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Vision syndrome due to the use of computers and psychological impact on teachers at a university in the province of Cañete

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ABSTRACT

Digital education has had consequences on the visual health of teachers and students during the pandemic generating a negative psychological impact, since being so long on the computer generates visual expenditure and therefore the person could present long-term visual problems, so the objective of the research is to determine the syndrome of vision by the use of computers and psychological impact in teachers of a University of the province of Cañete. It is a quantitative, descriptive, correlational, and cross-sectional study, with a total population of 98 teachers providing them with a digital survey with sociodemographic aspects, the Computer Vision Syndrome Questionnaire and the depression, anxiety, and stress scale. In their results, it was observed that 64% (n=57) of teachers have a low level of vision syndrome and a high level of psychological impact. To conclude, it is necessary to take into account the advice to teachers and students on prevention measures on the complications of being on the computer and their consequences.

1. Introduction

Given the situation generated by the coronavirus (COVID-19) pandemic around the world, people have been concerned about the great effects that COVID-19 may generate in the long term, because it constitutes a health risk, producing a negative psychological impact that affects the entire population in general (Al-Okaily et al., 2020).

While it is true that COVID-19 not only generated consequences on mental and physical health but also affected the educational system which was very compromised, researchers have maintained that face-to-face classes could not yet be forced to take place because COVID-19 is still latent (Bhattacharya et al., 2020; Saha et al., 2021), however, the educational system was forced to look for options that allow students to continue with their education in the face of the complicated situation in which they live (Sitaula et al., 2020).

Likewise, the houses of the study had to be closed in each country, due to the spread of COVID-19 generating a negative psychological impact since the houses of studies did not have how to carry out their activities, therefore, it was decided to carry out distance education through digital platforms in which it was allowed to carry out classes in a different way until the pandemic is diminished (Humayun, 2020; Maheshgaori et al., 2018).

Today, education at the national and international levels has advanced considerably, so the support of the educational system in the houses of study for the development of digital platforms has been of great support to students to continue with their education that was stagnant by the pandemic (Abudawood et al., 2020; Altalhi et al., 2020).

Although online classes have been foreseen as a risk to sitting at the computer for so long, generating complications in the ophthalmic system, such as eye diseases, insomnia, and even postural problems (Al Tawil et al., 2020; Maharani et al., 2020), although not only teachers but also students are affected by being several hours in their virtual classes, therefore, they present symptoms of depression, anxiety, and stress as a result of the pandemic and even virtual classes (Gammoh, 2021).

In such a way that eye health will fulfill an important function during the pandemic, since, during education in a virtual way, healthy habits that allow maintaining good vision must be taken into account and since being so long on the computer as a consequence generate the loss of vision completely if it is not prevented (Boadi-Kusi et al., 2020; Kumar, 2020).

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In a study carried out in Spain (Cantó-Sancho et al., 2021), with a population of 244 participants, its results showed that 76.6% of the students presented the ophthalmic syndrome by the computer and that the symptoms that mostly occurred were headache and pruritus. Concluding that wearing glasses daily and using the computer for a long time was associated with a higher prevalence of computer ophthalmic syndrome.

In a study conducted in Saudi Arabia (Alamro et al., 2020), with a population of 275 participants, it was found in its results that 69.8% were positive for computer ophthalmic syndrome and that the most intense symptom reported was headache (70%); and the least frequent was a double vision (30%). Concluding that the use of daily electronic methods causes a higher incidence of presenting ophthalmic syndrome by computer.

In a study conducted in Pakistan, with a population of 240 participants, it is observed in its results that 70.8% experience pain and tiredness in the eyes followed by tearing, 40.8% blurred vision, and 42.9% eyelid spasms. Concluding that most have been using the ordered for more than 5 years and that by the pandemic have been used regularly so the consequences are aggravated more as the computer is used more.

Therefore, the objective of the study is to determine the vision syndrome due to the use of computers and the psychological impact on teachers at a University in the province of Cañete.

2. Methodology

In this section, a flowchart has been developed (Fig. 1) based on the variable of the computer vision syndrome, its causes, signs, and symptoms; and finally its treatment, in addition to the type and design of the study, population, and to finalize the technique and instrument of data collection of the present study.

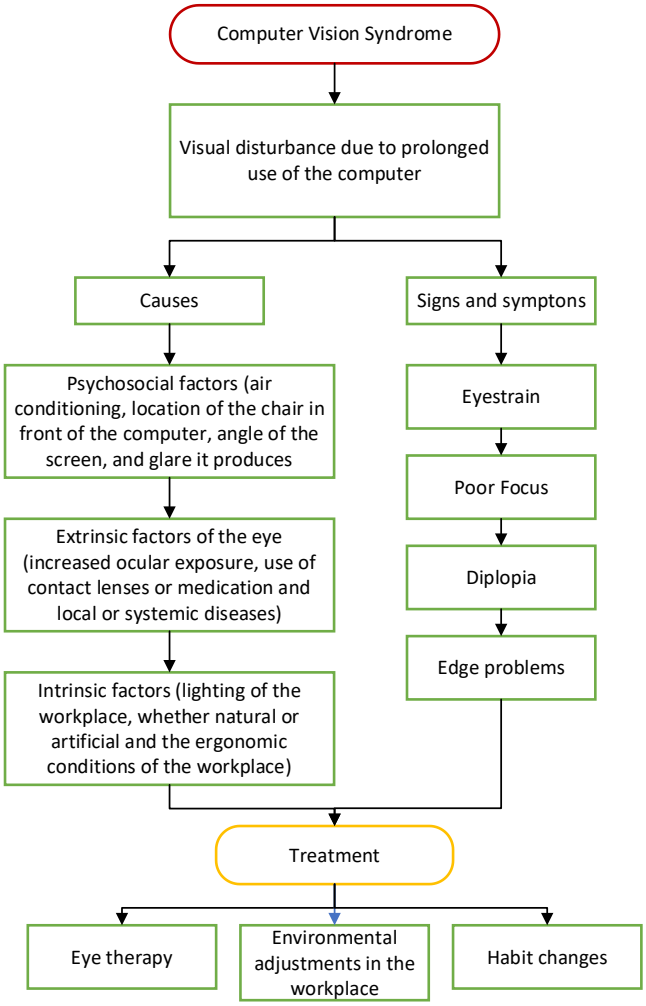

Fig. 1: Flowchart on computer vision syndrome

The flowchart in Fig. 1 describes the syndrome of computer vision, given in 4 partitions:

- First of all, it is described the syndrome that is defined as the visual alteration of the person to be so long in the computer.
- Secondly, it describes the causes that can generate the syndrome of computer vision, this refers to the factors that affect vision in people if computers are used too long:

- Psychosocial Factors: These factors compromise the eye health of the person, indirectly such as air

conditioning at work that produces dry eyes, and the location of the chair in front of the computer since this allows to have a good visualization of what is working.

- Extrinsic and Intrinsic Factors: These factors compromise the eye health of the person directly, where the exposure of their eyes is compromised being considerably affected.

❖ Thirdly, it describes the signs and symptoms generated by computer vision syndrome if it is not prevented in time:

- Eye strain: This occurs when the person's eyes are tired and this is a frequent disease due to the continuous use of the computer.
- Poor focus: This is because the person's eyes cannot focus clearly and this can be foreseen as a vision problem.
- Diplopia: This is because the perception of a person's eyes perceives an object differently, in which one thinks that there are two objects.
- Vergential problems: This is due to the fact that the person presents a binocular dysfunction since the visual coordination of the eyes tends to deviate outward when reading or is close when performing other activities.

❖ Fourth, the treatment to be performed for computer vision syndrome is described:

- For visual fatigue: You must perform 20 minutes of Rest where your gaze is focused on a single object of 3 meters away as a minimum or you can use the method 20-10-20, which indicates that every 20 minutes for 10 seconds an object is due to be every 20 meters away.
- For poor focus: It is suggested to use the Hart primers that allow visual accommodation (visualize a calendar at 3 meters away and another at 50cm) and as an option, you can use the concentric circles.
- For diplopia: It is suggested that visual training should be performed with the brock cord since it is one of the simple tools that allows awareness and control of ocular motility.
- For vergential problems: Training should be done with alphabetic pencils, a brock cord, or with prismatic therapy, the latter allows symptomatic relief of the person's eyes.

The present research study has quantitative properties, descriptive, experimental, and cross-sectional methodology (Fernández and Baptista, 2015). In the study, the total population is made up of 98 teachers who are working at a university in the Province of Cañete. The following criteria are considered as inclusion criteria:

- Teachers who work at the University for a time greater than 2 years.
- Teachers who voluntarily agree to participate in the study.
- Teachers who teach classes virtually.

2.1. Technique and instrument

A digital survey was carried out through the Google form, in which the Computer Vision Syndrome Questionnaire (CVS-Q) instrument was written. The data collection is carried out as follows: first, the socio-graphic aspects about whether you are a lens user, how long it is present on the computer, and if you have any visual disease; followed by the CVS-Q that 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 dimension frequency of the symptoms is assessed with a Likert scale with 3 response options where: "1=Never," "2=Occasionally," and "3=Often"; in the dimension intensity of the symptoms is assessed with a Likert scale with 2 response options where: "1=Moderate" and "2=Severe"; the higher the score, the presence of some complication with respect to their eye health due to being on the computer (del Mar Seguí et al., 2015).

The validity of the instrument to determine the ophthalmic syndrome was performed with the Kaiser-Mayer-Olkin sample adequacy measure obtained a coefficient of 0.889 (KMO>0.5), while the Bartlett sphericity test obtained significant results (X^2 approx.=1051.841; gl=120; p=0.000).

The reliability of the instrument was determined based on Cronbach's Alpha statistical test, which obtained for the total of the items (i=16) a coefficient of 0.9 23 (α>0.8).

The DASS-21 has 3 dimensions (depression, anxiety, and stress), each of the three DASS scales contains 14 elements, divided into subscales of 2 to 5 elements with similar content. It consists of 4 response alternatives, 0 "nothing at all," 1 "sometimes," 2 "much of the time" and 3 "most of the time" that serve to qualify the degree to which they have experienced each state during the past week (Tran et al., 2013; Lovibond and Lovibond, 1995).

The validity of the instrument to measure psychological impact was determined by the Kaiser-Mayer-Olkin sample adequacy measure obtained a coefficient of 0.924 (KMO>0.5), while the Bartlett sphericity test obtained significant results (X^2 approx.=1643.409; gl=210; p=0.000).

The reliability of the instrument was determined with Cronbach's Alpha statistical test, in which a coefficient of 0.960 (α>0.8) was obtained for the items (i=21).

2.2. Place and application of the instrument

The virtual survey has been carried out through the computers and cell phones of teachers to be able to carry out the surveys in a more effective way.

In the first place, the necessary coordination was made with each teacher so that he or she is present in the research study, in addition to his orientation

on the subject to be carried out. Finally, the surveys were carried out with a time of approximately 15 minutes, culminating in a satisfactory way since the teachers gave the accessibility to be able to carry out the study.

3. Results

In Fig. 2, we can see in the results of the teachers of a University in the province of Cañete that, 80 participating teachers representing 90.8% have a low level of vision syndrome and 9 of the participating teachers representing 9.2% have a medium level.

In Fig. 3, we can see that in its dimension frequency of symptoms, 46 participating teachers representing 46.9% have a low level of the ophthalmic syndrome, 39 participating teachers representing 39.8% have a medium level and 13 participating teachers representing 13.3% have a high level with respect to the ophthalmic syndrome; in the dimension intensity of symptoms, we can observe that 98 teachers representing 100% have a low level with respect to the ophthalmic syndrome.

In Fig. 4, we can see the results of the psychological impact on teachers, in which 7 of the participating teachers representing 7.1% have a low psychological impact, 31 of the teachers representing 31.6% average psychological impact, and 60 participating teachers representing 61.2% have a high psychological impact.

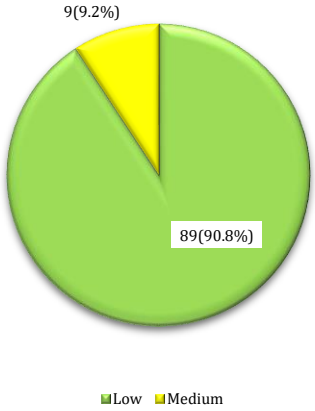

Fig. 2: Vision syndrome in teachers due to the use of computers at a university in the province of Cañete

In Fig. 5, it can be seen, in the stress dimension of the psychological impact that, 19 teachers representing 19.4% have a mild psychological impact, 10 teachers representing 10.2% a moderate psychological impact, 39 teachers representing 39.8% a severe psychological impact, and 30 teachers representing 30.6% extremely severe psychological impact. In their anxiety dimension, 10 teachers representing 10.2% have a moderate as well as severe psychological impact and 78 teachers representing 79.6% have an extremely severe psychological impact; and in the depression dimension, 4 teachers representing 4.1% have a mild psychological impact, 17 teachers representing 17.3% moderate psychological impact, 13 teachers representing 13.3% severe psychological impact and 64 teachers representing 65.3% extremely severe psychological impact.

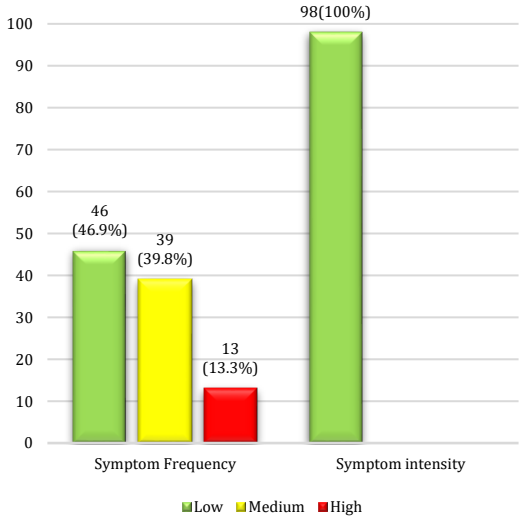

Fig. 3: Vision syndrome related to the use of the computer in relation to its dimensions in teachers of a University in the province of Cañete

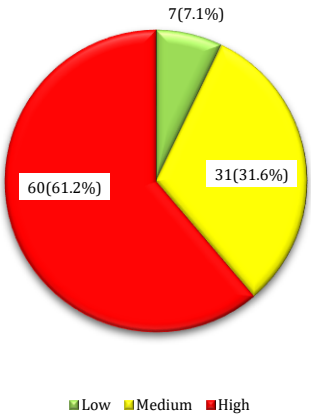

Fig. 4: Psychological impact on teachers of a university in the province of Cañete

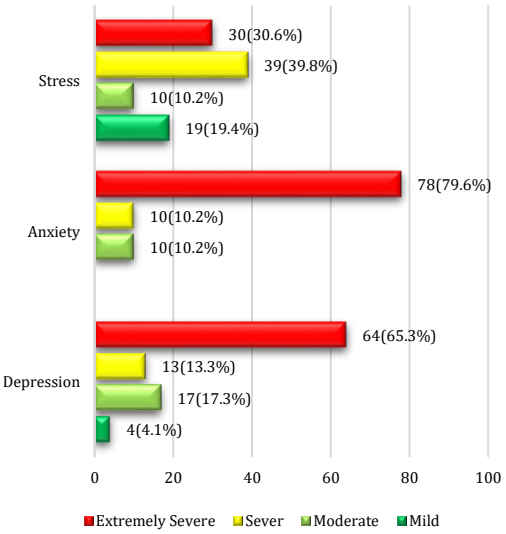

Fig. 5: Psychological Impact in relation to its dimensions in teachers of a University in the province of Cañete

In Table 1, we can see the relationship between the main variables of vision syndrome and psychological impact on teachers, which was determined with Pearson's chi-square test (X^2). The significance level of the test obtained a value of 0.06 ($p>0.05$) ($X^2=2.958$; d.f=12) was made, and in turn, the symmetric measurement of Pearson's R was made where its approximate value is 0.111 and the Spearman correlation where its approximate value is 0.83, by so much, an association hypothesis is not rejected, therefore, there is statistical data that proves the relationship between vision syndrome and psychological impact. We can interpret that, 57 teachers representing 64% have a low level of vision syndrome and a high level of psychological impact.

Table 1: Correlation between the variables computer vision syndrome and psychological impact on teachers of a university in the province of Cañete

			Psychological impact			Total
			Low	Middle	High	
Computer Vision Syndrome	Low	Recount	6	26	57	89
		% within Computer Vision Syndrome	6.7%	29.2%	64.0%	100.0%
	Middle	Recount	1	5	3	9
		% within Computer Vision Syndrome	11.1%	55.6%	33.3%	100.0%
Total		Recount	7	31	60	98
		% within Computer Vision Syndrome	7.1%	31.6%	61.2%	100.0%

Chi-square tests

	Value	**Mexico City**	**Asymptotic (bilateral) significance**
Pearson's Chi-square	3.271*	2	.195
Likelihood ratio	3.171	2	.205
Linear-by-linear association	2.545	1	.111
N of valid cases	98		

Symmetrical measurements

		Value	**Standard asymptotic error[a]**	**Approximate T[b]**	**Approximate significance**
Interval by interval	R from Pearson	-.162	.104	-1.608	.111[c]
Ordinal by ordinal	Spearman correlation	-.176	.102	-1.750	.083[c]
N of valid cases		98			

*: 2 boxes (33.3%) have expected a count of less than 5. The minimum expected count is .64; a: The null hypothesis is not presupposed; b: Use of the standard asymptotic error that presupposes the null hypothesis c: It is based on normal approximation

4. Discussions

The vision syndrome is a conditioning factor that, at present due to the COVID-19 pandemic, has become very common in different people, either for work or studies, but people do not know that with the passage of time, they have presented the symptoms of the syndrome and that this further complicates their well-being in their health, especially at the ocular level because of the negative psychological impact of the pandemic of the COVID-19.

The prevalence of vision syndrome has been low in the present study, this is because university teachers are well-being in their eye health, so it allows them to continue with virtual classes regularly, although over time you may have symptoms if you continue working remotely, it will depend if the necessary precautions are not carried out, such as adjusting the brightness of the computer, avoiding the reflections of the windows, performing eye exercises during the rest, taking the gaze away from the computer for at least 20 minutes and focusing on a point at a distance since it allows to relax the gaze and gives rest to the eyes to continue working. Al Tawil et al. (2020) argued that the problems at the ocular level are due to the fact that people stop the 12 hours exposed to the computer for work or studies and that this generates symptoms such as headache, dizziness, visual burning, and constant blinking.

While it is true to be so long on the computer, it brings serious consequences on the eye health of the person, since spending a lot of time on the computer, can generate defects in vision that may have been previously had that have not detected such as hypermetropia, slight myopia or slight astigmatism, therefore, when presenting a blurred vision, dry eyes, irritation, and eye tension, it is likely to present the vision syndrome. Gammoh (2021) claimed that being so long on the computer impairs vision in which both eyes are compromised and as a consequence, the person may lose sight if they do not stay on the computer for a certain time.

In the same way, when presenting an eye disease, makes the predisposition to vision syndrome more serious, since when presenting an eye disease, you have the risk that your disease becomes complicated. Maharani et al. (2020) showed that people with eye diseases should be exposed to technological devices less at the time of people who do not have eye diseases because exposure to technological devices especially screens make their disease more complicated and may loss of vision if prevention is not done in a correct way.

5. Conclusions

It should be taken into account the advice to teachers and students on prevention measures on the complications of being on the computer and their consequences. Strategies should be sought to help

prevent the symptoms generated by being on the computer for so long and thus be able to maintain eye health in an adequate way. Young people should be made aware of why electronic devices should be used little and the risks that can generate in their vision.

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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