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Research Article

A Descriptive Study about Students' Symptoms and Knowledge of Computer Vision Syndrome

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ABSTRACT

Background: The COVID-19 pandemic has had many impacts on various aspects of life, one of which is education. The education system has changed from face-to-face to online learning methods. Online learning methods make students more likely to use digital media such as computers, laptops, or mobile phones. The use of digital media that occurs continuously and without being balanced with sufficient knowledge can undoubtedly impact eye health. One form of eye health problem that often arises due to digital media is computer vision syndrome (CVS). **Purposes**: Therefore, it is necessary to conduct a study to see the description of students' symptoms and knowledge about CVS. **Methods**: The method used in this research is cross-sectional descriptive. **Result**: The mean age of the respondents was 19.91±1.648 years. A total of 82.7% of respondents complained of having more than five symptoms, and as many as 98.5% had CVS, 90.6% of respondents complained about fatigue eyes, followed by 80.5% complained about eye strain symptoms, and 80.5% complained about headaches, 42.9% of respondents have a lack of knowledge about CVS, and only 15.4% of respondents have a good level of knowledge about CVS. **Conclusion**: It can be concluded that respondents' lack of knowledge about CVS may cause the high prevalence of CVS in students, so they don't know how to prevent it. Therefore, it is necessary to increase student's knowledge about this disorder so that it doesn't cause negative impacts on eye health in the future.

Keywords: computer vision syndrome, knowledge, students

INTRODUCTION

The world was shocked by the outbreak of the coronavirus disease (COVID-19) pandemic, which case was first reported in Wuhan, China on December 31st, 2019 (1). The COVID-19 pandemic has had many impacts on various aspects of life. One aspect that is affected by the pandemic is the world of education. The education system has changed from face-to-face to distance learning methods with an online lecture system (2).

This distance learning method makes students more likely to use digital media such as computers, laptops, or mobile phones as a medium to participate in the educational process. The use of digital media that occurs continuously and without being balanced with sufficient knowledge can certainly have an impact on eye health.

One form of eye health problem that often arises due to the use of digital media is Computer Vision Syndrome (2).

Computer Vision Syndrome (CVS) is a collection of symptoms that occur in the eyes and neck due to excessive use of digital media. A group of symptoms that often appear can include blurry eyes/ vision, headache, neck pain, eye irritation, double vision, red eyes, and dry eyes (3–6). A survey reported that around 60 million people are known to have CVS in the world, and it is estimated that this number is growing every year. The prevalence of CVS among digital media users such as office workers and students who use computers ranges from 64% to 90% (7–9). The use of digital media for more than 3 hours/day can increase the risk of developing CVS symptoms (10,11).

According to the American Optometric Association, symptoms that may appear in CVS can be caused by staring at digital media screens continuously, inappropriate viewing distances, poor posture, poor lighting, uncorrected refractive disorders, and a combination of several factors (12). The long duration of daily digital media screen usage also plays a role as a cause of CVS symptoms (12–14). Agarwal et al. showed that CVS symptoms were more likely reported by respondents who used computers >6 hours/day than those who used ≤6 hours/day (13). Logaraj et al. reported that computer use 4-6 hours/day is more at risk of developing CVS symptoms such as dry eyes, burning sensation, and redness compared to computer use <4 hours/day (14).

CVS symptoms that appear can be temporary and usually disappear when computers or other digital media are discontinued. However, in some cases, a decrease in visual function was found even though the use of computers/other digital media had been discontinued (12). This can be due to a lack of general knowledge on preventing this CVS incident, especially among digital media users. Several studies have been conducted, and most of them found that knowledge about CVS is still very lacking.

Students are one of the groups at risk for CVS. This is related to the distance learning method system, making students more likely to use digital media to attend lectures and do the assigned tasks. Research on students' knowledge of CVS, especially in Indonesia, is still very limited. In fact, without good knowledge about CVS, the future of students' eye health will be threatened. Without good knowledge about CVS, they will find it difficult to prevent this disease, which will worsen symptoms in computer/other digital media users in the future. That's why this research is done to see a picture of students' knowledge about CVS so that prevention can be taken

METHODS

The design used in this study was cross-sectional descriptive. Digital questionnaires were used as the instrument for the data collection, which was conducted from October to December 2020. The questionnaires contain demographic data, respondents' symptoms data while using digital media during lectures, and knowledge about CVS, which consists of 9 questions (definition, symptoms, and prevention). The respondents' knowledge level is grouped by category from Arikunto quoted by Wawan et al. (15), namely if the value <56 is grouped as lack of knowledge; 56-75.99 as sufficient knowledge; and ≥76 is good knowledge. The sampling technique used in this research is purposive, non-

random sampling. Respondents who can participate are currently carrying out lectures at the diploma or undergraduate program level and have active lecture status.

RESULT

The total number of respondents who participated in this study was 266 respondents. The demographic characteristics of the respondents can be seen in Table 1, which shows the mean age of the respondents is 19.91 years with an age range of 17-28 years. One hundred ninety-seven (74.1%) of respondents were female, while 194 (72.9%) respondents came from the medical faculty.

Table 1. Demographic characteristics of respondents

Variable	Proportion N = 266 (%)	Mean (SD)	Median (min – max)
Age		19.91 (1.648)	20 (17 – 28)
Gender			
Male	69 (25.9)		
Female	197 (74.1)		
Faculty			
Not Faculty of Medicine	72 (27.1)		
Faculty of Medicine	194 (72.9)		

This study found that 168 (63.2%) respondents used glasses, and 50 (18.8%) respondents used contact lenses. Respondents were asked about various symptoms related to CVS were asked to respondents, and 11 symptoms were reported, including eye strain, sore eyes, dry eyes, itchy eyes, fatigue eyes, double vision, blurry eyes, headaches, neck pain, and pain in the neck-shoulder, and back pain. On average, there are eight symptoms complained of by respondents. A total of 220 (82.7%) respondents had more than five symptoms or complaints, and only 4 (1.5%) respondents had no signs or complaints at all. This study also showed that 262 (98.5%) respondents experienced CVS.

Table 2. Eye health characteristics of respondents

Variable	Proportion N = 266 (%)	Mean (SD)	Median (min – max)
Using Glasses			
Yes	168 (63.2)		
No	98 (36.9)		
Using Contact Lenses			
Yes	50 (18.8)		
No	216 (81.2)		
Number of CVS symptoms		7.8 (2.47)	8 (0 – 11)
No symptoms	4 (1.5)		
1 symptom	3 (1.1)		
2 symptoms	2 (0.8)		
3 symptoms	4 (1.5)		
4 symptoms	8 (3.0)		
5 symptoms	25 (9.4)		
> 5 symptoms	220 (82.7)		
Computer Vision Syndrome			
Yes	262 (98.5)		
No	4 (1.5)		

Of the various symptoms of CVS, fatigue eyes were the most reported symptom by respondents while attending the lecture, 241 (90.6%). The least reported symptom was a double vision, with a total of 88 (33.1%) respondents. Complete data can be seen in Table 3.

Table 3. Characteristics of the types of complaints in respondents

Type of complaints	Yes (%)	No (%)
Strain Eyes	214 (80.5)	52 (19.5)
Sore Eyes	202 (75.9)	64 (24.1)
Dry Eyes	204 (76.7)	62 (23.3)
Itchy Eyes	160 (60.2)	106 (39.8)
Fatigue Eyes	241 (90.6)	25 (9.4)
Double vision	88 (33.1)	178 (66.9)
Blurred Eyes	144 (54.1)	122 (45.9)
Headache	214 (80.5)	52 (19.5)
Neck pain	205 (77.1)	61 (22.9)
Shoulder pain	194 (72.9)	72 (27.1)
Low back pain	210 (78.9)	56 (21.1)

Table 4. The level of knowledge of respondents about computer vision syndrome

Knowledge level	Proportion N = 266 (%)	Mean (SD)	Median (min – max)
Lack	114 (42.9)	61.61	66.67
Sufficient	111 (41.7)	(12.09)	(22.22-88.89)
Good	41 (15.4)		

A total of 9 questions about CVS were asked to measure the level of knowledge of the respondents. The analysis results show that the mean value of knowledge from 266 respondents is 61.61, with the highest score of 88.89 and the lowest score of 22.22

The respondents' knowledge was then grouped into three categories: lack of knowledge, sufficient and good knowledge. The analysis results showed that 114 (42.9%) respondents had a lack of knowledge about CVS, while only 41 (15.4%) respondents had good knowledge about computer vision syndrome. The complete results can be seen in Table 4.

DISCUSSION

The prevalence of CVS in various studies varies from 67% to 95% (8,16–18). Ranasinghe's study of 2210 office workers in Sri Lanka showed that the prevalence of CVS for 1 year was 67.4% (8). When viewed from the severity of symptoms, as many as 57.9% of respondents suffered from severe CVS, where they experienced >7 symptoms and had at least one sign that did not go away after resting. As many as 42.1% of respondents suffered from mild to moderate CVS, where they had seven symptoms that could still disappear after resting (8).

Akinbinu et al' s study of 100 office workers in Abuja, Nigeria, found that 74% of respondents reported suffering from at least 1 CVS symptom (16). Research

conducted by Reddy et al. on 795 students from various universities in Malaysia with an age range between 18-25 years found that 89.9% of respondents complained about 1 CVS symptom while 10.1% respondents had no symptoms at all (17). From 10.1% of respondents who were asymptomatic, 41 (5.2%) were male, while 39 (4.9%) were female. Abudawood et al's study on 587 medical students in Saudi Arabia, showed that 95% of respondents experienced at least 1 CVS symptom during computer use (18). Female respondents reported a higher incidence of CVS than males.

A higher CVS prevalence found in this study was 98.5%. This means that only 1.5% of respondents reported having no complaints at all during computer use. This difference in prevalence may be due to different data collection situations. In this study, data were obtained during the pandemic, so that the intensity of computer use by students to attend lectures increased.

According to Loh et al, various factors can increase the incidence of CVS, namely individual and environmental factors (19). Individual factors include improper sitting position, poor visibility, or previous eye disorders, while environmental factors may include excessively contrasting or bright computer screens, poor lighting, uncomfortable seating, and so on. These various factors may have contributed to the high incidence of CVS in this study.

A total of 90.6% of respondents in this study complained about fatigue eyes, followed by complaints of eye strain and headaches with the same number of 214 (80.5%) respondents. This result is slightly different from the study by Reddy et al. which showed that the most common CVS

symptom reported by students was headache (19.7%), followed by eye strain (16.4%) and dry eye (13.6%) (17). Nevertheless, headaches and eye strain remained as the most reported complaints by respondents in both studies.

Headache was also the most common symptom of mild CVS reported in Al Tawil et al's study of 713 medical and business students in Saudi Arabia (20). Al Tawil et al. classified CVS symptoms into mild, moderate, and severe. CVS is classified as mild if symptoms persist for a few minutes to hours, moderate CVS if symptoms persist for several hours and only disappear when resting, and severe CVS if symptoms persist and require medical treatment. The most common severe CVS symptoms reported by students were neck and shoulder pain.

Research by Iqbal et al (21) and Kharel et al. (22) obtained different results related to the most CVS symptoms reported by the participants. Iqbal et al. studied 100 medical students in Egypt and said that most respondents complained about blurred vision with a percentage of 31%, followed by dry eyes as much as 28%, and headaches as much as 26%. Kharel et al.'s research on 236 medical students in Nepal also found that blurred vision was the most complained of, namely 37.7% of respondents (22). Two other complaints that were mostly reported by respondents in the study were dry eyes (21.1%) and watery eyes (14.8%) (7,18,21).

This study found that the majority of respondents had a lack of knowledge about computer vision syndrome, as many as 114 (42.9%) respondents. Samhitha et al and Mersha et al reported similar results (23,24). Samhitha et al's research on nursing students in India showed that 40% of respondents got a D score with <50%

correct answers, which can be assumed they have a lack of knowledge about CVS. The mean score of CVS knowledge in the Samhitha study was 13.46 (23).

Mersha et al conducted a study of 234 bank workers in Ethiopia and classified CVS knowledge into 3 categories, namely good, moderate, and poor (24). Good knowledge if the respondent answers 80-100% of the questions correctly, while poor knowledge if the correct answer is <60%. Respondents with good and moderate CVS knowledge levels were 26.9% and 32.5%, respectively. Respondents who have poor CVS knowledge are 40.6%, almost the same as the percentage of respondents reported by Samhitha et al and this study.

Different research results were obtained in Amirul et al.'s study of 172 academic staff of the medicine and health sciences faculty in Malaysia. Amirul et al reported that the percentage of respondents who had good CVS knowledge was higher than the percentage of respondents with poor CVS knowledge (51.2% vs. 48.8%) (25). The high level of good CVS knowledge in Amirul et al's research is closely related to the level of education, which is dominated by highly educated respondents with Bachelor to PhD degrees (p-value <0.001) (25).

Lack of CVS knowledge in some of the respondents in this study may be due to data collection on a student population that is still active in the learning process. They are, of course, still ignorant about health, especially CVS. This can be the reason to educate students to understand CVS and take preventive actions as early as possible.

This research certainly has limitations, where there is an inequality in the number of respondents from the medical faculty with respondents outside the medical faculty, which may result in

information bias. In addition, there was no further study of the relationship between the symptoms experienced and the level of knowledge about CVS or the efforts made to prevent CVS. However, this is a pilot study for further research.

CONCLUSION

It can be concluded from this study that the respondents' knowledge is still low, which may result in high CVS among students, so they don't know how to prevent computer vision syndrome. Therefore, it is necessary to increase student's knowledge about this disorder so that it doesn't yield any negative impact on eye health in the future.

CONFLICT OF INTEREST

None.

REFERENCES

1. World Health Organization. Coronavirus (COVID-19) events as they happen [Internet]. 2020 [cited 2020 May 19]. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen

2. Arifudin O. Pandemi corona dan dampak terhadap dunia pendidikan. Pasundan Ekspres [Internet]. 2020 Mar17. Available from:https://www.pasundanekspres.co/opini/pandemi-corona-dan-dampak-terhadap-dunia-pendidikan/

3. Gowrisankaran S, Sheedy JE. Computer vision syndrome: A review. Work. 2015 Aug;52(2):303–14.Available from: http://www.ncbi.nlm.nih.gov/pubmed/26519133

4. Mowatt L, Gordon C, Santosh ABR, Jones T. Computer vision syndrome and ergonomic practices among undergraduate university students. Int J Clin Pract. 2018 Jan 1;72(1). Available from: https://onlinelibrary.wiley.com/doi/10.1111/ijcp.13035

5. Direktorat P2PTM Kemenkes RI. Apa itu CVS (Computer Vision Syndrome)? [Internet]. 2019 [cited 2020 Jul 7]. Available from: http://www.p2ptm.kemkes.go.id/infographic-p2ptm/stress/page/6/apa-itu-cvs-computer-vision-syndrome

6. Cheema MN, Anwar S, Naz MA, Saleem A, Nawaz MM. Prevalence of computer vision syndrome and its risk factors among medical students of Islam Medical & Dental College, Sialkot. Pakistan J Med Heal Sci. 2019;13(3):553–5. Available from: https://www.pjmhsonline.com/2019/july_sep/pdf/553.pdf

7. Kumar BS. A study to evaluate the knowledge regarding computer vision syndrome among medical students. Biomed Pharmacol J. 2020;13(1):469–73. Available from: https://biomedpharmajournal.org/vol13no1/a-study-to-evaluate-the-knowledge-regarding-computer-vision-syndrome-among-medical-students/

8. Ranasinghe P, Wathurapatha WS, Perera YS, Lamabadusuriya DA, Kulatunga S, Jayawardana N, et al. Computer vision syndrome among computer office workers in a developing country: An evaluation of prevalence and risk factors. BMC Res Notes. 2016 Dec 9;9(1):150. Available from: http://www.biomedcentral.com/1756-0500/9/150

9. Altalhi AA, Khayyat W, Khojah O, Alsalmi M, Almarzouki H. Computer vision syndrome among health sciences students in Saudi Arabia: Prevalence and Risk Factors. Cureus. 2020 Feb 20; 12(2):e7060.

Available from: https://www.cureus.com/articles/26595-computer-vision-syndrome-among-health-science s-students-in-saudi-arabia-prevalence-and-risk-factors

10. Sen A, Richardson S. A study of computer-related upper limb discom fort and computer vision syndrome. J Hum Ergol (Tokyo). 2007;36 (2):45–50. Available from: https://pubmed.ncbi.nlm.nih.gov/18572794/

11. Ranganatha SC, Jailkhani S. Pre-valence and associated risk factor of computer vision syndrome among the computer science students of an Engineering College of Bengaluru-A cross-sectional study. Galore Int J Heal Sci Res. 2019;4(3):10–5. Available from: https://www.gijhsr.com/GIJHSR_Vol.4_Issue.3_July2019/3.pdf

12. American Optometric Assosiation. Computer Vision Syndrome. [cited 2020 Jul 6]; Available from: https://www.aoa.org/patients-and-public/caring-for-your-vision/protecting-your-vision/computer-visi on-syndrome

13. Agarwal S, Goel D, Sharma A. Evaluation of the factors which contribute to the ocular complaints in computer users. J Clin Diagn Res. 2013 Feb 1;7(2):331–5. Available from: https://pubmed.ncbi.nlm.nih.gov/23543722/

14. Logaraj M, Madhupriya V, Hegde SK. Computer vision syndrome and associated factors among medical and engineering students in Chennai. Ann Med Health Sci Res. 2014; 4(2):179-85. Available from: https://pubmed.ncbi.nlm.nih.gov/2476123/

15. Wawan A, Dewi M. Teori & pengukuran pengetahuan, sikap, dan perilaku manusia. Yogyakarta: Nuha Medika; 2014.

16. Akinbinu TR, Mashalla YJ. Knowledge of computer vision syndrome among computer users in the workplace in Abuja, Nigeria. J Physiol Pathophysiol. 2013 Sep;4(4):58–63. Available from: https://academicjournals.org/journal/JPAP/article-full-text-pdf/497CABC15892

17. Reddy SC, Low C, Lim Y, Low L, Mardina F, Nursaleha M. Computer vision syndrome: A study of knowledge and practices in university students. Nepal J Ophthalmol. 2013 Sep 23;5(2):161–8. Available from: https://www.nepjol.info/index.php/NEPJOPH/article/view/8707

18. Abudawood GA, Ashi HM, Almarzouki NK. Computer vision syndrome among undergraduate medical students in King Abdulaziz University, Jeddah, Saudi Arabia. J Ophthalmol. 2020 Apr 1;2020:1–7. Available from: https://www.hindawi.com/journals/joph/2020/2789376/

19. Loh KY, Reddy SC. Understanding and preventing computer vision syndrome. Malaysian Fam Phy sician. 2008 Dec 31;3(3):128-30. Available from: https://www.e-mfp.org/old/2008v3n3/computer_vision_syndrome.html

20. Al Tawil L, Aldokhayel S, Zeitouni L, Qadoumi T, Hussein S, Ahamed SS. Prevalence of self-reported computer vision syndrome symp-toms and its associated factors among university students. Eur J Ophthalmol. 2020 Jan 1;30(1):189–95. Available from: https://journals.

sagepub.com/doi/pdf/10.1177/1120672118815110

21. Iqbal M, El-Massry A, Elagouz M, Elzembely H. Computer vision syndrome survey among the medical students in Sohag University Hospital, Egypt. Ophthalmol Res An Int J. 2018;8(1):1–8. Available from: https://www.journalor.com/index.php/OR/article/view/22479

22. Kharel Sitaula R, Khatri A. Knowledge, attitudes and practice of Computer Vision Syndrome among medical students and its impact on ocular morbidity. J Nepal Health Res Counc. 2018 Nov;16(3):291–6. Available from: https://www.nepjol.info/index.php/JNHRC/article/view/21426

23. Samhitha J, Jilta J, Ramya K, Indira S. Knowledge on computer vision syndrome. Int J Appl Res [Internet]. 2017;3(12):434–7. Available from: https://www.allresearchjournal.com/archives/2017/vol3issue12/PartG/3-12-71-645.pdf

24. Mersha GA, Hussen MS, Belete GT, Tegene MT. Knowledge about computer vision syndrome among bank workers in Gondar City, Northwest Ethiopia. Occup Ther Int. 2020 Apr;2020:1–5. Available from: https://www.hindawi.com/journals/oti/2020/2561703/

25. Amirul FZ, Aqilah R, Lee ML, Azuhairi AA, Isa MM. Knowledge, attitude and practice of computer vision syndrome among staffs that use video display terminal in a faculty of a Malaysian Public University. Int J Public Heal Clin Sci. 2015;2(1):137–47. Available from: http://publichealthmy.org/ejournal/ojs2/index.php/ijphcs/article/view/162