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8. ASSOCIATION BETWEEN COMPUTER VISION SYNDROME AND ATTENTION IN WORKERS

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ASSOCIATION BETWEEN COMPUTER VISION SYNDROME AND ATTENTION IN WORKERS

Sansan R Arjuna[1], Titiek Ernawati[2], Edith M Djaputra[3]

ABSTRACT

Introduction: Nowadays, digital devices are rapidly growing and demanding everybody to use a computer or laptop for daily life, such as working, studying, playing games. Generally, the eye problem goes parallel with the growth of technology. Eyes problem related to the use of the computer, such as dry eyes, tired eyes, blurred eyes, and it is called Computer Vision Syndrome (CVS). Attention is a process that restricts much information that needs to be received and has a vital role in maintaining cognitive function. Attention is affected by the sensory stimulus, especially from the eyes. That is why CVS might influence attention. If the attention becomes distracted, it will affect studying or working performance.

Aim: To analyze the association between CVS and attention in Workers.

Methods: Cross-sectional is used in this research, and the sampling method was consecutive sampling. Computer Vision Syndrome Questionnaire and Trail Making Test part B is the instrument for this research

Result: Respondents with CVS was 59,2%, disturbed attention was 63,2%, both CVS and disturbed attention was 40,8%. Chi-square trial showed p=0,110, which means that there is no association between CVS and attention.

Conclusion: There is no association between CVS and attention in Workers.

Keyword: Computer Vision Syndrome, *Digital Eye Strain*, Attention, Disturbed Attention

[1] Student of Faculty of Medicine Widya Mandala Catholic University Surabaya, Kalisari Selatan 1 Surabaya
   Email : sansanra33@gmail.com@gmail.com
[2] Department of Opthalmology Faculty of Medicine Widya Mandala Catholic University Surabaya, Kalisari Selatan 1 Surabaya
[3] Department of Neurology Faculty of Medicine Widya Mandala Catholic University, Kalisari Selatan 1 Surabaya

INTRODUCTION

Digital development requires us to use computers as a medium for working and studying; this may cause eyes problem. Eyes problems within computer users called Occupational Disease[1], which is eye fatigue, sore eyes, dry eyes, blurred eyes, neck stiffness that is called Computer Vision Syndrome (CVS)[2].

According to Nilsen (2005)[3], 90% of 70 million workers in America suffered CVS. Unconsciously, in the 21st century, 70% of computer users suspect to suffer from CVS[4]. Research by Melati Aisyah Permana (2014)[5] found 30 out of 36 computer rental workers in Semarang suffered from CVS.

Attention is a process limiting the amount of information that coming in, which will be stored in short term memory. Attention plays an essential role in maintaining cognitive functions (to perceive, understand, memorize, change, and create the information)[6]. Attention consists of alerting, orienting, and executive control networks. Alerting network is the ability to receive a stimulus, orienting network responsible for focusing on one stimulus, and executive control network made to plan that information that comes in.[7]

The most common symptom in CVS is eye fatigue, which is called asthenopia. Asthenopia usually causes by reading, watching, staring at the computer screen too long. Cardona (2011)[8] said that dry eyes are affected attention, and according to La Berge and Samuel (1974)[9] that the ability to read is affected by attention. The conclusion of the research was done by Mangen (2013)[10] is people tend to have less concentration reading a passage from a computer than on paper-based[11].

That is why a decrease in attention makes the difficulty of maintaining a stimulus that comes in, school, or work performance might cause distraction. Based on this background, we are interested in researching the association between computer vision syndrome in workers.

METHODS

Cross-sectional is used in this research; the sampling method was consecutive sampling and will be confirmed with chi-square. This study was done in Tuesday-Wednesday/July 16th-17th 2019 at
8.00-23.00 in one of the newspaper company, with 125 respondents.

The instrument of the CVS is Computer Vision Syndrome Questionnaire (CVSQ), and attention is the Trail Making Test part B (TMTB).

The CVSQ has 16 symptoms, which is burning eyes, itching eyes, feeling of a foreign body, tearing, excessive blinking, eye redness, eye pain, heavy eyelid, dryness, blurred vision, double vision, difficulty focusing for near vision, increased sensitivity to light, colored halos around the object, feeling that sight is worsening, and headache. Someone diagnosed by CVS if the score of CVSQ is more than 6. CVSQ is validated (ICC 0.802; 95% CI 0,673-0,883).

Trail Making Test (TMT) is an attention assessment with 73% of sensitivity and 68& specificity. TMT is used for evaluating brain damage, attention, visual seeking, fine motor speed, and also cognitive function(11). TMT is consist of TMT part A (TMTA) and TMT part B (TMTB). TMTB is used in this research.

The data was taken two times, before and after work. Before working was informed consent paper, CVSQ, and pre-test TMTB and after working was post-test TMTB. Distracted attention is called when the post-test TMTB was worst than in pre-test TMTB. Inclusion criteria were working in front of the computer more than four hours per day and willing to be a respondent and exclusion criteria were doing TMTB more than 300 seconds, brain or eye trauma history, having eyes disease on the past 14 days, eye surgery history, contact lens users, mental disorder history, taking medical history.

RESULT

Table 1 Respondents complaint based on CVSQ

Complaint	Presentation
Burning eyes	33,6%
Itching eyes	48,8%
Feeling of a foreign body	21,6%
Tearing	51,2%
Excessive blinking	25,6%
Eye redness	39,2%
Eye pain	33,6%
Heavy eyelids	44%
Dryness	32,8%
Blurred vision	50,4%
Double vision	36,8%
Difficulty focusing for near vision	22,4%
Increased sensitivity to light	49,6%
Colored halos around object	18,4%
Feeling that sight is worsening	26,4%
Headache	53,6%

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Table 2. Analysis association CVS and attention

Variable	Attention				Total		P (asy. Sig)
	Distracted		Undistracted				
	n	%	n	%	n	%	
CVS +	51	40,80	23	18,40	74	59,20	
CVS -	28	22,40	23	18,40	51	40,80	0,110
Total	79	63,20	46	36,80	125	100,00	

The odds ratio showed 1,8 times, which was confirmed using a chi-square trial showed p=0,110, which meant that there was no association between CVS and attention (Table 2).

DISCUSSION

In this study, there were found 59,2% was diagnosed with CVS. The most complaints based on CVSQ were headache, blurred vision, increased sensitivity of the light, and itching eyes, and it was corresponding with American Optometric Association (AOA) that the most complaint was eyes fatigue, headache, blurred vision, dry vision, and sore in the neck and shoulder[12]. Based on Ranasinghe (2016)[13], in Sri Lanka, workers who work in front of the computer started having a headache, dry eyes, and sore around the eyes.

There was some factor that affects on diagnosing of CVS such as environment (lighting, the temperature of the room, the height of the computer) which we cannot control. In this study, distracted attention was found 63,2%. According to Lodge and Harrison (2019)[14], attention in computer users depends on the work that they do. The risk factor that related to the attention that can't be controlled with researcher were mood, food, drink, and lifestyle (smoking, staying up late), and also the weakness of the instrument, such as test-retest error which means if someone ever does the test, they will feel familiar with it. It causes a false negative, for someone who feels the test was complicated and feel frustrated, it creates a false positive15.

CONCLUSION

Based on this study, there was 59,2% who had CVS, 63,2% who had distracted attention cause using computer ≥4 hours per day, 40,8% respondents who had CVS and distracted attention, and there is no association between CVS and attention

REFERENCES

1. Lurati AR. Computer Vision Syndrome: Implications for the Occupational Health Nurse [Internet]. Vol. 66, Workplace Health and Safety. California: California State University; 2018 [cited 2019 Mar 25]. p. 56–60. Available from: https://www.ncbi.nlm.nih.gov/pubmed/28975849

2. Loh K, Reddy SC. Understanding and Preventing Computer Vision Syndrome [Internet]. Vol. 3, Malaysian Family

Physician. 2008 [cited 2019 May 4]. p. 128–30. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4170366/

3. Akinbinu TR, Mashalla YJ. Medical Practice and Review Impact of Computer Technology on Health: Computer Vision Syndrome (CVS) [Internet]. Vol. 5, Medical Practice and Review. academic journals; 2014 [cited 2019 Mar 22]. p. 20–30. Available from: http://www.academicjournals.org/M PR

4. Dessie A, Adane F, Nega A, Wami SD, Chercos DH. Computer Vision Syndrome and Associated Factors among Computer Users in Debre Tabor Town, Northwest Ethiopia [Internet]. Vol. 2018, Journal of Environmental and Public Health. 2018 [cited 2019 Mar 24]. p. 1–8. Available from: https://www.researchgate.net/public ation/327684034_Computer_Vision _Syndrome_and_Associated_Factor s_among_Computer_Users_in_Debr e_Tabor_Town_Northwest_Ethiopia

5. Aisyah M, Koesyanto H, Mardiana. Unnes Journal of Public Health VISION SYNDROME (CVS) PADA PEKERJA RENTAL KOMPUTER DI [Internet]. Vol. 2. 2015 [cited 2019 Apr 10]. p. 48–57. Available from: https://journal.unnes.ac.id/sju/index. php/ujph/article/view/6372

6. Ling J, Catling J. PSIKOLOGI KOGNITIF. Rahmat R, Maulana A, editors. Jakarta: Penerbit Erlangga; 2012.

7. Spagna A, Martella D, Sebastiani M, Maccari L, Marotta A, Casagrande M. Efficiency and Interactions of Alerting, Orienting and Executive Networks: The Impact of Imperative Stimulus Type. Vol. 148, Acta Psychologica. Elsevier B.V.; 2014. p. 209–15.

8. Cardona G, García C, Serés C,Vilaseca M, Gispets J. Blink Rate, Blink Amplitude, and Tear Film Integrity during Dynamic Visual Display Terminal Tasks [Internet]. Vol. 36, Current Eye Research. 2011 [cited 2019 Apr 4]. p. 190–7. Available from:

https://www.ncbi.nlm.nih.gov/pubm ed/21275516

9. Laberge D, Samuel SJ. Cognitive Psychology 6. In Minnesota: University of Minnesota; 1974. p. 293–323.

10. Mangen A, Walgermo BR,Brønnick K. Reading linear texts on paper versus computer screen: Effects on reading comprehension [Internet]. Vol. 58, International Journal of Educational Research. Elsevier Ltd; 2013 [cited 2019 Oct 31]. p. 61–8. Available from: http://dx.doi.org/10.1016/j.ijer.2012.12. 002

11. Gaudino EA, Geisler MW, Squires NK. Construct Validity in the Trail Making Test: What Makes Part BHarder? Vol. 17, Journal of Clinical and Experimental Neuropsychology. 1995. p. 529–35.

12. Sheppard AL, Wolffsohn JS. Digital Eye Strain: Prevalence, Measurement and Amelioration [Internet]. Vol. 3, BMJ Open Ophthalmology. 2018 [cited 2019 Feb 14]. p. e000146. Available from: https://bmjophth.bmj.com/content/3/1/e 000146

13. 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. Vol. 9, BMC Research Notes. BioMed Central; 2016. p. 1–9.

14. Junco R, Cotten SR. No A 4 U: The relationship between multitasking and academic performance [Internet]. Vol. 59, Computers and Education. Elsevier Ltd; 2012 [cited 2019 Oct 31]. p. 505–14. Available from: http://dx.doi.org/10.1016/j.compedu.20 11.12.023.

15. OCTH 6260-Spring-Assessment Rating Form I. General Information Title of the test: Trail Making Test (TMT) [Internet]. 1944 [cited 2019 Feb 28].