nita kurniawati

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ASSOCIATION OF BETWEEN DURATION OF COMPUTER LIGHT EXPOSURE AND COMPUTER VISION SYNDROME INCIDENCES IN EMPLOYEES WHO ARE USING COMPUTERS

Kevin A Danuseputro[1)] Nita Kurniawati[2)] J Alphonsus Warsanto[3)]

ABSTRACT

Introduction: The use of computers is increasing these days. The use of computer cause serious eye complaints in the form of *Computer vision syndrome* (CVS) symptoms. CVS is a disease associated with symptoms of watery eyes, blurred vision, eye redness, eye strain, etc. Consequences of these symptoms can reduce working productivity or efficiency. Allegedly one of the factors that trigger CVS symptoms is the duration of computer's light exposure.
Purpose: To determined whether there is association between duration of computer light exposure with Computer Vision Syndrome (CVS)'s incidence in employees who use computers.
Method: This study was an observational analytic study with cross-sectional design. The sampling method used was purposive sampling. The total sample in this study was 85 people. The duration of light exposure was measured by interview while the CVS was measured using the CVS-q questionnaire. Data analysis was performed using the SPSS program with chi-square test.
Results: The results of this study found that people who work more than 4 hours were more likely to experienced symptoms of CVS compared to people who work less than 4 hours. The results showed that there was a significant association between the duration of computer light exposure with computer vision syndrome (CVS) incidences in employees who are using computers.
Conclusion: There was an association between the duration of computer light exposure with computer vision syndrome (CVS) incidences in employees that using computers

Keywords: Duration computer light exposure, Computer Vision Syndrome

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INTRODUCTION

Technological progress is a good thing to achieve work efficiency in everyday life. Electronic devices have an important function in human life, because the development in technology's field can provide its own satisfaction in various angles to electronic users. It was estimated that around 1 billion people around the world use computers in their daily lives[(1)], while in Indonesia around 73.7 million people used computers for their own benefit[(2)]. However, electronic goods such as computers have a certain level of lighting, so in the current era the use of computers in the workplace has begun to cause several health problems[(3)]. According to the American Optometric Association, a national survey of ophthalmologists found that more than 14% of patients experienced complaints of eye or related symptoms resulting from the use of electronic devices and these could worsen a person's performance[(4)]. *Computer Vision Syndrome* (CVS) is a disease related to eye problems related to vision or, related to the activities of a person by carrying out work related to computers with close vision[(5)]. Agarwall.S stated that people who get computer exposure for more than 6 hours may experience symptoms of *Computer Vision Syndrome*[(6)], whereas, Reddy SC et all, stated that people who work using computer for 2 hours continuously can experience symptoms of *Computer Vision Syndrome* [(7)]. Therefore, this study want to analyze whether there is an association between the duration of computer light exposure (less or equal to 4 hours and more than 4 hours) with Computer Vision Syndrome incidences in computer workers at Bank BCA in the city of Surabaya on Jln. Raya Darmo No.5, Keputran, Tegalsari, Surabaya City, East Java. The purpose of this study was to determine the association between the duration of computer light exposure with *Computer Vision Syndrome* in workers who use computers. The benefits of this research were to increase the knowledge and insight of researchers about an association of computer light exposure Computer Vision Syndrome.

METHOD

The research design was observational analytic, with cross sectional design. The location of this study was in BCA bank on Raya Darmo street No.5, Keputran, Tegalsari, Surabaya, East Java. This study was started from July-September 2019. The total population in the BCA KCU Darmo bank was approximately 200 people. The sample used in this study were all BCA bank employees in the city of Surabaya on Raya Darmo street No.5, Keputran, Tegalsari, Surabaya, East Java, which met the inclusion and exclusion criteria. Samples were taken using a non-probability sampling

technique which was purposive sampling, and the total sample obtained was 85 people.

The variables studied include computer Light Exposure Time (independent variable), *Computer Vision Syndrome* (dependent variable), and eyepiece wearing (confounding variable). Data collected by interviewing and distributing questionnaires. Data were processed and analyzed with chi-square statistical test and processed using the SPSS system.

RESULTS

Table 1 Basic Characteristics of Respondents

	Frequency (n)	Percentage (%)
Gender		
Male	48	56,5
Woman	37	43,5
Age (year)		
< 40	58	68,2
≥ 40	27	31,8
Long exposure		
≤ 4 hour	36	42,4
> 4 hour	49	57,6
CVS incidence rate		
CVS	49	57,6
Not CVS	36	42,4

Based on the table 1, it was found that there were more male respondents (56.5%) than women. The highest percentage of respondents's age was <40 years old (68.2%), the highest percentage of duration of exposure was more than 4 hours (57.6%) compared to less than 4 hours and most respondents had CVS (57.6%).

Table 2 exposure length and Computer Vision Syndrome (CVS)

Long exposure	***Computer Vision Syndrome* (CVS)**		**Total**	**P(*Chi-square*)**
	Not CVS	CVS		p
	n (%)	n (%)	n (%)	
≤ 4 hour	26 (30,6)	10 (11,8)	36 (42,4)	0,000 (IK 95% 3,703 – 27,764)
>4 hour	10 (11,8)	39 (45,9)	49 (57,6)	
Total	36 (42,4)	49 (57,6)	85 (100)	

OR=10,140

The results of data analysis using the chi-square test showed that the association between duration of computer light exposure of more than 4 hours and CVS incidences was significant, with p > 0,001 (p <0.05) and 95% CI 3,703-27,764. (Can be seen in table 2)

DISCUSSION

Basic Characteristics of Respondents

Most of respondents who used computers were less than 40 years old. A survey conducted by the United States

Census Bureau said that people under 45 years old used computers more than people over 45 years old [8].

Respondents in this study were mostly male(39 people (52.2%)). A survey about the use of information and communication technology in European society showed that 48% of men aged 16-74 used computers at least once a day. This number was more than the number of female computer users (39%) [9].

Most respondents in this study were exposed to computer light for more than 4 hours, 49 people/57.6%. Other research by Nurmay et al mentioned that the length of computer use in typing service employees were more than 4 hours, on average 6 to 10 hours. Other research also showed that computer employees at a university had a computer usage time of more than 5 hours [10].

The majority of BCA bank employees who were respondents in this study experienced CVS (49 people (57.6%)). Dessie et al said that the CVS incidences rate were more common in respondents who used computers over 4.6 hours and could also occur in respondents even though they used ergonomic comfortable chairs. The used of an ergonomically comfortable chair could help improve the ergonomic position of computer workers so as to reduce the risk of CVS but this was actually inversely proportional because most workers were less able to implement a good ergonomic position at work so that despite having a good understanding of ergonomics or facilities in the form of a comfortable chair, CVS events still could occur[11]. Other studies by Logaraj et al., found that people who used contact lenses were 4x more risky in experiencing CVS compared to those who did not wear contact lenses[12].

Analysis of Association Between Duration of Computer Light Exposure and Computer Vision Syndrome Incidences in Employee Who Using Computer

The results showed that the group exposed to more than 4 hours of computer light were at higher risk of experiencing CVS compared to the group exposed to computer light for less than 4 hours with a p value of <0,001. The underlying mechanisms of this association are extra-ocular mechanism, accommodating eye, and ocular surface mechanism[13]. Extra-ocular mechanism such as musculoskeletal symptoms consisting of pain in the head, shoulder pain, and stiffness in the neck. This mechanism is influenced by prolonged sitting patterns and incorrect seating positions, which causes pressure on the invertebral discs, muscles and ligaments[14].

The accommodating mechanism of the eye cause symptoms like blurred vision. The blurred vision was caused by the focus point on the eye not directly falling on the point of

the object but falling behind the point of the object when workers see the computer at close range so that it can cause blurry vision[15].

The Ocular Surface mechanism played a role in the onset of symptoms such as eye strain, dryness and redness of the eyes, and watery eyes[13]. Eye strain that occurs in CVS occurs due to a decrease in the number of eye blinks, imperfect eye blinks or narrowing of the Palpebra Apertura where these three things cause tension in the orbicularis oculi muscles[16]. Lack of eye blinks and imperfect eye blinks cause increased evaporation of tears resulting in dryness of the eyes[16,17]. Dryness of the eyes cause a lack of tears, so that there will be compensation of the surface of the eye by triggering reflex lacrimation of the eye through the trigeminal and facial nerve to produce tears so that the eyes become runny [18].

CONCLUSION

The results showed that there was a significant association between duration of computer light exposure with Computer Vision Syndrome (CVS).

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References

1. Acharya A, Panth M. The Unprecedented Role of Computer in Improvement and Transformation of Public Health: An Emerging Priority. Indian J Community Med [Internet]. 2015(disitasi 2019 April 20);40:8. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4317987/
2. Indonesia kementrian komunika dan informatika republik. Infografis Indikator TIK [Internet]. Jakarta: Pusat penelitian dan pengembangan SDPPPI, Badan Penelitian dan pengembangan Sumber Daya Manusia, Kementrian Komunikasi dan Informatika; 2016. p. 60. Available from: http://www.kominfo.go.id
3. Krishnan S, Zakaria A, Khalil F, Jofree S. The Effect of Electronic Device on Human Health. 2017(disitasi 2019 April 26);7:40–3. Available from: http://article.sapub.org/10.5923.j.mm.20170701.05.html
4. Blvd L. American Optometric Association The Effects of Computer Use on Eye Health and Vision. 1997(disitasi 2019 april 1);(314). Available from: https://www.aoa.org/Documents/opt

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ometrists/effects-of-computer-use.pdf

5. Shrivastava S, Bobhate P. Computer Related Health Problems Among Software Professionals in Mumbai: A Cross-Sectional Study. Int J Heal Allied Sci [Internet]. 2014(24 april 2019);1(2):74. Available from: http://www.ijhas.in/article.asp?issn=2278-344X;year=2012;volume=1;issue=2;spage=74;epage=78;aulast=Shrivastava
6. Agarwal S, Goel D, Sharma A. Evaluation of the Factors which Contribute to the Ocular Complaints in Computer Users. 2013(disitasi 2019 april 28);7(2):331–5. Available from: https://www.ncbi.nlm.nih.gov/pubmed/23543722
7. Reddy SC, Low C, Lim Y, Low L, Mardina F NM. Computer vision syndrome : a study of knowledge and practices in university students. 2013(disitasi 2019 april 1);5:161–8. Available from: availablefrom:https://www.ncbi.nlm.nih.gov/pubmed/24172549
8. Ryan BC, Lewis JM. Computer and Internet Use in the United States : American Community Survey Reports. 2017(disitasi 2019 oktober 30);1. Available from: https://www.census.gov/library/publications/2018/acs/acs-39.html
9. Czaja SJ, Charness N, Fisk AD, Hertzog C, Rogers WA, Sharit J. Factors Predicting the Use of Technology : Findings From the Center for Research and Education on Aging and Technology Enhancement (CREATE). 2006 (disitasi 2019 oktober 20);21(2):333–52. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1524856/
10. Nurmaya Rachmawati. Hubungan Intensitas dan Lama Paparan Cahaya Layar Monitor dengan Kelurahan X. 2011(disitasi 2019 november 3);1. Available from: https://eprints.uns.ac.id/8613/
11. 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. 2018(disitasi 2019 november 3);422. Available from: https://www.hindawi.com/journals/jeph/2018/4107590/
12. Logaraj M, Madhupriya V, Sk H. Computer Vision Syndrome and Associated Factors Among Medical and Engineering Students in Chennai. 2014(disitasi 2019 april 13);4:179–85. Available from:

https://www.ncbi.nlm.nih.gov/pubmed/24761234

13. Mmed KYL, Redd SC. Understanding And Preventing Computer Vision Syndrome. 2008(disitasi 2019 april 19);3:128–30. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4170366/
14. Tasneem Borhany, Erum shahid, Washim Ahmed Siddique HA. Musculoskeletal Problems in Frequent Computer and Internet users. 2018(disitasi 21 april 2019);(1). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6060916/
15. Anshel J. Visual Ergonomics Handbook [Internet]. jeffrey anshel, editor. New York: CRC press, Taylor & Francis group; 2005 (disitasi 2019 april 19). 214 p. Available from: PDFwww.ssu.ac.ir
16. 20. Urmi Ravindra Salve. Vision-related Problems Among The Workers Engaged in Jewellery Manufacturing. 2015(disitasi 2019 april 20);(1). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4446936/
17. 21. Rahman Z, Sanip S. Computer User: Demographic and Computer Related Factors That Predispose User to Get Computer Vision Syndrome. … J business, Humanit Technol [Internet]. 2011(disitasi 2019 April 24);1(2):84–91. Available from: http://www.ijbhtnet.com/journals/Vol_1_No_2_September_2011/11.pdf
18. Akinbinu TR, Mashalla YJ. Medical Practice and Review Impact of computer technology on health : Computer Vision Syndrome (CVS). 2014(disitasi 2019 april 1);5:20–30. Available from: http://www.academicjournals.org/MPR