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## 13. COMPUTER VISION SYNDROME AND TENSION TYPE HEADACHE IN COMPUTER WORKERS

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## COMPUTER VISION SYNDROME AND TENSION TYPE HEADACHE IN COMPUTER WORKERS

Delincia Hamdani<sup>1)</sup>, Nita Kurniawan<sup>2)</sup>, Titiek Ernawati<sup>3)</sup>

### ABSTRACT

**Introduction:** Nowadays, the average human uses digital tools for their daily needs such as work, study, and communication. One of the most commonly used is a computer. Long-term use of computers can cause several complex problems in the eyes and vision, such as eye fatigue, eye irritation, red eyes, blurred vision, dry eyes, neck and shoulder pain, and headache that can be referred to as Computer Vision Syndrome. Tension-Type headache (TTH) is a headache with a binding sensation with mild to a moderate intensity that lasts for several minutes to days, that might be caused by excessive contraction of muscle due to fatigue at work. Therefore, there is a possibility that there is an association between Computer Vision Syndrome and Tension-Type Headache.

**Purpose:** To analyze the association between CVS and TTH in Computer Workers.

**Method:** Cross-sectional design was used in this research, and the sampling method was consecutive sampling, and a questionnaire was used. The research period was two days, from 16th to 17th July 2019, at Graha Pena Building, Surabaya.

**Results:** Respondent that experienced CVS was 61,9%, TTH was 27,6%, both CVS and TTH was 19,4%, and analysis with chi-square test, showed  $p=0,220$  which means that there's no association between CVS and TTH.

**Conclusion:** There's no association between CVS and TTH in Computer Workers.

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

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## INTRODUCTION

The American Optometrist Association defines Computer Vision Syndrome (CVS) as a complex problem of the eyes and vision related to work done for a long time using computers.<sup>(1)</sup> CVS with a series of eye and visual symptoms estimated to have a prevalence of 50% or more among computer users.<sup>(2)</sup> Logaraj et al., in 2015, reported that CVS had a high prevalence among medical and engineering students at Chennai with 80.3% presentations. Reddy et al., 2013 and Almaheyu 2014 reported that CVS has a prevalence of 89.9% and 79.3%.<sup>(3)</sup>

CVS occurs because the eyes and brain have different reactions to characters seen on a computer screen than characters printed on paper. On a computer screen, changes can occur constantly, but the printed characters remain stable and have clear contrast and edges.<sup>(4)</sup> When the eyes see the computer for a long time, and the distance between the eyes and the computer is close, it can trigger fatigue of the ciliary muscles, which can cause pain in the head.<sup>(5)</sup>

According to the 3rd Edition of the International Classification of Headache Disorders, headaches are classified into primary and secondary headaches. Primary headache consists of migraine, Tension-Type Headache (TTH), trigeminal autonomic cephalalgias, and other primary headaches.<sup>(7)</sup> TTH is the primary headache most

commonly found, occurring in 20% - 60% of the general population.

TTH caused by uncomfortable posture at work can cause muscle tension, resulting in a decrease in work efficiency and social activity, and is often reported to occur up to 60% in TTH patients.<sup>(7,8)</sup> The International Headache Society says that in computer users, one of the headache problems that is often experienced is TTH.<sup>(9)</sup>

This study aims to find out whether there is an association between CVS and TTH in Computer Workers and to find out whether there is an association between CVS and TTH. The benefit of this study is that it can provide information and knowledge about CVS and TTH.

## METHOD

The study design used in this study was observational analytic with cross-sectional design using the CVS-Q questionnaire and Headache Screening Questionnaire Algorithm for Tension-type Headache with each cut-off point 6, where the results of the questionnaire received a score  $\geq$  six can be defined as experiencing CVS or TTH.<sup>(10)</sup> The study was conducted in Jawa Pos Company, Jalan Jendral Ahmad Yani No.88 Surabaya.

This study was conducted on 16-17 July 2019. The number of respondents obtained was 156 people with data collection techniques using non-probability sampling with the results of respondents after the

inclusion and exclusion was 134 people. The variables studied were CVS (independent variable) and TTH (dependent variable). data collection was done by interviewing and distributing questionnaires accompanied by the writer. The data were processed and analyzed using a chi-square test by utilizing the SPSS software.

## RESULTS

**Table 1 Basic Characteristics Respondent**

| Variable                        | n (%)       |
|---------------------------------|-------------|
| <b>Sex</b>                      |             |
| Male                            | 65 (48,5%)  |
| Female                          | 69 (51,5%)  |
| <b>Age</b>                      |             |
| < 40 years old                  | 100 (74,6%) |
| > 40 years old                  | 34 (25,4%)  |
| <b>Computer Vision Syndrome</b> |             |
| Yes                             | 83 (61,9%)  |
| No                              | 51 (38,1%)  |
| <b>Tension-Type Headache</b>    |             |
| Yes                             | 37 (27,6%)  |
| No                              | 97 (72,4%)  |

Based on Table 1, it was found that the number of female respondents was higher than male (51.5%), and the highest percentage of age was <40 years (74.6%). Respondents who experienced CVS were relatively high (61.9%), and those who experienced TTH were only 27.6%.

**Table 2 Distribution of questionnaire variable**

| Questionnaire Variable          | n (%)      |
|---------------------------------|------------|
| <b>Computer Vision Syndrome</b> |            |
| <b>Eyesore</b>                  |            |
| Yes                             | 73 (54,5%) |
| No                              | 61 (45,5%) |
| <b>Blurry sight</b>             |            |
| Yes                             | 70 (52,2%) |
| No                              | 64 (47,8%) |
| <b>Headache</b>                 |            |
| Yes                             | 70 (52,2%) |
| No                              | 64 (47,8%) |
| <b>Tension-Type Headache</b>    |            |
| <b>Headache Intensity</b>       |            |
| Low                             | 84 (62,7%) |
| Severe                          | 45 (33,6%) |
| Acute                           | 4 (3%)     |
| Chronic                         | 1 (0,7%)   |
| <b>Headache Frequency</b>       |            |
| 1 - 4 times                     | 77 (57,5%) |
| 4 - 9 times                     | 25 (18,6%) |
| ≥ 10 times                      | 32 (23,9%) |
| <b>Headache duration</b>        |            |
| 0 - 30 minutes                  | 71 (53%)   |
| 30 minutes - 4 hours            | 52 (38,8%) |
| 4 hours - 3 days                | 10 (7,5%)  |
| 3 - 7 days                      | 1 (0,7%)   |
| > 7 days                        | -          |

In Table 2, it was found that the symptoms of headache in CVS sufferers were relatively high (52.2%). Still, the results of the TTH

questionnaire showed that the basis for the diagnosis of TTH did not reach the classification of mild intensity, duration, and frequency of headaches experienced by most respondents.

**Table 3 Analysis of associations between Computer Vision Syndrome and Tension-Type Headache**

| Variable                        | <i>Tension-Type Headache</i> |               | Total<br>n (%) |
|---------------------------------|------------------------------|---------------|----------------|
|                                 | Yes                          | No            |                |
| <i>Computer Vision Syndrome</i> |                              |               |                |
| Yes                             | 26<br>(19,4%)                | 57<br>(42,5%) | 83<br>(61,9%)  |
| No                              | 11<br>(8,2%%)                | 40<br>(29,9%) | 51<br>(38,1%)  |
| Total                           | 37<br>(27,6%)                | 97<br>(72,4%) | 134<br>(100%)  |

**Table 4 the Result of Association between Computer Vision Syndrome and Tension-Type Headache**

| Variable  | <i>P</i><br>( <i>Chi-Square</i> ) |
|---|-----------------------------------|
| Association between<br>Computer Vision Syndrome<br>and Tension-Type Headache<br>on Computer Workers | 0,220                             |

Table 4 stated that respondents who suffered from CVS and TTH were only 19.4%, and

the results of the analysis showed the value of  $p = 0.220$ .

## DISCUSSION

### Basic characteristics of respondents regarding CVS and TTH

In this study, from the 134 respondents after the exclusion and inclusion process, it was found that respondents who experienced CVS were relatively high (61.9%), and the most common symptoms of CVS were watery eyes (54%), blurred vision (52.2%) and headache (52.2%). This is in line with the previous study that blurred vision symptoms were found in as much as 59.4%, headaches in as much as 82.1%, and watery eyes in as much as 66.4% of subjects

In this study, it was also found that subjects aged  $> 40$  years experienced more CVS with a percentage of 72.7% and TTH with 29%. Still, in previous theory, it was stated that people aged  $> 40$  years were riskier from CVS development due to a decrease in eye accommodation caused by the distribution of respondents and the peak age in which TTH occurred between 40-49 years. (Bayraktutan et al.).<sup>(11,12,13)</sup>

In this study, it was also found that the majority of the respondents were females (51.5%), and those experiencing CVS and TTH were also females with a percentage of 72.5% and 33.3%. This is in line with the previous studies conducted by Yeni Anggraini, saying that females experienced

CVS at higher rate than men with a percentage of 69.5%. Moreover, Ranasinghe et al., stated that the prevalence of women experiencing CVS was higher than men. Moreover, based on the previous theories, women were more at risk of experiencing TTH because women have a slender and longer neck so that the burden from the head can affect the occurrence of TTH<sup>(14)</sup>

Association Analysis between Computer Vision Syndrome and Tension-Type Headache in Computer Workers.

Based on the Chi-Square analysis test results in this study, the value of  $p = 0.220$  where a p-value can be significant if  $p < 0.05$ , therefore, in this study, there was no significant association between CVS and TTH. This insignificant association might be caused by the unequal distribution of respondents in terms of age and gender grouping. It may also be caused by several confounding factors that cannot be controlled, such as drug consumption affecting the intensity and duration of headaches felt by the respondents of this study. Moreover, other possibilities can also be caused by the use of measuring instruments in the form of subjective questionnaires, and the questionnaire used in this study (Headache Screening Questionnaire Algorithm for Tension-type Headache) only had a specificity of 48%.

Even though there was no significant association between Computer Vision

Syndrome and Tension-Type Headache, from Table 5.2, it can be seen that Computer Vision Syndrome has one of the most common symptoms: a headache with a percentage of 52.2%. Still, the headache characteristics found in this study did not match the headache characteristics in the TTH questionnaire used. Therefore, for further study, identification of the type of headache experienced by CVS sufferers in computer workers who have high headache symptoms is needed.

## CONCLUSION

This study showed that there was no significant association between Computer Vision Syndrome and Tension-Type Headache in computer workers. Still, it was found that CVS sufferers in this study were relatively high, with a percentage of 61.9%, and that one of the most common symptoms of CVS was a headache with a percentage of 52.2%.

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