



The Risk Factors that Affecting Carpal Tunnel Syndrome (CTS)

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Abstract

Introduction: Nowadays, interaction between human and machine is often happened, it can be with computer or laptop, using computer/laptop with mouse in long period without resting the wrist will lead to symptom of Carpal Tunnel Syndrome (CTS). CTS have a significant correlation with improper posture of the hand and the age. This research is to know the relation between age, improper hand position, and work period towards risk of CTS on staffs who work in front of computer/laptop >4 hours a day. **Methods:** For the method was giving some questionnaires, direct observation and Phallen test to each respondent. **Results:** From 33 of respondents was found 26 staffs that had risk of CTS. In improper hand position and work period factor was found the p-value of 0.000. But in the age factor was found p-value of 0.277. **Analysis:** In improper hand position and work period factor it caused by wrong position of the hand and pressure median nerve. In the age factor it caused due to staffs often did wrist gymnastic on work hours which is one of the exercises that preventing CTS. **Conclusion:** There is correlation between improper hand position and work period with risk of CTS.

Keywords: *Carpal Tunnel Syndrome, Improper Hand Position, Work Period*

Introduction

Carpal Tunnel Syndrome (CTS) is a condition where median nerve is compressed through the carpal tunnel, which is on the wrist. The compression of median nerve can cause an inflammation. The inflammation which caused by the pressure of median nerve can cause a symptoms. The symptoms usually begin with sensory symptoms and also can cause a motor symptom.

At the beginning of the symptom, it is usually feeling painful, numbness, and feeling like tingling in the area that innervated by median nerve [1-6]. Nowadays in the globalization era, the interaction of human with machines happened very common, one of them is with computer or laptop, where machines are one of the most commonly tools that used by humans, so in a daily life many activities can trigger the occurrence of Carpal Tunnel Syndrome, one of them is the job that using computer with holding the mouse, too much and for a long time without resting the wrist will trigger symptoms of Carpal Tunnel Syndrome [7-12].

Based on the results of the preliminary study conducted by researchers, it was obtained from the staffs at Poltekkes Kemenkes Jakarta I who felt symptoms of CTS by 80% in the form of 65% tingling, 25% pain, and 10% numbness. Until now a study has not been carried out on the health workers especially related to occurrence of CTS, and based on information from the workers, most of the staffs using computers for more than 4 hours a day.

Methods

Type of this research was descriptive study, using cross sectional design. This research was using primary data from all staffs of Poltekkes Kemenkes Jakarta I. Population in this research was staffs who working on computer at least for 4 hours during 8 hours work. There were 36 staffs with 3 exclusion, selected as respondents. Data were collected through filling out the questionnaire. The questions were about the fact and opinion of respondents about CTS which felt by the staffs. Variable could be known by this

questionnaire was gripe of CTS, personal factor as age, and work factor such as work period, posture during typing and holding the mouse. The researcher also observed the staffs hand position during working and filled the form follow the correct picture of the proper or improper position of the hand. After observed researcher asked respondent to do Phallen test and check within 60 second with the wrist of the respondent's hand in hyperflexion position.

The researcher input the data that already collected into case record form, sorting data that met the inclusion and input data in the computer as a report on the results of the research to do statistical tests using SPSS software. Descriptive analysis has done to

each variable to know the overview of respondents' characteristic, job characteristic, and description of CTS in the form of frequency and percentage [13]. Bivariate analysis was done to see the correlation between independent variable with dependent variable, using Chi square test with the confidence interval of 95%. This analysis was performed to analyze the correlation between age, work period, and improper hand position with incidence of CTS.

Results

The following is a presentation of the results of the data analysis that has been carried out.

Table 1: The characteristics of respondent

Characteristics	Category	Frequency	Percentage
Gender	Female	21	63.6
	Male	12	36.4
Age	<30	3	15.2
	>30	28	84.8

Based on the table 1, it is seen that male respondents were 12 people (36.4%) and female respondents were 21 people (63.6%). It also seen that most of the age of respondents who were <30 years old was 3 people (15.2 %) and the rest of it who were ≥30 years old was 28 people (84.8%)

Table 2: The hand position and work period

Variable	Category	Frequency	Percentage
Improper position	Proper	3	9.1
	Improper	30	90.9
Work period	<4 years	4	12.1
	≥ 4 years	29	87.9

Based on the table 2, it is seen that respondents who used mouse and keyboard with improper hand position were 30 people (90,9%) and respondents who used mouse and keyboard with proper hand position were 3 people (9,1%). For work period, it was known that most of respondents who has been worked for < 4 years were 4 people (12,1 %) and the rest of respondents who has been woked for ≥ 4 years were 29 people (87.9%)

Table 3: the risk of CTS

Risk	Frequency	Percentage
Yes	26	78.8
No	7	21.2

Table 3 shows that most of respondents had risk to CTS were 26 (78.8%) respondents. But respondents who assume did not have CTS were 7 (21.2%) respondents

Table 4: Correlation between age and risk of CTS

Age	Risk to CTS				Total		p-value	OR
	Yes		No		n	%		
	f	%	f	%				
>30 years	21	77.8	6	22.2	27	100	0.624	0.7 (0.68-7.201)
<30 years	5	83.3	1	16.7	6	100		
Total	26	78.8	7	21.2	33	100		

Table 4 shows that 5 people (83.3%) of <30-year-old-respondent had risk towards CTS, but 1 person (16.7%) had not risk to get CTS. 21 people (77.8%) of ≥30-year-old-respondent had risk to CTS. The p-value was 0.624, it means there was no significant correlation between risk of CTS and age

Table 5: Correlation between hand position and risk of CTS

Hand position	Risk to CTS				Total		p-value	OR
	Yes		No		n	%		
	F	%	f	%				
Proper	25	92.6	2	7.4	27	100	0.000	62.5

Improper	1	16.7	5	83.3	6	100		(4.711-29.262)
Total	26	78.8	7	21.2	33	100		

Table 5 shows that 25 (92.6%) of people who did improper hand position had risk to CTS, on the other hand, 2 people (7.4%) did not have risk to CTS. 1 person (16.7%) who did not do improper hand position get risk to CTS as well. But 5 people (83.3%) did not have risk to CTS. The p-value was 0.000; it means there was significant correlation between risk of CTS and improper hand position

Based on Table 6, it is seen that 26 people (96.2%) of respondents who work for ≥ 4 years, most of them had risk to CTS. But 6 people (100%) of respondents, who work for <

4 years, did not have risk to CTS. The p-value was 0.000; it means there was significant correlation between risk of CTS and work period.

Table 6: Correlation between work period and risk of CTS

Work period	Risk to CTS				Total		p-value	OR
	Yes		No		n	%		
	F	%	f	%				
>4 years	25	96.2	1	3.8	26	100	0.000	150 (8.159-2757.647)
<4 years	1	14.3	6	85.7	7	100		
Total	26	78.8	7	21.2	33	100		

Discussion

The results of this study shows there was no correlation between age and CTS on staffs, staffs with more longer work experiences has a decline in physical ability at work. This caused they worked slowly and did repeating movements in low frequency. Optimum physical ability of someone was reached when they were about 25-30 years old, and physiology capacity of someone will decline 1% per years after their climax passed [14].

It was also supported based on answer from interview which done by researcher that the staffs often doing gymnastic or stretching their hand while they were working in front of computer. The other result from this study shows that that 92.6% of people who did improper hand position and improper position can cause risk of CTS due to trigger inflammation on wrist and pressing median nerve [1]. But this risk can be prevented by applying gymnastic on wrist while working in order to make it well.

The result shows there is significant correlation between risk of CTS and improper hand position on staffs. The result was also shown that CTS is riskier sixteen times. In this research work period of staffs categorized into two <4 years and ≥ 4 years. This study shows that 96.3% of respondents, who work for ≥ 4 years, have risk to CTS. The data analysis showed that there is significant correlation between risk of CTS and work period on staffs. The results also shown work period has risk 27 times higher towards CTS. Rising work period become factor of CTS, the longer someone work using computer the riskier they had to get CTS.

Therefore, it is better to decrease risk of CTS. It can be done by making a guidance to change system of work. Synchronize working and resting, and applying working based on priority so it can prevent activity that makes hand used too much and can minimize painful.

Conclusion

In conclusion, this research shows the risk representation of CTS on the staffs at Poltekkes Kemenkes Jakarta I showed most of the staffs has risk towards CTS is 78.8%. The results showed that more ≥ 30 years old staffs has this risk, also staffs who did improper position, and work factor is include to the risk of it, and make staffs who work ≥ 4 years get this CTS. There is no significant correlation between risk of CTS and age of the staffs and there is significant correlation between risk of CTS and improper hand position and work period of staffs.

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