

Determinants associated with carpal tunnel syndrome complaints

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ABSTRACT

Introduction: Carpal Tunnel Syndrome (CTS) is one of the most common problems in the upper extremities caused by the narrowing of the carpal tunnel, which results in pressure on the median nerve. Increased pressure in the carpal tunnel causes compression and damage to the median nerve.

Objective: determinants associated with carpal tunnel syndrome .

Methods: quantitative research with a cross-sectional research design. The sampling technique in this study used a total sampling technique in which the entire population is equal to the number of samples, namely 36 people. Data was obtained by using a questionnaire. The analytical method used was univariate and bivariate analysis using the chi-square test.

Result: showed that there was a relationship between length of work and carpal tunnel syndrome (p-value = 0.0190). There is a relationship between age and complaints of carpal tunnel syndrome (p-value = 0.032). There is no relationship between personal protective equipment and complaints of carpal tunnel syndrome (p-value = 0.759). There is no relationship between repetitive movements and carpal tunnel syndrome (p-value = 0.787).

Conclusion: It was concluded that there is a relationship between length of service and carpal tunnel syndrome complaints; there is a relationship between age and carpal tunnel syndrome complaints; and there is no relationship between body mass index and carpal tunnel syndrome complaints . In this study, researchers suggest that companies pay more attention to employees who have a long working period so as not to do excessive work and for employees to take advantage of adequate rest time to minimize the occurrence of complaints of Carpal Tunnel Syndrome (CTS).

Keywords: age, carpal tunnel syndrome, years of service.



INTRODUCTION

Carpal Tunnel Syndrome (CTS) is a disorder of the bones caused by repeated movements for a long time in a static position so that the blood supply to the wrists, hands, and nerves is disrupted. *Carpal Tunnel Syndrome* (CTS) is caused by occupational factors such as repetitive movements, length of work, length of work, and length of work (Hassan *et al.*, [2022](#)). *Carpal tunnel syndrome* (CTS) can cause pain, tingling, and numbness. These symptoms can cause disruption of daily activities, interfere with sleep at night and can also cause weakness in the thenar muscle, which will affect the function of the hand, such as grasping, pinching, and so on (Rezazadeh, Aminianfar and Pahlevan, [2023](#)). *Carpal Tunnel Syndrome* (CTS) is the most common case of mononeuropathy, which is produced by neuropathy entrapment in the median nerve in the carpal tunnel, in the form of an anatomical space formed by carpal bones and transverse ligaments in the wrist. Swelling by flexor tendons in the carpal tunnel also results in narrowing of the confinent space and in the median nerve (Obuchowicz, Kruszyńska and Strzelecki, [2021](#)). The National Health Interview Study (NHIS) reports that approximately 1.55% (2.6 million) of the adult population suffers from CTS. Then (Saputra, 2020) The International Labour Organization (ILO) states that in 27 EU states, *Musculoskeletal Disorders* (MSDs), including *Carpal Tunnel Syndrome* (CTS), represent as many as 59% of all types of diseases recognized (Trillos-Chacón *et al.*, [2021](#)).

In research on work with high risks to the wrist and hand in Indonesia, the prevalence of Carpal Tunnel Syndrome (CTS) is reported to be between 5.6% and 15% (Hamid *et al.*, [2020](#)). Meanwhile, according to Astrina Aulia's research on packing plant workers in Indarung, West Sumatra, it was found that 65.2% of workers suffered from Carpal Tunnel Syndrome (CTS). Then, in the province of North Sulawesi itself, more precisely in Bitung City, the prevalence of Carpal Tunnel Syndrome (CTS) in bank employees was 28% (Mandias and Dengah, [2019](#)). Working period is one of the factors that causes Carpal Tunnel Syndrome (CTS), where the working period is the time calculated from the first time the worker comes to work until the research takes place. Time forms a person's experience, so the work period is when a worker has served as a company worker or employee (Zhang *et al.*, [2022](#)). Then working time is also a risk factor that can cause Carpal Tunnel Syndrome (CTS) complaints. Length of work per day is one of the risk factors that can cause complaints of Carpal Tunnel Syndrome (CTS). In a report issued by the Accident Compensation Corporation in 2014, it was explained that several things increase the risk of Carpal Tunnel Syndrome (CTS) in a worker, so it can be said that working 4-8 hours has a risk of developing Carpal Tunnel Syndrome (CTS) 24, 5 times greater than those with a working time of ≤ 4 hours (Permatasari and Arifin, [2021](#)). Apart from what has been mentioned above, age is also included as one of the factors causing Carpal Tunnel Syndrome (CTS), where there is a relationship between age and the incidence of Carpal Tunnel Syndrome (CTS). In workers, Carpal Tunnel Syndrome (CTS) is most often found in those aged ≥ 30 years. This can happen because the physical abilities of workers will decrease over time. Additionally, hormonal solid changes in each worker also make it possible for Carpal Tunnel Syndrome (CTS) to occur (Hidayati *et al.*, [2022](#)).

Body Mass Index (BMI) is a value taken from calculating the quotient between body weight (BB) in kilograms and the square of body height (TB) in meters. BMI determines body proportions (fat, regular, thin) and indicators of current nutritional status. BMI is now widely used to determine a person's nutritional status, which can influence Carpal Tunnel Syndrome (CTS) complaints (Nandini *et al.*, [2022](#)). Nutritional status is an integral part of a person's health because nutritional status shows a person's condition caused by consumption, absorption, and use of nutrients from food for a long time. The nutritional status of workers aged 18 years and over is shown by the Body Mass Index (BMI), calculated based on weight and height. Body Mass Index (BMI) is a simple way to determine people's nutritional status, exceptionally underweight and overweight (Lebiedowska, Hartman-Petrycka and Błońska-Fajfrowska, [2021](#)). Based on initial data collection through interviews conducted at PT Santosa Utama Lestari, the CD-Gowa Unit is divided into five sections and 1 unit head. This research was only carried out

in the plant section, where researchers will examine the determinant factors associated with Carpal Tunnel Syndrome (CTS) complaints. This research involved workers in the plant section, where there were 36 workers. When collecting initial data on workers in the plant section at PT Santosa Utama Lestari Unit CD Gowa, it was found that workers experienced complaints of tingling or pain in their hands or fingers which affected the amount of output or work results. Based on the description of the background above, the researcher raised a research problem regarding the determinant factors associated with Carpal Tunnel Syndrome (CTS) complaints at PT. Santosa Utama Lestari CD Unit – Gowa.

METHODS

The type of research used is quantitative with a cross-sectional design to see the determinants associated with complaints of Carpal Tunnel Syndrome (CTS) at PT Santosa Utama Lestari Unit CD-GowaYear 2023. This study comprises workers in the PT Santosa Utama Lestari Unit CD-Gowa plant section, which amounted to 36 people. The sample in this study used a total sampling technique where the entire population was equal to the number of samples, which was 36 people.

RESULTS

Table 1. Distribution of Respondents Based on Characteristics of *Carpal Tunnel Syndrome Complaints*, Length of Work, Age and Body Mass Index of PT. Santosa Utama Lestari CD–Gowa Unit in 2023

Variable	N	%
Age		
Old	29	80,6
Young	7	19,4
Complaints of Carpal Tunnel Syndrome		
Moderate CTS Complaints	10	27,8
Mild CTS Complaints	25	69,4
No Complaints	1	2,8
Years of service		
Long	31	86,1
New	5	13,9
Body Mass Index (BMI)		
Abnormal	7	19,4
Normal	29	80,6

Based on Table 1, the frequency distribution of 36 (100%) workers at PT can be seen from the univariate results. Santosa Utama Lestari Unit CD – Gowa in 2023 shows that the old age category is 29 people (80.6%), and the young age category is seven people (19.4%). Based on the results of the frequency distribution of 36 people (100%) workers, there were ten moderate CTS (27.8%), then mild CTS complaints were 25 people (69.4%), and the category of no complaints was one person (2.8%). Based on the results of the frequency distribution of 36 people (100%) workers, it shows the category of old work as many as 31 people (86.1%) and the category of the new working period as many as five people (13.9%). Based on the frequency distribution results from 36 respondents, the highest results were obtained: respondents with standard categories as many as 29 (80.6%) respondents, and the lowest was the abnormal category as many as 7 (19.4%) respondents.

Table 2. Age Relationship with Carpal Tunnel Syndrome Complaints in PT. Santosa Utama Lestari CD–Gowa Unit in 2023

Age	Complaints of Carpal Tunnel Syndrome						Total	P (Value)	
	No complaints		Mild CTS Complaints		Moderate CTS Complaints				
	n	%	n	%	n	%	n		%
Young	1	100	6	24	0	0	7	19,4	0,032
Old	0	0	19	76	10	100	29	80,6	
Period of Service	1	100	4	16	0	0	5	13,9	0,019
New	0	0	21	84	10	100	31	86,1	
Body Mass Index	0	0	4	16	3	30	7	19,4	0,565
Abnormal	1	100	21	84	7	70	29	80,6	

Based on Table 2 of the chi-square test analysis results, it can be seen that the value (p-value = 0.032 < 0.005) can be concluded that there is a relationship between age factors and complaints of Carpal Tunnel Syndrome (CTS), it can be seen that the value (p-value = 0.019 < 0.005) so that it can be concluded that there is a relationship between the working life factor and complaints of Carpal Tunnel Syndrome (CST). It can be seen that the value (p-value = 0.565 > 0.005) so that it can be concluded that there is no relationship between Body Mass Index (BMI) factors and complaints of Carpal Tunnel Syndrome (CTS) in workers at PT. Santosa Utama Lestari Unit CD Gowa.

DISCUSSION

Researchers revealed that there is a relationship between years of work and age with complaints of Carpal Tunnel Syndrome (CST) in workers. The working period is the working time from the first time you enter work until research is carried out. A person's work experience will affect the occurrence of occupational diseases. The longer a person works in a company, the more the feeling of saturation of his work will affect the level of fatigue he experiences (Nurhalizah, Syam and Sulaeman, 2023). Carpal Tunnel Syndrome (CTS) complaints are most commonly found in workers with long working periods; this is because the increase in working period will make workers make repetitive movements continuously, which in this case can be the main factor that causes workers to experience complaints of Carpal Tunnel Syndrome (CTS) (Muthoharoh, Basri K and Nuraeni, 2018). Where the results of statistical tests using Fisher Exact Test values, obtained probability) so that it can be concluded that there is a relationship between length of service and the incidence of Carpal Tunnel Syndrome (CTS) in SPBE employees in Indramayu in 2017. Age is the age of an individual from birth to birthday. As we get older, it can be ascertained that exposure to hand work tools at work is getting longer, the ability of elasticity of bones, muscles or tendons is decreasing (Stegink-Jansen et al., 2021).

From the results of research that has been conducted with complaints of Carpal Tunnel Syndrome (CTS), most found in workers with old age; this can be caused by the age factor of workers who are mainly in the old category where the increasing age of a person, the process of organ degeneration is higher so that it can reduce the ability of one's organs to carry out activities so that it can cause various complaints, one of which is complaints of Carpal Tunnel Syndrome (CTS) (Feng et al., 2021). Increasing age can trigger degeneration in that person's body. Based on this, CTS is more likely to occur at an older age (age at risk) because the

median nerve is more susceptible to injury (Boerger *et al.*, 2022). Carpal Tunnel Syndrome is caused by excess pressure on the median nerve in the wrist as it passes through the carpal tunnel. Workers who perform repetitive or monotonous tasks repetitively over long periods of work can have a higher risk of developing CTS. Jobs that involve repetitive hand movements or excessive pressure on the wrist can increase this risk. The risk of CTS also tends to increase with age. Body structure tends to change over time, including changes in connective tissue and fluid buildup that can affect pressure on the median nerve. Everyone can have different tolerances and responses to these factors. In addition, prevention through attention to ergonomics, adequate rest, and early treatment if symptoms of CTS appear can help reduce the risk and impact of this condition on workers (Carmassi *et al.*, 2020).

Body mass index is a measuring tool used to determine a person's nutritional status based on body weight in kilograms (kg) and divided by height in meters squared (m²). Body mass index (BMI) can be widely used to determine the risk factors for a disease (BMI) (Khanna *et al.*, 2022). Carpal Tunnel Syndrome (CTS) complaints are often found in workers with an average Body Mass Index (BMI) category. However, they are not related to Carpal Tunnel Syndrome (CTS) complaints because Body Mass Index is not the main factor in Carpal Tunnel Syndrome (CTS) complaints (Andini, 2019). Carpal Tunnel Syndrome (CTS) complaints experienced by respondents with a Body Mass Index (BMI) that meets the requirements can be caused by other factors such as nutritional status because the thing that influences physical quality is nutritional status, so the lower the nutritional status, the lower the physical quality of the worker. This will cause complaints of Carpal Tunnel Syndrome (CTS) (Hartanti, Asnifatima and Fatimah, 2018). It was found that there was no significant relationship between body mass index and complaints of carpal tunnel syndrome; the Daily Metropolitan computer operator had a body mass index with a value (p-value=0.476), so it could be concluded that there was no relationship between body mass index factors and complaints of Carpal Tunnel Syndrome (CTS) on the Metropolitan Daily computer operator. Body Mass Index (BMI) is a measuring tool used to assess a person's weight in proportion to their height (Al Shahrani, Al Shahrani and Al-Maflehi, 2021). Although BMI does not directly measure nutritional status, it can provide an indication of whether a person is under normal weight, normal, overweight, or obese. There is no direct relationship between BMI and Carpal Tunnel Syndrome (CTS) (Holmes and Racette, 2021). CTS is usually more related to occupational factors and certain medical conditions than body mass index. Factors such as jobs that involve repetitive hand movements, excess stress on the wrist, and poor posture may contribute to the risk of CTS. However, there is some association between obesity and the risk of musculoskeletal disorders, although not explicitly related to CTS (Prakasa, 2020). Obesity can increase joint stress and the risk of other musculoskeletal problems (Suprpto, 2023). When assessing nutritional status or risk of certain diseases, using several parameters other than BMI alone is better. Measuring waist circumference, body fat distribution, and overall dietary evaluation can provide more detailed information about health risks (Andreacchi *et al.*, 2021). In addition, consultation with a medical professional or nutritionist can provide a more appropriate assessment of individual needs and conditions.

CONCLUSIONS

It was concluded that there is a relationship between length of service and carpal tunnel syndrome complaints, there is a relationship between age and carpal tunnel syndrome complaints, and there is no relationship between body mass index and carpal tunnel syndrome complaints. In this study, researchers suggest that companies pay more attention to employees who have a long working period so as not to do excessive work and for employees to take advantage of adequate rest time to minimize the occurrence of complaints of Carpal Tunnel Syndrome (CTS). Consider the specific context of the work and work environment. In addition, collaboration between company management and employees in creating a healthy and

ergonomic work environment can be vital in preventing health problems such as carpal tunnel syndrome.

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