Original Article

Relationship Between Position and Work Duration with incidence Carpal Tunnel Syndrome in Maxim Online motorcycle taxi at Makassar

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ABSTRACT

Introduction:
Online motorcycle taxi is a service that is currently widely used in goods delivery services and other forms of services. There are several things that are not considered by online motorcycle taxi drivers when driving, namely the driving position that is not good and correct. The more consumer demand for online motorcycle taxi applications, the higher the working hours of online motorcycle taxi drivers which leads to increased complaints of pain in the body. This study aims to determine the relationship between position and duration of work with complaints of suspected carpal tunnel syndrome in maxim motorcycle taxi drivers in Makassar City. ***Methods:*** *The sampling technique in this study was purposive sampling through a cross sectional approach. Respondents in this study were riders aged 17 years and over as many as 373 riders who met the exclusion and inclusion criteria. Work position was measured using REBA, Work Duration was measured using a work duration questionnaire, while Suspect carpal tunnel syndrome complaints were measured using Phalen's Test.* ***Results:*** *The Kolmogorov Smirnov normality test shows a significance value (p) of 0.000, meaning that the data is not normally distributed (p <0.05). Then the correlation test between the two variables using the Spearman's rho test (p), namely the work position with complaints of suspected carpal tunnel syndrome obtained results (p=0.025; r=0.116 *) which means there is a significant relationship between the two*

variables and for the duration of work with complaints of suspected carpal tunnel syndrome obtained results (p=0.448; r=0.39) which means there is no relationship between the two variables. ***Conclusions:*** *The distribution of maxim online motorcycle taxi drivers' work positions in the city of Makassar is dominated by respondents who experience the high risk category and category of work duration are more than 8 hours/day. There is a significant relationship between work position and complaints of suspected carpal tunnel syndrome on maxim online motorbike taxis in the city of Makassar. There is no significant relationship between work duration and complaints suspect carpal tunnel syndrome on maxim online motorcycle taxi in Makassar city.*

1. INTRODUCTION

Online motorcycle taxis are currently widely used in goods delivery services and other forms of services[1]. Maxim is an online, application-based transportation service company. The services provided by Maxim are online motorcycle taxis, online taxi services, delivery services, help with towing broken down cars, and battery starters[2].

There are several aspects that online motorcycle taxi drivers pay less attention to when driving, namely poor and correct driving positions. This position can cause local mechanical stress on muscles, ligaments, and joints. This incident will result in injuries to the neck, spine, shoulders, wrists, etc[3].

According to the American Academy of Orthopedic Surgeons (AAOS), Carpal Tunnel Syndrome occurs due to neuropathic pressure on the median nerve at the wrist, characterized by increased pressure in the carpal tunnel and decreased function of the nerve[4]. Symptoms that can be felt include weakness; slight stiffness or discomfort in the hand and wrist; tingling; numbness in the wrist or fingers, especially in the thumb, middle finger, and ring finger; and other symptoms such as heat or pain accompanied by a tingling sensation (nocturnal paresthesia)[5].

According to the American Academy of Orthopedic Surgeons database in 2007, the incidence of carpal tunnel syndrome (CTS) in the United States is estimated to be 1 to 3 cases per 1,000 people per year, with a prevalence of around 50 cases per 1,000 people in the general population. The incidence rate in England can reach 6% -17% higher than that in America, which is approximately 5%[6].

As for the results of the initial observations carried out on Maxim online motorcycle taxis in Makassar when carrying out the Phalen's Test and Tinnel Test, it was found that 70% complained of CTS on the extra side and 30% complained of CTS on the left side. In addition, Maxim online motorbike taxi drivers still pay less attention to CTS and do not care more if they feel symptoms such as paralysis, numbness, and tingling in the thumb to the middle of the fourth finger (Data Primer, 2023). The average duration of online motorcycle taxi work per day was more than eight hours. When they

feel the symptoms, they prefer to rest at home rather than go to the hospital or health center to have themselves checked.

2. METHODS

This research is a quantitative study with a descriptive analytical design and uses a cross-sectional research design (cross-sectional study) with a sample of three hundred and seventy three (n=373) that aims to determine the relationship between work position and complaints of suspected carpal tunnel syndrome in online motorcycle taxis. Maximum in the city of Makassar.

3. MAIN HEADING OF THE ANALYSIS OR RESULTS

This research was conducted from April 20, 2023, to May 21, 2023. The number of respondents who took part in this study was 373 from the 5,520 population of Maxim online motorcycle taxis working in the city of Makassar. The sample was determined using a purposive sampling method to obtain 373 respondents who met the inclusion criteria. All respondents in this study were male. The data obtained is Primary data were obtained from direct interviews and questionnaires.

Table 1. General Characteristics of Respondents

Karakteristik		n	%
Age (Years)			
Late Teenagers	(17-25 tahun)	129	34.6
Early Adulthood	(26-35 tahun)	151	40.5
Late Adulthood	(36-45 tahun)	93	24.9
	Total	373	100
BMI (kg/m²)			
So Skinny	(<17.0 kg/m²)	32	8.6
Thin	(17.0-18.4 kg/m²)	26	7.0
Standard	(18.5-25.0 kg/m²)	194	52.0
Fat	(25,1-27.0 kg/m²)	41	11.0
Obesity	(>27.0 kg/m²)	80	21.4
	Total	373	100

Source: Primary Data, 2023. (Information: n= Frequence, %= Persentage)

Table 2. Distribution of Job Positions

Work Position Variables	Total (n)	Persentage (%)
The Risk is Ignored	0	0
Low Risk	0	0
Medium Risk	161	43.2
High Risk	167	44.8
Very High Risk	45	12.1
Total	373	100

Source: Primary Data, 2023. (Information: n= Frequency; %= Percentage)

Table 3. Distribution of work positions based on age and BMI

Characteristics		Work Position Variables					Total n(%)
		Risk is Ignored n(%)	Low Risk n(%)	Merdium Risk n(%)	High Risk n(%)	Very High Risk n(%)	
Age (Year)	17-25	0	0	63 (16.9)	50 (13.4)	16 (4.3)	129 (34.6)
	26-35			62 (16.6)	71 (19.0)	18 (4.8)	151 (40.4)
	36-45			36 (9.7)	46 (12.4)	11 (2.9)	93 (25.0)
	Total			161 (43.2)	167 (44.8)	45 (12.0)	373 (100)
BMI (kg/m²)	So Skinny	0	0	17 (4.6)	15 (4.0)	0	32 (8.6)
	Thin			11 (3.0)	12 (3.2)	3 (0.8)	26 (7.0)
	Standard			81 (21.7)	86 (23.1)	27 (7.2)	194 (52.0)
	Fat			17 (4.5)	20 (5.4)	4 (1.1)	41 (11.0)
	Obesity			35 (9.4)	34 (9.1)	11 (2.9)	80 (21.4)
	Total			161 (43.2)	167 (44.8)	45 (12.0)	373 (100)

Source: Primary Data, 2023. (Information: n= Frequency; %= Percentage)

Table 4. Work Duration Distribution

Work Duration	Total (n)	Persentage (%)
≤ 8 hour	165	44.2
> 8 hour	208	55.8
Total	373	100

Source: Primary Data, 2023. (Information: n= Frequency; %= Percentage)

Table 5. Distribution of Work Duration based on age and BMI

Characteristics		Duration Work Variable		Total n(%)
		≤ 8 hour n(%)	> 8 hour n(%)	
Age (Year)	17-25	65 (17.4)	64 (17.2)	129 (34.6)
	26-35	58 (15.5)	93 (24.9)	151 (40.5)
	36-45	42 (11.3)	51 (13.7)	93 (24.9)
	Total	165 (44.2)	208 (55.8)	373 (100)
BMI (kg/m²)	So Skinny	19 (5.1)	13 (3.5)	32 (8.6)
	Thin	14 (3.8)	12 (3.2)	26 (7.0)
	Standard	83 (22.3)	111 (29.8)	194 (52.0)
	Fat	14 (3.8)	27 (7.2)	41 (11.0)
	Obesity	35 (9.4)	45 (12.1)	80 (21.4)
	Total	165 (44.2)	208 (55.8)	373 (100)

Source: Primary Data, 2023. (Information: n= Frequency; %= Percentage)

Table 6. Distribution of complaints suspecting carpal tunnel syndrome

Complaints suspect carpal tunnel syndrome	Total (n)	Persentage (%)
Feeling tingling, Pain	205	55.0
Didn't feel anything	168	45.0
Total	373	100

Source: Primary Data, 2023. (Information: n= Frequency; %= Percentage)

Table 7. Distribution of complaints suspecting carpal tunnel syndrome based on age and BMI

Characteristics		Complaints suspect carpal tunnel syndrome		Total n(%)
		Feeling tingling, Pain n(%)	Didn't feel anything n(%)	
Age (Year)	17-25	64 (17.2)	65 (17.4)	129 (34.6)
	26-35	92 (24.7)	59 (15.8)	151 (40.5)
	36-45	44 (13.1)	44 (11.8)	93 (24.9)
	Total	205 (55.0)	168 (45)	373 (100)
BMI (kg/m²)	So Skinny	17 (4.6)	15 (4.0)	32 (8.6)
	Thin	14 (3.8)	12 (3.2)	26 (7.0)
	Standard	111 (29.8)	83 (22.3)	194 (52.0)
	Fat	20 (5.4)	21 (5.6)	41 (11.0)
	Obesity	43 (11.4)	37 (9.9)	80 (21.4)
	Total	205 (55)	168 (45)	373 (100)

Source: Primary Data, 2023. (Information: n= Frequency; %= Percentage)

Table 8. Relationship between working positions and complaints suspected of carpal tunnel syndrome

Variable	Work Position Category					
Complaints *suspect Carpal tunnel syndrome*	**Risk Ignored n(%)**	**Low risk n(%)**	**Medium risk n(%)**	**High risk n(%)**	**Very high risk n(%)**	**P**
Feeling tingling, Pain	0	0	79 (21.2)	96 (25.7)	30 (8.0)	
Didn't feel anything	0	0	82 (22.0)	71 (19.0)	15 (4.0)	0.075
Total			161 (43.1)	167 (44.8)	45 (12.1)	

Source: Primary Data, 2023. (Information: n= Frequency; %= Percentage)

Table 9. The relationship between work duration and complaints suspected of carpal tunnel syndrome

Variable	Work Duration Category		
Complaints *suspect Carpal tunnel syndrome*	**≤ 8 hour n(%)**	**> 8 hour n(%)**	**p**
Feeling tingling, Pain	87 (23.3)	118 (31.6)	
Didn't feel anything	78 (20.9)	90 (24.1)	0.440
Total	165 (44.2)	208 (55.8)	

Source: Primary Data, 2023. (Information: n= Frequency; %= Percentage)

4. DISCUSSIONS

The respondents in this study were only men aged > 17 years. In this study, the 23-27 year age group dominated the total number of respondents, namely 93 (24.9%) respondents. In line with the research results of Rakhmatulloh, Tyas and Subianto[7] show that online motorcycle taxi drivers are dominated by men aged 20-30 years. Based on BMI, 194 (52%) respondents were dominated by drivers with a normal BMI.

The distribution of work positions based on age in table 5.3 shows that the 26-35 year age range dominates the total number of respondents, of which 18 (4.8%) respondents were in the very high-risk work posture, 71 (19.0%) respondents in the high category, and 71 (19.0%) respondents in the high-risk category. medium category, 62 (16.6%) respondents. This is because early adulthood is when a person is at a time of high productivity at work. Age is related to performance because increasing age will be followed by a process of organ degeneration; in this case, the capacity of the organs in the body will decrease. With a decrease in organ capacity, this will cause workers more easily experience fatigue more easily[8]. However, in this study, on average, respondents did not know the correct working position guidelines, which could result in a bad working position. This is in line with statements in other research where physical work, if done incorrectly and ergonomically, can slowly cause musculoskeletal disorders, which can worsen if not handled properly[9].

The distribution of work positions based on BMI in table 5.3 also shows that normal BMI dominated the total number of respondents. Based on these two characteristics, there was no significant relationship between age and work position or BMI and work position in this study because the number of respondents was dominated by drivers aged 26-35 years whose muscle strength and endurance were still good; therefore, the risk of musculoskeletal complaints was still rare. In line with research conducted by Alfiansyah and Febriyanto[10], there was no relationship between body mass index and musculoskeletal complaints in heavy equipment operators. This is because there were more respondents who had a normal weight than those who were overweight or obese.

Based on the results of the research that has been conducted, a work duration of more than 8 hours is dominated by drivers aged 26-35 years as many with 93 (24.9%) respondents. This is because the average respondent had the goal of working to meet family needs. Meanwhile, those who work less than or equal to 8 h/day on average have a maximum online motorcycle taxi work as a side job. However, many drivers who work

more than 8 h/day complain of musculoskeletal problems. This is in line with research conducted by Andini[11] which states that a work duration of more than 10 seconds and repeated (repetition) work has a risk of causing musculoskeletal complaints, one of which is carpal tunnel syndrome if carried out together with an awkward posture. This is because the duration and frequency of repetitive movements (repetitions) can cause muscle fatigue[12]. This is in line with the opinion expressed by Saputra[13] that repeated movements over a long period of time, if performed too often, will encourage fatigue and muscle tendon tension. The tendon muscle tension can be restored if a rest period is used to stretch the muscles.

A poor working position can cause or increase complaints of suspected carpal tunnel syndrome due to excessive body work and inappropriate body position, which can result in trauma to the muscles, ligaments, and joints in the back. Trauma can take the form of a fairly large injury that can be described as pain or tingling, tenderness, swelling, or muscle weakness. Tissue trauma arises from chronicity or repetitive movements, excessive stretching, or stress on one tissue[14]. This is in line with the research conducted by Hartono and Soewardi[15] which states that work carried out repeatedly in unnatural work positions has a significant relationship with the risk of musculoskeletal disorders.

Based on the results of this research, respondents' work positions were dominated by high-risk work positions. This is because the average respondent has a lower ergonomic neck, shoulder, back, and leg position. Meanwhile, on average, respondents had an ergonomic hand position of no more than 15º. In line with research conducted by Farahdhiya[16] on orchestra violinists, postures that cause discomfort often occur for beginners. Carpal Tunnel Syndrome Complaints of CTS usually arise when violinists are uncomfortable with their body posture and when their body is stiff (lack of stretching). When driving, respondents can also perform a little stretching when stopping at traffic lights so that their muscles feel more relaxed and comfortable. Stretching can optimize movements from the muscles to joints, which can prevent injury.

However, this research is not in line with research in the form of analysis using non-parametric test methods such as Cochran's test, where unnatural work attitudes or positions are the cause of musculoskeletal complaints[15]. The same finding was also found in research conducted on mining employees with a high risk of working posture, as many as 16 people (30.2%) and six people (11.3%) with a very high risk. There were 38 respondents who experienced musculoskeletal complaints based on this test. The contingency coefficient showed a significant relationship between work posture and musculoskeletal complaints in the miners ($p=0.028$). This has also been proven by other studies showing that the risk level of work posture is associated with musculoskeletal complaints. Based on the results of the analysis, a p-value of $0.000 < 0.05$ was obtained, which indicates that there is a significant relationship between work posture and musculoskeletal complaints[17].

It was found that the duration of work for Maxim online motorcycle taxi drivers was not related to complaints of carpal tunnel syndrome. In Table 5.9, the results of the analysis show that there was no significant relationship between work duration and complaints of suspected carpal tunnel syndrome with CTS ($p=0.448$; $r=0.39$, $p>0.05$). Based on this research, the average working duration of online motorcycle taxi drivers was more than eight hours. However, in Indonesia, the maximum length of working time per day is eight hours, and the rest is rest time (for family and social life).

The average maximum duration of online motorcycle taxi drivers is more than 8 h/day, and every time an online motorcycle taxi driver makes a trip, they have the possibility to rest their body for a while in between traffic jams so that the duration of driving does not contribute to the emergence of musculoskeletal complaints. Based on the theory of Vieira[18], it is not only the duration of work that triggers musculoskeletal complaints. The factors that cause musculoskeletal complaints are divided into two categories: personal factors, including demographic structure, symptoms, frequency of symptoms, and previous medical conditions, and workplace factors consisting of the physical environment of the workplace, psychosocial environment of the workplace, and work equipment. Work duration is included in the physical environmental factors of the workplace, which in this study had no effect on musculoskeletal complaints in online motorcycle taxi drivers, except for complaints in the knee area. Based on research conducted by Radinda[19], a driving duration of 8-15 hours a day generally has no effect on musculoskeletal complaints in online motorcycle taxi drivers in Bandung City. Driving duration only affects complaints of pain, soreness, and/or discomfort in the knee area.

From the results of this research, it can be seen that work duration is not the main factor that causes complaints of suspected carpal tunnel syndrome in respondents, although in practice it was found that many respondents worked with a maximum work duration of more than 8 hours/day, which in theory should be a factor. were the cause of complaints suspected carpal tunnel syndrome in the respondents. However, in this case, it seems that the respondent's complaint of suspected carpal tunnel syndrome was caused by other factors outside the duration of work, such as environmental factors and other activities outside working hours.

5. CONCLUSION

1. The distribution of work positions for Maxim online motorcycle taxi drivers in the city of Makassar was dominated by respondents in the high-risk category.
2. The distribution of work duration for Maxim online motorcycle taxi drivers in the city of Makassar is dominated by employees who use the work duration category of more than 8 h/day.
3. There was no significant relationship between work position and complaints of suspected carpal tunnel syndrome on Maxim online motorcycle taxis in Makassar.
4. There was no significant relationship between work duration and complaints of suspected carpal tunnel syndrome on Maxim online motorcycle taxis in Makassar city.

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