

## ORIGINAL ARTICLE

### The correlation between motorcycle riding duration with carpal tunnel syndrome among online ojek workers in Cimahi

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#### ABSTRACT

Carpal Tunnel Syndrome (CTS) is a neuropathy of the wrist caused by the compression within the carpal tunnel, which puts pressure on the median nerve. Riding a motorcycle combines the risk factors for CTS, including grip strength and repetitive movements. The flexibility of working hours has led to an increase in the number of online motorcycle taxi workers. This research uses a cross-sectional design, and the sample consisted of 82 individuals selected using purposive sampling technique. Research data were processed using the Chi-Square test. The duration of motorcycle riding, categorized as either  $\geq 8$  hours per day or  $< 8$  hours per day, is associated with a risk of developing CTS. The results of the questionnaire indicated that the most common CTS symptoms reported by ojek online workers was tingling, experienced by 70.73% of respondents, while the least reported symptom was difficulty grasping or using small objects, reported by 23.17% of participants. The Chi-Square analysis test revealed no significant difference in the incidence of CTS complaints between those who rode motorbike for  $\geq 8$  hours and those who rode  $< 8$  hours per day among Ojek Online workers in Cimahi (p-value 0.635). This insignificant difference may be due to other risk factors that influence the emergence of CTS in Ojek Online workers.

**Keyword:** Carpal tunnel syndrome, CTS, motorcycle riding duration, repetitive movement, ojek online, ojek online Cimahi

Received: 2024-10-03, Revised: 2024-10-17 Accepted: 2024-10-29, Published: 2024-10-31.

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How to cite :

Djajasmita, D., Dessy, and Amalia F. (2024) "The correlation between motorcycle riding duration with carpal tunnel syndrome among online ojek workers in Cimahi", Acta Medical and Health Sciences, 3(2), p.68-74. doi: <https://doi.org/10.35990/amhs.v3n2.p68-74>

## INTRODUCTION

Carpal Tunnel Syndrome (CTS) is characterized as a neuropathy of the wrist resulting from increased pressure within the carpal tunnel, leading to compression of the median nerve as it traverses (passes through) the carpal tunnel. Clinical observations demonstrate that increased pressure on the median nerve forms a key pathophysiological basis for CTS.<sup>1</sup> Risk factors for CTS are associated with biomechanical stress on the wrist and hand. These stressors include repetitive movements, gripping or pinching actions, heavy lifting, wrist flexion-extension positions, direct pressure on the carpal tunnel, and the use of vibrating hand tools.<sup>2,3,4</sup> CTS is the most common neuropathy affecting the upper extremities. It ranks sixth among occupational diseases frequently resulting in reduced productivity for workers who use their wrists extensively. The prevalence of CTS among workers is estimated at 0.7 per 10,000 individuals, while in the general population, the estimated prevalence is approximately 9% in women and 0.6% in men, with a female-to-male ratio ranging from 3:1 to 10:1. The highest prevalence is observed among women over 45 years of age and in individuals with obesity.<sup>3,5</sup>

The initial manifestation of CTS symptoms is typically intermittent, often characterized by paresthesia that may progress to hypoesthesia. The onset of CTS is associated with activities that involve a combination of gripping force and repetitive movements of the fingers and wrist.<sup>5</sup> An example of an activity that combines gripping force with repetitive wrist movement is motorcycle riding, a common daily practice for many individuals that relies heavily on hand strength. Motorcycles are often chosen as a means of transportation due to factors such as reduced travel time and lower transportation costs.<sup>3,6</sup> The widespread use of motorcycles has led to the emergence of motorcycle transportation services, commonly referred to as "Ojek." The term Ojek refers to a

bicycle or motorcycle used to carry passengers or renters. With advancements in technology, an additional form of service has emerged, allowing motorcycle drivers to be booked through an online application - these services are known as "Ojek Online." Ojek Online has been rapidly accepted by the public because they are able to supply the needs of the public in the service sector effectively.<sup>2,7</sup>

According to the classifications by Statistics Indonesia or Indonesian Central Statistics Agency, Ojek Online is categorized as a freelance worker in the transportation sector. Freelance workers are defined as individuals who work for employers or institutions in non-permanent positions, receiving wages based on a daily or contract basis.<sup>8,9</sup> Duration is a temporal measure that indicates the length of time during which an event or activity occurs. The Ministry of Transportation of Indonesia regulates driving durations under the national traffic and transportation law, specifying that the safe driving duration limit is eight hours per day, while the maximum driving duration without a break is four hours, after which a rest period is mandated.<sup>10</sup> Online ojek workers are not bound by fixed working days or hours; their income depends on the number of completed orders. This flexibility can lead to the possibility of drivers exceeding safe driving limits in their pursuit to achieve their financial targets. A previous study conducted by Datu, Kawatu, and Mandagi reported that only 20.3% of online ojek drivers worked less than eight hours per day, whereas the majority, 70.7%, worked more than eight hours daily.<sup>11,12</sup>

The researcher aims to investigate the duration of motorcycle riding among Ojek Online workers in Cimahi, assess the duration of riding that may pose a risk for the onset of Carpal Tunnel Syndrome (CTS), and examine whether there is a correlation between the duration of motorcycle riding and the onset of CTS in online motorcycle taxi workers in Cimahi.<sup>13-15</sup>

## METHODS AND SUBJECT

The instruments used in this study included a riding duration questionnaire and the Boston Carpal Tunnel Questionnaire (BCTQ) to assess Carpal Tunnel Syndrome (CTS).

This study adopted an analytical approach with a cross-sectional design. The sampling method applied was non-probability sampling, specifically purposive sampling. The subjects of this study were online ojek drivers in Cimahi area, and the primary variable of interest was the duration of their daily riding.<sup>16</sup> The research procedures were divided into three phases: preparation, implementation, and reporting.

Preparation to determine the duration of motorcycle riding was conducted by the researcher. The researcher obtained the availability of online workers as research respondents through a consent form.

Questionnaires were then distributed to the online ojek drivers who agreed to participate, collecting demographic information, riding duration, and the Boston Carpal Tunnel Questionnaires (BCTQ). The researcher provided instructions for completing the questionnaires. The results of the BCTQ were subsequently calculated. The research variables included both independent and dependent variables, which were categorical, and the data scale was ordinal. Therefore, this study employed the Chi Square test, with results considered significant p-value was less than 0.05.<sup>17</sup>

## RESULTS AND DISCUSSION

This study was conducted with 82 online ojek drivers in Cimahi. The distribution of respondents by gender and age is presented in Table 1

**Table 1.** Characteristics of Online Ojek Drivers

Variable	Frequency	Percentage (%)
<b>Gender</b>		
Male	78	95.1
Female	4	4.9
<b>Age</b>		
< 20 years	5	6.09
20-39 years	46	56.09
> 40 years	31	37.80

The characteristics of online ojek drivers revealed that out of 82 respondents, 78 (95%) were male, and 4 (4.9%) were female. These findings are consistent with a 2019 police report highlighted a lower number of female motorcycle riders compared to males. Similarly, a study by Laurencia (2021)

reported a predominance of male respondents, with 168 males and 20 females. In terms of age, the majority of respondents (46 or 56.09%) were between 20 and 39 years old.<sup>11,18</sup>

The distribution of driving duration in online motorcycle taxi drivers in Cimahi is presented in Table 2.

**Table 2.** Riding Duration of Online Ojek Drivers

Variable	Frequency	Percentage (%)
≥ 8 hours	70	85.4
< 8 hours	12	14.6
<b>Total</b>	<b>82</b>	<b>100</b>

As indicated in Table 2, 70 respondents (85.4%) reported riding for 8 hours or more per day, whereas 12 respondents (14.6%) reported riding for less than 8 hours per day. These findings align with those from a previous study conducted

by Indiana (2023), which found that online ojek drivers have an average riding duration of 10.07 hours per day.<sup>19</sup>

The distribution of CTS symptoms based on riding duration among online ojek drivers in Cimahi is summarized in Table 3.

**Table 3.** CTS Symptoms by Riding Duration (≥ 8 Hours vs. < 8 Hours)

Riding Duration	≥ 8 hours		< 8 hours	
	N	%	N	%
<b>Symptomatic</b>	62	88,6	10	83,3
<b>Asymptomatic</b>	8	11,4	2	16,6
<b>Total</b>	<b>70</b>	<b>100</b>	<b>12</b>	<b>100</b>

According to Table 3, among 70 respondents who reported riding for more than 8 hours or more per day, 62 (88.6%) experienced CTS symptoms, while 8 (11.4%) were asymptomatic. In the group of respondents who rode for less than 8 hours per day, 10 out of 12 (83.3%) reported experiencing CTS symptoms, and only 2 (16.7%) were asymptomatic. Both groups demonstrated a risk of developing CTS, regardless of the duration of riding. The CTS symptoms reported by the respondents are presented in Table 4.

The study evaluated 82 respondents, all of whom reported experiencing symptoms associated with Carpal Tunnel Syndrome (CTS). According to the questionnaire results, the majority of respondents (58 or 70.73%) experienced tingling sensations, followed by pain (54 or 65.85%) and numbness (33 or 40.24%). The least frequently reported symptom was difficulty gripping or handling small objects (19 or 23.17%). Similar findings were reported by Farhan, who identified tingling as the most prevalent symptom, observed in 55 respondents (57.3%).<sup>2,20</sup>

**Table 4.** CTS Symptoms among Online Ojek Drivers

Symptom	Frequency	Percentage (%)
Pain	54	65.85
Numbness	33	40.24
Tingling	58	70.73
Difficulty handling small objects	19	23.17

The correlation between duration of riding and CTS among online ojek

drivers is summarized in Table 5.

**Table 5.** Relationship Between Riding Duration and CTS

Variable	Symptomatic		Asymptomatic		Total	p-value
	N	%	N	%	N	
Riding Duration						
≥ 8 hours	62	(88.6%)	8	(11.4%)	70	0.635
< 8 hours	10	(83.3%)	2	(16.7%)	12	
<b>Total</b>	72	(87.8%)	10	(12.2%)	82	

Statistical analysis using the Chi-square test yielded a p-value of 0.635, indicating that  $p > 0.05$ . Consequently, the null hypothesis ( $H_0$ ) was accepted, suggesting no significant association between riding duration ( $\geq 8$  hours or  $< 8$  hours) and the occurrence of CTS among online ojek drivers in Cimahi. This finding is in line with a study conducted in Tangerang (Athifah), which also reported no significant relationship between work duration and CTS among online ojek drivers in Tangerang City (p-value = 0.998). The absence of a significant association between riding duration and CTS may be attributed to the influence of other factors contributing to the development of CTS.<sup>11,14,21</sup>

## CONCLUSION

The risk of developing carpal tunnel syndrome (CTS) symptoms exists for both riding durations of 8 hours or more and less than 8 hours per day. The most commonly reported CTS symptom among online ojek drivers was tingling, occurring in 70.73% of cases, while the least reported symptom was difficulty in gripping or manipulating small objects, noted in 23.17% of cases. Results from the bivariate analysis using the Chi-square test indicated no significant association between riding duration ( $\geq 8$  hours or  $< 8$  hours per day) and the occurrence of CTS symptoms among online ojek drivers in Cimahi (p-value = 0.635). This lack of association may be attributed to other risk factors that contribute to the development of CTS in Ojek Online workers.

## CONFLICT OF INTEREST

No conflict of interest was reported in this study.

## ACKNOWLEDGMENTS

The authors express their gratitude to the Department of Physiology and the Department of Neurology, Faculty of Medicine, Universitas Jenderal Achmad Yani, Indonesia.

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