

The Carpal Tunnel Syndrome and Ergonomic Risk Factor Profile in Online Motorcycle Taxi Drivers (*ojol*) in Jakarta

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Abstract

Introduction: The increasing need for online motorcycle taxi driver (*ojol*) transportation continues to increase in Jakarta. This increases the activity of motorcycle taxi drivers, which can cause Carpal tunnel syndrome risks due to the awkward posture of the wrist while riding the motorcycle (the wrist posture is too long on the motorcycle handlebars with repetitive motion), which will affect the nerves and blood supply to the wrist and hand. This study aims to determine the risk of the motorcycle taxi driver's upper limb using Rapid Upper Limb Assessment (RULA) and Carpal tunnel syndrome risk factor using the Boston Carpal Tunnel Syndrome Questionnaire (BTCSQ).

Method: This research used a cross-sectional study approach with 97 respondents online motorcycle taxi drivers. The respondents were collected based on the activity of online motorcycle taxi drivers who were in or passing through the data collection location and willing to take part in the Rapid Upper Limb Assessment (RULA) and the Boston Carpal Tunnel Syndrome Questionnaire (BTCSQ). The RULA assessment and analysis were performed and supported by video (recording from a cycle of the activity while the respondents were riding the motorcycles). The respondents' criteria were an online motorcycle taxi driver with a minimum of 1 year of working experience, at least 3 hours working duration per day, and not clinically suffering from rheumatoid arthritis and wrist problems. This study has been approved by Universitas Kristen Krida Wacana ethical committee.

Result: The results of BCTSQ and RULA in online motorcycle taxi drivers have found that there's mild-moderate risk respectively in Jakarta. In RULA, it was found that there were 87.6% of respondents were reported at moderate risk which had an impact on musculoskeletal problems,

especially the upper limb. In the BCTSQ, the result showed that there were mild complaints in 38.1% of respondents regarding the wrist which was at risk of developing carpal tunnel syndrome.

Discussion: With RULA results, in the form of moderate risk, Further ergonomics investigation and assessment are needed to find out further risk factors, mitigation plans, and best improvements to reduce the risks. The occurrence of mild complaints in the wrist based on BCTSQ requires further clinical examination of carpal tunnel syndrome to reduce the incidence of CTS cases in online motorcycle taxi drivers.

Conclusion: This research's result has found mild-moderate risk factors from the activity and working posture among online motorcycle taxi drivers in Jakarta. Further investigation and research ergonomically are needed.

Keywords: Carpal Tunnel Syndrome, Motorcycle taxi driver, Rapid Upper Limb Assessment, Boston Carpal tunnel syndrome Questioner.

Introduction

Musculoskeletal disorders (MSDs) are complaints felt by someone with levels ranging from mild to severe (very painful). Usually, the areas where complaints will be felt are the joints, nerves muscles, and bones. One of the factors related to musculoskeletal disorders is occupational factors. These factors can arise from ergonomic exposure in the form of awkward posture, and static and repetitive movements, apart from that, physical and temperature exposures can also affect it such as temperature and vibration. Apart from work, individual factors such as gender, age, smoking years of service, and BMI could initiate MSDs.^{2,3}

One of the MSDs experienced by workers is Carpal Tunnel Syndrome (CTS) ⁴. From the physiology perspective, Carpal Tunnel Syndrome is characterized by increased pressure in the carpal tunnel and reduced nerve function in the wrist. CTS occurs at the rate of 1 to 3 cases per 1,000 people per year in the United States with the frequency of up to 50 cases per 1,000 people in this case, the incidence is 5% ⁵. The global prevalence of CTS in the total population throughout the world is estimated at 1-5%. Globally, this shows 276/100,000 people, but in other countries, such as England, the incidence of CTS sufferers reaches 7-16%. ⁶.

CTS is caused by repetitive use of the hands, either while working or playing. Inflammation of Tenosynovial swelling in the carpal tunnel can occur as a result of the symptoms.⁷ Motorcyclists and individuals who work in the online motorcycle taxi sector are at risk of developing CTS because they often use their hands. Motorcycle taxi riders are at risk of developing CTS due to wrong wrist position when gripping bicycle handlebars for a long period of time and repetitively. Nervous disorders can obstruct the blood supply to the hands and the wrists resulting in physical complaints in the wrists, this is caused by wrong working position or body posture. Riding a motorbike can cause stress for two reasons, namely repetitive movements and the risk of wrist injury. When operating a motorcycle handlebar; throttle (to control gas flow); front brake (for stopping); and clutch with the left hand, the hand is very vulnerable to the effects of engine vibrations. Uneven road surfaces can be one of the causes. Repeated incidents can occur in the wrist, causing tension.⁸

Carpal Tunnel Syndrome (CTS) can also be influenced by other variables, such as holding a flexed or extended position for a long time, using flexion muscles too often, and often being exposed to vibration for a long time⁹. One of the jobs as an online motorcycle taxi driver has a high risk. Suffer from CTS due to long working hours, awkward hand position, and repetitive movements. Based on the background and the results of observations from previous researchers, it can be concluded that motorbike riders who spend too long time, especially online motorcycle taxi drivers, have the potential to experience CTS symptoms. As the incident in Jakarta, frequent traffic jams have resulted in residents turning to use online motorcycle taxis. This study aims to determine the risk of the motorcycle taxi driver's upper limb using Rapid Upper Limb Assessment (RULA) and Carpal tunnel syndrome risk factor using the Boston Carpal Tunnel Syndrome Questionnaire (BTCSQ).

Methods

This study is a secondary analysis of collecting data as a Pilot Health Project of Online Motorcycle Drivers FKIK UKRIDA in December 2021. Data were captured using questionnaires to collect individual data such as gender, group age, physical activity, and history of the job. The standardized assessments are used in this study such as Rapid Upper Limb Assessment (RULA), and Boston Carpal Tunnel Questionnaire (BCTQ). The respondents' criteria were an online motorcycle taxi driver with a minimum of 1 year of working experience, at least 3 hours working duration per day, and

not clinically suffering from rheumatoid arthritis and wrist problems. The respondents were collected by giving invitations to the drivers when they worked in the FKIK UKRIDA area. They will be asked for their willingness to intake this study, get information and benefits, and sign the informed consent. There were 97 respondents. This study got approval from The Committee Ethic FKIK UKRIDA.

Results

Most of the respondents were male with their age more than 30 years old. They worked more than 3 hours every day and more than one year as drivers (Table 1). Based on their physical activity, there is no significant difference between them (Table 1).

Table 1. The Characteristic of Respondents

Characteristic	Frequency
Gender	
• Male	92 (94.85%)
• Female	5 (5.15%)
Age	
• ≤30 years	11 (11.34%)
• > 30 years	86 (88.66%)
Physical Activity	
• Yes	51 (52.58%)
• No	46 (47.42%)
Working hours in a day	
• ≤ 3 hours	2 (2.06%)
• > 3 hours	95 (97,94%)
Length of work	
• ≤ 1 year	17 (17.53)
• > 1 year	80 (82,47)

As their activity was using motorcycles, they were assessed for their ergonomic posture by Rapid Upper Limb Assessment (RULA). The majority of them were at moderate risk, and their scores were between 3 and 4 (table 2). There were two drivers with very high risk in ergonomic posture.

Table 2. The Results of Upper Limb Assessment (RULA)

Category	Frequency
• Low risk (1-2)	0 (0.00%)
• Moderate risk (3-4)	85 (87.63%)
• High Risk (5-6)	10 (10.31%)
• Very High Risk (7)	2 (2.06)

By using the Boston Carpal Tunnel Questionnaire (BCTQ), thirty-seven drivers reported their symptoms in mild conditions (38.14%). These symptoms have occurred on their wrist during their activities as drivers. They filled out this form based on their health conditions.

Table 3. The Results of the Boston Carpal Tunnel Questionnaire (BCTQ)

Category	Frequency
• No symptoms	60 (61.86%)
• Mild symptoms	37 (38.14%)

Discussion

In this study, it was found that 87.63% of drivers had moderate risk according to assessing the research results. This is evaluated by the Rapid Upper Limb Assessment (RULA). This was also found in several studies conducted by Rindu Febriyeni Utami in Bukittinggi with a similar 77% and Doli Okrianda in Padang with a similar 60.6% of drivers.^{10,11} This study, looks bigger than previous research. This is influenced by working hours in a day and the length of work as an online motorcycle taxi driver. This was also found by Anam and colleagues that age, length of work, rest time, and distance traveled have an influence on creating musculoskeletal disorders.¹²

As many as 38% of respondents suffered from complaints that led to Carpal Tunnel Syndrome. This is based on the questionnaire they filled out. In research conducted by Sari and friends using the same method, namely the Boston Carpal Tunnel Questionnaire (BCTQ), they also got a higher figure, namely 78.8% of respondents.¹³ This can be influenced by the length of work, duration of work each day, body mass index, or previous musculoskeletal disorders.¹⁴

Conclusion

Based on the analyzed results, it concluded that the work position with CTS experienced by online motorcycle taxi drivers in Jakarta based on the results of BCTSQ and RULA in online motorcycle taxi drivers have found that there's mild-moderate risk. In RULA, it was found that there were 87.6% of respondents were reported at moderate risk which had an impact on musculoskeletal problems, especially the upper limb. In the BCTSQ, the result showed that there were mild complaints in 38.1% of respondents regarding the wrist which was at risk of developing carpal tunnel syndrome. Further investigation is needed and changes in work posture may be needed.

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