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Driving and Back Pain among Online Motorcyclist Transportation in Jakarta

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Abstract

Introduction: Low Back Pain (LBP) is a musculoskeletal disorder in the form of pain in the lower back caused by various factors. One of the common factors is work. Work factors that can cause LBP are body position, posture, workplace design, repetition, duration of work, and work that forces labor. One of the risky jobs is being an online motorbike taxi driver ("Ojek"), one of Jakarta's most popular transportation types. By using an application to call, an online "Ojek" not only acts as a means of transporting people or goods but can also be used to buy goods and order food. The prolonged sitting position in static conditions and limited space to move around contribute to LBP in "Ojek" drivers. This study investigates the association between driving duration and LBP in "Ojek" drivers.

Methods: This was an observational analytic study with a cross-sectional approach on 63 male online "Ojek" drivers aged 25-35 with normal BMI who met the inclusion and exclusion criteria. The study was conducted in the Central Jakarta area in November-December 2019. The sampling technique is accidental sampling. Duration of the driving questionnaire and Nordic Low Back Pain Questionnaire were used to gather the data. A bivariate analysis test was conducted with a chi-square statistical test with $p \leq 0,05$.

Results: Thirty-eight online 'Ojek" drivers (60.32%) reported having LBP in the last 12 months. Bivariate analysis by chi-square statistical test found that the *p*-value equals 0.414 between driving duration and incidence.

Conclusion: Driving duration is unrelated to the incidence of lower back pain. LBP is most common in drivers driving more than 8 hours daily.

Keywords: driving duration - online drivers - low back pain - prolonged sitting - static condition

INTRODUCTION

Low back pain (LBP) is a musculoskeletal disorder in the form of pain in the lower back due to trauma to the vertebrae and surrounding nerves.[1] LBP significantly impacts sufferers, from productivity to the economy. In Indonesia, the prevalence of LBP sufferers is 18% of the population.[2] LBP can affect all ages, from children to adults. However, its prevalence increases with age, starting at 25, and among people under 45, LBP is the second most common reason to visit a physician after the common cold.[1]

Occupational factors related to body position, posture, workplace design, reps, length of work, and work that imposes energy can affect the occurrence of LBP. One of the jobs at risk of LBP is that of a motor vehicle driver. Motor vehicle drivers are exposed to many risk factors that can result in LBP in the form of work for drivers related to the length of sitting position in static conditions. A long sitting position will affect the lower spine and cause discomfort. If there are reps for a long time, it will cause pain in the lower back.

The vibrations produced by motor vehicles will cause injury to the *spinal cord* and cause pain.[3] In addition, limited space to move around and a lack of mechanical features that can support posture on the back will contribute to driver discomfort.[4] A study by Awang Lukman *et* al. among commercial drivers in Sabah shows that drivers exposed to whole-body vibration (WBV) probably have LBP.[5] Another study by Islami et al. in Bangkalan, East Java, also shows a relationship between sitting duration and the occurrence of LBP in online drivers.[6]

The high public interest in using *online* "Ojek" causes this transportation to be often used, so that the length of work of drivers also increases. Congestion that usually occurs in Jakarta also contributes to the increase in drivers' work length. The company's absence of a limit on working hours makes the length of work for *online* "Ojek" drivers uncontrollable. The risk factor for online drivers also increases, making online motorcycle taxi drivers more vulnerable to LBP. This study aims to know the relationship between driving time and the occurrence of LBP in online "Ojek" drivers, especially in Jakarta.

METHODS

Study Design

This is an analytical observational study with a cross-sectional approach. The study was conducted in Central Jakarta from November 2019 to April 2020.

Subject and Sampling method

The sample size was determined using the Snedecor and Cochran formula for simple prevalence studies with precision (0.05). A minimum of 61 respondents was determined and then increased to 66 after adjusting the sample size to allow for a dropout criteria rate of 10%. Sixty-three male respondents, aged 25-35, who are "Ojek" drivers that met inclusion criteria, were recruited through an accidental sampling method. The inclusion criteria are male, an online "Ojek" driver, aged 25-35 years, and having a BMI of 18.5-24.9. The exclusion criteria are doing strenuous exercise (> five times per week), having a job that requires lifting heavy weights, having a history of back trauma, having diseases and abnormality of the lower back (spondylosis, osteomyelitis, kyphosis, lordosis, scoliosis), Hypertension,

and diseases of internal organs (gastrointestinal diseases, kidney disease, and diseases of the pelvic organ) as well as smoking > 10 cigarettes per day.

Data Collection

The data was collected from November to December 2019 in areas around Bendungan Hilir, Central Jakarta, where many online “Ojek” drivers rest while waiting for incoming online jobs. In those areas, a brief explanation and informed consent are shared, and respondents can refuse to participate in the study. Duration of driving, personal data, and Nordic Musculoskeletal Questionnaire (NMQ) in Bahasa were obtained through personal interviews. The validity of the NMQ in Bahasa was tested by Ramdan et al. in 2018, with Cronbach's alpha reliability index of 0.726.7. The NMQ is in two well-differentiated structures. The first part, the general one, refers to symptoms in 9 body parts (neck, shoulders, elbows, wrists/hands, upper back, lower back, hip/thighs, knees, and ankles/feet) during the last 12 months/7 days. The second part refers to symptoms in three body parts (neck, shoulders, and lower back) throughout the subject's working life/7 days beforehand. To answer this questionnaire, the subjects were asked to answer "yes" or "no" to the following question: "Have you any time during the last 12 months had trouble (ache, pain, discomfort) followed by a list and body diagram of the nine different anatomical areas. If the respondent marked "yes", then the respondent was asked to answer the question "Have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble?" and "Have you had any trouble at any time during the last 7 days?"7 BMI data is obtained by measuring body weight and height and inspecting the driver's back to check for spinal abnormalities.

The study was conducted after receiving ethical approval from the ethical review commission of the Faculty of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, in November 2019, with the register number 03/11/KEP-FKIKUAJ/2019.

Statistical Analysis

Data were analyzed using Microsoft Excel and SPSS v19 software. This study used two types of tests: univariate and bivariate analysis. Univariate analysis was used to obtain the distribution of each variable. On the other hand, bivariate analysis was carried out with a Chi-square test to determine the association between driving time and LBP, with a p-value ≤ 0.05 considered statistically significant.

RESULTS

Sixty-three male online “Ojek” drivers participated in this study. More respondents are over 30 years old (55,56%). 74,60% of

respondents smoked less than ten cigarettes/day. Twenty-nine respondents (46,03%) exercise less than five times weekly and drive more than 8 hours daily. LBP was presented in 38 drivers (60,32%). (Table 1)

Both respondents aged less than 30 years and more than 30 years had the same percentage of suffering from LBP (30,16%). Smoking was more likely to suffer from LBP (50,79%) compared to non-smokers. LBP was more common in respondents who had never exercised their routines and driven more than 8 hours. A significant relationship was found between LBP and smoking (p=0.031) but no relationship with age or exercise routine. (Table 2). Driving duration showed no significant relationship with the incidence of LBP (p>0.05).

Table 1. Respondents' demographic characteristics

Variables	**Frequency (n=63)** (%)
Age	
<30 years	28 (44,44%)
>30 years	35 (55,56%)
Smoke	
Yes (<10 sticks/day)	47 (74,60%)
No	16 (25,40%)
Exercise	
Yes (<5 times/week)	29 (46,03%)
No	34 (53,97%)
Drive time*	
<6 hours	14 (22,22%)
6-8 hours	20 (31,75%)
>8 hours	29 (46,03%)
Symptom of LBP	
Yes	38 (60,32%)
No	25 (39,68%)

*Driving time based on the previous study.[8]

Table 2. Relationship between variables with LBP

Variables	**Symptoms of LBP**		***p*-value**
Age	**Yes**	**No**	
<30 years	19 (30,16%)	9 (14,28%)	0.274
>30 years	19 (30,16%)	16 (25,40%)	
Smoke			
Yes	32 (50,79%)	15 (23,81%)	0.031
No	6 (9,53%)	10 (15,87%)	
Routine exercise			
Yes	17 (26,99%)	12 (19,05%)	0.799
No	21 (33,33%)	13 (20,63%)	
Driving duration			
< 6 hours	7 (11,11%)	7 (11,11%)	
6-8 hours	11 (17,46%)	9 (14,29%)	0.414
>8 hours	20 (31,74%)	9 (14,29%)	

DISCUSSION

LBP risk factors can be divided into three parts: work factors, personal factors, and environmental factors. Only personal and work factors were obtained from the interview in this study. Data for personal factors include age, smoking habits, and exercise routine. Meanwhile, the data for the work factor is driving time in a day.

This study showed that there was no significant relationship between age and LBP. The small age range of respondents can affect these results, although LBP can affect various ages, even at a young age. A study by Kaptan et al. in Nigeria showed that Approximately half of the participants aged 24 years and younger have LBP at least once in their lifetime. They showed that the ratio of LBP complaints increases with age.[9] On the contrary, Meucci *et al. state* that the prevalence of LBP at 50 years is four times higher than at 18-30 years.[10] Similarly, Manchikanti et al. state that LBP is more common in aged individuals 45 years and older compared to younger individuals.[11] The other study by Wong et al. states that LBP is more at risk in retired adults than working adults. This is due to a decrease in tolerance to pain and a decrease in elasticity and muscle tone.[12]

Many studies have found that smoking is one of the causes of LBP. To avoid bias, this study only took smokers who smoked less than 10 cigarettes per day, as well as to see whether smoking less also affected the incidence of back pain. Through this study, we verify the relationship between smoking and the occurrence of LBP despite smoking only a few cigarettes a day. The chemical content in cigarettes, in the form of nicotine and carbon monoxide accumulated in the body, will inhibit the distribution of oxygen and nutrients to muscles, ligaments, and intervertebral discs. This can cause ischemia, which will lead to injury and LBP.[13] Furthermore, smoking is strongly associated with osteoporosis, which could induce vertebral bone density loss and bone microfractures. This long-term effect on bone tissues causes chronic inflammation and elevates the risk and extent of further spinal damage.[13] In addition, populations with smoking behaviors demonstrated a significantly lower pain threshold compared with that of non-smokers, indicating the over-amplification effect of smoking on pain perception signals.[13] These studies are in line with Xu et al. and Green et al., which show a relationship between smoking and LBP.[13,14] Their finding is that ever smoking, a greater number of cigarettes smoked daily, and higher smoking intensity are related to the development of LBP. They also found that female smokers are more likely to have an LBP compared with male smokers.[13] Good smoking cessation education needs to be provided to prevent the potential LBP occurrence.

There was no significant relationship between exercise routine and LBP in this study. Although exercise has many benefits in reducing the risk of LBP by increasing the flexibility of the back muscles and reducing stiffness in the lower back, the results are very dependent on the type of exercise, the duration of each exercise, and the length of time each respondent has been regularly exercising. This study's results are similar to those of a study by Sulaeman and Kunaefi, which also found no relationship between exercise habits and the occurrence of LBP in workers in the food and beverage industry in Cimahi, West Java.[15] It was reported that LBP was more frequent in people who exercised only on weekends than those who exercised daily. Exercising daily will increase muscle strength. This will increase spinal stabilization and reduce the risk of LBP.[16] Respondents in this study only exercised less than 5 times per week, affecting the study results. The lack of frequency of respondents doing sports may result in the benefits of exercise being done less optimally. The lack of information about the type of LBP respondents suffered also affected the study results. The exercises beneficial for LBP are aerobic fitness, muscle strengthening, and flexibility. Exercise should also be done gradually, starting from low intensity to avoid injury to muscles and joints, and should also be done regularly for at least 30 minutes.[16] The lack of data on the type of exercise performed, the duration of each exercise, and the length of each respondent's routine exercise can affect existing study results.

Driving time in this study showed no significant relationship with LBP symptoms. This may occur because the risk factors of LBP do not stand alone but are mutually exclusive. Related to each other. A previous study by Wanamo et al. found a correlation between driving time and LBP.[17] Ogundele et al. study states that LBP risk factors are multifactorial. The risk of LBP in motorbike taxi drivers increases when the driver sits for a long time (more than half of the working day), combined with whole-body vibration (WBV) produced by motor vehicles and incorrect posture.[18] A study by Awang Lukman et al. among commercial drivers in Sabah found that drivers exposed to WBV and sitting for a long time with awkward postures probably have more LBP than drivers exposed to only one of these risk factors.[5] WBV is produced by machines, poor motor vehicle design, and bad road conditions. WBV, along with poor posture, will increase the incidence of LBP. Both can cause excessive load on the spine and fatigue on the surrounding muscles. The type of motor vehicle also affects the occurrence of LBP because the vibrations produced vary, and if there is repetition for a long period of time, the factors mentioned above will increase the risk of LBP.[5]

When driving, the driver must maintain a static position for a long period of time. When a person sits with the upper limbs in a position of 90°, the lumbar area will flatten and cause a state of kyphosis. This situation can lead to stretching of the ligament and increased pressure of the intervertebral discs, leading to an increase in posterior annulus tension and emphasis on the pulpous nucleus.[19] This will cause LBP to occur. Incorrect posture, including sitting in a static state, limited movement, and a body that bends forward, also contribute to LBP.[18] Ogundele et al found that drivers who drive by bending forward are more at risk of developing LBP than drivers with an upright body position while driving. [18] Driving in a forward bent position, as sometimes happens at the "Ojek" driver position, increases the hydrostatic pressure of the nucleus pulposus and makes the posterior fibrous annulus stretch and thin. This condition increases the risk of disc rupture.[17]

There were several limitations during the implementation of this study. Data on respondents' driving time in a day is only based on respondents' memories, not on observations of working hours. Data based on online motorcycle taxi applications is unavailable because the application will automatically delete old data. The driving time of each respondent was different every day. Another limitation is that the age range is too small. This affects the study results, so the results contradict previous studies.

CONCLUSION

Driving time and LBP on online motorbike taxi drivers are unrelated. All driving ranges can cause LBP, but LBP tends to occur most in "Ojek" drivers who drive for more than 8 hours. In addition, smoking is related to LBP risk. Based on the results and discussion of this study, several suggestions can be conveyed, recording the time of online motorcycle taxi drivers when they start working and when they finish working.

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CONFLICT OF INTEREST

The author declares that there was no conflict of interest.

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