

Body Mass Index and Working Period Associated with Low Back Pain in Pedicab Drivers

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Abstract

Background: Low back pain (LBP), commonly referred to radiating low back pain or sciatica, is the discomfort between the ribcage and the gluteal folds. A risk factor for LBP is being overweight because weak abdominal muscles lead the center of gravity to shift forward, increasing lumbar lordosis and promoting exhaustion in the paravertebral muscles. A working period is an accumulation of one's work activities over a long period. If the activity is carried out continuously over the years can cause health problems.

Methods: This study was an observational analytic study using a cross-sectional study—a research population of pedicab drivers in Kemuning District, Palembang City. Classification data include age, gender, and body mass index

Results: Fifty-seven pedicab drivers met the requirements for participation. Bivariate analysis using the Chi-Square Test yielded a p-value of 0.038, indicating a significant association between BMI and low back pain, and a p-value of 0.025, indicating a significant association between length of employment and lower back pain.

Conclusion: BMI and working period had a significant relationship with lower back pain.

Keywords: low back pain, working period, body mass index

Abstrak

Pendahuluan: Nyeri Punggung Bawah (NPB) adalah nyeri di daerah punggung di antara tulang rusuk dan lipatan gluteal, termasuk juga nyeri ekstremitas yang menjalar karena gangguan punggung. Berat badan yang berlebih menyebabkan tonus otot abdomen lemah, sehingga pusat gravitasi seseorang akan terdorong ke depan dan menyebabkan lordosis lumbalis akan bertambah yang kemudian menimbulkan kelelahan pada otot paravertebra, hal ini merupakan risiko terjadinya LBP. Lama kerja merupakan akumulasi aktivitas kerja seseorang yang dilakukan dalam jangka waktu panjang yang apabila aktivitas tersebut dilakukan terus-menerus dalam jangka waktu bertahun-tahun dapat mengakibatkan gangguan kesehatan.

Metode: Penelitian ini adalah penelitian analitik observasional dengan menggunakan rancangan potong lintang (cross-sectional study). Populasi penelitian pengayuh becak di Kec.Kemuning, Kota Palembang. Data klasifikasi meliputi usia, jenis kelamin, indeks massa tubuh. Ditemukan 57 pengayuh becak yang memenuhi kriteria inklusi.

Hasil: Hasil analisis bivariat yang diperoleh dengan Uji Chi Square diperoleh nilai p sebesar 0.038, artinya terdapat hubungan yang signifikan antara IMT dengan nyeri punggung bawah dan nilai p sebesar 0.025 artinya terdapat hubungan yang signifikan antara lama kerja dengan nyeri punggung bawah.

Kesimpulan: IMT dan lama kerja mempunyai hubungan yang signifikan dengan nyeri punggung bawah.

Kata kunci: nyeri punggung bawah, usia, IMT

INTRODUCTION

Low back pain, often known as radiating low back pain or sciatica, is a type of back discomfort that occurs between the ribs and the gluteal folds. Most causes of lower back pain, a common health issue in the population, are related to work.¹ The World Health Organization (WHO) estimates that over 150 million people worldwide suffer from musculoskeletal conditions, including LBP, which can cause psychological and social issues due to chronic pain, inflammation, and functional impairment.² About 70% to 80% of people worldwide experience low back discomfort at least once in their lifetime.³ The prevalence of lower back pain in drivers, motorbike riders, or pedicab drivers is higher than in other jobs. Lower back pain from long sitting is a phenomenon that often occurs today.⁴ Pedicab is a modified tricycle widely used as a mode of transportation to carry passengers and baggage. Drivers of pedicabs perform strenuous physical labor while transporting people. Towers must also operate during the rainy and hot months. Pedicab drivers sometimes have to pull 2 or 3 times more weight than their weight. When pulling a rickshaw, they maintain a flexed lumbar position for a long time.⁵ The dominant position that causes discomfort in the lower back is prolonged flexion. Rickshaw pullers have the same body mechanics as cyclists while driving but have the added burden of pulling seats next to them.⁵

The Health and Safety Executive Seating at Work Guidance for Adults states that an unsuitable sitting position can cause changes in body posture leading to discomfort, back pain, and disorders of the upper extremities. Prolonged static sitting without rest can cause excessive burden, increased intradisc pressure, and tissue damage to the lumbar spine.⁶ Prolonged sitting has a negative effect on the nutrient flow in the intervertebral disc. Sitting for a long time in the wrong position will cause muscle tension and stretch the spinal ligament.^{6,7} Incorrect body position during sitting puts abnormal pressure on the tissue causing pain.⁸ Posture errors such as forward curved shoulders, forward protruding abdomen, and excessive lumbar lordosis can cause muscle spasms (muscle tension).^{4,9} This study aims to determine the relationship between mass index body and working period on pedicab drivers in Palembang. This is important to study until it can be an effort to prevent lower back pain in pedicab drivers.

METHODS

This study was an observational analytic study with a cross-sectional design. This research was conducted in Palembang. There were 57 Pedicab drivers in the Kemuning Subdistrict of Palembang City provided the information by filling out questionnaires by the proportionate stratified random sampling technique. The sampling technique first sets the units of population members in the form of strata based on the general characteristics of different population members. The selected sample is given a direct explanation of the purpose and objectives of the study. Then the sample is asked to fill in the personal data sheet and sign the consent sheet stating that the sample is understood and willing to be the research sample. Directly. The data taken in this study are primary data which include gender, age, and body mass index.

The inclusion criteria in this study were subjects who were willing to participate in the study and signed informed consent, a pedicab male who was > 20 years old, and a pedicab driver who pulled a rickshaw for more than one year. Exclusion criteria in this study were subjects with lower back pain due to disease or abnormalities in the spine, such as fractures, trauma to the spine, spinal abnormalities, scoliosis, lordosis, and others. Univariate analysis was carried out to obtain an overview of the frequency distribution of each variable under study, following data collection, tabulation, and presentation of categorical data utilizing frequency distribution tables. The results of the univariate analysis will be presented in the form of narratives and tables. Bivariate analysis was carried out to test the correlation between shared items with the occurrence of scabies. The Chi-square technique will carry out the bivariate analysis with the significance level (α) used is 0.05 by SPSS 2.0

This research has got the Ethical Approval from Health Research Review Committee of Faculty of Medicine Universitas Sriwijaya No: 017/kepkrsmhfkunsri/2019 referring to National Ethical Guidelines on Health and its supplements that the proposed health research is ethically liable and is approved to be carried out within.

RESULTS

The distribution of research subjects in this research can be seen in table 1. Most of the respondents are more than 40 years old with normal body mass index, and more than ten years of working period and there were 71.9% of them in low back pain condition.

Table 1. Distribution of Respondents

Characteristic	Amount (n)	Percentage (%)
Age		
≥ 40 years old	49	86,0
< 40 years old	8	14,0
Body Mass Index		
Overweight	9	15,8
Normal	42	73,7
Underweight	6	10,5
Duration of work		
>10 years	31	54,4
6-10 years	9	15,8
1-5 years	17	29,8
Low Back Pain		
(+)	41	71,9
(-)	16	28,1

Table 2 shows the relationship of BMI with lower back pain. Of 57 subjects, 15.8% had lower back pain, and 0.0% had no lower back pain with BMI > 25. Of 57 subjects, 49.1% had lower back pain, and 24.6% had no low back pain with BMI of 18.5-24.9. Of 57 subjects, 7.0% had lower back pain, and 3.5% had no low back pain with BMI ≤ 18.4.

Table 3 shows the length of work relationship with lower back pain. Of 57 subjects, 35.1% had lower back pain, and 19.3% had no lower back pain within a working period of > 10 years. Of the 57 subjects, 8.8% had low back pain, and 7.0% had no low back pain with 6-10 years of work. Of the 57 subjects, 28.1% had low back pain, and 1.8% had no low back pain with 1-5 years of work.

Table 2. Relationship between BMI and Lower Back Pain

BMI	LBP		LBP		P value
	(+)	(%)	(-)	(%)	
Overweight	9	15,8	0	0,0	0.038
Normal	28	49,1	14	24,6	
Underweight	4	7,0	2	3,5	
Total	41	71,9	16	28,1	

* *Chi-square Test*

Table 3. Relationship of Duration of Work with Lower Back Pain

Working Period	LBP		LBP		P-value
	+	(%)	-	(%)	
>10 years	20	35,1	11	19,3	0,025
6-10 years	5	8,8	4	7,0	
1-5 years	16	28,1	1	1,8	
Total	41		16		

DISCUSSIONS

Relationship Between BMI With Lower Back Pain

The results of the bivariate analysis obtained by the Chi-Square Test obtained a p-value of 0.038, meaning a significant relationship exists between BMI and low back pain. From these results, the subjects were less weight than six people (10%), normal body weight of 42 people (73.7%), and had an excessive body weight of nine people (15.8%).

This study examined the relationship between body mass index (BMI) categories of overweight and obesity and complaints of low back pain (LBP) in Udayana University medical faculty students in Denpasar, Bali. The results revealed that 33 respondents (54.1%) and 28 respondents (45.9%) had BMI categories of overweight or obesity, respectively.¹⁰¹¹ From the results of univariate analysis, it can be seen that there are quite a several students of the Medical Faculty of Udayana University who suffer from being overweight. For LBP complaints data, respondents in

this study experienced LBP complaints as many as 35 respondents (57.4%), while 26 did not experience LBP complaints (42.6%). This shows that LBP complaints are often experienced by overweight people, especially among Udayana University Medical Faculty students. The literature review states that someone with excess weight has a greater risk of experiencing LBP. Data obtained from the cross table results of the relationship between BMI in overweight and obesity with LBP complaints showed that respondents in the overweight BMI category had 14 people (23%) who experienced LBP complaints and 19 people (31.1%) who did not experience LBP complaints. In the BMI category obesity, respondents who experienced LBP complaints were 21 people (34.4%) and among those who did not experience LBP complaints were 7 people (11.5%). The study's results after the chi-square test to find the relationship between the overweight and obese categories of body mass index with complaints of low back pain in Udayana University Medical School students obtained a p-value of 0.01 ($p < 0.05$). The results of these statistical tests show a significant relationship between body mass index in the category of overweight and obesity with complaints of low back pain in students of the Faculty of Medicine, Udayana University. From the results of the cross table, the prevalence ratio that shows PR (prevalence ratio) with the number 0.25 means that the obesity category BMI tends to be 0.25 times riskier for experiencing LBP complaints compared to the overweight category BMI.¹⁰

The overweight has the risk of developing greater pain because the burden on the weighting joint will increase to allow low back pain. Excessive weight can cause tugging in the softback tissue.¹² Weight gain accompanied by changes in the projection of forwarding central gravity increases the burden borne by the paraspinal muscles (back muscles) and vertebrae (vertebrae) as a lever. Vertebrae (vertebrae) as pedophiles are located between the paraspinal muscle force and body weight protection. The quality of the paraspinal muscles' attraction when determining the body position's stability. Increasing the burden borne by the paraspinal and vertebral muscles is the beginning of complaints of back pain when standing. In chronic conditions, the body compensates by shifting the position of the vertebrae as the more advanced feeder follows a shift in central gravity and weight gain. The angle between vertebrae segments changes so that the body posture also changes while still being able to stand upright. For example, in central obesity patients and pregnant women,¹³

Excessive weight causes weak abdominal muscle tone so that the center of gravity of a person will be pushed forward and cause lumbar lordosis will increase, which then causes fatigue in paravertebral muscles. This is a risk of LBP.¹⁴ Weight also affects pressure compression of the spine in the lumbar region when making movements.¹⁰ From this, it is possible to have a relationship that overweight people can affect the flexibility of lumbar motion, which affects LBP complaints. A cross-sectional in 135 participants aged 25-62 years in Australia found that with the increasing BMI, significantly overweight and obesity, the duration of the onset of LBP symptoms also increased. This study also states that every 5 kg increase in body mass will cause an increase in pain intensity of up to 19%.⁸ Based on the research, it can be seen that the increase in BMI is closely related to the incidence of LBP.¹⁵

Relationship Between Working period and Lower Back Pain

The results of the bivariate analysis with the Chi-Square Test obtained a p-value of 0.025 means a significant relationship between the length of work and lower back pain. Regarding the relationship between BMI and working period on low back pain (LBP) in Farmers in Munca Village, Pesawaran District, with data of dengan 5 years, as many as 18 people (22.2%) and respondents with a working period of more than 5 years were 63 people (77.8%). The study's results after the chi-square test to find the relationship between BMI and duration of work on low back pain (LBP) in Farmers in Munca Village, Pesawaran District, were p-value of 0.295 ($p = 0.042$). Based on the results of the test statistically, it shows that there is a significant relationship between the length of work and the incidence of lower back pain.¹⁶ A working period is an accumulation of one's work activities over a long period. If the activity is carried out continuously over the years can lead to health problems.¹⁷ A person who works for more than five years will increase the risk of LBP compared to workers with fewer than five years of work. This is because someone with a more extended working period will be exposed to longer risk factors and also cause the disc cavity to constrict permanently, resulting in spinal degeneration, which is also influenced by the increase in the worker's age.¹⁸

According to the results of a statistical test analysis between years of work and complaints of lower back pain, the longer a person does the work, the higher the risk of experiencing a Musculoskeletal event, and in this case is a complaint of lower back pain.

Because complaints of lower back pain are a chronic symptom that takes time to develop, the longer a person is exposed to hearing musculoskeletal risk, the greater the risk of complaints of lower back pain. In addition, the length of work will also make the disc cavity narrow permanently and result in degeneration of the spine which will cause lower back pain.¹⁰ The researchers did not evaluate other factors (spinal bone anomalies, such as scoliosis in the elderly, smoking history, the type of pedicab, the Wall Test, etc.) that also affected lower back discomfort, which could have skewed the results of this study.¹⁹

CONCLUSION

Based on the research on the relationship between BMI and working period with low back pain in pedicab drivers in the city of Palembang, it can be concluded that there were 41 (71.9%) subjects who had low back pain. The average has a normal body weight; most have worked as pedicab drivers for over ten years. The data obtained in this study indicate that BMI and working period have a significant relationship with lower back pain.

Acknowledgment

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