

Radiologic Features SICMS

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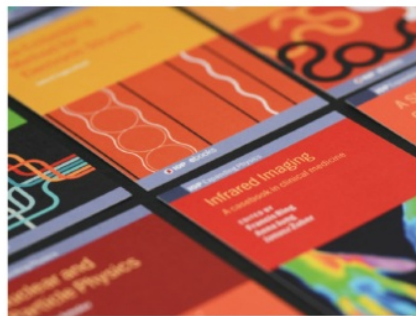
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A radiologic feature of spine related to musculoskeletal disorder on pedicab drivers

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Abstract. Musculoskeletal disorders (MSDs) is a health problem that was results from a work and reported form repetitious movement and awkward postures. The aim of this study is identifying MSDs on pedicab drivers and analyse the radiologic features of the spine (vertebral column) related to MSDs. The research was an observational study with 30 pedicab drivers in Palembang. Musculoskeletal disorders were identified from a Nordic questionnaire whereas other factors were measured using a self-data questionnaire, and anthropometric measurements. A radiologic feature of vertebral column was taken on X-Ray examination of thoracolumbalis spine on lateral and anteroposterior position. The results of this study show that there was a significance difference between lower back pain with lumbar spondylosis p -value = 0.042 ($p < \alpha$). A pedalling position on pedicab drivers that involves some muscles and bones that manifested to a radiologic feature of spine especially at lumbar spondylosis.

1. Introduction

Work-related musculoskeletal disorders (WMSDs) are common among drivers and official workers [1]. Musculoskeletal disorders (MSDs) are the most common cause of work-related disability with significant financial and medical cost [2]. Drivers have the highest prevalence of MSDs in comparison with other jobs [3]. Pedicab drivers generally complain a lot of pain such as the upper neck, lower neck, back, upper and right arms, upper and right arms, waist, buttocks, right and left calf, and left and right legs [4]. Job complaints can be caused due to the execution of the work performed manually with the unresponsiveness of working posture. This condition will impact more serious disease in the musculoskeletal. In 2014, the International Labor Organization (ILO) estimate worldwide every year 4 million people died by accident and occupational illness [5]. Excessive use of skeletal muscle will result in skeletal muscle disease [1]. Improper working posture such as bending, twisting, overreaching, repetitive task and uncomfortable posture contribute to musculoskeletal disorder (MSD) [6]. In America estimated at 6 million cases in a year or 300-400 cases in 100.000 workers. This problem causing lost workday to rest [7]. Musculoskeletal Disorders (MSDs) are disorders or soft-tissue injuries such as tendons, muscles, ligaments, joints, cartilage, and joints that can affect tissue including tendon, nerve sheaths, and related to bones, muscles, and nerves of hands, wrists, elbows, shoulders, neck, and back. These musculoskeletal disorders belong to a collection of health problems that are more prevalent among the working class than the general [1]. It resulted from a work-related event and reported form repetitious movement and awkward postures.



MSDs represent the second largest cause of short-term or temporary work disability [8]. It represents an occupational problem in public transportation drivers like pedicab driver that profession has a high risk for its workers towards the occurrence of body parts injury or skeletal muscle. Pedicab drivers who work in the market do not only carry passengers but also carry goods market [7]. Pedicab driver is a job done with a monotonous sitting position because the workers moving in the same position of movement for a long time [9]. This study aim is to identify musculoskeletal disorders on pedicab drivers and analyse the radiologic features of spine among pedicab drivers related to the musculoskeletal disorder that happened to them.

2. Methods

The research was an observational study with a cross-sectional design. The subject was 30 male pedicab drivers selected through incidental sampling technique. The subjects had a history of spinal injury or get MSDs before having this profession are excluded from this research.

The variables studied were age, body mass index, working time, smoking, family history. Musculoskeletal disorders was identified from a Nordic questionnaire whereas other factors were measured using a self-data questionnaire and anthropometric measurements. A radiologic feature of spine was taken on X-Ray examination of thoracolumbalis spine on lateral and anteroposterior position. Data were analyzed using Chi-square with SPSS statistics 22 and presented descriptively in the form of tables and narratives.

3. Results

From the table 1 shows that subject with age > 55 years is 16 people (53,3%), BMI mostly normal 25 people (83,3%), most respondents have smoking habit that is 24 people (80%) and the average duration of respondents worked in the hours of 9.2 hours and in the preceding year 26.13 years.

Table 1. Distribution of subject based on anthropometric and working period.

Characteristics	N	%
<i>Age</i>		
< 55 years	14	46,7
>= 55 years	16	53,3
<i>Body Mass Index (BMI)</i>		
Underweight	3	10,0
Normal	25	83,3
Overweight	2	6,7
<i>Smoking</i>		
No	6	20,0
Yes	24	80,0
<i>Working period in hours/day</i>		
Mean ± SD	9,20 ± 2,18	
Min-max	5 - 14	
<i>Working period in years</i>		
Mean ± SD	26,13 ± 10,98	
Min-max	6 - 50	
Total	30	100

It was found that from 30 respondents who experienced upper back pain is 9 people (30%) while respondents who experienced lower back pain is 23 people (76,7%). Radiologic feature of spine shows

the curvature of vertebral column (Fig 1). It shows scoliosis is a sideways curvature of the spine in 5 people (16,7%) with thoracic spondylosis 29 people (96,7%) and lumbar spondylosis 21 people (70%).



Figure 1. Radiologic features of spine; scoliosis; thoracic-lumbar spondylosis

Table 2. The relationship between risk factors with thoracic spondylosis.

Risk factors	<i>p value</i> <i>Thoracic Spondylosis</i>	<i>p value</i> <i>Lumbar Spondylosis</i>
<i>Age</i>	0,467	0,781
<i>Smoking</i>	1,000	0,156
<i>BMI</i>	0,902	0,917
<i>Working period/day</i>	0,139	0,218
<i>Working period/year</i>	0,518	0,802

The table 2 shows that there is no relationship between age, smoking, BMI, length of work in a day, length of work in a year against thoracic and lumbar spondylitis.

Table 3. The relationship between back pain and thoracic spondylosis.

Pain location	<i>Thoracic Spondylosis</i>		Total	<i>p-value</i>
	-	+		
<i>Upper Back</i>				
No	1 (4,8%)	20 (95,2%)	21 (100%)	1,000
Yes	0 (0%)	9 (100%)	9 (100%)	
<i>Low Back</i>				
No	1 (14,3%)	6 (85,7%)	7 (100%)	0,233
Yes	0 (0%)	23 (100%)	23 (100%)	
Total	1 (3,3%)	29 (96,7%)	30 (100%)	

The table 3 shows that there is no association between back pain with thoracic spondylosis. The result of a statistical test by using chi-square got $p\text{-value} = 0,687$ ($p > \alpha$) meaning there is no relation between upper back pain with lumbar spondylosis. However, there is a relationship between lower back pain with lumbar spondylosis $p\text{-value} = 0.042$ ($p < \alpha$).

Table 4. The relationship between back pain and lumbar spondylosis.

Pain location	Lumbar Spondylosis		Total	<i>p-value</i>
	-	+		
<i>Upper Back</i>				
-	7 (33,3%)	14 (66,7%)	21 (100%)	0,687
+	4 (44,4%)	5 (55,6%)	9 (100%)	
<i>Low Back</i>				
-	6 (66,7%)	3 (33,3%)	9 (100%)	0,042
+	5 (23,8%)	16 (76,2%)	21 (100%)	
Total	11 (36,7%)	19 (63,3%)	30 (100%)	

Table 5. The relationship between back pain and scoliosis.

Pain Location	Scoliosis		Total	<i>p-value</i>
	-	+		
<i>Upper Back</i>				
-	17 (81%)	4 (19%)	21 (100%)	1,000
+	8 (88,9%)	1 (11,1%)	9 (100%)	
<i>Low Back</i>				
-	8 (88,9%)	1 (11,1%)	9 (100%)	1,000
+	17 (81%)	4 (19%)	21 (100%)	
Total	11 (36,7%)	19 (63,3%)	30 (100%)	

The result of a statistical test by using chi-square got $p\text{-value} = 1,000$ ($p > \alpha$) meaning there is no relation between back pain with scoliosis.

4. Discussions

A good physical condition is needed by every worker, and one of the jobs that need that condition is a pedicab driver. Pedicab (becak) is a traditional transportation that uses human power as a driver. Pedicab drivers have a high-risk injury to skeletal muscle. Pedalling activity requires a considerable amount of energy [10]. Improper design of rickshaws makes the conditions and working positions are not ergonomic, so it will provide a static workload on the limbs. The design of the pedicab used causes the body part to move away from the natural position, so pedicab drivers generally complain of pain in the upper neck, lower neck, back, upper right arm, waist, buttocks, buttocks, left forearm, right forearm, left, right hand, left thigh, right thigh, right knee, left calf, right calf, left leg and right foot [11].

Biomechanical factors play an important role in the emergence of MSDs in pedicab drivers because this work requires repetitive movements such as pedalling and transportation (human/goods). In the occupational health science literature, several factors have been described to cause work-related illnesses: biological factors (bacteria, viruses, fungi, animals, plants), chemical factors (toxic and hazardous materials or radioactive), physical factors (pressure, temperature, noise, light), biomechanical factors (posture, repetitive motion, manual hauling), and psychological factors (Stress, etc. From the results of the above research, occupational diseases in pedicab drivers include back pain at the top and bottom supported by the vertebral column. This happens because the sitting position that keeps repeating and carrying heavy loads causes the back and the edge to feel pain and cause aches. Long-lasting pain conditions within decades allow for changes in the anatomical structures of the body such as bones, muscles, tendons, and ligaments [4].

A low back pain complaint is a chronic symptom that takes a long time to develop, so the longer a person works who is exposed to musculoskeletal risk, the greater the risk of low-back pain. Workers who have a long working period will perform the same movement and repeated, so this trigger the occurrence of tissue fatigue, the muscle tissue that can cause overuse, so it can cause muscle spasm. In addition, long working periods will also make the disc cavity narrow permanently and will lead to degeneration of the spine that will cause lower back pain [10]. This is likely due to pedalling position is the most frequent position is sitting in a pedalling position that involves some muscles and bones in the area of superior extremity that starts from the Lumbar vertebrae L1-L5 and sacral vertebrae. Risk factors for low back pain include age, body mass index, pregnancy, and psychological factors. An elderly person will experience low back pain (LBP) because of the decline in body functions, especially bone, so it is no longer elastic as in the young. Posture errors such as shoulders arched forward, belly bulging forward and excessive lumbar lordosis can cause muscle spasms (muscle tension). This is the most common cause of LBP [11]. Other risk factors include lifting heavy loads or lifting weights beyond the body's capability and sitting for long periods such as sitting in a car, truck or sitting on a chair that does not hold the posture well. The long smoking history had a significant association with lower back pain and lumbosacral radicular pain [12].

The muscles of the back contracts in the long term become tense and eventually arise pain. Muscle work will increase with poor posture, micro, and macro trauma. The result is a phase of compression and tension become longer than relaxation, the occurrence of a state of overload (critical load) and also the muscle experiencing rapid fatigue. Trauma in the tissues, both acute and chronic will lead to sequential events of hyperalgesia, skeletal muscle spasms, and capillary vasoconstriction. As a result, the myofascial tissue builds up the nutrients and oxygen to the tissues, leaving untreated tissue fibers and causing ischemia in the myofascial tissue. The ischemic state causes the circulation to decrease, resulting in a lack of nutrients and oxygen and the accumulation of metabolic waste resulting in an inflammatory process. The inflammatory process may also induce a neuromuscular response of muscle tension around the affected area and vicious circles arise. A chronic inflammation stimulates the substance of P to produce algogens in the form of prostaglandins, bradykinin and serotonin which can cause pain sensation [13].

5. Conclusions

Long-lasting pain conditions within decades allow for changes in the anatomical structures of the body such as bones, muscles, tendons, and ligaments. Due to pedicab drivers is the most frequent position is sitting in a pedalling position that involves some muscles and bones that manifested from a radiologic feature of spine.

6. References

- [1] Mozafari A, Vahedian M, Mohebi S and Najafi M 2015 Work-related musculoskeletal disorders in truck drivers and official workers *Acta Med. Iran.* **53** 432–8
- [2] Septadina I S and Legiran L 2014 Nyeri pinggang dan faktor-faktor risiko yang mempengaruhinya *J. Keperawatan Sriwij.* **1** 6–11
- [3] Aminian O, Jamshidi Z, Seifmanesh S, Mehrdad R, Sadeghniaat-Haghighi K and Sekhavati E 2016 Musculoskeletal disorders among Truck and taxi drivers: A retrospective study *Int. J. Med. Res. Heal. Sci.* **5** 309–15
- [4] Suciati T and Septadina I S 2018 Gambaran radiologis calcaneus pada pengayuh becak *J. Keperawatan Sriwij.* **5** 59–64
- [5] Office I L 2017 Fixing Teacher Professional Development *Working together to promote a safe and healthy working environment* vol 106 (Geneva: International Labour Office) pp 470–476
- [6] Zein R M, Halim I, Azis N A, Saptari A and Kamat S rahayu 2015 A survey on working postures among malaysian industrial worker *Procedia Manuf.* **2** 450–9

- [7] Mukaromah E, Suroto and Widjasena B 2017 Analisis Faktor Risiko Gangguan Muskuloskeletal Pada Pengayuh Becak (Studi Kasus Di Pasar Pagi Kabupaten Pematang) **5** 341–9
- [8] Damayanti S, Zorem M and Pankaj B 2017 Occurence of Work Related Musculoskeletal Disorders among School Teachers in Eastern and Northeastern Part of India *Int. J. Musculoskeletal Pain Prev.* **2**
- [9] Yudiantyo W and Suhardja C 2013 Perancangan Becak Motor Ditinjau dari Segi Ergonomi *Integra* **3** 139–55
- [10] Pratiwi M, Setyaningsih Y and Kurniawan B 2009 Beberapa Faktor Yang Berpengaruh Terhadap Keluhan Nyeri Punggung Bawah Pada Penjual Jamu Gendong *J. Promosi Kesehat. Indones.* **4** 61–7
- [11] Hasan M Keriri 2013 Prevalence and risk factors of low back pain among nurses in operating rooms, Taif, Saudi Arabia *J. Med. Sci. Res.* **4** 3
- [12] Lionel K A 2014 Risk Factors for Chronic Low Back Pain *J Community Med Heal. Educ* **4** 271
- [13] Makmuriyah and Sugijanto 2013 Iontophoresis Diclofenac lebih efektif dibandingkan ultrasound terhadap pengurangan nyeri pada myofascial syndrom musculus *J. Fisioter.* **13** 17–32

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