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Inflammatory Indicators and Radiological Features of Vertebral Column Weaving Craftsmen

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ABSTRACT

Static sitting conditions in the weaving craftsmen for a long time can cause negative effects in terms of health, especially in musculoskeletal complaints such as muscle pain, spinal pain, and cramps. Complaints of musculoskeletal disorders need to be treated well because if the pain is left it can spread to the extremities, and increase the risk of other diseases. This study was conducted to determine the effects of musculoskeletal disorders (MD) on weaving craftsmen in Palembang to radiologic features of the vertebral column, and inflammatory indicators. The research is an observational analytic study with a cross-sectional design. The population of this research is 30 public weaving craftsmen in Palembang. The variables studied were age, working time, radiologic features by X-Ray examination. Low Back Pain (LBP) was identified from a Nordic questionnaire whereas other factors were measured using a self-data questionnaire. Data were analyzed using Chi-square method. The results of the analysis of the difference in low back pain based on radiological images (X-ray) found that there was no significant difference between the mean low back pain scores based on the radiological picture (p-value = 0.641) P> α. The results of the correlation analysis of low back pain with degrees of disability found that there was no significant correlation between low back pain with CRP (p-value = 0.780) p> α, with a Correlation Coefficient (r) = -0.53 meaning the strength of the correlation between low back pain with SRT category is very weak with negative correlation direction.

Keywords: radiologic feature, weaving craftsmen

1. INTRODUCTION

Jobs are at risk of experiencing musculoskeletal disorders one of which is the craftsman. Craftsmen on average have a working time of about 10 hours every day with a static sitting position and a monotonous work duration with limited workspace and do not allow for free body movement.[1] Static sitting conditions for a long time that can cause negative effects in terms of health, especially in musculoskeletal complaints such as muscle pain, spinal pain, and cramps.[2] Complaints of low back pain need to be treated well because if the pain is left it can spread to the extremities, and increase the risk of other diseases.[3]

Previous research states that there is a relationship between long sitting posture flexion (bending) with self-reported low back pain (LBP) in the past month.[4] The relationship of sitting duration with MD complaints was also investigated in 2014 which revealed that there was a relationship between sitting time (p = 0,000) and sitting attitude (0.014) with complaints of low back pain. The study also explained that someone who sat for more than 4 hours had a 1.661 times greater risk of experiencing lower back pain compared to someone who sat for less than 4 hours. The risk of LBP complaints in someone with a bent-sitting attitude was found to be 2.657 times higher than someone with an upright sitting attitude.[5]

The Health and Safety Executive Seating at Work Guidance for Adults states that improper sitting positions can cause changes in body posture, causing discomfort, back pain and disruption in the upper limb. Prolonged static sitting without resting can cause excessive loads, increased intradiscal pressure and tissue damage in the lumbar vertebra.[6]

There was a significant difference between lower back pain with lumbar spondylosis p-value = 0.042 (p <α). A static position on weaving craftsmen that involves some muscles and bones that manifested to a radiologic feature of spine especially scoliosis.[7] This study was conducted to determine the effects of musculoskeletal disorders (MD) on craftsmen in Palembang to radiologic features of vertebral column and inflammatory indicators.

2. METHODS

The research is an observational analytic study with cross sectional design. The population of this research is 30 public weaving craftsman in Palembang who fulfilled the inclusion and exclusion criteria selected through incidental sampling technique. The variables studied were age, working time, radiologic features by X-Ray examination. Low Back Pain (LBP) was identified from a Nordic questionnaire whereas other factors were measured using a self-data questionnaire. Data were analyzed using Chi-square test.

3. RESULTS

The analysis of a frequency distribution based on characteristics got that 30 of the weaving craftsmen obtained 29 years in average age. At least 15 years and the maximum age 52 years. Most of them are female 53,3 % with duration of work more than three years are 40%.

Table 1.Characteristic of subjects

Characteristic	Amount (n)	(%)
Age		
- < 20 years	7	23,3
- 20 - 35 years	12	40,0
- > 35 years	11	36,7
Mean ± SD Med(Min-Max)	**29,70 ± 11,29 29 (15 - 52)**	
Sex		
- Male	14	46,7
- Female	16	53,3
Work duration		
- < 1 year	7	23,3
- 1 - 3 years	11	36,7
- >3 years	12	40,0

The radiologic features showed that there were 43,3% the weaving craftsmen with scoliosis thoracic, and most of them have spondylosis and good appearance of discus intervertebral. The results of the frequency distribution analysis based on disability scale found that from 30 craftsmen of low back pain about 93.3 % mild disability, while moderate disability 3.3 %, and severe disability 3.3 %. The measurement result of the pain scale with the Nordic body was shown on table 2

Table 2. Nordic Body Map measurement

Nordic Body Map	Mean ± SD	Median	Min-Max
Waist Score	1,70 ± 1,46	1	0 - 6
Oswetry LBP	3,86 ± 4,57	1	1 - 21
Score %	7,73 ± 9,15	2	0- 42

The results of age correlation analysis with low back pain (LBP Oswetri Score) found that there was a significant correlation between age and low back pain (LBP Oswetri Score) (p-value = 0,000) p <α, with Correlation Coefficient value (r) = 0.621 meaning the

strength of correlation between age and low back pain (LBP Oswetri Score) in the moderate category with a positive correlation direction. The older the craftsman, the higher the lower back pain score.

The results of correlation analysis of low back pain with disability found that there was a significant correlation between low back pain with disability (p-value = 0.030) p <α, with a Correlation Coefficient value (r) = 0.396 meaning the strength of the correlation between low back pain with degrees of disability was weak with a positive correlation direction. The results of the correlation analysis of low back pain with degrees of disability found that there was no significant correlation between low back pain with CRP (p-value = 0.780) p> α, with a Correlation Coefficient (r) = -0.53 meaning the strength of the correlation between low back pain with SRT category is very weak with negative correlation direction. The results of the analysis in table 3 and table 4.

Table 3. Relatioship between the characteristics with the disability

Age	**Disability**				
	Mild	Moderate	Severe	Total	***p value***
	n (%)	n (%)	n (%)	n (%)	
<20 years	7 (100,0)	0 (0)	0 (0)	7 (100,0)	
20-35 years	12 (100,0)	0 (0)	0 (0)	12 (100,0)	0,448
>35 years	9 (81,8)	1 (9,1)	1 (9,1)	11 (100,0)	
Male	13 (92,9)	1 (7,1)	0 (0)	14 (100,0)	
Female	15 (93,8)	0 (0)	1 (6,3)	16 (100,0)	0,364
<1 years	7 (100,0)	0 (0)	0 (0)	7 (100,0)	0,514
1-3 years	10 (90,9)	0 (0)	1(9,1)	11 (100,0)	
>3 years	11 (91,7)	1 (8,3)	0 (0)	12 (100,0)	

Table 3.4 Correlation between lowbackpain with inflammatory indicators (CRP)

	n	Sig.	*Correlation Coefficient (r)*
Low back pain	30	0,780	-0,53
CRP	30		

The results of the analysis of the difference in low back pain based on radiological images (X-ray) found that there was no significant difference between the average low back pain scores based on the radiological picture (p-value = 0.641) P> α. The results of the analysis in table 5.

Table 5. Low back pain based on radiologic features

Radiologic features	n	Pain Scale Mean ± SD	*p value*
Skoliosis	13	1,84 ± 1,46	0,641
Normal	17	1,58 ± 1,50	

**t test*

4. DISCUSSIONS

The incidence of lower back pain increases with age, and its prevalence in the elderly population ages 40 and up is 20-40% higher.[8] This study showed a significant association between age and LBP with p = 0.044. This is by following research which based on the results of statistical analysis, obtained value (p = 0.004) which can be concluded that there is a significant relationship between age with the incidence of low back pain.[9] At the age of 30 years, degeneration occurs in the form of tissue damage, tissue replaced by scar tissue, and fluid reduction. This causes the stability of the bones and muscles to be reduced. So the older a person, the higher the risk the person is experiencing a decrease in bone elasticity, which triggers the onset of symptoms musculoskeletal disorders. Skeletal muscle complaints begin to be felt at the working-age of 25-65 years. Muscle strength decreases as the number of muscle fibers decrease since the age of 25.[10]

The results showed there was no significant association between working period and low back pain (p = 0.514). In this study, it is known that there is a relationship between the working period with subjective complaints on the back of sarong weaving workers.[8] 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 triggers the occurrence of tissue fatigue, the muscle tissue that can cause overuse, so it can cause muscle spasm. Besides, 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.[11]

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.[12] 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 at 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 viscous 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

There was no significant correlation between low back pain with radiologic features and CRP (p-value = 0.780) p> α, with a Correlation Coefficient (r) = -0.53 meaning the strength of the correlation between low back pain with SRT category is very weak with negative correlation direction.

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