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Lumbal Flexibility in Songket Craftsmen in Palembang

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Abstract

Introduction. Flexibility in the human body is the range of abilities of certain joints or groups of joints in functional unity to move optimally,smoothly and pain-free. Lumbar flexibility is one of the most important factors that support daily human movement activities, such as walking and bending. Decreased lumbar flexibility occurs as human ages, this is also influenced by other related musculoskeletal complaints such as low back pain. Songket craftsmen generally have complaints of low back pain, due to the position and duration of work. This study was conducted to determine the relation of low back pain complaints with lumbar flexibility among weaving craftsmen in Palembang.

Method. This research is an observational analytic study with cross sectional design using total sampling technique. Subjects were 31 weaving craftsmen in the city of Palembang. Lower back flexibility is measured using the Sit and Reach Test method. Data were analyzed using the Gamma Correlation test.

Results. There is a significant moderate relation with a negative direction between lower back pain and lumbar flexibility in songket craftsmen ($p = 0.022$). The study shows that below normal lumbar flexibility scores were found in 11 people consisting of 9 male subjects (29.03%) and 8 subjects age 18-27 years old subjects (25.80%).

Conclusion. There is significant relation between lower back pain in lumbar flexibility in Songket craftmen in Palembang.

Keywords: Low Back Pain, Lumbal Flexibility

Introduction

Songket cloth is one of the characteristics of the city of Palembang which not only has a high selling value in the local market but also internationally. The woven fabric industry is one of the largest cottage industries in the city of Palembang. The number of weaving craftsmen in Palembang is estimated to be 245 people, with the majority being women.[1] In order to produce such high-priced woven fabrics, it is not uncommon for craftsmen to work without considering ergonomic aspects, both from the work methods and work facilities used. *The Occupational Safety and Health Administration (OSHA)* states that sewing has the risk of causing ergonomic problems.[2] One important aspect of ergonomics is the position at work and the length of time the job is performed. In the case of a songket craftsman, it is sitting in a static position for a long time.[3] Sitting for a long duration can put excessive load on the lumbar vertebrae. Sitting too long in the wrong position will result in increased ligament stretching and also tension in the spinal muscles. This can cause pain in the lower back as well as impact on lumbar flexibility.[4]

Low back pain (NPB) is pain or discomfort that is localized in the back area below the last rib angle (costal margin) to the lumbosacral (around the coccyx) with or without pain in the leg area. Pain can also spread to other areas such as the upper back and groin.[5]

The results of a study conducted by the Indonesian Association of Neurologists (PERDOSSI) in patients at the Cipto Mangunkusumo Hospital (RSCM) Neurology Polyclinic in 2002 found that the prevalence of NPB sufferers was 15.6%, the second highest after cephalgia. Based on research conducted by the Community Oriented Program for Control of Rheumatic Disease (COPCORD) in 2004, the incidence of NPB in Indonesia shows 18.2% in men and 13.6% in women.[5]

Low back pain is rarely fatal, but it can lead to a decrease in the functional ability of an individual with a decrease in lumbar flexibility that hinders the activities of daily living. This will directly cause a decrease in the quality of life of the individual.[6]

Flexibility in the human body is generally defined as the range of the ability of a particular joint or group of joints in a functional unit to move smoothly and pain-free.[7]

Lumbar muscle flexibility refers specifically to the maximum range of motion of the muscles in the lumbar region. Flexibility is one of the most important components that determine

human movement activity. Good flexibility can provide positive benefits for muscles and joints by assisting in injury prevention, helping to minimize muscle soreness, and increasing efficiency in all physical activities.[8] Many variables that can cause decreased flexibility include trauma, inactivity, and also a lack of stretch.[9]

Education and socialization regarding good work ergonomics is very important for non-formal workers such as songket craftsmen in Palembang City, to prevent musculoskeletal disorders that can cause disabilities in the future. This study was conducted to determine the relationship between the incidence of low back pain and lumbar flexibility specifically in songket craftsmen in Palembang City. Decreased lumbar flexibility is a progressive musculoskeletal disorder that is influenced by several internal and external factors, therefore early intervention is needed to ensure an individual's quality of life.

Methods

This study is an observational analytic study with a *cross-sectional* design approach to determine the correlation between low back pain and lumbar flexibility in weaving craftsmen in Palembang. The population of this research is songket craftsmen in Palembang City. The target population of this research is all weaving craftsmen in Palembang City, the affordable population is the combination weaving craftsmen at Tuan Kentang Fabric Center. The sample of this research is weaving craftsmen in Palembang who meet the inclusion and exclusion criteria.

Results

Distribution of Subjects by Gender and Age

All subjects in this study were 31 weaving craftsmen with 19 more male subjects than women (61.29%). The subject is divided into 5 age categories with the oldest subject is 60 years as many as 1 person, and the youngest age is 18 years as many as 2 people. Most of the subjects were in the age category 18-27 years (38.7%) and the least age category found in the subjects was 48-57 and> 57 (6.5%). The distribution of research subjects based on gender and age can be seen in table 1.

Table 1.Distribution of Subjects by Gender and Age (n = 31)

	N	%
Gender		
Male	19	61.29%
Female	12	38.70%
Age		
18-27 years	12	38.7%
28-37 years	7	22.6%
38-47 years	8	25.8%
48-57 years	2	6.5%
>57 years	2	6.5%

Distribution of Subjects by Degree of Oswetry Disability

As can be seen in Table 2. out of 31 weaving craftsmen aged 18-60 years who experienced complaints of low back pain, most of the study subjects were at the minimum disability level, namely 26 people (83.87%). Meanwhile, the level of moderate disability was only found in the age range of 28- 47 years as many as 3 people (9.67%), and the level of severe disability was only found in the age range of 38-57 years as many as 2 people (6.45%).

Table 2. Distribution of Subjects by Degree of Oswetry Disability (n = 31)

Demographic Status		Degree of Oswetry Disability			Total
		Severe	Moderate	Minimal	
Gender	Male	1	2	16	19
	Female	1	1	10	12
Total		2	3	26	31
Age	>57 Years	0	0	2	2
	48-57 Years	1	0	1	2
	38-47 Years	1	1	6	8
	28-37 Years	0	2	5	7
	18-27 Years	0	0	12	12
Total		2	3	26	31

Distribution of Subjects According to Lumbar Flexibility (Sit and Reach Test Score)

Data on lumbar flexibility were obtained through the implementation of sit and reach tests with the results of subject distribution according to lumbar flexibility which can be seen in table 3.The

		Lumbar Flexibility			
Demographic Status		Sub-Normal	Normal	Up-Normal	Total
Gender	Male	9	4	6	19
	Female	2	3	7	12
Total		11	7	13	31
Age	>57 Years	1	0	1	2
	48-57 Years	0	1	1	2
	38-47 Years	2	1	5	8
	28-37 Years	0	3	4	7
	18-27 Years	8	2	2	12
Total		11	7	13	31

majority of subjects who had flexibility below normal were male as many as 9 people (29.03%) and subjects who were in the age range of 18 -27 years as many as 8 people (25.80%).

Table 3.Distribution of Subjects by Lumbar Flexibility (n = 31)

Relation of Lower Back Pain with Lumbar Flexibility

The results of measuring lumbar flexibility using a *sit and reach test* for weaving craftsmen obtained a median value of 31 cm with a minimum value of 15 cm and a maximum value of 50 cm. The results of the bivariate analysis using *the Gamma correlation* test showed the value of the correlation coefficient -0.736 and p = 0.022 (p <0.05). This means that statistically there is a moderate to negative relationship between complaints of low back pain and lumbar flexibility which has clinical significance. The results of the bivariate analysis can be seen in **table 4.**

Table 4. Relationship of Low Back Pain Complaints with Lumbar Flexibility

Lower Back Pain	Lumbar Flexibility						Total		P Value	Correlation Coefficient (CI 95%)
	Sub-normal		Normal		Up Normal					
	n	%	n	%	N	%	N	%		
Severe	0	0	1	3.22	1	3.22	2	6.45	0.022	-0.736
Medium	0	0	0	0	3	9.67	3	9.67		
Minimal	11	35.48	6	19.35	9	29.03	26	83.87		
Total							31	100		

Discussion

In this study, all subjects observed were weaving craftsmen who met the inclusion and exclusion criteria. Of the 31 craftsmen who were research subjects, it was found that the youngest subject was 18 years old and the oldest was 60 years old. Ages 18 - 60 years are included in the productive age where at this age humans are at their peak activity. Physical activity that is carried out tends to be heavier than at other ages. Productive age population is the working age population who can produce goods and services. The central statistical agency divides Indonesia's population into 3 age groups, namely, the population group aged 0-14 years

is considered a population group that is not economically productive, the population group aged 15-64 years is a productive population group, and a population group aged 64 years and over. as a group that is no longer productive [10].

The age of the most research subjects was the age range of 18-27 years, as many as 12 people (38.7%), while the age of the least research subjects was the age range of more than 48 years, namely 4 people (12.9%). This is in accordance with data on the age of employment by the Central Statistics Agency (BPS) which shows that the highest frequency of working age is in the 20-39 years age range, and then decreases in the age range above 39 years.[11] Humans have the maximum level of fitness and body strength. at productive age, this underlies why family members who earn a living generally come from groups of productive age people[12]

In this study, it was found that the highest average value of lower back flexibility in weaving craftsmen was at the age of 42 years, namely 50cm, while the lowest average value of lumbar flexibility for weaving craftsmen was at the age of 25 years, namely 15cm. Age is an important factor affecting lumbar flexibility.[13]

As children age, bone and muscle growth plays an important role in the development of strength and flexibility. Lumbar flexibility has improved significantly from childhood to early adolescence. WHO sets the age limit for adolescents divided into three parts, namely early adolescents aged 10-13 years, middle adolescents 14-16 years, and late adolescents 17-20 years.At the age of 17 years, generally, lumbar flexibility begins to decline due to decreased physical activity in late adolescence, and decreased flexibility continues into adulthood.[14] Decreased lumbar flexibility in adolescents is also associated with decreased physical activity. Today's teenagers spend more time indoors playing on their smart phones compared to playing ball on the field, which causes a teenager to sit static for a long time and often in a sitting position that is not ergonomic, resulting in tension in the muscles and ligaments of the lower back that can causing limited motion of the lower back joints.[15] When entering adulthood, there are several physiological changes that can be exacerbated by limited physical activity in the form of decreased function and muscle mass, increased intramuscular connective tissue tension, and biochemical changes in collagen ligaments that can inhibit the movement of collagen fibers against each other, which then causes a decrease. lumbar flexibility. This has led to the finding of decreased lumbar flexibility in craftsmen aged 18-27 years.

Physical activity not only affects lumbar flexibility in young productive age subjects but also affects late productive age subjects, this is evidenced by the results of the *sit and reach test* with the highest score of 50cm in female subjects aged 42 years who are former pencak silat athletes. Regular stretching activities can help maintain the flexibility of the human body[16]

From the results of this study it was found that the level of lumbar flexibility was higher in women than in men. The same thing has also been stated by 17 in his research. Evidenced by the results of the *sit and reach test* score, which shows flexibility scores above normal are more in women, namely 7 people (22.58%) and flexibility scores below normal are more common in men, namely as many as 9 people (29.03%). Adult men have greater muscle mass than women which is affected by hormonal activity and heavier muscle use than women, this affects the level of male lumbar flexibility.

Lumbar flexibility decreases with increasing age in both men and women. According to research by Mistry et al (2014), the decrease in lumbar flexibility is more frequent and occurs more rapidly in men than in women. According to research by G.Mistry This can be influenced by anatomical factors in the joint structure, namely the popliteal angle in women is greater, which allows women to have a longer hamstring than men. This can also be influenced by differences in the lifestyles of men and women, where men generally do more heavy physical work which can cause trauma to the spinal structures, thereby reducing lumbar flexibility.[18]

The results of hypothesis testing using the *Gamma correlation* test in this study obtained a value of p = 0.022 (p value <0.05) which states that low back pain and lumbar flexibility have a significant moderate-strength relationship. This means that there is an effect of complaints of low back pain on the lumbar flexibility score of weavers. The results of this study are in line with research conducted by Lbs & Dgsk, 2018 [19] regarding the comparison of lumbar flexibility in patients with chronic low back pain and healthy patients.

Lower back pain is a musculoskeletal disorder that is very common among workers in a sitting position such as weaving craftsmen.[20] From the findings of the field survey, it was found that weavers in Palembang generally spend 8 hours working per day sitting on wooden or plastic chairs. have no backing and some are padded to provide comfort to the gluteal area. This situation causes the craftsmen to unconsciously sit in a bent position which tends to be static with only movement of the hands and feet. A bent sitting position can increase muscle activity by as much as 25% of body weight and will cause isometric contraction of the muscles in the main

muscles involved. The back muscles will work hard to hold the weight of the upper or lower limb that is doing the movement. The load that is resting on the waist area will cause the waist muscles that bear the main load to become tired and cause pain in the muscles around the waist or lower back.[21]

Lumbar flexibility is important to support daily life, such as walking and bending over. The *sit and reach test* is a simple examination method used to measure the flexibility of the lower back and hamstrings. The flexibility of the lower back according to the measurements of the *sit and reach test* is that the body performs maximum flexion to push both hands as far as possible along the ruler above the box. According to Baltaci et al. (2003), *sit and reach tests* are useful for preventing a decrease in lower back flexibility which can cause lower back injuries, postural deviation, walking problems, and falls.

According to Biering-Sorenson (1984) people with low back pain experience a decrease in the strength and resistance of the lumbar and abdominal extensor muscles. This results in decreased lumbar flexibility in people with low back pain. Lower back pain can cause lumbar area imbalance resulting in decreased lumbar flexibility. Low back pain sufferers will limit their body movement especially in the lumbar area to reduce the pain, but this will only reduce lumbar muscle strength and cause lumbar region imbalance, causing a continued decrease in lumbar flexibility and thereby also increasing low back pain. [22]

Conclusion

In the study, it was found that the value of lumbar flexibility was below normal as many as 11 people consisting of 9 male subjects (29.03%) and 8 subjects aged 18-27 years (25.80%).

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