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THE RELATIONSHIP BETWEEN WORK POSTURE AND COMPLAINTS OF LOW BACK PAIN AT PT. PRIMA CAHAYA UTAMA IN 2024

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Abstract

Complaints Low Back Pain generally occur in workers due to work postures that are not ergonomic. Work posture is the position of a worker in carrying out an activity, one important aspect that influences the analysis of work effectiveness is how workers position their bodies.. This study aim to see if there was a relationship between work postures applied by workers and complaints of low back pain experienced by workers. This research method was a quantitative with a cross-sectional design approach, which was used to see the relationship between the independent variables (age, gender, work mass, education level and work posture) and the dependent variable (complaints of low back pain). The sample was taken by total sampling, involving 55 workers at PT Prima Cahaya Utama. Data analysis included univariate, and bivariate analysis, using the chi-square test. The results of the analysis showed that age (p-value 0.789), gender (p-value 1.000), working mass (p-value 1.000), education level (p-value 0.775) had no significant relationship with low back pain complaints. However, work posture (p-value 0.001) showed a significant relationship with complaints of low back pain. There is a relationship between work posture and complaints of low back pain, therefore companies need to pay attention to employee posture at work.

Keywords: ***Low Back Pain, Nordic Body Map, Work Posture, REBA***

INTRODUCTION

According to the World Health Organization, the global prevalence of Low Back Pain complaints reached 568 million cases in 2019 (World Health Organization, 2022). In Indonesia, based on the 2018 Riskesdas data, the prevalence of Low Back Pain reached 7.6% (Kementrian Kesehatan RI, 2018). Non-ergonomic work postures have been identified as one of the main risk factors for NBP in workers. Improper body position during work can cause excessive pressure on the spine and surrounding tissues, which in turn can trigger pain (Septiadiana, 2022). Recent research has shown a strong correlation between poor work posture and an increased risk of Low Back Pain. In industrial workers in Indonesia, it was found that workers with non-ergonomic work postures had a 2.68 times greater risk of experiencing Low Back Pain compared to workers who had good work postures (Simamora, 2022). This finding is in line with the results of a study that reported that 57% of workers in Indonesia experienced Low Back Pain, with non-ergonomic work postures as the main risk factor (Puspitasari, *et al.,* 2022).

The impact of Low Back Pain on workers is very diverse and can affect various aspects of life. Physically, Low Back Pain causes pain and discomfort that can interfere with daily activities and work ability (Kusuma, H., & Hartono, 2023). Workers with Low Back Pain often experience decreased mobility and flexibility, which can reduce work efficiency and productivity (Wibowo, D. B., & Sutanto, 2023). From a psychological perspective, chronic Low Back Pain can cause stress, anxiety, and even depression in workers. A study in Indonesia found that 45.7% of workers with NPB experienced high levels of stress, which in turn can affect job performance and satisfaction (Nugroho, A. S., & Putri, 2023).

Low back pain can be caused by improper work posture. Work posture is the position of a worker in carrying out his activities, work posture is also a determining aspect in analyzing the effectiveness of a job (Muhtadin *et al.,* 2020).

Complaints of low back pain are often experienced by workers who lift heavy loads. This is supported by high work intensity and lack of knowledge about correct posture, prevention, and inappropriate work environment. Limited space for movement while working is also an important factor. When these factors are compounded by the absence of proper treatment. This can cause musculoskeletal disorders in workers, such as low back pain (Medha Sumantra & Novendy, 2023).

Based on the initial survey conducted by researchers along with the Supervisor of the SPPBE Filling Hall at PT Prima Cahaya Utama on August 26, 2024, complaints of lower back pain were found among several workers. This complaint is suspected to be caused by an ergonomic work position or one that is not suitable for the activities being performed. From the results of interviews conducted using questionnaires with 15 workers, data was obtained that 12 of them routinely complained of lower back pain, while the other 3 experienced similar complaints but only occasionally or infrequently. This can be caused by several factors including inappropriate work postures of workers when working. The purpose of this research is to determine whether there is a correlation between the work posture used by employees and the occurrence of lower back pain among employees of PT Prima Cahaya Utama during the year 2024.

LITERATURE REVIEW

1. Biomechanics Theory

Biomechanics is a branch of science that studies the movement of the human body using the principles of mechanics. It includes the analysis of force, motion, and body structure. Some important aspects of biomechanics theory include, Force and Movement: Biomechanics analyzes how forces (such as gravity, friction, and muscular forces) affect body movement. This includes the study of how muscles, tendons, and ligaments work together to produce movement. Next there is Balance and Stability, this theory also includes an understanding of how the body maintains balance and stability while in motion or at rest, and there is Application in Sport and Rehabilitation where biomechanics is often used in sport to improve athlete performance and in rehabilitation to design effective recovery programs.

2. Ergonomics Theory

Ergonomics is a science that studies the interaction between humans and other elements in the system. The goal is to improve comfort, efficiency, and safety in the work environment. Some of the key points of ergonomics theory include, work environment design, where ergonomics focuses on adjusting the workplace (such as chairs, tables, and tools) to suit the physical and psychological needs of workers. This helps reduce fatigue and increase productivity, next there is posture and movement, this theory also considers correct posture and efficient ways of moving to prevent injuries, especially in jobs that involve repetitive movements or uncomfortable positions and finally there is health and well-being, where ergonomics contributes to the long-term health of workers by reducing the risk of musculoskeletal injuries and increasing comfort in the workplace.

3. Musculoskeletal Theory

Musculoskeletal theory is concerned with the muscular and skeletal systems of the human body, and the disorders that can occur in these systems. Some important aspects of this theory include musculoskeletal disorders, which include various conditions that affect muscles, tendons, ligaments, and joints, such as back pain, carpal tunnel syndrome, and tendinitis. These disorders are often caused by poor posture, repetitive motion, or overload. Next there is prevention and management, this theory emphasizes the importance of injury prevention through education on correct posture, safe lifting techniques, and the use of ergonomic aids and finally there is rehabilitation, the approach in musculoskeletal theory also includes rehabilitation to help individuals recover from injury and restore normal function.

METHOD

This research is a type of quantitative research with a Cross-Sectional design. The cross-sectional design identifies the relationship between independent and dependent variables conducted at one time. In this study, the independent variables include human aspects such as (age, gender, length of work, education level, and work posture), While the dependent variable is (pain complaints in the lower back). The data analysis used includes univariate and bivariate analysis, with chi-square statistical tests analyzed using SPSS version 20. The location of this research is at SPBBE which is located in Peunaga Rayeuk Village, Mereubo District, West Aceh Regency. The research took place

from November 29 to December 05, 2024. The population in this study included all workers at PT Prima Cahaya Utama, totaling 55 people. The sampling technique used was total sampling, where the entire population was used as the research sample. Primary data was obtained through interviews using a questionnaire. Data collection was carried out through direct observation in the field related to low back pain complaints using the REBA Score method and the Nordic Body Map (NBM) Questionnaire.

Data management involved editing, coding, data entry, and data cleaning. Univariate analysis was used to describe the frequency distribution of the study variables. Bivariate analysis was conducted to determine the relationship between two variables, with the Chi-square test used to test the significance of the relationship between the independent and dependent variables.

RESULTS AND DISCUSSION

Univariate Analysis

The frequency distribution table is used to display the results of univariate analysis of respondent characteristics.

Variable	Frequency	Percentage (%)
Usia	26	47.3
<35 Years (Young)	29	52.7
≥35 Years (Old)		
Gender	52	94.5
Male	3	5.5
Female		
Working Mass	45	81.8
<5 Years (New)	10	18.2
≥5 Years (Old)		
Education	17	30.9
Low	38	69.1
High		
Working Posture	27	49.1
No Risk	28	50.9
Risk Exists		
LBP Complaints	27	49.1
No Complaints	28	50.9
Complaints		

Bivariate Analysis

This study used bivariate analysis to test the effect of the independent variable on the dependent variable.

Varibel	Low Back Pain Complaints				Total	%	p *value*
	No Complaint		Complaints				
	F	%	F	%			
Usia							
<35 Years (Young)	12	46.2	14	53.8	26	100	0.789
≥35 Years (Old)	15	51.7	14	48.3	29	100	
Gender							
Male	26	50.0	26	50.0	52	100	1.000
Female	1	33.3	2	66.7	3	100	
Working Mass							
< 5 Years (New)	22	48.9	23	51.1	45	100	1.000
> 5 Years(Old)	5	50.0	5	50.0	10	100	
Education							
Low	9	52.9	8	47.1	17	100	0.775
High	18	47.4	20	52.6	38	100	

Working Posture							
No Risk	27	100	0	0	27	100	0.001
Risk Exists	0	0	28	100	28	100	

There is no significant relationship between age and complaints of low back pain with a p-value of 0.789. Furthermore, no significant relationship was found between gender and complaints of low back pain with a p-value of 1.000. Then no relationship was found between work mass and complaints of low back pain with a p-value of 1,000. No correlation was found between education level and complaints of low back pain with a p-value of 0.775. But in this study a significant relationship was found between work posture and low back pain with a p-value of 0.001.

Relationship between Respondent Age and Low Back Pain Complaints

The results of this study showed that 53.8% of young respondents (<35 years) experienced low back pain, while in the old group (≥35 years) the number was 48.3%. Statistical analysis with the chi square test showed that there was no association between age and complaints of low back pain. The results of this study are in line with the findings (Hutasuhut *et al.,* 2021) which also stated that there was no significant relationship between age and complaints of low back pain. The findings (Kusumaningrum *et al.,* 2021) also said that age has no relationship with the onset of low back pain complaints. The same findings were made by (Annamyra & Simanjorang, 2023) who said age did not correlate with complaints of low back pain. With increasing age, there will be a decrease in the function of the human body system, one of which is the musculoskeletal system. This will result in an increase in musculoskeletal complaints which include low back pain. Low back pain is a complaint that is closely related to age. This complaint is rarely found in the age group 0-10 years. This might be connected to specific underlying causes that are more prevalent at older ages. This pain usually starts to be felt during a person's second decade, with the greatest incidence occurring during the fifth decade. In fact, complaints of low back pain increase over time until the age of about 55 years (Tenri Diah T.A & Adhinda Putri Pratiwi, 2023).

Relationship Between Respondents Gender and Complaints of Low Back Pain

Based on the results of this study, it is known that 66.7% of female respondents experienced complaints of low back pain, while in the male group the percentage was 50.0%. However, the results of the analysis using the chi-square test showed that there was no significant relationship between gender and low back pain. This finding is in line with research conducted by Kusumaningrum et al. (2021), which concluded that there is no correlation between gender and complaints of low back pain. Similar results were also found in a study by Febriani et al. (2022), which states that there is no relationship between gender and the appearance of these complaints. In general, men and women are equally prone to low back pain up to the age of 60. However, in reality, women experience this ailment more often. Hormonal reasons, such as pain that occurs during the menstrual cycle, may be to blame. In addition, menopause contributes to decreased

bone density due to a decrease in the hormone estrogen, which can increase the likelihood of low back pain (Susanty Dewi Winata, 2016).

Relationship Between Respondents Work Mass and Complaints of Low Back Pain

The results of research at PT Prima Cahaya Utama SPPBE showed that respondents who experienced complaints of low back pain in the new work mass group were 51.1% while the old work mass group who experienced complaints of low back pain were 50.0%. The statistical results of the chi square test showed no relationship between work mass and complaints of low back pain. This finding is in line with research conducted by (Annamyra & Simanjorang, 2023) which states that there is no correlation between work period and complaints of low back pain. Other findings from (Annissa *et al.,* 2024) also said there was no relationship between tenure and complaints of low back pain. Research conducted by (Rahmawati and Dewi in 2020) revealed that there was no significant relationship between work duration and complaints of pain in the lower back area. However, still, tenure is considered as one of the risk factors that can cause musculoskeletal disorders due to work. The longer a person works, the more they perform the same movements repeatedly, which can cause fatigue in the muscles. This fatigue can lead to overuse of the muscles, which then has the potential to make the muscles spasm. The condition is a physiological response from the muscles as a protective measure to prevent further tissue damage. Muscle spasm occurs as a natural signal from the body for the individual to stop the activity being performed and rest immediately, in order to maintain balance and health. In addition, prolonged work periods can cause permanent narrowing of the disc gap, which in turn has the potential to cause degeneration in the spinal structure (Raraswati et al., 2020).

Relationship between Respondents Education Level and Complaints of Low Back Pain

This study showed that as many as 47.1% of respondents with low education levels experienced low back pain, while in respondents with higher education, the figure reached 52.6%. Despite the percentage difference, the results of the analysis using the chi-square test showed that there was no significant relationship between education level and complaints of low back pain. This finding is in line with the results of a study conducted by Kurniawan et al. (2022), which states that there is no significant relationship between education level and these complaints. Another study by Azmy and Furqaan (2023) also reinforced these findings, as well as the research of Rahmawati and Widjasena (2022), which both showed that the level of education did not significantly affect the incidence of low back pain. The worker's latest education shows his knowledge in doing work with the right posture, and a person's education can also indicate the level of knowledge received by that person. Workers' education will affect the value of risk because a person's level of knowledge about everything faced cannot be separated from their educational status. The higher a person's level of education, the more knowledge they will gain (Andini, 2015).

Relationship Between Respondents' Work Posture with Complaints of Low Back Pain

From the research conducted, it was found that no respondents who worked with non-risky postures experienced lower back pain (0%). On the contrary, all respondents with risky work postures reported experiencing lower back pain complaints (100%). Statistical analysis using chi-square shows a significant relationship between work posture and complaints of lower back pain. These results are consistent with the research by Annissa et al. (2024), who also found a relationship between work posture and those complaints. The research by Lestari et al. (2023) also supports this finding by stating that work posture has a significant influence on lower back pain. Additionally, the research by Syaputra et al. (2022) supports this by stating that there is a significant relationship between work posture and lower back pain. Work posture is related to ergonomic hazards in workers. Work postures that do not meet ergonomic criteria can lead to muscle and bone health problems, including low back pain. Postures that are not ergonomic will inevitably lead to heavier postural loads on the body, which can cause postural strains that can disrupt the chemical balance of the muscles and inhibit blood flow to the muscles which have a negative impact on musculoskeletal health if done continuously. Work posture incompatibility can have an impact on work errors, decreased productivity, and suboptimal work results. (Baihaqi *et al.,* 2024).

CONCLUSION

This research uses data collected directly from the field through observation and distribution of questionnaires to respondents who work at PT Prima Cahaya Utama SPPBE. The objective of this research was to determine the correlation between job title and reports of lower back discomfort among employees at PT Prima Cahaya Utama. So it can be concluded as follows, no significant relationship was found between age, gender, work mass, education level with complaints of low back pain, but in this study a significant relationship was found between work posture and complaints of low back pain with a highly significant p-value of 0.001, indicating that risky work postures contribute to increased complaints of low back pain in workers.

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