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The Relationship Between Work Posture and Low Back Pain (LBP) Complaints Among BPBD Employees in Pandan City, Central Tapanuli Regency

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Abstract : Low Back Pain (LBP) is a common musculoskeletal complaint among workers in both physically demanding and sedentary jobs. Poor or non-ergonomic work postures can increase muscle strain, cause discomfort, and reduce work productivity. This study aimed to determine the relationship between work posture and Low Back Pain complaints among employees of the Regional Disaster Management Agency (BPBD) in Pandan City, Central Tapanuli Regency. This study used a quantitative observational method with a cross-sectional design. The population consisted of 97 employees, with 49 respondents selected using the Slovin formula. Data were collected through questionnaires and the Rapid Entire Body Assessment (REBA) method to assess work posture. Data analysis was performed using the Chi-Square test. The results showed that 35 respondents (70.0%) had non-ergonomic work postures, and 25 respondents (50.0%) experienced Low Back Pain. Statistical analysis produced a p-value of 0.003 ($p < 0.05$), indicating a significant relationship between work posture and Low Back Pain. In conclusion, non-ergonomic work posture is significantly associated with Low Back Pain complaints. Therefore, improving workplace ergonomics and promoting proper work posture are important to prevent musculoskeletal disorders.

1. INTRODUCTION

Indonesia is widely known as an agrarian country, as a large proportion of its population still depends on agricultural activities as their primary source of livelihood. The government continues to strive to enhance the competitiveness of various agricultural commodities such as rice, corn, soybeans, vegetables, and fruits, which have significant export potential. The agricultural sector not only serves as a provider of food supplies but also acts as a major pillar of the national economy. One strategy to strengthen this sector is by improving access to capital and investment, as financial support can accelerate growth and expand markets for agricultural products in Indonesia (Rasmi, 2023).

Agricultural activities generally require substantial physical effort. Farmers perform various tasks such as hoeing, planting, fertilizing, plowing, and harvesting, most of which are carried out manually. Repetitive movements and non-ergonomic body postures maintained over long periods can potentially cause musculoskeletal disorders, including Low Back Pain (LBP) (Zulfikri,

2021). Globally, Low Back Pain has become one of the most common health problems. Data from the World Health Organization (WHO, 2023) indicate that in 2020 there were approximately 619 million cases of low back pain worldwide, and this number is projected to increase to 843 million cases by 2050 due to population growth and aging.

In Indonesia, Low Back Pain is the second most prevalent disease after influenza. Although the exact prevalence is unknown, it is estimated that approximately 7.6% to 37% of the population has experienced this condition. The agricultural sector remains the largest absorber of labor. According to data from the Central Bureau of Statistics (BPS, 2023), the number of farmers in Indonesia reached 29.36 million, including 1.71 million in West Java, 98.3 thousand in Majalengka Regency, around 3 thousand in Sindangwangi District, and 178 in Buahkapas Village. Musculoskeletal disorders have increasingly become an important occupational health issue. These conditions can occur across various types of occupations, both in developing and developed countries. Musculoskeletal complaints are typically chronic and arise from damage to body tissues such as joints, muscles,

ligaments, nerves, and the spine. Symptoms include pain, stiffness, tingling sensations, swelling, and sleep disturbances, which ultimately reduce physical coordination and hinder work productivity (Wisnuwardana, 2022). In the agricultural context, repetitive stooping postures and excessive muscle use can lead to muscle spasms and spinal injuries, making them a major cause of Low Back Pain among farmers (Pristianto, 2023).

Low Back Pain is also commonly experienced by workers across various sectors, including those engaged in heavy physical activities as well as sedentary jobs such as prolonged sitting in front of computers. Low Back Pain is characterized by pain or tension in the lower back that may radiate to the lower limbs. Globally, this disorder is one of the leading causes of decreased work productivity. The World Health Organization and the Indonesian Ministry of Health (2018) reported that the prevalence of Low Back Pain in developed countries reaches 60–70%, with an annual incidence of approximately 5%, resulting in the loss of more than 260 million workdays worldwide each year. In Indonesia, a 2020 BPS survey showed that around 18% of the population experienced low back pain. Data from the Indonesian Neurological Association (PERDOSSI, 2021) recorded 4,456 pain cases, of which 1,598 were cases of low back pain. In North Sumatra, approximately 40% of the population aged over 65 years have experienced LBP, with prevalence rates of 13.6% among women and 18.2% among men. Not only manual workers are at risk, but office employees may also experience similar complaints due to incorrect sitting posture and long working hours. Factors such as non-ergonomic desks and chairs, as well as insufficient rest during work, further exacerbate the condition (Mahmud et al., 2020). Non-ergonomic working posture is a dominant factor contributing to Low Back Pain. A lack of workers' understanding of ergonomic principles increases the risk of musculoskeletal disorders. Therefore, ergonomic education is essential to prevent injuries and reduce the incidence of LBP (Soroush et al., 2020). Based on a preliminary survey conducted in February 2025 at the BPBD of Pandan City, Central Tapanuli Regency, it was found that out of 97 employees, 55 reported experiencing muscle pain such as stiffness in the neck, shoulders, lower back, and legs, while approximately 20 employees visited the clinic each month with similar complaints.

The application of ergonomic principles plays a crucial role in improving occupational health and safety. Ergonomically designed work environments help workers feel safe and comfortable, enabling them to work optimally and remain free from health disturbances. These principles emphasize the adjustment between job demands and workers' physical and mental capabilities while minimizing the risk of injury. In practice, ergonomics is applied by considering machine design, sitting posture, work aids, and proper lifting techniques. This approach marks the foundation of modern ergonomics science (Kurniawidjaja, 2012). In the field of occupational safety and health (OSH), ergonomics plays an important role in creating a healthy and productive work environment. According to Malaka (2016), improvements in occupational health can be achieved by controlling various workplace risks, including chemical, physical, biological, psychological, and ergonomic hazards. Ergonomic hazards arise when work activities exert excessive strain on specific body parts. The effects of injury usually develop gradually, ranging from mild muscle pain to permanent disorders. Kuswana (2016) added that habits such as lifting heavy loads, incorrect posture, and repetitive movements are the main causes of these disorders. To create a safe workplace, the application of ergonomic principles is essential, aiming to enhance workers' comfort and well-being while performing their tasks. Observations of eight harvest workers revealed that most experienced muscle pain in the back, neck, arms, and legs. These findings indicate that better ergonomic implementation is urgently needed to reduce the risk of occupational injuries and improve productivity. Such conditions may also lead to decreased work efficiency and an increased risk of occupational diseases. Factors contributing to Low Back Pain include incorrect posture, heavy workloads, long working durations, and individual factors such as age and length of employment. Given the importance of the relationship between work posture and spinal health, this study was conducted to examine the effect of work posture on Low Back Pain complaints among BPBD employees. Through the Rapid Entire Body Assessment (REBA) method, this study is expected to describe the level of injury risk associated with improper work posture. Therefore, this research is entitled "The Relationship between Work Posture and Low Back Pain Complaints among BPBD

Employees in Pandan City, Central Tapanuli Regency.”

2. RESEARCH METHODS

The study population consisted of 97 employees, of whom 49 were selected as samples using the Slovin formula and proportional random sampling technique. The independent variable in this study was work posture, while the dependent variable was Low Back Pain (LBP) complaints. Work posture was assessed using the Rapid Entire Body Assessment (REBA) method through direct

observation, whereas LBP complaints were measured using a questionnaire completed by the respondents. Data collected from observations and questionnaires were analyzed using univariate analysis to describe each variable and bivariate analysis using the Chi-Square test to examine the relationship between variables. The results were considered statistically significant if the p-value was less than 0.05. Throughout the study, research ethics were maintained by obtaining informed consent from respondents and ensuring the confidentiality of their personal data.

3. RESEARCH RESULTS

1. Respondent Characteristics

Table 1. Distribution of Respondent Characteristics of BPBD Employees in Pandan City, Central Tapanuli Regency

Variable	Frequency (n)	Percentage (%)
Gender		
Male	28	56,0
Female	21	42,0
Total	49	100

Based on the table, it can be seen that the majority of BPBD employees who were respondents were male, namely 28 people (56.0%), while the number

of female respondents was 21 people (42.0%).

2. Univariate Analysis

Table 2. Frequency Distribution of Work Posture and LBP Complaints Among BPBD Employees of Pandan City, Central Tapanuli Regency

Variable	Frequency (n)	Percentage (%)
Work Posture		
<5 not experienced	14	28,0
>5 experienced	35	70,0
Total	49	100
LBP Complaints		
≤7 not ergonomic	24	48,0
>7 ergonomic	25	50,0
Total	49	100

The table shows that the majority of BPBD employees, 35 (70.0%), have non-ergonomic working postures. Furthermore, the majority of respondents also

experience low back pain (LBP), 25 (50.0%).

3. Bivariate Analysis

Table 3. Cross Tabulation of Working Posture with LBP Complaints

Working Posture	Complaints (LBP)						P Value
	Not Experiencing		Experiencing		Total		
	f	%	f	%	f	%	
≤5	12	85,7	2	14,3	14	100.0	0.003
>5	12	34,3	23	65,7	35	100.0	
Total	24	45.0	25	55.0	49		

Based on the table, from a total of 49 respondents, it is known that in the work posture group <5, as many as 12 people (85.7%) did not experience Low Back Pain (LBP) complaints, while 2 people (14.3%) experienced

these complaints. Meanwhile, in the work posture group >5, there were 12 people (34.3%) who did not experience LBP complaints and 23 people (65.7%) who experienced complaints. The results of the analysis using

the Chi-Square test showed a p value = 0.003 ($p < 0.05$). Thus, it can be concluded that there is a significant relationship between work posture and Low Back Pain (LBP) complaints in BPBD employees of Pandan City, Central Tapanuli Regency.

4. DISCUSSION

1. The Relationship Between Work Posture and Low Back Pain Complaints in BPBD Employees of Pandan City, Central Tapanuli

Based on the results of the study involving 49 respondents, it was found that among employees with a work posture score of <5 , 12 individuals (85.7%) did not experience Low Back Pain (LBP), while 2 individuals (14.3%) reported LBP complaints. In contrast, among those with a work posture score of >5 , 12 individuals (34.3%) did not experience LBP, whereas 23 individuals (65.7%) reported LBP complaints. The Chi-Square analysis yielded a p -value of 0.003 ($p < 0.05$), indicating a statistically significant relationship between work posture and Low Back Pain complaints among BPBD employees in Pandan City, Central Tapanuli Regency, in 2025. These findings suggest that poorer work posture is associated with a higher risk of developing Low Back Pain. This result is consistent with previous studies indicating that non-ergonomic work posture is a major risk factor for LBP. A study by Putu Devi Anggreni (2022) found that all anesthetic technicians who worked in non-ergonomic postures experienced musculoskeletal disorders and back pain. Similarly, research conducted by Sumardiyono, Hikmah Nurul Fajar, and Sri Mulyani (2023) emphasized that among several variables examined, only work posture showed a significant association with LBP compared to age and length of employment.

The relationship between work posture and LBP is further supported by the study conducted by Intan Nurmala Putri (2022). Among 76 respondents, 64 experienced LBP, while 12 did not. The study concluded that age and length of employment influenced the occurrence of LBP, whereas working duration and body mass index were not significantly associated. These findings align with the study by Sela Ayu Gusti (2022), which revealed that age, length of employment, workload, body posture, and prolonged static posture were significantly associated with LBP among onion-peeling workers at Angso Duo Market in Jambi City. A similar study by Putri Dzahabiyah Farhah (2023) also reported a significant relationship between work posture and LBP complaints among online motorcycle taxi drivers in Rajabasa, Bandar Lampung. According to medical theory and comprehensive scientific studies, Low Back Pain is one of the most frequently occurring musculoskeletal disorders in daily activities. It is estimated that approximately 80% of the global population will

experience low back pain, either mild or severe, at some point in their lifetime.

This study is also consistent with the findings of Ginting (2024), which demonstrated statistically significant correlations between several occupational factors—namely work posture ($p = 0.001$), workload ($p = 0.005$), work frequency ($p = 0.032$), and work duration ($p = 0.012$)—and ergonomic risk. These findings indicate that workers with non-ergonomic postures have up to a 15-fold higher risk of experiencing ergonomic disorders, particularly among oil palm harvesters at PTPN IV Adolina Business Unit in 2024, based on the Prevalence Ratio (PR) calculation. As a preventive measure, the management of PTPN IV Adolina Business Unit is advised to conduct regular safety talks before working hours to raise workers' awareness of occupational safety. Workers are also encouraged to better understand ergonomic hazards and appropriate preventive measures to minimize the risk of work-related injuries. Furthermore, the results of this study may serve as a reference for future research to conduct more focused investigations on ergonomic risk control. Subsequent studies are expected to provide a scientific basis for the development of more effective preventive policies and programs in similar work environments.

In line with the findings of Ginting (2024), oil palm harvesters use traditional tools such as sickles to cut palm fronds and fruit bunches. Repetitive swinging and lifting movements during these activities may result in excessive strain on the shoulder and upper back muscles. In addition, workers are required to lift heavy fruit bunches while maintaining neck extension angles exceeding 25 degrees and continuously raised arms, which cumulatively increase the risk of physical injury (Saputri, Annisa Isnaniah, et al., 2022). According to Surya (2017), working continuously in non-ergonomic body positions can lead to injuries due to repetitive mechanical stress experienced by the body during work. This statement is reinforced by the study conducted by Rizeki Dwi Fibriansari and Arista Maisyarah (2018), which found that workers who maintained non-ergonomic postures tended to experience fatigue more quickly and had a 2.5 times greater risk of developing spinal disorders compared to those who maintained ergonomic working positions.

The association between work posture and LBP was also demonstrated by Suryati and Ngarang (2020), who studied 40 traditional songket weavers in Keta Village, Manggarai, East Nusa Tenggara. They found a significant relationship between work posture and LBP complaints, with a p -value of 0.017 ($p < 0.05$). Their observations showed that approximately 42.5% of weavers required further medical intervention due to back pain complaints, with Quick Exposure Checklist (QEC) results indicating high exposure risk levels in the back area. Saputra (2020) reported similar findings in a study of batik artisans in Semarang, where most workers had REBA scores ranging from 8 to 10, categorized as high risk for LBP, with a p -value of 0.042 ($p < 0.05$). Furthermore, Masloman et al.

(2018), who examined fishermen in Kalasey Village, Minahasa, also identified a significant relationship between work posture and LBP, with a p-value of 0.002 ($p < 0.05$). Most respondents in that study exhibited moderate to high postural risk levels. The study by Awaluddin et al. (2019) further supported these findings. Among 33 workers at Rumah Jahit Akhwat Makassar, 39.4% experienced LBP while 60.6% did not. Data analysis revealed that workload ($p = 0.005$) and work posture ($p = 0.000$) were significantly associated with Low Back Pain complaints. These results confirm that, in addition to individual factors, work environment and workload play important roles in the development of LBP.

The findings of this study are further reinforced by field observations indicating that most BPBD employees continue to work in non-ergonomic postures, particularly during activities such as lifting heavy loads, sitting for prolonged periods without back support, or maintaining the same body position for extended durations. Such conditions may result in muscle tension, fatigue, and even nerve disorders if sustained over time. Nevertheless, a small proportion of employees have begun to adopt ergonomic working postures, particularly with respect to lower back positioning. Therefore, improvements and increased awareness regarding the importance of applying ergonomic principles in the workplace are essential. Employees are encouraged to maintain balanced body posture, avoid prolonged static working positions, and routinely perform stretching or light exercises to reduce muscle tension. In addition, the use of ergonomic work equipment, such as chairs and desks with appropriate height adjustments, can help reduce the risk of Low Back Pain and enhance work comfort and productivity.

5. CONCLUSION

Conclusion

There is a relationship between work posture and complaints of low back pain in BPBD employees of Pandan City, Central Tapanuli.

Recommendations

Based on the findings of this study, efforts to reduce the risk of Low Back Pain (LBP) among BPBD employees should focus on improving workplace ergonomics and increasing awareness of proper work posture. BPBD management is encouraged to provide ergonomic work facilities and conduct regular ergonomic risk assessments, while employees are expected to apply ergonomic principles by maintaining correct posture, avoiding prolonged static positions, and performing regular stretching or light physical exercises. In addition, the implementation of routine occupational health and safety programs, such as ergonomic training and health promotion activities, is recommended to prevent musculoskeletal disorders. Future studies are suggested to

involve larger sample sizes and additional variables, as well as longitudinal or experimental designs, to better evaluate the effectiveness of ergonomic interventions in reducing LBP complaints.

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