

# The relationship between working posture and complaints of Musculoskeletal Disorders (MSDs) in PT Workers. Pertamina Patra Niaga Fuel Terminal Sibolga

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## ABSTRACT

This aim of this research is to determine the relationship between work posture and complaints of Musculoskeletal Disorders in PT workers. Pertamina Patra Niaga Fuel Terminal Sibolga This research is an observational study, with a cross sectional approach, the research was conducted on March 25-April 18 2023. The population at this research site was 40 workers with a sample size of 35 people. The sampling technique was carried out by total sampling. The analysis used is univariate and bivariate, using statistical test data processing using Chi-Square. The research results show that PT. Pertamina Patra Niaga Fuel Terminal Sibolga 15 people (42.9%) have a work posture with a high risk level, 20 people (57.1%) have a medium risk level. Meanwhile, the results of the level of Musculoskeletal Disorders complaints among PT workers. Pertamina Patra Niaga Fuel Terminal Sibolga for the medium category was 26 people (74.3%), and for the light category there were 9 people (25.7%). The results of the Chi-Square statistical test obtained a p value of  $0.048 \leq (0.05)$ , which means there is a relationship between work posture and MSDs complaints among PT workers. Pertamina Patra Niaga Fuel Terminal Sibolga 2023. To reduce the risk of work posture which can cause MSDs complaints, workers are advised to do stretching movements before carrying out work activities.

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## INTRODUCTION

The prevalence of complaints of musculoskeletal disorders in Indonesia is 11.9% and if we refer to the diagnosis, the percentage figure is 24.7% (Mulyaningstih & Paramita, 2018)(Yoga Prasetya, 2018). The prevalence of MSDs complaints in Indonesia based on doctor's diagnosis is 7.3%. From these results, in North Sumatra Province in 2018, it was discovered that 11.67% or 57,816 people experienced muscle pain and connective tissue disorders, this case is often experienced by factory workers, fishermen, farmers, etc. If compared with other provinces, MSDs in Indonesia, especially

in North Sumatra, are still relatively high with a prevalence of 11.67% ((Cheisario & Wahyuningsih, 2022).

In Indonesia, in 2018, data was obtained based on a survey conducted on 482 workers in 12 districts/cities in Indonesia(Sholeha & Sunaryo, 2022)(Cheisario & Wahyuningsih, 2022)(Adnyani et al., 2023). Musculoskeletal complaint data in Indonesia shows that field workers experience muscle injuries in the lower neck (80%), shoulders (20%), back (40%), back waist (40%), back hips (20%), buttocks (20 %), thighs (40%), knees (60%), and calves (80%).

*Musculoskeletal disorders*(MSDs) is a health problem involving the joints, muscles, tendons, skeleton, cartilage, ligaments and nerves.<sup>2</sup> The level of MSDs from the mildest to the most severe will interfere with concentration at work, cause fatigue and ultimately reduce productivity.<sup>3</sup> World Health Organization (WHO) in 2018. MSDs disorders are caused and worsened by work, work environment, and performance in carrying out work and can be influenced by several factors. Initial complaints include pain, tenderness, numbness, tingling, swelling, stiffness, shaking, sleep disturbances and burning(Aisyah et al., 2023). Work posture is a determining point in analyzing the effectiveness of a job. Working positions that are not ergonomic cause workers to experience fatigue more quickly and as a result provide extra responsibilities(Ir Julianus Hutabarat, 2021). In the European Union, musculoskeletal disorders are the most common health problems, namely 25-27% of workers complain of back pain and 23% of muscle pain. The lack of movement in the body due to lack of physical activity causes a high number of MSDs complaints(Puspitasari & Ariyanto, 2021)(Bachtiar et al., 2023).

Activities and factors that cause musculoskeletal disorders include incorrect work posture when lifting or carrying loads with the hands or shoulders, working with vibrating tools, repetitive work, static work and long work duration. Based on research conducted, researchers at PT. Pertamina Patra Niaga Fuel Terminal Sibolga conducted interviews and direct observation of workers aged 21-60 years, it was discovered that the workers felt pain in the wrists, elbows, neck, back, waist and legs, which indicated that the workers had musculoskeletal complaints. Problems that occur among PT. Pertamina Patra Niaga Fuel Terminal Sibolga where workers carry out their work in less ergonomic positions or body postures.

Based on the initial survey conducted on March 25 2024, researchers made observations by interviewing one of the employees at the reception desk of PT. Pertamina Patra Niaga Fuel Terminal Sibolga, the employee said that the number of workers at PT. Pertamina Patra Niaga Fuel Terminal Sibolga currently has around 40 employees. then a second survey was carried out again on that date

April 18 and conducted research using data collection methods using Rapid Entire Body Assessment (REBA) observation sheets and Nordic Body Map checklists as well as interview guidelines. The results of the second survey showed that there were characteristics of Musculoskeletal Disorders (MSDs) complaints due to the condition work environment with the body standing, bending for too long, most pain occurs such as pain in the neck, shoulders, lower back, knees and feet when working. Seeing the existing problems, researchers felt it necessary to conduct research with the title "The Relationship between Work Posture and Complaints of Musculoskeletal Disorders (MSDS) in PT Workers. Pertamina Patra Niaga Fuel Terminal Sibolga"

Lack of attention and proper treatment of cases of musculoskeletal disorders in workers will cause more serious problems and can result in fatal injuries. Based on these problems, the researcher intends to choose the title "The Relationship between Work Posture and Musculoskeletal Disorders (MSDs) complaints in PT workers. Pertamina Patra Niaga Fuel Terminal Sibolga" in order to help workers reduce the occurrence of MSDs complaints at PT. Pertamina Patra Niaga Fuel Terminal Sibolga.

## RESEARCH METHOD

This research method uses a quantitative type with a cross-sectional design. The variables analyzed in this research are the independent variable (Independent) is work posture and the dependent variable (Dependent) is Musculoskeletal Disorders (MSDs). The population in this study was 40 people. The sampling technique used was a total sampling technique, with sample determination using 2 proportions where the required sample size was 35 samples. The research took place from March to April 2024. Located at PT. Pertamina Patra Niaga Fuel Terminal Sibolga. For primary data, namely that obtained through observation and interviews. In collecting data, observations were first carried out to determine the description of the stages of work, in the form of work postures during work, and later to determine the risks of these work postures using the Rapid Entire method. *Body Assessment*(REBA) and the Nordic Body Map checklist to identify Musculoskeletal Disorders (MSDs) complaints. The analysis used in this research is univariate and bivariate analysis using the Chi Square test.

## RESULTS AND DISCUSSIONS

### Respondent Identity Characteristics

The respondents analyzed in this research were 35 employees. An overview of the characteristics can be seen in Table 1.

**Table 1.** Frequency distribution of respondent characteristics

Age	Number (n)	Percentage (%)
21-30 Years	16	44.4 %
31-40 Years	11	30.6 %
41-50 Years	5	13.9 %
51-60 Years	3	11.1 %
Total	35	100%
Gender	Number (n)	Percentage (%)
Woman	12	33.3 %
Man	23	66.7 %
Total	35	100%
Last education	Number (n)	Percentage (%)
JUNIOR HIGH SCHOOL	4	11.1 %
SENIOR HIGH SCHOOL	16	44.4 %
S1	15	44.4 %
Total	35	100%
Length of work	Number (n)	Percentage (%)
1-5 Years	18	52.8 %
6-10 Years	17	47.2 %
Total	35	100%

Source: Primary Data

Based on the research results in table 1, it shows that respondents in the age category (21-30 years) were 16 people (44.4%), in the age category (31-40 years) there were 11 people (30.6%), in the age category (41-50 years) there were 5 people (13.9%), in the age category (51-60 years) there were 4 (11.1%), based on gender in this study workers with gender There were 24 men (66.7%), and 12 female workers (33.3%). Based on education level, there were 4 people at junior high school level (11.1%), 16 people at high school level (44.4%), and 16 people at bachelor level (44.4%). Based on length of work In the 1-5 years working category there were 19 people (52.8%), in the 6-10 years long working category there were 17 people (47.2%).

## Univariate Analysis

**Table 2.** Distribution of work posture risk categories and MSDs complaints

Variable	N	%	CI 95%	
			Lower	Upper
Work Posture				
Tall	15	42.9	28.6	57.1
Currently	20	57.1	42.9	71.4
Total	35	100.0	100.0	100.0
MSDs Complaints				
Currently	26	74.3	57.2	85.6
Light	9	25.7	14.4	42.8
Total	35	100.0	100.0	100.0

Source: Primary Data

Based on the table above, according to the research results, it can be seen that measuring work posture using the REBA or Rapid Entire Body Assessment method for PT workers. Pertamina Patra Niaga Fuel Terminal Sibolga 15 people (42.9%) have a high risk level, 20 people (57.1%) have a moderate risk level. Meanwhile, the results of the level of Musculoskeletal Disorders (MSDs) complaints among PT workers. Pertamina Patra Niaga Fuel Terminal Sibolga for the medium category was 26 people (74.3%), and for the light category there were 9 people (25.7%).

## Bivariate Analysis

**Table 3.** Results of working posture risk measurement with MSDs complaints

Work Posture	MSDs Complaints		P-Value		OR (95 CI%)
	Currently		Light		
	N	%	N	%	
Tall	14	53.8	1	11.1	0.048 9,333(1,016-85,698)
Currently	12	46.2	8	88.9	
Total	26	100.0	9	100.0	

The statistical test in this study used Chi-Square to analyze the relationship between work posture and Musculoskeletal Disorders (MSDs) complaints. Based on the research results in table 3, the results of statistical analysis using the chi square test at alpha 5% of the relationship between work posture and musculoskeletal complaints in PT workers. Pertamina Patra Niaga Fuel Terminal Sibolga, results obtained from a P-value of 0.048 or <0.05. This means that there is a significant relationship between work posture and complaints of musculoskeletal disorders among workers at PT. Pertamina Patra Niaga Fuel Terminal Sibolga. Apart from that, an odd ratio (OR) value of 9.333 was obtained, which means that people who have a work posture with a high level of risk are 9.333 times more likely to experience complaints of Musculoskeletal Disorders (MSDs) compared to people who have a work posture with a medium risk level.

## Discussion

In this research, to determine the level of ergonomic risk of a work posture using the REBA (Rapid Entire Body Assessment) method because workers at PT. Pertamina Patra Niaga Fuel Terminal Sibolga in its work uses all parts of the body for work which is only divided into medium and high risk categories because the final REBA score results are only in that category.

Analysis of the identity characteristics of respondents shows that of the total of 40 workers who were research subjects, the majority were aged between 21-60 years with a peak in the age range of 21-30 years (44.4%) and followed by the lowest percentage in the age range of 51-60 years. (11.1 %). This shows that the majority of respondents are of productive age and work at PT. Pertamina Patra Niaga Fuel Terminal Sibolga. If we look at the length of work, most respondents have work experience between 1 and 5 years (52.8%) followed by those who have work experience

of less than 10 years (47.2%). This matter shows that most respondents have been working as drivers for a relatively long time, and only a few have work experience of more than 5 years.

Univariate analysis shows that when measuring work posture using the REBA or Rapid Entry Body Assessment method, the majority of workers at PT. Pertamina Patra Niaga Fuel Terminal Sibolga 15 people (42.9%) have a high risk level, 20 people (57.1%) have a moderate risk level. Musculoskeletal Disorders (MSDs) were dominated by the moderate category, 26 people (74.3%), and 9 people (25.7%) in the mild category.

Bivariate analysis shows that there is a significant relationship between work posture and MSDs complaints in workers, seen from the results of statistical analysis using the chi square test at alpha 5% of the relationship between work posture and musculoskeletal complaints in PT workers. Pertamina Patra Niaga Fuel Terminal Sibolga, results obtained from a P-value of 0.048 or <0.05 with a p-value <0.05. This is in line with research (Wildasari & Nurcahyo, 2023) which states that there is a relationship between work posture and MSDs complaints with a p-value

0.033 or < 0.05. This research is also supported by research (Mak & Wong, 2023) which states that there is a relationship between work posture and MSDs complaints with a p-value 0.016 or <0.05 with a p value <0.05. Then this research is also supported by research (Aisyah et al., 2023) stating that there is a relationship between work posture and MSDs complaints with a p-value of 0.046 or <0.05 with a p-value <0.05.

This research highlights the importance of ergonomics in the work environment where unergonomic work postures have the potential to cause MSDs complaints (Setiawan et al., 2022) (Suryani et al., 2024) (Enta & Masfuri, 2024). This finding is in accordance with previous research which shows that unergonomic work postures and poor nutritional status can increase the risk of MSDs complaints in workers. In this context, preventive efforts and ergonomic interventions are needed which aim to reduce the risk of MSDs complaints among drivers, including improving seating design and controlling work posture, as well as increasing healthy lifestyle patterns to regulate work productivity (Satria Ananda Pratama CF, 2020) (Bunga, 2021) (SARI, 2022). Therefore, greater attention to these factors can improve the well-being and performance of workers, as well as reduce the costs associated with work injuries and absenteeism.

The statistical test in this study used Chi-Square to analyze the relationship between work posture and Musculoskeletal Disorders (MSDs) complaints. Based on the research results in table 3, the results of statistical analysis using the chi square test of the relationship between work posture and musculoskeletal complaints in workers at PT. Pertamina Patra Niaga Fuel Terminal Sibolga acquired the result is p value (0.048) <0.05. This shows that  $H_0$  is rejected and  $H_a$  is accepted so that it can be seen that there is a significant relationship between jobs (Perkasa & Ajis, 2019) (Polakitang et al., 2019) (Diana & Anggreani, 2020) (Sundaroh et al., 2020). Body posture and complaints of musculoskeletal disorders in workers at PT. Pertamina Patra Niaga Fuel Terminal Sibolga. Work posture or body posture when working in this study was measured using REBA by assessing the body parts used in carrying out work activities (Sari et al., 2020) (Dewantari, 2021) (Ramayanti & Koesyanto, 2021) (Purnawinadi et al., 2022) (MF et al., 2023). After adding up, it can be seen whether the respondent's work attitude is risky or not in the medium risk and high risk categories. This research is strengthened by research, which states that there is a relationship between work posture and Complaints of Musculoskeletal Disorders among Employees at the Indonesian Ministry of Health's Personnel Bureau in 2020 with a p-value of 0.001. (p-value < 0.05) (SIRAJUDIN, 2017) (Wildasari & Nurcahyo, 2023). Working posture is also related to the incidence of MSDS, this is due to working posture or body position when carrying out work activities and there are repetitive movements of the muscles in odd positions, causing injury or trauma to the soft tissue and nervous system (Sisnandar & Sirait, 2021) (Bausad et al., 2022).

## CONCLUSION

Based on research that has been conducted on PT workers. It can be concluded from Pertamina Patra Niaga Fuel Terminal Sibolga that the majority who experience Musculoskeletal disorders (MSDs) with moderate complaints, 15 people (42.9%) have a high risk level, 20 people (57.1%) have a medium risk level. Chi-Square test results show that there is a significant relationship between work posture and complaints of Musculoskeletal disorders (MSDs) in PT workers. Pertamina Patra Niaga Fuel Terminal Sibolga obtained a p-value (0.048) < 0.05. The advice given by researchers is to stretch your body muscles for approximately 10 seconds to 3 minutes once during work breaks. The work process of lifting and moving materials is carried out by 2 people. Improve work posture by implementing work postures that comply with ergonomic principles for all parts of the worker. Implement a regular work rest system for all workers for ± 1 hour, namely from 12.00 - 13.00. Provide muscle cream or balm that contains methyl salicylate to reduce complaints of muscle pain.

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