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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

Work posture is a determining point in analyzing the effectiveness of a job. The problem that occurs among workers at one of the PTs operating in the oil sector in Sibolga City is that workers carry out their work in positions or body postures that lack ergonomics which can result in complaints of musculoskeletal disorders. The aim of this research is to determine the relationship between work posture and complaints of Musculoskeletal Disorders in PT workers working in the oil sector in Sibolga City. This research is an observational study, with a cross sectional approach, the research was conducted from March to April 2023. The population at this research site was 40 workers with a sample size of 40 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 showed that of PT workers working in the oil sector in Sibolga City, 18 people (45%) had a work posture with a high risk level, 22 people (55%) had a medium risk level. Meanwhile, the results of the level of Musculoskeletal Disorders complaints among PT workers working in the oil sector in Sibolga City were 31 people (77.5%) in the moderate category, and 9 people (22.5%) in the mild category. The results of the Chi-Square statistical test obtained a p value of 0.027 ≤ (0.05) with an OR value of 9.714, which means there is a relationship between work posture and MSDs complaints among PT workers engaged in the oil sector in Sibolga City in 2023. Reducing the risk of work posture that can causes MSDs complaints, it is necessary to carry out preventive efforts and ergonomic interventions such as education or providing training related to work procedures.

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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%(Mulyaningsih & 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.2 The level of MSDs from the mildest to the most severe will interfere with concentration at work, cause fatigue and ultimately reduce productivity.3 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 a PT operating in the oil sector in Sibolga City interviewed and directly observed workers aged 21-60 years, it was found that workers felt pain in their wrists, elbows, neck, back, waist and legs, which indicated that the workers had complaints. musculoskeletal. The problem that occurs among PT workers working in the oil sector in Sibolga City is that 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 section of a PT operating in the oil sector in Sibolga City. The employee said that the number of workers at PT operating in the oil sector in Sibolga City at this time This is around 40 employees. then the second survey was carried out again on April 18 and conducted research using data collection methods using the Rapid Entire Body Assessment (REBA) observation sheet and the Nordic Body Map checklist as well as interview guidelines. The results of the second survey showed that there were characteristics of disease complaints. Musculoskeletal Disorders (MSDs) due to the working environment where the body is standing, bending for too long, most of the pain that occurs is 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 "MSDS Risk: Posture Assessment Using REBA Method" 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 “MSDS Risk: Posture Assessment Using REBA Method" so that it can help workers to reduce the occurrence of MSDs complaints in PTs operating in the oil sector in Sibolga City.

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 40 samples. The research took place from March to April 2024. Located at PT operating in the oil sector in Sibolga City. 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 40 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 Year	19	47.5 %
31-40 Year	12	30 %
41-50 Year	5	12.5 %
51-60 Year	4	10 %
Total	40	100 %
Gender	Number (n)	Percentage (%)
Woman	14	33.3 %
Man	26	66.7 %
Total	40	100 %
Last Education	Number (n)	Percentage (%))
Junior High School	4	10 %
Senior High School	18	45 %
College	18	45 %
Total	40	100 %
Length of Work	Number (n)	Percentage (%)
1-5 Year	23	57.5 %
>5 Year	17	42.5 %
Total	40	100 %

Source: Primary Data

In table 1 above, it can be seen that, based on age characteristics, more respondents were aged 21-30 years. Respondents in this study were also dominated by male gender. Based on the average education of respondents, the background is high school and university. Then, there were more respondents whose work experience was less than 5 years. Analysis Univariate Numerical Data Posture MSDs and Complaints.

Table 2. Analysis score based on posture MSDS work and complaints

Variable	N	Minimum	Maximum	Mean	Median	Std. Deviation
A. Score Posture Work						
Position Neck	40	1	3	2.05	2.00	0.714
Foot Position	40	1	3	1.88	2.00	0.723
Body Position	40	1	3	2.05	2.00	0.677
Total Score	40	2	5	3.23	3.00	1,250
Position Wrist Hand Right and Left	40	1	2	1.60	2.00	0.496
Right / Left Forearm	40	1	2	1.35	1.00	0.483
Arm On Left right	40	1	2	1.48	1.00	0.506
Total Score	40	2	3	2.28	2.00	0.506
Activity value + Table C value	40	2	5	3.43	3.00	1,010
B. Score MSDs Complaints						

Variable	N	Minimum	Maximum	Mean	Median	Std. Deviation
Neck on	40	1	3	1.37	1.00	0.598
Neck lower	40	1	3	1.54	1.00	0.611
Left shoulder	40	1	3	1.77	2.00	0.646
Right shoulder	40	1	3	1.89	2.00	0.631
Arm on left	40	1	3	1.91	2.00	0.702
Arm on right	40	1	3	2.15	2.00	0.610
Back	40	1	4	2.09	2.00	0.612
Waist	40	1	3	2.37	2.00	0.770
Butt	40	1	3	1.37	1.00	0.598
Butt	40	1	3	1.34	1.00	0.639
Elbow left	40	1	3	1.49	1.00	0.562
Elbow right	40	1	3	1.60	2.00	0.604
Arm lower left	40	1	3	1.91	2.00	0.562
Arm lower right	40	1	4	2.06	2.00	0.482
Wrist hand left	40	1	4	2.03	2.00	0.707
Wrist hand right	40	1	3	2.26	2.00	0.611
Hand left	40	1	4	2.06	2.00	0.725
Hand right	40	1	4	2.37	2.00	0.731
Right thigh	40	1	3	1.69	2.00	0.718
Left thigh	40	1	3	1.80	2.00	0.719
Knee left	40	1	3	1.60	2.00	0.651
Knee right	40	1	3	1.65	2.00	0.691
Left calf	40	1	3	1.97	2.00	0.568
Right calf	40	1	3	1.97	2.00	0.618
Left ankle	40	1	3	2.14	2.00	0.692
Right ankle	40	1	4	2.14	2.00	0.692
Left foot	40	1	4	2.57	3.00	0.698
Right foot	40	1	3	2.46	3.00	0.741

Source: Primary Data

Based on table 2 above, you can known that posture The most risky work is for workers at PT who work in the field oil in Sibolga City that is position neck, legs and body position. Whereas For more MSDs complaints Lots worker experience complaints included in category currently namely in part back, waist, left and right legs, ankles hand, hand left and right, as well arm lower right. Analysis Results Univariate Posture MSDs Work and Complaints.

Table 3. Distribution category risk posture MSDS work and complaints

Variable	N	%	CI 95%	
			Lower	Upper
Posture Work				
Tall	18	45	25.3	67.3
Currently	22	55	32.7	74.7
Total	40	100	100	100
MSDs Complaints				
Currently	31	77.5	57.7	92.4
Light	9	22.5	7.6	42.3
Total	40	100	100	100

Source: Primary Data

Based on table above, according to results study can known that on measurements posture Work use REBA method or *Rapid Entry Body Assessment* at PT engaged in the field oil in Sibolga City 18 people have a risk level high, and 22 people have a risk level currently. Temporary that's the result level complaint *Musculoskeletal Disorders* (MSDs) in workers PT which operates in the field oil in Sibolga City majority experience MSDs complaints with level complaint currently. Analysis Bivariate Connection Posture Work with MSDs Complaints

Table 4. Relationship posture work with MSDS complaints

Posture Work	MSDs Complaints		P-Value	OR (95 CI%)
	Currently	Light		

	N	%	N	%		
Tall	17	53.8	1	11.1	0.027	9,714(1,081-87,313)
Currently	14	46.2	8	88.9		
Total	31	100.0	9	100.0		

Source: Primary Data

Statistical tests in research This use Chi-Square to analyze connection posture work and complaints of Musc *uloskeletal Disorders* (MSDs). Based on results research in table 4 results analysis statistics using the *chi square* test at alpha 5% of the relationship Posture Work with musculoskeletal complaints in workers PT which operates in the field oil in Sibolga City obtained results from P-value 0.027 or < 0.05. That means, there is significant relationship between posture Work with complaint *musculoskeletal disorders* in workers at PT which operates in the field oil in Sibolga City. Besides that, obtained mark *the odds ratio* (OR) is 9.714, where meaning the person who owns it posture Work level risk tall at risk 9,714 times more big For experience Musc *uloskeletal Disorders* (MSDs) complaints were compared with people who have posture Work with level risk currently.

Discussion

In this study, to determine the level of ergonomic risk of a work posture using the REBA (Rapid Entire Body Assessment) method because workers at a PT operating in the oil sector in Sibolga City in their work use all parts of the body to work which are only divided into medium risk categories and high because the final REBA score is only in that category. Analysis of the identity characteristics of respondents shows that the majority are between 21-60 years old with a peak in the 21-30 year age range. This shows that the majority of respondents are of productive age among PT workers working in the oil sector in Sibolga City. Based on research (Rahmah & Herbawani, 2021), age is one of the factors causing complaints of Musculoskeletal Disorders (MSDs). However, usually workers who experience MSDs complaints are workers aged >30 years. This is because in middle age, then muscle endurance and strength begin to decrease, causing the risk of experiencing muscle complaints to increase (Tarwaka, 2004). In this research, it can also be seen that respondents have a high level of work posture risk. This is in line with research (Sintawati, 2024), which states that the working posture of PT Pertamina Lubricants workers is included in the dangerous category. The results of the research show that there is a significant relationship between work posture and MSDs complaints in workers, seen from the results of statistical analysis using the chisquare test at alpha 5% of the relationship between work posture and musculoskeletal complaints in PT workers engaged in the oil sector in Sibolga City. The results obtained from the value P-value 0.027 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 in workers with a p-value of 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 of 0.016 or <0.05. Then this research is also supported by research (Aisyah et al., 2023) which states that there is a relationship between work posture and MSDs complaints with a p-value of 0.048 or <0.05. The research results also show that the most risky work postures for workers are the position of the neck, legs and body. The results of observations in the field also showed that some respondents often worked lifting manual loads such as oil and waste in a bent position, standing and also walking and making upward hand movements. This work position is a work posture that is not ergonomic. If you lift objects incorrectly, it can cause pain in the back and other body parts. Apart from that, pain is also influenced by the way you lift, frequency of lifting, weight of the load, lifting position, and lifting distance (Evadarianto, 2017a). Then the most frequent MSDs complaints are pain in the back, waist, left and right legs, wrists, left and right hands, and right forearm. If the muscles in this part of the body receive static loads continuously and repeatedly for a very long time, it will cause complaints in the form of damage to the tendons, ligaments and joints (Tarwaka, 2004). Based on the description above, it can be seen

that working postures that are not ergonomic have the potential to cause MSDs complaints. This finding is in accordance with previous research which shows that unergonomic working postures 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 in workers, including providing education about the correct body position when lifting weights, the correct way to lift weights, movements that should not be made when lifting weights, and The load lifted should not exceed the worker's capacity and abilities. Apart from that, companies should also provide special training regarding proper and correct manual handling or load transport procedures to existing and new workers, as well as carry out routine supervision to monitor the programs that have been enforced so that workers no longer carry out careless transport movements by forming work postures. which is not in accordance with ergonomic principles. 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 (Evadarianto, 2017).

CONCLUSION

Based on research that has been carried out at PTs operating in the oil sector in Sibolga City, it can be concluded that the majority of those who experience Musculoskeletal disorders (MSDs) have moderate complaints and have a work posture with a high level of risk. The results of the Chi-Square test show that there is a significant relationship between work posture and complaints of Musculoskeletal disorders (MSDs) among PT workers working in the oil sector in Sibolga City, with a p-value of (0.027) < 0.05. It is necessary to carry out preventive efforts and ergonomic interventions aimed at reducing the risk of MSDs complaints among workers, including providing education or providing special training regarding manual handling procedures or proper and correct load transportation to old or new workers, and the loads that should be lifted should be carried out. does not exceed the capacity and abilities of workers. Apart from that, companies should also carry out routine supervision to monitor the programs that have been enforced so that workers no longer carry out careless transportation movements by forming work postures that are not in accordance with ergonomic principles.

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