Risk Factor Analysis of Lamentation of Musculoskeletal Disorders (MSDs) in Palm Oil Harvester Workers in South Labuhan Batu District

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Abstract

The palm oil harvesting process is still carried out manually, relying on human power and is carried out repeatedly, potentially causing complaints of Musculoskeletal Disorders (MSDs). Data collection was carried out in January – February 2024 among palm oil harvesting workers in Labuhan Batu. The sample selection technique involved a total sampling of 58 oil palm harvesters. Data was collected using the Nordic Body Map (NBM) questionnaire through observation of palm oil harvesting activities. Data processing and analysis uses 4 processes, namely coding, editing, data entry and cleaning. This study uses an analysis carried out to assess the risk level of musculoskeletal disease (MSDs) based on many variables of age, body weight, years of work and duration of work. With the help of SPSS 26 using the correlation test, there is abnormal data on 4 variables, so the Spearman correlation test is used to determine the strength of the relationship between the variables. In the statistical test results, it was found that the pvalue was 0.001 < 0.05, which means there is a relationship between age and MSDs complaints, the statistical test results showed that the pvalue was 0.005 < 0.05,. Research shows the importance of musculoskeletal conditions throughout life, especially in palm oil harvesting workers who are susceptible to complaints of MSDs in various parts of the body. The factors age, length of service and duration of work influence this complaint, while body weight is not significant. The researchers' recommendations include work posture training and the use of assistive devices to reduce the risk of MSDs, as well as supporting the development of more effective occupational health and safety policies, especially in the palm oil industry.

Keywords: Complaint, Disturbance, Musculoskeletal, Palm Oil Harvester, Worker

INTRODUCTION

MSDs are a public health problem that affects approximately 1.71 billion people worldwide, and are a major contributor to disability (Demissie et al., 2024). The most common form of this disorder is work-related MSDs primarily caused or exacerbated by the work and the environmental impact surrounding where the work is performed (Dhas et al., 2023). Due to various factors, the number of people living with MSDs and the functional limitations associated with them has increased rapidly in recent years (World Health Organization, 2022). MSDs are typically characterized by pain (which persists in most cases) and limitations of mobility and ability, resulting in reduced productivity, increased disability, and an economic burden on health systems (Lu et al., 2023). Musculoskeletal conditions are relevant throughout the course of life from childhood to old age (Rochmania et al., 2024). Starting from conditions that appear suddenly and are short-term (such as fractures, sprains, and strains associated with pain and limited function) to long-term conditions such as chronic primary low back pain and

osteoarthritis (Bazazan et al., 2019). Musculoskeletal conditions are also the highest contributor to global rehabilitation needs (Alisha et al., 2021). They are one of the largest contributors to the need for rehabilitation services among children and account for about two-thirds of all adults in need of rehabilitation (Alisha et al., 2021). Musculoskeletal conditions often occur together with other non-communicable diseases and increase the risk of developing other non-communicable diseases, such as cardiovascular diseases (Teresia & Lestari, 2022). People with musculoskeletal conditions are also at higher risk of mental health problems (Sultan et al., 2022).

The Centers for Disease Control and Prevention defines work-related musculoskeletal disorders as injuries or disorders of muscles, nerves, tendons, joints, cartilage, and spinal discs caused in part by one's work environment and performance at work, resulting in worse or longer occupational musculoskeletal disorders (Srirug et al., 2023). Activities during palm oil harvesting are mostly carried out manually using human labor and only assisted by simple tools without the help of machines (Djaali, 2019). Workers who lift and transport manually are at risk of causing disease and spinal cord injury (Teresia & Lestari, 2022). This type of activity can be categorized as a heavy job because it requires extra energy (Nurtanti & Tejamaya, 2023). A series of activities in harvesting palm oil increases the risk of MSDs or skeletal muscle disorders in palm harvesters (Sultan et al., 2022).

Based on preliminary observations made by researchers on oil palm harvesters in South Labuhan Batu, oil palm harvest workers work with various work postures and are still manual. In his work, a harvester carries out a series of activities such as cutting fronds and oil palm fruits, then putting them into artco and pushing artco containing oil palm fruit to the collection point of fresh fruit bunches (FFB) (Sultan et al., 2022). During work, oil palm harvest workers perform with a hunched posture, indicating that workers do not work ergonomically. If workers work not ergonomically, then the chances of experiencing MSDs complaints are even higher (Teresia & Lestari, 2022). In harvesting activities, workers' necks always look up to see the palm oil to be harvested, as well as hands that must carry and grasp FFB cutting tools such as dodos and egrek, and especially the position of the feet always standing long enough (Sultan et al., 2022). One of the causes of MSDs complaints in palm oil harvesters is due to unnatural work positions (Hitman et al., 2023). The body position of workers when harvesting palm oil is often not done naturally, which further increases the risk of MSDs (Sultan et al., 2022). Palm oil harvesters often impose an unnatural work posture to unload FFB from palm tree (Aulia et al., 2019). Based on the previous description of the problem, a research is needed that aims to analyze the risk of complaints of MSDs

disturbances in oil palm harvesting workers in South Labuhan Batu, explaining that muculoskeletal conditions play an important role throughout the life course from childhood to old age.

METHODS

This study is a quantitative type and uses *a cross-sectional* research design. The research will be conducted in January - February 2024 on oil palm harvesters in South Labuhan Batu District.

The sample selection technique in total sampling was 58 palm oil harvesters. Data collection using Nordic Body Map (NBM) questionnaire through observation of palm oil harvester activities. This NBM Questionnaire is a questionnaire used to determine discomfort or pain in the body. In this questionnaire, respondents are asked to fill in and indicate whether or not there is a problem in that area of the body.

Data processing and analysis, the four processes used in data processing: coding, editing, data entry, and cleaning. Data analysis in this study was conducted to assess the level of risk of *musculoskeletal diseases* (MSDs) based on many variables of age, weight, length of work and duration of work.

With the help of SPSS 26, *the Nordic Body Map* questionnaire data will be processed and analyzed using a correlation test. Abnormal data were found on 4 variables, so the spearman correlation test was used to determine the strength of the relationship in the variables.

RESULTS

Univariate Analysis

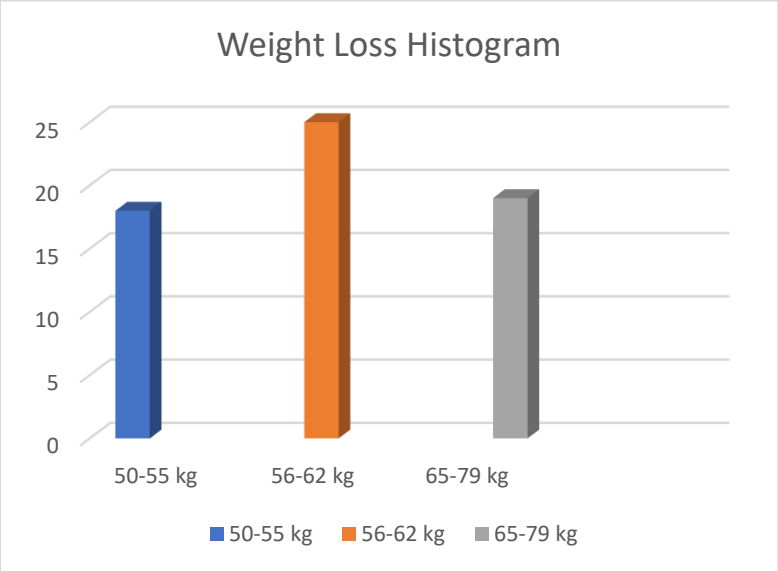

Figure 1. Weight Loss Histogram

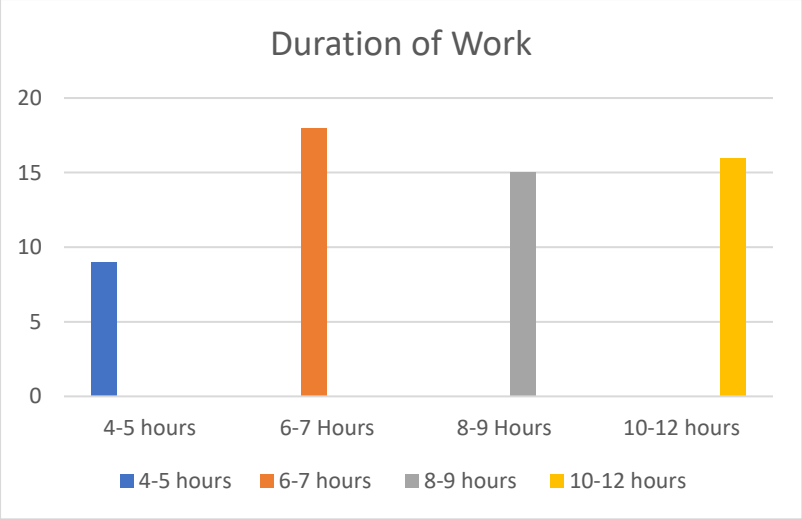

Figure 2. Duration of Work

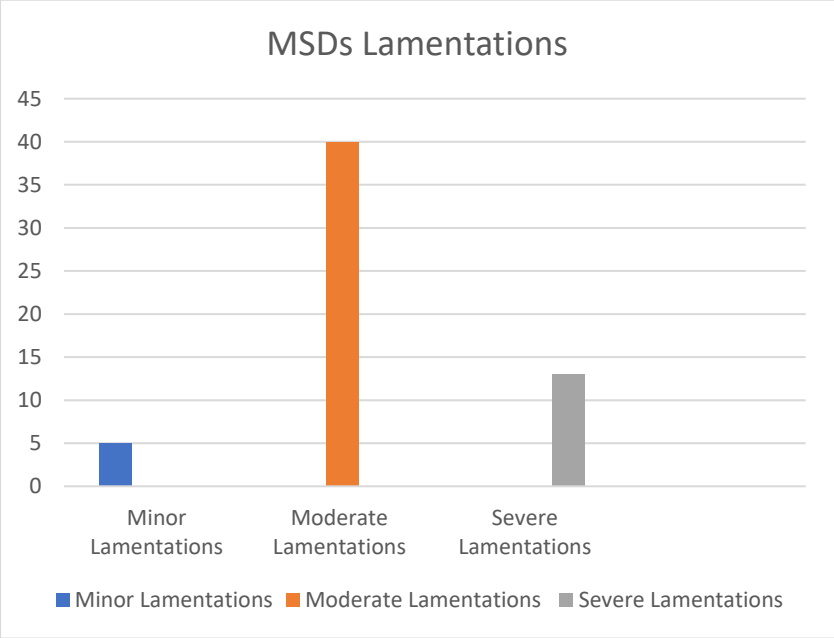

Figure 3 MSDs Lamentations

Based on the research conducted, the characteristics of respondents in this study are presented in the table below:

Table 1 Frequency Distribution of Respondents

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Age (Years)	58	30.78	8.195	19	53
Length of Service (Years)	58	4.40	2.527	1	9
Work Duration (Hours)	58	7.91	2.187	4	12
Weight (kg)	58	61.34	7.487	50	79

Source: SPSS Data

Based on table 1 of the *frequencies* statistical test data above, the mean in the age variable is 30.78 years, the standard deviation in the age variable is 8.195, the minimum in the age variable is 19 years and the maximum in the age variable is 53 years. Followed by the mean

on the working period variable which is 4.40 years, the standard deviation on the working period variable is 2.527, the minimum on the working period variable is 1 year and the maximum on the working period variable is 9 years. The mean in the work duration variable is 7.91 hours, the standard deviation in the work duration variable is 2.187, the minimum in the work duration variable is 4 hours and the maximum in the work duration variable is 12 hours. The mean in the weight variable is 61.34 kg, the standard deviation in the weight variable is 7,487, the minimum in the weight variable is 50 kg and the maximum in the weight variable is 79 kg.

Based on the results of filling out the Nordie Body Map questionnaire, various answers were found at 28 points according to the conditions or complaints felt during work. The results of the analysis on the level of complaints felt by oil palm harvester workers in South Labuhan Batu Regency as shown in the table below:

Table 2 Frequency Distribution of Respondents by MSDs Complaint Rate

Variable	Frequency	Percentage
Minor Complaints	5	8.6
Moderate Complaints	40	69.0
Severe Complaints	13	22.4
Total	**58**	**100**

Source: SPSS Data

Based on Table 2, it shows that respondents with a mild complaint level were 5 people (8.6%), respondents with a moderate complaint level were 40 people (69.0%), and respondents with a severe complaint level were 13 people (22.4%).

In the table, complaints occur due to several variables, namely age, length of service, duration of work, and body weight, so there are moderate complaints in the case of MSDs. Mild complaints occur due to a recent or long period of work affecting MSDs cases with a percentage of 8.6%. In the case of moderate complaints, it occurs due to age and weight which influence the MSDs cases with a percentage of 69% and serious complaints occur due to the duration of work which causes MSDs complaints with a percentage of 22.4% because the workers are already at an age that is vulnerable to work.

Bivariate Analysis

Table 3 Analyze of MSDs Complaint Factors

		Age	Weight	Period of service	Duration Of Work	MSDs
Age	Correlation Coefficient	1,00	0,147	0,125	-0,041	0,423**
	Sig. (2-Tailed)		0,271	0,349	0,759	0,001
	N	58	58	58	58	58
Weight	Correlation Coefficient	0,147	1,00	0,128	-0,172	-0,243
	Sig. (2-Tailed)	0,271		0,339	0,196	0,066
	N	58	58	58	58	58
Period of Service	Correlation Coefficient	0,125	0,128	1,0	0,097	0,367**
	Sig. (2-Tailed)	0,349	0,339		0,467	0,005
	N	58	58	58	58	58
Duration Of Work	Correlation Coefficient	-0,041	-0,172	0,097	1,00	0,394**
	Sig. (2-Tailed)	0,759	0,196	0,467		0,002
	N	58	58	58	58	58
MSDs	Correlation Coefficient	0,423**	-0,243	0,367**	0,394**	1,00
	Sig. (2-Tailed)	0,001	0,66	0,005	0,002	
	N	58	58	58	58	58

Based on table 3, it can be seen that there is a relationship between age and MSDs of 0.423 with a sign of 0.001, which means 0.001 < 0.01, thus the variables age and MSDs have a correlation or relationship. Furthermore, the relationship between Work Period and MSDs is 0.367 with sign. 0.005, which means 0.005 < 0.01, thus the Working Years variable and MSDs have a relationship. Apart from that, there is a relationship between MSDs and work duration of 0.394 with a sign of 0.002, which means 0.002 < 0.01.

DISCUSSION

Musculoskeletal diseases (MSDs) or musculoskeletal disorders are workplace health disorders that are widespread and increasing throughout the world. This complaint has become a health problem in society (Djaali, 2019). The musculoskeletal system includes tendons, tendon sheaths, ligaments, bursa, blood vessels, joints, bones, muscles and nerves. MSDs do not occur directly but rather are a combination and accumulation of injuries that occur continuously over a long period of time (Hermanto, 2021). Meilani 2023 said Body partThe upper part, especially the back and arms, are the parts most susceptible to the risk of developing MSDs.The risk factors for MSDs are divided into 2, namely individual factors and work factors (Meilani et al., 2023)

This indicates that of the 4 variables studied, only 3 are risk factors for musculoskeletal disease (MSDs) complaints in palm oil harvesting workers in South Labuhan Batu Regency, such as age, length of service and duration of work. Body weight is not a risk factor for complaints of musculoskeletal disease (MSDs) in palm oil harvesting workers in South Labuhan Batu Regency.

Utami Said, The relationship between Age and MSDs felt by workers is caused by excessive muscle contractions due to the workload given beyond the worker's abilities (Utami, 2022). The activities of a palm oil harvester are very diverse, starting from unloading FFB to transporting it to the FFB collection point and which is done manually and continuously, there is a high risk of experiencing MSDs complaints (Suherry et al., 2024). In carrying out palm oil harvesting activities, all parts of the palm harvester's body move and experience pressure so that the complaints felt by the palm harvester occur in all parts of the body from the feet to the neck of the palm harvester. Complaints about MSDs and the duration of work affecting the body parts of a palm harvester are caused by the duration of the harvester's work using orchids which is quite difficult when cutting palm fronds and FFB (Ginanjar et al., 2018). Periode of Service and MSDs are Related because when Someone’s working periode is too long it will because MSDs to Occur (Terminal & Kota, 2023)

Apart from that, palm harvesters lift quite heavy FFB with an average neck movement of > 20º. In the process of picking FFB from tall oil palm trees, a harvester raises the upper arm quite high, an average of 45°-90°. This work posture of palm harvesters increases the risk of experiencing MSDs complaints, both immediately while working and shortly after work. Palm oil harvesting activities with unnatural work postures and lasting quite a long time have negative impacts such as injuries (Teresia & Lestari, 2022).

Wrong or unergonomic working positions that workers practice at work will accelerate workers experiencing fatigue and even have a 2.5 times greater risk of experiencing spinal problems compared to working with an ergonomic working posture (Fibriansari et al., 2018). Apart from spinal problems, palm harvesters also have the potential to experience work accidents. In fact, work accidents are always experienced by FFB harvesters and this certainly causes a number of losses for the company (Alisha et al., 2021).

Various efforts have been made by the company, including protective efforts in the form of providing protective safety equipment, but accidents still occur (Srirug et al., 2023). Efforts to prevent work accidents, including preventing complaints about MSDs from palm oil harvesters, are important for workers to implement. Prevention efforts can be carried out optimally according to the causes of MSDs complaints experienced by oil palm harvesters.

Various factors cause MSDs complaints in palm oil millers, such as work posture (Sultan et al., 2022).

CONCLUSIONS

Based on the results of the study it can be concluded that musculoskeletal conditions play an important role throughout the course of life, from childhood to old age. These conditions can range from sudden, short-term problems such as fractures and sprains, to long-term problems such as chronic low back pain and osteoarthriti. The results showed that oil palm harvester workers experienced complaints of MSDs, with many complaints, especially in the calves, back, thighs, neck, and forearms. Factors such as age, length of service, and duration of work were associated with complaints of MSDs in oil palm harvesters, while weight was not significantly associated with these complaints.

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