Identifikasi Postur Janggal, Gerakan Berulang Dan Masa Kerja Terhadap Kejadian MSDs Pekerja Pemanen Kelapa Sawit PT Astra Agro Lestari Tbk

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A B S T R A C T

Complaints of Musculoskeletal Disorders (MSDs) occur in various types of work, including harvesting Oil Palm Fresh Fruit Bunches (FFB). The harvesting process can cause complaints to workers which are often in the form of pain and cramps in the wrists, shoulder and back pain, neck pain and pain in the elbows and feet. In the long term, it can trigger joint, tendon and ligament complaints, called musculoskeletal complaints. This study aims to identify awkward postures, repetitive movements and work periods for MSDs complaints felt by workers, especially oil palm harvesting workers carried out in January 2023. The sampling technique used the total sampling technique and obtained a total sample of 224 FFB harvesters. Data collection used the NBM (Nordic Body Map) questionnaire. Data analysis used univariate analysis, bivariate analysis and multivariate analysis with logistic regression test. This study showed a relationship between awkward postures (p=0.000), and repetitive movements (p=0.001) to MSDs complaints. Identified Working period (p=0.106) had no relationship with MSDs complaints in this study. The results of multivariate logistic regression analysis showed that the variable that had the most influence on MSDs complaints was awkward posture with (Odd Ratio=10, 024) with a p-value of 0.048 (<0.05). Companies must improve routine supervision and conduct proper natural handling training for oil palm harvesting workers to avoid musculoskeletal complaints.

Kata kunci:

Postur Janggal
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A B S T R A K

Keluhan Musculoskeletal Disorders (MSDs) terjadi pada berbagai jenis pekerjaan termasuk pekerjaan pemanen Tandan Buah Segar (TBS) Kelapa Sawit. Proses pemanenan dapat menyebabkan keluhan pada pekerja yang seringnya berupa nyeri dan keram pada pergelangan tangan, nyeri bahu dan punggung nyeri leher serta nyeri pada siku dan kaki, Jika otot pada bagian tubuh yang merasakan nyeri tersebut dilakukan dengan posisi kerja yang janggal, gerakan berulang pada durasi jangka panjang maka dapat memicu keluhan sendi, tendon mauopoun ligament, keluhan tersebutlah yang dinamakan keluhan muskuloskeletal. Penelitian ini bertujuan untuk mengidentifikasi postur janggal, Gerakan berulang dan masa kerja terhadap keluhan MSDs yang dirasakan oleh pekerja terkhusus pada pekerja panen kelapa sawit yang dilakukan pada bulan Januari 2023. Teknik pengambilan sampel menggunakan Teknik total sampling dan diperoleh jumlah sampel keseluruhan pemanen TBS sebanyak 224 responden. Pengumpulan data menggunakan kuisioner NBM (Nordic Body Map). Analisis data menggunakan analisis univariat, analisis bivariat dan analisis multivariat dengan uji regresi logistik. Hasil penelitian menunjukkan hubungan postur janggal (p=0,000), gerakan berulang (p=0,001) terhadap keluhan MSDs.

Teridentifikasi Masa kerja (p=0,106) tidak memiliki hubungan dengan keluhan MSDs pada penelitian ini. Hasil analisis multivariat regresi logistik menunjukkan variabel yang paling berpengaruh terhadap keluhan MSDs adalah postur janggal dengan (Odd Ratio=10, 024) dengan nilai p value sebesar 0,048 (<0,05). Untuk menghindari keluhan muskulosekletas perusahaan harus meningkatkan pengawasan rutin dan melakukan pelatihan manual handling yang baik kepada pekerja panen kelapa sawit.

INTRODUCTION

Bone and muscle complaints or what can be called musculoskeletal disorders are very common in various types of work which in public health is a fairly big problem (Bhuanantanondh et al., 2021). Common disorders that usually occur in complaints of musculoskeletal diseases with symptoms that attack the muscles, bones, nerves, and also other body systems due to non-ergonomic working conditions. Musculoskeletal Disorders (MSDs) very often occur in the process of worker activities in a job, not only seriously affecting worker efficiency and threatening the health and lives of workers, but can also cause a large economic burden for a country and company (Ge et al., 2018).

The World Health Organization (WHO) in 2020 estimates that based on the 2019 Global Burden of Disease (GBD) analysis data shows that there are 1.71 billion people worldwide experiencing conditions of musculoskeletal complaints which include low back pain, neck pain, broken bones, rheumatoid arthritis and other injuries. While the prevalence of musculoskeletal conditions varies according to age and diagnosis, it is undeniable that younger people also have musculoskeletal complaints. In 2017 the GBD study found that musculoskeletal conditions were the highest contributor to global disability (accounting for 16% of all years of life with disabilities), and low back pain has been the main cause of disability since it was first measured in 1990 (WHO, 2020).

The International Labor Organization (ILO) presented data on musculoskeletal complaints in Indonesia showing the prevalence of workers experiencing muscle injuries in the lower neck (80%), back (40%), shoulders (20%), hips backward (20%), waist to back (40%), buttocks (20%), thighs (40%), knees (60%), and calves (80%) (ILO, 2018). Based on the research data collected by the Center for Research and Development, there were 800 people from 8 sectors of domestic workers who showed that the musculoskeletal disorders of oil palm farmers ranked 6th in MSDs complaints with a percentage of 14.9% (Dheka Arwinno et al., 2018).

Elaeis guineensis Jacq or oil palm plant is a potential oil-producing plant. According to FAO (2002), with ideal management, high-yielding oil palm can produce more than 20 tonnes of FFB (Fresh Fruit Bunches)/Ha/Year which is equivalent to 5 tonnes of oil/Ha/Year. The process of cultivating oil palm plants plays a very important role in the final production, both in quality and quantity (Prabawati & Lidiana, et al., 2021)

The process of harvesting oil palm manually is still mostly done in the oil palm plantation sector. Manual handling consists of cutting the fronds and FFB (Fresh Fruit Bunches). The process carried out during harvesting can cause complaints to workers which often include pain and cramps in the wrists, shoulder and back pain, neck pain and pain in the elbows and feet. the same load and carried out continuously with repeated movements for a long-term duration can trigger joint, tendon and ligament complaints, these complaints are called musculoskeletal complaints.

The palm oil industry has developed greatly from year to year. The area of oil palm plantations in 2018 increased by 1.98% with a total area of 14.33 million Ha, which is expected to increase yearly. Three provinces have the largest land area in oil palm plantations, namely in the provinces of Kalimantan, Riau and Jambi (Indonesian Palm Oil Statistics Agency, 2018). Based on data from the Central Statistics Agency (BPS) for 2021, Riau Province has an area of oil palm plantations of 2.9 million Ha (BPS, 2023). One of the oil palm plantation companies, PT Sari Lembah Subur (SLS) Pelalawan, located in the capital city of Pekanbaru, Riau Province, is a subsidiary of PT Astra Agro Lestari Tbk, which is engaged in oil palm plantations. The plantation area of this company is 5,813 ha of mature plantations and 1,183 immature plantations. PT Sari Lembah Subur (SLS) is engaged in the processing of fresh palm fruit bunches which produces crude palm oil (CPO) as a product for sale. PT. Astra Agro Lestari Tbk was used as a research location because there had been no previous research identifying MSDs in its workers, especially in oil palm harvesting workers at the PT and the harvesting process was still being carried out using manual labor which could cause health problems, especially Musculoskeletal Disorders (MSDs) or musculoskeletal disorders. on workers,

Based on the discussion above, the researchers conducted a study on the identification of awkward postures, repetitive movements and work periods on MSDs complaints among palm oil harvesters at PT Sari Lembah Subur (SLS) Pelalawan. The purpose of this study was to identify awkward postures, repetitive movements and work periods for MSDs complaints felt by workers, especially oil palm harvesters.

RESEARCH METHODS

This research is a type of observational analytic study using a cross-sectional research design. This research was conducted in January 2023 at PT Sari Lembah Subur (SLS) Pelalawan Plantation, Pekanbaru, Riau Province. The research population consisted of all oil palm harvesters using the total sampling technique and the research sample consisted of 224 harvesters, all of whom were male and met the sample criteria. The instruments used in collecting data used a questionnaire and NBM (Nordic Body Map) to find out Musculoskeletal Disorders (MSDs) complaints.

The independent variables in this study are age, years of service, awkward postures, and repetitive movements. While

the dependent variable in this study is musculosekletal complaints in oil palm harvesters. Data analysis in this study was carried out using univariate analysis, bivariate analysis and multivariate analysis with multiple logistic regression tests. Univariate analysis was carried out to see the characteristics of the respondents and the frequency distribution of each variable. Bivariate analysis used the Chi Square statistical test with a degree of significance (: 0.05) to find out the relationship between the independent variables and the dependent variable, while multivariate analysis used multiple logistic regression tests (Binary Logistics) to find out how big the dominant influence was on dependent variable. Processing of the data obtained was carried out with the help of SPSS 25.0 software.

RESULTS AND DISCUSSION

Univariate Test Analysis

Table 1. Characteristics of respondents (N= 224)

	n	%
Respondent's age		
17-25 Tahun	49	21.9
26-35 Tahun	75	33.5
36-45 Tahun	84	37.5
46-55 Tahun	16	7.1
Last education		
SD	77	34.4
SMP	65	29.0
SMA	82	36.6
Working Duration		
7 Jam	54	24.1
8 Jam	166	74.1
9 Jam	4	1.8
Total	**224**	**100.0**

Musculoskeletal Disorders are generally experienced at the age of over 30 years and will increase at the age of 40 years and over, with increasing age where VO2 in the body also decreases so that work capacity also decreases (Handayan, et al., 2015). This decrease in work capacity occurs because the body has decreased function which results in tissue regeneration with the formation of scar tissue, reduced fluid volume and tissue destruction can occur which results in decreased stability of muscles and bones. The older a person is, the higher the risk of decreasing bone elasticity which can trigger complaints (Helmina, et al.,

2019). In table 1 the characteristics of the respondents, it is known that with a total sample of 224 respondents whose overall sex was male, it was found that the most dominant age group was at the age of 36-45 years as many as 84 (37.5%), then the second dominant age group was at 75 people (33.5%) aged 26-35 years, then 49 people (21.9%) for the 17-25 year age group and 16 people (7, 1%).

Based on the level of education, the most dominant respondent was high school with 82 people (36.6%), then elementary school with 77 people (34.4%) and the lowest level of education was junior high school with as many as 65 people (29%). The duration of work in based on research conducted, the dominant duration of work is 8 working hours for 166 people (74.1%), then 7 working hours for 54 people (24.1%) and finally 4 people (1.8%) who work 9 hours of work.

Table. 2: Types of MSDs Complaints of Palm Oil Harvesters

Complaint Type	n	%
No complaints	13	5.8
Pain or stiffness in the upper neck	10	4.5
Pain in the right shoulder	26	11.6
Pain in left wrist	29	12.9
Pain in the lower left arm	2	.9
pain in the waist	2	.9
pain in the right shoulder and pain in the back	43	19.2
Stiff pain in the upper neck and pain in the right shoulder	11	4.9
Stiff pain in the upper neck, right shoulder and right thigh	17	7.6
Right shoulder, neck stiffness, back pain	4	1.8
Stiff pain in neck, right shoulder, arm, wrist, finger, calf	29	12.9
stiff upper neck pain, right shoulder, wrist and sole of the foot	18	8.0
pain in the neck, hands and feet	20	8.9
Total	**224**	**100.0**

In table 2, the types of MSD complaints felt by oil palm workers have different complaints for each worker, the most common complaints are pain in the right shoulder and pain in the waist suffered by 43 oil palm harvesters. The second most common complaint was pain in the left wrist and stiffness in the neck which was suffered by 29 people.

Table. 3. Chi Square Statistical Test of Working Period with MSDs Complaints

Years of service	MSDs complaints			P value
	No MSDs	MSDs	Total	
	n	n	n(%)	
< 1 Years	5	29	34 (15,2%)	
1-5 Years	6	87	93 (41,5%)	
6-10 Years	0	52	52 (23,2%)	
11-15 Years	2	29	31 (13,8%)	0,106
16-20 Years	0	13	13 (5,8%)	
20 Years	0	1	1 (0,5%)	
Total	13	211	224 (100%)	

Table 4. Chi Square Statistical Test of Awkward Posture with MSDs Complaints

Awkward Posture	MSDs complaints			P value
	No MSDs	MSDs	Total	
	n	n	n(%)	
Don't take awkward postures	12	67	79 (35.3%)	
Takes awkward postures	1	144	145 (64.7%)	0,000
Total	13	211	224 (100%)	

Table 5. Repetitive Movement Chi-Square Statistical Test with MSDs Complaints

Repetitive Movement	MSDs complaints			P value
	No MSDs	MSDs	Total	
	n	n	n(%)	
Do not perform Repetitive Movements	12	85	97 (43.3%)	
Performing Repetitive Movements	1	126	127 (56.7%)	0,000
Total	13	211	224 (100%)	

Relationship of Tenure with MSD Complaints

Based on the bivariate results of the chi square test, it shows a p-value of 0.106 (> 0.05) so that Ho is accepted and Ha is rejected, which means that there is no significant relationship between length of service and MSDs complaints. Of the respondents with a working period of < 1 year, 34 people (15.2%) had 29 MSD complaints and 5 people who did not have MSD complaints, 93 respondents with 1-5 years of service (41.5%) 87 people had MSD complaints and 6 people did not have MSD complaints, 52 respondents with 6-10 years of service (23.2%) and all had MSD complaints, 31 respondents with 11-15 years of service (13.8%) had 29 MSD complaints and 2 people who did not have MSD complaints, 13 respondents with 16-20 years of service (5.8%) and all of them had MSD complaints, the last were respondents with working period >20 years as many as 1 person (0.5) with MSDs complaints.

Santoso (2018) conducted a similar study showing that there was no relationship between tenure and MSD complaints with a p value of 0.301, which means that respondents who had less than 5 years of work experience experienced MSDs complaints than respondents who had worked for more than 5 years (Santoso & Ariska, 2018). This is not in line with the results of research conducted by Lisna Afriani in 2022, the results showed that there was a significant relationship with a p value of 0.006, which meant that there was a significant relationship between length of work and complaints of Low Back Pain (Afriani et al., 2021).

There is no relationship between length of work and MSDs complaints in oil palm harvesters due to the adaptation process which has a positive effect which can reduce tension and can increase work activity and performance, besides that respondents have adapted to their work environment. Awareness of occupational diseases will also improve based on the increase in years of service at the workplace concerned (Putri et al., n.d.).

Relationship of Awkward Posture with MSDs Complaints

Based on the results of the chi square test, the p value was 0.000 (<0.05) so that Ho was rejected and Ha was accepted, which means that there is a significant relationship between awkward postures and MSDs complaints. With 145 respondents (64.7%) having awkward postures with MSDs complaints, 144 people had MSDs and 12 people had no MSDs complaints. Respondents who did not make awkward postures were 79 people (35.3%) with MSDs complaints as many as 67 people and 1 person had no MSds complaints.

This is in line with the results of research conducted by Asril Tanjung, Chairunnisa Hafez and Yuharika in 2021, the results showed that there was a significant relationship with a p value of 0.000, which meant that there was a significant relationship between work posture and MSDs complaints in plantation workers at PKS PT. Mitra Bumi Kampar district (Hafez & Pratiwi, et al., 2021).

Incorrect work posture in FFB harvesters causes body parts to move away from their proper position, for example hands raised too high above head, hunched back, raised head and many other things that can cause MSDs complaints.

Relation of Repetitive Movements with MSDs Complaints

Based on the results of the chi square test, it showed a p value of 0.001 (<0.05) so that Ho was rejected and Ha was accepted, which means that there is a significant relationship between repetitive motions and MSDs complaints. Respondents who did repetitive movements were 127 people (56.7%) with MSDs complaints as many as 126 people and 1 person had no MSDs complaints. Meanwhile, 97 people (43.3%) did not perform repetitive movements who had MSD complaints, 85 had MSD complaints and 12 had no MSD complaints.

This is not in line with the results of research conducted by Entianopa, Putri Sahara Harahap and Devita Rama 2021, the results obtained were that there was no significant relationship with a p value of 0.072, which meant that there was no significant relationship between repetitive movements and MSDs complaints in rubber tappers (Sahara Harahap et al., 2021)

Multivariate Analysis

Table 6. Logistic Regression Multivariate Analysis

Variable	Coefficient	P value	OR (IK 95%)
Service Period Category	1.150	0.140	1.712 (0,838 – 3, 498)
Awkward Posture Category	2.330	0.048	10.024 (1,024 – 103,150)
Repetitive Movement Category	1.444	0.239	4.037 (0,396-41,183)

Effects of Awkward Posture, Repetitive Movements and Working Period with MSDs Complaints

Significant variables in the bivariate analysis were then carried out further analysis using multivariate analysis of multiple logical regression tests. The variables included in this analysis were variables with a value (p value <0.2), namely the group of variables such as length of work, awkward postures and repetitive movements that had a p-value that met the requirements. Based on the results of the multivariate analysis of the multiple logistic regression test (Binary Logistics), it shows that the dominant result is the Awkward Posture variable with an Odd Ratio of 10.024 times more influential on MSDs complaints with a p value of 0.048 (<0.05) so that awkward posture is directly related partial (alone) and very influential on MSDs complaints, then in Repetitive Movement with an Odd Ratio of 4.037 with a p value of 0.239 (> 0.05) then Repetitive Movement is not related to MSDs complaints. In working period with an Odd Ratio of 1,712 with a p value of 0.140 (> 0.05), then working period is also not related to MSD complaints.

Oil palm harvesting workers often have unnatural working postures to harvest oil palm FFB. When working, oil palm harvesters have a slightly bent work posture which can result in MSDs complaints. When harvesting, workers always look with their necks looking up to see the FFB to be cut. Likewise with the hands that have to carry and hold FFB cutting tools such as dodos and egrek, as well as the position of the feet that hold a standing position for quite a long time (Saputri et al., 2022).

CONCLUSION

Based on research conducted on PT Sari Lembah Subur (SLS) Pelalawan FFB harvesters regarding the identification of awkward postures, repetitive movements and work periods with musculosekletal complaints, several conclusions can be drawn, namely:
1. Based on the results of bivariate analysis, a relationship was identified between work posture and MSDs complaints with a p value of 0.000 (<0.05), there was a relationship between repetitive movements and MSDs complaints with a p value of 0.001 (<0.05), and no there is a relationship between years of service and MSDs complaints with a p value of 0.106 (> 0.05) for PT Sari Lembah Subur (SLS) Pelalawan FFB harvesters, Pekanbaru Riau 2023.
2. Based on the results of the multivariate analysis using the logistic regression test, it was identified that awkward posture had a 10.024 times greater effect on MSDs complaints with a p value of 0.048 (<0.05).

Suggestions for companies to improve work posture by providing training specifically related to manual handling procedures which, as is still done by companies in the oil palm harvesting process, increase more routine supervision so that workers do not adopt unnatural awkward postures. Suggestions for future researchers to further deepen the discussion carried out by previous researchers.

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