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Determinants of Incidence of Myofascial Pain Syndrome on Coffee Picker Farmers in Pulu-Pulu Village, North Toraja Regency

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Abstract

Myofascial Pain Syndrome is a muscular pain that are often encountered in humans due to non-ergonomic positions during daily activities. In addition to the work position, Myofascial Pain Syndrome is also affected by individual factors and other occupational factors. This study aimed to determine the factors associated with the incidence of Myofascial Pain Syndrome on coffee picker farmers in Pulu-Pulu village, North Toraja Regency. This was a quantitativeresearch with cross sectional study method. Interviews were conducted on 45 respondents who were coffee picker farmers which was obtained based on the total sampling method. Data regarding sex, age, working period, working duration were measured using questionnaire. Data regarding posture were measured using the RULA assessment sheet and data regarding the incidence of myofascial pain syndrome were obtained through doctor's diagnosis.The data were analyzed using SPSS 21 with the results of Chi Square test showed that there was a correlation between gender (p = 0.011), age (p = 0.000), working period (p = 0.017), working duration (p = 0.010), posture (p = 0.019) and the incidence of myofascial pain syndrome. While the Logistic Regression test showed that the most significant and positive correlation was age and working duration. Writer would kindly suggest farmers to take breaks periodically while working to relax their body.

Keywords: Myofascial Pain Syndrome; Coffee Picker Farmers; Posture; Ergonomic.

Background

Agricultural sector in Indonesia is still the main employment field. Back in February 2018 around 30.46% of the Indonesian population had a main job in agriculture.[1] Like any other job, working in agricultural sector also possessed risk ofencountering accidents as well as occupational diseases. Occupational disease is a disease caused by your occupation, tools used at work, unergonomic posture when working and working period. One of the diseases that might possibly be experienced by farmers is Myofascial Pain Syndrome or pain disorders that affect joints and muscles.[2]

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Due to unattended and inadequate ergonomicfactors, existing hazards might lead to various complaints from workers related to musculoskeletal problems (Musculoskeletal Disorders) in many countries, one of which is the Republic of Korea. Korea reached 5,502 musculoskeletal problems in 2010. While in United Kingdom the proportion of musculoskeletal disorders (Musculoskeletal Disorders) reached 40% in all workers. Cases of low back pain and pneumoconiosis were common problems in Japan reaching 7,779 cases of work-related illnesses in 2011 (Haworth & Hughes, 2012). Overall musculoskeletal disorders in Indonesia in 2013 diagnosed by health workers reached 24.7%. The highest prevalence based on occupation was farmers, laborers and fishermen which reached 31.2% of it.[3]

Myofascial Pain Syndrome is pain in the muscles which is characterized by the appearance of one or more trigger points. This syndrome is caused by mechanical factors and medical factors. Conditions like this are commonly found among people who work with less ergonomic factors for a long time.[4]

Factors that affect Myofascial Pain Syndrome (MPS) are acute/chronic conditions of overworked muscles, heavy workloads, psychological stress, abnormal joint function, and motor control damage. The farmer's activity of picking coffee is often done in an incorrect or bad position, resulting in trauma to the muscles due to excessive loads. One of the muscles that often experience MPS is the upper trapezius muscle.

Data related to the prevalence of MPS cases in Indonesia were still very limited. In USA, MPS was the main cause of work disability and the second most common cause of disability.[5] Generally, the incidence rate of MPS was 54% in women and 45% in men. In the age category, MPSwas most often found in the productive age (27-50 years). Several factors that affected MPS were age, gender, smoking habits, physical fitness, muscle trauma, working period and working duration.[6]

One of the provincewith the biggest plantations and agriculture sector in Indonesia was the province of South Sulawesi with plantation commodities including coconut, rubber, cocoa (chocolate) and coffee. Coffee production (Robusta and Arabica) in South Sulawesi in 2015 was 9,862 tons with a land area of 24,526 Ha. North Toraja Regency was one of the coffee producers from South Sulawesi.[7]

Coffee picking farmers performnon-ergonomic work attitudes when picking coffee, including standing with the neck tilted up, bending when putting the picked coffee cherries into the bucket, squatting position and the position of the hands that was always raised upwards. These attitudes were carried out repeatedly and regularly. The most common occupational health problems experienced by coffee picker farmers, were fatigue and sore muscle.[8] Musculoskeletal complaints in some parts of the body tend to refer to the occurrence of myofascial pain syndrome disorders.

Research Method

This research was an observational study using cross sectional study design. The purpose of this study was to determine the factors associated with the incidence of myofascial pain syndrome in coffee-picking farmers in Pulu-pulu' village, North Toraja Regency. This research was carried out in February-March 2021 in Pulu-pulu' village, North Toraja Regency.

The population in this study were coffee-picker farmers in Pulu-pulu' village, North Toraja Regency, totaling 45 farmers. The sampling technique used in this study was total sampling, where the entire population was taken as sample, henceamount of sample or respondents was 45.

Data about age, sex, working period, smoking habits were collected using questionnaires and direct interviews while for work posture variables using the RULA Assessment Observation Sheet (Rapid Upper Limb Assessment) where this sheet was filled out by direct observation on respondent's work posture while working and the complaint of Myofascial Pain Syndrome that was diagnosed with qualified doctor. Data were processed using SPSS 21 for Chi Square and Linear Logistics Regression tests.

Discussion

Based on the result of this study, there were several topics to discuss about:

1. **Correlation between sex and the incidence of *Myofascial Pain Syndrome***

   Both Men and women work within their physical abilities. The physical strength of women's bodies was on average 2/3 of men's. Poltrast statedthat women had 65% of men lifting average power.

This gap existed because women experience biological cycles such as menstruation, pregnancy, postpartum, breastfeeding, and others.[9]

The result of this study showed that there was a significant correlation between sex and the incidence of myofascial pain syndrome (MPS) where the statistical test results obtained was p (0.010) <0.05 and statistical tests showed a positive results positive or unidirectional meaning that women were more at risk for MPS complaints.

Based on direct field observations, it was found that there were more female coffee pickers than men. This was because women were considered to have more perseverance in choosing the quality of coffee berries that were suitable for harvesting compared to men. Based on interviews with female farmer respondents, more women complained of neck pain than male farmers. This was because assumably male farmers had more physical strength the job was more like a man's job compared to women. This was in line with research conducted on residents in Jeddah, Saudi Arabia which stated that women showed a significantly higher risk of exposure to MPS compared to men.The study explained because women had fluctuating hormones such as the time of menstruation, pregnancy and others.[10]

2. Correlation between age and the incidence of Myofascial Pain Syndrome

In general, complaints of myofascial pain syndrome (MPS) began to be felt at the age of 30 and increase at the age of 40 and more. This was because naturally at middle age, muscle strength and endurance began to decrease thus the risk experiencing pain in muscles increases.[11] As coffee pickers got older, the risk of bones elasticity being degraded would increase which then became one of the risk factors to make MPS getting more frequent.[12]

Based on the results of research conducted on coffee picking farmers in Pulu'-Pulu' village, it was found that there was a significant correlation between age and the incidence of myofascial pain syndrome where the statistical test results obtained was p (0.000) < 0.05 and statistical test showed a positive results or unidirectional meaning that that the older a person gets, the higher the risk of having MPS. This was also in line with research conducted by Lai et al., (2017) on patients at The Northern Region of Taiwan Hospital which stated that elderly patients had high sensitivity towards exposure to MPS due to changes in the body's systems because of aging.[13]

Most Coffee picking farmers in Pulu'-Pulu village were more than 30 years old, where at that age, gradually, the body's physiological functions such as muscle strength and muscle stability would decrease. This was multiplied by the way coffee pickers work when they had to look up higher frequently to pick the coffees. This posture where the neck last very long in abnormal positionwould cause the neck to be more tense which lead might lead to muscle strained.

3. **Correlation between smoking habits and the incidence of *Myofascial Pain Syndrome***

Due to the presence of carbon monoxide within cigarette hence blood ability to consumed oxygen decreases. If the person performs a task that requiredhigh exertion, the person would easily get tired because the oxygen content in the blood was low, carbohydrate burning was inhibited, lactic acid would be accumulated and eventually muscle pain occurred.[14]

Based on the analysis results, it was found that there was no significant correlation between smoking habits and the incidence of myofascial pain syndrome where the statistical test results obtained was p (0.529) < 0.05 and the statistical test also showed a very weak correlation between smoking habit and myofascial pain syndrome. This was in line with research conducted by Sri Padmiswari B &AdiarthaGriadhi, (2017) which stated that there was no correlation between smoking habits and musculoskeletal complaints in silver craftsmen.[15]

The results direct observation showed that the respondents were dominated by farmers who did not smoke. One of the supporting reasons according to the farmers at the time of the interview was that smoking can be harmful to their work environment and some of the farmers also realized that smoking was not good for health, especially in their age. In addition, the company where they workoblige them not to smoke at work. However, these farmers could still become passive smoker, especially when outside their work environment and they were likely to be exposed by active smokers. Thus people who did not smoke were still very likely to be exposed to cigarette smoke and experienced complaints of musculoskeletal disorders.

4. Correlation between working period and the incidence of *Myofascial Pain Syndrome*

Work period was the accumulation of a person's work activities carried out over a long period

of time. If these activities were carried out continuously, it would possibly cause some disturbances within our body. Physical stress over a long period of time resulted in reduced muscle performance. If the stresses accumulated every day over a long period of time it could worsen the health which was also called clinical or chronic fatigue. The longer the time of working, the more muscles and bones saturation found. Where it could affect how they work both physically dan psychologically.

Based on the analysis results,it was found that there was a correlation between working period and the incidence of myofascial pain syndrome where the correlation was sufficient and positive. This means that the longer theworking period, the higher the risk of myofascial pain syndrome complaints. According to the results of observations, it was found that there were more respondents categorized to have young working period, as much as 28 people (62.2%) compared to respondents with long working period. However, it was still found that there were farmers who were new and felt pain in the neck and the major criteria were found during the examination by the doctor. The farmers had to look up higher frequently to pick the coffee where this posture was when the neck last very long in abnormal positionwhich might cause the neck to be more tense and might lead to muscle strained.

5. Correlation between working duration and the incidence of *Myofascial Pain Syndrome*

Working duration was the amount of time exposed to risk factors. Working duration impliedthe minutes of working hours/day of where the worker exposed to the risk. It was also could be seen as exposure/year to risk factors or job characteristics based on risk factors. Based on the analysis result, it was found that most of the farmers worked more than 8 hours which were 30 people (66.7%). Farmers who worked for more than 8 hours were the farmer with less side activities and those who were fit enough physically. While the farmers who worked less than 8 hours were the farmers who were still in school age or did not fit enough.

Based on the analysis result, it was found that there was a correlation between working duration and the incidence of myofascial pain syndrome (MPS) where the correlation was sufficient and positive. This meant that the longer the farmer's working duration, the higher the risk of MPS complaints. This was in line with research conducted by Mukherjee et al., (2020) which also found that working duration had a significant correlation with complaints of muscle disorders upon several domestic workers were in Kolkata, India.[16] One of the farmers complaintabout having MPS related to poor working hours, with several complaints of muscle pain in some of their limbs, especially in the neck and shoulders after work. This was strongly affected by the working time of the farmer which was 06.30 to 16.00 or 10 hours/day where this exceeded the recommended working duration which was maximum 8 hours/day.

Based on the analysis result, it was shown that the farmers who extended their working duration more than usual, oftenly not followed by higher efficiency, in fact there was usually a decrease in productivity and a tendency to encounter fatigue, illness, and accidents. The maximum break timewas 1 hour, while between working hours break time must be between 15-30% of the whole working time. If working hours exceeded these provisions, things such as a decrease in work speed and health problem might occurred which might leadto low levels of productivity.

6. Correlation between posture and the incidence of*Myofascial Pain Syndrome*

One aspect that was considered in ergonomics was work attitude. It was stated that work attitude was the various positions of the workers' posture during working. Natural work attitude was a work attitude that caused the position of body parts to move in a natural position. The farther the position of the body part from the centre of body gravity, the higher the risk of muscle complaints. Work attitude did not occur naturally just because of the characteristics of the task but work tools and work area which were not in accordance with the workers abilities would intervene as well.[17]

Based on the results of the study, it was found that there was a correlation between posture and the incidence of myofascial pain syndrome where the correlation was strong and unidirectional since it was positive result. In this study, it was found most of the farmers wereat very high-risk posture which were 19 people (42.2%). This was due to how they worked.They stand in a static working position or stand in a long time without taking breaks or stretching whether it was leaning on something, sitting and others.

The results of field observations showed that found most of the farmers posture while working were not compatible to regular ergonomic

standard. There were many movements that constrained their body parts to lean out of the natural body positions with incorrect and awkward attitudes. These incorrect movement or attitudes would increase the risk of injury to the muscles. This was in line with the research of Qureshi et al., (2019) which stated that Myofascial pain syndrome was a disease that causes pain in the neck and shoulders and was mostly caused by incorrect posture.Thereforetherapy and good ergonomic design were neededto prevent the MPS getting worse.[18]

7. Risk factors analysis of the incidence of *Myofascial Pain Syndrome*

Myofascial pain syndrome (MPS)was defined as musculoskeletal pain where the pain was located in the muscles. MPScould grow to acute or chronic, regional or generalized. This disorder could be a primary disorder that causes local or regional pain, or a secondary disorder that results from some other condition.[19]

Based on the results of the study, it was found that most of the farmers experienced complaints of MPS. In accordance with the results of observations, MPS complaints were motivated by the age of the farmers who were dominated by older farmers and they who worked for more than 8 hours with the head and neck looking up and arms and shoulders hanging outupwards to pick coffee cherries. Sometimes also stand on tiptoe to reach higher.

Regression analysis used to analyze several risk factors simultaneously using binomial logistic regression with the backward LR model. The results of the regression test on the risk factors for MPS complaints when viewed from the significance value, the most dominant risk factor for the incidence of MPSwas the variable of age and work duration. The older the farmer, the higher the risk of experiencing MPS hence the complaint would increase. In addition, the incidence of MPSwas also due to the time or duration of work of farmers. The longer the working duration, the higher the risk of MPS. To overcome the problem of MPS in coffee pickers in Pulu'-Pulu' village, the employers should put more concern upon their workers regarding any health complaints especially MPS to maintain high productivity.

Conclusion and Suggestion

Based on the results of this study, it could be concluded that sex, age, working period, working duration and posture have a significant correlation with the incidence of myofascial pain syndrome and after a deeper test using logistic regression it was found that age and length of work were the variable that has the closest and most positive relationship to the occurrence of myofascial pain syndrome. Based on this research, the researcher gives advice to the management to provide knowledge information to farmers about ergonomic work positions and perform muscle relaxation for at least 30 minutes at work to increase muscle flexibility.

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