

# Analysis of Employment Attitude To Musculoskeletal Complaints On Operator of Public Fuel Filling Station (SPBU) In Palembang City, 2021- [Similarity]

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## Analysis of Employment Attitude to Musculoskeletal Complaints on Operators of Public Fuel Filling Station (SPBU) In Palembang City, 2021

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### Abstract

*Musculoskeletal Disorders (MSDs) are disorders of the musculoskeletal system that cause symptoms such as pain due to damage to nerves and blood vessels in various locations of the body such as the neck, shoulders, wrists, hips, knees, and heels. This condition causes workers to experience fatigue more quickly. This study aims to analyze work attitudes towards complaints of Musculoskeletal Disorders at gas station operators in Palembang City. This type of research is a cross sectional study. The research was conducted at 12 gas stations in Palembang City. The number of samples in the study were 121 operators. Data was collected using interview techniques and data collection instruments using a questionnaire measuring instrument Nordic Body Map (NBM), and Rapid Entire Body Assessment (REBA). The results showed that there was a relationship between age and complaints of Musculoskeletal Disorders (p-value = 0.000), gender (p-value = 0.023), years of service (p-value = 0.000), smoking habits (p-value = 0.000), activity physical (p-value = 0.000), and work attitude (p-value = 0.000). Gas station workers are expected to be able to do light body stretching between breaks so as to reduce the risk of Musculoskeletal Disorders. Gas station operators are also expected to pay more attention to their work attitude, because if they do work with a bad work attitude, it will speed up the process of musculoskeletal disorders complaints. Keywords: Musculoskeletal Disorder (MSDs), Ergonomic, Gas Station*

### Keywords

musculoskeletal complaints;  
ergonomics; public fuel filling  
stations (SPBU)



### I. Introduction

Occupational health is a condition of workers who are protected from physical and mental disorders as a result of the interaction of work and the environment. Occupational health has a goal in the form of protecting the health of workers by preventing and controlling occupational diseases, work accidents and eliminating factors and working conditions that are harmful to health and safety in the workplace.(Stewart, 1958). One of the occupational health problems that often occurs is ergonomics. Organization must have a goal to be achieved by the organizational members (Niati et al., 2021). The success of leadership is partly determined by the ability of leaders to develop their organizational culture. (Arif, 2019).

Ergonomics is the study of the relationship between humans, physical and psychological aspects of the work environment (eg facilities and equipment), job demands and work methods. Ergonomics can be caused by machine construction errors, poor posture, wrong way of doing work, etc., all of which cause physical fatigue and even gradually affect the physical changes of the worker's body.(Siringoringo, 2003).One type

of ergonomic problem that is often encountered, especially those related to human strength and endurance in carrying out their work, is the complaint of Musculoskeletal Disorders (MSDs)..

Musculoskeletal Disorders(MSDs) is a disorder of the musculoskeletal system that causes symptoms such as pain due to damage to blood vessels in various locations of the body such as the neck, shoulders, wrists, hips, and knees.(Mayasari & Saftarina, 2016). Musculoskeletal disorders are disorders in workers that have the highest prevalence in the world. Jobs that force workers to be in non-ergonomic work postures cause workers to experience fatigue more quickly and indirectly provide additional workloads.(Kasimirus Ebu To, Noorce C. Berek, 2020).Labor Force Survey(LFS) states Musculoskeletal disorders (MSDs) as the highest health problems related to work. The results of other studies in America found about 6 million cases of MSDs per year or an average of 300-400 cases per 100,000 workers. The results of a study by the Ministry of Health of the Republic of Indonesia on the profile of health problems in Indonesia in 2005 showed that around 40.5% of the illnesses suffered by workers were related to their work. A study conducted on 9,482 workers in 12 regencies/cities in Indonesia found the incidence of musculoskeletal diseases (16%), cardiovascular (8%), nervous disorders (6%), respiratory disorders (3%) and Ear Nose Throat (ENT) disorders ( 1.5%) which is common(Kasimirus Ebu To, Noorce C. Berek, 2020).

Currently, the development of industry in Indonesia, especially in the city of Palembang, is currently experiencing a fairly rapid increase, especially in the General Fuel Filling Station (SPBU) industry. Currently, to meet the increasing demand for fuel, many gas stations have been built. The operating time of the gas station itself varies. Gas stations in the city of Palembang operate 24 hours on average. The operator of each gas station has a guard shift consisting of 3 shifts. The morning shift works from 06.00 to 13.00 WIB, the afternoon shift from 13.00 to 21.00 WIB, and the night shift from 21.00 to 06.00 WIB. Based on the initial survey conducted, 8 out of 10 gas station operators reported complaints in the musculoskeletal area, with severe categories on the left and right legs and neck, while the back and other limbs were categorized as moderate. In carrying out their duties, gas station operators most often work in a standing position. The duration of standing varies, depending on the level of crowd at the gas station. Standing for long periods of time can cause various complications if done for a long period of time. This is also due to the operator's poor working posture and lasts a long time. Based on this background, a study was conducted that aims to analyze the relationship between work attitudes and complaints of Musculoskeletal Disorders at the operator of the Public Refueling Station in Palembang City. This is also due to the operator's poor working posture and lasts a long time. Based on this background, a study was conducted that aims to analyze the relationship between work attitudes and complaints of Musculoskeletal Disorders at the operator of the Public Refueling Station in Palembang City. This is also due to the operator's poor working posture and lasts a long time. Based on this background, a study was conducted that aims to analyze the relationship between work attitudes and complaints of Musculoskeletal Disorders at the operator of the Public Refueling Station in Palembang City.

## **II. Research Method**

This research is quantitative research with a cross sectional design. The research was conducted at 12 gas stations in Palembang City. Data collection was carried out from November 2021 to February 2022. The population in this study were all operators at 12 gas

stations in Palembang City with a total of 203 operators. The sample is 121 operators who are determined by purposive random sampling technique.

Data was collected using interview techniques and data collection instruments using a questionnaire measuring instrument Nordic Body Map (NBM), and Rapid Entire Body Assessment (REBA). Data processing in this research is using a computer in the form of data checking (editing), coding (coding), data entry into a computer (entry), and data cleaning (cleaning). The type of test used is chi-square. Data will be analyzed by univariate and bivariate.

### III. Result and Discussion

#### 3.1 Characteristics of Respondents

Table 1 shows that the highest proportion of age is in the age group of 25-35 years (53.7%). Most of the gas station operators are male (71.9%).

**Table 1.** Characteristics of Gas Station Operators by Age and Gender in Palembang City

Characteristics	f	Proportion
<b>Age</b>		
17-25 years old	56	46.3%
25-35 years old	65	53.7%
<b>Gender</b>		
Man	87	71.9%
Woman	34	28.1%

#### 3.2 Descriptive Analysis

**Table 2.** Distribution of Gas Station Operators Based on Complaints of Musculoskeletal Disorders, Work Period, BMI, Smoking Habits, Physical Activity and Work Attitudes in Palembang City.

Variable	f	Proportion
<b>Complaints of Musculoskeletal Disorders</b>		
Moderate Risk if NBM 0- 41	73	60.3%
High Risk if NBM 42- 84	48	39.7%
<b>Years of service</b>		
New (if < 3 years old)	32	26.4%
Old (if > 3 years)	89	73.6%
<b>Body Mass Index (BMI)</b>		
Normal (if 18.5- 22.9)	94	77.7%
Overweight(if >23)	27	22.3%
<b>Smoking habit</b>		
Do not smoke	60	49.6%
Light Smoker	46	38.0%
Medium Smoker	15	12.4%
<b>Physical Activity</b>		
Light	31	25.6%
Currently	<b>64</b>	<b>52.9%</b>
Heavy	26	21.5%

<b>Work attitude</b>		
<b>Currently</b>	68	56.2%
<b>Tall</b>	<b>39</b>	<b>32.2%</b>
<b>Very high</b>	14	11.6%

Based on Table 2, it can be seen that there are 48 operators of gas station operators who experience high risk Musculoskeletal Disorders complaints (39.7%). The majority of gas station operators have a working period of >3 years (73.6%). A total of 94 (77.75) gas station operators have a normal BMI. Most of the gas station operators who do not smoke are 60 operators (49.6%). Most gas station operators have moderate physical activity as many as 64 operators (52.9%). And operators who have a moderate work attitude are 68 operators (56.2%).

### 3.3 Bivariate Analysis

**Table 3.** Relationship of Age, Gender, Period of Work, BMI, Smoking Habits, Physical Activity and Work Attitudes Against Complaints of Musculoskeletal Disorders at Gas Station Operators in Palembang City

Variable	Complaints of		Amount	%	p-value
	High Risk	Medium Risk			
<b>Age</b>					
<b>17-25 years old</b>	2	54	56	46.3%	0.000
<b>25-35 years old</b>	46	19	65	53.7%	
<b>Gender</b>					
<b>Man</b>	40	47	87	71.9%	0.023
<b>Woman</b>	8	26	34	28.1%	
<b>Years of service</b>					
<b>New</b>	2	30	32	26.4%	0.000
<b>Long</b>	46	43	89	73.6%	
<b>BMI</b>					
<b>Normal</b>	33	61	94	77.7%	0.056
<b>Overweight</b>	15	12	27	22.3%	
<b>Smoking habit</b>					
<b>Do not smoke</b>	10	50	60	49.6%	
<b>Light Smoker</b>	23	23	46	38.0%	0.000
<b>Medium Smoker</b>	15	0	15	12.4%	
<b>Physical Activity</b>					
<b>Light</b>	1	30	31	25.6%	
<b>Currently</b>	21	43	64	52.9%	0.000
<b>Heavy</b>	26	0	26	21.5%	
<b>Work attitude</b>					
<b>Currently</b>	7	61	68	56.2%	
<b>Tall</b>	27	12	39	32.2%	0.000
<b>Very high</b>	14	0	14	11.6%	



The results of the analysis of the relationship between age and complaints of Musculoskeletal Disorders in table 3 show that from operators aged 17-25 years, 54 people (44.6%). Musculoskeletal Disorders complaints were high as many as 46 people (38.0%). Based on the results of the chi-square statistical test obtained  $p\text{-value} = 0.000$ . The results of the analysis of the relationship between sex and complaints of Musculoskeletal Disorders in table 3 can be seen that from a total of 87 men, there were 40 people (33.1%) who experienced moderate risk while 26 of 34 female operators (21.5%) experienced moderate risk. . Based on the results of the chi-square statistical test,  $p\text{-value} = 0.023$  was obtained. The results of the analysis of the relationship between years of service and complaints of Musculoskeletal Disorders in table 3 show that from 32 people who have worked <3 years, 30 people have moderate risk (24.8%) while out of 89 people who have worked >3 years, 46 people (38.0%) experienced high risk. Based on the results of the chi-square statistical test,  $p\text{-value} = 0.000$  was obtained. The results of the analysis of the relationship between years of service and complaints of Musculoskeletal Disorders in table 3 can be seen that of 89 people who have a working period of > 3 years, who have a high risk of Musculoskeletal Disorders complaints are 46 people (38.0%) while from 32 people who have a <3 years of work, 30 people who have a moderate risk (24.8%). Based on the results of the chi-square statistical test obtained  $p\text{-value} = 0.000$ .

### 3.4 Discussion

#### 1. Relationship of Age with Complaints of Musculoskeletal Disorders

In general, skeletal muscle complaints begin to be felt at working age, which is 25-65 years. The first complaint is usually felt at the age of 35 years and the level of complaints will continue to increase with age because at middle age, muscle strength and endurance begin to decrease so that the risk of muscle complaints increases.(Andriani et al., 2020). Increasing age is followed by a decrease in  $VO_2$  max intake so that it will reduce work capacity. Decreased work capacity will be characterized by physical fatigue caused by muscle weakness. Muscles need oxygen and adequate blood supply to carry out metabolic processes and regulate muscle contractions to keep them going(Devi et al., 2017). At the age of 30 years there is degeneration in the form of tissue damage, tissue replacement into scar tissue, fluid reduction. This causes the stability of the bones and muscles to be reduced. In other words, the older a person is, the higher the risk of that person experiencing a decrease in the elasticity of the bones which triggers MSDs symptoms(Bridger, 2003).

The results showed that the respondents aged 17-25 years were 56 respondents and aged 26-35 years were 65 respondents. For those aged 17-25 years who experienced moderate risk as many as 54 respondents and who experienced high risk as many as 2 respondents. Meanwhile, for those aged 26-35 years who experienced moderate risk as many as 19 respondents and 46 respondents who experienced high risk. The results of the statistical test obtained a  $p\text{-value}$  of 0.000 ( $p\text{-value} < 0.05$ ), which means that there is a relationship between age and complaints of musculoskeletal disorders at the operator of the Public Fuel Filling Station (SPBU) in the city of Palembang. Other studies also prove that there is a relationship between age and complaints of Musculoskeletal Disorders.

#### 2. Relationship of Gender with Complaints of Musculoskeletal Disorders

Gender is closely related to MSDs complaints because physiologically the male muscle ability is stronger than the female muscle ability. This is due to the different hormonal influences between men and women. Female hormones make women physically more vulnerable(Helmina, Noor Diani & Hafifah, 2019). Some experts express differences of opinion regarding the influence of gender with musculoskeletal complaints. However,

several other studies found that gender showed a significant influence on the risk of muscle complaints. The female muscles are smaller in size and only two-thirds (60%) stronger than the male muscles, especially the arms, back and legs.(Kasimirus Ebu To, Noorce C. Berek, 2020).

The results showed that respondents with male sex were 87 respondents and 34 respondents were female. For the male gender who experienced moderate risk as many as 47 respondents, and 40 respondents experienced high risk. As for the gender of women who experience moderate risk as many as 26 respondents, and 8 respondents who experience high risk. The results of the statistical test obtained a p-value of 0.023 (p-value <0.05), which means that there is a relationship between gender and complaints of musculoskeletal disorders at the operator of the Public Fuel Filling Station (SPBU) in Palembang City.

### 3. The Relationship of Working Period with Complaints of Musculoskeletal Disorders

MSDs are chronic diseases that take a long time to develop and manifest(Kasimirus Ebu To, Noorce C. Berek, 2020). Working period is a risk factor for Musculoskeletal Disorders complaints because Musculoskeletal Disorders complaints related to work are cumulative, which means that the longer a person is exposed to risk factors, the greater a person feels physical complaints due to his work.(Siregar, 2018). MSDs do not appear spontaneously and immediately, but gradually until the human body's ability to begin to respond to pain(Devi et al., 2017). Based on the results of observations made, all respondents do repetitive work and take place every day. If these activities last for years, of course, there will be a risk of musculoskeletal complaints that will be felt by workers(Tjahayuningtyas, 2019). Complaints of Musculoskeletal Disorders can increase if the individual's working period also increases and will experience physical and psychological boredom. The working period symbolizes the risk factors that affect individuals at work that can increase the risk of Musculoskeletal Disorders, especially in the types of activities that utilize a large amount of work energy.(Helmina, Noor Diani & Hafifah, 2019).

The results showed that respondents with new tenures were 32 respondents and respondents with long tenures were 89 respondents. Respondents with a new tenure who experienced moderate risk were 30 respondents and who experienced high risk were 2 respondents. Meanwhile, 43 respondents with long tenure who experienced moderate risk, and 46 respondents who experienced high risk. The results of the statistical test obtained a p-value of 0.000 (p-value <0.05), which means that there is a relationship between years of service and complaints of Musculoskeletal Disorders at the operators of Public Fuel Filling Stations (SPBU) in Palembang City.

### 4. Relationship between Body Mass Index (BMI) and Complaints of Musculoskeletal Disorders

BMI is one of the factors that can cause complaints of Musculoskeletal Disorders. In people who are overweight, the risk of back pain is greater, because the load on the joints will increase(Oktaviannoor et al., 2015). People who have an excess Body Mass Index have a tendency to increase mechanical stress due to gravity on their musculoskeletal system, which can result in fatigue to injury in the form of musculoskeletal disorders. humans such as lower extremities and back(Purnawijaya & I Putu Gede Adiatmika, 2019). Someone with a BMI above normal not only feels pain at work, but they can feel the pain can still be felt by workers even though they are not working.

The results showed that 94 respondents with normal BMI and 27 respondents with overweight BMI. For respondents with normal BMI who experienced moderate risk as many as 61 respondents and who experienced high risk as many as 33 respondents. For

respondents with overweight BMI who experienced moderate risk as many as 12 respondents and 15 respondents experienced high risk. The results of the statistical test obtained a p-value of 0.056 (p-value > 0.05), which means that there is no relationship between BMI and complaints of Musculoskeletal Disorders at the operator of Public Fuel Filling Stations (SPBU) in Palembang City.

#### 5. The Relationship of Smoking Habits with Complaints of Musculoskeletal Disorders

There is a significant relationship between smoking habits and complaints of lumbar muscles, especially for jobs that require muscle exertion, because nicotine in cigarettes can cause reduced blood flow to tissues. In addition, smoking can also cause a decrease in the mineral content of the bones, causing pain due to fractures or damage to the bones (Rizka Widitia & Hapis, 2020). Several studies have shown that an increase in muscle complaints is closely related to the level of smoking habits. The longer and the higher the frequency of smoking. The higher the level of muscle complaints that are felt (Kamiluddin et al., 2017). In another study described a positive relationship between smoking and the incidence of Low Back Pain in men. Not only the number of cigarettes smoked per day but also the duration of smoking is important in estimating the exposure and effect of smoking on the incidence of muscle complaints (Michael J. Zvolensky, Katherine A. McMillan, 2011). Several surveys have been conducted that pain musculoskeletal disorders are more common in smokers and ex-smokers than those who have never smoked. Currently, smokers have a higher prevalence of chronic pain than nonsmokers (Palmer et al., 2003).

The results showed that 60 respondents did not smoke, 46 light smokers and 15 moderate smokers. For non-smoking respondents who experienced moderate risk as many as 50 respondents and who experienced high risk as many as 10 respondents. For respondents with light smokers who experienced moderate risk as many as 23 respondents and who experienced high risk as many as 23 respondents. Meanwhile, for respondents with moderate smokers who experience moderate risk, there were 15 respondents who experienced high risk. The results of the statistical test obtained a p-value of 0.000 (p-value < 0.05), which means that there is a relationship between smoking habits and complaints of Musculoskeletal Disorders at the operator of Public Fuel Filling Stations (SPBU) in Palembang City.

#### 6. Relationship of Physical Activity with Complaints of Musculoskeletal Disorders

Physical activity, also called external activity, is something that uses energy or energy to carry out various physical activities, such as walking, running, exercising and others. Each physical activity requires different energy according to the length of intensity and the nature of muscle work. Physical activity can also be interpreted as lifting and carrying activities carried out manually, which is defined as a job related to lifting, lowering, pushing, pulling, and moving loads with the exertion of all members of the body. Heavy physical work will certainly require greater muscle strength and have a risk of developing complaints in the body that will have an impact on health. Musculoskeletal complaints will increase if the muscles receive a load that is too heavy and continuously repeated coupled with a long duration of time. (Tjahayuningtyas, 2019). The occurrence of musculoskeletal disorders in addition to a decrease in physical activity can also be caused by several factors, including position and duration of activity. Body position during activities is strongly related to the occurrence of complaints of musculoskeletal disorders where poor body position will result in suppression or displacement of tendons, bones, and nerves, causing complaints. (Syadza Salsabila & Wulandari, 2022).

The results showed that respondents with light physical activity were 31 respondents, with moderate physical activity were 64 respondents and strenuous activity were 26 respondents. For respondents with light physical activity who experienced moderate risk as



many as 30 respondents and who experienced high risk as many as 1 respondent. Respondents with moderate physical activity who experienced moderate risk were 43 respondents and those who experienced high risk were 21 respondents. Meanwhile, respondents with strenuous physical activity who experienced moderate risk were not present, and 26 respondents experienced high risk. %). Statistical test results obtained a p-value of 0.000 (p-value < 0,

#### 7. Relationship between Work Attitude and Complaints of Musculoskeletal Disorders

Work attitude is an attitude when working that causes the position of body parts to move away from their natural position, causing musculoskeletal complaints, for example, the back is too bent, the head is too long to lift when taking things in a high place. Ergonomic risk factors with repetitive movements will cause repeated injuries which will have an impact on musculoskeletal complaints. Workers who work with awkward postures coupled with repetitive movements for a long time can cause excessive muscle contractions and put pressure on blood vessels and nerves. This condition causes the flow of oxygen to the muscles to be blocked. Over a long period of time, this condition causes muscle damage and in the worst cases will end in paralysis (Prabarukmi & Widajati, 2020). Workers with low work attitudes mean that the work attitudes of these workers have a low risk of musculoskeletal complaints and no action is needed to correct them. the work attitude so as not to continue with more dangerous health complaints. Workers with a moderate work attitude mean that the worker's work attitude has a low risk of musculoskeletal complaints and it may be necessary to take corrective action against the worker's work attitude so as not to experience more dangerous health complaints. (Utari et al., 2015). Non-ergonomic work attitudes, including repetitive work attitudes, will quickly cause fatigue and various disorders of the skeletal muscle system (Oley et al., 2018).

The results showed that respondents with moderate work attitudes were 68 respondents, 39 respondents had high work attitudes and 14 respondents with very high work attitudes. For respondents with moderate work attitudes who experience moderate risk as many as 61 respondents and those who experience high risk as many as 7 respondents. For respondents with high work attitudes who experience moderate risk as many as 12 respondents and those who experience high risk as many as 27 respondents. Meanwhile, respondents with very high work attitudes who experienced moderate risk did not exist, and those who experienced high risk were 14 respondents. Statistical test results obtained a p-value of 0.000 (p-value < 0,

Prevention of the risk of Musculoskeletal Disorders can be done by stretching or relaxing during rest hours. Stretching can be done by means of small warm-ups by moving the hands for about 5 minutes so that the hand muscles do not contract continuously. Relaxation of the neck can also be done by stretching the neck slowly. Relaxation of the legs also needs to be done, for example by walking or bending the legs back so that the leg muscles relax.

## IV. Conclusion

Based on the results of the study, conclusions can be drawn, among others: there are 48 workers (39.7%) gas station operators in Palembang City who have high complaints of Musculoskeletal Disorders. Respondents aged 25-35 years were 65 workers (53.7%). Respondents in the study were dominated by male workers, had a long working period (> 3 years), normal BMI, did not smoke, moderate physical activity and moderate work attitude. Variables of age, gender, years of service, smoking habits, physical activity and work

attitudes have a relationship with complaints of Musculoskeletal Disorders at gas station operators in Palembang City.

Gas station workers are expected to be able to stretch between breaks so as to reduce the risk of Musculoskeletal Disorders. Gas station operators are also expected to pay more attention to their work attitude, because if they do work with a bad work attitude, it will speed up the process of musculoskeletal disorders complaints.

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