

Smoking Habits And Stress Of Work On Musculoskeletal Disorders On Factory Workers Ferronickel Section Smelting

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Abstract: The problem of employment concern the world including occupational disease. Musculoskeletal disorder is a disease become a trend in recent years. This study aimed to determine the smoking habits and work stress on musculoskeletal disorders in Ferronickel Smelting part Antam limited in Nickel Mining Business Unit (UBPN) Southeast Sulawesi Indonesia. Analytic observational research, using cross sectional design. As many as 56 research subjects. Independent variables smoking and stressful employment. The dependent variable musculoskeletal disorders. Measurement variables smoking habits using questionnaires identity of respondents. Measurement of job stress questionnaires indicators of job stress. Measurement of musculoskeletal disorders using questionnaires Nordic Body Map. Results showed that the variables after Correlation Test Product Momment the habit of smoking on musculoskeletal disorders have significant value 0.023 and a correlation coefficient -0303. Variable work stress on musculoskeletal disorders have significant value 0.004 and a correlation coefficient -0379. Work stress and smoking habits there is a significant relationship with musculoskeletal disorders and lead to a negative relationship. Smoking habits by employees should be terminated, that the effort to create an atmosphere conducive working environment to reduce stress in the work environment such as the recreation work.

Keywords: Musculoskeletal Disorders, Smoking habits, Job stress, and Factory workers Ferronickel.

INTRODUCTION

Occupational disease is a matter of concern in the world of employment. This is because of occupational diseases is very influential on the effectiveness and efficiency of the work of a worker which will eventually lead to decreased employee productivity¹. All physical activity done by employees, including activities in the field of development will have the risk of accidents, ranging from wound - the wound, became a lifelong disability or death. Accidents and illness in the workplace causes death or more victims compared to a world war. Research conducted by the international labor organization ILO in 2003 led to the conclusion that every day an average of 6,000 people died, the equivalent of one person every 15 seconds, or 2.2 million people per year due to illness or accidents related to their work².

One type of occupational disease is a disease that often occurs musculoskeletal disorders. The estimation results published by NIOSH in 1996 showed that the cost of compensation to the complaints of the musculoskeletal system has reached U \$ 13 billion annually. The fee is the largest when compared with the cost of compensation for complaints / pain due to other work³. Based on data from the Bureau of Labor Statistics (BLS) of the US Department of Labor, there were approximately 705 800 cases of loss of working days caused

by work too hard and repetitive movements and also have an impact on musculoskeletal disorders⁴. Musculoskeletal disorders are the main reason for the weakening of labor productivity due to sick leave⁵. Other information shown by Andersson (1999) referred to under Viester et al. (2013) explains that musculoskeletal disorders have been identified as the most frequent causes of absence from work and work limitations⁶.

Ferronickel plant, which is in the Antam limited, Nickel Mining Business Unit (UBPN) Southeast Sulawesi, a nickel processing plant in which there are a wide range of basic activities such as processing, smelting ore, and purification. On the Smelting (melting) material and equipment used, work processes using the tools that large and in large numbers, activities raised, and activities of the deployment of other muscle and coupled with the environmental conditions of the factory has great risks in contributing cause of occupational diseases musculoskeletal disorders, especially for the employees of the plant. Musculoskeletal disorder is a disease that is becoming a trend in recent years in the Antam Limited (Tbk), UBPN Southeast Sulawesi.

CHAPTER II RESEARCH METHODS

This study is analytic observational study using cross sectional design. As many as 56 research subjects. To measure musculoskeletal disorders using questionnaires individual Nordic Body Map which then calculates the total score of individuals from around the skeletal muscle (skeletal muscle section 28) observed³. To measure stress caused by work using questionnaires indicators of job stress with the scoring method used to assess the severity of the individual stress in the working group that is quite a lot or a sample group that can represent the population as a whole³.

RESEARCH RESULT

2.1 Characteristics of Research Subjects.

Table 1 Characteristics of Research Subjects

Characteristics	n (Sum)	%
Work stress		
Low	36	64.3
Moderate	15	26.8
High	5	8.9
Total	56	100.0
Smoking Habit		
Smoke	22	39.3
Do not smoke	34	60.7
Total	56	100.0
Smoking intensity		
Light smoker	3	5.6
Moderate smokers	15	26.8
Heavy smokers	4	7.1
Non smoker	34	60.7
Total	56	100.0
Musculoskeletal complaints		
Low	53	93.0
Moderate	3	5.3
High	1	1.8
Total	56	100.0

Based on the characteristics of the study subjects known table of frequency distribution of work stress, most respondents in the group with low job stress as many as 36 people (64.3%), the group of respondents who have job stress were as many as 15 people (26.8%), and group have high job stress as much as 5 people (8.9%). For the frequency distribution of smoking habit, the group who do not smoke as many as 34 people (60.7%), while for the group of 22 people who smoke (39.3%). The frequency distribution of the intensity of the smoke, light smokers as group 3 (5.4%), smokers were as many as 15 people (26.8%), weigh as much as four people (7.1%), and non-smokers as many as 34 people (59 , 6%). Frequency distribution musculoskeletal complaints, respondents who have low complaint as many as 52 people (92.9%), which had as many complaints were 3 (5.4%), and which has particularly high complaint as much as 1 (1.8%).

2.2. Analysis bivariable

Bivariable analysis was conducted to determine the relationship between the dependent variable and independent variables. In this study bivariable analysis performed using correlation test product moment.

Table 2. Results of correlation test product moment independent variable on the independent variable.

Correlation Between	r_{xy}	Sig (p)	Description
X ₁ with Y	-0.379*	0.004	Significant
X ₂ with Y	-0.303*	0,023	Significant

Description:

X₁: Stress Job, X₂: Smoking Habit, Y: Musculoskeletal Disorders

Table based product moment correlation test results, for the variable job stress has a significant value 0.004 and a correlation coefficient of -0.379. This shows that there is a significant correlation between age and musculoskeletal complaints. Direction of the relationship between the variables of job stress with musculoskeletal disorders is negative. It can be concluded that the higher the level of stress respondent, the lower the rate of musculoskeletal disorders. To the habit of smoking has a significant value 0.023 and a correlation coefficient of -0.303. This shows that there is a significant relationship between smoking and musculoskeletal disorders. Direction of the relationship between the variables smoking and musculoskeletal disorders is negative. It can be concluded that smoking is inversely related to musculoskeletal disorders respondents.

CHAPTER III DISCUSSION

3.1. Relationship Stress Work with Musculoskeletal Disorders

Feelings of stress will increase muscle tension, and if tension is long lasting (permanent) that can cause musculoskeletal disorders⁷. Feelings of stress can also heighten the perception of symptoms muskuloskeleta. Other studies explain that the complaint at the back is the most common musculoskeletal disorders related to work⁸. Among the many factors such as job stress subgroup, the physical environment, the demands of work, organizational systems, work climate, lack of appreciation, and insecurity in the work associated with the incidence of musculoskeletal disorders

associated with work⁸. Symptoms of stress potentially great influence on the physical, emotional, cognitive, and social functions⁹.

Results of bivariate analysis product moment correlation coefficient (r_{xy}) -0.379 with a significance value of 0.004. The results are reinforced by multivariate analysis Backward Regression method. At the initial stage and the end of the multivariate analysis showed a significant correlation between age and musculoskeletal disorders ($p < 0.05$). This is shown by the regression of the finish stages of beta coefficient -0.158 and $p = 0.014$.

The negative relationship between job stress and musculoskeletal disorders is contrary to the results of a previous study conducted by Leino (1989) explains that the symptoms of stress have a reciprocal relationship with chronic musculoskeletal disorders¹⁰. Nevertheless based on the observation, it may be due to the high motivation in relation to labor compensation is high, so that even in a state of stress of musculoskeletal disorders be so perceived. In other words, the perceived musculoskeletal complaints is not a problem because the high motivation.

It is even possible that the stress that occurs leads to a positive stress which can be interpreted as a positive adaptive response, mediated by individual differences, and or psychological processes which is a konskuensi of action or external situation¹¹. Musculoskeletal disorders become not so perceived even in a state of stress or in other words the perceived musculoskeletal complaints is not a problem because the high motivation. High motivation that will encourage someone to do something if he believes that his behavior is bring results¹².

3.2. The relationship of smoking habits with Musculoskeletal Disorders

Several studies have shown that increasing muscle complaints is closely related to the old and the level of smoking habits. The longer and the higher the frequency of smoking, the higher the level of perceived muscle complaints. In another study describes a positive relationship between smoking and the incidence of Low Back Pain in men. Not only the number of cigarettes smoked every day but also the duration of smoking may be important in estimating the exposure and the effects of smoking on the incidence of non-specific Low Back Pain Chronic¹³. Similarly Zvolensky et al., (2010) and Holley et al., (2013) reported that there is a relationship between chronic musculoskeletal disorder with smoking status^{14,15}.

Results of the study showed a negative correlation between smoking and musculoskeletal disorders contrary to research conducted by Soleman in 2012 which showed that there was a significant relationship with the positive direction between smoking and musculoskeletal complaints with the value of $r_{xy} = 0.453$ and $p < 0.05$ ¹⁶. On this study, the results showed a negative relationship between smoking and musculoskeletal disorders can be understood because in theory substances contained in cigarettes is nicotine can provide physiological effects that stimulate the nervous system so that smokers feel comfortable and relaxed and feel more energetic and vibrant, known as biphasic effect¹⁷. The more often a person will feel more and more addicted to smoking and also increased the doses to be used¹⁸. In addition to nicotine can affect the brain by binding to receptors which stimulate spending a lot of neurotransmitters including dopamine and acetylcholine so as to facilitate the spread of signals between brain cells¹⁹.

In the process of hard work, workers who smoke generally let's have a tendency to make smoking as compensation for perceived musculoskeletal complaints to obtain such a comfortable feeling. It needs to be a concern that smoking even in small amounts can lead to dependence and to a certain dose that exceeds the tolerance will be a bad influence on health¹⁷.

3.3. Other variables that could potentially cause musculoskeletal disorders

Musculoskeletal disorders are generally caused by multiple factors such as the physical, psychological and influence - social influence²⁰. Besides repetitive movement, exertion large, attitudes or postures which are not naturally played a role in causing musculoskeletal disorders²¹. Based on observations made during the study, there are several factors that could potentially lead to musculoskeletal disorders in workers ferronickel plant Smelting part Antam UBPN Southeast Sulawesi. These factors include vibration, noise and heat.

Especially for vibration, exposure to whole body vibration at least half the work time associated with the prevalence ratio of over two to musculoskeletal symptoms in the low back, neck, shoulders / arms and hands among workers²². Vibration is also recognized as ergonomic risk factors for musculoskeletal disorders in general cases, including carpal tunnel syndrome and some types of tendinitis²³. It also expressed by Wigley et al. (2007) which states that the vibrations are important factors that cause musculoskeletal disorders that need to be controlling, as well as diseases that can be prevented²⁴.

In relation to the exertion and muscle workers, Broadly speaking, the activities in the smelting of ferronickel plant PT. Antam UBPN Southeast Sulawesi among others cleaning runner uses the crowbars and spades, demolition slag is frozen using a breaker, drilling furnaces, drilling metal bar to determine the height of the level of slag and metal in the furnace, pushing ambulance pype highly at risk of bursts of liquid metal, Mashing at the time Slag Hole closure activities are also potentially exposed sembran hot slag from the furnace and are also at risk for shoulder injury due to impingement activity requires considerable power.

CHAPTER IV CONCLUSION AND SUGGESTION

Based on the results of research conducted on the analysis of the causes of musculoskeletal disorders in workers ferronickel plant Smelting part PT. Antam UBPN Southeast Sulawesi obtained the following conclusions:

1. There is a significant relationship between job stress with musculoskeletal disorders in workers ferronickel plant Smelting part Antam limited . Nickel Mining Business Unit South East Sulawesi.
2. There is a significant association between smoking and musculoskeletal disorders in workers ferronickel plant Smelting part Antam limited. Nickel Mining Business Unit South East Sulawesi.

SUGGESTION

1. Stress work are positive light can boost employee motivation but severe stress can cause various health problems, especially musculoskeletal disorders. Therefore, the company needs to consider the efforts to create a conducive working environment to minimize stress in the work environment such as the recreation work.

2. Smoking habits by employees should be stopped, because even small amounts can cause dependency so that if in certain doses can cause musculoskeletal disorders also affect general health.
3. Need for education and training to employees in terms of ergonomics to improve the understanding of plant employees ferronickel smelting part of the working environment and work processes effectively and efficiently as well as the provision of minor muscle exercise to employees both before and after the work process in an attempt to minimize musculoskeletal disorders.

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