



Factors Related to the Risk of Musculoskeletal Disorders in Welding Workshop Workers in Lhokseumawe City in 2019

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Abstract:

Working in an awkward posture without using work aids for welding shop workers can pose a risk of Musculoskeletal Disorders. The study aims to determine the factors associated with the risk of Musculoskeletal Disorders in welding workshop workers in the city of Lhokseumawe. This type of research is a type of quantitative research, with a cross sectional approach. Performed on 40 populations which are all used as samples. Data collection was carried out through interviews using the Nordic Body Map (NBM) worksheet to determine the level of MSDs complaints and to find out whether age, education, years of work, number of hours worked, number of hours of rest (independent variables) affected the MSDs (dependent variable). The results showed that there was an influence of the age factor (p score = 0,000), years of service (p score = 0,000), the number of hours worked (p score = 0.009) and the number of hours of sleep (p score = 0.009) on the risk of MSDs, but the education factor did not show the effect which is significant (p score = 0.548). The conclusions of this study are: age, years of work, number of hours worked and number of hours of sleep are the causes of MSDs risk in welding workshop workers except the level of education which is mostly high school. It is recommended to welding workshop workers to use tools such as work desks to reduce the odd work posture, the allocation of working time in accordance with the applicable government regulations, namely 7 hours a day by business owners, as well as the continuity of activities of the UKK Team towards informal workers both in terms of knowledge transfer (counseling) and health services.

Keywords:

musculoskeletal disorders; nordic body map; welding workshop workers

I. Introduction

The emergence of disease, disability or even premature death of more than hundreds of people each year due to the effects of the work environment puts work risk at number 10 as reported by World Health 2002. Regarding this, WHO reports several illnesses to workers such as back disorders or spine (37%), loss of hearing function (16%), chronic obstructive pulmonary disease (13%), asthma (11%), accidents (10%), lung cancer (9%), leukemia (2%) (Tarwaka, 2013).

Accidents and diseases caused by work are health challenges arising in workers due to exposure to environmental hazards and work risks. Lack of attention and awareness in working either by the business owner or the worker itself. Disregarding behavior and ignoring the procedures at work that should be obeyed, this is often found in informal work groups with a low educational background or doing work not in accordance with expertise because of the insistence on the necessities of life. With these conditions, it causes bodily disorders to other fatal incidents such as accidents while working until it finally stops productivity and disrupts the family economy (RI Ministry of Health, 2014).

Welding workshop that grows in community settlements is one example of informal sector work which is a business owned by individuals or more with several workers serving the

manufacture of fences, metal doors, window trellis, canopies, stairs and so forth from iron construction and the like through the process of cutting activities and connecting iron formed as you wish by using a grinding and welding machine to pass through other processes such as transportation, measurement, cutting, welding, until the stages of refinement, painting, drying and also installation, of course, when viewed from environmental conditions or work stations and the application of occupational health and safety is very different from the working conditions in the formal sector and tend to be what it is, so easy to cause workplace accidents.

The welding work process is also full of risks, where the process is always associated with fire, electricity and also other elements that can catch fire or even explode. High ultraviolet light radiation, sparks, heat, noise, inhalation of harmful smoke and dust as well as work positions that are not ergonomic at work give the effect of fatigue to decrease alertness which affects work productivity.

One of the businesses that developed in Lhokseumawe City is a welding shop business. The initial survey was conducted at 12 welding workshop locations with varying conditions and the number of workers (2-4 people per place of business), carrying the number of permanent workers as many as 40 people. Most of the workers in the welding workshop with various complaints such as aches, pain in the waist, back, neck, shoulders, thighs, front calf (tibia), upper and lower arms after carrying out a series of welding activities both squatting, standing, bend over, look up and hold a load for a long time. From the information above, we want to examine whether age, work period and number of hours worked are associated with the risk of Musculoskeletal Disorders in welding workshop workers in Lhokseumawe City in 2019.

II. Research Method

This type of research is a type of quantitative research, with a cross sectional approach and will be conducted on welding workers in Lhokseumawe City in 2019, conducted from November 2018 to June 2019. The research sample is all welding workers in 12 welding workshops as many as 40 people.

The MSDs data collection technique is done by interviewing using forms containing respondent characteristics data and the Nordic Body Map (NBM) worksheet to determine the level of pain in 27 joints and muscles of the body with a Yes or No answer, and with other expressions to find out how much pain there is. felt (mild, moderate, severe and very severe) with scores of 1, 2, 3, and 4 respectively.

The analysis used in this study is univariate and bivariate analysis. Univariate Analysis: Data analysis is carried out to get the frequency distribution of each variable. Bivariate analysis: Analysis of the data used to determine the influence of the factors of the dependent variable, namely age, education, work period, number of hours worked and number of hours of sleep on the independent variable, Musculoskeletal Disorders using the Chi Square test. With the provisions, there is a relationship if the p score <0.05.

III. Discussion

3.1. Result

Table1. Distribution of Respondent Characteristics of Welding Workshop Workers with or without Tables in Lhokseumawe City in 2019.

No	Characteristics	Total	
		f	%
Age			
1	≤35 year	16	40,0
2	36-50 year	18	45,0
3	>50 year	6	15,0
Total		40	100,0
Education			
1	Elementary School	1	2,5
2	Junior High School	6	15,0
3	Senior High School	32	80,0
4	Bachelor degree	1	2,50
Total		40	100,0
Period of service			
1	<10 year	13	32,5
2	11-20year	11	27,5
3	21-30 year	12	30,0
4	>30 year	4	10,0
Total		40	100,0
Total of working time			
1	6 hour	4	10,0
2	7 hour	21	52,5
3	8 hour	15	37,5
Total		40	100,0
Total of sleep time			
1	Good	19	47,5
2	Bad	21	52,5
Total		40	100,0
NBM			
1	Light	6	15,0
2	Medium	10	25,0
3	Heavy	19	47,5
4	Very heavy	5	12,5
Total		40	100,0

From Table 1 above shows that of the 40 workers, the most frequency is in the age group of 36-50 years with a total of 18 people (45.0%), almost all of the respondents' education is high school as many as 32 people (80.0%), work period has the highest frequency in the category <10 years, namely 13 people (32.5%), the number of hours of sleep for 7 hours a day, namely as many as 21 people (52.5%), while for the level of risk of MSDs the number of hours of sleep that has the highest rating at the high level is 19 people (47.5%).

Table 2. Distribution of Respondents by Risk Level of MSDs to Welding Workers by the NBM Method in Lhokseumawe City in 2019

No	Risk Factors MSDs	MSDs With NBM								Total	
		Light		Medium		Heavy		Very heavy		f	%
		f	%	f	%	f	%	f	%		
Age											
1	≤35 Year	5	12,50	5	12,50	6	15,00	0	0,00	16	40,00
2	36-50 Year	1	2,50	5	12,50	12	30,00	0	0,00	18	45,00
3	>50 Year	0	0,00	0	0,00	1	2,50	5	12,50	6	15,00
Total		6	15,00	10	25,00	19	47,50	5	12,50	40	100,00
Education											
1	Elementary School	0	0,00	0	0,00	1	2,50	0	0,00	1	2,50
2	Junior High School	1	2,50	2	5,00	1	2,50	2	5,00	6	15,00
3	Senior High School	8	20,00	15	37,50	5	12,50	4	10,00	32	80,00
4	Bachelor degree	0	0,00	1	2,50	0	0,00	0	0,00	1	2,50
Total		9	22,50	18	45,00	7	17,50	6	15,00	40	100,00
Period of service											
1	<10 Year	7	17,50	6	15,00	0	0,00	0	0,00	13	32,50
2	11-20 Year	2	5,00	7	17,50	2	5,00	0	0,00	11	27,50
3	21-30 Year	0	0,00	5	12,50	4	10,00	3	7,50	12	30,00
4	>30 Year	0	0,00	0	0,00	1	2,50	3	7,50	4	10,00
Total		9	22,50	18	45,00	7	17,50	6	15,00	40	100,00
Total working time											
1	6 Hour	0	0,00	0	0,00	1	2,50	3	7,50	4	10,00
2	7 Hour	6	15,00	8	20,00	4	10,00	3	7,50	21	52,50
3	8 Hour	3	7,50	10	25,00	2	5,00	0	0,00	15	37,50
Total		9	22,50	18	45,00	7	17,50	6	15,00	40	100,00
Total sleep time											
1	Good	5	12,50	8	20,00	4	10,00	2	5,00	19	47,50
2	Bad	4	10,00	10	25,00	3	7,500	4	10,00	21	42,50
Total		9	22,50	18	45,00	7	17,50	6	15,00	40	100,00

Based on Table 2 above, the distribution of MSDs risk level among welding workers based on the Nordic Body Map (NBM) method is the highest risk of MSDs with a total of 19 people (47.5%), and is dominated by the age group 36 to 50 years (30.0%). Education respondents who had the highest risk of MSDs were at the moderate level (45.0%) and dominated by the high school group of 15 people (37.5%) The length of work of respondents who have the highest risk of MSDs is at a moderate level and is dominated by the category of work years between 11-20 years (17.5%), the number of working hours of respondents who have the highest risk of MSDs is at a moderate level (45.0%) and dominated by the number of hours worked 8 hours (25.0%). While the number of hours of sleep that has the highest risk of MSDs is also at a moderate level (45.0%) and is dominated by the group of respondents with poor sleep hours (25.0%). Based on the results of the bivariate analysis the following results were obtained:

Table 3. Factors affecting Musculoskeletal Disorders in Las Workers in Lhokseumawe City in 2019

Risk facto	P- Score	Mean	Std. Deviasi	Information
Age	0,000	1,78	0,733	There is a relationship
Education	0,548	2,83	0,501	No relationship
Period of service	0,000	2,17	1,010	There is a relationship
Total working time	0,009	1,50	0,640	There is a relationship
Total sleeping time	0,009	1,50	0,506	There is a relationship
NBM	0,000	2,25	0,981	There is a relationship

Based on table 3 above it is known that the risk of MSDs can be influenced by factors such as age (pscore 0,000), years of service (0,000), number of hours worked (0.009), number of hours of sleep (0.009), but not influenced by factors of education (0.548) at welding workshop workers in Lhokseumawe City in 2019. The results also showed that the average age of workers was 1.78 (age group 36-50 years), with an average education level of 2.83 (high school category), the average length of service was 2.17 (more than 10 years), the average number of hours worked 1.50 (6.5 hours), and the average number of hours of sleep was 1.50 (5.5 hours). From the results of Chi Square analysis on welding workshop workers it is known that age, years of service, number of hours worked, number of hours of sleep and the analysis of the Nordic Body Map has a p-score <0.05, meaning that there is an influence of these factors on the risk of MSDs in welding workers while education has a p-value > 0.05, meaning that there is no influence of MSD risk on welding workers based on education.

3.2. Discussion

Doing this welding job requires a lot of energy in every step of the work they do, both in lifting weights in the form of iron to be formed as well as working equipment, cutting either by using a clamp or grinding machine that prioritizes the strength of pressure and withstand the heat of sparks, welding with attention to balance shape for good results and withstand glare from the welding process. All processes really require strength and good stamina. This study also shows that over 36 years of age are susceptible to complaints of MSDs, which can be caused by physical conditions that decline with age as well as the repair process in our bodies takes longer. Complaints of MSDs are more common in respondents aged over 35 years with heavy and very heavy levels, complaints that are felt by the average pain in the back, waist, neck, shoulders, thighs, knees and calves. Ranging from aches, mild to severe pain and tingling.

This study also shows that a person's education level is not related to inhibiting the risk of MSDs. Of the 40 respondents on average including high school education with a number of 32 people, but only 15 people were exposed to moderate risk and the rest were spread from mild to very severe risk levels. This can be caused by the education that the respondents obtained is not vocational special education, or training that can increase respondents' knowledge about welding as well as the effects of hazards arising from the work environment.

The length of service is related to the risk of MSDs, this is because the risk of MSDs is experienced at all levels of the service period category. At the beginning of the work period, pain complaints are not so felt but over time it turns out that the pain accumulates because of awkward postures when doing welding work continuously for a long time, such as squatting, bending, body twisting, tilting left or right, reaching distant objects and holding heavy burden at work, which over time has an effect on the framework of the human body. According to RI Law No. 13 of 2003 article 77 that manpower hours are 7 hours a day (including 1 hour of rest). Working hours in the welding shop business generally range from 6-8 hours a day excluding rest

periods. The results of this study found that the number of hours worked is associated with the risk of MSDs. This is due to the longer number of hours worked a day, the longer the workers do work with odd postures, resulting in a high risk of MSDs.

According to D.F. research Kripke in Ade (2004) a person can sleep for 8 hours and under 4 hours a day has a risk of death more quickly than people who sleep 6-7 hours a day who turns out to have a longer life. From these studies it can be concluded that a healthy sleep is 6-7 hours a day. Sleeping too long or too short will have a negative impact on health. In this study there is a relationship between the risk of MSDs. This happens because the risk of MSDs is experienced by respondents both in the number of hours of sleep 6-7 hours and <6 hours or> 7 hours a day. With a number of hours of sleep less than 6 hours is not enough for pain relief so it takes enough hours of sleep to reduce the effects on health.



Figure 1. Activities in a welding workshop

IV. Conclusion

There were relationship between ages, work period, number of hours worked, number of hours of sleep with the risk of MSDs in welding workshop workers in Lhokseumawe City, There is no relationship of education with the risk of MSDs in welding workers in Lhokseumawe City.

Work facilities are needed in the form of tools (work desks) for welding workshop workers to reduce odd work postures. Business owners should allocate work time in accordance with applicable regulations, which are 7 hours a day (including 1 hour of rest), The UKK team carries out activities that are useful for informal workers, to be able to provide basic knowledge that must be known by informal workers about the dangers posed in completing work in their respective fields. Continue to provide basic treatment and treatment for workers on a regular basis. Collaborating with employment agencies for further good and there is continuity in reporting.

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