

THE INFLUENCE OF WORK POSTURE TO THE MUSCULOSKELETAL DISORDER ON LAUNDRY WORKERS IN TEMBALANG REGION

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Abstract

Musculoskeletal disorders is one of the injury caused by the bad of MMH (Manual Material Handling). Laundry workers are at risk for musculoskeletal disorders. The risk is indicated by their working attitude. Their position is not ergonomic. The purpose of the study is to analyze the work attitude and to describe musculoskeletal disorders of laundry workers.

This research used several laundry worker in tembalang region. The result showed that musculoskeletal disorders occur in skeletal muscle. It is the muscle of the neck, shoulders, arms, fingers, back, waist and low body muscles.

The musculoskeletal issus is dominated by low back pain. The more of work period mean the more risk of musculoskeletal disorders for the worker. Additionaly, musculoskeletal disorders influenced by the excessive stretching of working poor posture, repetitive movements, bad working attitude. Based on the research, it can be conclude that the work postures during the ironing session are in the action level 2. It is indicated that the further and the deep investigation is needed. The most common complaint is on the neck, nape of neck, right shoulder, back, right upper arm, waist, hips, forearm, wrist, and right hand.

In order to avoid musculoskeletal disorders, work posture and work tools that fit with the anthropometry of each respondent is needed. In ironing session, the workers need to use a chair with backrest. This backrest is aimed to support the back of the workers. During the ironing session, the workers need to take a break for 5 to 10 minutes. This way, the workers can relax for a while.

Keywords: work posture, musculoskeletal disorder, laundry worker

A. Introduction

Workers are the capital and the main assets to support the development of industry and business. The interaction between workers, employment and production equipment can increase the risk of accidents and occupational diseases¹⁾. In order to increase the productivity, the worker need to be placed in a good work environment. The environment have to fulfill the standards of health and safety. The workers need to work in complete comfort. If the requirements are not fulfilled, there will be uncomfortable of work, illness, disease and accidents. Those problems are caused by imbalance between workload with the capacity or ability of the workers.²⁾

The result of the work is influenced by a sense of comfort. A sense of comfort will spur

the performance of the workers. As a result they can work optimally. For instance, the workers need to shrug their shoulders when adapting the height groundwork. This condition causes the backache.²⁾

For some of job, the worker needs the ability of manual material handling (MMH). MMH is raise up/ down, push in/ pull out, turn, hold back, and carry in the material. Sometimes, this activities cause an injury for the workers. It is widely accepted that manual handling of heavy loads has potential to cause musculoskeletal disorders. When there is a mismatch between the physical requirements of the job and the physical capacity of the worker, musculoskeletal disorders can be result. Musculoskeletal disorders is one of the injury caused by the bad of MMH.³⁾ It is an injury or disorder of muscles,

nerves, tendons, ligaments, joint cartilage, or spinal discs. Deborah states that Musculoskeletal disorders can be seen as responses to overloads on the body, caused in varying degrees by unhealthy levels of physical stress in the environment (2008:9). For example, the workers who must repeat the same motion throughout their workday, do their work in an awkward position, etc.⁴⁾

The numbers of study shows that low back pain is the higher complaint of musculoskeletal disorders. Based on the National Ambulatory Medical Care Survey in 1989, it was estimated that there were 19.9 million visits for low back pain. Laundry workers are at risk for musculoskeletal disorders. The risk is indicated by their working attitude. Their position is not ergonomic. They do repetitive work that relies on one type of muscle. Musculoskeletal disorders include inflammation disorders and degenerative conditions that affect muscles, nerves, tendons, ligaments, joints, and the human spine. These complaints are called RSI (Repetitive Strain Injuries), CTD (Cumulative Trauma Disorders), and RMI (Repetitive Motion Injuries)⁵⁾. Nurmala, in her research shows that in every single activities of laundry workers, the positions are not ergonomic. Based on the posture assessment with RULA in her research, shows that the grand score is 4-7, the action level 2-4. This finding suggests that the improvement for the laundry workers' posture is needed. In addition, the finding shows that the ironing activities is the worse. The action level of ironing activities are two. Based on the result above, the exhaustive investigation is needed.⁶⁾

Due to the pre survey in laundry house, the workers are work too hard using their muscle. The activities include lifting and moving, washing, drying and ironing clothes. Based on the opinion of workers, the hardest activities is ironing. The workers finds the pain of waist and arm after ironing. They works fifteen hours. They works from 7 am to 10 pm.

1. Problem Statement

The comfortable and ergonomic position will greatly assist the workers in completing the job. However, unergonomic position causes

musculoskeletal disorders. Based on the survey, ironing activities require workers to work in uncomfortable position. They needs standing by bending or sitting with bowed. It is assumed that this position cause musculoskeletal disorders. Due to the assumption above, the research related with the musculoskeletal disorders in laundry house is needed.

2. Significance of the Study

The purpose of the study is to analyze the work attitude and to describe musculoskeletal disorders of laundry workers. Moreover, the result of the research is expected to give some benefits. The benefits are:

- a. To provide an overview of the work attitude and its influence to musculoskeletal disorders for the employee in laundry house.
- b. To give the recommendations of the right work attitude in order to reduce musculoskeletal disorders.

B. Method

Research population: laundry worker in Tembalang areas. Instrument of research: observation, assessment of work posture, identification of musculoskeletal complaints. Method of sampling with purposive sampling, the instrument used are measuring tool and RULA Nordic Body Map Quest. Nordic Body Map Questionnaire is used to measure pain of the body. Procedure research: primary data retrieval with the observation data to work process and monitoring of the conditions and the environment as well as the interview respondents. Data were analyzed qualitatively descriptive.

C. Results And Discussion

1. Job Description

The activities of laundry house are the process of washing clothes, lifting a bucket of laundry, drying the clothes, and ironing the clothes. Washing machine is used to wash the clothes. All the laundry worker do the same activities. It takes 30 minutes to wash the clothes (or depend on the automatic machine). It takes 4 to 6 seconds for lifting the bucket of

laundry. It takes 3 to 8 minutes for drying the clothes (depend on the number of clothes). The rest of the time is used for ironing the clothes. Manual material handling is used during this process. Furthermore, musculoskeletal disorders may occur during the process above.

Musculoskeletal Disorders may appear during this activities. The activities are:

a. Lifting the bucket of laundry

The workers put in the clothes into the bucket of laundry. Then, the worker lift and carry the clothes for drying. This lifting process use manual way (manpower). It is between 2 to 10 kilograms.

b. Drying the clothes.

During this process, the workers needs to stand with both hands raised and head looked up slightly.

c. Ironing the clothes.

Ironing is the last process before packaging process. During this process, the workers are in the seat position with slouching body and head bowed. It is the longest process than lifting and ironing clothes. An appropriate of the table and the chair is identified as the main perceived cause of musculoskeletal disorders.

Based on the table 1, 90.3 % of laundry workers are female. They are more than 30 year (60.3%). 51.6 % of them, are work less than one year.

Frequency distribution of Nordic Body Map.

Based on the workers' Nordic Body Map questionaire, the nape and the right shoulders' pain is the worse. It is 54.8% for nape pain. Then, it is 71.0% for right shoulder pain.

The result of RULA assessment

The RULA assessment is conducted during ironing session. The researcher analyze by using RULA software.

Based on the data above, a lot of ironing session of the laundry worker in Tembalang region is in action level 2 (64,51%). It is indicated that the further investigation is needed.

The analysis of work postures with RULA in ironing session

Based on the RULA assessment above, the respondents' ironing session is categorized in action level 2. It is indicated that the further investigation and treatment is needed.

The respondents form an angle of upper arm, forearm, wrist, neck, and torso. Three respondents form an angle of 20 to 45 degree in using upper arm. Then, two respondents form an angle of 45 to 90 degree in using upper arm. 60% of the respondents form an angle of > 100 degree in using forearm. 40% of the respondents form an angle of 60 to 100 degree in using forearm. More over, 80% of the respondent form an angle of 0 to 15 degree by using wrist in the middle position. Then, 20% of them form an angle of 15 degree by using wrist in the middle position.

The respondents' neck form an angle of 10 to 20 degree. The flexion forward of neck posture may cause muscle disorders. Backs hunched posture is an awkward postures that cause abnormalities of the spine.

The respondents' torso form an angle of 0 to 20 degree. The first respondent have torso incursion. Then the fifth respondent have neck bending.

Based on the picture, the position of the respondent is the head down, torso bent, and the chair without back to lean on. Sit for long period is indicated as the main cause the weak of the abdomen muscles, curve spine, respiration disorders, and digestion organ. In sit position, the pressure of the back rise increasingly than in stand position or lie down position.

There are some findings in RULA analysis. The chair that is used by the respondent have no back for leaning on. It makes the worker easy to get tire and stiff. One of the respondents' table is lower than the workers' sit position. As a result, the worker have to work with bending their body and neck. The tool need to be designed for the workers' comfort. This effort is used to reduce musculoskeletal disorders.

It is unstable position when you have to work with bent position. Repetitive manual handling and bending position might also be link

with problem in low back pain. Moreover, poor ergonomic position (like bent) may have consequences in slipped disk.⁵⁾

The laundry worker need more than one hour to finish the ironing. The incompatible of work tools, anthropometry, and the work duration are indicated as cause of musculoskeletal disorders. Poor ergonomic gives influence to the workers' physical health.^{6,7)}

The Analysis of Musculoskeletal Complaints

Totally (100%) of the respondents complains stiff of muscles after ironing the clothes. Based on the Nordic Body Map questionnaire, the most common complaint is on the neck, nape of neck, right shoulder, back, right upper arm, waist, hips, forearm, wrist, and right hand. Awkward posture is the reason of the illness. The ironing activites count heavily on the upper limb. It is the hand, back, neck, shoulder, and arm.

The worker feel the musculoskeletal disorders at the age of 30 years. This condition is getting worse at the age of 40 years and above. The strength and resilience of the muscle is declining in the middle age. One of the respondents, age 31, have complained the musculoskeletal disorder in his leg. One of five respondents have leg cramps. The flexibility and body composition are getting weak when the body is getting older. The muscles' elasticity is

decreasing due to the reduction of activities.^{7,8)}

The shortest work period is six month. The longest period is five year. Working period influence the workers' musculoskeletal disorder. Working period have a strong relationship with muscle complaints. Based on the finding of a research, there are some classification of work period and the strength of muscle. They are 0-5 year, 6-10 year, and 11 year and more. The more of work period mean the more risk of musculoskeletal disorders for the worker. Additionaly, musculoskeletal disorders influenced by the excessive stretching of working poor posture, repetitive movements, bad working attitude.

According to the worker activities, the movement of the left hand does not significant. The left hand is not always do the heavy work. As a result, the workers' left hand is almost no complaint. Due to the Nordic Body Map, musculoskeletal disorder mostly affects the right limbs.⁹⁾

Based on the interview using RULA method, three respondents state their left forearm is fine. Then, two respondent state their left leg is fine.

Three respondents complain the upper arm stiffness since work in the laundry house. Then, two of respondents complain of stiffness in the upper arm after work in the laundry house. 80% of the respondents have wrist stiffness after

Table 1. The characteristic of laundry worker in Tembalang Region in 2014.

	Characteristic	Frequency	Percentage (%)
Sex			
- Male		3	9,7
- Female		28	90,3
Age			
- > 30 year		19	61,3
- <= 30year		12	38,7
WorkTime			
- < = 8 hour		10	32,3
- > 8 hour		21	67,7
Work Periode			
- < 1 year		16	51,6
- > = 1 year		15	48,4
Nutrition (IMT)			
- Less		5	16,1
- Normal		11	35,5
- More		15	48,4

work in the laundry house. Next, Four respondents complain the neck stiffness since work. Then, the torso soreness is suffered by all the respondents since work in the laundry house.

Based on the result of the study, musculoskeletal disorders occur in skeletal muscle. It is the muscle of the neck, shoulders,

arms, fingers, back, waist and low body muscles. The musculoskeletal issues is dominated by low back pain. Based on Bureau Of Labor Statistics (LBS) in 1982, there are 20% cases of occupational illness, and 25% cases of back pain. Meanwhile, the National Safety Council reported that the occupational illness is 22% of 1.7 million cases of back pain.

Table 2. The result of Nordic Body Map for the Laundry Worker in Tembalang Region 2014.

No.	Part of the body	Number (n)	Percentage (%)
0.	Neck	4	12,9
1.	Nape	17	54,8
2.	Left Shoulder	8	25,8
3.	Right Shoulder	22	71,0
4.	Left upper arm	0	0
5.	Spine	0	0
6.	Right upper arm	5	16,1
7.	Waist	14	45,2
8.	Hips	14	45,2
9.	Bottom	5	16,1
10.	Left elbow	1	3,2
11.	Right elbow	3	9,7
12.	Left forearm	1	3,2
13.	Right forearm	7	22,6
14.	Left wrist	0	0
15.	Right wrist	7	22,6
16.	Left hand	2	6,5
17.	Right hand	7	22,6
18.	Left thigh	1	3,2
19.	Right thigh	0	0
20.	Left knee	5	16,1
21.	Right Knee	4	12,9
22.	Left calf	10	32,3
23.	Right calf	10	32,3
24.	Left ankle	1	3,2
25.	Right ankle	1	3,2
26.	Left leg	4	12,9
27.	Right Leg	4	12,9

Tabel 3. The result of Grand Score dan Action Level for the Laundry Worker in Tembalang Region 2014

	Grand Score	f	%
3	10	32,25	
4	10	32,25	
5	5	16,13	
6	4	12,9	
7	2	6,45	
Action Level		f	%
2	20	64,51	
3	9	29,03	
4	2	6,45	

40% of the respondents said that the pain happen every week. Then, 40% of the respondents said that the pain happen every day. Next, 20% of the respondents said that the pain happen three times a week. Some of the respondents states that the pain will disappear after 1-2 days . However, some of them states that the pain will disappear after take a rest in the night. Take a rest in the night is the relaxation of all the organ systems of the human body.

The work duration of the respondents is 15 hours a day. Work period, were drafted by the goverment in the constitution number 13 article 77 section 2 in 2003. Based on the regulation, the maximum work period is 12 hours a day with one hour rest. The longer work duration influence the risk factor of musculoskeletal disorders. Undoubtedly, the over-duration causes the muscle disorder.^{7,9}

D. Conclusion

Based on the findings and the discussions of the research, It can be conclude that:

- a. Based on the work posture analysis during the ironing session, 100% of the respondents are in the action level 2. It is indicated that the further and the deep investigation is needed.
- b. The complaint of the worker lead to the risk of musculoskeletal disorders. All the respondents (100%) illness caused by by the unnatural posture while working. The most common complaint is on the neck, nape of neck, right shoulder, back, right upper arm, waist, hips, forearm, wrist, and right hand. 40% of the respondents said that the pain happen every week. Then, 40% of the respondents said that the pain happen every day. Next, 20% of the respondents said that the pain happen three times a week. Some of the respondents states that the pain will disappear after 1-2 days. All the respondents complain the body stiffness since work in the laundry house.

Suggesion

Realizing the harmful of musculoskeletal disorders, some suggestion are proposed for the owner of laundry house, and the worker of laundry house (respondent). The suggestions are:

a. For the owners

It is necessary to reduce the work period in order to prevent the musculoskeletal disorders. Based on the constitution number 13 article 77 section 2 in 2003, the maximum of work period is 7 hours in a day, 40 hours in a week of 6 days work. For the workers.

b. For the workers

In order to avoid musculoskeletal disorders, work posture and work tools that fit with the anthropometry of each respondent is needed.

In ironing session, the workers need to use a chair with backrest. This backrest is aimed to support the back of the worker.

During the ironing session, the workers need to take a break for 5 to 10 minutes. This way, the workers can relax for a while.

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