



Body Posture Analysis Using Rapid Entire Body Assessment (REBA) Method with Skeletal Muscle Complaints in Furniture Workers in Gorontalo Regency

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ABSTRACT

Manual Material Handling (MMH) is an activity that carries the risk of causing musculoskeletal problems in workers. The results of interviews with workers at Faninda Jaya Meubel, they do their work manually, so many experience musculoskeletal complaints due to improper work posture. The aim of this research is to analyze the relationship between body posture and musculoskeletal complaints in Faninda Jaya Meubel workers. The methods used in this research are Rapid Entire Body Assessment (REBA) and Nordic Body Map (NBM). The population in this study was all workers who worked at Faninda Jaya Meubel totaling 23 workers and samples were taken using total sampling techniques. Data analysis used the Chi Square test. The research results found that as many as 43.48% of respondents had a body posture with a very high risk level and as many as 60.87% of respondents had MSDs complaints in the severe complaint category. The results of statistical tests using chi-square showed that there was a relationship between body posture and musculoskeletal complaints among Faninda Jaya Meubel workers ($p=0.025$). Suggestions for companies to provide facilities for workers such as ergonomic work equipment and machines for working so as to minimize occupational risks.

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1. INTRODUCTION

Occupational Health and Safety (K3) is an effort made by a workplace to create safe and comfortable conditions for workers to reduce or avoid the risk of work accidents which can cause harm to workers and the workplace (1). Ergonomics is a branch of scientific discipline which studies and discusses the abilities of both physiology and psychology within the limitations of human abilities (2).

Working positions that are not ergonomic cause workers to experience fatigue more quickly and as a result give them extra responsibilities (3). Static loads received by workers continuously and for a long duration can cause complaints in the form of damage to ligaments, joints and tendons (4). Based on Riskesdas data the prevalence of musculoskeletal diseases in Indonesia is 7.9%. The highest prevalence based on diagnosis was in Aceh (13.3%) followed by Bengkulu (10.5%) and Bali (8.5%) (5).

The assessment of work position on the respondent's body posture uses the Rapid *Entire Body Assessment* (REBA) method. The REBA method is a very sensitive method in terms of evaluating posture risks, especially in the musculoskeletal system. Division of body segments is also done in this method. Body segments will be coded individually and evaluate all parts of the body, both upper limbs and trunk, neck and legs (6).

Musculoskeletal disorders often originate from multifactorial factors and are influenced by risk factors including biomechanical, psychosocial, and individual, which are characterized by pain and loss of physical function in the body, thereby limiting a people's activities (7). Most musculoskeletal disorders develop over time. This disorder can be acute or chronic and can also result from injuries suffered in work accidents. In addition, this disorder can develop from mild to severe. MSDs rarely threaten life, but can damage the quality

of life of most adults (8). Musculoskeletal complaints in this study were assessed using the *Nordic Body Map* (NBM), by using this we can identify the parts of the muscles experiencing complaints with the level of complaints ranging from discomfort sick to the point of being very sick. The Nordic Body Map includes 27 ways of dividing skeletal muscles on both right and left sides of the body (6). Previous research on welding workers at PT. X Bekasi, the results showed that there was a significant relationship between work position and musculoskeletal complaints in welding workers and showed a moderate level of correlation (6).

Based on initial observations, there are several types of work including: sander, button maker, painter and upholstery worker. The results of interviews conducted with 10 workers found that workers complained of neck pain, butt, wrists, fingers, upper arms, lower arms, shoulders, waist, calves and back pain. Of all the complaints above, the one they feel most often is back pain. Based on this background, this research aims to analyze body posture using the *Rapid Entire Body Assessment* (REBA) method with musculoskeletal complaints in furniture workers in Gorontalo Regency.

2. METHODOLOGY

This research uses a quantitative approach with a cross sectional design because the independent and dependent variables are researched and observed at one time. This research was conducted at PT. Faninda Jaya Meubel, Gorontalo Regency in March – May 2023. The population in this study is all workers who work at Faninda Jaya Meubel in the Gorontalo Regency area. The sampling technique used in this research was a total sampling technique, namely 23 workers. The data collection technique was carried out through observation by observing body posture and then adapting to the Rapid Entire Body Assessment (REBA) observation sheet, then continuing with interviews to fill in the Nordic Body Map (NBM) sheet which is useful in determining the severity of the respondent's musculoskeletal complaints. The instruments used were questionnaires, Nordic Body Map sheets, REBA assessment observation sheets, and cameras. Next, a statistical test was carried out using the chi-square test to see the relationship between workers' body posture and workers' musculoskeletal complaints.

3. RESULTS

Table 1. Distribution based on Respondent Characteristics

Variable	Category	n	%
Age (Year)	23-28	5	21,7
	29-34	9	39,2
	35-40	5	21,7
	41-46	2	8,7
	47-52	2	8,7
Work period (Year)	1-2	7	30,44
	3-4	3	13,04
	5-6	3	13,04
	7-8	3	13,04
	9-10	7	30,44

Table 2. Distribution based on Body Posture and Skeletal Muscle Complaints

Variable	Category	n	%
Body Posture Risk	Moderate	4	17,39
	High	9	39,13
	Very High	10	43,48
Skeletal Muscle Complaints	Light	2	8,7
	Moderate	7	30,43
	Heavy	14	60,87

Table 3. Correlation Between Body Posture and Skeletal Muscle Complaints

Body Posture Risk	Skeletal Muscle Complaints						Total		p-value
	Light		Moderate		Heavy		n	%	
	n	%	N	%	n	%			
Moderate	0	0	1	4,35	3	13,04	4	17,39	0,025
High	1	4,34	6	26,08	2	8,69	9	39,13	
Very High	1	4,34	0	0	9	39,13	10	43,48	
Total	2	8,70	7	30,43	14	60,87	23	100	

Based on the results of univariate analysis of the characteristics of respondents (table 1), it can be seen that the majority of respondents' ages were between 29-34 years, namely 9 respondents (39.1%) and most had a working period of between 1-2 years and 9-10 years, namely 7 respondents each (30.44%). Apart from that, table 2 shows the distribution of respondents based on work posture and workers' musculoskeletal complaints. The workers with the highest risk of very high work posture, namely 10 respondents (43.48%) and severe musculoskeletal complaints, namely 14 respondents (60.87%).

Based on the bivariate results (table 3), data was obtained from 10 respondents (43.48%) who had a very high risk of body posture, there were 9 respondents (39.13%) who experienced severe musculoskeletal complaints and only 1 respondent (4.34%) who experience mild musculoskeletal complaints. This research also obtained data that of the 9 respondents (39.13%) who had a high risk body posture, there were 6 respondents (26.08%) who experienced moderate levels of musculoskeletal complaints, 2 respondents (8.69%) experienced musculoskeletal complaints. severe skeletal muscle and 1 respondent (4.34%) experienced mild musculoskeletal complaints. The results of statistical tests using chi-square show a p-value of $0.025 < \alpha = 0.05$, this means that there is a relationship between workers' body posture and workers' musculoskeletal complaints.

4. DISCUSSION

Body posture when working that is not ergonomic is one of the causes of musculoskeletal complaints (6). Work-related musculoskeletal disorders are a major health problem in the workplace and require attention and preventive measures to ensure that these disorders do not affect work productivity (9). Apart from decreased productivity, the impact Other diseases of the musculoskeletal system include a decrease in the quality of life of workers and an increase in health costs (10).

This research obtained results related to musculoskeletal complaints which were measured through interviews with respondents using the Nordic Body Map (NBM) checklist sheet. It was found that the majority of workers had severe complaints. Workers complained of pain in the lower back, left and right shoulders, and in the calves. This can happen because the majority of the body's position when working is resting on one leg and squatting for too long, bending over and the neck often facing downwards for a long time. Apart from that, based on the results of interviews, workers also said that they work with high work demands because they have to meet furniture production targets, so they have to work overtime and exceed 8 working hours. Workers who work at PT. Faninda Jaya Meubel is mostly aged between 29-39 years and has worked the longest between 9-10 years.

Based on the results of measuring body posture using the REBA method, this research showed that the majority of workers working in the sanding section had a body posture with a final score of 11, which means very high risk and must be immediately improved. The REBA method is a postural analysis tool that is very sensitive to work that involves sudden changes in position, usually as a result of unexpected handling (11). The application of this method is aimed at preventing the risk of injury related to position, especially to skeletal muscles.

The Chi-Square test carried out showed that there was a relationship between workers' body posture variables and workers' musculoskeletal complaints. These results show that the less ergonomic a worker's body posture is or the more risky a worker's body posture is, the more severe the musculoskeletal complaints the worker will experience. This research is in line with research conducted on clay craftsmen, namely that there is a significant relationship between work posture and musculoskeletal complaints in clay craftsmen in Pejaten Village, Tabanan (12). Other research that is also in line with this research is the relationship between work attitude and complaints of Musculoskeletal Disorders (MSDs) for workers transporting goods at the Komodo Wholesale Store in Denpasar. This research shows that the higher the risk of work attitudes carried out by transport workers, the higher the risk of experiencing Musculoskeletal Disorders (MSDs) (13).

Workers body posture are very important factors to pay attention to because production results are greatly influenced by what workers do. If the worker's body posture is not ergonomic, the effect will be that the worker will quickly feel tired so that concentration, level of accuracy decreases, work becomes slow, quality and quantity of production decreases. This decline will ultimately lead to a decline in productivity (14).

5. CONCLUSION

Most workers work with postures that have a very high risk. Apart from that, they are also have severe musculoskeletal complaints. There is a significant relationship between workers' body posture and furniture workers' musculoskeletal complaints.

6. RECOMMENDATION

Workers are advised to always pay attention to their body posture when working and stretch between work hours. Apart from that, companies are also advised to provide workers with ergonomic work stations and regulate workers' working hours so as not to cause excessive workload.

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