The relationship of posture working with musculoskeletal disorders (MSDs) in the weaver West Sulawesi Indonesia☆

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ABSTRACT

Objective: This study aims to determine the relationship between work posture and musculoskeletal disorders (MSDs) complaints in Lipa'Sa'be Mandar weavers.
Method: This research is a quantitative study with an observational approach using a cross sectional study design on 42 samples selected by purposive sampling ($N = 124$).
Results: All respondents (100%) experienced complaints of MSDs, of the 37 (100%) respondents who weaved with a moderate risk work posture, there were 10 (27.0%) respondents experienced complaints of mild MSDs, 21 (56.7%) complaints of MSDs moderate, and 6 (16.2%) experienced severe MSDs complaints. 5 (100%) respondents who weaved with high-risk work postures, with 1 (20%) mild MSDs complaining and 4 (80.0%) severe MSDs complaints. Results of the chi-Square test with $\alpha = 0.05$, it shows that there is a significant relationship between work posture and MSDs complaints.
Conclusions: Work posture is significantly associated with MSDs complaints in Lipa'Sa'be Mandar weavers.

Introduction

In Indonesia, industry development is currently very rapid, both in the formal and informal business sector. Workers in the informal sector amounted to 58.35% or around 72.67 million people, while for the formal sector amounted to 41.65% or around 51.87 million people. So that most workers are absorbed in the informal sector.[1] Occupational health problems prevail in every industry, especially in those industries that rely heavily on manual means of handling and performance.[2] Work related musculoskeletal disorders (MSDs) are one such ergonomic disorder.[3,4] The prevalence of MSDs was very high among the workers.[5] MSDs prevention measures have been studied in great depth throughout various industries.[6] Musculoskeletal Disorder is a health problem involving the joints, cartilage, muscles, nerves, tendons, skeleton, ligaments, and related to the intensity and severity of work, although often light activities such as housework or exercise may also be involved.[7,8]

Ergonomics that are lacking attention can cause ergonomic problems. Technical development and advancement have created many means of ergonomic intervention to reduce occupational hazards of this kind.[9] Despite these technical improvements, a large number of workers are still falling prey to work related MSDs.[10] This rising number adds an economic burden to the industry despite serious attention from respective legislative groups.[11,12] This aspect of work contributes to the development of disorders of the muscles, joints, and bones. In addition, workers lack of understanding of occupational hazards and control measures, as well as non-ergonomic workplace design, has the potential to increase the burden of MSDs.[13] The research show poor work posture contributes to the severity of MSDs risk in manufacturing industry workers.[14,15] The other results of surveys of milling, turning, and drilling workers. Apart from work posture, the risk factors for MSDs are gender, age, length of work, body mass index, environmental, work attitudes, smoking habits, and work facilities as well.[16]

Method

This analysis could be a quantitative study, with associate data-based approach employing a cross sectional study style. The population during this study were all 124 individuals of Lipa'Sa'be Mandar weavers in Karama Village, Tinambung District, Polewali Mandar Regency, totaling 124 individuals, and therefore the sample was chosen by purposive sampling of 42 individuals. Complaints of MSDs on Lipa'Sa'be weaver employees because the variable quantity were obtained employing a Nordic Body Map (NBM) form with the standards of no complaints (score: 28), delicate complaints (score: 29–56), moderate complaints (score: 57–84), and high complaints (score: 85–112). Work posture as associate variable was analyzed exploitation the fast diversion Body Assessment (REBA) with criteria of terribly low risk (total score 1), low risk (total score: 2–3), moderate risk (total score: 4–7), high risk (total score: 8–10), and really high risk (total score: 11–15). The camera is employed to require photos of the work posture whereas weaving, and therefore the drafting instrument to live the angle fashioned throughout weaving. The applied mathematics check used is Chi squared with a significance degree of $\alpha = 0.05$, and H0 is rejected if $p < 0.05$. Information were analyzed exploitation SPSS that is given in tables and graphs.

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Results

Process in weaving Lipa'Sa'be Mandar

1. Sumau Process
   In order to manage the threads employed in the sumau method, respondents sometimes use an outsized space below the house as a method of constructing sautan. The sautan stage is typically created between the pillars below the house fabricated from gamo (*rumbia leaf midrib*). At the time of this sumau method, the staff sleep with in an exceedingly standing position, slightly bending and bending to regulate the body position to the position or location of the work object.
2. Mappatama Process
   The mappatama method or inserting the thread into the sign, 1st the thread operate is checked before doing this method, and straightaway performs the association if there's a broken thread within the Mappatama method, the position of the respondent should match the work instrumentality and therefore the object being worked on. Therefore, respondents usually have awkward postures like bending, trying down and sitting for terribly long.
3. The Manette Process
   The process of Manette or weaving employing a parewa sign that has been made up of generation to generation by the Mandar individuals. This method is that the final method of constructing Lipa'Sa'be Mandar, with the respondent's position adjusting to the work instrumentality and therefore the object he's engaged on staff area unit usually in awkward postures like bending over, trying down, and sitting for terribly long.

Respondent characteristics (Table 1)

1. Assessment of work posture risk levels based on the Rapid Entire Body Assessment (REBA) method

a. Assessment of work posture in Sumau Process
   In the Sumau process stage, in doing their job, the worker makes repeated movements more than 4 times in 1 min. The position of the back rotates or tilts to the right, and or to the left. For leg posture, in a standing position with your body resting on both feet. The forearm of the worker forms an angle of 60°, while the wrist is in a 40° angle indicating deviation. Based on the REBA measurement, the activity obtained an activity score of +1, and the final REBA score was 9. This indicates that the level of action is 3 with a high risk level or dangerous condition, so it is necessary to immediately carry out checks and changes in work posture (Fig. 1).

Table 1
Characteristics of respondents by age and working period.

Respondent characteristics	*n* (42)	%
Age (years)		
17–23	2	4.7
24–30	3	7.1
31–37	7	16.6
38–44	11	26.1
45–51	10	23.8
52–58	6	14.2
59–65	3	7.1
Service period (years)		
4–10	5	11.9
11–17	6	14.2
18–24	7	16.6
25–31	16	38.1
32–38	4	9.5
39–45	4	9.5

Source: Primary Data, 2018.

Fig. 1. Sumau process.

Fig. 2. The Mappatama process.

Fig. 3. The Manette process.

b. Work posture assessment in the Mappatama process
   In the Mappatama process, the body is seated with the legs extended, the hands and arms making repeated movements more than 4 times within 1 minute. The worker's neck is bent at an angle of 30, the worker's upper arm flexes at an angle of 100, the worker's forearm forms an angle of 80, and the wrist forms an angle of 15. The final REBA score is 4, so it can be seen that the level of action is 2 with a moderate risk level, so it requires immediate examination and changes in work posture (Fig. 2).
c. Work posture assessment in *the Manette process*
   Worker's neck is bent at an angle of 20, the back is in a straight position, and the legs are in a sitting position (extended). The position of the upper arm flexes at an angle of 90 °, and the wrist is at an angle of 300. In this process the hands and arms perform back and forth movements with a beat that is repeated more than 4 times per minute. The final REBA score is 4. Based on the calculation of the REBA score, it can be seen that the level of action is 2 with a moderate risk level, so it requires immediate examination and changes in work posture (Fig. 3).

2. MSDs complaint level assessment based on nordic body map

The MSDs complaint indicator in this study is based on 28 points of the respondent's body parts based on the Nordic Body Map questionnaire format (Fig. 4).

3. Relationship between work posture and complaints of musculoskeletal disorders (Table 2)

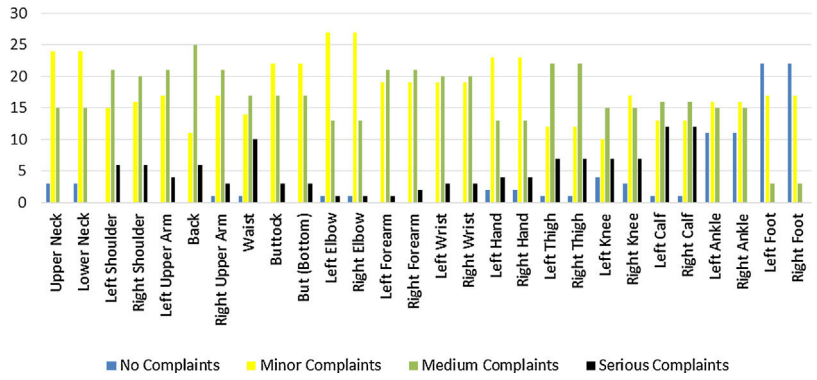

Fig. 4. Graph of complaints of Lipa'Sa'be Mandar weaver MSDs.

Table 2
The relationship between work posture and MSDs complaints on Lipa'Sa'be Mandar weavers in Karama Village, Tinambung District, Polewali Mandar Regency.

Work posture	MSDs complaint						Total		*P* value
	Minor complaints		Medium complaints		Serious complaints				
	n	%	*n*	%	*n*	%	*n*	%	
Moderate	10	27.0	21	56.7	6	16.2	37	100	0.005
High	1	20.0	0	0	4	80.0	5	100	

Source: Primary Data, 2018.

Discussion

Previous studies on MSDs in numerous kinds of trade showed that the foremost common musculus complaints full-fledged by employees were the rear and shoulder muscles. This drawback is often full-fledged by employees WHO do constant and perennial movements ceaselessly. during this study, all 100% of respondents full-fledged MSDs complaints supported the info obtained from this study, the elements of the body that had heaps of complaints were the proper and left elbows (64.3%), the rear (59.5%), the higher and lower neck (57.1%) furthermore because the left and left hands. This can be not abundant completely different from the analysis conducted by Rahman, 2917 within the informal sector concrete employees within the Samata village, Somba Opu District, Gowa Regency.[17] The elements of the body that employees typically complain regarding the rear, that is 88.6%, the right forearm is 84.1%, and the upper left arm is 79.5%. The back is a vulnerable area in humans due to the mechanisms of the human body and the types of tissue and structures that make up the spine. If employees expertise fatigue simply, the results of the work done by these employees will decrease and don't seem to be for sure. In this study, respondents weave with a moderate to high risk level of labor posture.

This shows that the operating posture of Lipa'Sa'be Mandar weavers is dangerous, therefore an endeavor is required to enhance. For the grip conditions for the 3 work processes have completely different scores, within the Sumau method, the grip conditions used are solely holding the load by hand while not transportation the load nearer to the supporting limb in order that it's given a score of two. Moreover, within the Mappatama method, the grip condition is employed to carry the load by transportation the load nearer to the supporting limb, in order that the score is one. Whereas the Manette'process is that the same because the Mappatama method, specifically holding the load by transportation the load nearer to the supporting limb in order that the according fatigue within the right and left higher shoulder muscles according being the dominant grievance throughout carpet weaving. The work method of weaving is comparable to weaving that incorporates a important impact on the fatigue of the workers' backs and shoulders.[18] Conducted a cross-sectional survey geared toward evaluating and distinguishing risk factors for work-related discomfort among Thai bog plant handicraft weavers sitting on the ground. Complaints on the buttocks (72.7%) and lower back (67.3%) were the areas most frequently full-fledged discomfort compared to the neck (56.9%), shoulders (56.7%), and higher back (52.6%) In line with the results of this study, the bulk of weavers expertise work-related discomfort.[19]

Not ergonomic work posture will make workers perform a forced attitude in doing their work. The farther the position of the piece from the middle of gravity, the upper the chance of developing MSDs. The causes of complaints of contractile organ Disorders (MSDs) in Lipa'Sa'be Mandar weavers are the results of work posture or body position once weaving and there's additionally a load on the muscles that are perennial in awkward positions inflicting injury or trauma to the soft tissue and system nervosum. The trauma can type a sizeable injury that is then expressed as pain or tingling, soreness, tenderness, swelling, and muscle weakness. Tissue trauma that arises because of chronicity or repetitive sweat, excessive stretching, or stress on one tissue. The analysis results also are in accordance with the previous analysis that claimed that there was a powerful correlation between the operating postures and therefore the complaints of contractile organ in attachment employees because of non-ergonomic operating postures.[20,21]

Conclusions

Based on research conducted on 42 respondents who work as Lipa'Sa'be Mandar weavers, it is concluded that there is a significant relationship between work posture and complaints of Musculoskeletal Disorders (MSDs) in Lipa' Sa'be Mandar weavers in Karama Village, Tinambung District, Polewali Regency. Mandar with value ($p = 0.005$). The most common complaints are the elbows, the neck, the hands, and the buttocks.

Conflicts of interest

The authors declare that they have no conflict of interest.

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