
The Relationship Of Working Posture And Individual Factors With Complaints Of Low Back Pain In Brick-Making Workers In South Jambi In 2020

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Abstract

Jambi City 40.5% of diseases are caused by work activities and musculoskeletal complaints, including the 10 largest diseases. Low back pain is a musculoskeletal complaint that is often suffered. This study was conducted to determine the relationship between work posture and individual factors with complaints of low back pain in brick-making workers in the South Jambi District. This type of research was an observational research with a cross sectional design. The population of this study were all workers in the small brick-making industry in South Jambi District, Jambi City. The number of samples was 66 workers who were taken by proportional random sampling. The data obtained were analyzed with the chi-square test. Workers who experience work postures with a RULA value of 7 must implement changes as quickly as possible as many as 10 workers (15.2%), workers who experience work postures with a RULA value of 5-6 must carry out investigations and immediate improvements as many as 17 workers (25.8) , Workers who have a work posture with a RULA value of 3-4 may need a change of 21 workers (31.8%), Workers who have a work posture with a RULA value of 1-2 good work postures and can be accepted as many as 18 workers (27.3%). Workers as many as 50 workers (75.8%) and 17 people (25 , 8%) have an abnormal BMI and are at risk. The factors associated with pain relief under work posture obtained p-value: 0.054 (>0.05) with a PR value: 1.768 (95% CI: 0.961-3.253), age obtained p- value: 0.014 (< 0, 05) with PR value: 2,240 (95% CI: 1,059-4,738) and BMI obtained p-value: 0,322 (>0,05) with PR value: 1,237 (95% CI: 0835-1,826). There were relationship between work posture and complaints of low back pain in workers, but there is no close relationship between BMI and complaints of low back pain in brick-making workers in The South Jambi District.

Keywords: Working Posture, Age, Bmi, Rula, Low Back Pain, Brick Worker

INTRODUCTION

Occupational Safety is a mandatory task that must be carried out by every worker who is working to prevent the occurrence of work accidents that can result in severe or minor injuries, up to death (P.K S. 2018). While Occupational Health is a health science whose main goal is for workers to get a high degree of Health in physical, mental, and social preventive and curative ways to avoid diseases that can be caused by environmental factors and occupational factors. Occupational Safety and health have been recognized along with the development of the Industrial Revolution. These developments, lead to changes and have a considerable impact, especially on Human Relations in the workplace. The need for labor safety has not been taken into account, so there are still many accidents in the work environment (Ramli S, 2018).

Industry in Indonesia is experiencing increasingly rapid development in the formal and informal sectors, while Indonesia has more informal sectors than the formal sector with a workforce of 73.98 million people (58.22%)(BPS 2018). One of the efforts to achieve work productivity, informal sector companies need to get the attention of related parties by implementing Occupational Safety and health (K3) in the sector. Based on the law of 2003 concerning manpower Article 86 paragraph 1, every worker has the right to protection of Occupational Safety and health, morals and decency, and equal treatment with human dignity and with religious values (Republic of Indonesia,2003).

Data released by the International Labor Organization (ILO) in 2018 estimated that 2.78 million workers died annually due to work accidents and occupational diseases (ILO, 2020). The Ministry of Health in Indonesia said Jambi province is one of the provinces with the highest number of cases of occupational diseases in 2013 as many as 25,920 cases (Ministry of health, 2015). The Health Department of Jambi city showed that 40.5% of diseases were caused by work activities and musculoskeletal complaints, including the 10 largest diseases. Low back pain is a musculoskeletal complaint that is often suffered by workers due to ergonomic factors (Jambi provincial Health Office, 2016).

The World Health Organization (WHO), estimates that 60-70% of industrialized countries experience low back pain disorders with a prevalence of 5% per year (WHO, 2010). Low back pain is pain that is felt in the lower back area, can be radicular or local pain and even both. This pain is felt at the lowest rib angle to the lower buttock fold is in the lumbar or lumbosacral area and is often accompanied by propagation of pain towards the legs and feet (Artadana, 2009). Incorrect posture, heavy workload, and high repetition of work movements and having vibrations throughout the body are conditions that can worsen lowback pain disease. Low back pain disorders for workers can occur, due to ergonomic risks caused by humans themselves or human factors.

According to Kuswana (2014), ergonomics studies are multidisciplinary and rooted in anatomy, physiology, neurology, biomechanics, physiology, psychology, anthropometry, engineering, art and programming. Repetitive work activities, unnatural work attitudes, and muscle stretching overuse can lead to complaints in the skeletal muscles.

Working posture is the shape and structure of the worker's body during work that can be observed. Analyzing work posture plays an important role in identifying ergonomic problems that can cause occupational diseases and discomfort for workers while working in the work environment, so that work posture, work tools, and work stations can be improved. Repetitive work activities, unnatural work attitudes and overstretching of the muscles can lead to complaints of the skeletal muscles.

The brick making industry is one of the informal jobs in Indonesia. Based on preliminary data from the Department of trade and Industry of the city of Jambi there are 134 small industrial location point pembutan bricks in the city of Jambi, and most are in the District of South Jambi as many as 50 point. After conducting an initial survey on 15 points of the brick industry in South Jambi District, researchers distributed questionnaires to 27 respondents of brick-making workers and found that they experienced pain in the back. Most of the respondents who experienced low back pain disorders were over 35 years old and had worked for more than 5 years as a brick-making workforce.

In the initial observation, researchers found the work process of printing bricks, namely the removal of bricks using carts, preparation of bricks to dry, and preparation of bricks to be burned. Repetitive and monotonous work, twisting, bending, excessive brick load, and poor working posture performed for < 8 hours/day may increase the risk of low back pain.

In accordance with the theory of Peter (2000) ergonomic factors can cause complaints or pain in the skeletal muscles that is good working posture stretching muscles excessively, unnatural work attitudes, and repetitive activities.(11) one way to do a good posture assessment while working is to use the Rula or Rapid Upper Limb Assessment method.

Rula (Rapid Upper Limb Assessment) is a fast and systematic ergonomic calculation method that uses body posture to be the target in calculating or estimating the occurrence of musculoskeletal system disorders with work that requires more strength for workers, static muscle activity, repetitive movements, and so on (Tarwaka, 2019). The end result of using the RULA method can provide suggestions or remedial solutions for poor posture of workers.

Based on research conducted by Rinaldi, Utomo and Nauli (2015), there is a significant relationship between brick-making workers with complaints of low back pain or low back pain

caused by bending, standing, and rotating work positions repeatedly. In the study of Sakinah, Djajakusli, and Naeim (2012), there is a relationship of age variables with complaints of low back pain in brick workers. While the body mass index variable (*BMI*), no one has conducted a study between the relationship of *BMI* with lower back pain complaints of brick workers. Therefore, researchers want to conduct research on the relationship of working posture and individual factors (age and *BMI*) with complaints of low back pain in brick-making workers in South Jambi District.

RESEARCH METHODS

The study was conducted using observational research with cross sectional approach. The population in this study were all workers in the small brick making industry in South Jambi District, Jambi city. The number of samples was 66 workers taken by proportional random sampling and tested using chi-square test.

RESULTS AND DISCUSSION

Univariate Analysis

Table 1. roporsi low back pain new bata workers in South jambi district in 2020

Characteristics	Amount	Percentage %
complaints of severe low back pain	40	60,6
complaints of mild low back pain	26	39,4

The table shows that the proportion of low back pain in brick workers is dominated by workers who have low back pain with a difference of 21% greater proportion than those who do not have low back pain.

Table 2. Table overview of respondents by work posture, age and BMI

Characteristics	Amount	Percentage %
working posture		
the need for a thorough investigation and repair as soon as possible	10	15,2%
need for immediate investigation and repair	17	25,8%
further investigation is needed, it may be necessary to take action in the future	21	31,8%
acceptable posture	18	27,3%
Age		
At risk	50	75,8%
Not at risk	16	24,2%
BMI		
At risk	17	25,8%
Not at risk	49	74,2%

From Table 2. it can be seen that the work posture in this study is divided into 4 categories based on the final results of the RULA, namely 1 work posture with a final value of ≥ 7 as many as 10 workers (15.2%) where this posture is dangerous and must be corrected as soon as possible, 2 work posture with a value of RULA 5-6 as many as 17 workers (25.8) where must do further investigation

and immediately change, 3 work posture with a value of RULA 3-4 as many as 21 workers (31.8%) where the work posture should be further investigation and may require changes, 4 work posture with the final value of 1-2 as many as 18 workers (27.3%) where the work posture is good and acceptable.

Categorizing the age of respondents based on 2 categories, namely the age of workers not at risk under 35 years and workers at risk age at the age of 35 years, it was found that brick-making workers at risk age is more dominant with 50 number of workers.

The table also states that 17 people (25.8%) had an abnormal BMI and were at risk, and 49 people (74.2%) had a normal BMI and were not at risk.

Bivariate Analysis

Table 3. of results of bivariate analysis of working posture variables and individual factors (age and BMI) associated with low back pain in bricklaying workers in South Jambi District in 2020.

variable	lower back pain				Total		P Value	PR (95% CI)
	complaints of severe back pain		complaints of mild back pain					
	(n)	(%)	(n)	(%)	(n=66)	%		
working posture								
a thorough investigation and repair is required as soon as possible	4	40%	6	60%	10	100%	0,025	
immediate investigation and repair required	13	76,5%	4	23,5%	17	100%		
further investigation is needed, it may take action in the future	16	76,2%	5	23,8%	21	100%		
acceptable posture	17	38,9%	11	61,1%	18	100%		
Age								
At risk	35	70%	15	30%	50	100%	0,014	2.240(1.059-4.738)
Not at risk	5	31,3%	11	68,8%	16	100%		
BMI								
At risk	12	70,6%	5	29,4%	17	100%	0,490	1.237(0.835-1.26)
Not at risk	28	57,1%	21	42,9%	49	100%		

Based on Table 3. the results of the analysis of the relationship between working posture and individual factors (age, BMI) with low back pain is known that the proportion of severe low back pain as much as 40.0% dangerous and applied immediate improvement, 76.5% require further investigation and immediate improvement, 76.2% mild danger level and may require improvement

and 38.9% good posture and acceptable. where these results are higher than respondents who experience mild low back pain with a percentage of 60.0% dangerous and applied immediate improvement, 23.5% need further investigation and immediate improvement, 23.8% mild danger level and may require improvement and 61.1%. good posture and acceptable statistik test results obtained p-value: 0.025 (> 0.05) means there is a relationship between working posture with low back pain. Based on the analysis of the relationship between age and back pain in respondents who have a risk age of 70.0%, higher than respondents who have no risk age of 31.3 %. Statistical test results obtained p-value: 0.014 (<0.05) where there is a relationship between age and low back pain. The analysis also obtained the value of PR: 2.240 (95% CI:1.059-4.738) which means that brick workers with age at risk have a risk of experiencing low back pain 2,847 times greater than brick workers who have age is not at risk.

Based on the results of the analysis of the relationship between BMI and low back pain, the proportion of low back pain in respondents who had a BMI at risk was 29.4% lower than respondents who had a BMI not at risk, which was 42.9%. Statistik test results obtained p-value: 0.490 (0.05) means there is no relationship between BMI and low back pain. The results of the analysis also obtained the value of PR:1,237 (95% CI: 0835-1,826) that brick workers with BMI at risk have a risk of experiencing low back pain 1,237 times greater than brick workers who have BMI is not at risk.

Discussion

features of low back pain in workers :

Pain is a form of discomfort that can be experienced by individuals and is potential and actual (Andarmoyo, 2017) low back pain or Low Back Pain (LBP) is a musculoskeletal disorder caused by the wrong and unfavorable body activity. According to Kurniawidjaja & Ramdhan (2019), low back pain is a complaint of pain or other disorders in the muscles and spine from the initial base of the neck to the hips.

Based on the results of the study, complaints of severe low back pain in small brick-making industry workers in South Jambi District in 2020 were 60.6%. This result is strengthened by the previous study on brick industry workers in 2019 in Pejaten Village, Tabanan Regency (Artadana, 2019), which stated that 83.3.0% of workers experienced lower back pain.

Relationship of working posture with low back pain.

Identification results that have been made against.

66 respondents of small brick making industry workers in South Jambi District, Jambi city in 2020 with the chi-square test, the results of the bivariate analysis and the p-value = 0.025 where the p value < 0.05 can be concluded that there is a relationship between working posture and low back pain in workers.

Guidelines for assessment of working posture in this study using the measuring instrument Rapid Upper Limb Assessment (RULA) and Angulus application assistance to calculate the degree angle. The working posture in this study covers the upper limbs (neck, back and upper arms). In this study the work attitude is divided into 2 parts, namely ergonomics (do not need improvement) and not ergonomi (need improvement), ergonomic work attitude if it is at level 1 and 2 is not need improvement, as well as at levels 3,4,5,6 and 7 Need Improvement

The results of this study indicate a relationship between work posture with low back pain and this study is in line with the results of several previous studies and in this study supported by the theory of tarwaka et al, in 2004 in ergonomics for Safety, Health and productivity where it is said that a non-ergonomic work attitude has a high risk of experiencing low back pain. Muscle complaints usually occur because of excessive muscle contraction caused by too heavy a load with a long duration, with excessive muscle contraction, muscle blood circulation will decrease so that muscle blood intake will decrease and metabolism is disturbed, if metabolism is inhibited, lactic acid

accumulation occurs which will cause pain in the muscles.

This study is in line with the results of Rindu Tia Sari research in 2017. Made Agus Wahyu Artadana et al in 2019 (26) and Awaludi et al in 2019. where in this study the results of bivariate analysis using chi-square test obtained the value of p-value is smaller than 0.05 and in this study can be said to be a relationship between work position with low back pain in workers.

However, this study is not in line with the results of Dian Dini Islami's research in 2016 Anisa Rahmawati et al in 2019 and Nisa Maghfirani in 2019 where in this study the results of bivariate analysis of $p > 0.05$ and it can be concluded that there is no significant relationship and has a low correlation between work position and low back pain.

Relationship of age with low back pain

From the results of the identification that has been done to 66 respondents pembutan brick workers in South Jambi District of Jambi city bivariate analysis results obtained p value = 0.014 which means that there is a relationship between age with low back pain in small industry workers brick making in South Jambi District.

In this study, the results obtained are that there is a relationship between age and low back pain, where these results are similar to several previous studies and this research is supported by the Tarwaka theory in 2019 in industrial ergonomics that skeletal complaints usually begin to be felt at the age of 35 years and keuhan will increase as age grows, this is because in middle age endurance and muscle strength will decrease and have an impact on the increasing risk of muscle complaints.

This study is also in line with the research results of Dede Yeni Fristi et al in 2016, Izzatul Alifah Sifai et al in 2018, as well as Arifianto et al in 2018, where in this study the results of C-square test analysis and p-value < 0.05 which can be concluded that there is a significant relationship between the age of workers with complaints of low back pain.

However, this study is not in line with the results of Fikri Fahmi Amrulloh et al in 2017, Ambar Dani Syuhada et al in 2018 and the results of Atthariq Wahab in 2019 where in this study from the c-square test results obtained p-value = > 0.05 it can be said that in this study there is no relationship between age and lower back pain.

Relationship of BMI with low back pain

From the identification that has been done to 66 respondents brick making workers in South Jambi District, Jambi city obtained the results of bivariate analysis and the value of p value = 0.490 and the value of PR = 1.235 (0.835-1.826) where $p < 0.05$ it can be concluded in this study BMI is not associated with complaints of low back pain in small industry workers brick making in South Jambi District.

In this study the results obtained are no BMI relationship with complaints of low back pain, this study is different from some previous research results and some theories where some researchers get the results of BMI relationship with complaints of low back pain. This can be caused by differences in the characteristics of the samples in each study as well as the presence of other more dominant factors that cause low back pain. For example, in the case of this study, respondents who have BMI are not at risk are more dominant and respondents who have BMI are at risk of not feeling any of these complaints.

This research is in line with the research results of Ambar Dani Syuhada et al in 2018, Izzatul Alifah Sifai et al in 2018 and the research results of Atthariq Wahab in 2019, where in this study the c-square test results obtained p - value < 0.05 it can be concluded that in this study there is no relationship between the BMI of workers with low back pain.

This study is not in line with the results of dede yeni fristy's research in 2016, arfianto et al in 2018, as well as naufal afif's research in 2021, where in this study it is known that the p-value = <0.05 and can be concluded in this study that the existence of significant association between bmi and low back pain.

CONCLUSION

Based on the results and discussion of the study entitled "The relationship of working posture and individual factors with complaints of low back pain in brick-making workers in South Jambi district" can be concluded that :

1. Workers who experience complaints of severe low back pain have a more dominant percentage of 60.6% (40 workers) and workers who experience mild low back pain as many as 39.4 (26 workers)
2. Workers who experience dangerous work postures and must be improved as soon as possible with a final value of 7-10 workers (15.2%). workers who have a working posture with a value of 5-6 RULA where to do further research and immediate changes were made of 17 employees (25,8). Workers who have a work posture with a RULA value of 3-4 where the work posture should be further investigated and may need changes as many as 21 workers (31.8%). Workers who have a work posture with a final value of 1-2 where the work posture is good and acceptable as many as 18 workers (27.3%).
3. Workers of working age are at risk of 75.8% (50 workers) and workers of working age are not at risk of 24.2% (16 workers).
4. Workers who have BMI at risk as much as 25.8% (17 workers) and BMI was not at risk by 74.2% (49 people).
5. There is a relationship between working posture with complaints of low back pain in brick - making workers in South Jambi district with a value of p-value = 0.025.
6. There is a relationship between age and lower back pain in brick-making workers in South Jambi district with p-value = 0.014.
7. There is no relationship between BMI with complaints of low back pain in New brick making workers in South Jambi district with p-value = 0.490

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