

Relationship Between Work Position and Non-Specific Low Back Pain Incidence in Farmer Groups

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Submission : 2023-10-18; Accepted : 2024-11-18; Published : 2025-01-01

ABSTRACT

Introduction: Farmers are someone who spends a lot of time in the field to plant, fertilize and harvest. During the process of planting, farmers tend to be in a bent position for a long time. Low back pain is one of the complaints that can reduce human productivity. Low back pain does not recognize gender, age, or social status. Non-specific low back pain results in pain, muscle spasms, and muscle imbalance, so the stability of the abdominal and lower back muscles decreases, limited lumbar mobility, changes in posture and results in disability in sufferers of non-specific low back pain. The students aim to determine whether there is a correlation between working posture and the incidence of non-specific low back pain in farmers. **Methods:** The research method used by sampling using total sampling, the dependent variable was the work position and the independent variable in the researcher's research was non-specific low back pain. **Results:** Sig value. (2-sided) in the chi-square test is 0.018. Because the sig value (2-sided) is $0.018 < 0.05$, then based on the decision-making above, it can be concluded that H_0 is rejected H_a is accepted. This means that there is a relationship between working posture and non-specific low back pain in farmer groups. **Conclusion:** There is a correlation between working posture and the incidence of non-specific low back pain in farmers. Future researchers are expected to add or examine further related postures while working on workers and increase the number of respondents to be more relevant in the coming years.

Keywords: *Farmers, Non-specific Low Back Pain, Working posture*

INTRODUCTION

Farmers are the main actors in the agricultural sector who spend a lot of time in the rice fields every day in static positions that take a long time such as hoeing, planting or just looking at their plants. When hoeing or planting, farmers tend to be in a hunched position and use their back muscles as the main support.

Farmers' activities that are often carried out are cultivating land, planting, fertilizing and harvesting. The activities carried out by farmers are usually in a bent position. According to research, the best working position for farmers over the age of 45 will cause farmers to experience abnormalities in the musculoskeletal system which is often felt in lower back pain. This

disorder occurs due to the habit of incorrect working positions, bending in a long position and age (Kawatu, 2016)

Lower back pain commonly called Lower back pain is one of the complaints that can reduce human productivity, lower back pain does not recognize gender, age, or social status. Low Back Pain is a common symptom felt by everyone of all ages with varying degrees of pain. Low Back pain is defined as pain, muscle tension, or stiffness in the area around the lower back with or without pain in the legs (Djawas, 2022).

The Central Statistics Agency (2019) noted that as of 2019 the number of farmers in Indonesia reached 33.4 million people, of which 8% were young farmers aged 20-39 years or equivalent to

2.7 million people, while 91% or around 30.3 million people were over 40 years old. The highest musculoskeletal factor is due to work in terms of length of work and work position. The incidence of musculoskeletal disorders is 1,144,000 with 493,000 cases affecting the back. In Indonesia, the highest number of musculoskeletal cases according to occupation are farmers out of 43,000 workers in the agricultural sector, 27,000 workers experience LBP complaints, and the prevalence in Indonesia is 18%. The World Health Organization (WHO) in 2018 stated that musculoskeletal is the second highest cause in the world, with lower back pain being the leading cause of disability globally. The Global Burden of Disease (GBD) study provides evidence of the impact of musculoskeletal conditions, due to significant disability associated with these conditions. Meanwhile, the prevalence of musculoskeletal varies by age and diagnosis, between 20% - 33% of people in the world experience pain due to musculoskeletal disorders. In the United States, which is a developed country in industry and manufacturing, WMSDs (Work-related musculoskeletal disorders) are the main cause of work-related diseases (Sari & Rifai, 2019).

According to (Nugraha, 2019) Yogyakarta City, the prevalence rate of low back pain that is most often complained of among workers is 70.4% which is recorded with complaints of lower back pain, there is a prevalence in the age group of 36 to 50 years with a working period of 1 to 10 years.

Non-Specific Back Pain is a symptom of lower back pain that occurs without a clear cause, the diagnosis is based on the exclusion of specific pathology. Non-specific lower back pain causes pain, muscle spasms, and muscle imbalance so that the stability of the abdominal and lower back muscles decreases, lumbar mobility is limited, changes in posture and causes disability in sufferers of non-specific low back pain (Kurniawan, 2019).

There are several risk factors associated with the occurrence of low back pain, namely work factors, individual factors and environmental factors. Individual factors consist of gender, age, body mass index, length of service, physical activity, smoking habits, history of trauma, history of education, and income level. Work factors, namely workload, duration of work, and position. There are several risk factors associated with the occurrence of low back pain, namely work factors, individual factors and environmental factors. Individual factors consist of gender, age, body mass index, length of service, physical activity, smoking habits, history of trauma, history of education, and income level. Work factors, namely workload, duration of work, work position and repetition of work. Environmental factors are noise and vibration. Lifting work is one of the most common causes of LBP, accounting for around 80% of cases (Andini, 2015).

METHODS

This study is a quantitative study using a cross-sectional study design. This study aims to determine the correlation between work position and the incidence of non-specific low back pain. In this study, the sample taken used total sampling where this method used all samples in the field because the samples in the field were less than 100 people. This study used 48 respondents as research subjects based on inclusion and exclusion criteria. Sample selection using total samples, namely using all samples that meet the criteria. Respondents were instructed to fill out a questionnaire through a sheet of paper that had been distributed, then a specific test was carried out. The Inclusion Criteria for this study are as follows: Willing to be a respondent, Active member of a farmer group, Aged 30 years to 75 years, Experiencing back pain, Working hours of more than 6 hours, The results of all specific tests are negative. The exclusion criteria of this study are as follows: Age over 75 years, History of trauma to the spine such as fracture, Resigning as



a respondent, a history of hypertension, a history of diabetes mellitus, a history of cholesterol, Those with a history of gout (gout arthritis)

The independent variable in this study is the working position. The dependent variable in this study is low back pain (non-specific low back pain).

The method of data processing in this study was Univariate analysis in the form of age, gender and work position. Bivariate analysis used to determine the relationship between the two variables was using the Chi-Square statistical test. Hypothesis testing in this study used the Chi-Square correlation because the data presented in this study were on a nominal scale. This data analysis used the help of the SPSS computer program.

This study was conducted after the issuance of Ethical Clearance from Aisyiyah University Yogyakarta No: 3120 / KEP-UNISA / VII / 2023.

RESULTS

The study was conducted in 4 farmer groups in Bulurejo Village, namely the Karangasem hamlet farmer group, the Grogolan hamlet farmer group, the Bulurejo Lor hamlet farmer group and the Bulurejo Kidul hamlet farmer group, which are located in Semin District, Gunungkidul Regency, Special Region of Yogyakarta. Bulurejo Village has 7 hamlets.

The study was conducted directly by gathering all members of the active farmer groups and gathering them at the residents' meeting place. Overall, there were 97 members from 4 farmer groups and 75 members who experienced lower back pain.

Univariate Analysis

The characteristics of respondents in this study include age, gender and work position.

Table 1. Characteristics of Respondents Based on the Age of Farmer Groups in Bulurejo Village in August 2023.

Age	Frequency (n)	Percentage (%)
45 – 59	19	39,6
60 – 74	29	60,4
Total	48	100

Table 1 The results obtained from the analysis of the respondents' age characteristics show that of the 48 respondents, the most results were in the elderly age group of 60 - 74 years with a frequency of 29 respondents and a percentage of (60.4%).



Table 2. Characteristics of Respondents Based on Gender of Farmer Groups in Bulurejo Village in August 2023.

Gender	Frequency (n)	Percentage %
Man	15	31,3
Woman	33	68,8
Total	48	100

Table 2 The results of the analysis of the characteristics of the respondents' gender show that out of 48 respondents, the results most are female with a frequency of 33 respondents and a percentage of (68.8%).

Table 3. Respondent Characteristics Based on NRS of Farmer Groups in Bulurejo Village in August 2023.

NRS	Frequency (n)	Percentage (%)
Low	19	39,6
Moderate	26	54,2
High	2	4,2
Very High	1	2,1
Total	100	100

Table 3 The results of the analysis of the characteristics of the respondents' pain with NRS, showed that out of 48 respondents, the most results were in the moderate pain classification (NRS) with a frequency of 26 respondents with a percentage (54.2%).

Table 4. Respondent. Characteristics Based on ODI Farmer Groups in Bulurejo Village in August 2023

ODI	Frequency (n)	Percentage (%)
Minimum disability	27	56,3
Moderate disability	21	43,8
Total	48	100

Table 4 Results obtained from the analysis of the characteristics of the daily living activity assessment respondents with ODI showed that out of 48 respondents, the most results were in the minimal disability classification with a frequency of 27 respondents and a percentage (56.3%).

Table 5. Respondent Characteristics Based on REBA Farmer Groups in Bulurejo Village in August 2023.

REBA	Frequency (n)	Percentage (%)
Risk can be ignored	2	4,2
Low Risk	11	22,9
Moderate Risk	27	56,3
High Risk	8	16,7
Total	100	100

Table 5 The results of the analysis of work position characteristics with REBA on respondents show that for 48 respondents, the most results are in the medium risk classification with a frequency of 27 respondents with a percentage (56.7%).



Table 6. Results obtained from tabulation analysis

REBA	ODI		Total
	Disabilities Minimal	Disabilitas Sedang	
	Frequency (n)	Frequency (n)	
Risk can be ignored	1	1	2
Low Risk	3	8	11
Moderate Risk	15	12	27
High Risk	8	0	8
Total	27	21	48

The cross-section between work position with REBA and daily living activities with ODI shows that out of 48 respondents, the most results obtained were in work position (REBA) with moderate risk and minimal disability level (ODI) with a frequency of 15 respondents.

Table 7. Cross Tabulation Results of Farmer Groups in Bulurejo Village in August 2023.

REBA	NRS			Total
	Low	Moderate	High	
	Frequency (n)	Frequency (n)	Frequency (n)	
Risk can be ignored	1	1	0	2
Low Risk	2	8	1	11
Moderate Risk	10	16	1	27
High Risk	0	4	4	8
Total	13	29	6	48

Table 7 The results of the cross-tabulation analysis between work position with (REBA) and pain with (NRS) showed that out of 48 respondents, the most results were in the work position (REBA) with moderate risk and moderate pain scale with a frequency of 16 respondents.



Bivariate Analysis

To find the statistical test, a hypothesis test was first carried out. In this study, the hypothesis test used the Chi-square correlation.

Table 8. Results of the Normality Test of Farmer Groups in Bulurejo Village in August 2023

	Sig.	Distribusi
Relationship	0,000	Tidak
Job Position		Normal
with		
Canadian		
Low Back		
Pain non		
Specific		

Table 8 above shows the results of the normality test using Shapiro Wilk with a sig. P value <0.05 which shows that the data is not normally distributed.

Table 9. Results of Hypothesis Testing of Farmer Groups in Bulurejo Village in August 2023

Testing	Value	Sig (2-sided)
Relationship between Work Position and Non-Specific Low Back Pain	15,349	0,018

Based on the output table above, the sig. (2-sided) value in the chi-square test is 0.018. Because the sig. (2-sided) value of 0.018 <0.05, then based on the decision-making above, it can be concluded that H_0 is rejected and H_a is accepted. This means that there is a relationship between work position and non-specific lower back pain in farmer groups.

DISCUSSION

Univariate Analysis

Respondent characteristics based on age The results of the study showed that out of 48 respondents with a middle-aged age range of 45-59 years and an elderly age of 60-74 years, the largest number of respondents were aged 60-74 years, as many as 29 respondents (60.4%). This age is the average age of the farmer group.

As a person ages, bone degeneration will occur, starting when a person reaches the age of 30. At this age, degeneration occurs in tissue damage, tissue replacement with scar tissue (fibrosis), and fluid loss. The older a person is, the higher the risk of experiencing decreased elasticity. At the age of <60 years, decreased bone elasticity will cause decreased bone and muscle stability (Andini, 2015). In their daily lives, farmers also make efforts to meet some or all of their life needs in the agricultural sector in a broad sense, including agricultural farming. Farmers' activities that are often carried out are cultivating land, planting, fertilizing, and harvesting. The activities carried out by farmers are usually in a bent position. The working position carried out by farmers is more in a bent position and if done for a long period, it will cause problems with the musculoskeletal system, one of which is lower back pain.

Age is one of the factors related to the incidence of low back pain, in line with research conducted (Hadyan & Saftarina, 2017) there is a relationship between age and the incidence of low back pain ($p = 0.037$) the highest incidence of low back pain at the age of 35-65 years and continues to increase with age. In the spine, there is a decrease in the elasticity of the intervertebral discs due to degeneration of the nucleus pulposus which functions as a cushion and mobility in the spine.

The results of the study showed that out of 48 respondents consisting of 4 farmer groups, namely the Karangasem Hamlet farmer group, the Grogolan Hamlet farmer group, the Bulurejo Lor Hamlet farmer group and the Bururejo Kidul



Hamlet farmer group, the male and female genders showed that the majority of respondents were female with a total of 33 respondents (68.8%).

From the results of this study, the prevalence of lower back pain is more often complained of in women than in men, and the level of leave from work is more in women than men with complaints of lower back pain.

The incidence of lower back pain is more common in women than in men, especially during menstruation and the menopause process which results in reduced bone density which is a result of decreased estrogen hormones which can cause lower back pain (Rahmawati, 2021).

In line with the research conducted by Tarwaka (Ulandari, 2017) the results of the study showed that gender affects the level of risk of muscle complaints, this occurs because of physiology, women's muscle capacity is lower than men's, the average muscle strength of women is only approximately 60% of the strength of men, especially in the arm, back and leg muscles, the comparison of muscle complaints between men and women is 1:3.

Respondent Characteristics Based on the NRS Pain Scale.

The results of the study showed that out of 48 respondents, the results of the pain examination using the Numeric Rating Scale (NRS) showed that the majority of respondents had moderate pain levels, namely 26 (54.2%) respondents.

One of the complaints of discomfort is because of disturbing pain, from the results of this study, most respondents experienced moderate pain, and not a few respondents with this pain value can inhibit daily functional activities.

In line with the research conducted (Maryaningsih, 2022) respondents who experienced lower back pain with a moderate pain category, which means that respondents can carry out daily activities but are accompanied by pain when sitting, and standing for a long time accompanied by interference in lifting activities.

In line with the research conducted (Kaur, 2016) the more severe the pain felt, the more severe the limitations experienced by the sufferer, and the lighter the pain felt, the fewer limitations experienced and the sufferer is still able to withstand the pain so that they can still do daily activities as usual.

According to the research (Zahra et al., 2019), Low back pain has very minimal fatal consequences, but the pain felt can affect sufferers experiencing a decrease in daily activities, especially workers, who experience a decrease in work productivity, decreased work performance, work quality, and work concentration.

Respondent Characteristics Based on the scale of daily activity capabilities with the Oswestry Disability Index (ODI) The results showed that 48 respondents, more respondents had ODI values with a minimum classification of 27 (56.3%) respondents. This means that respondents can still cope with most daily activities.

From the results of this study, it was found that most respondents experienced minimal disability but it may have had an impact on the limitations of daily activities such as lifting activities that are often done. Cases of lower back pain that disrupt daily activities can be measured by the ODI questionnaire consisting of 10 questions that can produce interpretations that can be grouped to determine the level of disability suffered for prevention or to get the right treatment. Classification of disability levels is divided into 5 minimal disabilities with a value of 0% to 20%, moderate disability 21% to 40%, severe disability 41% to 60%, very severe disability 61% to 80% and paralysis 81% to 100%. High ODI values indicate poor functional ability, conversely, low functional ability values indicate good activity and functional ability (Nugroho et al., 2017)

In line with the research conducted (Atmantika, 2014) a person with functional limitation disorders, disorders in the body are



caused by decreased anatomical, physiological and psychological functions due to pain, from 180 respondents, 38% experienced permanent functional limitations. Morbidity can be prevented by implementing a physiotherapy program on ergonomic working methods, to minimize functional limitations that can reduce productivity.

Respondent Characteristics Based on Work Position with Rapid Entire Body Assessment (REBA)

The results of the study showed that 48 respondents, the largest respondents, namely 27 (56.7%) had a REBA classification with moderate risk. REBA results were obtained from each image sent directly by respondents online or researchers who took pictures directly while respondents were working, this analysis was carried out by measuring from the position of the head, back position, arms, to the position of the feet. From the results obtained, it was classified into 5, namely value 1 risk can be ignored, value 2-3 low risk, value 4-7 moderate risk, 8-10 high risk and <11 very high risk (Fatimah, 2012).

In this study, respondents had more moderate risk levels, which means that there needs to be a change and improvement in posture while working. The working position of farmers when working is more with bending movements and is done for a long time, which can cause muscles to contract continuously which results in musculoskeletal problems, namely lower back pain. So there needs to be correction and changes in posture while working.

In line with the research conducted (Paturusi, 2021) the results of the study with a value ($p = 0.004$, $p\text{-value} < 0.05$) showed a relationship between work position and musculoskeletal complaints, namely low back pain in farmers, because the more risky the work position, the higher the risk level of the work position, the musculoskeletal complaints will increase

As a result of less ergonomic loading and posture, which triggers musculoskeletal complaints in farmers.

Bivariate Analysis

This study discusses the relationship between work position and the incidence of non-specific low back pain. The results show that there is a relationship between work position and the incidence of non-specific low back pain.

Farmers do their work in a bent position and use their backs as the main support. All of these activities involve various spinal support muscles that function to maintain good posture and balance coordination. From the work posture carried out by farmers in static conditions and for a long period, farmers can experience lower back pain.

In line with the research conducted (Kawatu, 2016) The description of the working position of rice farmers when doing their work is that those at the medium-risk level are 17 farmers and at the high-risk level 4 farmers. The continuous bending working position will increase the workload so that fatigue and musculoskeletal complaints will quickly appear, one of which is lower back pain. The bending working position causes the muscles to continuously contract and become tense, when the bending position requires greater muscle endurance, this causes a greater burden on the spine and triggers pain.

Unergonomic working positions coupled with long working duration will cause lower back pain. High-risk working positions such as bending, doing repetitive movements, and working in a static position for a long period will cause wear in the lumbar region. Excessive muscle work in maintaining the farmer's working position will also cause muscle spasms, so it is very risky to experience lower back pain (Andini, 2015).

In line with research conducted by Sujono (Sutami & Laksmi, 2021) poor working position will cause heavy postural load. If the postural load is heavy and if this postural load occurs for a long time, it will cause postural strain which is a static mechanical load on the muscles. This condition will reduce blood flow to the muscles so that there is a disturbance in the chemical balance in the



muscles which leads to muscle fatigue, which will lead to musculoskeletal disorders such as lower back pain.

Farmers are high-risk jobs seen from the type of activity and work environment, farmer activities such as hoeing, planting, fertilizing and harvesting have different levels of risk, one of the high-risk ones is when farmers are in a planting position which is done by most farmers is bending statically for a long time which can have an impact on musculoskeletal health.

The musculoskeletal system involves many body systems such as bones, muscles, ligaments, tendons and nerves. The working position or posture while working is to facilitate the body in supporting the work when workers are working. Bending is one of the working positions that is not in a stable condition while working. When bending the spine moves to the front of the body, the front of the lumbar intervertebral disc is compressed and the back of the intervertebral disc is stretched. Muscle tension and tension of the spinal ligaments can affect the regional curvature of the vertebral column. So when someone bends for a long time and is done continuously, then over time the muscles and ligaments will experience stretching or loosening so that they are no longer able to maintain an ideal and stable posture. When someone bends more than 90 degrees in the lumbar area it will become flat out, if this is done for a long time it will cause kyphosis (Zahra et al., 2019)

During the bending movement performed by farmers, what happens to the spine, namely the lumbar, is flexion or curvature. The normal angle during lumbar flexion is around 60 degrees. This lumbar flexion movement is carried out by the flexor muscles, namely the rectus abdominis muscles assisted by the spinal extensor muscles. 50% of the trunk flexion movement comes from pelvic rotation, likewise, the movement from a bent position to standing (flexion extension) will also result in a forward pelvic rotation movement followed by the spinal extension. The load of movement from 90 degrees to 45 degrees flexion

will be borne by the ligaments while the load from 45 degrees flexion to an upright position will be borne by the muscles (Eliyana, 2017).

CONCLUSION

Based on research involving 48 active farmer group members, it can be concluded that there is a relationship between work position and the occurrence of non-specific low back pain.

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