

FACTORS ASSOCIATED WITH THE INCIDENCE OF LOW BACK PAIN BASED ON THE NUMERIC PAIN RATING SCALE IN DAILY WORKERS AT THE BBPPT KOMINFO DEPOK PROJECT

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ABSTRAK

Low Back Pain (LBP) adalah nyeri yang dirasakan di area punggung bawah dan berasal dari tulang belakang, otot, saraf, atau struktur lain di sekitar area tersebut. Angka prevalensi LBP di Indonesia pada tahun 2016 sebesar 59,25%. Penelitian ini bertujuan untuk mengetahui faktor-faktor yang berhubungan dengan kejadian nyeri pinggang pada pekerja harian proyek BBPPT Kominfo Depok. Penelitian kuantitatif dengan desain studi cross-sectional. Populasinya adalah pekerja lapangan harian yang berjumlah 70 orang dan teknik pengambilan sampelnya adalah total sampling. Pengumpulan data dilakukan pada bulan Januari 2023. Analisis data menggunakan uji chi-square $\alpha = 0,05$. Dari hasil penelitian diperoleh p-value masing-masing variabel yaitu: Usia (p-value 0,071 artinya tidak ada hubungan yang signifikan antara usia dengan kejadian LBP), Indeks Massa Tubuh (BMI) (p-value 1,000 artinya tidak ada hubungan yang signifikan antara BMI dengan kejadian LBP), Kebiasaan Merokok (p-value 0,044 artinya ada hubungan yang signifikan antara kebiasaan merokok dengan kejadian LBP), Massa Kerja (p-value 0,042 artinya ada terdapat hubungan yang signifikan antara massa kerja dengan kejadian LBP), Waktu Kerja (p-value 0,017 artinya ada hubungan yang signifikan antara waktu kerja dengan kejadian LBP) dan Angkat Berat (p-value 0,013 artinya ada hubungan yang signifikan hubungan antara angkat beban dengan kejadian LBP). Kebiasaan merokok, masa kerja, masa kerja, dan angkat beban mempunyai hubungan dengan kejadian LBP. Mengurangi lama kerja pekerja harian agar pekerja harian mendapatkan waktu istirahat yang cukup, dan menyediakan alat bantu dalam jumlah yang cukup agar pekerja tidak mengangkat benda atau material secara manual.

Kata Kunci: *Low back pain, pekerja harian, faktor*

ABSTRACT

Low back pain (LBP) is pain that is felt in the lower back area and originates in the spine, muscles, nerves, or other structures around the area. The prevalence rate of LBP in Indonesia in 2016 was 59.25%. This study aims to determine the factors associated with the incidence of low back pain in daily workers at the BBPPT Kominfo Depok project. Quantitative research with a cross-sectional study design. The population is daily field workers with a total of 70 people and the sampling technique is total sampling. Data collection was carried out in January 2023. Data analysis used the chi-square test $\alpha = 0.05$. From the study results, the p-value of each variable was obtained, namely: Age (p-value 0.071 meaning that there is no significant relationship between age and the incidence of LBP), Body Mass Index (BMI) (p-value 1.000 meaning there is no significant relationship between BMI with the incidence of LBP), Smoking Habit (p-value 0.044 means that there is a significant relationship between smoking habits and the incidence of LBP), Working Mass (p-value 0.042 means that there is a significant relationship between working mass and the incidence of LBP), Working Time (p-value 0.017 means that there is a significant relationship between working time and the incidence of LBP) and Lifting Weight (p-value 0.013 means that there is a significant relationship between the lifting weight and the incidence of LBP). Smoking habits, years of service, length of work, and weight of lifting have a relationship with the incidence of LBP. Reducing the length of work for daily workers so that daily workers get sufficient rest time, and providing an adequate number of assistive devices so that workers do not lift objects or materials manually.

Keywords: *Low back pain, daily worker, factors*

INTRODUCTION

The implementation of Occupational Health and Safety aims to protect the safety of workers/laborers for optimal work efficiency. Occupational safety and health efforts in question are to provide safety guarantees and improve the health status of workers or laborers by taking measures to prevent accidents and occupational diseases, taking measures to control hazards in the workplace environment, carrying out health promotion, and curative and rehabilitative actions. Every construction project has a hazard that has the potential to cause occupational diseases, one of which is PT. PP (Persero) BBPPT Kominfo Depok project, especially for daily field workers. Occupational Disease is a disease caused by work and work environment. Low Back Pain (LBP) is an occupational disease that is often referred to as Lower Back Pain (LBP) which belongs to the physiological group.

Based on data from WHO in 2013 in Duthey B., in 2014 the highest low back pain was the age of 45-59 years whose sufferers reached approximately 9.1 million and aged 50-54 years with a total of 8.8 million sufferers. This data shows that the productive age range is at high risk of developing low back pain. ⁽¹⁾ Low Back Pain (LBP) in Indonesia is a real health problem. Lower Back Pain (LBP) is the second disease in humans after influenza. Data for the number of Low Back Pain (LBP) sufferers in Indonesia is not known with certainty, but it is estimated that low back pain sufferers in Indonesia vary between 7.8% to 37% of the total population in Indonesia, the prevalence of low back pain is 59.25 % of sufferers of low back pain in 201. ⁽²⁾

In general, the physical abilities of humans, such as vision, and reaction speed will decrease at the age of 30 years or more so that this age group generally experiences severe work accidents and even death compared to the younger age group. ⁽³⁾ Based on research conducted by Made *et al.*, (2019) on 20 batik craftsmen in Pejeng Village, Gianyar showed that more batik craftsmen were aged 40-54 years. From the Fisher test conducted on age with low back pain complaints, it was found that $p\text{-value} = 0.001$, so there is a relationship between age and lower back pain in batik craftsmen. ⁽⁴⁾

Nutritional status has a relationship with complaints of low back pain. People who have more nutritional status or are overweight will easily experience back pain due to supporting excess fat loads (Septiawan, 2013). Based on the results of a study conducted by Septiawan (2013) on 49 construction workers at PT Mikroland Property Development Semarang and obtained results the Body Mass Index (BMI) has a relationship with complaints of low back pain. From the Chi-Square test conducted on Body Mass Index (BMI), it was found that out of 23 respondents who had a BMI at risk 13 respondents experienced low back pain and obtained a $p\text{-value} = 0.030$, so there was a relationship between Body Mass Index (BMI) of the construction workers with incidents of low back pain. ⁽⁵⁾

Smoking habits can reduce lung capacity which results in a lack of ability to consume oxygen which leads to a decrease in one's body fitness level. Research conducted by Noviyanti (2021) on 58 workers in the Welding section at PT X showed that there was a relationship between smoking habits and complaints of lower back pain with a $p\text{-value} = 0.000$. ⁽⁶⁾

The working period has a close relationship with the occurrence of musculoskeletal complaints. Low back pain is a chronic disease that takes a long time to develop and be felt by someone (Andini, 2015). Research conducted by Noviyanti (2021) obtained the results that there was a relationship between the length of work and complaints of lower back pain in welding workers. Workers who have worked for ≥ 5 years experiences more complaints of low back pain with a p-value of 0.000, which means there is a relationship between the length of work and complaints of low back pain in welding workers at PT X Kota Batam. ⁽⁶⁾

The length of work for a person determines his efficiency and productivity. The working time that exceeds the ability of workers and is not accompanied by high efficiency can result in decreased productivity, and there is a tendency for excessive fatigue, work-related illnesses, and work-related accidents. This is in line with research conducted by Bilondatu (2018) on the operator PT. Makassar Container Terminal from the results of the bivariate test obtained a p value of 0.018, which means H_0 that the length of work has a relationship with low back pain in Operator PT. Makassar Container Terminal Year 2018. ⁽⁸⁾

Work with heavy loads resulting in excessive exertion and wrong posture such as bending and carrying loads is a risk for musculoskeletal complaints. This is in line with research conducted by Susanto *et al.*, (2013) on 32 carrying workers at the Bandungan Market, Semarang Regency, obtained bivariate test results with a p-value of 0.000, which means that there is a relationship between the weight of the lifting load and the incidence of low back pain which divides two groups of heavy lifting loads, workers who carry loads of more than 40 kg tend to experience severe back pain while workers who carry loads of less than 40 kg experience mild low back pain. From the results of the research above it is known that if the carrying load is more than 40 kg and the activity is carried out repeatedly it results in a risk of musculoskeletal complaints. ⁽⁹⁾

Based on the results of an observational preliminary study conducted by researchers at the BBPPT Kominfo Depok project, it was found that there were daily field workers who experienced low back pain. Of the 10 daily field workers, 8 (80%) of them complained of low back pain in the last seven days. Based on the description above, the researcher is interested in researching "Factors Associated with the Incidence of Low Back Pain in Daily Field Workers at the BBPPT Kominfo Depok Project."

METHOD

This research is a type of descriptive quantitative research using cross-sectional. This research was conducted at the BBPPT Kominfo Depok project in January 2023. This research used total sampling so that the research sample was all daily field workers (project workers), totaling 70 people. This study aims to look at the relationship between the independent variables (age, body mass index, smoking habits, years of service, length of work, and lifting weights) with the dependent variable (low back pain). This study used a questionnaire as a measuring tool for the independent variable while for the

measurement of the dependent variable it used the Numeric Pain Rating Scale (NPRS). In this study, data were collected from respondents using a survey method using a questionnaire on daily field workers at the BBPPT Kominfo Depok Project.

RESULTS AND DISCUSSION

Table 1 shows the results of the univariate analysis recapitulation, It can be seen that out of 70 respondents, there were 46 (65.7%) respondents who experienced low back pain, and 24 (34.4%) respondents did not experience low back pain. There were 45 (64.3%) respondents aged <35 years and there were 25 (35.7%) respondents aged ≥35 years. There were 64 (91.4%) respondents who had BMI normal and there were 6 (8.6%) respondents who had BMI Abnormal (Obesity). There were 65 (92.9%) respondents who smoked and there were 5 (7.1%) who did not smoke. There were 39 (55.7%) respondents who had worked ≥ 5 years and there were 31 (44.3%) respondents who had worked < 5 years. There were 46 (65.7%) respondents who had a category of working duration > 8 hours and there were 24 (34.4%) respondents who had a category of working time of 8 hours. There were 49 (70.0%) respondents who had a lifting weight category of > 40 Kg and there were 21 (30.0%) respondents who had a lifting weight category of ≤ 40 Kg.

Table 1. Univariate Analysis Results

Variable Name	n	%
Low Back Pain (LBP)		
Yes	46	65.7
No	24	34.3
Age		
≥35 years	25	35.7
<35 years	45	64.3
Body Mass Index (BMI)		
Abnormal (Obesity)	6	8.6
Normal	64	91.4
Smoking Habits		
Smoke	65	92.9
Do not smoke	5	7.1
Years of service		
≥ 5 years	39	55.7
< 5 years	31	44.3
Length of Work		
> 8 hours	46	65.7
8 hours	24	34.4
Weight of Lifting		
>40 Kg	49	70.0
≤40 Kg	21	30.0

Table 2 shows the results of the bivariate analysis recapitulation, based on the table it is known that there is a relationship between smoking habits and the incidence of low back pain based on the results of statistical tests using chi-square, obtained a P value of 0.044 with an odds ratio = 9,000, 95% CI = 1,821 – 28,638 respondents in the non-smoking category were 9,000 times higher not to experience LBP events than respondents who smoked. There is a relationship between years of service and the

incidence of low back pain based on the results of statistical tests using chi-square, which obtained a P value of 0.042 with an odds ratio = 3.125, 95% CI = 1.121 – 8.712, which means that respondents with a category of working period <5 years 3.125 times higher not to experience LBP events than respondents who have worked ≥5 years. There is a relationship between the length of work and the incidence of low back pain based on the results of statistical tests using chi-square, obtained a P value of 0.017 with an odds ratio = 3.760, 95% CI = 1.315 – 10.752, which means that respondents with 8 hours of working time category 3.760 times higher for not experiencing LBP events than respondents who have worked > 8 hours. There is a relationship between the weight of lifting weights and the incidence of low back pain based on the results of statistical tests using chi-square, obtained a P value of 0.013 with an odds ratio = 4.111, 95% CI = 1.393 – 12.131, which means that respondents in the category of lifting weights ≤ 40 Kg 4.111 times higher for not experiencing complaints of LBP events than respondents who have a lifting weight category > 40 Kg. There is no relationship between age and body mass index (BMI) with the incidence of low back pain. This is indicated by the P value of age (p = 0.071 > 0.05) and length of work (p = 1.000 > 0.05).

Table 2. Bivariate Analysis Results

Variable	Low Back Pain (LBP)						p-value	OR (95% CI)
	Yes		No		Total			
	n	%	n	%	n	%		
Age								
≥35 years	20	80.0	5	20.0	25	100.0	0.071	
<35 years	26	57.8	19	42.2	45	100.0		
Body Mass Index (BMI)								
Abnormal (Obesity)	4	66.7	2	33.3	6	100.0	1.000	
Normal	42	65.6	22	34.4	64	100.0		
Smoking Habits								
Smoke	45	70.8	20	29.2	65	100.0	0.044	
Do not Smoke	1	20.0	4	80.0	5	100.0		
Years of service								
≥5 years	30	76.9	9	23.1	39	100.0	0.042	
<5 years	16	51.6	15	48.4	31	100.0		
Length of Work								
>8 hours	35	76.1	11	23.9	46	100.0	0.017	
8 hours	11	45.8	13	54.2	24	100.0		
Weight of Lifting								
>40 Kg	37	75.5	12	24.5	49	100.0	0.013	
≤40 Kg	9	42.9	12	57.1	21	100.0		

The results of the analysis of the relationship between age and the incidence of low back pain showed that out of 46 respondents who experienced low back pain in the age category <35 years, 26 respondents (57.8%) and in the age category ≥35 years, 20 respondents (80.0%). Meanwhile, 19 respondents (42.2%) did not experience low back pain in the <35 years age category, and 5 respondents (20.0%) in the ≥35 years age category. The results of data analysis using chi-square obtained a p-value of 0.071 (p > 0.05), this means that H0 is accepted, and it can be concluded that age has no relationship with the incidence of low back pain in daily field workers at the BBPPT Kominfo Depok Project.

The results of this study are in line with research conducted by Umboh et al., (2017) who researched the relationship between individual characteristics and complaints of low back pain in nurses in the inpatient room of RSU GMIM Pancaran Kasih Manado using the chi-square test showing a p-value of 0.194, meaning that there is no relationship between age and complaints of low back pain in nurses in the inpatient room of RSU GMIM Pancaran Kasih Manado. ⁽¹⁰⁾

The results of the analysis of the relationship between Body Mass Index (BMI) and the incidence of low back pain show that out of 46 respondents who experienced low back pain in the BMI category of Normal, 42 respondents (65.6%) and in the BMI category Abnormal (Obesity) as many as 4 respondents (66.7%). Meanwhile, 22 respondents (34.4%) did not experience low back pain in the BMI category of Normal and 2 respondents (33.3%) in the BMI category Abnormal (Obesity). The results of data analysis using chi-square obtained a p-value of 1.000 ($p > 0.05$), this means that H_0 is accepted, and it can be concluded that Body Mass Index (BMI) has no relationship with the incidence of low back pain on daily field workers at the BBPPT Kominfo Depok Project.

Nutritional status is the condition of the body as a result of food consumption and use of nutrients. Abnormal nutritional status indicates poor body condition. These body conditions can affect workers at work and can cause work fatigue. For someone who is overweight, the fat will be distributed to the abdominal area and hoarding can occur. The accumulation of fat in the area makes the pressure increase because of the extra burden, thereby increasing the risk of low back pain. ⁽¹¹⁾ Nutritional status in this study can be described by calculating Body Mass Index (BMI) which is categorized into 2, namely daily field workers with normal nutritional status if the results of BMI measurements are between 18.5 kg/m² – 25.0 kg/m² and daily field workers with abnormal nutritional status if the results of BMI measurements are <18.5 kg/m² and >25.0 kg/m².

The results of this study are also in line with those carried out by Bilondatu (2018) on the operator PT. Makassar Container Terminal in 2018 Based on statistical tests, it obtained a value of $p = 0.715$ ($p < 0.05$), which means there is no relationship between nutritional status and low back pain (Bilondatu, 2018). This is not in line with research conducted by Ilma *et al.*, (2021) on 122 employees of the Plywood Line Section of PT. Sumber Graha Sejahtera Luwu 2021 found that there is a relationship between Body Mass Index (BMI) and complaints of low back pain with a p-value of 0.000. ⁽¹²⁾

The results of the analysis of the relationship between smoking habits and the incidence of low back pain showed that out of 46 respondents who experienced low back pain in the smoking category, 45 respondents (70.8%) and in the non-smoking category, 1 respondent (20.0%). Meanwhile, there were 20 respondents (29.2%) who did not experience low back pain in the smoking category and 4 respondents (80.0%) in the non-smoking category. The results of data analysis using chi-square obtained a p-value of 0.044 ($p < 0.05$), this means that H_0 is rejected, and it can be concluded that smoking habits have a relationship with the incidence of low back pain in daily field workers at the

BBPPT Kominfo Depok Project. From the results of the analysis, the value of OR = 9,000 was also obtained, meaning that respondents in the non-smoking category were 9,000 times more likely to not experience LBP than respondents who smoked.

Smoking habits can reduce lung capacity which results in a lack of ability to consume oxygen which leads to a decrease in one's body fitness level. If workers have to perform tasks that require exertion, the burning of carbohydrates is hampered and the buildup of lactic acid occurs which causes muscle pain. This is in line with research conducted by Nurzannah *et al.*, (2015) on Loading and Unloading Workers (TKBM) in chi-square obtained a p-value of 1,000 meaning that p-value > 0.05 indicates no significant relationship with the proportion of TKBM experiencing low back pain in TKBM with those who smoke compared to TKBM who do not smoke. The magnitude of the difference can be seen from the OR which is 0.724 (0.148 ± 3.531), meaning that the risk of developing low back pain in TKBM who have smoking habits is 0.724 times greater than in TKBM who do not smoke. ⁽¹³⁾

The working period has a close relationship with the occurrence of musculoskeletal complaints. Low back pain is a chronic disease that takes a long time to develop and be felt by someone (Andini, 2015). Working for more than 5 years there is an increased risk of experiencing low back pain complaints compared to workers who work for less than 5 years, with an increase rate that varies between 2 to 3 times depending on the increase in years of service. The increased risk of low back pain complaints is caused by the narrowing of the disc cavity and spinal generation.

The results of the analysis of the relationship between years of service and the incidence of low back pain showed that out of 46 respondents who experienced low back pain in the < 5-year service category, 16 respondents (51.6%) and in the ≥ 5-year service category, 30 respondents (76, 9%). Meanwhile, 15 respondents (48.4%) did not experience low back pain in the < 5-year service category, and 9 respondents (23.1%) in the ≥ 5-year service category. The results of data analysis using chi-square obtained a p-value of 0.042 (p < 0.05), this means that H₀ is rejected, and it can be concluded that work period has a relationship with the incidence of low back pain in daily field workers at the BBPPT Kominfo Depok Project. From the analysis results, the value of OR = 3.125 was also obtained, meaning that respondents with a service period of < 5 years were 3.125 times more likely not to experience LBP events than respondents who had a service period of ≥ 5 years.

The results of this study are in line with research conducted by Mulfianda *et al.*, (2021) who conducted a study on 59 employees at the Aceh Regional PLN Office and found that tenure has a relationship with the incidence of low back pain. From the Chi-Square test conducted on the years of service of employees, it was found that of the 36 respondents who had worked > 5 years, 29 respondents experienced low back pain and obtained a p-value = 0.000, so there is a relationship between the years of service of office employees and incidence of low back pain. ⁽¹⁴⁾ This research is also in line with the research conducted by Tristiawan *et al.*, (2019) on 33 workers in the engineering section, using the chi-

square test the results obtained a p-value of 0.017 which indicates a relationship between the tenure of office employees and the incidence of low back pain. ⁽¹⁵⁾

The length of work for a person determines his efficiency and productivity. The working time that exceeds the ability of workers and is not accompanied by high efficiency can result in decreased productivity, and there is a tendency for excessive fatigue, work-related illnesses, and work-related accidents.

The results of the analysis of the relationship between the length of work and the incidence of low back pain showed that out of 46 respondents who experienced low back pain in the 8-hour-long category, 11 respondents (45.8%) and in the > 8-hour category, 35 respondents (76.1%). Meanwhile, there were 13 respondents (54.2%) who did not experience low back pain in the 8-hour-long working category and 11 respondents (23.9%) in the > 8 hours-long working category. The results of data analysis using chi-square obtained a p-value of 0.017 ($p < 0.05$), this means that H_0 is rejected, and it can be concluded that length of work has a relationship with the incidence of low back pain in daily field workers at the BBPPT Kominfo Depok Project. From the analysis results, the value of OR = 3.760 was also obtained, meaning that respondents with 8 hours of working duration were 3.760 times more likely not to experience LBP events than respondents who had worked > 8 hours.

This is in line with research by Anggraini (2014) on 272 cigarette factory workers. In their research, it was found that there was a relationship between the length of work increasing the incidence of low back pain using the Pearson Correlation test, obtaining a p-value of 0.042 (Anggraini, Jenie, and Ronica, 2018). This is in line with research conducted by Bilondatu (2018) on the operator PT. Makassar Container Terminal from the results of the bivariate test obtained a p value of 0.018, which means H_0 that the length of work has a relationship with low back pain in Operator PT. Makassar Container Terminal Year 2018. ⁽⁸⁾

The weight of the lifting weight greatly affects complaints of low back pain because the heavier the load is lifted, the greater the back muscle strength of the worker used.

The results of the analysis of the relationship between the weight of the lifting load and the incidence of low back pain showed that out of 46 respondents who experienced low back pain in the heavy lifting category ≤ 40 kg, 9 respondents (42.9%) and in the heavy lifting category > 40 kg, 37 respondents (75.5%). Meanwhile, 12 respondents (57.1%) did not experience low back pain in the category of weight lifting ≤ 40 kg, and in the category of weight lifting > 40 kg there were 12 respondents (24.5%). The results of data analysis using chi-square obtained a p-value of 0.013 ($p < 0.05$), this means that H_0 is rejected, and it can be concluded that lifting weights has a relationship with the incidence of low back pain in daily field workers at the BBPPT Kominfo Depok Project. From the results of the analysis, the value of OR = 4.111 was also obtained, meaning that respondents with a lifting weight category of ≤ 40 kg were 4.111 times higher in not experiencing complaints of LBP events than respondents who had a lifting weight category of > 40 kg.

Work with heavy loads resulting in excessive exertion and wrong posture such as bending and carrying loads is a risk for musculoskeletal complaints.

This is in line with research conducted by Susanto *et al.*, (2013) on 32 carrying workers at the Bandungan Market, Semarang Regency, obtained bivariate test results with a p-value of 0.000, which means that there is a relationship between the weight of the lifting load and the incidence of low back pain which divides two groups of heavy lifting loads, workers who carry loads of more than 40 kg tend to experience severe back pain while workers who carry loads of less than 40 kg experience mild low back pain. From the results of the research above it is known that if the carrying load is more than 40 kg and the activity is carried out repeatedly it results in a risk of musculoskeletal complaints. This happens because the worker's muscles receive pressure due to the excessive lifting of weights without any relaxation. ⁽⁹⁾

Research conducted by Wahyuni (2019) on porters at Pasar Legi Surakarta obtained the results of a bivariate test p-value of 0.001 which concluded that there was a relationship between the weight of the load carried by porters and the incidence of low back pain. ⁽¹⁷⁾

CONCLUSION AND SUGGESTIONS

Based on the results of the research that has been done, it can be concluded that the factors associated with the incidence of low back pain in daily field workers at the BBPPT Kominfo Depok project in 2023 are smoking habits with a p-value of 0.044, years of service with a p-value of 0.042, length of work with a p-value of 0.017 and the weight of the load with a p-value of 0.013. Meanwhile, the factors that are not related to the incidence of low back pain in daily field workers at the BBPPT Kominfo Depok project in 2023 are age with a p-value of 0.071 and body mass index (BMI) with a P value of 1.000.

Suggestions workers are expected to warm up before carrying out work activities so that the muscles do not feel stiff, reduce smoking consumption, and use tools to move materials or other objects. Suggestions for contracting companies are reducing working time for daily workers so that daily workers get sufficient rest time, adjusting the ability of all workers in the division of tasks and adding daily workers to reduce the length of work for daily workers, paying attention to the physical health of daily workers in The BBPPT Kominfo Depok project and provided an adequate number of assistive devices so that workers do not lift objects or materials manually.

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