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Factors related to Low Back Pain (LBP) in Jambi City Health Service Employees in 2025

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Abstract

Low Back Pain (LBP) is a common phenomenon and a frequent complaint among office workers. According to data from the World Health Organization (WHO), 1.7 billion people worldwide suffer from musculoskeletal disorders, with 17.3 million of them experiencing Low Back Pain (LBP). Therefore, the aim of this study is to identify the factors associated with Low Back Pain (LBP) among employees of the Jambi City Health Office. This research used a cross-sectional design with a chi-square test. A total of 99 respondents were selected using purposive sampling. The variables examined included age, length of employment, physical activity (exercise), and work posture. The results showed significant associations between age (p = 0.003), physical activity (exercise) (p = 0.001), and work posture (p = 0.022) with complaints of Low Back Pain (LBP), while no significant association was found between length of employment (p = 0.546) and complaints of Low Back Pain (LBP). Age was found to have the greatest influence on complaints of Low Back Pain (LBP) (PR = 1.519), indicating that employees aged ≥ 35 years are 1.519 times more likely to experience Low Back Pain (LBP) compared to those under 35 years old

Keywords: Age, LBP, RULA, Office Workers

INTRODUCTION

Occupational health is a branch of public health that focuses on addressing the health needs of the working population, both in the formal and informal sectors. Optimal occupational health can be achieved when the three key components—worker capacity, workload, and the work environment—interact harmoniously and effectively. The attainment of occupational safety and health is closely linked to the role of ergonomics, as ergonomics pertains directly to workers, not only in terms of enhancing work efficiency and effectiveness, but also in preventing health issues. One of the common ergonomic problems encountered is lower back pain (LBP), which is classified as a musculoskeletal disorder resulting from improper body mechanics during mobilization. Low Back Pain (LBP) is a common health problem experienced by individuals across various age groups, including workers. Typically, LBP affects the lower back region and may be caused by multiple factors, such as non-ergonomic body posture, excessive physical workload, or a lack of balanced physical activity and exercise. This condition frequently occurs in office settings, where work is often monotonous and performed in static postures for extended periods. Musculoskeletal disorders are impairments affecting the human musculoskeletal system, typically caused by injuries to the muscles due to sustained static loading over a prolonged period. Such activities often lead to complaints involving the joints, ligaments, and tendons.

According to data from the World Health Organization (WHO) (2023), Low Back Pain (LBP) affects approximately 619 million people globally. The number of cases is projected to rise to an estimated 843 million by the year 2050, a trend that has been evident since data recorded in 2013. The highest prevalence of LBP worldwide is found among the working population aged 40–55 years, which falls within the adult age group. Although individuals aged ≤ 40 years may also experience LBP, its prevalence tends to increase with age, reaching a peak in individuals up to 80 years old. According to a study by Novianto (2024), Low Back Pain (LBP) frequently occurs in office environments. Based on an ergonomic risk assessment conducted using the Rapid Entire Body Assessment (REBA) method, 96.4% of office workers were found to be at a moderate ergonomic risk level, falling into the category that requires corrective actions. Furthermore, these workers commonly reported mild to moderate levels of discomfort in the lower back region.

The study was conducted at the Jambi City Health Office. Preliminary surveys and observations indicated that several respondents experienced symptoms consistent with Low Back Pain (LBP), characterized by intermittent pain in the lower back region. Employees work on regular weekdays, from Monday to Friday, between 07:15 and 16:15 Western Indonesian Time (WIB). All employees have specific job descriptions, with some departments involved in outdoor activities, while others remain stationed in the office.

RESEARCH METHODS

This study employed a quantitative approach with a cross-sectional design. It was conducted at the Jambi City Health Office from August to November 2024. The study population comprised all employees at the Jambi City Health Office. The sample was selected using purposive sampling and the Slovin formula, resulting in a total of 99 respondents.

The Low Back Pain (LBP) variable was measured using *The Pain and Distress Scale* questionnaire, adapted from William J.K. Zung, which is a self-descriptive instrument. Meanwhile, data on age, physical activity (exercise), and length of employment were collected through questionnaires using interview techniques. The length of employment variable was further assessed through observation using the Rapid Upper Limb Assessment (RULA) form. Data analysis was conducted using univariate and bivariate techniques, with the chi-square test employed to examine the relationship between independent and dependent variables. All analyses were performed using SPSS software.

RESULTS AND DISCUSSION

Table 1. Characteristics of Respondents at the Jambi City Health Office

Characteristics of Respondents	n	Percentage (%)
Education Level		
Senior High School	6	6.1
Bachelor's Degree	93	93.9
Income Level (IDR)		
3 Million IDR	45	45.5
>3 3 Million IDR	54	54.5
History of Bone Disease		
Yes	7	7.1
No	92	92.9

Source: Processed Primary Data, 2025

Based on Table 1, the study results indicate that the educational backgrounds of the respondents ranged from Senior High School (SMA) to Bachelor's degree holders. The majority of respondents held a Bachelor's degree, totaling 93 respondents (93.9%), while the smallest proportion had completed Senior High School, with 6 respondents (6.1%). Regarding income levels, respondents were varied, with 45 respondents (45.5%) earning between 1 and 3 million IDR, and 54 respondents (54.5%) earning more than 3 million IDR.

The history of bone disease was obtained through interviews, where respondents were asked about possible bone conditions, including congenital issues, disabilities, accidents, and others. Most respondents reported no history of bone disease, accounting for 92 respondents (92.9%), whereas 7 respondents (7.1%) reported a history of bone disease. The most commonly reported bone conditions included osteoporosis and bone pain.

Table 2. Distribution of Respondents Based on Research Variables Among Employees of the Jambi City Health Office

Variables	n	Percentage (%)
Age		
< 35 years old	17	17.2
≥ 35 years old	82	82.8
Length of Employment		
< 5 years	16	16.2
≥ 5 years	83	83.8
Physical Activity (Exercise)		
1-3 times per week	64	64
≥ 3 times per week	35	35
Work Posture		
Ergonomic	37	37.4
Non Ergonomic	62	62.6
***Low Back Pain* (LBP)**		
No Complaints	28	28.3
Complaints Present	71	71.7

Source: Processed Primary Data, 2025

The respondents' ages were categorized into risk and non-risk groups for Low Back Pain (LBP), with the cut-off being under 35 years and 35 years or older. Based on the table above, the majority of respondents belonged to the at-risk age category (≥ 35 years), totaling 82 respondents (82.8%), while 17 respondents (17.2%) were in the non-risk age group (< 35 years). Length of employment was similarly categorized into risk and non-risk groups, with less than 5 years and 5 years or more, respectively. The dominant employment length among respondents was ≥ 5 years, with 83 respondents (83.8%), whereas 16 respondents (16.2%) had worked for less than 5 years. Physical activity (exercise) was categorized into two groups: 1–3 times per week and ≥ 3 times per week. The majority of respondents performed physical activity 1–3 times per week, totaling 64 respondents (64%), while 35 respondents (35%) exercised more than 3 times per week. Work posture was categorized as ergonomic and non-ergonomic. More respondents reported non-ergonomic work postures, accounting for 62 respondents (62.6%), compared to 37 respondents (37.4%) who maintained ergonomic postures during work. Complaints of Low Back Pain (LBP) were categorized into absence of complaints and presence of complaints. Based on the conducted study, the majority of respondents reported experiencing LBP complaints, totaling 71 respondents (71.7%), while 28 respondents (28.3%) reported no complaints.

Tabel 3. Bivariate Analysis of Independent Variables in Relation to Low Back Pain Complaints

Variable	PR	95%CI	*p-value*
Age	1.519	1.299 – 1.775	0.003
Length of Employment	0.535	0.140 – 2.045	0.0546
Physical Activity	1.500	1.891 –	0.001
(exercise)	1.341	24.730	0.022

Work Posture	1.271 – 7.843

Source: Processed Primary Data, 2025

The bivariate analysis revealed that the variables of age (p = 0.003), physical activity (exercise) (p = 0.001), and work posture (p = 0.022) had a significant association with complaints of Low Back Pain (LBP) among employees at the Jambi City Health Office. The prevalence ratios (PR) with 95% confidence intervals (CI) were as follows: age 1.519 (1.299 – 1.755), physical activity 1.500 (1.891 – 24.730), and work posture 1.341 (1.271 – 7.843). Age showed the strongest influence, indicating that employees aged ≥ 35 years were 1.519 times more likely to experience LBP compared to those under 35 years.

Discussion

a. The Correlation Between Age and Low Back Pain (LBP) Complaints Among Employees at the Jambi City Health Office

The intervertebral disc structure undergoes a continuous degenerative process starting around the age of 30, which can lead to tears and scar tissue formation, reduced fluid content in the bone, permanent narrowing of the disc space, and loss of stability in spinal segments. Age is defined as the number of years calculated from the respondent's birth until the time of data collection. Individuals typically begin to experience Low Back Pain (LBP) complaints between the ages of 25 and 65, which corresponds to the productive working age. The onset of LBP symptoms generally starts around the age of 35, and the severity of complaints tends to increase with advancing age[6]. The results of this study indicate a significant correlation between age and complaints of Low Back Pain (LBP) among employees at the Jambi City Health Office. This correlation is demonstrated by the chi-square test yielding a p-value of 0.003 (p < 0.05). Furthermore, the analysis showed a prevalence ratio (PR) of 1.519 (95% CI: 1.299–1.775), meaning that respondents in the at-risk age category (≥ 35 years) are 1.519 times more likely to experience Low Back Pain compared to those in the non-risk category (< 35 years).

Similar findings were reported in a study conducted by Nurcahyani et al. (2024) on rice farmers in Semen Village. The analysis showed that respondents aged ≥ 35 years had a higher frequency of LBP complaints compared to those under 35 years, with 26 respondents (86.7%) in the older age group. Statistical analysis revealed a p-value of 0.035 (p < 0.05), indicating a significant association between age and Low Back Pain (LBP) complaints among the rice farmers in Semen Village[7].

The employees of the Health Office range in age from 28 to 58 years, with the majority being aged ≥ 35 years. Age is related to work performance because the aging process is accompanied by the degeneration of organs, leading to a decline in their capacity. This reduction in organ function results in decreased physical strength and a greater susceptibility to fatigue. To address the increasing complaints of Low Back Pain (LBP) among employees aged ≥ 35 years, preventive measures are necessary. These include age rejuvenation efforts through a healthy and nutritious diet and adequate rest. Regular weekly exercise is also highly recommended to promote rejuvenation, which can help minimize the incidence of LBP complaints.

b. The Correlation Between Age and Low Back Pain (LBP) Complaints Among Employees at the Jambi City Health Office

Generally, the ability of human bones to withstand pressure from workload decreases as the length of employment increases. Length of employment can influence complaints of Low Back Pain (LBP) because workers in a company who perform repetitive tasks or maintain static work postures over prolonged periods are more likely to experience LBP[8]. The results of the study indicate that there is no significant correlation between length of employment and complaints of Low Back Pain (LBP) among employees at the Jambi City Health Office. This is supported by the chi-square test analysis which yielded a p-value of 0.546 (p > 0.05). Additionally, the prevalence ratio (PR) was 0.860 (95% CI: 0.140–2.045), indicating no significant correlation between length of employment and LBP complaints.

This finding is supported by a study conducted by Yacob (2018) on the relationship between length of employment and workload with Low Back Pain (LBP) complaints among nurses in the inpatient ward of Bhayangkara Hospital Level III Manado. The analysis showed that among nurses with less than 5 years of employment, 15 respondents (35.8%) did not experience LBP complaints, while 21 respondents (50%) had experienced LBP. The study employed the Spearman rank test and obtained a p-value of 0.0403 ($p > 0.05$), indicating no significant association between length of employment and LBP complaints[9].

The researchers found that the length of employment among employees at the Jambi City Health Office did not have a significant impact on Low Back Pain (LBP) complaints. This may be attributed to the variation in employment duration among staff and the rotational system where employees change divisions every few years. Additionally, the bivariate analysis results for the length of employment variable showed no significant difference in LBP complaints between those with and without symptoms. This lack of significance is likely influenced by the diverse lengths of employment among respondents, indicating that length of employment does not substantially affect the occurrence of LBP. However, this does not rule out the possibility that a majority of employees with employment durations ≥ 5 years may experience some complaints related to Low Back Pain.

c. The Correlation Between Physical Activity (Exercise) and Low Back Pain (LBP) Complaints Among Employees at the Jambi City Health Office

Physical activity is an important factor influencing the occurrence of Low Back Pain (LBP). Research has shown an association between physical activity levels and abnormal structures in the lumbosacral spine, including intervertebral disc narrowing and increased fat content. Low physical activity reduces mechanical stimuli that generally play a role in maintaining the integrity of the intervertebral discs[10]. The study results indicate a significant correlation between physical activity (exercise) and Low Back Pain (LBP) complaints among employees at the Jambi City Health Office. This relationship is supported by the chi-square test analysis, which yielded a p-value of 0.001 ($p < 0.05$). The analysis also produced a prevalence ratio (PR) of 1.500 (95% CI: 1.891–24.730), meaning that respondents who engage in physical activity infrequently (1–3 times per week) are 1.5 times more likely to experience LBP compared to those who exercise more frequently (≥ 3 times per week).

A study conducted by Fernando (2021) on the relationship between physical activity and Low Back Pain (LBP) complaints among students at Muhammadiyah 3 Senior High School in Surabaya reported a Spearman rank correlation analysis with a significance value (2-tailed) of 0.000 (< 0.05) and a correlation coefficient of 0.913. This indicates a significant relationship between physical activity and LBP complaints[11]. This finding is supported by a study conducted by Rizki et al. (2025) on the association between physical activity and pain complaints in patients with Low Back Pain. The chi-square test analysis yielded a p-value of 0.000 ($p < 0.05$), indicating a significant relationship between physical activity and Low Back Pain (LBP) pain in outpatients at the Neurology Clinic of the Aceh Regional General Hospital[10].

Employees at the Health Office participate in mandatory exercise sessions every Friday; however, this does not preclude the possibility that employees who are otherwise inactive may still experience complaints of Low Back Pain (LBP).

d. The Correlation Between Work Posture and Low Back Pain (LBP) Complaints Among Employees at the Jambi City Health Office

Non-ergonomic work posture can cause body parts to move away from their natural positions, such as raised arms or excessive bending of the back. The further the body position deviates from the center of gravity, the greater the risk of musculoskeletal complaints, one of which is Low Back Pain (LBP). Bad posture has the potential to cause muscle fatigue and discomfort during activities, as well as injuries, complaints, or abnormalities in the peripheral nerves. The study results indicate a significant association between work posture and Low Back Pain (LBP) complaints among employees at the Jambi City Health Office. This relationship is supported by the chi-square test analysis, which yielded a p-value of 0.001 ($p < 0.05$). The analysis also produced a prevalence ratio (PR) of 1.341

(95% CI: 1.271–7.843), meaning that respondents with non-ergonomic work postures are 1.341 times more likely to experience LBP compared to those with ergonomic work postures.

This finding aligns with a study conducted by Damayanti et al. (2024) on the incidence of Low Back Pain (LBP) among helpers at PT. Karya Makmur Agung Cemerlang in Kendari City. Among 62 respondents, 50 (80.6%) reported working in non-ergonomic postures. Statistical analysis yielded a p-value of 0.003 ($p < 0.05$), indicating a significant association between work posture and Low Back Pain (LBP) complaints[12]. This study also measured variables using the Rapid Entire Body Assessment (REBA) and Rapid Upper Limb Assessment (RULA) tools. A study by Sumardiyono et al. (2023) on the relationship between work posture and Low Back Pain complaints among tea pickers at PT. Perkebunan Tambi Wonosobo supports these findings, with similar analysis results. The posture assessment in that study was conducted using the RULA method[13].

Based on observations conducted, the researchers found that workers generally adopt non-ergonomic postures for extended periods involving the upper arms, forearms, wrist placement, and neck. However, during work activities, most employees maintained ergonomic positions for a considerable duration.

CONCLUSION

Based on the results and discussion of this study, it can be concluded that age plays a significant role in Low Back Pain (LBP) complaints. Age is proven to have a significant association with LBP due to the degenerative processes that occur with increasing age, which reduce the function and strength of the body's supporting structures, especially in the spinal area. This leads to a higher risk of LBP among older individuals compared to younger age groups. This finding aligns with degenerative theory, which states that aging contributes to decreased tissue elasticity, damage to intervertebral disc structures, and weakening of the muscles and ligaments that support the spine. These factors increase vulnerability to lower back pain, particularly in individuals aged 35 years and older. In addition to age, this study also found that physical activity (exercise) and work posture have significant relationships with LBP complaints. This indicates that regular exercise habits and the application of ergonomic work postures can play important roles in preventing or reducing the risk of LBP among workers.

REFERENCES

Agustin A, Puji LKR, Andriati R. Hubungan Durasi Kerja, Masa Kerja Dan Postur Kerja Terhadap Keluhan Low Back Pain Pada Bagian Staff Di Kantor X, Jakarta Selatan. J Heal Res Sci. 2023;3(1):13–22Mustafa. Upaya Meningkatkan Kesadaran Menerapkan K3 (keselamatan dan kesehatan kerja) pada Pelajaran Produktif dengan Pendekatan Pembelajaran Experiential Learning Cycle (ELC) Kelas X Teknik Las SMK Negeri 2 Karang Baru. Multiverse Open Multidiscip J. 2022;1(3):7–13.

Damayanti SF, Zainuddin A, Pratiwi AD. ANALISIS FAKTOR YANG BERHUBUNGAN DENGAN KEJADIAN LOW BACK PAIN PADA PEKERJA HELPER PT. KARYA MAKMUR AGUNG CEMERLANG KOTA KENDARI. 2024;4:4846–58Rahman A, Selatan S. Hubungan Tingkat Kesegaran Jasmani Terhadap Hasil Belajar Pendidikan Jasmani Siswa SMA Negeri 8 Bone Relation Of Physical Fitness Level To Physical Education Learning Out Comes To Student Senior High School 8 Bone. JOCCA J Sport Educ Coach Heal. 2022;3(1):62–070.

Fernando AK. Hubungan Aktivitas Fisik Terhadap Keluhan Low Back Pain Pada Siswa SMA Muhammadiyah 3 Surabaya Di Masa Pandemi COVID-19. J Kesehat Olahraga. 2021;000:241–50.

Novianto D, Meirina E. Hubungan Posisi Kerja Dengan Keluhan Low Back Pain Pada Pekerja Home Industry. 2024;5(September):1–23.

Nurcahyani AD, Ekawati E, Jayanti S. Hubungan Usia, Masa Kerja, Waktu Kerja, Sikap Kerja Dan Aktivitas Pekerjaan Dengan Kejadian Nyeri Punggung Bawah Pada Petani Padi Desa Semen. J Kesehat Masy. 2024;12(2):180–8.

Organization WH. Low Back Pain [Internet]. who.int. 2023 [cited 2023 Jun 25]. Available from: https://www.who.int/news-room/fact-sheets/detail/low-back-pain

Saputra A. Sikap Kerja, Masa Kerja, dan Usia terhadap Keluhan Low Back Pain pada Pengrajin Batik. Higeia J Public Heal Res Dev [Internet]. 2020;1(3):625–34. Available from: http://journal.unnes.ac.id/sju/index.php/higeia

Rizki MR, Fazlylawati E, Phonna RM, Adha MRF, Nabella. Journal of Language and Health. Hub Akt Fis DENGAN KELUHAN NYERI PADA PASIEN LOW BACK PAIN. 2025;6(1):139–44.Yacob DML, Kolibu FK, Punuh MI. Hubungan antara Masa Kerja dan Beban Kerja dengan Keluhan Low Back Pain pada Perawat di Ruangan Rawat Inap RS Bhayangkara Tingkat III Manado. J KESMAS. 2018;7:4.

Sumardiyono, Fajar HN, Mulyani S. Hubungan Postur Kerja Terhadap Keluhan Low Back Pain Pemetik Teh PT Perkebunan Tambi Wonosobo. J Appl Agric Heal Technol. 2023;2(1):15–21.

Umami AR, Hartanti, Ragil Ismi ADP. Hubungan antara Karakteristik Responden dan Sikap Kerja Duduk dengan Keluhan Nyeri Punggung Bawah (Low Back Pain) Pada Pekerja Batik Tulis (The Relationship Among Respondent Characteristic and Awkward Posture with Low Back Pain in Batik Workers). Pustaka Kesehat [Internet]. 2014;2(1):72–8. Available from: http://jurnal.unej.ac.id/index.php/JPK/article/view/599