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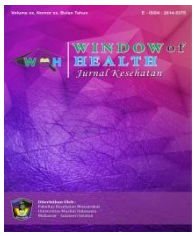

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Personal and Occupational Risk Factors of Low Back Pain in Hospital Administration Workers

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ABSTRACT

Around 223.5 million individuals experienced low back pain, and there were 63.7 million years lived with disability. Multiple studies have identified various risk factors that contribute to the development and persistence of LBP in this demographic, including personal and occupational risk factors. This study aims to investigate personal and occupational risk factors causing LBP complaints among administrative workers at the two largest hospitals in Surakarta City, Indonesia. This study was an analytical observational study with a cross-sectional design conducted at RSUNS and RSDM in June-July 2024, using purposive sampling to select 130 respondents. This study used a questionnaire to collect data on personal and work risk factors such as age, education, gender, length of service, medical history, sitting position, chair backrest height, and duration of sitting in the office. The data was processed using the Somers D test to determine the correlation between the independent and dependent variables. This study found that key occupational risk factors, such as sitting position ($p = 0.688$), height of chair backrest ($p = 0.372$), and duration of sitting at the office ($p = 0.283$), showed no significant correlation to low back pain (LBP) among hospital administrative workers. However, over half of the respondents reported experiencing moderate LBP, highlighting it as an occupational health issue. The findings suggest that commonly measured ergonomic indicators alone may not adequately assess LBP risk in this setting. Therefore, hospitals should implement structured active breaks, work mobility/rest periods, and health education about prolonged sitting.

Keywords: Administrative workers; Low back pain; Risk factors

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INTRODUCTION

Low back pain (LBP) is a common and often debilitating condition that affects many people in sedentary occupations, such as healthcare workers. In 2021, an estimated 628.8 million people worldwide suffered from LBP, and there were 63.7 million years lived with disability [1]. The number of LBP cases is expected to rise further by 2050, increasing the burden and making it a major global public health issue. The disease burden associated with LBP may continue to increase. with significant variations across countries [2]. Apart from these global data, the prevalence of LBP in Indonesia is very high, reaching 37% of the total working population [3]. Untreated LBP can cause various negative impacts in the workplace, including disruption of work activities, decreased productivity, discomfort at work, decreased quality of life, increased turnover, depression, increased risk of anxiety and work stress, fatigue, and the burden of health costs due to examinations and treatment [4–6]. Studying the causes of the high prevalence of LBP is very important in order to find the causes and provide recommendations for corrective action [1,7].

Hospital administration workers are more likely to suffer from low back pain. In Europe and the United States, low back pain is one of the most common and expensive health issues among healthcare workers[8]. Multiple studies have identified various risk factors that contribute to the development and persistence of low back pain in this demographic, ranging from personal and occupational risk factors [9,10].

Personal factors that influence low back pain (LBP) include age, gender, education level, length of service, physical condition, body mass index, muscle strength and flexibility, physical fitness, history of LBP and previous musculoskeletal disorders, physical activity, smoking habits, and sleep quality [11–13]. Age, gender, education level and length of service are some of the personal factors that are often discussed as the cause of low back pain experienced by health workers [14,15]. However, previous studies have shown varying relationships between these factors [16,17]. This indicates the need for further analysis to determine the strength of the correlation and interactions between these factors [18]. Cumulative risk may also have different effects, particularly for hospital administrative workers with different activities and personal backgrounds. This would be an interesting research gap to explore in further study [19,20].

Occupational risk factors related to LBP include static work postures, unergonomic seating conditions, prolonged sitting at work, bent work positions, repetitive body twisting, excessive manual lifting, repetitive movements, exposure to vibration, long working hours, excessive work demands, and long work shifts [21,22]. Hospital administrative workers spend most of their working hours sitting in front of a computer, where the actual working conditions are the sitting posture and duration of sitting, not heavy manual lifting or machine vibrations, as in industrial workers. A scoping review of 22 studies with 7,814 office administrative workers showed that unergonomic seating conditions and prolonged sitting at work are the two main variables that dominantly cause LBP [23]. Prolonged sitting can lead to muscle imbalances, reduced flexibility, and increased pressure on the intervertebral discs, all of which can contribute to the development of low back pain [24]. Many administrative workstations are not

designed with proper ergonomic principles in mind, resulting in suboptimal spine, shoulder, and neck positions. This can lead to increased strain on the musculoskeletal system and the development of chronic low back pain [25]. This makes it interesting to conduct further studies to determine whether these factors also affect hospital administrative workers.

In Indonesia and other developing countries, studies related to LBP have been conducted primarily on healthcare workers such as midwives, doctors, and nurses. The focus and work histories studied are often related to manual lifting and prolonged standing. Meanwhile, in hospitals, administrative work is also at high risk, especially for LBP, as administrative workers work at least five days a week in a static sitting position [19,26]. RSUNS and RSDM are the two largest hospitals in Surakarta, Indonesia. Each hospital has thousands of healthcare workers who work at least 8 hours per day and 40 hours per week. Administrative work, which involves sitting for long periods, poses a higher risk of low back pain compared to other jobs in the hospital. Additionally, low back pain is one of the most commonly reported health issues among administrative workers at both hospitals. This study aims to investigate personal and occupational risk factors causing low back pain complaints among administrative workers at the two largest hospitals in Surakarta City, Indonesia.

METHOD

This research is an analytical observational study that employs a cross-sectional design. This study was conducted at RSUNS and RSDM in June-July 2024. The study population comprised 210 administrative workers, including 150 from RSDM and 60 from RSUNS. Participants were selected using a purposive sampling technique, which involves a non-randomized selection based on specific inclusion and exclusion criteria established by the researcher. Ultimately, a sample of 130 administrative workers who met these criteria was obtained, without adhering to a minimum sample size formula. The inclusion criteria in this study were administrative workers at RSUNS and RSDM who had worked for more than 1 year, worked sitting using a computer, and had no history of kidney disease. Participants in this study had signed an informed consent before the study was conducted, and this study had obtained ethical approval with the number 1.153/V/HREC/2024.

This study used a questionnaire to collect data on personal and work risk factors such as age, education, gender, length of service, medical history, sitting position, chair backrest height, and duration of sitting in the office. The questionnaire on low back pain complaints was adapted from the Oswestry Low Back Pain Disability Questionnaire and tested for validity and reliability in the Indonesian version. The data was processed using the Somers' D test to determine the correlation between the independent and dependent variables. The Somers' D test is suitable for a non-parametric test, especially for an ordinal scale. In this study, all of the variables were ordinal with categories from 2 to 5 according to the variables tested.

RESULTS

Table 1. Distribution of Personal Factors Among Administrative Workers in Hospitals

Criteria	Category	n	%
Age	56 – 65 years	2	1.5
	46 – 55 years	29	22.3
	36 – 45 years	36	27.7
	26 – 35 years	58	44.6
	17 – 25 years	5	3.8
Education	Senior High School	7	5.4
	Diploma	21	16.2
	Bachelor's Degree	95	73.1
	Master's Degree	7	5.4
Gender	Female	88	67.7
	Male	42	32.3
Working Period	> 5 years	94	72.3
	≤ 5 years	36	27.7
History of Low Back Pain	Yes	20	15.4
	No	110	84.6

Table 1 showed that out of 130 respondents, the most respondents were in the age group of 26-35 years as many as 58 respondents (44.6%), Bachelor's degree as many as 95 respondents (73,1%), female gender with 88 respondents (88%), 94 respondents (72.3%) had worked for more than 5 years, and 110 respondents (84.6%) had no medical history of low back pain.

Table 2. Distribution of Occupational Risk Factors Among Administrative Workers in Hospitals

Criteria	Category	n	%
Sitting Position	Unergonomic	62	47.7
	Ergonomic	68	52.3
Height of Chair Backrest	Half-back	42	32.3
	Up to Neck	84	64.6
	Up to Head	4	3.1
Duration of Sitting at the Office	> 8 hours/day	7	5.4
	7-8 hours/day	58	44.6
	5-6 hours/day	62	47.7
	3-4 hours/day	3	2.3

Based on Table 2, 68 respondents (52.3%) used an ergonomic sitting position, 84 respondents (64.6%) had a chair backrest height that reached up to the neck, and 62 respondents (47.7%) sat at the office for 5-6 hours per day.

Table 3. Distribution of Low Back Pain Among Administrative Workers in Hospitals

Criteria	Category	n	%
Low Back Pain	Moderate	71	54.6
	Mild	59	45.4

Table 3 showed that most respondents reported moderate to low back pain, with 71 respondents (54.6%).

Table 4. Correlation Between Personal Factors and Low Back Pain (LBP) in Hospital Administration Workers

Variable	Category	Moderate		Mild		p-value
		n	%	n	%	
Age	56 – 65 years	1	0.8	1	0.8	0.574
	46 – 55 years	17	13.1	12	9.2	
	36 – 45 years	15	11.5	21	16.2	
	26 – 35 years	36	27.7	22	16.9	
	17 – 25 years	2	1.5	3	2.3	
Education Level	Senior High School	3	2.3	4	3.1	0.901
	Diploma	13	10	8	6.2	
	Bachelor's Degree	51	39.2	44	33.8	
	Master's Degree	4	3.1	3	2.3	
Gender	Female	44	33.8	44	33.8	0.119
	Male	27	20.8	15	11.5	
Working Period	>5 years	50	38.5	44	33.8	0.596
	≤ 5 years	21	16.2	15	11.5	
History of Low Back Pain	Yes	11	8.5	9	6.9	0.970
	No	60	46.2	50	38.5	

Based on Table 4, there is no correlation between age (p-value 0.574), educational level (p-value 0.901), gender (p-value 0.119), working period (p-value 0.596), medical history (p-value 0.970), and low back pain in hospital administration workers.

Table 5. Correlation Between Occupational Risk Factors and Low Back Pain (LBP) in Hospital Administration Workers

Variable	Category	Moderate Pain		Mild Pain		p-value
		n	%	n	%	
Sitting Position	Unergonomic	35	26.9	27	20.8	0.688
	Ergonomic	36	27.7	32	24.6	
Height of Chair Backrest	Half-Back	21	16.2	21	16.2	0.372
	Up to Neck	47	36.2	37	28.5	
	Up to Head	3	2.3	1	0.8	
Duration of Sitting at the Office	> 8 hours/day	4	3.1	3	2.3	0.283
	7-8 hours/day	35	26.9	23	17.7	
	5-6 hours/day	30	23.1	32	24.6	
	3-4 hours/day	2	1.5	1	0.8	

Based on Table 5, there is no correlation between sitting position (p-value 0.688), height of the chair backrest (p-value 0.372), and duration of sitting at the office (p-value 0.283) with low back pain in hospital administration workers.

DISCUSSION

The Correlation between Age and Low Back Pain

The hospital administrative workers in this study were dominated by those aged 36 and over. Static sitting with minimal movement and stretching can put a strain on the lumbar. The reduced cell regeneration process with age can exacerbate LBP experienced by administrative workers due to repetitive sitting activities [27,28]. As age increases, the possibility of someone experiencing LBP increases. This is because muscle strength and endurance begin to decline, increasing the risk of muscle complaints, which can impact work effectiveness [29]. After a person reaches the age of thirty, their body begins to degenerate due to tissue damage, scar tissue replacement, and fluid reduction. Muscles and bones become less stable as a result. One factor that can lead to the development of LBP symptoms is a decrease in the risk level of less elastic or less bone as people age [30].

In contrast to earlier research, age did not exhibit a significant correlation in this study (p-value 0.574). Age has a direct correlation with physical capacity, with a maximum age of 25 marking the peak of this relationship. Between the ages of 50 and 60, there is a 25% reduction in muscle strength and a 60% decrease in sensory-motor abilities. A person's physical capacity for labor is only 50% of what it is at age 25. As one ages, physical conditions can cause a decrease in muscle and spinal flexibility, which can lead to an increase in LBP complaints [31].

The Correlation between Education Level and Low Back Pain

The education level is a stage of education that is determined based on the level of development of students, the goals to be achieved, and the desires that are developed. The level of education influences changes in knowledge and attitudes. A higher level of education will make it easier for a person or society to absorb information and implement it in everyday behavior and lifestyle [32]. In this study, the research respondents at RSUNS and RSDM were predominantly at the Bachelor's degree level (73.1%). The level of education determines a person's understanding of information. In higher education, a person will get information about back pain management, which affects worker discipline in following LBP prevention programs [33]. Furthermore, hospital administrative workers with a higher level of education can be an added advantage in understanding ergonomic principles in the workplace. These principles can include maintaining appropriate sitting posture, managing breaks between tasks, and understanding the importance of regular stretching to reduce LBP complaints [34,35].

This study did not show a significant correlation between education level and LBP (p-value 0.901). This is different from previous studies, which have shown that education level will affect respondents' knowledge about LBP complaints. Knowledge plays an important role in realizing a behavior. Without knowledge about LBP, it will also be difficult to carry out various efforts to prevent and overcome LBP in the workplace [36].

The Correlation between Gender and Low Back Pain

Gender refers to the biological difference between men and women that exists from birth. Men's and women's biological differences and biological functions cannot be exchanged [37]. In this study, it was dominated by female respondents (67.7%). Where in several studies, women are more susceptible to LBP than men [38,39]. This could be due to the estrogen hormone factor playing a role. Women's estrogen levels rise and fall due to pregnancy, contraception use, and menopause. Increased estrogen during pregnancy and contraception causes an increase in the hormone relaxin. Increased levels of the hormone relaxin can lead to joint and ligament weakness, particularly around the waist. Furthermore, the menopause process can cause bone density to decrease due to lower estrogen hormone levels, allowing LBP to occur [40].

The gender factor had no significant correlation in this study (p-value 0.119). This is consistent with previous research, which found that gender is not an absolute risk factor for LBP, but there are habitual factors that can reduce the risk of women developing LBP compared to men. Regular stretching can help women reduce their risk of developing LBP [41].

The Correlation between Working Period and Low Back Pain

Administrative workers in this study mostly had a working period of more than 5 years (72.3%). In previous studies, workers who have worked in a sitting position for more than 5 years are more likely to experience low back pain than those who have worked for less than or equal to 5 years. This is because prolonged spinal loading causes the disc cavity to narrow permanently and causes degeneration [42].

The working period factor in this study did not show a significant correlation with LBP (p-value 0.596). A person's working hours are closely related to the same and repeated job descriptions performed over multiple periods of time. Repetitive work can cause LBP. However, in daily activities, a person does not do the same job for an extended period of time, so there is no continuous activity. Furthermore, there is an adaptation factor that causes people to become accustomed to pain, which is aided by adequate rest at work [43]. With longer work experience, some individuals with LBP also demonstrate behavioral adaptations to reduce the impact and causes of their LBP. These adaptations include strategies for adjusting work positions, rest breaks, physical activity, and stretching. Previous studies, especially among workers with a history of low back pain (LBP), have indicated that their objective pain thresholds and tolerances are similar to those of healthy individuals. This suggests that prolonged work habits do not necessarily enhance workers' physiological resilience to pain. However, self-efficacy and effective pain coping strategies can help lessen the perception of disability associated with LBP [44,45].

The Correlation between History of Low Back Pain

Many studies report that a previous history of low back pain or spinal trauma substantially increases the risk of future, more disabling LBP episodes, as prior injury may alter spinal structures and pain processing [46]. However, in this study, 84.6% of administrative workers had never experienced LBP, leaving relatively few participants with a positive history and thereby limiting the statistical power to detect an association. Moreover, most evidence on recurrence risk comes from populations with physically demanding work or severe work-related back injuries. Hospital administrative staff who work

in prolonged sitting positions, static postures, and pressure on the lumbar muscles are considered strong risk factors for developing LBP. Although these results are contradictory and did not correlate significantly in this study, they may reflect adaptation to the seating conditions or to previous treatments not being reported [47,48].

Prior research has identified a number of medical history diagnoses associated with low back pain, such as LBP from lumbago with sciatica, LBP from spondylosis, LBP from lordosis, unexplained LBP from lumbago, LBP from osteoarthritis, LBP from dorsalgia, and furthermore [49]. Drug therapy can be used to lessen the number of LBP complaints that employees experience, but there is an alternative to using drugs: taking herbal medicine, such as warm ginger, which can also lessen LBP complaints [50].

The Correlation between Sitting Position and Low Back Pain

Seated upright with the thighs fixed to the chair and touching the back of the chair, with the shoulders and back straight, is a good or ergonomic sitting position. When seated, an unergonomic position involves bending forward and having an unstraight back, which can put pressure on the back and cause pain [3].

In this study, 52.3% of workers settled in an ergonomic position, and there was not a correlation between sitting position and LBP. One position that supports the upper body is sitting, which is supported by the hips, and a portion of the thighs that have a limited range of motion. When work or activities are not done ergonomically, the body will become uncomfortable, accidents and even work-related diseases will increase, and sitting for more than two hours a day will become monotonous. Less ergonomic static sitting positions, like hunching over, can cause prolonged, intense muscle contractions without enough recovery, and they can also reduce blood flow to the muscles [51].

The Correlation between Height of Chair Backrest and Low Back Pain

When contrasted with sitting without a backrest, sitting using a backrest can relieve up to 36% of the strain on the spine. In most cases, the chairs that employees use for work have backrests, but they are not made with proper posture in mind, so employees frequently choose not to use them because they are uncomfortable [52].

Most of the height of the chair backrest is in the up to neck (64.6%), and does not show a significant relationship to LBP. Long periods of sitting without a backrest, awkward postures, and inadequate rest will result in discomfort and stiffness in a number of body parts. Muscle tension is frequently felt in the arms, legs, waist, back of the neck, and back. One crucial factor that needs to be taken into account in order to avoid LBP symptoms is the seating arrangement while working [53].

The Correlation between Duration of Sitting at the Office and Low Back Pain

Working with an ergonomic sitting position has the advantage of reducing excessive burden on the feet and reducing excessive energy consumption compared to standing position. However, sitting for too long can cause the abdominal muscles to become soft and the spine to curve. This posture will put more strain on the tendons and muscles, obstructing blood flow to the muscles and raising the possibility of pain, numbness, and exhaustion [54].

In this study, the duration of workers sitting at the Office was dominated by 5-6 hours/day (47.7%). However, it did not show a significant correlation with LBP [55]. This is in line with previous studies, which state that sitting for more than 4 hours is not significantly related, because LBP is a multifactorial condition, and supported by an ergonomic work posture with adequate rest, will reduce the risk of LBP.

Several studies on ergonomic assessments, particularly those examining LBP complaints, continue to rely on self-assessment questionnaires to evaluate workers' experiences with LBP. This approach presents a limitation, as some occupational risk factors do not consistently show a significant relationship with LBP. For instance, while the duration of sitting was found to have no significant correlation in some studies, other research indicated a substantial increase in LBP risk associated with prolonged sitting [56,57]. Additionally, various external factors occurring outside of work hours cannot be directly observed, making it difficult to clearly identify their positive and negative effects on LBP. Moreover, biases arising from participants' under- or over-reporting of complaints may influence the findings, leading some variables not to demonstrate a significant impact on LBP.

CONCLUSIONS AND RECOMMENDATIONS

This study revealed that the key occupational risk factors, such as sitting position ($p = 0.688$), height of chair backrest ($p = 0.372$), and duration of sitting at the office ($p = 0.283$), showed no statistically significant correlation to LBP for hospital administrative workers. Widespread LBP as an occupational health problem for this group is evidenced by the fact that, despite the lack of association, over half of the respondents experienced moderate low back pain. By showing that commonly measured ergonomic indicators, when considered separately for the hospital administrative environment of a developing country, may not be sophisticated enough to assess low back pain risk, this study adds to the body of work. These results indicate that basic ergonomic changes in the workplace are insufficient for implementing workplace innovations. Hospitals' management needs to adopt such initiatives that provide structured active breaks, work time mobility/rest periods, and health education about the risks of prolonged sitting and symptom reporting. Providing ergonomic enhancements along with comprehensive organizational and behavioral strategies can minimize the incidence of low back pain for hospital administrative workers.

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