

[← Back to Submissions](#)909 / **Simarmata et al.** / Occupational Sitting Posture and Lower Back Pain Among Employe[Library](#)[Workflow](#)[Publication](#)[Submission](#)[Review](#)[Copyediting](#)[Production](#)

Submission Files

[Search](#)

▶	 5379	Article Submission_Vidi_JPHS.docx	April 1, 2025	Article Text
---	--	---	---------------	--------------

[Download All Files](#)

Pre-Review Discussions

[Add discussion](#)

Name	From	Last Reply	Replies	Closed
No Items				

Relationship between Sitting Position During Work and Lower Back Pain Incidence in Employees of Merdeka Community Health Center, Bogor City in 2024

¹Vidi Posdo A. Simarmata*, ²Silphia Novelyn, ³Daniel R. Parsaoran Situmorang

Corresponding Author: * vidi.simarmata@uki.ac.id

¹ Department of Medical Community, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

² Department of Anatomy, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

³ Department of Internal Medicine, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

ARTICLE INFO

ABSTRACT

Article history

Received XX July 2022

Revised XX August 2022

Accepted XX August 2022

Background: Low back pain occurs when the back hurts so much that routine tasks are difficult. The health center is one of the environments with ergonomics activities, such as lifting, pushing, pulling, reaching, carrying objects, and handling patients with more vulnerable potential hazards that can cause disorders of the musculoskeletal system. Purpose: This study aims to determine whether the incidence of low back pain in Merdeka Health Center employees in 2024 is related to sitting position while working. Method: An analytical survey with a cross-sectional approach is the research method used. The research tool used is a questionnaire that collects primary data. with a total of 35 respondents who meet the inclusion criteria. Result: From the research results, data was obtained that respondents were dominated by female employees (82.9%), employees with an age range of 26 to 35 years (40%), employees working in functional sections (51.4%), employees with a sitting position while working on a chair with a backrest (82.9%), employees who do not work with a hunched posture (60%), and employees who work for less than 6 hours a day (62.9%). The results of data analysis showed a p-value = 0.564 > 0.005. Conclusion: There is no significant relationship between sitting position while working and lower back pain in employees of Merdeka Health Center,

Bogor City in 2024 from the results of the analysis for the past week and year.

Keywords

Low Back Pain
Ergonomics
Health Center
Sitting Position
Sitting Position at Work,
Hunched Posture
Sitting Duration

This is an open-access article under the [CC-BY-SA](#) license.



Introduction

Occupational Safety and Health (K3) is an effort to provide safety and health guarantees to improve the health of workers by preventing work accidents and occupational diseases, accompanied by health promotion, treatment, and rehabilitation. Low back pain is an ergonomic problem that is often found in the implementation of K3 which has an impact on economic losses due to decreased work capacity and worker productivity. Low back pain is local and/or radicular pain that is felt between the lower costal arch to the lumbosacral area [1]. According to data from the World Health Organization (2022), low back pain is the 3rd health problem in the world after osteoarthritis and rheumatism with a total of 17.3 million people. According to the Directorate General of Health Services of the Ministry of Health of the Republic of Indonesia (Kemenkes RI) in 2018, the prevalence of Low Back Pain in Indonesia was 18% [2].

Community Health Centers or commonly referred to as Puskesmas are one of the health service facilities that implement public health efforts and individual health efforts at the first level, whose main focus is organizing promotive and preventive efforts, in order to achieve a high level of public health in their work area, by prioritizing the safety and security of patients, officers, and visitors (Ministry of Health, 2014) [1]. Health centers as a means of public health

services have potential hazards that affect officers, patients, visitors and the surrounding community. Potential hazards such as physical, chemical, biological, ergonomic and psychosocial hazards. Health centers are one of the environments where there are activities related to ergonomics, such as lifting, pushing, pulling, reaching, carrying objects, and handling patients who have more vulnerable potential hazards that can cause disorders of the musculoskeletal system [1].

The prevalence of LBP continues to increase and is caused by risk factors such as aging, a sedentary lifestyle, and jobs that involve heavy lifting or non-ergonomic sitting positions. Poor sitting positions, such as using chairs that do not support good posture or inappropriate work desks, are often the main cause of discomfort and pain in the lower back. In addition, factors such as the duration of sitting, frequency of breaks, and stress levels at work also contribute to the increased risk of low back pain [3]. Working positions are divided into two, namely static positions and dynamic positions. Static positions are working positions without moving the joints and for a long period [4]. The effect of static positions will disrupt the distribution of nutritional intake in the body, the metabolism process and the spine will also be disrupted [5]. While dynamic positions according to Rina et al. are working positions that involve a lot of movement in the joints [6]. Based on the discussion using Systematic Review by Murti Latifah in 2022, it can be concluded that sitting position and sitting duration play a role in the occurrence of low back pain complaints in workers [7]. This is supported by research conducted by Saputra in 2020 stating that symptoms of lower back pain are often influenced by non-ergonomic sitting work positions so that there is a disturbance in the stability of body posture when working and a relationship was found between sitting position and the incidence of lower back pain among batik craftsmen with a p-value = 0.042 [8].

Based on the high prevalence of low back pain which is often associated with sitting position while working and based on the background above, the author is interested in conducting a study entitled The Relationship between Sitting Position while Working and the Incidence of Lower Back Pain in Employees of the Merdeka Health Center, Bogor City in 2024. The purpose of this study was to understand whether there is a relationship between sitting position while working and the incidence of lower back pain in employees of the Merdeka Health Center, Bogor City in 2024.

Literature Review

A. Low Back Pain

Low back pain is a symptom, not a disease, which can be caused by various factors, known and unknown; and is determined by its location, which is between the XII rib (lower rib margin) and the gluteal fold. This pain is local or radicular or both, and is often accompanied by pain in

one or both legs and is associated with neurological symptoms in the lower extremities [3]. According to The International Classification of Diseases, the prevalence of low back pain is defined as acute or chronic pain in the lumbar and/or sacral region of the spine, which can be caused by sprains, strains, shifts of the intervertebral discs, or any part of the anatomical spine around the spine [9].

There are five main categories of etiology of low back pain. First, mechanical, such as injury to the spine or intervertebral disc. Herniated intervertebral disc is also a common factor. Pregnancy can also be a mechanical cause of back pain. Second, degenerative process. The presence of degenerative conditions such as osteoarthritis of the spine and degenerative disc disease. Third, inflammation, this is mainly caused by inflammatory spondyloarthropathies (seronegative) such as ankylosing spondylitis. Fourth, oncological or malignant, this can be caused by the presence of lytic lesions in the spine, bone marrow cancer, or the phenomenon of nerve compression from lesions that occupy adjacent spaces. Often appears as a pathological fracture. And the fifth, by infection. Can occur from spinal infections, discs, epidural abscesses, and muscle/soft tissue abscesses [10].

Based on its onset, lower back pain can be divided into: 1) Acute pain, which is sudden, deep, and severe. A person cannot sleep well, and the painful area in his back increases with every movement. The discomfort lasts less than eight weeks; 2) Chronic pain, which is ongoing and usually does not go away. Although it sometimes lasts a week or a few weeks, the discomfort often appears after a few days. Sometimes repeated pain and simple exercise can also cause recurrence [11]. Clinical findings of sciatica usually include a history of dermatomal leg pain, leg pain that is worse than back pain, and leg pain that worsens when the patient coughs, strains, or sneezes. At the same time, radiculopathy is characterized by weakness, decreased sensory sensitivity or motor disturbances related to the radices or a combination of these and occurs with radicular pain [12].

There are several symptoms and signs to watch out for in people with lower back pain, known as red flags. If someone has the symptoms or signs mentioned, they should immediately get a referral for therapy. The components of red flags are divided into symptoms and signs. Some components of symptoms are age under 18, age over 50, immunocompromised and components of signs are lower extremity muscle weakness, saddle anesthesia, decreased anal sphincter tone, hyperreflexia, hyporeflexia, and areflexia [13]. Several anatomical structures and components of the lumbar spine (such as bones, ligaments, tendons, discs, and muscles) all play a role in the occurrence of low back pain. The majority of components of the lumbar spine have sensory nerves that can produce nociceptive signals and function in responding to stimuli that damage the tissue. Neuropathic (such as sciatica) is also a cause and most cases of chronic low back pain have a mixed etiology of nociception and neuropathic [14].

Material And Methods

The research design uses an analytical survey with a cross-sectional approach and uses primary data obtained through a questionnaire sheet. The results of this study were processed using the Fisher exact test which was then analyzed in depth. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The inclusion criteria include: 1) Employees of the Merdeka Health Center, Bogor City; 2) Willing to be respondents; while the exclusion criteria include: 1) Respondents who are unwilling; 2) Respondents who have spinal abnormalities such as scoliosis; 3) Respondents who have spinal diseases such as spondylosis or herniated nucleus pulposus (HNP); 4) Respondents who have a history of spinal trauma.

The data in this study are primary data because they were collected by the researcher himself and obtained directly from the respondents. Information was collected through a questionnaire sheet that would be given to the respondents. Before filling out the questionnaire, participants were asked to provide their identity and answer several questions about the exclusion criteria. The research instrument or tool used in this study is a questionnaire sheet consisting of two parts. The first part contains patient data and the variables studied as well as questions regarding exclusion criteria. The second part of the questionnaire is the Roland-Morris Disability Questionnaire. In this second part, 17 questions function to determine whether or not there is a disability caused by the occurrence of lower back pain. In this study, the questionnaire used was the Roland-Morris Disability Questionnaire (RMDQ) which had been translated into Indonesian and had passed the validity test by Ghina Widiasih in 2015 [15]. The researcher used the translated RMDQ which had also passed the validity test by the previous researcher, Heydi Amorina Abigail Saragi Napitu, which showed the same results. The results of the test showed that out of 24 statements, 7 statements were considered invalid so the statements used in Indonesian totaled 17 statements.²⁶ Therefore, it can be stated that this translated RMDQ questionnaire is reliable [16].

Data analysis was conducted using univariate and bivariate methods. Univariate analysis was conducted to describe the frequency distribution of each variable studied and will be presented in the form of a percentage using a table. Bivariate analysis was conducted to find the relationship between the potential incidence of lower back pain and sitting position in

employees of the Merdeka Health Center, Bogor City using a non-parametric statistical test, namely Chi-Square, the results of which are expressed in P value or P value using IBM Statistics SPSS software version [16].

Results

A. Respondent Profile

The study was conducted at the Merdeka Health Center in Bogor City, the results of this study were obtained from primary data in the form of questionnaires. Based on the questionnaire data, a total of 35 respondents were obtained. 35 respondents had data following the inclusion criteria.

Table 1 shows the characteristics of respondents based on gender, age, and job description. In terms of gender, it is dominated by women, with 29 out of 35 respondents, or 82.9 percent which means that there are only 6 male health workers at the Merdeka Health Center, Bogor City. Meanwhile, age is dominated by respondents aged 26 to 35 years, with 14 out of 35 respondents or 40%, in other words, health workers at the Merdeka Health Center in Bogor City are dominated by young people. In terms of Jobs, it was found that the number of administrative work frequencies was 48.6% or 17 people and functional workers were 51.4% or 18 people.

Table 1. Profile of Respondent

Profile	Frequency	Percentage
Gender		
Male	6	17.1
Female	29	82.9
Age		
16-25 year	3	8.6
26-35 year	14	40.0
36-45 year	7	20.0
46-55 year	8	22.9
56-65 year	3	8.6
Job		
Administrative	17	48.6
Functional	18	51.4

B. Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, Sitting Duration, Incidence of Lower Back Pain in the Past Week, and Incidence of Lower Back Pain in the Past Year

1. Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, and Sitting Duration

Table 2 shows the distribution data of respondents with a sitting position on a chair with a backrest with 29 out of 35 respondents or 82.9 percent and a sitting position

on a chair without a backrest as many as 6 respondents or 17.1 percent. Meanwhile, based on sitting posture, most respondents were in a non-hunchback position with 21 out of 35 respondents or 60 percent, and with a hunchback position as many as 14 respondents or 40 percent. Meanwhile, based on the duration of sitting, data obtained showed that the longest sitting duration was <6 hours, namely 22 out of 35 respondents or 62.9 percent.

Table 2. Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, and Sitting Duration

Description	Frequency	Percentage
Sitting Position		
Sitting on a chair with a backrest	29	82.9
Sitting on a chair without a backrest	6	17.1
Hunched Posture		
Hunchback	14	40
Not hunched	21	60
Sitting Duration		
<6 hours	22	62.9
6 – 9 hours	13	37.1

2. Frequency Distribution of Respondents Based on the Incidence of Low Back Pain during the Last Week and Based on the Incidence of Low Back Pain during the Last Year

Table 3 shows data that the majority of respondents did not experience lower back pain during the last week or in the last year, namely 25 out of 35 respondents or 71.4 percent.

Table 3. Frequency Distribution of Respondents Based on the Incidence of Low Back Pain during the Last Week and Based on the Incidence of Low Back Pain during the Last Year

Description	Frequency	Percentage
Lower Back Pain Occurrence in the Past Week		
Lower Back Pain	10	28.6
No Lower Back Pain	25	71.4
Lower Back Pain Occurrence in the Past Year		
Lower Back Pain	10	28.6
No Lower Back Pain	25	71.4

C. Bivariate Analysis

1. Relationship of Potential Ergonomic Hazards to the Incidence of Lower Back Pain in the Past Week

Table 4. Relationship of Work to the Incidence of Low Back Pain in the Past Week

Job Type	Lower Back Pain For The Past Week		P-Value	Odd Ratio
	yes	No		
	%	%		

Administrative	4	40	13	52	0.396	0.615
Functional	6	60	12	48		

It was found that respondents who experienced lower back pain during the past week amounted to 4 people in administrative workers and 6 people in functional workers. Showing the results of P value 0.396. A value of less than 0.05 is the maximum significant value in determining the relationship.

2. Relationship Between Sitting Position at Work and Lower Back Pain During the Past Week

Table 5. Relationship Between Sitting Position at Work and Lower Back Pain During the Past Week

Sitting Position	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
Sitting on a chair with a backrest	8	80	21	84	0.564	1.313
Sitting on a chair without a backrest	2	20	4	12		

It was found that respondents who experienced lower back pain during the past week were 2 people sitting in a chair with a backrest and 8 people sitting in a chair without a backrest. Showing a P value of 0.564. A value of less than 0.05 is the maximum significant value in determining the relationship,

3. Relationship Between Stooped Posture at Work and Lower Back Pain During the Past Week

Table 6. Relationship Between Stooped Posture at Work and Lower Back Pain During the Past Week

Hunched Posture	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
Yes	7	70	7	28	0.029	6.000
No	3	30	18	72		

There were 7 respondents with a hunched posture and 3 respondents with a non-hunched posture who experienced lower back pain in the last week with a P value of 0.029.

4. Relationship Between Sitting Duration at Work and Lower Back Pain Incidence in the Past Week

Table 7. Relationship Between Sitting Duration at Work and Lower Back Pain Incidence in the Past Week

Sitting Duration	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
6 – 9 hours	4	40	9	36	0.560	0.844
< 6 hours	6	60	16	64		

There were 4 respondents with a sitting duration of 6-9 hours a day or a high-risk duration who experienced lower back pain during the last week with a P value of 0.560.

5. Relationship of Potential Ergonomic Hazards to Lower Back Pain Incidence in the Past Year

Table 8. Relationship of Potential Ergonomic Hazards to Lower Back Pain Incidence in the Past Year

Job Type	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Administrative	3	30	14	56	0.155	0.337
Functional	7	70	11	44		

It was found that respondents who experienced lower back pain during the past year amounted to 3 people in administrative workers and 7 people in functional workers. Showing the results of P value 0.155. A value of less than 0.05 is the maximum significant value in determining the relationship.

6. Relationship Between Sitting Position at Work and Lower Back Pain Incidence in the Past Year

Table 9. Relationship Between Sitting Position at Work and Lower Back Pain Incidence in the Past Year

Sitting Position	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Sitting on a chair with a backrest	8	80	21	84	0.564	1.313
Sitting on a chair without a backrest	2	20	4	12		

It was found that 8 respondents experienced lower back pain in the last year sitting on chairs with backrests and 2 people sitting on chairs without backrests with a P value of 0.564.

7. Relationship between Stooped Posture at Work and the Incidence of Lower Back Pain in the Past Year

Table 10. 7.Relationship between Stooped Posture at Work and the Incidence of Lower Back Pain in the Past Year

Hunched Posture	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		

Yes	7	70	7	28	0.029	6.000
No	3	30	18	72		

D. Discussion

1. Relationship of Work with the Incidence of Lower Back Pain

The results of the study were obtained from 35 respondents, there were 4 people in the administrative section and 6 people in the functional section. In the distribution of the frequency of lower back pain in the past year, there were 3 people in the administrative section and 7 people in the functional section. The results of the study conducted using Chi-Square Analysis of the relationship between work and the incidence of lower back pain obtained a P value of 0.396 for the past week and a P value of 0.155 for the past year. The results of the Pearson chi-square and Fisher exact test analysis accept H0 and reject H1 (there is no relationship) with a p-value greater than 0.05 in the last week and the last year. This result is in line with the research conducted by Sumangando et al in 2017 entitled "The relationship between nurses' workload and the incidence of Low Back Pain (LBP) in implementing nurses at RS TK.III. R.W Monginsidi Manado". The results showed that there was no relationship between nurses' workload and the incidence of low back pain in implementing nurses at RS TK.III R.W Monginsidi Manado. This can be seen through the Pearson Chi Square test with a significance level of 95% ($\alpha = 0.05$), the analysis result is 0.365, so the value of $p > \alpha$. Based on the theory and several studies, it states that it is not only workload that can cause LBP, but there are several risk factors, namely age, gender, BMI, lifestyle and smoking habits [16].

2. Relationship between Sitting Position and Lower Back Pain

The results of the study conducted using Chi-Square Analysis of the relationship between sitting position and the incidence of lower back pain obtained a P value of 0.564 for the past week and a P value of 0.564 for the past year. The results of the Pearson chi-square and Fisher exact test analysis accepted H0 and rejected H1 (no relationship) with a p-value greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with research by Shafira Nur Aisyah in 2021 with a P value = 0.406 there is no relationship between sitting position and lower back pain can be caused by many factors other than sitting position such as physical exercise, smoking, and BMI.28 Based on the bivariate chi-square analysis by Natasya in 2018, the P value of sitting

position with LBP complaints was 0.741 ($p > 0.05$), meaning there is no significant relationship between sitting position and LBP complaints [17].

The ideal sitting position is described as a position that is in accordance with a good sitting position, namely sitting upright, shoulders back, and buttocks touching the chair. While the less than ideal and non-ideal sitting position is a sitting position other than the ideal position. The less than ideal position is described as a hunched sitting position, legs crossed / legs hanging. The arrangement of the workplace and appropriate seating must be arranged so that there is no harmful effect on health and minimizes the potential for danger due to ergonomic factors [18].

3. The Relationship Between Stooped Posture and the Incidence of Lower Back Pain

The Relationship Between Stooped Posture and the Incidence of Lower Back Pain

The results of the study conducted using Chi-Square Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a P value of 0.029 for the past week and a P value of 0.029 for the past year. The results of the Pearson chi-square and Fisher exact test analysis accepted H1 (there is a relationship) and rejected H0 (there is no relationship) with a p-value of less than 0.05. The results of the bivariate analysis test showed that there was a significant relationship between hunched posture and the incidence of lower back pain during the past week or year. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the research entitled The Relationship between Awkward Postures and the Incidence of Low Back Pain in Plantation Workers at the PT Mitra Bumi Palm Oil Factory in Kampar Regency, obtained a p-value = 0.000 ($p < 0.05$) which means that there is a relationship between uncomfortable postures and the incidence of low back pain because workers do several uncomfortable postures such as looking up accompanied by a static position for 1 minute in harvesters and a bent position in workers loading and collecting the remaining results of picking tea leaves [19].

Poor posture while working such as a hunched posture can trigger lower back pain. Generally, a hunched posture occurs when the chair used while working does not meet ergonomic standards such as not being equipped with a backrest or from poor sitting habits. Inadequate workplace design such as chairs without wheels or without backrests and arms can make workers less free to move so that they often make twisting movements of the upper body [20].

The sitting position with the body leaning forward or bending less than 90 degrees results in a load on the lumbar region. More than 25% of the body's load increases at the center of gravity so there is an increase in intervertebral disc pressure. In the article (Dubey et al., 2019 in Janna, 2021) entitled Ergonomics for Desk Job Workers explains that correct posture not only maintains the natural curve of the spine but also minimizes stress on the human body. Therefore, the importance of sitting with correct posture when working in the office needs to be emphasized. Working for a long time in a non-ergonomic body position will cause muscle pain due to pressure [21].

4. Relationship between Sitting Duration and the Incidence of Lower Back Pain

The results of the study conducted using Chi-Square Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a P value of 0.560 for the past week and a P value of 0.440 for the past year. The results of the Pearson chi-square and Fisher exact test analysis accepted H0 and rejected H1 (no relationship) with a p-value greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the research of Ni Made and Novendy in 2022 with an observational analytical method with a cross-sectional design, namely that no correlation was found between sitting duration and the incidence of low back pain ($p = 0.595$) [15]. This back pain can occur in various work situations, but the risk is greater if sitting for a long time in a static position because it will cause continuous muscle contractions and narrowing of blood vessels. In the narrowing of blood vessels, blood flow is obstructed and ischemia occurs, tissue lacks oxygen and nutrients, while prolonged muscle contractions will cause lactic acid accumulation [22].

Low back pain is a chronic disease that develops gradually and takes a long time to develop. Factors such as long working hours exceeding 8 hours will affect the lumbar region which can cause pain if used continuously and not in a good ergonomic position [23]. The amount of efficient working time in a week is around 40-48 hours calculated in days between 5 or 6 working days and 30 minutes maximum time for additional work.¹ The lack of relationship between sitting time and lower back pain in respondents can be caused by age, gender, smoking habits, work mass, and body mass index (BMI)[24].

Conclusion

From the results of the study it was concluded that the respondents mostly consisted of female employees (82.9%), employees with an age range of 26 to 35 years (40%), employees working in functional sections (51.4%), employees with a sitting position while working on a chair with a backrest (82.9%), employees do not work with a hunched posture (60%), and employees who work for less than 6 hours a day (62.9%); furthermore, from the results of the bivariate analysis, it was found that there was no significant relationship between sitting position while working and lower back pain in employees of the Merdeka Health Center, Bogor City in 2024 from the results of the analysis for the past week and year (P value = 0.564).

Conflict of Interest

The authors declare that there is no conflict of interest.

References

- [1] R. R. Al Mahdi, "HUBUNGAN POSTUR KERJA TERHADAP KELUHAN LOW BACK PAIN PADA PETANI DI DESA BULUS KECAMATAN BANDUNG KABUPATEN TULUNGAGUNG," Universitas Muhammadiyah Malang, 2024. [Online]. Available: <https://eprints.umm.ac.id/id/eprint/14278/>
- [2] K. A. Mastuti, "Gambaran kejadian low back pain pada karyawan CV. Pacific Garment," *J. Ilmu Kesehat. Mandira Cendikia*, vol. 2, no. 8, pp. 297–305, 2023.
- [3] F. A. Makkiyah, T. A. Sinaga, and N. Khairunnisa, "A study from a highly populated country: risk factors associated with lower back pain in middle-aged adults," *J. Korean Neurosurg. Soc.*, vol. 66, no. 2, pp. 190–198, Mar. 2023, [Online]. Available: <https://synapse.koreamed.org/articles/1516081592>
- [4] W. Simatupang, "Hubungan posisi, durasi dan masa bekerja dengan kejadian nyeri punggung bawah (NPB) pada masyarakat penenun Ulos di Desa Lumban Suhi-Suhi Kecamatan Pangururan Kabupaten Samosir Sumatera Utara," Universitas Sumatera Utara, 2019. [Online]. Available: <https://repository.usu.ac.id/handle/123456789/21891>
- [5] Y.-T. Wang *et al.*, "The effect of cupping therapy for low back pain: A meta-analysis based on existing randomized controlled trials," *J. Back Musculoskelet. Rehabil.*, vol. 30, no. 6, pp. 1187–1195, Mar. 2017, doi: 10.3233/BMR-169736.
- [6] R. Rina, H. Hansen, and F. Fadzul, "Hubungan Sikap Kerja Mengemudi dan Durasi Mengemudi dengan Keluhan Nyeri Punggung Bawah (Low Back Pain) pada Pengemudi Bus di Terminal Lempake Kota Samarinda Tahun 2016," 2016.
- [7] M. Latifah, M. Citrawati, and H. Yusmaini, "Hubungan posisi duduk dan lama duduk dengan low back pain pada pekerja sektor industri: Tinjauan sistematis," Mar. 2022. [Online]. Available: <https://conference.upnvj.ac.id/index.php/sensorik/article/view/2067>
- [8] A. Saputra, "Sikap kerja, masa kerja, dan usia terhadap keluhan low back pain pada pengrajin batik," *HIGEIA [Journal Public Heal. Res. Dev.]*, vol. 4, no. Special 1, pp. 147–157, Mar. 2020, [Online]. Available: <https://journal.unnes.ac.id/sju/higeia/article/view/36828>
- [9] V. E. Casiano, G. Sarwan, A. M. Dydyk, and M. Varacallo, "Back pain," Mar. 2019, [Online]. Available: <https://europepmc.org/article/nbk/nbk538173>
- [10] N. P. Kumbea, O. J. Sumampouw, and A. Asrifuddin, "Keluhan nyeri punggung bawah pada nelayan," *Indones. J. Public Heal. Community Med.*, vol. 2, no. 1, pp. 21–26, Mar. 2021, [Online]. Available: <https://ejournal.unsrat.ac.id/index.php/ijphcm/article/view/33580>
- [11] A. Rahmawati, "Risk factor of low back pain," *J. Med. Utama*, vol. 3, no. 01 Oktober, pp. 1601–1607, Mar. 2021, [Online]. Available: <http://www.jurnalmedikahutama.com/index.php/JMH/article/view/323>
- [12] M. G. DePalma, "Red flags of low back pain," *Jaapa*, vol. 33, no. 8, pp. 8–11, Mar. 2020, [Online]. Available:

- https://journals.lww.com/jaapa/fulltext/2020/08000/Red_flags_of_low_back_pain.1.aspx/1000
- [13] E. C. Hills, "Mechanical Low Back Pain: Practice Essentials, Background," *Pathophysiology*, 2022.
- [14] A. Biyani and G. B. J. Andersson, "Low back pain: pathophysiology and management," *JAAOS-Journal Am. Acad. Orthop. Surg.*, vol. 12, no. 2, pp. 106–115, Mar. 2004, [Online]. Available: https://journals.lww.com/jaaos/fulltext/2004/03000/low_back_pain_pathophysiology_and_management.6.aspx
- [15] H. A. A. S. Napitu, "Hubungan Potensi Bahaya Ergonomi dengan Kejadian Nyeri Punggung Bawah selama Pembelajaran Jarak Jauh pada Mahasiswa FK UKI Angkatan 2019," Universitas Kristen Indonesia, 2022. [Online]. Available: <http://repository.uki.ac.id/id/eprint/7738>
- [16] M. Sumangando, J. Rottie, and J. Lolong, "Hubungan beban kerja perawat dengan kejadian low back pain (LBP) pada perawat pelaksana di RS Tk. III RW Monginsidi Manado," *J. Keperawatan UNSRAT*, vol. 5, no. 1, p. 110022, Mar. 2017, [Online]. Available: <https://ejournal.unsrat.ac.id/index.php/jkp/article/view/14717>
- [17] N. Milenia, "Pengaruh Posisi Duduk Terhadap Keluhan Low Back Pain Pada Mahasiswa Universitas Yarsi Angkatan 2018," *J. Ilm. Mhs. Kedokt. Indones.*, vol. 10, no. 1, pp. 11–21, 2022.
- [18] S. Nur'aisyah, R. E. Sahputra, H. Ali, N. Noverial, G. Revilla, and Z. Fadila, "Hubungan Posisi dan Lama Duduk dengan Nyeri Punggung Bawah pada Mahasiswa Pendidikan Dokter Universitas Andalas," *eJournal Kedokt. Indones.*, vol. 12, no. 1, p. 32, Mar. 2024, [Online]. Available: <https://ejki.fk.ui.ac.id/index.php/journal/article/view/373>
- [19] H. N. Fajar and S. Mulyani, "Hubungan Postur Kerja Terhadap Keluhan Low Back Pain Pemetik Teh PT Perkebunan Tambi Wonosobo," *J. Appl. Agric. Heal. Technol.*, vol. 2, no. 1, pp. 15–21, Mar. 2023, [Online]. Available: <https://journal.uns.ac.id/jaht/article/view/526>
- [20] D. S. Nikaputra, M. Marji, and A. Kurniawan, "Studi literatur pengaruh postur kerja duduk dan lama kerja terhadap keluhan low back pain pada karyawan yang bekerja di depan komputer," Mar. 2021, [Online]. Available: <http://conference.um.ac.id/index.php/starwars/article/view/2954>
- [21] A. B. Yulianto, S. Sartoyo, P. Wardoyo, and A. Fariz, "Hubungan Posisi Duduk Terhadap Keluhan Nyeri Punggung Bawah Pada Petugas Administrasi Di Rumah Sakit Perkebunan Jember Klinik," *J. Keperawatan Muhammadiyah*, Mar. 2023, [Online]. Available: <https://journal.um-surabaya.ac.id/JKM/article/view/16604>
- [22] A. A. H. Dinata, "Hubungan lama duduk dengan kejadian nyeri punggung bawah," *J. Med. Hutama*, vol. 3, no. 01 Oktober, pp. 1718–1722, Mar. 2021, [Online]. Available: <http://jurnalmedikahutama.com/index.php/JMH/article/view/350>
- [23] N. K. D. Sutami and I. A. A. Laksmi, "Hubungan durasi kerja dan posisi kerja dengan kejadian nyeri punggung bawah pada petani," *J. Borneo Holist. Heal.*, vol. 4, no. 2, pp. 85–96, Mar. 2021, [Online]. Available: <http://jurnal.borneo.ac.id:443/index.php/borticalth/article/view/2028>
- [24] M. Hutasoit *et al.*, "PENDAHULUAN Stunting atau pendek adalah kondisi kegagalan pertumbuhan pada balita yang ditandai dengan angka tinggi badan per umur kurang dari -2 (nilai z-score) (WHO , 2018). Kejadian stunting disebabkan kondisi kekurangan gizi kronis dalam rentang w," vol. 2, 2018.

Authors



1st Author    Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: vidi.simarmata@uki.ac.id).



2nd Author    Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: silphia.novelyn@uki.ac.id).



3rd Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. He is a subspecialist doctor for hypertension kidneys at Siloam Hospitals. (email: dr.situmorang@yahoo.co.uk).

← Back to Submissions

909 / Simarmata et al. / Occupational Sitting Posture and Lower Back Pain Among Employe

Library

Workflow

Publication

Submission

Review

Copyediting

Production

Round 1

Round 1 Status

Submission accepted.

Reviewer's Attachments

Search

No Files

Revisions

Search

Upload File

▶	 5916	Article Revision_Vidi_JPHS.pdf	May 15, 2025	Article Text
▶	 5917	Article Revision_Vidi_JPHS.docx	May 15, 2025	Article Text
▶	 5918	IISTR Response to Reviewer Template.doc	May 15, 2025	Other

Review Discussions

Add discussion

Name	From	Last Reply	Replies	Closed
Payment of Article Processing Charge (APC) for Accepted Paper	admin 2025-05-26 02:41 AM UTC	chome23 2025-05-26 04:09 AM UTC	1	☐

Relationship between Sitting Position During Work and Lower Back Pain Incidence in Employees of Merdeka Community Health Center, Bogor City in 2024

¹Vidi Posdo A. Simarmata*, ²Silphia Novelyn, ³Daniel R. Parsaoran Situmorang

Corresponding Author: * vidi.simarmata@uki.ac.id

¹ Department of Medical Community, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

² Department of Anatomy, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

³ Department of Internal Medicine, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

ARTICLE INFO

ABSTRACT

Article history

Received XX July 2022

Revised XX August 2022

Accepted XX August 2022

Background: Low back pain occurs when the back hurts so much that routine tasks are difficult. The health center is one of the environments with ergonomics activities, such as lifting, pushing, pulling, reaching, carrying objects, and handling patients with more vulnerable potential hazards that can cause disorders of the musculoskeletal system. **Purpose:** This study **aims** to determine whether the incidence of low back pain in Merdeka Health Center employees in 2024 is related to sitting position while working. **Method:** An analytical survey with a cross-sectional approach is the research method used. The research tool used is a questionnaire that collects primary data. with a total of 35 respondents who meet the inclusion criteria. **Result:** From the research results, data was obtained that respondents were dominated by female employees (82.9%), employees with an age range of 26 to 35 years (40%), employees working in functional sections (51.4%), employees with a sitting position while working on a chair with a backrest (82.9%), employees who do not work with a hunched posture (60%), and employees who work for less than 6 hours a day (62.9%). The results of data analysis showed a p-value = 0.564 ($p > 0.005$). **Conclusion:** There is no significant relationship between sitting position while working and lower back pain in employees of Merdeka

Health Center, Bogor City in 2024 from the results of the analysis for the past week and year.

Keywords

Low Back Pain
Ergonomics
Health Center
Sitting Position
Sitting Position at Work
Hunched Posture
Sitting Duration

This is an open-access article under the [CC-BY-SA](#) license.



Introduction

Occupational Safety and Health (K3) is an effort to provide safety and health guarantees to improve the health of workers by preventing work accidents and occupational diseases, accompanied by health promotion, treatment, and rehabilitation. Low back pain is an ergonomic problem that is often found in the implementation of K3 which has an impact on economic losses due to decreased work capacity and worker productivity. Low back pain is local and/or radicular pain that is felt between the lower costal arch to the lumbosacral area [1]. According to data from the World Health Organization (2022), low back pain is the 3rd health problem in the world after osteoarthritis and rheumatism with a total of 17.3 million people. According to the Directorate General of Health Services of the Ministry of Health of the Republic of Indonesia (Kemenkes RI) in 2018, the prevalence of Low Back Pain in Indonesia was 18% [2].

Community Health Centers or commonly referred to as Puskesmas are one of the health service facilities that implement public health efforts and individual health efforts at the first level, whose main focus is organizing promotive and preventive efforts, in order to achieve a high level of public health in their work area, by prioritizing the safety and security of patients, officers, and visitors (Ministry of Health, 2014) [1]. Health centers as a means of public health

services have potential hazards that affect officers, patients, visitors and the surrounding community. Potential hazards such as physical, chemical, biological, ergonomic and psychosocial hazards. Health centers are one of the environments where there are activities related to ergonomics, such as lifting, pushing, pulling, reaching, carrying objects, and handling patients who have more vulnerable potential hazards that can cause disorders of the musculoskeletal system [1].

The prevalence of LBP continues to increase and is caused by risk factors such as aging, a sedentary lifestyle, and jobs that involve heavy lifting or non-ergonomic sitting positions. Poor sitting positions, such as using chairs that do not support good posture or inappropriate work desks, are often the main cause of discomfort and pain in the lower back. In addition, factors such as the duration of sitting, frequency of breaks, and stress levels at work also contribute to the increased risk of low back pain [3]. Working positions are divided into two, namely static positions and dynamic positions. Static positions are working positions without moving the joints and for a long period [4]. The effect of static positions will disrupt the distribution of nutritional intake in the body, the metabolism process and the spine will also be disrupted [5]. While dynamic positions according to Rina et al. are working positions that involve a lot of movement in the joints [6]. Based on the discussion using Systematic Review by Murti Latifah in 2022, it can be concluded that sitting position and sitting duration play a role in the occurrence of low back pain complaints in workers [7]. This is supported by research conducted by Saputra in 2020 stating that symptoms of lower back pain are often influenced by non-ergonomic sitting work positions so that there is a disturbance in the stability of body posture when working and a relationship was found between sitting position and the incidence of lower back pain among batik craftsmen with a p-value = 0.042 [8].

Based on the high prevalence of low back pain which is often associated with sitting position while working and based on the background above, the author is interested in conducting a study entitled The Relationship between Sitting Position while Working and the Incidence of Lower Back Pain in Employees of the Merdeka Health Center, Bogor City in 2024. The purpose of this study was to understand whether there is a relationship between sitting position while working and the incidence of lower back pain in employees of the Merdeka Health Center, Bogor City in 2024.

Literature Review

A. Low Back Pain

Low back pain is a symptom, not a disease, which can be caused by various factors, known and unknown; and is determined by its location, which is between the XII rib (lower rib margin) and the gluteal fold. This pain is local or radicular or both, and is often accompanied by pain in

one or both legs and is associated with neurological symptoms in the lower extremities [3]. According to The International Classification of Diseases, the prevalence of low back pain is defined as acute or chronic pain in the lumbar and/or sacral region of the spine, which can be caused by sprains, strains, shifts of the intervertebral discs, or any part of the anatomical spine around the spine [9].

There are five main categories of etiology of low back pain. First, mechanical, such as injury to the spine or intervertebral disc. Herniated intervertebral disc is also a common factor. Pregnancy can also be a mechanical cause of back pain. Second, degenerative process. The presence of degenerative conditions such as osteoarthritis of the spine and degenerative disc disease. Third, inflammation, this is mainly caused by inflammatory spondyloarthropathies (seronegative) such as ankylosing spondylitis. Fourth, oncological or malignant, this can be caused by the presence of lytic lesions in the spine, bone marrow cancer, or the phenomenon of nerve compression from lesions that occupy adjacent spaces. Often appears as a pathological fracture. And the fifth, by infection. Can occur from spinal infections, discs, epidural abscesses, and muscle/soft tissue abscesses [10].

Based on its onset, lower back pain can be divided into: 1) Acute pain, which is sudden, deep, and severe. A person cannot sleep well, and the painful area in his back increases with every movement. The discomfort lasts less than eight weeks; 2) Chronic pain, which is ongoing and usually does not go away. Although it sometimes lasts a week or a few weeks, the discomfort often appears after a few days. Sometimes repeated pain and simple exercise can also cause recurrence [11]. Clinical findings of sciatica usually include a history of dermatomal leg pain, leg pain that is worse than back pain, and leg pain that worsens when the patient coughs, strains, or sneezes. At the same time, radiculopathy is characterized by weakness, decreased sensory sensitivity or motor disturbances related to the radices or a combination of these and occurs with radicular pain [12].

There are several symptoms and signs to watch out for in people with lower back pain, known as red flags. If someone has the symptoms or signs mentioned, they should immediately get a referral for therapy. The components of red flags are divided into symptoms and signs. Some components of symptoms are age under 18, age over 50, immunocompromised and components of signs are lower extremity muscle weakness, saddle anesthesia, decreased anal sphincter tone, hyperreflexia, hyporeflexia, and areflexia [13]. Several anatomical structures and components of the lumbar spine (such as bones, ligaments, tendons, discs, and muscles) all play a role in the occurrence of low back pain. The majority of components of the lumbar spine have sensory nerves that can produce nociceptive signals and function in responding to stimuli that damage the tissue. Neuropathic (such as sciatica) is also a cause and most cases of chronic low back pain have a mixed etiology of nociception and neuropathic [14].

To provide a robust academic foundation, this study adopts an integrated theoretical approach combining:

1. The Biomechanical Model of Musculoskeletal Disorders

This model posits that mechanical loading on the spine—such as compression, shear, and torque forces—can lead to micro-injuries of spinal structures when posture is suboptimal or ergonomics are poor. Sustained forward flexion (e.g., hunched sitting) can increase disc pressure and alter lumbar curvature, predisposing workers to LBP.

2. The NIOSH Work-Related Musculoskeletal Disorder (WMSD) Framework

Developed by the National Institute for Occupational Safety and Health (NIOSH), this framework highlights key occupational risk factors—awkward posture, force, and repetition—as contributors to musculoskeletal disorders. Sitting position is a critical component of the "awkward posture" risk domain.

3. The Biopsychosocial Model of Pain

Recognizing that pain perception and chronicity are influenced not only by physical factors but also by psychosocial elements (e.g., stress, job satisfaction, and individual health beliefs), this model allows for a holistic interpretation of LBP in the context of the work environment.

Material And Methods

The research design uses an analytical survey with a cross-sectional approach and uses primary data obtained through a questionnaire sheet. The results of this study were processed using Fisher Exact test which was then analyzed in depth. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The inclusion criteria include: 1) Employees of the Merdeka Health Center, Bogor City; 2) Willing to be respondents; while the exclusion criteria include: 1) Respondents who are unwilling; 2) Respondents who have spinal abnormalities such as scoliosis; 3) Respondents who have spinal diseases such as spondylosis or herniated nucleus pulposus (HNP); 4) Respondents who have a history of spinal trauma.

The data in this study are primary data because they were collected by the researcher himself and obtained directly from the respondents. Information was collected through a

questionnaire sheet that would be given to the respondents. Before filling out the questionnaire, participants were asked to provide their identity and answer several questions about the exclusion criteria. The research instrument or tool used in this study is a questionnaire sheet consisting of two parts. The first part contains patient data and the variables studied as well as questions regarding exclusion criteria. The second part of the questionnaire is the Roland-Morris Disability Questionnaire. In this second part, 17 questions function to determine whether or not there is a disability caused by the occurrence of lower back pain. In this study, the questionnaire used was the Roland-Morris Disability Questionnaire (RMDQ) which had been translated into Indonesian and had passed the validity test by Ghina Widiasih in 2015 [15]. The researcher used the translated RMDQ which had also passed the validity test by the previous researcher, Heydi Amorina Abigail Saragi Napitu, which showed the same results. The results of the test showed that out of 24 statements, 7 statements were considered invalid so the statements used in Indonesian totaled 17 statements.²⁶ Therefore, it can be stated that this translated RMDQ questionnaire is reliable [16]. To minimize bias, several variables that are subjective in nature, such as: Variables such as "hunched body posture" and "sitting on a chair with/without a backrest" were defined by providing definitions in the instrument script.

Data analysis was conducted using univariate and bivariate methods. Univariate analysis was conducted to describe the frequency distribution of each variable studied and will be presented in the form of a percentage using a table. Bivariate analysis was conducted to find the relationship between the potential incidence of lower back pain and sitting position in employees of the Merdeka Health Center, Bogor City using a non-parametric statistical test, namely Fisher Exact, the results of which are expressed in P value or P value using IBM Statistics SPSS software version [16].

Results

A. Respondent Profile

The study was conducted at the Merdeka Health Center in Bogor City, the results of this study were obtained from primary data in the form of questionnaires. Based on the questionnaire data, a total of 35 respondents were obtained. 35 respondents had data following the inclusion criteria.

Table 1 indicate the characteristics of respondents based on gender, age, and job description. In terms of gender, it is dominated by women, with 29 out of 35 respondents, or 82.9 percent which means that there are only 6 male health workers at the Merdeka Health

Center, Bogor City. Meanwhile, age is dominated by respondents aged 26 to 35 years, with 14 out of 35 respondents or 40%, in other words, health workers at the Merdeka Health Center in Bogor City are dominated by young people. In terms of Jobs, it was found that the number of administrative work frequencies was 48.6% or 17 people and functional workers were 51.4% or 18 people.

Table 1: Profile of Respondent

Profile	Frequency	Percentage
Gender		
Male	6	17.1
Female	29	82.9
Age		
16-25 year	3	8.6
26-35 year	14	40.0
36-45 year	7	20.0
46-55 year	8	22.9
56-65 year	3	8.6
Job		
Administrative	17	48.6
Functional	18	51.4

B. Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, Sitting Duration, Incidence of Lower Back Pain in the Past Week, and Incidence of Lower Back Pain in the Past Year

1. Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, and Sitting Duration

Table 2 indicate the distribution data of respondents with a sitting position on a chair with a backrest with 29 out of 35 respondents or 82.9 percent and a sitting position on a chair without a backrest as many as 6 respondents or 17.1 percent. Meanwhile, based on sitting posture, most respondents were in a non-hunchback position with 21 out of 35 respondents or 60 percent, and with a hunchback position as many as 14 respondents or 40 percent. Meanwhile, based on the duration of sitting, data obtained showed that the longest sitting duration was <6 hours, namely 22 out of 35 respondents or 62.9 percent.

Table 2: Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, and Sitting Duration

Description	Frequency	Percentage
Sitting Position		
Sitting on a chair with a backrest	29	82.9
Sitting on a chair without a backrest	6	17.1
Hunched Posture		
Hunchback	14	40
Not hunched	21	60

Sitting Duration		
<6 hours	22	62.9
6 – 9 hours	13	37.1

- Frequency Distribution of Respondents Based on the Incidence of Low Back Pain during the Last Week and Based on the Incidence of Low Back Pain during the Last Year

Table 3 indicates data that the majority of respondents did not experience lower back pain during the last week or in the last year, namely 25 out of 35 respondents or 71.4 percent.

Table 3: Frequency Distribution of Respondents Based on the Incidence of Low Back Pain during the Last Week and Based on the Incidence of Low Back Pain during the Last Year

Description	Frequency	Percentage
Lower Back Pain Occurrence in the Past Week		
Lower Back Pain	10	28.6
No Lower Back Pain	25	71.4
Lower Back Pain Occurrence in the Past Year		
Lower Back Pain	10	28.6
No Lower Back Pain	25	71.4

C. Bivariate Analysis

- Relationship of Potential Ergonomic Hazards to the Incidence of Lower Back Pain in the Past Week

Table 4: Relationship of Work to the Incidence of Low Back Pain in the Past Week

Job Type	Lower Back Pain For The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
Administrative	4	40	13	52	0.396	0.615
Functional	6	60	12	48		

It was found that respondents who experienced lower back pain during the past week amounted to 4 people in administrative workers and 6 people in functional workers. Showing the results of P value 0.396. A value of less than 0.05 is the maximum significant value in determining the relationship.

- Relationship Between Sitting Position at Work and Lower Back Pain During the Past Week

Table 5: Relationship Between Sitting Position at Work and Lower Back Pain During the Past Week

Sitting Position	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
Sitting on a chair with a backrest	8	80	21	84	0.564	1.313
Sitting on a chair without a backrest	2	20	4	12		

It was found that respondents who experienced lower back pain during the past week were 2 people sitting in a chair with a backrest and 8 people sitting in a chair

without a backrest. Showing a P value of 0.564. A value of less than 0.05 is the maximum significant value in determining the relationship.

3. Relationship Between Stooped Posture at Work and Lower Back Pain During the Past Week

Table 6: Relationship Between Stooped Posture at Work and Lower Back Pain

During the Past Week

Hunched Posture	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
Yes	7	70	7	28	0.029	6.000
No	3	30	18	72		

There were 7 respondents with a hunched posture and 3 respondents with a non-hunched posture who experienced lower back pain in the last week with a P value of 0.029.

4. Relationship Between Sitting Duration at Work and Lower Back Pain Incidence in the Past Week

Table 7: Relationship Between Sitting Duration at Work and Lower Back Pain

Incidence in the Past Week

Sitting Duration	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
6 – 9 hours	4	40	9	36	0.560	0.844
< 6 hours	6	60	16	64		

There were 4 respondents with a sitting duration of 6-9 hours a day or a high-risk duration who experienced lower back pain during the last week with a P value of 0.560.

5. Relationship of Potential Ergonomic Hazards to Lower Back Pain Incidence in the Past Year

Table 8: Relationship of Potential Ergonomic Hazards to Lower Back Pain

Incidence in the Past Year

Job Type	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Administrative	3	30	14	56	0.155	0.337
Functional	7	70	11	44		

It was found that respondents who experienced lower back pain during the past year amounted to 3 people in administrative workers and 7 people in functional

workers. Showing the results of P value 0.155. A value of less than 0.05 is the maximum significant value in determining the relationship.

6. Relationship Between Sitting Position at Work and Lower Back Pain Incidence in the Past Year

Table 9: Relationship Between Sitting Position at Work and Lower Back Pain Incidence in the Past Year

Sitting Position	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Sitting on a chair with a backrest	8	80	21	84	0.564	1.313
Sitting on a chair without a backrest	2	20	4	12		

It was found that 8 respondents experienced lower back pain in the last year sitting on chairs with backrests and 2 people sitting on chairs without backrests with a P value of 0.564.

7. Relationship between Stooped Posture at Work and the Incidence of Lower Back Pain in the Past Year

Table 10: Relationship between Stooped Posture at Work and the Incidence of Lower Back Pain in the Past Year

Hunched Posture	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Yes	7	70	7	28	0.029	6.000
No	3	30	18	72		

D. Discussion

1. Relationship of Work with the Incidence of Lower Back Pain

The results of the study were obtained from 35 respondents, there were 4 people in the administrative section and 6 people in the functional section. In the distribution of the frequency of lower back pain in the past year, there were 3 people in the administrative section and 7 people in the functional section. The results of the study conducted using Fisher Exact Analysis of the relationship between work and the incidence of lower back pain obtained a P value of 0.396 for the past week and a P value of 0.155 for the past year. The results of the Fisher Exact test analysis accept H0 and reject H1 (there is no relationship) with a p-value greater than 0.05 in the last week and the last year.

This result is in line with the research conducted by Sumangando et al in 2017 entitled "The relationship between nurses' workload and the incidence of Low Back Pain (LBP) in implementing nurses at RS TK.III. R.W Monginsidi Manado". The results showed that there was no relationship between nurses' workload and the incidence of low back pain in implementing nurses at RS TK.III R.W Monginsidi Manado. This can be seen through the Fisher Exact test with a significance level of 95% ($\alpha = 0.05$), the analysis result is 0.365, so the value of $p > \alpha$. Based on the theory and several studies, it states that it is not only workload that can cause LBP, but there are several risk factors, namely age, gender, BMI, lifestyle and smoking habits [16].

2. Relationship between Sitting Position and Lower Back Pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting position and the incidence of lower back pain obtained a P value of 0.564 for the past week and for the past year ($p > 0.05$). The results of the Fisher Exact test analysis accepted H_0 and rejected H_1 (no relationship) with a p-value greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with research by Shafira Nur Aisyah in 2021 with a P value = 0.406, there is no relationship between sitting position and lower back pain can be caused by many factors other than sitting position such as physical exercise, smoking, and BMI.²⁸ Based on the Fisher Exact analysis by Natasya in 2018, the P value of sitting position with LBP complaints was 0.741 ($p > 0.05$), meaning there is no significant relationship between sitting position and LBP complaints [17].

The ideal sitting position is described as a position that is in accordance with a good sitting position, namely sitting upright, shoulders back, and buttocks touching the chair. While the less than ideal and non-ideal sitting position is a sitting position other than the ideal position. The less than ideal position is described as a hunched sitting position, legs crossed / legs hanging. The arrangement of the workplace and appropriate seating must be arranged so that there is no harmful effect on health and minimizes the potential for danger due to ergonomic factors [18].

3. The Relationship Between Stooped Posture and the Incidence of Lower Back Pain

The Relationship Between Stooped Posture and the Incidence of Lower Back Pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a

P value of 0.029 for the past week and a P value of 0.029 for the past year. The results of Fisher Exact accepted H1 (there is a relationship) and rejected H0 (there is no relationship) with a p-value of less than 0.05. The results of the bivariate analysis test showed that there was a significant relationship between hunched posture and the incidence of lower back pain during the past week or year. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the research entitled The Relationship between Awkward Postures and the Incidence of Low Back Pain in Plantation Workers at the PT Mitra Bumi Palm Oil Factory in Kampar Regency, obtained a p-value = 0.000 ($p < 0.05$) which means that there is a relationship between uncomfortable postures and the incidence of low back pain because workers do several uncomfortable postures such as looking up accompanied by a static position for 1 minute in harvesters and a bent position in workers loading and collecting the remaining results of picking tea leaves [19].

Poor posture while working such as a hunched posture can trigger lower back pain. Generally, a hunched posture occurs when the chair used while working does not meet ergonomic standards such as not being equipped with a backrest or from poor sitting habits. Inadequate workplace design such as chairs without wheels or without backrests and arms can make workers less free to move so that they often make twisting movements of the upper body [20].

The sitting position with the body leaning forward or bending less than 90 degrees results in a load on the lumbar region. More than 25% of the body's load increases at the center of gravity so there is an increase in intervertebral disc pressure. In the article (Dubey et al., 2019 in Janna, 2021) entitled Ergonomics for Desk Job Workers explains that correct posture not only maintains the natural curve of the spine but also minimizes stress on the human body. Therefore, the importance of sitting with correct posture when working in the office needs to be emphasized. Working for a long time in a non-ergonomic body position will cause muscle pain due to pressure [21].

4. Relationship between Sitting Duration and the Incidence of Lower Back Pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a P value of 0.560 for the past week and a P value of 0.440 for the past year. The results of the Fisher Exact analysis accepted H0 and rejected H1 (no relationship) with a p-value greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the

research of Ni Made and Novendy in 2022 with an observational analytical method with a cross-sectional design, namely that no correlation was found between sitting duration and the incidence of low back pain ($p = 0.595$) [15]. This back pain can occur in various work situations, but the risk is greater if sitting for a long time in a static position because it will cause continuous muscle contractions and narrowing of blood vessels. In the narrowing of blood vessels, blood flow is obstructed and ischemia occurs, tissue lacks oxygen and nutrients, while prolonged muscle contractions will cause lactic acid accumulation [22].

Low back pain is a chronic disease that develops gradually and takes a long time to develop. Factors such as long working hours exceeding 8 hours will affect the lumbar region which can cause pain if used continuously and not in a good ergonomic position [23]. The amount of efficient working time in a week is around 40-48 hours calculated in days between 5 or 6 working days and 30 minutes maximum time for additional work. The lack of relationship between sitting time and lower back pain in respondents can be caused by age, gender, smoking habits, work mass, and body mass index (BMI)[24].

Conclusion

The results of this study indicate that there is no statistically significant relationship between sitting position while working and the incidence of low back pain among employees at the Merdeka Health Center in 2024 ($p = 0.564$). These findings suggest that other factors beyond sitting posture may contribute more substantially to the occurrence of low back pain, underscoring the need for a broader ergonomic and occupational health assessment in similar work environments.

Conflict of Interest

The authors declare that there is no conflict of interest.

References

- [1] R. R. Al Mahdi, "HUBUNGAN POSTUR KERJA TERHADAP KELUHAN LOW BACK PAIN PADA PETANI DI DESA BULUS KECAMATAN BANDUNG KABUPATEN TULUNGAGUNG," Universitas Muhammadiyah Malang, 2024. [Online]. Available: <https://eprints.umm.ac.id/id/eprint/14278/>
- [2] K. A. Mastuti, "Gambaran kejadian low back pain pada karyawan CV. Pacific Garment," *J. Ilmu Kesehat. Mandira Cendikia*, vol. 2, no. 8, pp. 297–305, 2023.
- [3] F. A. Makkiyah, T. A. Sinaga, and N. Khairunnisa, "A study from a highly populated country: risk factors associated with lower back pain in middle-aged adults," *J. Korean Neurosurg. Soc.*, vol. 66, no. 2, pp. 190–198, Mar. 2023, [Online]. Available: <https://synapse.koreamed.org/articles/1516081592>
- [4] W. Simatupang, "Hubungan posisi, durasi dan masa bekerja dengan kejadian nyeri punggung bawah (NPB) pada masyarakat penenun Ulos di Desa Lumban Suhi-Suhi Kecamatan Pangururan

- Kabupaten Samosir Sumatera Utara,” Universitas Sumatera Utara, 2019. [Online]. Available: <https://repository.usu.ac.id/handle/123456789/21891>
- [5] Y.-T. Wang *et al.*, “The effect of cupping therapy for low back pain: A meta-analysis based on existing randomized controlled trials,” *J. Back Musculoskelet. Rehabil.*, vol. 30, no. 6, pp. 1187–1195, Mar. 2017, doi: 10.3233/BMR-169736.
- [6] R. Rina, H. Hansen, and F. Fadzul, “Hubungan Sikap Kerja Mengemudi dan Durasi Mengemudi dengan Keluhan Nyeri Punggung Bawah (Low Back Pain) pada Pengemudi Bus di Terminal Lempake Kota Samarinda Tahun 2016,” 2016.
- [7] M. Latifah, M. Citrawati, and H. Yusmaini, “Hubungan posisi duduk dan lama duduk dengan low back pain pada pekerja sektor industri: Tinjauan sistematis,” Mar. 2022. [Online]. Available: <https://conference.upnvj.ac.id/index.php/sensorik/article/view/2067>
- [8] A. Saputra, “Sikap kerja, masa kerja, dan usia terhadap keluhan low back pain pada pengrajin batik,” *HIGEIA (Journal Public Heal. Res. Dev.)*, vol. 4, no. Special 1, pp. 147–157, Mar. 2020, [Online]. Available: <https://journal.unnes.ac.id/sju/higeia/article/view/36828>
- [9] V. E. Casiano, G. Sarwan, A. M. Dydyk, and M. Varacallo, “Back pain,” Mar. 2019, [Online]. Available: <https://europepmc.org/article/nbk/nbk538173>
- [10] N. P. Kumbea, O. J. Sumampouw, and A. Asrifuddin, “Keluhan nyeri punggung bawah pada nelayan,” *Indones. J. Public Heal. Community Med.*, vol. 2, no. 1, pp. 21–26, Mar. 2021, [Online]. Available: <https://ejournal.unsrat.ac.id/index.php/ijphcm/article/view/33580>
- [11] A. Rahmawati, “Risk factor of low back pain,” *J. Med. Hutama*, vol. 3, no. 01 Oktober, pp. 1601–1607, Mar. 2021, [Online]. Available: <http://www.jurnalmedikahutama.com/index.php/JMH/article/view/323>
- [12] M. G. DePalma, “Red flags of low back pain,” *Jaapa*, vol. 33, no. 8, pp. 8–11, Mar. 2020, [Online]. Available: https://journals.lww.com/jaapa/fulltext/2020/08000/Red_flags_of_low_back_pain.1.aspx/1000
- [13] E. C. Hills, “Mechanical Low Back Pain: Practice Essentials, Background,” *Pathophysiology*, 2022.
- [14] A. Biyani and G. B. J. Andersson, “Low back pain: pathophysiology and management,” *JAAOS-Journal Am. Acad. Orthop. Surg.*, vol. 12, no. 2, pp. 106–115, Mar. 2004, [Online]. Available: https://journals.lww.com/jaaos/fulltext/2004/03000/low_back_pain_pathophysiology_and_management.6.aspx
- [15] H. A. A. S. Napitu, “Hubungan Potensi Bahaya Ergonomi dengan Kejadian Nyeri Punggung Bawah selama Pembelajaran Jarak Jauh pada Mahasiswa FK UKI Angkatan 2019,” Universitas Kristen Indonesia, 2022. [Online]. Available: <http://repository.uki.ac.id/id/eprint/7738>
- [16] M. Sumangando, J. Rottie, and J. Lolong, “Hubungan beban kerja perawat dengan kejadian low back pain (LBP) pada perawat pelaksana di RS Tk. III RW Monginsidi Manado,” *J. Keperawatan UNSRAT*, vol. 5, no. 1, p. 110022, Mar. 2017, [Online]. Available: <https://ejournal.unsrat.ac.id/index.php/jkp/article/view/14717>
- [17] N. Milenia, “Pengaruh Posisi Duduk Terhadap Keluhan Low Back Pain Pada Mahasiswa Universitas Yarsi Angkatan 2018,” *J. Ilm. Mhs. Kedokt. Indones.*, vol. 10, no. 1, pp. 11–21, 2022.
- [18] S. Nur’aisyah, R. E. Sahputra, H. Ali, N. Noverial, G. Revilla, and Z. Fadila, “Hubungan Posisi dan Lama Duduk dengan Nyeri Punggung Bawah pada Mahasiswa Pendidikan Dokter Universitas Andalas,” *eJournal Kedokt. Indones.*, vol. 12, no. 1, p. 32, Mar. 2024, [Online]. Available: <https://ejki.fk.ui.ac.id/index.php/journal/article/view/373>
- [19] H. N. Fajar and S. Mulyani, “Hubungan Postur Kerja Terhadap Keluhan Low Back Pain Pemetik Teh PT Perkebunan Tambi Wonosobo,” *J. Appl. Agric. Heal. Technol.*, vol. 2, no. 1, pp. 15–21, Mar. 2023, [Online]. Available: <https://journal.uns.ac.id/jaht/article/view/526>
- [20] D. S. Nikaputra, M. Marji, and A. Kurniawan, “Studi literatur pengaruh postur kerja duduk dan lama kerja terhadap keluhan low back pain pada karyawan yang bekerja di depan komputer,” Mar. 2021. [Online]. Available: <http://conference.um.ac.id/index.php/starwars/article/view/2954>
- [21] A. B. Yulianto, S. Sartoyo, P. Wardoyo, and A. Fariz, “Hubungan Posisi Duduk Terhadap Keluhan Nyeri Punggung Bawah Pada Petugas Administrasi Di Rumah Sakit Perkebunan Jember Klinik,” *J. Keperawatan Muhammadiyah*, Mar. 2023, [Online]. Available: <https://journal.um-surabaya.ac.id/JKM/article/view/16604>
- [22] A. A. H. Dinata, “Hubungan lama duduk dengan kejadian nyeri punggung bawah,” *J. Med. Hutama*, vol. 3, no. 01 Oktober, pp. 1718–1722, Mar. 2021, [Online]. Available: <http://jurnalmedikahutama.com/index.php/JMH/article/view/350>
- [23] N. K. D. Sutami and I. A. A. Laksmi, “Hubungan durasi kerja dan posisi kerja dengan kejadian nyeri

- punggung bawah pada petani," *J. Borneo Holist. Heal.*, vol. 4, no. 2, pp. 85–96, Mar. 2021, [Online]. Available: <http://jurnal.borneo.ac.id:443/index.php/borticalth/article/view/2028>
- [24] M. Hutasoit *et al.*, "PENDAHULUAN Stunting atau pendek adalah kondisi kegagalan pertumbuhan pada balita yang ditandai dengan angka tinggi badan per umur kurang dari -2 (nilai z-score) (WHO , 2018). Kejadian stunting disebabkan kondisi kekurangan gizi kronis dalam rentang w," vol. 2, 2018.

Authors



1st Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: vidi.simarmata@uki.ac.id).



2nd Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: silphia.novelyn@uki.ac.id).



3rd Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. He is a subspecialist doctor for hypertension kidneys at Siloam Hospitals. (email: dr.situmorang@yahoo.co.uk).

Relationship between Sitting Position During Work and Lower Back Pain Incidence in Employees of Merdeka Community Health Center, Bogor City in 2024

¹Vidi Posdo A. Simarmata*, ²Silphia Novelyn, ³Daniel R. Parsaoran Situmorang

Corresponding Author: * vidi.simarmata@uki.ac.id

¹ Department of Medical Community, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

² Department of Anatomy, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

³ Department of Internal Medicine, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

ARTICLE INFO

ABSTRACT

Article history

Received XX July 2022

Revised XX August 2022

Accepted XX August 2022

Background: Low back pain occurs when the back hurts so much that routine tasks are difficult. The health center is one of the environments with ergonomics activities, such as lifting, pushing, pulling, reaching, carrying objects, and handling patients with more vulnerable potential hazards that can cause disorders of the musculoskeletal system. **Purpose:** This study **aims** to determine whether the incidence of low back pain in Merdeka Health Center employees in 2024 is related to sitting position while working. **Method:** An analytical survey with a cross-sectional approach is the research method used. The research tool used is a questionnaire that collects primary data. with a total of 35 respondents who meet the inclusion criteria. **Result:** From the research results, data was obtained that respondents were dominated by female employees (82.9%), employees with an age range of 26 to 35 years (40%), employees working in functional sections (51.4%), employees with a sitting position while working on a chair with a backrest (82.9%), employees who do not work with a hunched posture (60%), and employees who work for less than 6 hours a day (62.9%). The results of data analysis showed a p-value = 0.564 ($p > 0.005$). **Conclusion:** There is no significant relationship between sitting position while working and lower back pain in employees of Merdeka

Health Center, Bogor City in 2024 from the results of the analysis for the past week and year.

Keywords

Low Back Pain
Ergonomics
Health Center
Sitting Position
Sitting Position at Work
Hunched Posture
Sitting Duration

This is an open-access article under the [CC-BY-SA](#) license.



Introduction

Occupational Safety and Health (K3) is an effort to provide safety and health guarantees to improve the health of workers by preventing work accidents and occupational diseases, accompanied by health promotion, treatment, and rehabilitation. Low back pain is an ergonomic problem that is often found in the implementation of K3 which has an impact on economic losses due to decreased work capacity and worker productivity. Low back pain is local and/or radicular pain that is felt between the lower costal arch to the lumbosacral area [1]. According to data from the World Health Organization (2022), low back pain is the 3rd health problem in the world after osteoarthritis and rheumatism with a total of 17.3 million people. According to the Directorate General of Health Services of the Ministry of Health of the Republic of Indonesia (Kemenkes RI) in 2018, the prevalence of Low Back Pain in Indonesia was 18% [2].

Community Health Centers or commonly referred to as Puskesmas are one of the health service facilities that implement public health efforts and individual health efforts at the first level, whose main focus is organizing promotive and preventive efforts, in order to achieve a high level of public health in their work area, by prioritizing the safety and security of patients, officers, and visitors (Ministry of Health, 2014) [1]. Health centers as a means of public health

services have potential hazards that affect officers, patients, visitors and the surrounding community. Potential hazards such as physical, chemical, biological, ergonomic and psychosocial hazards. Health centers are one of the environments where there are activities related to ergonomics, such as lifting, pushing, pulling, reaching, carrying objects, and handling patients who have more vulnerable potential hazards that can cause disorders of the musculoskeletal system [1].

The prevalence of LBP continues to increase and is caused by risk factors such as aging, a sedentary lifestyle, and jobs that involve heavy lifting or non-ergonomic sitting positions. Poor sitting positions, such as using chairs that do not support good posture or inappropriate work desks, are often the main cause of discomfort and pain in the lower back. In addition, factors such as the duration of sitting, frequency of breaks, and stress levels at work also contribute to the increased risk of low back pain [3]. Working positions are divided into two, namely static positions and dynamic positions. Static positions are working positions without moving the joints and for a long period [4]. The effect of static positions will disrupt the distribution of nutritional intake in the body, the metabolism process and the spine will also be disrupted [5]. While dynamic positions according to Rina et al. are working positions that involve a lot of movement in the joints [6]. Based on the discussion using Systematic Review by Murti Latifah in 2022, it can be concluded that sitting position and sitting duration play a role in the occurrence of low back pain complaints in workers [7]. This is supported by research conducted by Saputra in 2020 stating that symptoms of lower back pain are often influenced by non-ergonomic sitting work positions so that there is a disturbance in the stability of body posture when working and a relationship was found between sitting position and the incidence of lower back pain among batik craftsmen with a p-value = 0.042 [8].

Based on the high prevalence of low back pain which is often associated with sitting position while working and based on the background above, the author is interested in conducting a study entitled The Relationship between Sitting Position while Working and the Incidence of Lower Back Pain in Employees of the Merdeka Health Center, Bogor City in 2024. The purpose of this study was to understand whether there is a relationship between sitting position while working and the incidence of lower back pain in employees of the Merdeka Health Center, Bogor City in 2024.

Literature Review

A. Low Back Pain

Low back pain is a symptom, not a disease, which can be caused by various factors, known and unknown; and is determined by its location, which is between the XII rib (lower rib margin) and the gluteal fold. This pain is local or radicular or both, and is often accompanied by pain in

one or both legs and is associated with neurological symptoms in the lower extremities [3]. According to The International Classification of Diseases, the prevalence of low back pain is defined as acute or chronic pain in the lumbar and/or sacral region of the spine, which can be caused by sprains, strains, shifts of the intervertebral discs, or any part of the anatomical spine around the spine [9].

There are five main categories of etiology of low back pain. First, mechanical, such as injury to the spine or intervertebral disc. Herniated intervertebral disc is also a common factor. Pregnancy can also be a mechanical cause of back pain. Second, degenerative process. The presence of degenerative conditions such as osteoarthritis of the spine and degenerative disc disease. Third, inflammation, this is mainly caused by inflammatory spondyloarthropathies (seronegative) such as ankylosing spondylitis. Fourth, oncological or malignant, this can be caused by the presence of lytic lesions in the spine, bone marrow cancer, or the phenomenon of nerve compression from lesions that occupy adjacent spaces. Often appears as a pathological fracture. And the fifth, by infection. Can occur from spinal infections, discs, epidural abscesses, and muscle/soft tissue abscesses [10].

Based on its onset, lower back pain can be divided into: 1) Acute pain, which is sudden, deep, and severe. A person cannot sleep well, and the painful area in his back increases with every movement. The discomfort lasts less than eight weeks; 2) Chronic pain, which is ongoing and usually does not go away. Although it sometimes lasts a week or a few weeks, the discomfort often appears after a few days. Sometimes repeated pain and simple exercise can also cause recurrence [11]. Clinical findings of sciatica usually include a history of dermatomal leg pain, leg pain that is worse than back pain, and leg pain that worsens when the patient coughs, strains, or sneezes. At the same time, radiculopathy is characterized by weakness, decreased sensory sensitivity or motor disturbances related to the radices or a combination of these and occurs with radicular pain [12].

There are several symptoms and signs to watch out for in people with lower back pain, known as red flags. If someone has the symptoms or signs mentioned, they should immediately get a referral for therapy. The components of red flags are divided into symptoms and signs. Some components of symptoms are age under 18, age over 50, immunocompromised and components of signs are lower extremity muscle weakness, saddle anesthesia, decreased anal sphincter tone, hyperreflexia, hyporeflexia, and areflexia [13]. Several anatomical structures and components of the lumbar spine (such as bones, ligaments, tendons, discs, and muscles) all play a role in the occurrence of low back pain. The majority of components of the lumbar spine have sensory nerves that can produce nociceptive signals and function in responding to stimuli that damage the tissue. Neuropathic (such as sciatica) is also a cause and most cases of chronic low back pain have a mixed etiology of nociception and neuropathic [14].

To provide a robust academic foundation, this study adopts an integrated theoretical approach combining:

1. **The Biomechanical Model of Musculoskeletal Disorders**

This model posits that mechanical loading on the spine—such as compression, shear, and torque forces—can lead to micro-injuries of spinal structures when posture is suboptimal or ergonomics are poor. Sustained forward flexion (e.g., hunched sitting) can increase disc pressure and alter lumbar curvature, predisposing workers to LBP.

2. **The NIOSH Work-Related Musculoskeletal Disorder (WMSD) Framework**

Developed by the National Institute for Occupational Safety and Health (NIOSH), this framework highlights key occupational risk factors—awkward posture, force, and repetition—as contributors to musculoskeletal disorders. Sitting position is a critical component of the "awkward posture" risk domain.

3. **The Biopsychosocial Model of Pain**

Recognizing that pain perception and chronicity are influenced not only by physical factors but also by psychosocial elements (e.g., stress, job satisfaction, and individual health beliefs), this model allows for a holistic interpretation of LBP in the context of the work environment.

Material And Methods

The research design uses an analytical survey with a cross-sectional approach and uses primary data obtained through a questionnaire sheet. The results of this study were processed using Fisher Exact test which was then analyzed in depth. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The inclusion criteria include: 1) Employees of the Merdeka Health Center, Bogor City; 2) Willing to be respondents; while the exclusion criteria include: 1) Respondents who are unwilling; 2) Respondents who have spinal abnormalities such as scoliosis; 3) Respondents who have spinal diseases such as spondylosis or herniated nucleus pulposus (HNP); 4) Respondents who have a history of spinal trauma.

The data in this study are primary data because they were collected by the researcher himself and obtained directly from the respondents. Information was collected through a

questionnaire sheet that would be given to the respondents. Before filling out the questionnaire, participants were asked to provide their identity and answer several questions about the exclusion criteria. The research instrument or tool used in this study is a questionnaire sheet consisting of two parts. The first part contains patient data and the variables studied as well as questions regarding exclusion criteria. The second part of the questionnaire is the Roland-Morris Disability Questionnaire. In this second part, 17 questions function to determine whether or not there is a disability caused by the occurrence of lower back pain. In this study, the questionnaire used was the Roland-Morris Disability Questionnaire (RMDQ) which had been translated into Indonesian and had passed the validity test by Ghina Widiasih in 2015 [15]. The researcher used the translated RMDQ which had also passed the validity test by the previous researcher, Heydi Amorina Abigail Saragi Napitu, which showed the same results. The results of the test showed that out of 24 statements, 7 statements were considered invalid so the statements used in Indonesian totaled 17 statements.²⁶ Therefore, it can be stated that this translated RMDQ questionnaire is reliable [16]. To minimize bias, several variables that are subjective in nature, such as: Variables such as "hunched body posture" and "sitting on a chair with/without a backrest" were defined by providing definitions in the instrument script.

Data analysis was conducted using univariate and bivariate methods. Univariate analysis was conducted to describe the frequency distribution of each variable studied and will be presented in the form of a percentage using a table. Bivariate analysis was conducted to find the relationship between the potential incidence of lower back pain and sitting position in employees of the Merdeka Health Center, Bogor City using a non-parametric statistical test, namely Fisher Exact , the results of which are expressed in P value or P value using IBM Statistics SPSS software version [16].

Results

A. Respondent Profile

The study was conducted at the Merdeka Health Center in Bogor City, the results of this study were obtained from primary data in the form of questionnaires. Based on the questionnaire data, a total of 35 respondents were obtained. 35 respondents had data following the inclusion criteria.

Table 1 indicate the characteristics of respondents based on gender, age, and job description. In terms of gender, it is dominated by women, with 29 out of 35 respondents, or 82.9 percent which means that there are only 6 male health workers at the Merdeka Health

Center, Bogor City. Meanwhile, age is dominated by respondents aged 26 to 35 years, with 14 out of 35 respondents or 40%, in other words, health workers at the Merdeka Health Center in Bogor City are dominated by young people. In terms of Jobs, it was found that the number of administrative work frequencies was 48.6% or 17 people and functional workers were 51.4% or 18 people.

Table 1: Profile of Respondent

Profile	Frequency	Percentage
Gender		
Male	6	17.1
Female	29	82.9
Age		
16-25 year	3	8.6
26-35 year	14	40.0
36-45 year	7	20.0
46-55 year	8	22.9
56-65 year	3	8.6
Job		
Administrative	17	48.6
Functional	18	51.4

B. Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, Sitting Duration, Incidence of Lower Back Pain in the Past Week, and Incidence of Lower Back Pain in the Past Year

1. Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, and Sitting Duration

Table 2 indicate the distribution data of respondents with a sitting position on a chair with a backrest with 29 out of 35 respondents or 82.9 percent and a sitting position on a chair without a backrest as many as 6 respondents or 17.1 percent. Meanwhile, based on sitting posture, most respondents were in a non-hunchback position with 21 out of 35 respondents or 60 percent, and with a hunchback position as many as 14 respondents or 40 percent. Meanwhile, based on the duration of sitting, data obtained showed that the longest sitting duration was <6 hours, namely 22 out of 35 respondents or 62.9 percent.

Table 2: Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, and Sitting Duration

Description	Frequency	Percentage
Sitting Position		
Sitting on a chair with a backrest	29	82.9
Sitting on a chair without a backrest	6	17.1
Hunched Posture		
Hunchback	14	40
Not hunched	21	60

Sitting Duration		
<6 hours	22	62.9
6 – 9 hours	13	37.1

2. Frequency Distribution of Respondents Based on the Incidence of Low Back Pain during the Last Week and Based on the Incidence of Low Back Pain during the Last Year

Table 3 indicates data that the majority of respondents did not experience lower back pain during the last week or in the last year, namely 25 out of 35 respondents or 71.4 percent.

Table 3: Frequency Distribution of Respondents Based on the Incidence of Low Back Pain during the Last Week and Based on the Incidence of Low Back Pain during the Last Year

Description	Frequency	Percentage
Lower Back Pain Occurrence in the Past Week		
Lower Back Pain	10	28.6
No Lower Back Pain	25	71.4
Lower Back Pain Occurrence in the Past Year		
Lower Back Pain	10	28.6
No Lower Back Pain	25	71.4

C. Bivariate Analysis

1. Relationship of Potential Ergonomic Hazards to the Incidence of Lower Back Pain in the Past Week

Table 4: Relationship of Work to the Incidence of Low Back Pain in the Past Week

Job Type	Lower Back Pain For The Past Week				P-Value	Odds Ratio
	yes	%	No	%		
Administrative	4	40	13	52	0.396	0.615
Functional	6	60	12	48		

It was found that respondents who experienced lower back pain during the past week amounted to 4 people in administrative workers and 6 people in functional workers. Showing the results of P value 0.396. A value of less than 0.05 is the maximum significant value in determining the relationship.

2. Relationship Between Sitting Position at Work and Lower Back Pain During the Past Week

Table 5: Relationship Between Sitting Position at Work and Lower Back Pain During the Past Week

Sitting Position	Lower Back Pain for The Past Week				P-Value	Odds Ratio
	yes	%	No	%		
Sitting on a chair with a backrest	8	80	21	84	0.564	1.313
Sitting on a chair without a backrest	2	20	4	12		

It was found that respondents who experienced lower back pain during the past week were 2 people sitting in a chair with a backrest and 8 people sitting in a chair

without a backrest. Showing a P value of 0.564. A value of less than 0.05 is the maximum significant value in determining the relationship.

3. Relationship Between Stooped Posture at Work and Lower Back Pain During the Past Week

Table 6: Relationship Between Stooped Posture at Work and Lower Back Pain During the Past Week

Hunched Posture	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
Yes	7	70	7	28	0.029	6.000
No	3	30	18	72		

There were 7 respondents with a hunched posture and 3 respondents with a non-hunched posture who experienced lower back pain in the last week with a P value of 0.029.

4. Relationship Between Sitting Duration at Work and Lower Back Pain Incidence in the Past Week

Table 7: Relationship Between Sitting Duration at Work and Lower Back Pain Incidence in the Past Week

Sitting Duration	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
6 – 9 hours	4	40	9	36	0.560	0.844
< 6 hours	6	60	16	64		

There were 4 respondents with a sitting duration of 6-9 hours a day or a high-risk duration who experienced lower back pain during the last week with a P value of 0.560.

5. Relationship of Potential Ergonomic Hazards to Lower Back Pain Incidence in the Past Year

Table 8: Relationship of Potential Ergonomic Hazards to Lower Back Pain Incidence in the Past Year

Job Type	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Administrative	3	30	14	56	0.155	0.337
Functional	7	70	11	44		

It was found that respondents who experienced lower back pain during the past year amounted to 3 people in administrative workers and 7 people in functional

workers. Showing the results of P value 0.155. A value of less than 0.05 is the maximum significant value in determining the relationship.

6. Relationship Between Sitting Position at Work and Lower Back Pain Incidence in the Past Year

Table 9: Relationship Between Sitting Position at Work and Lower Back Pain Incidence in the Past Year

Sitting Position	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Sitting on a chair with a backrest	8	80	21	84	0.564	1.313
Sitting on a chair without a backrest	2	20	4	12		

It was found that 8 respondents experienced lower back pain in the last year sitting on chairs with backrests and 2 people sitting on chairs without backrests with a P value of 0.564.

7. Relationship between Stooped Posture at Work and the Incidence of Lower Back Pain in the Past Year

Table 10: Relationship between Stooped Posture at Work and the Incidence of Lower Back Pain in the Past Year

Hunched Posture	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Yes	7	70	7	28	0.029	6.000
No	3	30	18	72		

D. Discussion

1. Relationship of Work with the Incidence of Lower Back Pain

The results of the study were obtained from 35 respondents, there were 4 people in the administrative section and 6 people in the functional section. In the distribution of the frequency of lower back pain in the past year, there were 3 people in the administrative section and 7 people in the functional section. The results of the study conducted using Fisher Exact Analysis of the relationship between work and the incidence of lower back pain obtained a P value of 0.396 for the past week and a P value of 0.155 for the past year. The results of the Fisher Exact test analysis accept H0 and reject H1 (there is no relationship) with a p-value greater than 0.05 in the last week and the last year.

This result is in line with the research conducted by Sumangando et al in 2017 entitled "The relationship between nurses' workload and the incidence of Low Back Pain (LBP) in implementing nurses at RS TK.III. R.W Monginsidi Manado". The results showed that there was no relationship between nurses' workload and the incidence of low back pain in implementing nurses at RS TK.III R.W Monginsidi Manado. This can be seen through the Fisher Exact test with a significance level of 95% ($\alpha = 0.05$), the analysis result is 0.365, so the value of $p > \alpha$. Based on the theory and several studies, it states that it is not only workload that can cause LBP, but there are several risk factors, namely age, gender, BMI, lifestyle and smoking habits [16].

2. Relationship between Sitting Position and Lower Back Pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting position and the incidence of lower back pain obtained a P value of 0.564 for the past week and for the past year ($p > 0.05$). The results of the Fisher Exact test analysis accepted H_0 and rejected H_1 (no relationship) with a p-value greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with research by Shafira Nur Aisyah in 2021 with a P value = 0.406, there is no relationship between sitting position and lower back pain can be caused by many factors other than sitting position such as physical exercise, smoking, and BMI.²⁸ Based on the Fisher Exact analysis by Natasya in 2018, the P value of sitting position with LBP complaints was 0.741 ($p > 0.05$), meaning there is no significant relationship between sitting position and LBP complaints [17].

The ideal sitting position is described as a position that is in accordance with a good sitting position, namely sitting upright, shoulders back, and buttocks touching the chair. While the less than ideal and non-ideal sitting position is a sitting position other than the ideal position. The less than ideal position is described as a hunched sitting position, legs crossed / legs hanging. The arrangement of the workplace and appropriate seating must be arranged so that there is no harmful effect on health and minimizes the potential for danger due to ergonomic factors [18].

3. The Relationship Between Stooped Posture and the Incidence of Lower Back Pain

The Relationship Between Stooped Posture and the Incidence of Lower Back Pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a

P value of 0.029 for the past week and a P value of 0.029 for the past year. The results of Fisher Exact accepted H1 (there is a relationship) and rejected H0 (there is no relationship) with a p-value of less than 0.05. The results of the bivariate analysis test showed that there was a significant relationship between hunched posture and the incidence of lower back pain during the past week or year. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the research entitled *The Relationship between Awkward Postures and the Incidence of Low Back Pain in Plantation Workers at the PT Mitra Bumi Palm Oil Factory in Kampar Regency*, obtained a p-value = 0.000 ($p < 0.05$) which means that there is a relationship between uncomfortable postures and the incidence of low back pain because workers do several uncomfortable postures such as looking up accompanied by a static position for 1 minute in harvesters and a bent position in workers loading and collecting the remaining results of picking tea leaves [19].

Poor posture while working such as a hunched posture can trigger lower back pain. Generally, a hunched posture occurs when the chair used while working does not meet ergonomic standards such as not being equipped with a backrest or from poor sitting habits. Inadequate workplace design such as chairs without wheels or without backrests and arms can make workers less free to move so that they often make twisting movements of the upper body [20].

The sitting position with the body leaning forward or bending less than 90 degrees results in a load on the lumbar region. More than 25% of the body's load increases at the center of gravity so there is an increase in intervertebral disc pressure. In the article (Dubey et al., 2019 in Janna, 2021) entitled *Ergonomics for Desk Job Workers* explains that correct posture not only maintains the natural curve of the spine but also minimizes stress on the human body. Therefore, the importance of sitting with correct posture when working in the office needs to be emphasized. Working for a long time in a non-ergonomic body position will cause muscle pain due to pressure [21].

4. Relationship between Sitting Duration and the Incidence of Lower Back Pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a P value of 0.560 for the past week and a P value of 0.440 for the past year. The results of the Fisher Exact analysis accepted H0 and rejected H1 (no relationship) with a p-value greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the

research of Ni Made and Novendy in 2022 with an observational analytical method with a cross-sectional design, namely that no correlation was found between sitting duration and the incidence of low back pain ($p = 0.595$) [15]. This back pain can occur in various work situations, but the risk is greater if sitting for a long time in a static position because it will cause continuous muscle contractions and narrowing of blood vessels. In the narrowing of blood vessels, blood flow is obstructed and ischemia occurs, tissue lacks oxygen and nutrients, while prolonged muscle contractions will cause lactic acid accumulation [22].

Low back pain is a chronic disease that develops gradually and takes a long time to develop. Factors such as long working hours exceeding 8 hours will affect the lumbar region which can cause pain if used continuously and not in a good ergonomic position [23]. The amount of efficient working time in a week is around 40-48 hours calculated in days between 5 or 6 working days and 30 minutes maximum time for additional work. The lack of relationship between sitting time and lower back pain in respondents can be caused by age, gender, smoking habits, work mass, and body mass index (BMI)[24].

Conclusion

The results of this study indicate that there is no statistically significant relationship between sitting position while working and the incidence of low back pain among employees at the Merdeka Health Center in 2024 ($p = 0.564$). These findings suggest that other factors beyond sitting posture may contribute more substantially to the occurrence of low back pain, underscoring the need for a broader ergonomic and occupational health assessment in similar work environments.

Conflict of Interest

The authors declare that there is no conflict of interest.

References

- [1] R. R. Al Mahdi, "HUBUNGAN POSTUR KERJA TERHADAP KELUHAN LOW BACK PAIN PADA PETANI DI DESA BULUS KECAMATAN BANDUNG KABUPATEN TULUNGAGUNG," Universitas Muhammadiyah Malang, 2024. [Online]. Available: <https://eprints.umm.ac.id/id/eprint/14278/>
- [2] K. A. Mastuti, "Gambaran kejadian low back pain pada karyawan CV. Pacific Garment," *J. Ilmu Kesehatan. Mandira Cendikia*, vol. 2, no. 8, pp. 297–305, 2023.
- [3] F. A. Makkiyah, T. A. Sinaga, and N. Khairunnisa, "A study from a highly populated country: risk factors associated with lower back pain in middle-aged adults," *J. Korean Neurosurg. Soc.*, vol. 66, no. 2, pp. 190–198, Mar. 2023, [Online]. Available: <https://synapse.koreamed.org/articles/1516081592>
- [4] W. Simatupang, "Hubungan posisi, durasi dan masa bekerja dengan kejadian nyeri punggung bawah (NPB) pada masyarakat penenun Ulos di Desa Lumban Suhi-Suhi Kecamatan Pangururan

- Kabupaten Samosir Sumatera Utara,” Universitas Sumatera Utara, 2019. [Online]. Available: <https://repository.usu.ac.id/handle/123456789/21891>
- [5] Y.-T. Wang *et al.*, “The effect of cupping therapy for low back pain: A meta-analysis based on existing randomized controlled trials,” *J. Back Musculoskelet. Rehabil.*, vol. 30, no. 6, pp. 1187–1195, Mar. 2017, doi: 10.3233/BMR-169736.
- [6] R. Rina, H. Hansen, and F. Fadzul, “Hubungan Sikap Kerja Mengemudi dan Durasi Mengemudi dengan Keluhan Nyeri Punggung Bawah (Low Back Pain) pada Pengemudi Bus di Terminal Lempake Kota Samarinda Tahun 2016,” 2016.
- [7] M. Latifah, M. Citrawati, and H. Yusmaini, “Hubungan posisi duduk dan lama duduk dengan low back pain pada pekerja sektor industri: Tinjauan sistematis,” Mar. 2022. [Online]. Available: <https://conference.upnvj.ac.id/index.php/sensorik/article/view/2067>
- [8] A. Saputra, “Sikap kerja, masa kerja, dan usia terhadap keluhan low back pain pada pengrajin batik,” *HIGEIA (Journal Public Heal. Res. Dev.)*, vol. 4, no. Special 1, pp. 147–157, Mar. 2020, [Online]. Available: <https://journal.unnes.ac.id/sju/higeia/article/view/36828>
- [9] V. E. Casiano, G. Sarwan, A. M. Dydyk, and M. Varacallo, “Back pain,” Mar. 2019, [Online]. Available: <https://europepmc.org/article/nbk/nbk538173>
- [10] N. P. Kumbea, O. J. Sumampouw, and A. Asrifuddin, “Keluhan nyeri punggung bawah pada nelayan,” *Indones. J. Public Heal. Community Med.*, vol. 2, no. 1, pp. 21–26, Mar. 2021, [Online]. Available: <https://ejournal.unsrat.ac.id/index.php/ijphcm/article/view/33580>
- [11] A. Rahmawati, “Risk factor of low back pain,” *J. Med. Hutama*, vol. 3, no. 01 Oktober, pp. 1601–1607, Mar. 2021, [Online]. Available: <http://www.jurnalmedikahutama.com/index.php/JMH/article/view/323>
- [12] M. G. DePalma, “Red flags of low back pain,” *Jaapa*, vol. 33, no. 8, pp. 8–11, Mar. 2020, [Online]. Available: https://journals.lww.com/jaapa/fulltext/2020/08000/Red_flags_of_low_back_pain.1.aspx/1000
- [13] E. C. Hills, “Mechanical Low Back Pain: Practice Essentials, Background,” *Pathophysiology*, 2022.
- [14] A. Biyani and G. B. J. Andersson, “Low back pain: pathophysiology and management,” *JAAOS-Journal Am. Acad. Orthop. Surg.*, vol. 12, no. 2, pp. 106–115, Mar. 2004, [Online]. Available: https://journals.lww.com/jaaos/fulltext/2004/03000/low_back_pain_pathophysiology_and_management.6.aspx
- [15] H. A. A. S. Napitu, “Hubungan Potensi Bahaya Ergonomi dengan Kejadian Nyeri Punggung Bawah selama Pembelajaran Jarak Jauh pada Mahasiswa FK UKI Angkatan 2019,” Universitas Kristen Indonesia, 2022. [Online]. Available: <http://repository.uki.ac.id/id/eprint/7738>
- [16] M. Sumangando, J. Rottie, and J. Lolong, “Hubungan beban kerja perawat dengan kejadian low back pain (LBP) pada perawat pelaksana di RS Tk. III RW Monginsidi Manado,” *J. Keperawatan UNSRAT*, vol. 5, no. 1, p. 110022, Mar. 2017, [Online]. Available: <https://ejournal.unsrat.ac.id/index.php/jkp/article/view/14717>
- [17] N. Milenia, “Pengaruh Posisi Duduk Terhadap Keluhan Low Back Pain Pada Mahasiswa Universitas Yarsi Angkatan 2018,” *J. Ilm. Mhs. Kedokt. Indones.*, vol. 10, no. 1, pp. 11–21, 2022.
- [18] S. Nur’aisyah, R. E. Sahputra, H. Ali, N. Noverial, G. Revilla, and Z. Fadila, “Hubungan Posisi dan Lama Duduk dengan Nyeri Punggung Bawah pada Mahasiswa Pendidikan Dokter Universitas Andalas,” *eJournal Kedokt. Indones.*, vol. 12, no. 1, p. 32, Mar. 2024, [Online]. Available: <https://ejki.fk.ui.ac.id/index.php/journal/article/view/373>
- [19] H. N. Fajar and S. Mulyani, “Hubungan Postur Kerja Terhadap Keluhan Low Back Pain Pemetik Teh PT Perkebunan Tambi Wonosobo,” *J. Appl. Agric. Heal. Technol.*, vol. 2, no. 1, pp. 15–21, Mar. 2023, [Online]. Available: <https://journal.uns.ac.id/jaht/article/view/526>
- [20] D. S. Nikaputra, M. Marji, and A. Kurniawan, “Studi literatur pengaruh postur kerja duduk dan lama kerja terhadap keluhan low back pain pada karyawan yang bekerja di depan komputer,” Mar. 2021. [Online]. Available: <http://conference.um.ac.id/index.php/starwars/article/view/2954>
- [21] A. B. Yulianto, S. Sartoyo, P. Wardoyo, and A. Fariz, “Hubungan Posisi Duduk Terhadap Keluhan Nyeri Punggung Bawah Pada Petugas Administrasi Di Rumah Sakit Perkebunan Jember Klinik,” *J. Keperawatan Muhammadiyah*, Mar. 2023, [Online]. Available: <https://journal.um-surabaya.ac.id/JKM/article/view/16604>
- [22] A. A. H. Dinata, “Hubungan lama duduk dengan kejadian nyeri punggung bawah,” *J. Med. Hutama*, vol. 3, no. 01 Oktober, pp. 1718–1722, Mar. 2021, [Online]. Available: <http://jurnalmedikahutama.com/index.php/JMH/article/view/350>
- [23] N. K. D. Sutami and I. A. A. Laksmi, “Hubungan durasi kerja dan posisi kerja dengan kejadian nyeri

- punggung bawah pada petani," *J. Borneo Holist. Heal.*, vol. 4, no. 2, pp. 85–96, Mar. 2021, [Online]. Available: <http://jurnal.borneo.ac.id:443/index.php/borticalth/article/view/2028>
- [24] M. Hutasoit *et al.*, "PENDAHULUAN Stunting atau pendek adalah kondisi kegagalan pertumbuhan pada balita yang ditandai dengan angka tinggi badan per umur kurang dari -2 (nilai z-score) (WHO , 2018). Kejadian stunting disebabkan kondisi kekurangan gizi kronis dalam rentang w," vol. 2, 2018.

Authors



1st Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: vidi.simarmata@uki.ac.id).



2nd Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: silphia.novelyn@uki.ac.id).



3rd Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. He is a subspecialist doctor for hypertension kidneys at Siloam Hospitals. (email: dr.situmorang@yahoo.co.uk).

Original Manuscript ID: 909

Original Article Title: Relationship between Sitting Position During Work and Lower Back Pain Incidence in Employees of Merdeka Community Health Center, Bogor City in 2024

To: IISTR Editorial Office

Re: Response to reviewers

Dear Editor,

Thank you for allowing a resubmission of our manuscript, with an opportunity to address the reviewers' comments.

We are uploading (a) our point-by-point response to the comments (below) (response to reviewers), (b) an updated manuscript with **yellow** highlighting indicating changes (pdf), and (c) a clean updated manuscript without highlights (*.docx main document/LaTeX files).

Best regards,

Vidi Posdo A. Simarmata

Reviewer#A, Concern # 1: The article uses Fisher Exact and Chi-Square tests. Clearly state the rationale for choosing one over the other in each case—especially for small expected frequencies in contingency tables

Author response: Agreed

Author action: The test used is Fisher Exact, and has been revised on the page 5. 10. 11.12

Reviewer#A, Concern # 2: The sample size is relatively small ($n = 35$). Include justification (e.g., minimum sample size calculation or power analysis) to explain sufficiency for statistical testing.

Author response: Agreed

Author action: The test used was Fisher Exact, because the number of samples was small (<50 respondents) and the article had been revised on the first page 5. 10. 11.12

Reviewer#A, Concern # 3: Variables such as "hunched posture" and "sitting on chair with/without backrest" are subjective. Were these self-reported or observed? If self-reported, how was bias minimized?

Author response: Variables such as "slouching posture" and "sitting on a chair with/without backrest" were self-reported. One way to minimize bias is to provide definitions of "slouching posture" and "sitting on a chair with/without backrest."

Author action: We updated the manuscript by revision on the page 5

Reviewer#2, Concern # 4: There are inconsistencies in describing p-value significance thresholds. Use a uniform threshold (e.g., $p < 0.05$) and avoid repetition (e.g., " $0.564 > 0.05$ " stated twice).

Author response: Agreed

Author action: We updated the manuscript by revision of abstract dan text in page 10

Reviewer#B, Concern # 1: This paper provides valuable insight into workplace ergonomics in health facilities, particularly regarding preventive strategies for musculoskeletal disorders. However, the presentation and theoretical framing require enhancement for stronger academic impact. Focuses on healthcare professionals—an often overlooked population in ergonomic studies. Balanced investigation of posture, sitting duration, and work type. Practical implications for occupational health programs and workplace redesign.

Author response: Agreed

Author action: We updated the manuscript by revision on page 5

Reviewer#2, Concern # 3: The manuscript includes grammatical issues and informal phrases: Replace “this shows...” with “these results indicate...”; Avoid redundant statements (e.g., conclusion restates multiple descriptive findings already detailed in results).

Author response: Agreed

Author action: We updated the manuscript by revision on page 6. 7

Reviewer#2, Concern #4 : The abstract should more clearly reflect the methodology and main findings (including statistical outcomes). Use a structured format: Background – Objective – Method – Results – Conclusion.

Author response: Thank you, the abstract is in the recommended format.

Author action: -

Reviewer#2, Concern #5: Move beyond summarizing and include: Recommendations for ergonomic intervention (e.g., mandatory breaks, adjustable chairs). Policy implications for local or national health institutions.

Author response: Agreed

Author action: We updated the manuscript by revision of Conclusion

Reviewer#2, Concern # 6: Tables are rich but visually dense. Use consistent formatting, number all tables, and add captions such as “Table 3: LBP Incidence in the Last Week.”

Author response: Agreed

Author action: We updated the manuscript by revision on all tables

Note: *References suggested by reviewers should only be added if it is relevant to the article and makes it more complete. Excessive cases of recommending non-relevant articles should be reported to editor@journal.iistr.org*

[← Back to Submissions](#)

Workflow

Publication

Submission

Review

Copyediting

Production

Copyediting Discussions					Add discussion
Name	From	Last Reply	Replies	Closed	
Request for Ethical Clearance Statement and Similarity Report	admin 2025-05-30 10:09 AM UTC	-	0	☐	
▶ Complete document for the publication of the article by Vidi et al	chome23 2025-06-12 05:02 AM UTC	-	0	☐	
▶ Revised files according to requests in copyedited files	chome23 2025-06-13 05:38 AM UTC	-	0	☐	
▶ Proof Payment Article Code 909 Vidi A Simarmata	chome23 2025-06-26 02:55 AM UTC	-	0	☐	

Copyedited	Search



6270

Copyedited_Article Revision_Vidi_JPHS.docx

June
5,
2025

Article Text

Journal of Public Health Sciences

Back to Submissions

909 / Sima

Workflow

Submis

Copy

Name

Requ

Co

Re

Pr

Note

From

admin

2025-05-30 10:09 AM UTC

Dear Authors,

Congratulations on the acceptance of your manuscript! We are pleased to inform you that we will proceed with publishing your work as soon as the remaining documentation and the copyediting process are completed.

However, before we can finalize the publication process, we kindly request the following:

- Ethical Clearance Statement**
Please provide an official ethical clearance statement from your institution.
- If formal ethical clearance was **not required**, kindly submit a statement from the authors or your institution explaining why it was not necessary. For instance, the participants may have been fully anonymized and unidentifiable, and the instruments/interventions used may have already undergone ethical review in previous studies.
- Informed Consent**
- If you have obtained written informed consent from participants, please upload the consent documentation (you may anonymize identifying information as needed).
- If such documentation is not available, please include a statement confirming that all participants gave their informed consent to participate in the study.
- Similarity Report**
- Please upload a similarity or plagiarism report (e.g., from Turnitin, iThenticate, or similar tools) to ensure the originality of the submission.

We greatly appreciate your cooperation and look forward to publishing your valuable work very soon. Should you have any questions or require assistance with the above, please don't hesitate to reach out.

Warm regards,
JPHS Editorial Office

Library

Discussion

Closed



Universitas Kristen Indonesia

Fakultas Kedokteran

THE ETHICS REVIEW COMMITTEE

Ethical Clearance

No. 14.A/Etik Penelitian/FKUKI/2024

The Ethics Review Committee Faculty of Universitas Kristen Indonesia after reviewing proposal entitled :

With the following :

Title : Relationship between Sitting Position During Work and Lower Back Pain Incidence in Employees of Merdeka Community Health Center, Bogor City in 2024.

Researcher : 1. Vidi Posdo Simarmata
2. Silphia Novelyn
3. Daniel R. P. Situmorang

Address : Universitas Kristen Indonesia
Jl. Mayjen Sutoyo No.2, RT.9/RW.6, Cawang, Kramat Jati, 13630

Stated the research has met ethical requirements to be implemented, based on The Indonesia National Guideliness on Health Research Ethic, Ministry of Health 2007.

Jakarta, May 12th 2024

The Ethics Review Committee

Universitas Kristen Indonesia

Chairman,

Dr. dr. Bambang Suprayogi, Sp.THT-KL., M.Si.Med
NIP UKI. 151198

Universitas Kristen Indonesia

Dean,

Dr. dr. Robert Sinarat, Sp.BS(K)
NIP UKI. 021525

INFORMED CONSENT (INFORMATION SHEET)

We, Dr. Vidi Posdo Simarmata, Dr. Silphia Novelyn, and Dr. Daniel R. Parsaoran Situmorang, intend to conduct a research study to investigate the relationship between sitting posture while working and the incidence of lower back pain among employees at Merdeka Public Health Center (Puskesmas Merdeka) in Bogor City. This study aims to determine whether there is a correlation between sitting posture during work and the occurrence of lower back pain in the employees of Puskesmas Merdeka, Bogor City. The results of this research will be used as a reference or foundation for efforts to reduce the incidence of lower back pain among employees, thereby improving their performance and productivity.

In this study, you will be asked to complete a questionnaire and participate in an interview, which will take approximately 15 minutes. Please answer the questions as truthfully and accurately as possible. There is no cost involved in participating in this research.

The researchers guarantee that this study will not have any negative impact on any party (including respondents, their families, or the community). All information and data obtained during the data collection, processing, and presentation stages of this research will be treated confidentially and will not be disclosed except for scientific or educational purposes.

Through the above explanation, we sincerely hope for your participation and willingness to sign the consent form to take part in this research. We also extend our gratitude for your participation and willingness to be a respondent in this study.

Jakarta, 5 Mei 2024

Researchers,



Vidi Posdo A. Simarmata

Relationship between Sitting Position During Work and Lower Back Pain Incidence in Employees of Merdeka Community Health Center, Bogor City in 2024

by Edi Wibowo

Submission date: 12-Jun-2025 09:27AM (UTC+0700)

Submission ID: 2668747492

File name: C-Article_Revision_Vidi_JPHS.docx (301.35K)

Word count: 5711

Character count: 30319

Relationship between Sitting Position During Work and Lower Back Pain Incidence in Employees of Merdeka Community Health Center, Bogor City in 2024

¹Vidi Posdo A. Simarmata*, ²Silphia Novelyn, ³Daniel R. Parsaoran Situmorang

Corresponding Author: *vidi.simarmata@uki.ac.id

¹ Department of Medical Community, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

² Department of Anatomy, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

³ Department of Internal Medicine, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

ARTICLE INFO

Article history

Received XX July 2022

Revised XX August 2022

Accepted XX August 2022

ABSTRACT

Background: Low back pain occurs when the back hurts so much that routine tasks are difficult. The health center is one of the environments with ergonomics activities, such as lifting, pushing, pulling, reaching, carrying objects, and handling patients with more vulnerable potential hazards that can cause disorders of the musculoskeletal system. **Purpose:** This study aims to determine whether the incidence of low back pain in Merdeka Health Center employees in 2024 is related to sitting position while working. **Method:** An analytical survey with a cross-sectional approach is the research method used. The research tool used is a questionnaire that collects primary data, with a total of 35 respondents who meet the inclusion criteria. **Result:** From the research results, data was obtained that respondents were dominated by female employees (82.9%), employees with an age range of 26 to 35 years (40%), employees working in functional sections (51.4%), employees with a sitting position while working on a chair with a backrest (82.9%), employees who do not work with a hunched posture (60%), and employees who work for less than 6 hours a day (62.9%). The results of data analysis showed a p-value = 0.564 ($p > 0.005$). **Conclusion:** There is no significant relationship between sitting position while working and lower back pain in employees of Merdeka

Health Center, Bogor City in 2024 from the results of the analysis for the past week and year.

Keywords

Low Back Pain
Ergonomics
Health Center
Sitting Position
Sitting Position at Work
Hunched Posture
Sitting Duration

This is an open-access article under the [CC-BY-SA](#) license.



Introduction

Occupational Safety and Health (K3) is an effort to provide safety and health guarantees to improve the health of workers by preventing work accidents and occupational diseases, accompanied by health promotion, treatment, and rehabilitation. Low back pain is an ergonomic problem that is often found in the implementation of K3 which has an impact on economic losses due to decreased work capacity and worker productivity. Low back pain is local and/or radicular pain that is felt between the lower costal arch to the lumbosacral area [1]. According to data from the World Health Organization (2022), low back pain is the 3rd health problem in the world after osteoarthritis and rheumatism with a total of 17.3 million people. According to the Directorate General of Health Services of the Ministry of Health of the Republic of Indonesia (Kemenkes RI) in 2018, the prevalence of Low Back Pain in Indonesia was 18% [2].

Community Health Centers or commonly referred to as Puskesmas are one of the health service facilities that implement public health efforts and individual health efforts at the first level, whose main focus is organizing promotive and preventive efforts, in order to achieve a high level of public health in their work area, by prioritizing the safety and security of patients, officers, and visitors (Ministry of Health, 2014) [1]. Health centers as a means of public health

services have potential hazards that affect officers, patients, visitors and the surrounding community. Potential hazards such as physical, chemical, biological, ergonomic and psychosocial hazards. Health centers are one of the environments where there are activities related to ergonomics, such as lifting, pushing, pulling, reaching, carrying objects, and handling patients who have more vulnerable potential hazards that can cause disorders of the musculoskeletal system [1].

The prevalence of LBP continues to increase and is caused by risk factors such as aging, a sedentary lifestyle, and jobs that involve heavy lifting or non-ergonomic sitting positions. Poor sitting positions, such as using chairs that do not support good posture or inappropriate work desks, are often the main cause of discomfort and pain in the lower back. In addition, factors such as the duration of sitting, frequency of breaks, and stress levels at work also contribute to the increased risk of low back pain [3]. Working positions are divided into two, namely static positions and dynamic positions. Static positions are working positions without moving the joints and for a long period [4]. The effect of static positions will disrupt the distribution of nutritional intake in the body, the metabolism process and the spine will also be disrupted [5]. While dynamic positions according to Rina et al. are working positions that involve a lot of movement in the joints [6]. Based on the discussion using Systematic Review by Murti Latifah in 2022, it can be concluded that sitting position and sitting duration play a role in the occurrence of low back pain complaints in workers [7]. This is supported by research conducted by Saputra in 2020 stating that symptoms of lower back pain are often influenced by non-ergonomic sitting work positions so that there is a disturbance in the stability of body posture when working and a relationship was found between sitting position and the incidence of lower back pain among batik craftsmen with a p-value = 0.042 [8].

Based on the high prevalence of low back pain which is often associated with sitting position while working and based on the background above, the author is interested in conducting a study entitled The Relationship between Sitting Position while Working and the Incidence of Lower Back Pain in Employees of the Merdeka Health Center, Bogor City in 2024. The purpose of this study was to understand whether there is a relationship between sitting position while working and the incidence of lower back pain in employees of the Merdeka Health Center, Bogor City in 2024.

Literature Review

A. Low Back Pain

Low back pain is a symptom, not a disease, which can be caused by various factors, known and unknown; and is determined by its location, which is between the XII rib (lower rib margin) and the gluteal fold. This pain is local or radicular or both, and is often accompanied by pain in

one or both legs and is associated with neurological symptoms in the lower extremities [3]. According to The International Classification of Diseases, the prevalence of low back pain is defined as acute or chronic pain in the lumbar and/or sacral region of the spine, which can be caused by sprains, strains, shifts of the intervertebral discs, or any part of the anatomical spine around the spine [9].

There are five main categories of etiology of low back pain. First, mechanical, such as injury to the spine or intervertebral disc. Herniated intervertebral disc is also a common factor. Pregnancy can also be a mechanical cause of back pain. Second, degenerative process. The presence of degenerative conditions such as osteoarthritis of the spine and degenerative disc disease. Third, inflammation, this is mainly caused by inflammatory spondyloarthropathies (seronegative) such as ankylosing spondylitis. Fourth, oncological or malignant, this can be caused by the presence of lytic lesions in the spine, bone marrow cancer, or the phenomenon of nerve compression from lesions that occupy adjacent spaces. Often appears as a pathological fracture. And the fifth, by infection. Can occur from spinal infections, discs, epidural abscesses, and muscle/soft tissue abscesses [10].

Based on its onset, lower back pain can be divided into: 1) Acute pain, which is sudden, deep, and severe. A person cannot sleep well, and the painful area in his back increases with every movement. The discomfort lasts less than eight weeks; 2) Chronic pain, which is ongoing and usually does not go away. Although it sometimes lasts a week or a few weeks, the discomfort often appears after a few days. Sometimes repeated pain and simple exercise can also cause recurrence [11]. Clinical findings of sciatica usually include a history of dermatomal leg pain, leg pain that is worse than back pain, and leg pain that worsens when the patient coughs, strains, or sneezes. At the same time, radiculopathy is characterized by weakness, decreased sensory sensitivity or motor disturbances related to the radices or a combination of these and occurs with radicular pain [12].

There are several symptoms and signs to watch out for in people with lower back pain, known as red flags. If someone has the symptoms or signs mentioned, they should immediately get a referral for therapy. The components of red flags are divided into symptoms and signs. Some components of symptoms are age under 18, age over 50, immunocompromised and components of signs are lower extremity muscle weakness, saddle anesthesia, decreased anal sphincter tone, hyperreflexia, hyporeflexia, and areflexia [13]. Several anatomical structures and components of the lumbar spine (such as bones, ligaments, tendons, discs, and muscles) all play a role in the occurrence of low back pain. The majority of components of the lumbar spine have sensory nerves that can produce nociceptive signals and function in responding to stimuli that damage the tissue. Neuropathic (such as sciatica) is also a cause and most cases of chronic low back pain have a mixed etiology of nociception and neuropathic [14].

To provide a robust academic foundation, this study adopts an integrated theoretical approach combining:

1. **The Biomechanical Model of Musculoskeletal Disorders**

This model posits that mechanical loading on the spine—such as compression, shear, and torque forces—can lead to micro-injuries of spinal structures when posture is suboptimal or ergonomics are poor. Sustained forward flexion (e.g., hunched sitting) can increase disc pressure and alter lumbar curvature, predisposing workers to LBP.

2. **The NIOSH Work-Related Musculoskeletal Disorder (WMSD) Framework**

Developed by the National Institute for Occupational Safety and Health (NIOSH), this framework highlights key occupational risk factors—awkward posture, force, and repetition—as contributors to musculoskeletal disorders. Sitting position is a critical component of the "awkward posture" risk domain.

3. **The Biopsychosocial Model of Pain**

Recognizing that pain perception and chronicity are influenced not only by physical factors but also by psychosocial elements (e.g., stress, job satisfaction, and individual health beliefs), this model allows for a holistic interpretation of LBP in the context of the work environment.

Material And Methods

The research design uses an analytical survey with a cross-sectional approach and uses primary data obtained through a questionnaire sheet. The results of this study were processed using Fisher Exact test which was then analyzed in depth. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The inclusion criteria include: 1) Employees of the Merdeka Health Center, Bogor City; 2) Willing to be respondents; while the exclusion criteria include: 1) Respondents who are unwilling; 2) Respondents who have spinal abnormalities such as scoliosis; 3) Respondents who have spinal diseases such as spondylosis or herniated nucleus pulposus (HNP); 4) Respondents who have a history of spinal trauma.

The data in this study are primary data because they were collected by the researcher himself and obtained directly from the respondents. Information was collected through a

Title: Paper Formatting for IISTR (max. 12 words) (First author, et al.)

questionnaire sheet that would be given to the respondents. Before filling out the questionnaire, participants were asked to provide their identity and answer several questions about the exclusion criteria. The research instrument or tool used in this study is a questionnaire sheet consisting of two parts. The first part contains patient data and the variables studied as well as questions regarding exclusion criteria. The second part of the questionnaire is the Roland-Morris Disability Questionnaire. In this second part, 17 questions function to determine whether or not there is a disability caused by the occurrence of lower back pain. In this study, the questionnaire used was the Roland-Morris Disability Questionnaire (RMDQ) which had been translated into Indonesian and had passed the validity test by Ghina Widiasih in 2015 [15]. The researcher used the translated RMDQ which had also passed the validity test by the previous researcher, Heydi Amorina Abigail Saragi Napitu, which showed the same results. The results of the test showed that out of 24 statements, 7 statements were considered invalid so the statements used in Indonesian totaled 17 statements. Therefore, it can be stated that this translated RMDQ questionnaire is reliable [16]. To minimize bias, several variables that are subjective in nature, such as: Variables such as "hunched body posture" and "sitting on a chair with/without a backrest" were defined by providing definitions in the instrument script.

Data analysis was conducted using univariate and bivariate methods. Univariate analysis was conducted to describe the frequency distribution of each variable studied and will be presented in the form of a percentage using a table. Bivariate analysis was conducted to find the relationship between the potential incidence of lower back pain and sitting position in employees of the Merdeka Health Center, Bogor City using a non-parametric statistical test, namely Fisher Exact, the results of which are expressed in P value or P value using IBM Statistics SPSS software version [16].

Results

A. Respondent Profile

The study was conducted at the Merdeka Health Center in Bogor City, the results of this study were obtained from primary data in the form of questionnaires. Based on the questionnaire data, a total of 35 respondents were obtained. 35 respondents had data following the inclusion criteria.

Table 1 indicate the characteristics of respondents based on gender, age, and job description. In terms of gender, it is dominated by women, with 29 out of 35 respondents, or 82.9 percent which means that there are only 6 male health workers at the Merdeka Health

Center, Bogor City. Meanwhile, age is dominated by respondents aged 26 to 35 years, with 14 out of 35 respondents or 40%, in other words, health workers at the Merdeka Health Center in Bogor City are dominated by young people. In terms of Jobs, it was found that the number of administrative work frequencies was 48.6% or 17 people and functional workers were 51.4% or 18 people.

Table 1: Profile of Respondent

Profile	Frequency	Percentage
Gender		
Male	6	17.1
Female	29	82.9
Age		
16-25 year	3	8.6
26-35 year	14	40.0
36-45 year	7	20.0
46-55 year	8	22.9
56-65 year	3	8.6
Job		
Administrative	17	48.6
Functional	18	51.4

B. Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, Sitting Duration, Incidence of Lower Back Pain in the Past Week, and Incidence of Lower Back Pain in the Past Year

1. Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, and Sitting Duration

Table 2 indicate the distribution data of respondents with a sitting position on a chair with a backrest with 29 out of 35 respondents or 82.9 percent and a sitting position on a chair without a backrest as many as 6 respondents or 17.1 percent. Meanwhile, based on sitting posture, most respondents were in a non-hunchback position with 21 out of 35 respondents or 60 percent, and with a hunchback position as many as 14 respondents or 40 percent. Meanwhile, based on the duration of sitting, data obtained showed that the longest sitting duration was <6 hours, namely 22 out of 35 respondents or 62.9 percent.

Table 2: Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, and Sitting Duration

Description	Frequency	Percentage
Sitting Position		
Sitting on a chair with a backrest	29	82.9
Sitting on a chair without a backrest	6	17.1
Hunched Posture		
Hunchback	14	40
Not hunched	21	60

Title: Paper Formatting for IISTR (max. 12 words) (First author, et al.)

Sitting Duration		
<6 hours	22	62.9
6 – 9 hours	13	37.1

2. Frequency Distribution of Respondents Based on the Incidence of Low Back Pain during the Last Week and Based on the Incidence of Low Back Pain during the Last Year

Table 3 indicates data that the majority of respondents did not experience lower back pain during the last week or in the last year, namely 25 out of 35 respondents or 71.4 percent.

Table 3: Frequency Distribution of Respondents Based on the Incidence of Low Back Pain during the Last Week and Based on the Incidence of Low Back Pain during the Last Year

Description	Frequency	Percentage
Lower Back Pain Occurrence in the Past Week		
Lower Back Pain	10	28.6
No Lower Back Pain	25	71.4
Lower Back Pain Occurrence in the Past Year		
Lower Back Pain	10	28.6
No Lower Back Pain	25	71.4

C. Bivariate Analysis

1. Relationship of Potential Ergonomic Hazards to the Incidence of Lower Back Pain in the Past Week

Table 4: Relationship of Work to the Incidence of Low Back Pain in the Past Week

Job Type	Lower Back Pain For The Past Week		P-Value	Odd Ratio
	yes	No		
Administrative	4	13	0.396	0.615
Functional	6	12		

It was found that respondents who experienced lower back pain during the past week amounted to 4 people in administrative workers and 6 people in functional workers. Showing the results of P value 0.396. A value of less than 0.05 is the maximum significant value in determining the relationship.

2. Relationship Between Sitting Position at Work and Lower Back Pain During the Past Week

Table 5: Relationship Between Sitting Position at Work and Lower Back Pain During the Past Week

Sitting Position	Lower Back Pain for The Past Week		P-Value	Odd Ratio
	yes	No		
Sitting on a chair with a backrest	8	21	0.564	1.313
Sitting on a chair without a backrest	2	4		

It was found that respondents who experienced lower back pain during the past week were 2 people sitting in a chair with a backrest and 8 people sitting in a chair

without a backrest. Showing a P value of 0.564. A value of less than 0.05 is the maximum significant value in determining the relationship.

3. Relationship Between Stooped Posture at Work and Lower Back Pain During the Past Week

Table 6: Relationship Between Stooped Posture at Work and Lower Back Pain During the Past Week

Hunched Posture	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
Yes	7	70	7	28	0.029	6.000
No	3	30	18	72		

There were 7 respondents with a hunched posture and 3 respondents with a non-hunched posture who experienced lower back pain in the last week with a P value of 0.029.

4. Relationship Between Sitting Duration at Work and Lower Back Pain Incidence in the Past Week

Table 7: Relationship Between Sitting Duration at Work and Lower Back Pain Incidence in the Past Week

Sitting Duration	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
6 – 9 hours	4	40	9	36	0.560	0.844
< 6 hours	6	60	16	64		

There were 4 respondents with a sitting duration of 6-9 hours a day or a high-risk duration who experienced lower back pain during the last week with a P value of 0.560.

5. Relationship of Potential Ergonomic Hazards to Lower Back Pain Incidence in the Past Year

Table 8: Relationship of Potential Ergonomic Hazards to Lower Back Pain Incidence in the Past Year

Job Type	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Administrative	3	30	14	56	0.155	0.337
Functional	7	70	11	44		

It was found that respondents who experienced lower back pain during the past year amounted to 3 people in administrative workers and 7 people in functional

workers. Showing the results of P value 0.155. A value of less than 0.05 is the maximum significant value in determining the relationship.

6. Relationship Between Sitting Position at Work and Lower Back Pain Incidence in the Past Year

Table 9: Relationship Between Sitting Position at Work and Lower Back Pain Incidence in the Past Year

Sitting Position	Lower Back Pain for The Past Year		P-Value		Odd Ratio
	yes	%	No	%	
Sitting on a chair with a backrest	8	80	21	84	0.564 1.313
Sitting on a chair without a backrest	2	20	4	12	

It was found that 8 respondents experienced lower back pain in the last year sitting on chairs with backrests and 2 people sitting on chairs without backrests with a P value of 0.564.

7. Relationship between Stoop Posture at Work and the Incidence of Lower Back Pain in the Past Year

Table 10: Relationship between Stoop Posture at Work and the Incidence of Lower Back Pain in the Past Year

Hunched Posture	Lower Back Pain for The Past Year		P-Value		Odd Ratio
	yes	%	No	%	
Yes	7	70	7	28	0.029 6.000
No	3	30	18	72	

D. Discussion

1. Relationship of Work with the Incidence of Lower Back Pain

The results of the study were obtained from 35 respondents, there were 4 people in the administrative section and 6 people in the functional section. In the distribution of the frequency of lower back pain in the past year, there were 3 people in the administrative section and 7 people in the functional section. The results of the study conducted using Fisher Exact Analysis of the relationship between work and the incidence of lower back pain obtained a P value of 0.396 for the past week and a P value of 0.155 for the past year. The results of the Fisher Exact test analysis accept H0 and reject H1 (there is no relationship) with a p-value greater than 0.05 in the last week and the last year.

This result is in line with the research conducted by Sumangando et al in 2017 entitled "The relationship between nurses' workload and the incidence of Low Back Pain (LBP) in implementing nurses at RS TK.III. R.W Monginsidi Manado". The results showed that there was no relationship between nurses' workload and the incidence of low back pain in implementing nurses at RS TK.III R.W Monginsidi Manado. This can be seen through the Fisher Exact test with a significance level of 95% ($\alpha = 0.05$), the analysis result is 0.365, so the value of $p > \alpha$. Based on the theory and several studies, it states that it is not only workload that can cause LBP, but there are several risk factors, namely age, gender, BMI, lifestyle and smoking habits [16].

2. Relationship Between Sitting Position and Lower Back Pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting position and the incidence of lower back pain obtained a P value of 0.564 for the past week and for the past year ($p > 0.05$). The results of the Fisher Exact test analysis accepted H_0 and rejected H_1 (no relationship) with a p-value greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with research by Shafira Nur Aisyah in 2021 with a P value = 0.406, there is no relationship between sitting position and lower back pain can be caused by many factors other than sitting position such as physical exercise, smoking, and BMI.28 Based on the Fisher Exact analysis by Natasya in 2018, the P value of sitting position with LBP complaints was 0.741 ($p > 0.05$), meaning there is no significant relationship between sitting position and LBP complaints [17].

The ideal sitting position is described as a position that is in accordance with a good sitting position, namely sitting upright, shoulders back, and buttocks touching the chair. While the less than ideal and non-ideal sitting position is a sitting position other than the ideal position. The less than ideal position is described as a hunched sitting position, legs crossed / legs hanging. The arrangement of the workplace and appropriate seating must be arranged so that there is no harmful effect on health and minimizes the potential for danger due to ergonomic factors [18].

3. The Relationship Between Stooped Posture and the Incidence of Lower Back Pain

The Relationship Between Stooped Posture and the Incidence of Lower Back Pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a

P value of 0.029 for the past week and a P value of 0.029 for the past year. The results of Fisher Exact accepted H1 (there is a relationship) and rejected H0 (there is no relationship) with a p-value of less than 0.05. The results of the bivariate analysis test showed that there was a significant relationship between hunched posture and the incidence of lower back pain during the past week or year. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the research entitled ³ **The Relationship between Awkward Postures and the Incidence of Low Back Pain** in Plantation Workers at the PT Mitra Bumi Palm Oil Factory in Kampar Regency, obtained a p-value = 0.000 ($p < 0.05$) which means that there is a relationship between uncomfortable postures and the incidence of low back pain because workers do several uncomfortable postures such as looking up accompanied by a static position for 1 minute in harvesters and a bent position in workers loading and collecting the remaining results of picking tea leaves [19].

Poor posture while working such as a hunched posture can trigger lower back pain. Generally, a hunched posture occurs when the chair used while working does not meet ergonomic standards such as not being equipped with a backrest or from poor sitting habits. Inadequate workplace design such as chairs without wheels or without backrests and arms can make workers less free to move so that they often make twisting movements of the upper body [20].

The sitting position with the body leaning forward or bending less than 90 degrees results in a load on the lumbar region. More than 25% of the body's load increases at the center of gravity so there is an increase in intervertebral disc pressure. In the article (Dubey et al., 2019 in Janna, 2021) entitled Ergonomics for Desk Job Workers explains that correct posture not only maintains the natural curve of the spine but also minimizes stress on the human body. Therefore, the importance of sitting with correct posture when working in the office needs to be emphasized. Working for a long time in a non-ergonomic body position will cause muscle pain due to pressure [21].

4. ³ **Relationship between Sitting Duration and the Incidence of Lower Back Pain** ¹¹

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a P value of 0.560 for the past week and a P value of 0.440 for the past year. The results of the Fisher Exact analysis accepted H0 and rejected H1 (no relationship) with a p-value greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the

research of Ni Made and Novendy in 2022 with an observational analytical method with a cross-sectional design, namely that no correlation was found between sitting duration and the incidence of low back pain ($p = 0.595$) [15]. This back pain can occur in various work situations, but the risk is greater if sitting for a long time in a static position because it will cause continuous muscle contractions and narrowing of blood vessels. In the narrowing of blood vessels, blood flow is obstructed and ischemia occurs, tissue lacks oxygen and nutrients, while prolonged muscle contractions will cause lactic acid accumulation [22]. Low back pain is a chronic disease that develops gradually and takes a long time to develop. Factors such as long working hours exceeding 8 hours will affect the lumbar region which can cause pain if used continuously and not in a good ergonomic position [23]. The amount of efficient working time in a week is around 40-48 hours calculated in days between 5 or 6 working days and 30 minutes maximum time for additional work.¹ The lack of relationship between sitting time and lower back pain in respondents can be caused by age, gender, smoking habits, work mass, and body mass index (BMI)[24].

Conclusion

The results of ¹⁷ this study indicate that there is no statistically significant relationship between sitting position while working and the incidence of low back pain among employees at the Merdeka Health Center in 2024 ($p = 0.564$). These findings suggest that other factors beyond sitting posture may contribute more substantially to the occurrence of low back pain, underscoring the need for a broader ergonomic and occupational health assessment in similar work environments.

Conflict of Interest

The authors declare that there is no conflict of interest.

References

- [1] R. R. Al Mahdi, "HUBUNGAN POSTUR KERJA TERHADAP KELUHAN LOW BACK PAIN PADA PETANI DI DESA BULUS KECAMATAN BANDUNG KABUPATEN TULUNGAGUNG," Universitas Muhammadiyah Malang, 2024. [Online]. Available: <https://eprints.umm.ac.id/id/eprint/14278/>
- [2] K. A. Mastuti, "Gambaran kejadian low back pain pada karyawan CV. Pacific Garment," *J. Ilmu Kesehatan. Mandira Cendikia*, vol. 2, no. 8, pp. 297–305, 2023.
- [3] F. A. Makkiyah, T. A. Sinaga, and N. Khairunnisa, "A study from a highly populated country: risk factors associated with lower back pain in middle-aged adults," *J. Korean Neurosurg. Soc.*, vol. 66, no. 2, pp. 190–198, Mar. 2023, [Online]. Available: <https://synapse.koreamed.org/articles/1516081592>
- [4] W. Simatupang, "Hubungan posisi, durasi dan masa bekerja dengan kejadian nyeri punggung bawah (NPB) pada masyarakat penenun Ulos di Desa Lumban Suhi-Suhi Kecamatan Pangururan

Title: Paper Formatting for IISTR (max. 12 words) (First author, et al)

- Kabupaten Samosir Sumatera Utara," Universitas Sumatera Utara, 2019. [Online]. Available: <https://repositori.usu.ac.id/handle/123456789/21891>
- [5] Y.-T. Wang *et al.*, "The effect of cupping therapy for low back pain: A meta-analysis based on existing randomized controlled trials," *J. Back Musculoskelet. Rehabil.*, vol. 30, no. 6, pp. 1187–1195, Mar. 2017, doi: 10.3233/BMR-169736.
 - [6] R. Rina, H. Hansen, and F. Fadzul, "Hubungan Sikap Kerja Mengemudi dan Durasi Mengemudi dengan Keluhan Nyeri Punggung Bawah (Low Back Pain) pada Pengemudi Bus di Terminal Lempake Kota Samarinda Tahun 2016," 2016.
 - [7] M. Latifah, M. Citrawati, and H. Yusmaini, "Hubungan posisi duduk dan lama duduk dengan low back pain pada pekerja sektor industri: Tinjauan sistematis," Mar. 2022. [Online]. Available: <https://conference.upnvj.ac.id/index.php/sensorik/article/view/2067>
 - [8] A. Saputra, "Sikap kerja, masa kerja, dan usia terhadap keluhan low back pain pada pengrajin batik," *HIGEIA (Journal Public Heal. Res. Dev.)*, vol. 4, no. Special 1, pp. 147–157, Mar. 2020, [Online]. Available: <https://journal.unnes.ac.id/sju/higeia/article/view/36828>
 - [9] V. E. Casiano, G. Sarwan, A. M. Dydyk, and M. Varacallo, "Back pain," Mar. 2019, [Online]. Available: <https://europepmc.org/article/nbk/nbk538173>
 - [10] N. P. Kumba, O. J. Sumampouw, and A. Asrifuddin, "Keluhan nyeri punggung bawah pada nelayan," *Indones. J. Public Heal. Community Med.*, vol. 2, no. 1, pp. 21–26, Mar. 2021, [Online]. Available: <https://ejournal.unsrat.ac.id/index.php/ijphcm/article/view/33580>
 - [11] A. Rahmawati, "Risk factor of low back pain," *J. Med. Utama*, vol. 3, no. 01 Oktober, pp. 1601–1607, Mar. 2021, [Online]. Available: <http://www.jurnalmedikahutama.com/index.php/JMH/article/view/323>
 - [12] M. G. DePalma, "Red flags of low back pain," *Jaapa*, vol. 33, no. 8, pp. 8–11, Mar. 2020, [Online]. Available: https://journals.lww.com/jaapa/fulltext/2020/08000/Red_flags_of_low_back_pain.1.aspx/1000
 - [13] E. C. Hills, "Mechanical Low Back Pain: Practice Essentials, Background," *Pathophysiology*, 2022.
 - [14] A. Biyani and G. B. J. Andersson, "Low back pain: pathophysiology and management," *JAAOS-Journal Am. Acad. Orthop. Surg.*, vol. 12, no. 2, pp. 106–115, Mar. 2004, [Online]. Available: https://journals.lww.com/jaas/fulltext/2004/03000/low_back_pain_pathophysiology_and_management.6.aspx
 - [15] H. A. A. S. Napitu, "Hubungan Potensi Bahaya Ergonomi dengan Kejadian Nyeri Punggung Bawah selama Pembelajaran Jarak Jauh pada Mahasiswa FK UKI Angkatan 2019," Universitas Kristen Indonesia, 2022. [Online]. Available: <http://repository.uki.ac.id/eprint/7738>
 - [16] M. Sumangando, J. Rottie, and J. Lolong, "Hubungan beban kerja perawat dengan kejadian low back pain (LBP) pada perawat pelaksana di RS Tk. III RW Monginsidi Manado," *J. Keperawatan UNSRAT*, vol. 5, no. 1, p. 110022, Mar. 2017, [Online]. Available: <https://ejournal.unsrat.ac.id/index.php/jkp/article/view/14717>
 - [17] N. Milenia, "Pengaruh Posisi Duduk Terhadap Keluhan Low Back Pain Pada Mahasiswa Universitas Yarsi Angkatan 2018," *J. Ilm. Mhs. Kedokt. Indones.*, vol. 10, no. 1, pp. 11–21, 2022.
 - [18] S. Nur'aisyah, R. E. Sahputra, H. Ali, N. Noverial, G. Revilla, and Z. Fadila, "Hubungan Posisi dan Lama Duduk dengan Nyeri Punggung Bawah pada Mahasiswa Pendidikan Dokter Universitas Andalas," *ejournal Kedokt. Indones.*, vol. 12, no. 1, p. 32, Mar. 2024, [Online]. Available: <https://ejki.fk.ui.ac.id/index.php/journal/article/view/373>
 - [19] H. N. Fajar and S. Mulyani, "Hubungan Postur Kerja Terhadap Keluhan Low Back Pain Pemetik Teh PT Perkebunan Tambi Wonosobo," *J. Appl. Agric. Heal. Technol.*, vol. 2, no. 1, pp. 15–21, Mar. 2023, [Online]. Available: <https://journal.uns.ac.id/jaht/article/view/526>
 - [20] D. S. Nikaputra, M. Marji, and A. Kurniawan, "Studi literatur pengaruh postur kerja duduk dan lama kerja terhadap keluhan low back pain pada karyawan yang bekerja di depan komputer," Mar. 2021, [Online]. Available: <http://conference.um.ac.id/index.php/starwars/article/view/2954>
 - [21] A. B. Yulianto, S. Sartoyo, P. Wardoyo, and A. Fariz, "Hubungan Posisi Duduk Terhadap Keluhan Nyeri Punggung Bawah Pada Petugas Administrasi Di Rumah Sakit Perkebunan Jember Klinik," *J. Keperawatan Muhammadiyah*, Mar. 2023, [Online]. Available: <https://journal.um-surabaya.ac.id/JKM/article/view/16604>
 - [22] A. A. H. Dinata, "Hubungan lama duduk dengan kejadian nyeri punggung bawah," *J. Med. Utama*, vol. 3, no. 01 Oktober, pp. 1718–1722, Mar. 2021, [Online]. Available: <http://jurnalmedikahutama.com/index.php/JMH/article/view/350>
 - [23] N. K. D. Sutami and I. A. A. Laksmi, "Hubungan durasi kerja dan posisi kerja dengan kejadian nyeri

- punggung bawah pada petani," *J. Borneo Holist. Heal*, vol. 4, no. 2, pp. 85–96, Mar. 2021, [Online]. Available: <http://jurnal.borneo.ac.id:443/index.php/borticalth/article/view/2028>
- [24] M. Hutasoit *et al.*, "PENDAHULUAN Stunting atau pendek adalah kondisi kegagalan pertumbuhan pada balita yang ditandai dengan angka tinggi badan per umur kurang dari -2 (nilai z-score) (WHO , 2018). Kejadian stunting disebabkan kondisi kekurangan gizi kronis dalam rentang w," vol. 2, 2018.

Authors



1st Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: vidi.simarmata@uki.ac.id).



2nd Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: silphia.novelyn@uki.ac.id).



3rd Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. He is a subspecialist doctor for hypertension kidneys at Siloam Hospitals. (email: dr.situmorang@yahoo.co.uk).

Relationship between Sitting Position During Work and Lower Back Pain Incidence in Employees of Merdeka Community Health Center, Bogor City in 2024

ORIGINALITY REPORT

13%

SIMILARITY INDEX

12%

INTERNET SOURCES

9%

PUBLICATIONS

4%

STUDENT PAPERS

PRIMARY SOURCES

1	jurnal.globalhealthsciencegroup.com Internet Source	1 %
2	repository.uki.ac.id Internet Source	1 %
3	www.ijahst.org Internet Source	1 %
4	Faeze Sarraf, Saeid Abbasi, Sakineh Varmazyar. "Self-Management Exercises Intervention on Text Neck Syndrome Among University Students Using Smartphones", Pain Management Nursing, 2023 Publication	1 %
5	e-journal.fkmumj.ac.id Internet Source	1 %
6	garuda.kemdikbud.go.id Internet Source	1 %
7	Khoirul Anwar, Alya Salsabilla, Muh. Nur Hasan Syah. "Relationship between the Frequency of Formula Feeding and the Use of Milk Bottle Size with the Nutritional Status of Infants Aged 0-24 Months at Puskesmas Merdeka, Bogor City", Amerta Nutrition, 2023 Publication	1 %
8	Farisa Ulul Azmi, Riska Risty Wardhani, Prihantoro Larasati Mustiko. "Relationship	1 %

Between Work Position and Non-Specific Low Back Pain Incidence in Farmer Groups", FISIO MU: Physiotherapy Evidences, 2025

Publication

9	cris.maastrichtuniversity.nl Internet Source	1 %
10	herminahospitals.com Internet Source	1 %
11	www.seejph.com Internet Source	1 %
12	ejournalmalahayati.ac.id Internet Source	1 %
13	www.theijmed.com Internet Source	1 %
14	Augustine, Grace. "The Effect of Treatment Modalities on Chronic Low Back Pain and Self-Transcendence.", Barry University, 2020 Publication	1 %
15	Submitted to Palm Beach Atlantic University Student Paper	1 %
16	emedicine.medscape.com Internet Source	1 %
17	repository.uinsu.ac.id Internet Source	1 %

Exclude quotes On

Exclude matches < 1%

Exclude bibliography On

Journal of Pub

Back to Submissions

909 / Simarr

Workflow

Submissi

Coppe

Name

Reques

Revised files according to requests in copyedited files

Participants

Cyril B. Romero (cyril)

jers chome (chome23)

Journal Layouter - Copyeditor (layouter)

Messages

Note	From
Here we send the article file that we have adjusted to the editor's suggestions written in the copyedited file. Thank you	chome23 2025-06-13 05:38 AM UTC
909-Article Text-4828-6270-9-20250605_Revision.docx	

Add Message

Relationship between Sitting Position and Lower Back Pain in Employees of Community Health Center

¹Vidi Posdo A. Simarmata*, ²Silphia Novelyn, ³Daniel R. Parsaoran Situmorang

Corresponding Author: * vidi.simarmata@uki.ac.id

¹ Department of Medical Community, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

² Department of Anatomy, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

³ Department of Internal Medicine, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

ARTICLE INFO

ABSTRACT

Article history

Received XX July 2022

Revised XX August 2022

Accepted XX August 2022

Background: Low back pain occurs when the back hurts so much that routine tasks are difficult. The health center is one of the environments with ergonomics activities, such as lifting, pushing, pulling, reaching, carrying objects, and handling patients with more vulnerable potential hazards that can cause disorders of the musculoskeletal system. **Purpose:** This study **aims** to determine whether the incidence of low back pain in Merdeka Health Center employees in 2024 is related to sitting position while working. **Method:** An analytical survey with a cross-sectional approach is the research method used. The research tool used is a questionnaire that collects primary data. with a total of 35 respondents who meet the inclusion criteria. **Result:** From the research results, data was obtained that respondents were dominated by female employees (82.9%), employees with an age range of 26 to 35 years (40%), employees working in functional sections (51.4%), employees with a sitting position while working on a chair with a backrest (82.9%), employees who do not work with a hunched posture (60%), and employees who work for less than 6 hours a day (62.9%). The results of data analysis showed a p-value = 0.564 ($p > 0.005$). **Conclusion:** There is no significant relationship between sitting position while working and lower back pain in employees of Merdeka Health Center, Bogor City in 2024 from the results of the analysis for the past week and year.

Keywords

Low Back Pain

Ergonomics

Health Center

Sitting Position at Work

Hunched Posture

Sitting Duration

This is an open-access article under the [CC-BY-SA](#) license.



Introduction

Occupational Safety and Health (K3) is an effort to provide safety and health guarantees to improve the health of workers by preventing work accidents and occupational diseases, accompanied by health promotion, treatment, and rehabilitation. Low back pain is an ergonomic problem that is often found in the implementation of K3 which has an impact on economic losses due to decreased work capacity and worker productivity. Low back pain is local and/or radicular pain that is felt between the lower costal arch to the lumbosacral area (Al Mahdi, 2024). According to data from the World Health Organization (2022), low back pain is the 3rd health problem in the world after osteoarthritis and rheumatism with a total of 17.3 million people. According to the Directorate General of Health Services of the Ministry of Health of the Republic of Indonesia (Kemenkes RI) in 2018, the prevalence of Low Back Pain in Indonesia was 18% (Mastuti, 2023).

Community Health Centers or commonly referred to as Puskesmas are one of the health service facilities that implement public health efforts and individual health efforts at the first level, whose main focus is organizing promotive and preventive efforts, in order to achieve a high level of public health in their work area, by prioritizing the safety and security of patients, officers, and visitors (Ministry of Health, 2014) (Al Mahdi, 2024). Health centers as a means of public health services have potential hazards that affect officers, patients, visitors and the surrounding community. Potential hazards such as physical, chemical, biological, ergonomic and psychosocial hazards. Health centers are one of the environments where there are activities related to ergonomics, such as lifting, pushing, pulling, reaching, carrying objects, and

handling patients who have more vulnerable potential hazards that can cause disorders of the musculoskeletal system (Al Mahdi, 2024).

The prevalence of LBP continues to increase and is caused by risk factors such as aging, a sedentary lifestyle, and jobs that involve heavy lifting or non-ergonomic sitting positions. Poor sitting positions, such as using chairs that do not support good posture or inappropriate work desks, are often the main cause of discomfort and pain in the lower back. In addition, factors such as the duration of sitting, frequency of breaks, and stress levels at work also contribute to the increased risk of low back pain (Makkiyah et al., 2023). Working positions are divided into two, namely static positions and dynamic positions. Static positions are working positions without moving the joints and for a long period (Simatupang, 2019). The effect of static positions will disrupt the distribution of nutritional intake in the body, the metabolism process and the spine will also be disrupted (Wang et al., 2017). While dynamic positions according to Rina et al. are working positions that involve a lot of movement in the joints (Rina et al., 2016). Based on the discussion using Systematic Review by Murti Latifah in 2022, it can be concluded that sitting position and sitting duration play a role in the occurrence of low back pain complaints in workers (Latifah et al., 2022). This is supported by research conducted by Saputra in 2020 stating that symptoms of lower back pain are often influenced by non-ergonomic sitting work positions so that there is a disturbance in the stability of body posture when working and a relationship was found between sitting position and the incidence of lower back pain among batik craftsmen with a p-value = 0.042 (Saputra, 2020).

Based on the high prevalence of low back pain which is often associated with sitting position while working and based on the background above, the author is interested in conducting a study entitled The Relationship between Sitting Position while Working and the Incidence of Lower Back Pain in Employees of the Merdeka Health Center, Bogor City in 2024. The purpose of this study was to understand whether there is a relationship between sitting position while working and the incidence of lower back pain in employees of the Merdeka Health Center, Bogor City in 2024.

Literature Review

A. Low Back Pain

Low back pain is a symptom, not a disease, which can be caused by various factors, known and unknown; and is determined by its location, which is between the XII rib (lower rib margin) and the gluteal fold. This pain is local or radicular or both, and is often accompanied by pain in one or both legs and is associated with neurological symptoms in the lower extremities (Makkiyah et al., 2023). According to The International Classification of Diseases, the prevalence of low back pain is defined as acute or chronic pain in the lumbar and/or sacral

region of the spine, which can be caused by sprains, strains, shifts of the intervertebral discs, or any part of the anatomical spine around the spine (Casiano et al., 2019).

There are five main categories of etiology of low back pain. First, mechanical, such as injury to the spine or intervertebral disc. Herniated intervertebral disc is also a common factor. Pregnancy can also be a mechanical cause of back pain. Second, degenerative process. The presence of degenerative conditions such as osteoarthritis of the spine and degenerative disc disease. Third, inflammation, this is mainly caused by inflammatory spondyloarthropathies (seronegative) such as ankylosing spondylitis. Fourth, oncological or malignant, this can be caused by the presence of lytic lesions in the spine, bone marrow cancer, or the phenomenon of nerve compression from lesions that occupy adjacent spaces. Often appears as a pathological fracture. And the fifth, by infection. Can occur from spinal infections, discs, epidural abscesses, and muscle/soft tissue abscesses (Kumbea et al., 2021).

Based on its onset, lower back pain can be divided into: 1) Acute pain, which is sudden, deep, and severe. A person cannot sleep well, and the painful area in his back increases with every movement. The discomfort lasts less than eight weeks; 2) Chronic pain, which is ongoing and usually does not go away. Although it sometimes lasts a week or a few weeks, the discomfort often appears after a few days. Sometimes repeated pain and simple exercise can also cause recurrence (Rahmawati, 2021). Clinical findings of sciatica usually include a history of dermatomal leg pain, leg pain that is worse than back pain, and leg pain that worsens when the patient coughs, strains, or sneezes. At the same time, radiculopathy is characterized by weakness, decreased sensory sensitivity or motor disturbances related to the radices or a combination of these and occurs with radicular pain (DePalma, 2020).

There are several symptoms and signs to watch out for in people with lower back pain, known as red flags. If someone has the symptoms or signs mentioned, they should immediately get a referral for therapy. The components of red flags are divided into symptoms and signs. Some components of symptoms are age under 18, age over 50, immunocompromised and components of signs are lower extremity muscle weakness, saddle anesthesia, decreased anal sphincter tone, hyperreflexia, hyporeflexia, and areflexia (Hills, 2022). Several anatomical structures and components of the lumbar spine (such as bones, ligaments, tendons, discs, and muscles) all play a role in the occurrence of low back pain. The majority of components of the lumbar spine have sensory nerves that can produce nociceptive signals and function in responding to stimuli that damage the tissue. Neuropathic (such as sciatica) is also a cause and most cases of chronic low back pain have a mixed etiology of nociception and neuropathic (Biyani & Andersson, 2004).

To provide a robust academic foundation, this study adopts an integrated theoretical approach combining:

1. The Biomechanical Model of Musculoskeletal Disorders

This model posits that mechanical loading on the spine—such as compression, shear, and torque forces—can lead to micro-injuries of spinal structures when posture is suboptimal or ergonomics are poor. Sustained forward flexion (e.g., hunched sitting) can increase disc pressure and alter lumbar curvature, predisposing workers to LBP.

2. The NIOSH Work-Related Musculoskeletal Disorder (WMSD) Framework

Developed by the National Institute for Occupational Safety and Health (NIOSH), this framework highlights key occupational risk factors—awkward posture, force, and repetition—as contributors to musculoskeletal disorders. Sitting position is a critical component of the "awkward posture" risk domain.

3. The Biopsychosocial Model of Pain

Recognizing that pain perception and chronicity are influenced not only by physical factors but also by psychosocial elements (e.g., stress, job satisfaction, and individual health beliefs), this model allows for a holistic interpretation of LBP in the context of the work environment.

Material And Methods

The research design uses an analytical survey with a cross-sectional approach and uses primary data obtained through a questionnaire sheet. The results of this study were processed using Fisher Exact test which was then analyzed in depth. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The inclusion criteria include: 1) Employees of the Merdeka Health Center, Bogor City; 2) Willing to be respondents; while the exclusion criteria include: 1) Respondents who are unwilling; 2) Respondents who have spinal abnormalities such as scoliosis; 3) Respondents who have spinal diseases such as spondylosis or herniated nucleus pulposus (HNP); 4) Respondents who have a history of spinal trauma.

The data in this study are primary data because they were collected by the researcher himself and obtained directly from the respondents. Information was collected through a questionnaire sheet that would be given to the respondents. Before filling out the questionnaire, participants were asked to provide their identity and answer several questions

about the exclusion criteria. The research instrument or tool used in this study is a questionnaire sheet consisting of two parts. The first part contains patient data and the variables studied as well as questions regarding exclusion criteria. The second part of the questionnaire is the Roland-Morris Disability Questionnaire. In this second part, 17 questions function to determine whether or not there is a disability caused by the occurrence of lower back pain. In this study, the questionnaire used was the Roland-Morris Disability Questionnaire (RMDQ) which had been translated into Indonesian and had passed the validity test by Ghina Widiasih in 2015 (Napitu, 2022). The researcher used the translated RMDQ which had also passed the validity test by the previous researcher, Heydi Amorina Abigail Saragi Napitu, which showed the same results. The results of the test showed that out of 24 statements, 7 statements were considered invalid so the statements used in Indonesian totaled 17 statements.²⁶ Therefore, it can be stated that this translated RMDQ questionnaire is reliable (Sumangando et al., 2017). To minimize bias, several variables that are subjective in nature, such as: Variables such as "hunched body posture" and "sitting on a chair with/without a backrest" were defined by providing definitions in the instrument script.

Data analysis was conducted using univariate and bivariate methods. Univariate analysis was conducted to describe the frequency distribution of each variable studied and will be presented in the form of a percentage using a table. Bivariate analysis was conducted to find the relationship between the potential incidence of lower back pain and sitting position in employees of the Merdeka Health Center, Bogor City using a non-parametric statistical test, namely Fisher Exact , the results of which are expressed in P value or P value using IBM Statistics SPSS software version (Sumangando et al., 2017).

Results

A. Respondent Profile

The study was conducted at the Merdeka Health Center in Bogor City, the results of this study were obtained from primary data in the form of questionnaires. Based on the questionnaire data, a total of 35 respondents were obtained. 35 respondents had data following the inclusion criteria.

Table 1 indicate the characteristics of respondents based on gender, age, and job description. In terms of gender, it is dominated by women, with 29 out of 35 respondents, or 82.9 percent which means that there are only 6 male health workers at the Merdeka Health Center, Bogor City. Meanwhile, age is dominated by respondents aged 26 to 35 years, with 14 out of 35 respondents or 40%, in other words, health workers at the Merdeka Health Center in

Bogor City are dominated by young people. In terms of Jobs, it was found that the number of administrative work frequencies was 48.6% or 17 people and functional workers were 51.4% or 18 people.

Table 1: Profile of Respondent

Profile	Frequency	Percentage
Gender		
Male	6	17.1
Female	29	82.9
Age		
16-25 year	3	8.6
26-35 year	14	40.0
36-45 year	7	20.0
46-55 year	8	22.9
56-65 year	3	8.6
Job		
Administrative	17	48.6
Functional	18	51.4

B. Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, Sitting Duration, Incidence of Lower Back Pain in the Past Week, and Incidence of Lower Back Pain in the Past Year

1. Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, and Sitting Duration

Table 2 indicate the distribution data of respondents with a sitting position on a chair with a backrest with 29 out of 35 respondents or 82.9 percent and a sitting position on a chair without a backrest as many as 6 respondents or 17.1 percent. Meanwhile, based on sitting posture, most respondents were in a non-hunchback position with 21 out of 35 respondents or 60 percent, and with a hunchback position as many as 14 respondents or 40 percent. Meanwhile, based on the duration of sitting, data obtained showed that the longest sitting duration was <6 hours, namely 22 out of 35 respondents or 62.9 percent.

Table 2: Frequency Distribution of Respondents Based on Sitting Position, Hunched Posture, and Sitting Duration

Description	Frequency	Percentage
Sitting Position		
Sitting on a chair with a backrest	29	82.9
Sitting on a chair without a backrest	6	17.1
Hunched Posture		
Hunchback	14	40
Not hunched	21	60
Sitting Duration		
<6 hours	22	62.9
6 – 9 hours	13	37.1

2. Frequency Distribution of Respondents Based on the Incidence of Low Back Pain during the Last Week and Based on the Incidence of Low Back Pain during the Last Year

Table 3 indicates data that the majority of respondents did not experience lower back pain during the last week or in the last year, namely 25 out of 35 respondents or 71.4 percent.

Table 3: Frequency Distribution of Respondents Based on the Incidence of Low Back Pain during the Last Week and Based on the Incidence of Low Back Pain during the Last Year

Description	Frequency	Percentage
Lower Back Pain Occurrence in the Past Week		
Lower Back Pain	10	28.6
No Lower Back Pain	25	71.4
Lower Back Pain Occurrence in the Past Year		
Lower Back Pain	10	28.6
No Lower Back Pain	25	71.4

C. Bivariate Analysis

1. Relationship of Potential Ergonomic Hazards to the Incidence of Lower Back Pain in the Past Week

Table 4: Relationship of Work to the Incidence of Low Back Pain in the Past Week

Job Type	Lower Back Pain For The Past Week		P-Value		Odd Ratio
	yes	%	No	%	
Administrative	4	40	13	52	0.396
Functional	6	60	12	48	

It was found that respondents who experienced lower back pain during the past week amounted to 4 people in administrative workers and 6 people in functional workers. Showing the results of P value 0.396. A value of less than 0.05 is the maximum significant value in determining the relationship.

2. Relationship Between Sitting Position at Work and Lower Back Pain During the Past Week

Table 5: Relationship Between Sitting Position at Work and Lower Back Pain During the Past Week

Sitting Position	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
Sitting on a chair with a backrest	8	80	21	84	0.564	1.313
Sitting on a chair without a backrest	2	20	4	12		

It was found that respondents who experienced lower back pain during the past week were 2 people sitting in a chair with a backrest and 8 people sitting in a chair without a backrest. Showing a P value of 0.564. A value of less than 0.05 is the maximum significant value in determining the relationship.

3. Relationship Between Stooped Posture at Work and Lower Back Pain During the Past Week

Table 6: Relationship Between Stooped Posture at Work and Lower Back Pain During the Past Week

Hunched Posture	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
Yes	7	70	7	28	0.029	6.000
No	3	30	18	72		

There were 7 respondents with a hunched posture and 3 respondents with a non-hunched posture who experienced lower back pain in the last week with a P value of 0.029.

4. Relationship Between Sitting Duration at Work and Lower Back Pain Incidence in the Past Week

Table 7: Relationship Between Sitting Duration at Work and Lower Back Pain Incidence in the Past Week

Sitting Duration	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	yes	%	No	%		
6 – 9 hours	4	40	9	36	0.560	0.844
< 6 hours	6	60	16	64		

There were 4 respondents with a sitting duration of 6-9 hours a day or a high-risk duration who experienced lower back pain during the last week with a P value of 0.560.

5. Relationship of Potential Ergonomic Hazards to Lower Back Pain Incidence in the Past Year

Table 8: Relationship of Potential Ergonomic Hazards to Lower Back Pain Incidence in the Past Year

Job Type	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Administrative	3	30	14	56	0.155	0.337
Functional	7	70	11	44		

It was found that respondents who experienced lower back pain during the past year amounted to 3 people in administrative workers and 7 people in functional workers. Showing the results of P value 0.155. A value of less than 0.05 is the maximum significant value in determining the relationship.

6. Relationship Between Sitting Position at Work and Lower Back Pain Incidence in the Past Year

Table 9: Relationship Between Sitting Position at Work and Lower Back Pain Incidence in the Past Year

Sitting Position	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Sitting on a chair with a backrest	8	80	21	84	0.564	1.313
Sitting on a chair without a backrest	2	20	4	12		

It was found that 8 respondents experienced lower back pain in the last year sitting on chairs with backrests and 2 people sitting on chairs without backrests with a P value of 0.564.

7. Relationship between Stooped Posture at Work and the Incidence of Lower Back Pain in the Past Year

Table 10: Relationship between Stooped Posture at Work and the Incidence of Lower Back Pain in the Past Year

Hunched Posture	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	yes	%	No	%		
Yes	7	70	7	28	0.029	6.000
No	3	30	18	72		

D. Discussion

1. Relationship of Work with the Incidence of Lower Back Pain

The results of the study were obtained from 35 respondents, there were 4 people in the administrative section and 6 people in the functional section. In the distribution of the frequency of lower back pain in the past year, there were 3 people in the administrative section and 7 people in the functional section. The results of the study conducted using Fisher Exact Analysis of the relationship between work and the incidence of lower back pain obtained a P value of 0.396 for the past week and a P value of 0.155 for the past year. The results of the Fisher Exact test analysis accept H0 and reject H1 (there is no relationship) with a p-value greater than 0.05 in the last week and the last year.

This result is in line with the research conducted by Sumangando et al in 2017 entitled "The relationship between nurses' workload and the incidence of Low Back Pain (LBP) in implementing nurses at RS TK.III. R.W Monginsidi Manado".

The results showed that there was no relationship between nurses' workload and the incidence of low back pain in implementing nurses at RS TK.III R.W Monginsidi Manado. This can be seen through the Fisher Exact test with a significance level of 95% ($\alpha = 0.05$), the analysis result is 0.365, so the value of $p > \alpha$. Based on the theory and several studies, it states that it is not only workload that can cause LBP, but there are several risk factors, namely age, gender, BMI, lifestyle and smoking habits (Sumangando et al., 2017).

2. Relationship between Sitting Position and Lower Back Pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting position and the incidence of lower back pain obtained a P value of 0.564 for the past week and for the past year ($p > 0.05$). The results of the Fisher Exact test analysis accepted H_0 and rejected H_1 (no relationship) with a p-value greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with research by Shafira Nur Aisyah in 2021 with a P value = 0.406, there is no relationship between sitting position and lower back pain can be caused by many factors other than sitting position such as physical exercise, smoking, and BMI.²⁸ Based on the Fisher Exact analysis by Natasya in 2018, the P value of sitting position with LBP complaints was 0.741 ($p > 0.05$), meaning there is no significant relationship between sitting position and LBP complaints (Milenia, 2022).

The ideal sitting position is described as a position that is in accordance with a good sitting position, namely sitting upright, shoulders back, and buttocks touching the chair. While the less than ideal and non-ideal sitting position is a sitting position other than the ideal position. The less than ideal position is described as a hunched sitting position, legs crossed / legs hanging. The arrangement of the workplace and appropriate seating must be arranged so that there is no harmful effect on health and minimizes the potential for danger due to ergonomic factors (Nur'aisyah et al., 2024).

3. The Relationship Between Stooped Posture and the Incidence of Lower Back Pain

The Relationship Between Stooped Posture and the Incidence of Lower Back Pain
The results of the study conducted using Fisher Exact Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a P value of 0.029 for the past week and a P value of 0.029 for the past year. The results of Fisher Exact accepted H_1 (there is a relationship) and rejected H_0 (there is no relationship) with a p-value of less than 0.05. The results of the bivariate

analysis test showed that there was a significant relationship between hunched posture and the incidence of lower back pain during the past week or year. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the research entitled *The Relationship between Awkward Postures and the Incidence of Low Back Pain in Plantation Workers at the PT Mitra Bumi Palm Oil Factory in Kampar Regency*, obtained a $p\text{-value} = 0.000$ ($p < 0.05$) which means that there is a relationship between uncomfortable postures and the incidence of low back pain because workers do several uncomfortable postures such as looking up accompanied by a static position for 1 minute in harvesters and a bent position in workers loading and collecting the remaining results of picking tea leaves (Fajar & Mulyani, 2023).

Poor posture while working such as a hunched posture can trigger lower back pain. Generally, a hunched posture occurs when the chair used while working does not meet ergonomic standards such as not being equipped with a backrest or from poor sitting habits. Inadequate workplace design such as chairs without wheels or without backrests and arms can make workers less free to move so that they often make twisting movements of the upper body (Nikaputra et al., 2021).

The sitting position with the body leaning forward or bending less than 90 degrees results in a load on the lumbar region. More than 25% of the body's load increases at the center of gravity so there is an increase in intervertebral disc pressure. In the article (Dubey et al., 2019 in Janna, 2021) entitled *Ergonomics for Desk Job Workers* explains that correct posture not only maintains the natural curve of the spine but also minimizes stress on the human body. Therefore, the importance of sitting with correct posture when working in the office needs to be emphasized. Working for a long time in a non-ergonomic body position will cause muscle pain due to pressure (Yulianto et al., 2023).

4. Relationship between Sitting Duration and the Incidence of Lower Back Pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a P value of 0.560 for the past week and a P value of 0.440 for the past year. The results of the Fisher Exact analysis accepted H_0 and rejected H_1 (no relationship) with a $p\text{-value}$ greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the research of Ni Made and Novendy in 2022 with an observational analytical method with a cross-sectional design, namely that no correlation was found between sitting duration and the incidence of low back pain ($p = 0.595$) (Napitu, 2022). This

back pain can occur in various work situations, but the risk is greater if sitting for a long time in a static position because it will cause continuous muscle contractions and narrowing of blood vessels. In the narrowing of blood vessels, blood flow is obstructed and ischemia occurs, tissue lacks oxygen and nutrients, while prolonged muscle contractions will cause lactic acid accumulation (Dinata, 2021). Low back pain is a chronic disease that develops gradually and takes a long time to develop. Factors such as long working hours exceeding 8 hours will affect the lumbar region which can cause pain if used continuously and not in a good ergonomic position (Sutami & Laksmi, 2021). The amount of efficient working time in a week is around 40-48 hours calculated in days between 5 or 6 working days and 30 minutes maximum time for additional work.¹ The lack of relationship between sitting time and lower back pain in respondents can be caused by age, gender, smoking habits, work mass, and body mass index (BMI) (Hutasoit et al., 2018).

Conclusion

The results of this study indicate that there is no statistically significant relationship between sitting position while working and the incidence of low back pain among employees at the Merdeka Health Center in 2024 ($p = 0.564$). These findings suggest that other factors beyond sitting posture may contribute more substantially to the occurrence of low back pain, underscoring the need for a broader ergonomic and occupational health assessment in similar work environments.

Conflict of Interest

The authors declare that there is no conflict of interest.

References

- Al Mahdi, R. R. (2024). *Hubungan Postur Kerja Terhadap Keluhan Low Back Pain Pada Petani Di Desa Bulus Kecamatan Bandung Kabupaten Tulungagung* [Universitas Muhammadiyah Malang]. <https://eprints.umm.ac.id/id/eprint/14278/>
- Biyani, A., & Andersson, G. B. J. (2004). Low back pain: pathophysiology and management. *JAAOS-Journal of the American Academy of Orthopaedic Surgeons*, 12(2), 106–115. https://journals.lww.com/jaaos/fulltext/2004/03000/low_back_pain_pathophysiology_and_management.6.aspx
- Casiano, V. E., Sarwan, G., Dydyk, A. M., & Varacallo, M. (2019). *Back pain*. <https://europepmc.org/article/nbk/nbk538173>
- DePalma, M. G. (2020). Red flags of low back pain. *Jaapa*, 33(8), 8–11. https://journals.lww.com/jaapa/fulltext/2020/08000/Red_flags_of_low_back_pain.1.aspx/1000
- Dinata, A. A. H. (2021). Hubungan lama duduk dengan kejadian nyeri punggung bawah. *Jurnal Medika Hutama*, 3(01 Oktober), 1718–1722. <http://jurnalmedikahutama.com/index.php/JMH/article/view/350>
- Fajar, H. N., & Mulyani, S. (2023). Hubungan Postur Kerja Terhadap Keluhan Low Back Pain Pemetik Teh PT Perkebunan Tambi Wonosobo. *Journal of Applied Agriculture, Health, and Technology*, 2(1), 15–

21. <https://journal.uns.ac.id/jaht/article/view/526>
- Hills, E. C. (2022). Mechanical Low Back Pain: Practice Essentials, Background. *Pathophysiology*.
- Hutasoit, M., Utami, K. D., Afriyiliani, N. F., Keperawatan, P., Kesehatan, F., Jenderal, U., & Yani, A. (2018). *Pendahuluan Stunting atau pendek adalah kondisi kegagalan pertumbuhan pada balita yang ditandai dengan angka tinggi badan per umur kurang dari -2 (nilai z-score) (WHO, 2018). Kejadian stunting disebabkan kondisi kekurangan gizi kronis dalam rentang w. 2.*
- Kumbea, N. P., Sumampouw, O. J., & Asrifuddin, A. (2021). Keluhan nyeri punggung bawah pada nelayan. *Indonesian Journal of Public Health and Community Medicine*, 2(1), 21–26. <https://ejournal.unsrat.ac.id/index.php/ijphcm/article/view/33580>
- Latifah, M., Citrawati, M., & Yusmaini, H. (2022). *Hubungan posisi duduk dan lama duduk dengan low back pain pada pekerja sektor industri: Tinjauan sistematis. 3.* <https://conference.upnvj.ac.id/index.php/sensorik/article/view/2067>
- Makkiyah, F. A., Sinaga, T. A., & Khairunnisa, N. (2023). A study from a highly populated country: risk factors associated with lower back pain in middle-aged adults. *Journal of Korean Neurosurgical Society*, 66(2), 190–198. <https://synapse.koreamed.org/articles/1516081592>
- Mastuti, K. A. (2023). Gambaran kejadian low back pain pada karyawan CV. Pacific Garment. *Jurnal Ilmu Kesehatan Mandira Cendikia*, 2(8), 297–305.
- Milenia, N. (2022). Pengaruh Posisi Duduk Terhadap Keluhan Low Back Pain Pada Mahasiswa Universitas Yarsi Angkatan 2018. *Jurnal Ilmiah Mahasiswa Kedokteran Indonesia (JIMKI)*, 10(1), 11–21.
- Napitu, H. A. A. S. (2022). *Hubungan Potensi Bahaya Ergonomi dengan Kejadian Nyeri Punggung Bawah selama Pembelajaran Jarak Jauh pada Mahasiswa FK UKI Angkatan 2019 [Universitas Kristen Indonesia]*. <http://repository.uki.ac.id/id/eprint/7738>
- Nikaputra, D. S., Marji, M., & Kurniawan, A. (2021, March 30). *Studi literatur pengaruh postur kerja duduk dan lama kerja terhadap keluhan low back pain pada karyawan yang bekerja di depan komputer.* <http://conference.um.ac.id/index.php/starwars/article/view/2954>
- Nur'aisyah, S., Sahputra, R. E., Ali, H., Noverial, N., Revilla, G., & Fadila, Z. (2024). Hubungan Posisi dan Lama Duduk dengan Nyeri Punggung Bawah pada Mahasiswa Pendidikan Dokter Universitas Andalas. *Ejournal Kedokteran Indonesia*, 12(1), 32. <https://ejki.fk.ui.ac.id/index.php/journal/article/view/373>
- Rahmawati, A. (2021). Risk factor of low back pain. *Jurnal Medika Utama*, 3(01 Oktober), 1601–1607. <http://www.jurnalmedikahutama.com/index.php/JMH/article/view/323>
- Rina, R., Hansen, H., & Fadzul, F. (2016). *Hubungan Sikap Kerja Mengemudi dan Durasi Mengemudi dengan Keluhan Nyeri Punggung Bawah (Low Back Pain) pada Pengemudi Bus di Terminal Lempake Kota Samarinda Tahun 2016.*
- Saputra, A. (2020). Sikap kerja, masa kerja, dan usia terhadap keluhan low back pain pada pengrajin batik. *HIGEIA (Journal of Public Health Research and Development)*, 4(Special 1), 147–157. <https://journal.unnes.ac.id/sju/higeia/article/view/36828>
- Simatupang, W. (2019). *Hubungan posisi, durasi dan masa bekerja dengan kejadian nyeri punggung bawah (NPB) pada masyarakat penenun Ulos di Desa Lumban Suhi-Suhi Kecamatan Pangururan Kabupaten Samosir Sumatera Utara [Universitas Sumatera Utara]*. <https://repositori.usu.ac.id/handle/123456789/21891>
- Sumangando, M., Rottie, J., & Lolong, J. (2017). Hubungan beban kerja perawat dengan kejadian low back pain (LBP) pada perawat pelaksana di RS Tk. III RW Monginsidi Manado. *Jurnal Keperawatan UNSRAT*, 5(1), 110022. <https://ejournal.unsrat.ac.id/index.php/jkp/article/view/14717>
- Sutami, N. K. D., & Laksmi, I. A. A. (2021). Hubungan durasi kerja dan posisi kerja dengan kejadian nyeri punggung bawah pada petani. *Journal of Borneo Holistic Health*, 4(2), 85–96. <http://jurnal.borneo.ac.id:443/index.php/borticalth/article/view/2028>
- Wang, Y.-T., Qi, Y., Tang, F.-Y., Li, F.-M., Li, Q.-H., Xu, C.-P., Xie, G.-P., & Sun, H.-T. (2017). The effect of cupping therapy for low back pain: A meta-analysis based on existing randomized controlled trials. *Journal of Back and Musculoskeletal Rehabilitation*, 30(6), 1187–1195. <https://doi.org/10.3233/BMR-169736>
- Yulianto, A. B., Sartoyo, S., Wardoyo, P., & Fariz, A. (2023). Hubungan Posisi Duduk Terhadap Keluhan Nyeri Punggung Bawah Pada Petugas Administrasi Di Rumah Sakit Perkebunan Jember Klinik. *Jurnal Keperawatan Muhammadiyah*. <https://journal.um-surabaya.ac.id/JKM/article/view/16604>

Authors



1st Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: vidi.simarmata@uki.ac.id).



2nd Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: silphia.novelyn@uki.ac.id).



3rd Author     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. He is a subspecialist doctor for hypertension kidneys at Siloam Hospitals. (email: dr.situmorang@yahoo.co.uk).

Title:
Max.12
words

Relationship between Sitting Position during Work and Lower Back Pain Incidence in Employees of Merdeka Community Health Center, Bogor City in 2024

¹Vidi Posdo A. Simarmata*, ²Silphia Novelyn, ³Daniel R. Parsaoran Situmorang

Corresponding Author: *vidi.simarmata@uki.ac.id

¹ Department of Medical Community, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

² Department of Anatomy, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

³ Department of Internal Medicine, Faculty of Medicine, Universitas Kristen Indonesia, Jakarta, Indonesia

ARTICLE INFO

Article history

Received 01 April 2025

Revised 15 May 2025

Accepted 25 May 2025

ABSTRACT

Background: Low back pain occurs when the back hurts so much that routine tasks are difficult. The health center is one of the environments with ergonomics activities, such as lifting, pushing, pulling, reaching, carrying objects, and handling patients with more vulnerable potential hazards that can cause disorders of the musculoskeletal system. **Purpose:** This study **aims** to determine whether the incidence of low back pain in Merdeka Health Center employees in 2024 is related to sitting position while working. **Method:** An analytical survey with a cross-sectional approach is the research method used. The research tool used is a questionnaire that collects primary data. with a total of 35 respondents who meet the inclusion criteria. **Result:** From the research results, data was obtained that respondents were dominated by female employees (82.9%), employees with an age range of 26 to 35 years (40%), employees working in functional sections (51.4%), employees with a sitting position while working on a chair with a backrest (82.9%), employees who do not work with a hunched posture (60%), and employees who work for less than 6 hours a day (62.9%). The results of data analysis showed a p-value = 0.564 ($p > 0.005$). **Conclusion:** There is no significant relationship between sitting position while working and lower back pain in employees of Merdeka Health Center, Bogor City in 2024 from the results of the analysis for the past week and year.

Keywords

Low Back Pain
Ergonomics
Health Center
Sitting Position
Sitting Position at Work
Hunched Posture
Sitting Duration

please limit the
number of keywords to
a maximum of 5-6

This is an open-access article under the [CC-BY-SA](#) license.



Introduction

Occupational Safety and Health (K3) is an effort to provide safety and health guarantees to improve the health of workers by preventing work accidents and occupational diseases, accompanied by health promotion, treatment, and rehabilitation. Low back pain is an ergonomic problem that is often found in the implementation of K3 which has an impact on economic losses due to decreased work capacity and worker productivity. Low back pain is local and/or radicular pain that is felt between the lower costal arch to the lumbosacral area [1]. According to data from the World Health Organization (2022), low back pain is the 3rd health problem in the world after osteoarthritis and rheumatism with a total of 17.3 million people. According to the Directorate General of Health Services of the Ministry of Health of the Republic of Indonesia (Kemenkes RI) in 2018, the prevalence of Low Back Pain in Indonesia was 18% [2].

Community Health Centers or commonly referred to as Puskesmas are one of the health service facilities that implement public health efforts and individual health efforts at the first level, whose main focus is organizing promotive and preventive efforts, in order to achieve a high level of public health in their work area, by prioritizing the safety and security of patients, officers, and visitors (Ministry of Health, 2014) [1]. Health centers as a means of public health services have potential hazards that affect officers, patients, visitors and the surrounding community. Potential hazards such as physical, chemical, biological, ergonomic and psychosocial hazards. Health centers are one of the environments where there are activities related to ergonomics, such as lifting, pushing, pulling, reaching, carrying objects, and handling

patients who have more vulnerable potential hazards that can cause disorders of the musculoskeletal system [1].

The prevalence of LBP continues to increase and is caused by risk factors such as aging, a sedentary lifestyle, and jobs that involve heavy lifting or non-ergonomic sitting positions. Poor sitting positions, such as using chairs that do not support good posture or inappropriate work desks, are often the main cause of discomfort and pain in the lower back. In addition, factors such as the duration of sitting, frequency of breaks, and stress levels at work also contribute to the increased risk of low back pain [3]. Working positions are divided into two, namely static positions and dynamic positions. Static positions are working positions without moving the joints and for a long period [4]. The effect of static positions will disrupt the distribution of nutritional intake in the body, the metabolism process and the spine will also be disrupted [5]. While dynamic positions according to Rina et al. are working positions that involve a lot of movement in the joints [6]. Based on the discussion using Systematic Review by Murti Latifah in 2022, it can be concluded that sitting position and sitting duration play a role in the occurrence of low back pain complaints in workers [7]. This is supported by research conducted by Saputra in 2020 stating that symptoms of lower back pain are often influenced by non-ergonomic sitting work positions so that there is a disturbance in the stability of body posture when working and a relationship was found between sitting position and the incidence of lower back pain among batik craftsmen with a p-value = 0.042 [8].

Based on the high prevalence of low back pain which is often associated with sitting position while working and based on the background above, the author is interested in conducting a study entitled The Relationship between Sitting Position while Working and the Incidence of Lower Back Pain in Employees of the Merdeka Health Center, Bogor City in 2024. The purpose of this study was to understand whether there is a relationship between sitting position while working and the incidence of lower back pain in employees of the Merdeka Health Center, Bogor City in 2024.

Literature Review

A. Low back pain

Low back pain is a symptom, not a disease, which can be caused by various factors, known and unknown; and is determined by its location, which is between the XII rib (lower rib margin) and the gluteal fold. This pain is local or radicular or both, and is often accompanied by pain in one or both legs and is associated with neurological symptoms in the lower extremities [3]. According to The International Classification of Diseases, the prevalence of low back pain is defined as acute or chronic pain in the lumbar and/or sacral

region of the spine, which can be caused by sprains, strains, shifts of the intervertebral discs, or any part of the anatomical spine around the spine [9].

There are five main categories of etiology of low back pain. First, mechanical, such as injury to the spine or intervertebral disc. Herniated intervertebral disc is also a common factor. Pregnancy can also be a mechanical cause of back pain. Second, degenerative process. The presence of degenerative conditions such as osteoarthritis of the spine and degenerative disc disease. Third, inflammation, this is mainly caused by inflammatory spondyloarthropathies (seronegative) such as ankylosing spondylitis. Fourth, oncological or malignant, this can be caused by the presence of lytic lesions in the spine, bone marrow cancer, or the phenomenon of nerve compression from lesions that occupy adjacent spaces. Often appears as a pathological fracture. And the fifth, by infection. Can occur from spinal infections, discs, epidural abscesses, and muscle/soft tissue abscesses [10].

Based on its onset, lower back pain can be divided into: 1) Acute pain, which is sudden, deep, and severe. A person cannot sleep well, and the painful area in his back increases with every movement. The discomfort lasts less than eight weeks; 2) Chronic pain, which is ongoing and usually does not go away. Although it sometimes lasts a week or a few weeks, the discomfort often appears after a few days. Sometimes repeated pain and simple exercise can also cause recurrence [11]. Clinical findings of sciatica usually include a history of dermatomal leg pain, leg pain that is worse than back pain, and leg pain that worsens when the patient coughs, strains, or sneezes. At the same time, radiculopathy is characterized by weakness, decreased sensory sensitivity or motor disturbances related to the radices or a combination of these and occurs with radicular pain [12].

There are several symptoms and signs to watch out for in people with lower back pain, known as red flags. If someone has the symptoms or signs mentioned, they should immediately get a referral for therapy. The components of red flags are divided into symptoms and signs. Some components of symptoms are age under 18, age over 50, immunocompromised and components of signs are lower extremity muscle weakness, saddle anesthesia, decreased anal sphincter tone, hyperreflexia, hyporeflexia, and areflexia [13]. Several anatomical structures and components of the lumbar spine (such as bones, ligaments, tendons, discs, and muscles) all play a role in the occurrence of low back pain. The majority of components of the lumbar spine have sensory nerves that can produce nociceptive signals and function in responding to stimuli that damage the tissue. Neuropathic (such as sciatica) is also a cause and most cases of chronic low back pain have a mixed etiology of nociception and neuropathic [14].

To provide a robust academic foundation, this study adopts an integrated theoretical approach combining:

1. The biomechanical model of musculoskeletal disorders

This model posits that mechanical loading on the spine—such as compression, shear, and torque forces—can lead to micro-injuries of spinal structures when posture is suboptimal or ergonomics are poor. Sustained forward flexion (e.g., hunched sitting) can increase disc pressure and alter lumbar curvature, predisposing workers to LBP.

2. The niosh work-related musculoskeletal disorder (wmsd) framework

Developed by the National Institute for Occupational Safety and Health (NIOSH), this framework highlights key occupational risk factors—awkward posture, force, and repetition—as contributors to musculoskeletal disorders. Sitting position is a critical component of the "awkward posture" risk domain.

3. The biopsychosocial model of pain

Recognizing that pain perception and chronicity are influenced not only by physical factors but also by psychosocial elements (e.g., stress, job satisfaction, and individual health beliefs), this model allows for a holistic interpretation of LBP in the context of the work environment.

Material And Methods

The research design uses an analytical survey with a cross-sectional approach and uses primary data obtained through a questionnaire sheet. The results of this study were processed using Fisher Exact test which was then analyzed in depth. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The study was conducted at the Merdeka Health Center, Bogor City in October 2024 with a population of all employees of the Merdeka Health Center, Bogor City 2024, and a sample of 35 respondents taken using the total sampling technique and meeting the inclusion and exclusion criteria. The inclusion criteria include: 1) Employees of the Merdeka Health Center, Bogor City; 2) Willing to be respondents; while the exclusion criteria include: 1) Respondents who are unwilling; 2) Respondents who have spinal abnormalities such as scoliosis; 3) Respondents who have spinal diseases such as spondylosis or herniated nucleus pulposus (HNP); 4) Respondents who have a history of spinal trauma.

The data in this study are primary data because they were collected by the researcher himself and obtained directly from the respondents. Information was collected through a questionnaire sheet that would be given to the respondents. Before filling out the questionnaire, participants were asked to provide their identity and answer several questions about the exclusion criteria. The research instrument or tool used in this study is a

questionnaire sheet consisting of two parts. The first part contains patient data and the variables studied as well as questions regarding exclusion criteria. The second part of the questionnaire is the Roland-Morris Disability Questionnaire. In this second part, 17 questions function to determine whether or not there is a disability caused by the occurrence of lower back pain. In this study, the questionnaire used was the Roland-Morris Disability Questionnaire (RMDQ) which had been translated into Indonesian and had passed the validity test by Ghina Widiastih in 2015 [15]. The researcher used the translated RMDQ which had also passed the validity test by the previous researcher, Heydi Amorina Abigail Saragi Napitu, which showed the same results. The results of the test showed that out of 24 statements, 7 statements were considered invalid so the statements used in Indonesian totaled 17 statements. Therefore, it can be stated that this translated RMDQ questionnaire is reliable [16]. To minimize bias, several variables that are subjective in nature, such as: Variables such as "hunched body posture" and "sitting on a chair with/without a backrest" were defined by providing definitions in the instrument script.

Data analysis was conducted using univariate and bivariate methods. Univariate analysis was conducted to describe the frequency distribution of each variable studied and will be presented in the form of a percentage using a table. Bivariate analysis was conducted to find the relationship between the potential incidence of lower back pain and sitting position in employees of the Merdeka Health Center, Bogor City using a non-parametric statistical test, namely Fisher Exact, the results of which are expressed in P value or P value using IBM Statistics SPSS software version [16].

Results

A. Respondent profile

The study was conducted at the Merdeka Health Center in Bogor City, the results of this study were obtained from primary data in the form of questionnaires. Based on the questionnaire data, a total of 35 respondents were obtained. 35 respondents had data following the inclusion criteria.

Table 1 indicates the characteristics of respondents based on gender, age, and job description. In terms of gender, it is dominated by women, with 29 out of 35 respondents, or 82.9 percent which means that there are only 6 male health workers at the Merdeka Health Center, Bogor City. Meanwhile, age is dominated by respondents aged 26 to 35 years, with 14 out of 35 respondents or 40%, in other words, health workers at the Merdeka Health Center in Bogor City are dominated by young people. In terms of Jobs, it was found that the number of administrative work frequencies was 48.6% or 17 people and functional workers were 51.4% or 18 people.

Table 1. Profile of respondent

Profile	Frequency	Percentage
Gender		
Male	6	17.1
Female	29	82.9
Age		
16-25 year	3	8.6
26-35 year	14	40.0
36-45 year	7	20.0
46-55 year	8	22.9
56-65 year	3	8.6
Job		
Administrative	17	48.6
Functional	18	51.4

B. Frequency distribution of respondents based on sitting position, hunched posture, sitting duration, incidence of lower back pain in the past week, and incidence of lower back pain in the past year

1. Frequency distribution of respondents based on sitting position, hunched posture, and sitting duration

Table 2 indicate the distribution data of respondents with a sitting position on a chair with a backrest with 29 out of 35 respondents or 82.9 percent and a sitting position on a chair without a backrest as many as 6 respondents or 17.1 percent. Meanwhile, based on sitting posture, most respondents were in a non-hunchback position with 21 out of 35 respondents or 60 percent, and with a hunchback position as many as 14 respondents or 40 percent. Meanwhile, based on the duration of sitting, data obtained showed that the longest sitting duration was <6 hours, namely 22 out of 35 respondents or 62.9 percent.

Table 2. Frequency distribution of respondents based on sitting position, hunched posture, and sitting duration

Description	Frequency	Percentage
Sitting position		
Sitting on a chair with a backrest	29	82.9
Sitting on a chair without a backrest	6	17.1
Hunched posture		
Hunchback	14	40
Not hunched	21	60
Sitting duration		
<6 hours	22	62.9
6 – 9 hours	13	37.1

2. Frequency distribution of respondents based on the incidence of low back pain during the last week and based on the incidence of low back pain during the last year

Table 3 indicates data that the majority of respondents did not experience lower back pain during the last week or in the last year, namely 25 out of 35 respondents or 71.4 percent.

Table 3. Frequency distribution of respondents based on the incidence of low back pain during the last week and based on the incidence of low back pain during the last year

Description	Frequency	Percentage
Lower back pain occurrence in the past week		
Lower back pain	10	28.6
No lower back pain	25	71.4
Lower back pain occurrence in the past year		
Lower back pain	10	28.6
No lower back pain	25	71.4

C. Bivariate Analysis

1. Relationship of potential ergonomic hazards to the incidence of lower back pain in the past week

Table 4. Relationship of work to the incidence of low back pain in the past week

Job Type	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	Yes	%	No	%		
Administrative	4	40	13	52	0.396	0.615
Functional	6	60	12	48		

It was found that respondents who experienced lower back pain during the past week amounted to 4 people in administrative workers and 6 people in functional workers. Showing the results of P value 0.396. A value of less than 0.05 is the maximum significant value in determining the relationship.

2. Relationship between sitting position at work and lower back pain during the past week

Table 5. Relationship between sitting position at work and lower back pain during the past week

Sitting Position	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	Yes	%	No	%		
Sitting on a chair with a backrest	8	80	21	84	0.564	1.313
Sitting on a chair without a backrest	2	20	4	12		

It was found that respondents who experienced lower back pain during the past week were 2 people sitting in a chair with a backrest and 8 people sitting in a chair without a backrest. Showing a P value of 0.564. A value of less than 0.05 is the maximum significant value in determining the relationship.

3. Relationship between stooped posture at work and lower back pain during the past week

Table 6. Relationship between stooped posture at work and lower back pain during the past week

Hunched Posture	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	Yes	%	No	%		
Yes	7	70	7	28	0.029	6.000
No	3	30	18	72		

There were 7 respondents with a hunched posture and 3 respondents with a non-hunched posture who experienced lower back pain in the last week with a P value of 0.029.

4. Relationship between sitting duration at work and lower back pain incidence in the past week

Table 7. Relationship between sitting duration at work and lower back pain incidence in the past week

Sitting Duration	Lower Back Pain for The Past Week				P-Value	Odd Ratio
	Yes	%	No	%		
6 – 9 hours	4	40	9	36	0.560	0.844
< 6 hours	6	60	16	64		

There were 4 respondents with a sitting duration of 6-9 hours a day or a high-risk duration who experienced lower back pain during the last week with a P value of 0.560.

5. Relationship of potential ergonomic hazards to lower back pain incidence in the past year

Table 8. Relationship of potential ergonomic hazards to lower back pain incidence in the past year

Job Type	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	Yes	%	No	%		
Administrative	3	30	14	56	0.155	0.337
Functional	7	70	11	44		

It was found that respondents who experienced lower back pain during the past year amounted to 3 people in administrative workers and 7 people in functional

workers. Showing the results of P value 0.155. A value of less than 0.05 is the maximum significant value in determining the relationship.

6. Relationship Between Sitting Position at Work and Lower Back Pain Incidence in the Past Year

Table 9. Relationship between sitting position at work and lower back pain incidence in the past year

Sitting Position	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	Yes	%	No	%		
Sitting on a chair with a backrest	8	80	21	84	0.564	1.313
Sitting on a chair without a backrest	2	20	4	12		

It was found that 8 respondents experienced lower back pain in the last year sitting on chairs with backrests and 2 people sitting on chairs without backrests with a P value of 0.564.

7. Relationship between Stooped Posture at Work and the Incidence of Lower Back Pain in the Past Year

Table 10. Relationship between stooped posture at work and the incidence of lower back pain in the past year

Hunched Posture	Lower Back Pain for The Past Year				P-Value	Odd Ratio
	Yes	%	No	%		
Yes	7	70	7	28	0.029	6.000
No	3	30	18	72		

D. Discussion

1. Relationship of work with the incidence of lower back pain

The results of the study were obtained from 35 respondents, there were 4 people in the administrative section and 6 people in the functional section. In the distribution of the frequency of lower back pain in the past year, there were 3 people in the administrative section and 7 people in the functional section. The results of the study conducted using Fisher Exact Analysis of the relationship between work and the incidence of lower back pain obtained a P value of 0.396 for the past week and a P value of 0.155 for the past year. The results of the Fisher Exact test analysis accept H0 and reject H1 (there is no relationship) with a p-value greater than 0.05 in the last week and the last year.

This result is in line with the research conducted by Sumangando et al in 2017 entitled "The relationship between nurses' workload and the incidence of Low Back Pain (LBP) in implementing nurses at RS TK.III. R.W Monginsidi Manado". The results showed that there was no relationship between nurses' workload and the incidence of

low back pain in implementing nurses at RS TK.III R.W Monginsidi Manado. This can be seen through the Fisher Exact test with a significance level of 95% ($\alpha = 0.05$), the analysis result is 0.365, so the value of $p > \alpha$. Based on the theory and several studies, it states that it is not only workload that can cause LBP, but there are several risk factors, namely age, gender, BMI, lifestyle and smoking habits [16].

2. Relationship between sitting position and lower back pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting position and the incidence of lower back pain obtained a P value of 0.564 for the past week and for the past year ($p > 0.05$). The results of the Fisher Exact test analysis accepted H_0 and rejected H_1 (no relationship) with a p-value greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with research by Shafira Nur Aisyah in 2021 with a P value = 0.406, there is no relationship between sitting position and lower back pain can be caused by many factors other than sitting position such as physical exercise, smoking, and BMI.²⁸ Based on the Fisher Exact analysis by Natasya in 2018, the P value of sitting position with LBP complaints was 0.741 ($p > 0.05$), meaning there is no significant relationship between sitting position and LBP complaints [17].

The ideal sitting position is described as a position that is in accordance with a good sitting position, namely sitting upright, shoulders back, and buttocks touching the chair. While the less than ideal and non-ideal sitting position is a sitting position other than the ideal position. The less than ideal position is described as a hunched sitting position, legs crossed / legs hanging. The arrangement of the workplace and appropriate seating must be arranged so that there is no harmful effect on health and minimizes the potential for danger due to ergonomic factors [18].

3. The relationship between stooped posture and the incidence of lower back pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a P value of 0.029 for the past week and a P value of 0.029 for the past year. The results of Fisher Exact accepted H_1 (there is a relationship) and rejected H_0 (there is no relationship) with a p-value of less than 0.05. The results of the bivariate analysis test showed that there was a significant relationship between hunched posture and the incidence of lower back pain during the past week or year. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the research entitled The Relationship between Awkward Postures and the Incidence of Low Back Pain in Plantation Workers at the PT Mitra Bumi Palm Oil

Factory in Kampar Regency, obtained a p-value = 0.000 ($p < 0.05$) which means that there is a relationship between uncomfortable postures and the incidence of low back pain because workers do several uncomfortable postures such as looking up accompanied by a static position for 1 minute in harvesters and a bent position in workers loading and collecting the remaining results of picking tea leaves [19].

Poor posture while working such as a hunched posture can trigger lower back pain. Generally, a hunched posture occurs when the chair used while working does not meet ergonomic standards such as not being equipped with a backrest or from poor sitting habits. Inadequate workplace design such as chairs without wheels or without backrests and arms can make workers less free to move so that they often make twisting movements of the upper body [20].

The sitting position with the body leaning forward or bending less than 90 degrees results in a load on the lumbar region. More than 25% of the body's load increases at the center of gravity so there is an increase in intervertebral disc pressure. In the article (Dubey et al., 2019 in Janna, 2021) entitled Ergonomics for Desk Job Workers explains that correct posture not only maintains the natural curve of the spine but also minimizes stress on the human body. Therefore, the importance of sitting with correct posture when working in the office needs to be emphasized. Working for a long time in a non-ergonomic body position will cause muscle pain due to pressure [21].

4. Relationship between sitting duration and the incidence of lower back pain

The results of the study conducted using Fisher Exact Analysis of the relationship between sitting duration at work and the incidence of lower back pain obtained a P value of 0.560 for the past week and a P value of 0.440 for the past year. The results of the Fisher Exact analysis accepted H_0 and rejected H_1 (no relationship) with a p-value greater than 0.05. A value of less than 0.05 is the maximum significant value in determining the relationship. This result is in line with the research of Ni Made and Novendy in 2022 with an observational analytical method with a cross-sectional design, namely that no correlation was found between sitting duration and the incidence of low back pain ($p = 0.595$) [15]. This back pain can occur in various work situations, but the risk is greater if sitting for a long time in a static position because it will cause continuous muscle contractions and narrowing of blood vessels. In the narrowing of blood vessels, blood flow is obstructed and ischemia occurs, tissue lacks oxygen and nutrients, while prolonged muscle contractions will cause lactic acid accumulation [22].

Low back pain is a chronic disease that develops gradually and takes a long time to develop. Factors such as long working hours exceeding 8 hours will affect the lumbar region which can cause pain if used continuously and not in a good ergonomic position

[23]. The amount of efficient working time in a week is around 40-48 hours calculated in days between 5 or 6 working days and 30 minutes maximum time for additional work.1 The lack of relationship between sitting time and lower back pain in respondents can be caused by age, gender, smoking habits, work mass, and body mass index (BMI)[24].

Conclusion

The results of this study indicate that there is no statistically significant relationship between sitting position while working and the incidence of low back pain among employees at the Merdeka Health Center in 2024 ($p = 0.564$). These findings suggest that other factors beyond sitting posture may contribute more substantially to the occurrence of low back pain, underscoring the need for a broader ergonomic and occupational health assessment in similar work environments.

Conflict of Interest

The authors declare that there is no conflict of interest.

References

- [1] R. R. Al Mahdi, "HUBUNGAN POSTUR KERJA TERHADAP KELUHAN LOW BACK PAIN PADA PETANI DI DESA BULUS KECAMATAN BANDUNG KABUPATEN TULUNGAGUNG," available:

Please use APA style 7th edition (<https://apastyle.apa.org/products/publication-manual-7th-edition>).

Example:

- [1] Hartinah, S., Suherman, S., Syazali, M., Efendi, H., Junaidi, R., Jermisittiparsert, K., & Rofiqul, U. M. A. M. (2019). Probing-prompting based on ethnomathematics learning model: The effect on mathematical communication skill. *Journal for the Education of Gifted Young Scientists*, 7(4), 799-814.
- [2] Sulisworo, D., & Toifur, M. (2016). The role of mobile learning on the learning environment shifting at high school in Indonesia. *Int. J. Mob. Learn. Organisation*, 10(3), 159-170.
- [3] Harahap, K. A., & Surya, E. (2017). Application of cooperative learning model with type of two stay two stray to improve results of mathematics teaching. *International Journal of Sciences: Basic and Applied Research (IJSBAR)*, 33(2), 156-165.
- [4] Wyman, P. J., & Watson, S. B. (2020). Academic achievement with cooperative learning using homogeneous and heterogeneous groups. *School Science and Mathematics*, 120(6), 356-363.

Ensure that the author names are correctly ordered (surname and given name), that capitalization is consistent, and that the year, journal volume, issue number, and page numbers follow the required formatting style

- [5] A. Supada, "Hubungan postur kerja, masa kerja, dan usia terhadap keluhan low back pain pada pengrajin batik," *HIGEIA (Journal Public Heal. Res. Dev.)*, vol. 4, no. Special 1, pp. 147-157, Mar. 2020, [Online]. Available: <https://journal.unnes.ac.id/sju/higeia/article/view/36828>
- [9] V. E. Casiano, G. Sarwan, A. M. Dydyk, and M. Varacallo, "Back pain," Mar. 2019, [Online]. Available: <https://europepmc.org/article/nbk/nbk538173>
- [10] N. P. Kumbea, O. J. Sumampouw, and A. Asrifuddin, "Keluhan nyeri punggung bawah pada nelayan," *Indones. J. Public Heal. Community Med.*, vol. 2, no. 1, pp. 21-26, Mar. 2021, [Online]. Available: <https://ejournal.unsrat.ac.id/index.php/ijphcm/article/view/33580>
- [11] A. Rahmawati, "Risk factor of low back pain," *J. Med. Hutama*, vol. 3, no. 01 Oktober, pp. 1601-1607,

- Mar. 2021, [Online]. Available: <http://www.jurnalmedikahutama.com/index.php/JMH/article/view/323>
- [12] M. G. DePalma, "Red flags of low back pain," *Jaapa*, vol. 33, no. 8, pp. 8–11, Mar. 2020, [Online]. Available: https://journals.lww.com/jaapa/fulltext/2020/08000/Red_flags_of_low_back_pain.1.aspx/1000
- [13] E. C. Hills, "Mechanical Low Back Pain: Practice Essentials, Background," *Pathophysiology*, 2022.
- [14] A. Biyani and G. B. J. Andersson, "Low back pain: pathophysiology and management," *JAAOS-Journal Am. Acad. Orthop. Surg.*, vol. 12, no. 2, pp. 106–115, Mar. 2004, [Online]. Available: https://journals.lww.com/jaaos/fulltext/2004/03000/low_back_pain_pathophysiology_and_management.6.aspx
- [15] H. A. A. S. Napitu, "Hubungan Potensi Bahaya Ergonomi dengan Kejadian Nyeri Punggung Bawah selama Pembelajaran Jarak Jauh pada Mahasiswa FK UKI Angkatan 2019," Universitas Kristen Indonesia, 2022. [Online]. Available: <http://repository.uki.ac.id/id/eprint/7738>
- [16] M. Sumangando, J. Rottie, and J. Lolong, "Hubungan beban kerja perawat dengan kejadian low back pain (LBP) pada perawat pelaksana di RS Tk. III RW Monginsidi Manado," *J. Keperawatan UNSRAT*, vol. 5, no. 1, p. 110022, Mar. 2017, [Online]. Available: <https://ejournal.unsrat.ac.id/index.php/jkp/article/view/14717>
- [17] N. Milenia, "Pengaruh Posisi Duduk Terhadap Keluhan Low Back Pain Pada Mahasiswa Universitas Yarsi Angkatan 2018," *J. Ilm. Mhs. Kedokt. Indones.*, vol. 10, no. 1, pp. 11–21, 2022.
- [18] S. Nur'aisyah, R. E. Sahputra, H. Ali, N. Noverial, G. Revilla, and Z. Fadila, "Hubungan Posisi dan Lama Duduk dengan Nyeri Punggung Bawah pada Mahasiswa Pendidikan Dokter Universitas Andalas," *eJournal Kedokt. Indones.*, vol. 12, no. 1, p. 32, Mar. 2024, [Online]. Available: <https://ejki.fk.ui.ac.id/index.php/journal/article/view/373>
- [19] H. N. Fajar and S. Mulyani, "Hubungan Postur Kerja Terhadap Keluhan Low Back Pain Pemetik Teh PT Perkebunan Tambi Wonosobo," *J. Appl. Agric. Heal. Technol.*, vol. 2, no. 1, pp. 15–21, Mar. 2023, [Online]. Available: <https://journal.uns.ac.id/jaht/article/view/526>
- [20] D. S. Nikaputra, M. Marji, and A. Kurniawan, "Studi literatur pengaruh postur kerja duduk dan lama kerja terhadap keluhan low back pain pada karyawan yang bekerja di depan komputer," Mar. 2021. [Online]. Available: <http://conference.um.ac.id/index.php/starwars/article/view/2954>
- [21] A. B. Yulianto, S. Sartoyo, P. Wardoyo, and A. Fariz, "Hubungan Posisi Duduk Terhadap Keluhan Nyeri Punggung Bawah Pada Petugas Administrasi Di Rumah Sakit Perkebunan Jember Klinik," *J. Keperawatan Muhammadiyah*, Mar. 2023, [Online]. Available: <https://journal.um-surabaya.ac.id/JKM/article/view/16604>
- [22] A. A. H. Dinata, "Hubungan lama duduk dengan kejadian nyeri punggung bawah," *J. Med. Hutama*, vol. 3, no. 01 Oktober, pp. 1718–1722, Mar. 2021, [Online]. Available: <http://jurnalmedikahutama.com/index.php/JMH/article/view/350>
- [23] N. K. D. Sutami and I. A. A. Laksmi, "Hubungan durasi kerja dan posisi kerja dengan kejadian nyeri punggung bawah pada petani," *J. Borneo Holist. Heal.*, vol. 4, no. 2, pp. 85–96, Mar. 2021, [Online]. Available: <http://jurnal.borneo.ac.id:443/index.php/borticalth/article/view/2028>
- [24] M. Hutasoit *et al.*, "PENDAHULUAN Stunting atau pendek adalah kondisi kegagalan pertumbuhan pada balita yang ditandai dengan angka tinggi badan per umur kurang dari -2 (nilai z-score) (WHO , 2018). Kejadian stunting disebabkan kondisi kekurangan gizi kronis dalam rentang w," vol. 2, 2018.

Authors



Vidi Posdo A. Simarmata    Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: vidi.simarmata@uki.ac.id).



Silphia Novelyn    Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. (email: silphia.novelyn@uki.ac.id).



Daniel R. Parsaoran Situmorang     Lecturer at Universitas Kristen Indonesia, Jakarta. Actively conducting research and community service. He is a subspecialist doctor for hypertension kidneys at Siloam Hospitals. (email: dr.situmorang@yahoo.co.uk).