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# The Relationship Between Sitting Duration and Low Back Pain on Office Workers in DKI Jakarta 2021

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**ABSTRACT**
Low back pain is the main cause of activity limitation and can cause socio-economic losses to a person, society, and country. Low back pain is pain that is localized between the 12th rib and the lower part of the gluteal folds with or without pain radiating to the legs. The risk factors for low back pain at the age of 18-56 years vary, namely psychosocial factors, individual factors, and occupational factors. One of the risk factors that are included in the occupational factor is that workers who sit for half or more than half of their work shift period have a greater risk of experiencing complaints of non-specific low back pain. This is thought to be due to the theory of muscle fatigue when maintaining a sitting position and the theory of intervertebral discs. The purpose of this study was to find a relationship between sitting duration and low back pain in office workers in DKI Jakarta. The results obtained were from 61 respondents who took part in the study, as many as 4 (6.56%) respondents who had a sitting duration of less than half the time working every day without low back pain, 1 (1.64%) respondents who had a sitting duration of less than out of half the length of time working every day with low back pain, 17 (27.87%) respondents who have a sitting duration equal to or more than the length of time working every day without low back pain, and 39 (63.93%) respondents who have duration of sitting equal to or more than the length of time worked each day with low back pain. Based on the Fisher exact test calculation, $p < 0.05$ ($p = 0.044$) which states that there is a relationship between sitting duration and low back pain with Prevalence Ratio = 3,5.
***Keywords**: low back pain, office worker, sitting duration*

## 1. INTRODUCTION

Low back pain is a major cause of activity limitation and can cause socio-economic losses to individuals, communities and countries.[1] Low back pain is pain that is localized between the 12th rib and the lower part of the gluteal folds with or without pain radiating to the legs. Low back pain based on its cause can be divided into two, specific low back pain (due to degenerative conditions, inflammatory, infectious and neoplastic causes) and non-specific low back pain is low back pain with no known underlying cause.[1,2] Low back pain is suspected influenced by several risk factors such as individual factors, psychosocial factors and occupational factors.[3,4,5] The global prevalence of adults with low back pain in women reaches 35.3% and in men it reaches 29.4%.[6]

With the rapid development of technology in developing countries, sitting is the most common position in the office.[7,8] Sitting is described as an upright posture in which the head and body are in a vertical line, the lower legs are bent about 90° at the hips and knees, and the feet are placed on the floor.[9] In one study it was found that workers who sit for half or more of their work shift, have a greater risk of low back pain.[10] Low back pain in office workers is caused by uncompensated muscle fatigue when sitting uninterrupted for long periods of time.[10,11] Another cause of low back pain beside muscle fatigue is intervertebral discs that get excessive pressure due to sitting for long periods of time and inhibition of the diffusion of cerebrospinal fluid into the intervertebral discs that causes lack of oxygenation and nutrition to the intervertebral disc.[10,11] In America, the prevalence of low back pain in office workers reaches 25.7 %, with 24.5% in males, and 27.1% in females.[12] For prevalence of low back pain in office worker in Indonesia and the Special Capital Region of Jakarta (DKI) Jakarta is unknown. According to the Central Statistics Agency of DKI Jakarta Province, the number of office worker working in the DKI Jakarta area on 2019 reached 4,836,977 people with average working shift of 8 hours per day or more than 40 hours per week.[13] Based on the description above, it is necessary to know whether there is a relationship between duration sitting and low back pain in office workers. It is hoped that with this study, low back pain in office worker can be prevented, detected, and treated as soon as possible to avoid further complications.

**Table 1**. Characteristic of The Respondents (N=61)

| Variable | Frequency (%) | Mean ± SD | Median (Min;Max) |
|---|---|---|---|
| **Sex** | | | |
| ● Male | 27 (44.26%) | | |
| ● Female | 34 (55.74%) | | |
| **Age (years)** | | 29.38 ± 6.19 | 29 (19;47) |
| **Low back pain** | | | |
| ● yes | 40 (65.58%) | | |
| ● no | 21 (34.42%) | | |
| **Work shift each day (hours)** | | 8.26 ± 1.0 | 8 (7;13) |
| **Sitting duration when working (hours)** | | 6.31 ±1.4 | 6 (3;10) |
| ● sitting duration < ½ work shift | 5 (8.2%) | | |
| ● sitting duration ≥ ½ work shift | 56 (91.8%) | | |

## 2. METHODS

This study is a cross-sectional analytical study. This study was conducted in DKI Jakarta from January 2021 to March 2021. The subjects of this study were 61 respondents who were office worker in DKI Jakarta and were taken using a purposive sampling technique. The inclusion criteria of this study were office worker in the DKI Jakarta area who did not have disorders of the musculoskeletal system, had a normal body mass index (BMI=18-25 kg/m2), worked in a sitting position most of the time while working and were willing to take part in this study. Data retrieval in this study used a questionnaire to obtain personal data, the history of complaints on the respondent and the duration of the respondent's sitting at workplace every day. The Oswestry Disability Questionnaire was used to assess complaints of low back pain in respondents based on how low back pain affecting respondent daily activity.[4,5] The collected data were analyzed to determine the association between sitting duration and low back pain using the Fisher Exact Test with a significance limit of $p < 0.05$.

## 3. RESULTS

From 61 respondents who joined this study, 34 respondents (55.74%) were female and 27 respondents (44.26%) were male. The average age of the respondents was 29.38 years old (SD=6.19, median=19;47). The majority of respondents suffer from low back pain, as many as 40 respondents (65.58%). The average respondent's workings hour is 8.26 hours per day. Based on the sitting duration at work compared to the work shift each day, 5 people (8.2%) had a sitting duration of less than half of work shift each day and 56 people (91.2%) had a sitting duration equal or more than half the work shift each day. (Table 1)

In this study, it was found that 5 respondents had a sitting duration of less than half the work shift every day, 4 respondents (6.56%) not experiencing low back pain and 1 respondent (1.64%) experiencing low back pain. From 56 respondents who had a sitting duration equal to or more than half of work shift each day, 17 respondents (27.87%) did not experience low back pain and 39 respondents (63.93%) experienced low back pain. The results of this study showed a significant relationship between the duration of sitting at work and low back pain with a value of $p = 0.044$. Based on the epidemiological association, the prevalence ratio (PR) was 3.5. This means that the incidence of low back pain is 3.5 times greater in office worker who have a sitting duration of more than half the time of work each day compared to office worker who have the duration of sitting is less than half the length of time working each day. (Table 2)

## 4. DISCUSSION

In this study, it was found that the average age of respondents who experienced low back pain was 29 years, this result is in line with a study conducted by Hoy D et al which stated that the prevalence of low back pain increased when individuals reaching age of 20-29 years. When Individuals getting older, the function of the muscles to hold the body position decreases, and the body's compensation for muscle

fatigue also decreases and can cause pain in the lower back area.[6]

**Table 2.** The Relationship between Sitting Duration and Low Back Pain *Cross Tabulation* (N=61)

| | Low Back Pain | | PR | *p-value* |
|---|---|---|---|---|
| | Yes | No | | |
| **Sitting duration at work** | | | | |
| Sitting duration ≥ ½ work shift | 39 (63,-93%) | 17 (27,-87%) | 3,5 | 0.044* |
| Sitting duration < ½ work shift | 1 (1,-64%) | 4 (6,-56%) | | |

*P value significant, p<0.05

In this study, it was found that the average sitting duration of respondents who experienced low back pain was 6.31 hours per day, this is in line with a study conducted by Gupta et al., which found that office workers sat for 4-6 hours every day tend to experience lower back pain. The theories that can explain the relationship between sitting duration and low back pain such as increased intradiscal pressure, reduced lower back muscle strength, and stiffness in the spine.[14]

This study also incline with the study conducted by Goncharenko et al. In the study was said that worker who sat for more than 3 hours every day had a greater risk of experiencing low back pain. This is thought to be influenced by risk factors such as individual risk factors such as age and muscle, bone, and joint injuries, as well as occupational risk factors such as prolonged sitting, workload, and psychosocial stress at work.[15]

Table 2 shows that office worker who have a sitting duration equal to or more than half their work shift are 3.5 times more prone to low back pain compared to office worker who have a sitting duration of less than half their work shift (prevalence ratio = 3.5), these results are in line with the results of the study of Lis et al. which shows the prevalence of low back pain increases up to 50% in the population of worker who have a sitting duration equal to or more than half the work shift. This occurs due to several factors such as habits at work such as uninterrupted sitting for a long time, in an upright position, and psychosocial factors like stress, assignment at office and duration of work each day.[10]

## 5. CONCLUSION

In this study, it was found that the number of office worker in DKI Jakarta who had a sitting duration of more than half of the work shift period was 91% and the number of office worker in DKI Jakarta who had a sitting duration of less than half of the work shift period was 9%. Complaints of low back pain experienced as much as 65.57% and no lower back pain as much as 34.43%. Based on this study, it can be concluded that there is a significant effect of sitting duration on low back pain in DKI Jakarta office worker.

## 6. SUGGESTION

In future studies, it is expected to consider other risk factors such as age, gender, and psychological stress. Companies and office worker are expected to be more conscious of the risk of low back pain and do take preventive measures and build a healthy supportive working space.

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