

ANALYSIS OF OCCUPATIONAL SITTING AND LOW BACK PAIN COMPLAINTS (CASE STUDY ON TAILORS IN THE HOME INDUSTRY CONVECTION IN BANDUNG CITY)

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ABSTRACT---Complaints about lower back pain are common that often happens to a worker, especially workers who work in a sitting position. Some of the factors that cause lower back pain are standing or bending for a long time, sitting in an inappropriate chair or not being ergonomic, driving for a long time, poor posture, lack of exercise, obesity, pregnancy, lifting, carrying, pushing, or pulling too much weight. According to the World Health Organization (WHO), 2-5% of employees in industrialized countries experience lower back pain every year, and 15% of these employees are cargo lifters, coolies, tailors, computer operators, and jobs related to back problems. An example of work that can cause musculoskeletal disorders is sewing. In Indonesia, sewing is a job that has been occupied by both individuals and convection businesses. This research was conducted to the home industry convection tailors in Bandung. This study was an analytic observational study with a cross sectional approach with data collection techniques, namely questionnaires and direct observation. The results of this study are the existence of a strong relationship between the tailor's sitting position variable with the perceived low back pain complaint variable with a correlation coefficient of 0.715 and a significance level <0.01 . Then there is a strong relationship between the duration of work (per day) with complaints of low back pain with a correlation coefficient of 0.518 with a significance level <0.01 .

Keywords---low back pain, sitting position, duration of work, ergonomics

I. INTRODUCTION

Low Back Pain is one of the musculoskeletal disorders resulting from inappropriate work positions. Low Back Pain complaints often occur especially in occupations with a sitting posture. When doing activities, a person usually uses several body positions in work such as sitting upright, bent or half-seated. Sitting with a long duration and static will certainly cause tension in the back area, especially in the lower back area. The factors associated with complaints of low back pain include, standing or bending for a long time, sitting in an inappropriate chair or not ergonomic, driving for a long time, poor posture, lack of exercise, obesity, pregnancy, lifting, carrying, pushing, or pulling too much weight. In addition to the above factors, other factors associated with complaints of low back pain are injury, inflammatory diseases, cancer,

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and osteoporosis (Rahmat, 2019). According to Wulandari 2010, myogenic lower back pain is associated with stress / strain of back muscles, tendons and ligaments that are usually present when doing excessive daily activities, such as sitting / standing for too long also lifting heavy objects in the wrong way.

In general, complaints from skeletal muscles begin to be felt at work age, which is 25-65 years. Where the first complaint was felt at the age of 35 years and complaints continue to increase with age. Pain is an important sensation for the body. The sensation of vision, hearing, smell, taste, touch, and pain are the results of sensory receptor stimulation. Provocation of pain sensory nerves results in discomfort, distress, or suffering. The most severe pain experience is acute pain which can then disappear. The cause of back pain cannot always be determined, but the place where the pain occurs can be used to indicate the cause of the pain. Back pain can also be caused by a shift in one of the pads between the spine or pressure on the pelvic nerve (Koesyanto, 2013; Simon, 2008; Eugene, 2005).

Low back pain is a case of work-related illness that often occurs in workers. According to the World Health Organization (WHO), 2-5% of employees in industrialized countries experience lower back pain every year, and 15% of these employees are cargo lifters, coolies, tailors, computer operators, and jobs related to back problems. An example of work that can cause musculoskeletal disorders is sewing. In Indonesia, sewing is a job that has been occupied by both individuals and convection businesses. In doing work, workers are at risk of getting an accident or illness due to work. This can occur because workers often experience a sitting position and a long period of sitting that is not appropriate, resulting in a state of rigid posture and static muscle load. Activities that use excessive forward or bending movements, lift heavy loads inappropriately, or work in a sitting position for long periods of time may be factors that can cause pain in the limbs, back, arms, joints, and other muscle tissue . In this study, researchers will conduct research on the effect of sitting position in work and duration of sitting work (per day) on tailors in the home industry convection in Bandung City.

II. RESEARCH METHODOLOGY

This research is an analytic observational study with Cross Sectional approach, which is a type of research that emphasizes the measurement or observation of data at one time at a time which is conducted on the dependent variable and the independent variable. This approach is used to see the relationship between one variable with another variable. The independent variable in this study, namely the length of sitting and work posture, while the dependent variable, namely complaints of low back pain in tailors. Statistical tests conducted using Spearman rank correlation analysis can be used to test the relationship between research variables on non-parametric statistics (ordinal scale). The population in this study are all objects that have been determined by researchers in several home industry convection in the city of Bandung, as many as 64 people. While the sample is the whole object or all sewing workers who are considered to represent the population. Data collection techniques were carried out direct observation and questionnaire. The instrument in this study was to use observation sheet of sitting position and length of sitting. How it works from research distributing questionnaire sheets to respondents who later respondents only answer the answers on the sheet about general data, and for specific data is the answer from observations made by researchers. Data processing using SPSS for Windows 16.00. In determining the level of strength of the relationship between variables, we can be guided by the value of the correlation coefficient which is the result of the SPSS output, provided that:

1. Correlation coefficient value of 0.00 - 0.25 = very weak relationship
2. Correlation coefficient values of 0.26 - 0.50 = sufficient relationship
3. Correlation coefficient values of 0.51 - 0.75 = strong relationship

4. Correlation coefficient values of 0.76 - 0.99 = a very strong relationship
5. Correlation coefficient value of 1.00 = perfect relationship

III. RESULT AND DISCUSSION

1. Characteristics of respondents by sex

Table 1: Characteristics of respondents by sex

Sex	Amount	Percentage (%)
Man	46	0,72
Woman	18	0,28
Total	64	1,00

From the results of a questionnaire for gender characteristics of tailors in the home industry convection, of 64 respondents tailors with male sex more than women that is equal to 72%. While female tailors are 28%.

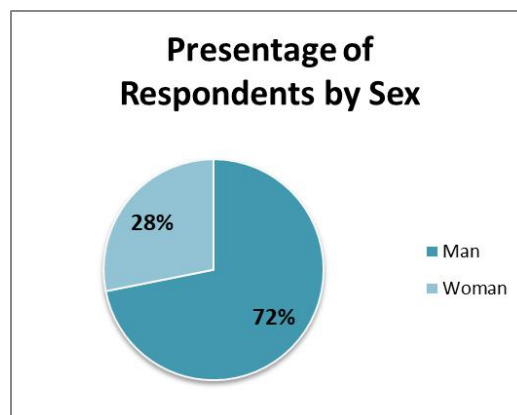


Figure 1: Presentage of tailors by sex

2. Characteristics of Respondents by Age

Table 2: Characteristics of respondents by age

Age	Amount	Percentage (%)
< 17	4	0,06
18 - 25	15	0,23
26 - 35	22	0,34
36- 45	20	0,31
> 46	3	0,05
Total	64	1,00

The results of the questionnaire with the characteristics of respondents by age are tailors with age under 17 years there are 4 people with a percentage of 6%, tailors with ages 18-25 years there are 15 people with a percentage of 23%, tailors with ages 26-35 years there are 22 people with a percentage 34%, tailors aged 36-45 years there were 20 people with a percentage of 31% and tailors with age over 46 years there were 3 people with a percentage of 5% of the total sample of 64 respondents. The average tailor who works in the Bandung City home industry convection is between the ages of 25 to 45 years, where in the age range is the beginning of complaints of low back pain felt by the workers.

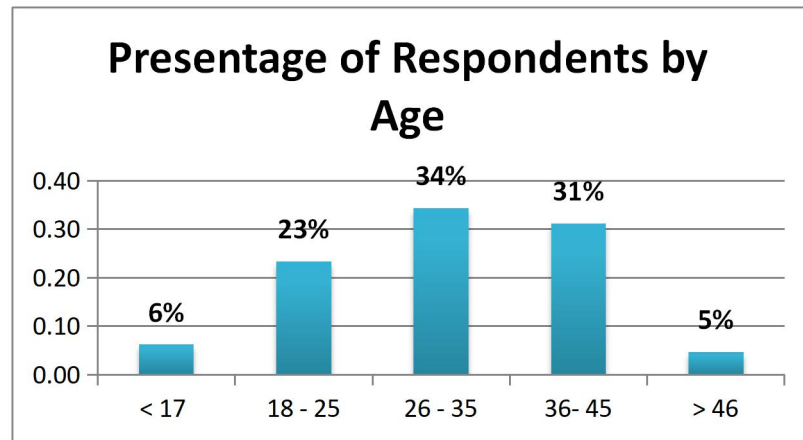
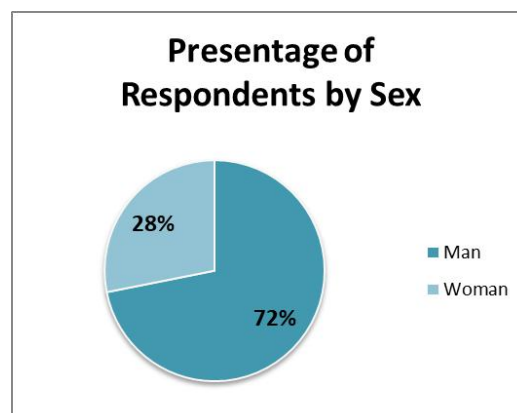


Figure 2: Percentage of Respondent by Age

3. Characteristics of Respondents by Educational Background

Table 3. Characteristics of Respondents by Educational Background

Educational Background	Amount	Percentage (%)
Elementary School	7	0,11
Junior High School	36	0,56
Senior High School	21	0,33
Total	64	1,00



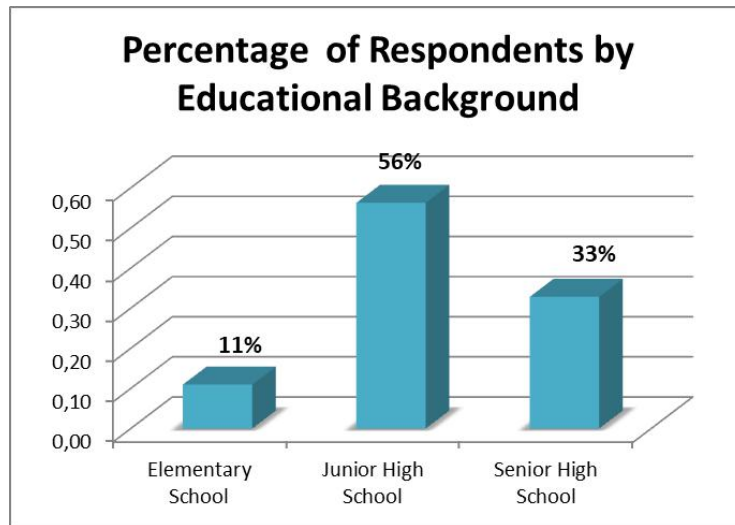


Figure 3: Percentage of Respondents by Educational Background

The results of the questionnaire with the characteristics of respondents based on educational background that is equal to 11% of respondents with an elementary school education background, 56% with a junior high school education background and 21% with a senior high school education background.

4. Characteristics of Respondents by Work Experience

Table 4: Characteristics of Respondents by Work Experience

Work Experience	Amount	Percentage (%)
< 1 years	4	0,06
1 - 5 years	21	0,33
5 -10 years	28	0,44
10 - 15 years	6	0,09
> 15 years	5	0,08
Total	64	1,00

The results of the questionnaire to 64 respondents with characteristics of respondents based on the length of experience working as a tailor are as follows: as many as 6% of tailors have worked less than 1 year, 33% of tailors have worked with vulnerable time between 1 to 5 years, 44% of tailors have worked with vulnerable time between 5 to 10 years of work, 9% of tailors have worked with vulnerable time of 10 to 15 years and as many as 8% of tailors have worked as tailors for more than 15 years.

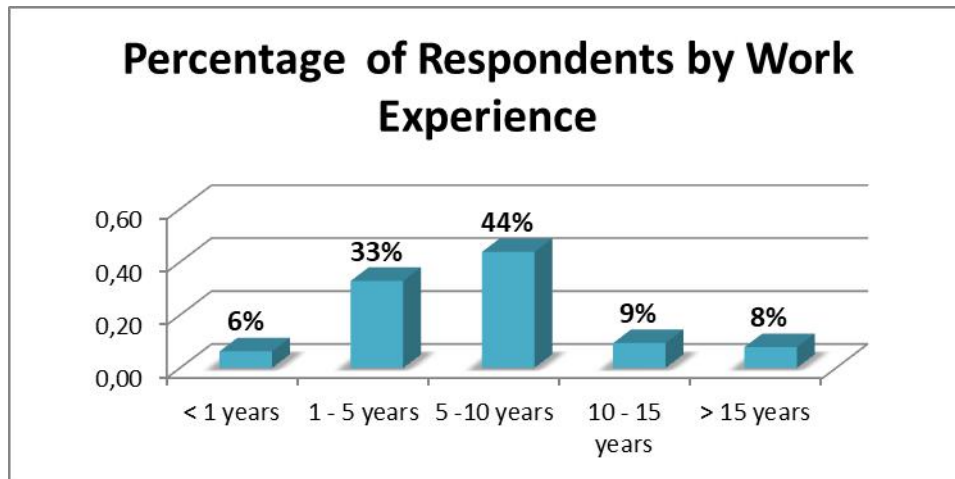


Figure 4: Percentage of Respondents by Work Experience

5. Characteristics Respondent by Length of Work (per day)

Table 5: Characteristics Respondent by Length of Work
(per day)

Length of Work (per day)	Amount	Percentage (%)
< 4 hours	13	0,20
> 4 hours	51	0,80
Total	64	1,00

The duration of sitting is one of the independent variables that will be examined for its correlation with complaints of low back pain. The length of work in 1 day is divided into 2 categories, namely tailors with a work duration of less than 4 hours per day and tailors with work duration above 4 hours per day. On the results of the questionnaire with the characteristics of respondents based on the length of sitting working in 1 day that is equal to 20% of tailors working less than 4 hours per day and 80% of tailors working above 4 hours per day. An average of 64 respondents work in a sewing position for more than 4 hours per day, which of course tailors will be exhausted especially in the back area. Because the maximum recommended length of sitting is no more than 2 hours. Workers who have to sit more than 4 hours a day should stretch their muscles on the sidelines of their work to minimize complaints of low back pain.

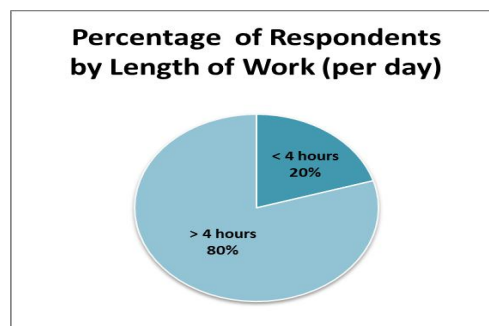


Figure 5: Percentage of Respondents by Length of Work (per day)

6. Characteristic Respondent by Sitting Position

Sitting position is one of the variables used to test the correlation of low back pain complaints. Seated position is assessed based on direct observation by researchers to help respondents determine which sitting position they work in which category. The sitting position is divided into 4 categories, namely:

- a. The sitting position is very ergonomic

The sitting position with the very ergonomic category is described as the most ideal and comfortable position for the respondent, this sitting position uses a cushion and a soft backrest to minimize muscle tension in the respondent. The respondent's sitting attitude is to sit up straight and the neck does not bend.

- b. The sitting position is ergonomic

The sitting position with the ergonomic category is described as an ideal position in which the respondent sits upright and only occasionally has his neck down.

- c. The sitting position is less ergonomic

The sitting position with the less ergonomic category is described as a sitting position which is slightly bent and the neck is slightly bent.

- d. The sitting position is not ergonomic

The sitting position with no ergonomic categories are described as sitting positions that are bent and neck bent

Table 6: Characteristic Respondent by Sitting Position

Sitting Positions	Amount	Percentage (%)
Very ergonomics position	0	0,00
Ergonomics position	11	0,17
Position less than ergonomics	48	0,75
Position is not ergonomics	5	0,08
Total	64	1,00

The results of the questionnaire with the characteristics of respondents based on sitting position at work are as many as 17% of seated tailors in an ergonomic position, as many as 75% of seated tailors in less ergonomic positions and as much as 8% of seated tailors in non-ergonomic positions. While from 64 respondents, 0% or none of the tailors sat in a very ergonomic position. This has become one of the causes of many low back pain complaints

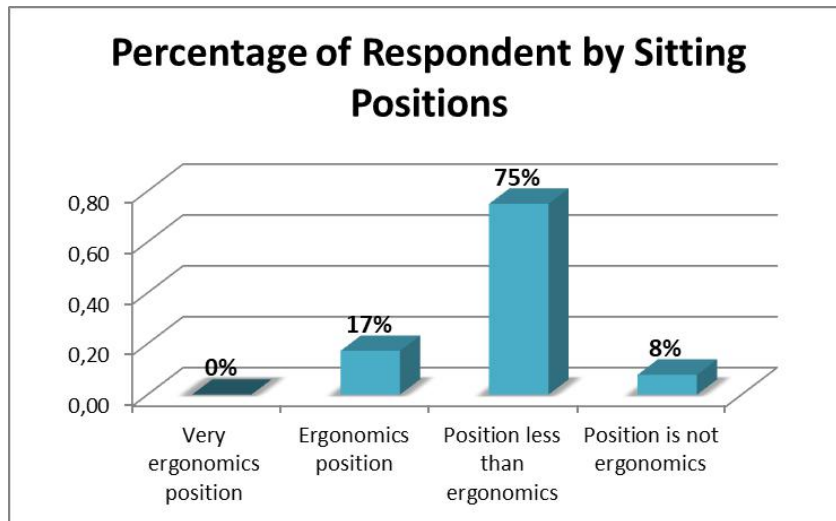


Figure 6: Percentage of Respondents by Sitting Positions

7. Characteristics of Respondent by Low Back Pain Complaints

Measurement of low back pain complaints in this study using the Numeric Rating Scale (NRS). This measurement is used to measure the intensity of low back pain complaints felt by respondents. This measurement consists of a horizontal scale that is divided equally from 0 to 5. Respondents are given an understanding before filling out that the number 0 means the least pain intensities (no complaints at all pain) and the number 5 means the pain is very maximum (pain the worst they feel). Respondents were then asked to mark the numbers they thought were appropriate to describe the level of pain they had been complaining about.

Table 7: Characteristics of Respondent by Low Back Pain Complaints

Low Back Pain	Amount	Percentage (%)
0	0	0,00
1	6	0,09
2	9	0,14
3	14	0,22
4	23	0,36
5	12	0,19
Total	64	1,00

The results in this study with the characteristics of respondents based on complaints of low back pain felt by respondents is as much as 0% or there are no tailors who never complained of low back pain, as much as 9% of tailors complained of low back pain at pain level no.1, 14% of tailors complained of low back pain at pain level no.2, 22% of tailors complained of low back pain at pain level no.3, then 36% of tailors complained of pain at level no.4 and as many as 19% of tailors complained of low back pain at pain level no. 5 the average respondent who fills the pain scale is the respondent whose sitting position and length of work per day are at a high level so that complaints of pain often occur in the lower back area.

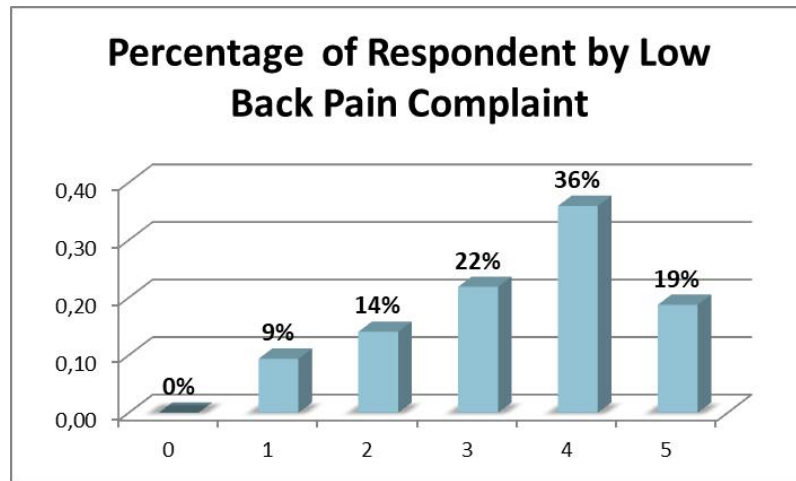


Figure 7: Percentage of Respondents by Low Back Pain Complaints

A. Correlation of Sitting Position with Low Back Pain Complaints

Table 8: Correlation result of Stting Position with Low Back Pain Complaints

			Sitting Position	Low Back Pain Complaint
Spearman's rho	Sitting Position	Correlation Coefficient	1.000	.715**
		Sig. (2-tailed)	.	.000
		N	64	64
	Low Back Pain Complaint	Correlation Coefficient	.715**	1.000
		Sig. (2-tailed)	.000	.
		N	64	64

** . Correlation is significant at the 0.01 level (2-tailed).

From the results of table 8. the correlation coefficient figure of 0.715 is found at the interval of the correlation coefficient 0.51 - 0.75, meaning that the level of correlation strength between sitting position variables and low back pain complaints is strong. Meanwhile, because the correlation coefficient is positive, the relationship between the two variables is unidirectional, thus it can be interpreted that the less good the sitting position, the higher the low back pain complaints experienced by workers. Then the results of the significance value <0.01 then it means that there is a significant relationship between the variable sitting position with the variable low back pain complaints.

B. Correlation of Length of Work (per day) with Low Back Pain Complaints

Table 9: Correlation Result of Length of Work (per day) with Low Back Pain Complaints

			Sitting Duration	Low Back Pain Complaint
Spearman's rho	Sitting Duration	Correlation Coefficient	1.000	.548**
		Sig. (2-tailed)	.	.000
		N	64	64
	Low Back Pain Complaint	Correlation Coefficient	.548**	1.000
		Sig. (2-tailed)	.000	.
		N	64	64

** Correlation is significant at the 0.01 level (2-tailed).

From the results of table 9. the correlation coefficient figure of 0.518 is found at the interval of the correlation coefficient value 0.51 - 0.75, meaning that the level of correlation strength between the variables of length of work sitting (per day) with complaints of low back pain is strong. Meanwhile, because the correlation coefficient is positive, the relationship between the two variables is unidirectional, thus it can be interpreted that the longer the duration of work sitting per day, the higher the low back pain complaints experienced by workers. Then the results of the significance value <0.01 then it means that there is a significant relationship between sitting position variables with complaints of low back pain.

IV. CONCLUSION

The conclusion of this research is

1. There is a strong correlation between the tailor's seated position with low back pain complaints with a correlation coefficient of 0.715. The two variables are in the same direction, which means that the less ergonomic a person's sitting position at work, the higher the low back pain complaints that will be felt.
2. The correlation between length of work per day with complaints of low back pain is strong with a correlation coefficient of 0.518. with the correlation of two variables in the same direction means the longer the duration of work per day, the higher the low back pain complaints that will be felt by workers.
3. With the results of this study it can be concluded that sitting work positions pose a risk of low back pain to workers. Complaints of this pain can be felt directly by workers when sitting in a non-ergonomic work position with a duration of days long enough without any breaks in between work. In the long term complaints of low back pain will be a serious disease for sufferers if not handled properly.

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