

# ANALYSIS OF THE RISK FACTORS OF WORK FATIGUE IN FORMAL AND INFORMAL WORKERS

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## ABSTRACT

**Background:** Labor productivity can be significantly reduced as a result of fatigue. The purpose of this study was to analyze the risk factors for work fatigue that exist in the formal and informal sector workers in Jambi City.

**Method:** This research was conducted using a cross-sectional design with a total sample of 200 respondents, namely 100 respondents from formal workers and 100 respondents from informal workers. The sampling technique used purposive sampling.

**Result:** Based on the results of the study, it can be seen that there is a significant relationship between age ( $p$ -value 0.034 PR 1.80 95% CI 1.02-3.16), length of work ( $p$ -value 0.000 PR 0.41 95% CI 0.28 - 0.59), years of service ( $p$ -value 0.001 PR 2.18 95%CI 1.33-3.56), and medical history ( $p$ -value 0.000 PR 2.07 95%CI 1.54-2, 79) with job burnout in formal and informal sector workers in Jambi City, and there is no significant relationship between gender ( $p$ -value 0.227 PR 0.79 95%CI 0.57-1.10), nutritional status ( $p$ -value 0.416 PR 1.23 95%CI 0.83-1.82), and workload ( $p$ -value 0.450 PR 0.83) 95%CI 0.58-1.20) with work fatigue in formal and informal sector workers in Jambi City.

**Conclusion:** The conclusion of this study is that there is a relationship between age, length of work, years of service, and history of illness with work fatigue.

**Keywords:** work fatigue, formal and informal sectors

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## INTRODUCTION

Labor productivity can be significantly reduced as a result of fatigue. Fatigue at work is defined as a process of decreasing ability, effectiveness and efficiency as well as decreasing the strength and endurance of a worker in doing work. According to the Occupational Safety and Health Service (1998) fatigue can be understood as decreased performance, temporary incapacity, reluctance to react to a condition caused by excessive physical, emotional or mental activity. Fatigue is one of the causes of

accidents at work because work fatigue contributes 50% to work accidents that occur in the workplace.<sup>1</sup>

Several factors related to the fatigue of the workers themselves, including working hours, workload, shifts, too little rest time, and an uncomfortable work environment. Meanwhile fatigue caused from outside work includes responsibility to family, illness and lifestyle<sup>2</sup>.

The work environment in both the formal and informal sectors each has its own risks which will eventually lead to

burnout due to work. This is not only related to physiological and psychological fatigue, but mainly related to decreased physical performance, feeling tired, decreased motivation and decreased productivity at work which can be affected by working time or working hours.

Jambi City is the most densely populated in Jambi Province. Jambi City is the capital city of Jambi Province which is very developed and is a trading center in Jambi Province. Arousing everyone's enthusiasm to work and settle down, making this area the most densely populated area in Jambi Province, as well as the number of working age population, of course, has a positive correlation with the total population. . Of the 1.77 million workers in Jambi province, 307,022 workers are spread across the city of Jambi<sup>3</sup>. Based on the explanation above, the research problem can be formulated what are the risk factors for work fatigue in formal sector workers and informal sector workers in Jambi City.

## **METHODS**

This type of research is quantitative research using a cross-sectional research design. This research will be carried out on formal and informal sector workers in Jambi City, which will be carried out in March-October 2022. The sampling technique in this study was purposive

sampling. Data collection was carried out by means of interviews, observation and measurement of variables. Data were analyzed using the chi square test and multiple logistic regression.

The study population consisted of all workers in the formal and informal sectors in the city of Jambi totaling 307,027 workers, for formal sector workers covering 200,117 workers, and the number of informal sector workers totaling 106,905. By using the slovin formula, the minimum sample size is -- for each sector. The sample results for the formal sector were 100 respondents, and the informal sector was 100 respondents. The total number of respondents is 200 respondents. In determining the sample, inclusion criteria : Has been working for more than 3 years, This is work done 8 hours/day or 40 hours/week, The minimum age of the respondent is over 18 years and Willing to answer questions in questionnaires and take measurements.

## **RESULTS AND DISCUSSION**

The following is a table of distribution of the frequency of work fatigue, age, gender, nutritional status, length of work, years of service, workload and disease history.

**Table 1. Univariate Analysis Results**

	<b>Variable</b>	<b>n</b>	<b>%</b>
Work Fatigue	Tall	82	41.0
	Currently	118	59.0
Age	≥ 35 years	160	80.0
	<35 years	40	20.0
Gender	Man	121	60.5
	Woman	79	39.5
Nutritional status	Abnormal	35	17.5
	Normal	165	82.5
Length of working	≥ 8 hours/day	109	54.5
	< 8 hours/day	91	45.5
Years of service	≥ 5 years	138	69.0
	< 5 years	62	31.0
Workload	Tall	153	76.5
	Currently	47	23.5
Disease History	Own	30	15.0
	Do not have	170	85.0
Total		200	100.0

Source: Processed Primary Data, 2022

Based on table 1, it can be seen that the highest proportion of work fatigue is in the medium category, namely 59.0%, the highest age is in the ≥35 year category, namely 80.0%, the male sex has the highest proportion, namely 60.5%. In the nutritional status variable, the highest proportion was in the normal category, namely 82.5%, the highest working duration was in the category ≥ 8 hours/day, namely 54.5%. Respondents who had worked for ≥ 5 years were 69.0%, had a high workload of 76.5%, and had no history of illness, namely 85.0%.

Based on table 2 it can be seen in the age variable, the proportion of high work fatigue is high at age ≥ 35 years (45.0%) compared to age < 35 years. The results of the bivariate analysis showed that there was a significant relationship between age and work fatigue with a p-value of 0.034. Age ≥ 35 years has 1.80 times the risk of experiencing high work fatigue compared to age < 35 years (PR

1.80 95% CI 1.02-3.16). In the gender variable, the highest proportion of high-level work fatigue was found in women (46.8%) compared to men. Based on the results of bivariate analysis, it can be seen that there is no relationship between gender and work fatigue (p-value 0.227). The association value indicates that the male sex is protective of the female sex (PR 0.79 95% CI 0.57-1.10).

In the nutritional status variable, a high level of work fatigue is a large proportion of abnormal nutritional status (48.6%) compared to normal nutritional status. P-value is 0.416 which means there is no relationship between nutritional status and work fatigue. Based on the association value, abnormal nutritional status has a risk of 1.23 times work fatigue (PR 1.23 95% CI 0.83-1.82). In the length of work variable, the proportion of high levels of work fatigue is greater when working hours < 8 hours/day (60.4%) compared to working hours ≥ 8 hours/day. The results of the

analysis show that there is a significant relationship between length of work and work fatigue (p-value 0.000), where length of work  $\geq 8$  hours is protective against work fatigue (PR 0.41 95% CI 0.28-0.59). On the variable length of service, it can be seen that the proportion of high level of work fatigue is greater in working period  $\geq 5$  years (49.3%) compared to working period

$< 5$  years. The statistical test results showed a p-value of 0.001, which means that there is a significant relationship between length of service and the level of work fatigue (p-value  $< 0.05$ ). Working period  $\geq 5$  years has a risk of 2.18 times experiencing high levels of work fatigue compared to working period  $< 5$  years (PR 2.18 95% CI 1.33-3.56).

**Table 2. Results of Bivariate Analysis**

Variable	Work Fatigue				Total	PR	(95% CI)	P-Value
	Tall		Currently					
	n	%	n	%				
<b>Age*</b>								
$\geq 35$ years old	72	45.0	88	55.0	160	1.80	1.02-3.16	0.034
$< 35$ years	10	25.0	30	75.0	40			
<b>Gender*</b>								
Man	45	37,2	76	62,8	121	0.79	0.57-1.10	0.227
Woman	37	46,8	42	53,2	79			
<b>Nutritional status</b>								
Abnormal	17	48,6	18	51,4	35	1.23	0.83-1.82	0.416
Normal	65	39,4	100	60,6	165			
<b>Length of working*</b>								
$\geq 8$ hours/day	27	24,8	82	75,2	109	0.41	0.28-0.59	0.000
$< 8$ hours/day	55	60,4	36	39,6	91			
<b>Years of service*</b>								
$\geq 5$ years	68	49,3	70	50,7	138	2,18	1.33-3.56	0.001
$< 5$ years	14	22,6	48	77,4	62			
<b>Workload</b>								
Tall	60	39,2	93	60,8	153	0.83	0.58-1.20	0.450
Currently	22	46,8	25	53,2	47			
<b>Disease History*</b>								
Own	22	73,3	8	26,7	30	2.07	1.54-2.79	0.000
Do not have	60	35,3	110	64,7	170			
<b>Total</b>	<b>82</b>		<b>118</b>		<b>200</b>			

Source: Processed Primary Data, 2022

\*: Multivariate Candidate

In the workload variable, the proportion of high levels of fatigue is greater in moderate workloads (46.8%) compared to high workloads. Statistical test results showed that there was no significant relationship between workload and work fatigue (p-value 0.450). Based on the association value, it can be seen that high workload is protective against work fatigue compared to moderate workload (PR 0.83 95% CI 0.58-1.20). In the history of disease variable, the proportion of respondents who had a history of illness (73.3%) had a high level of work fatigue. Based on the p-value it can be seen that

there is a significant relationship between the history of the disease and the level of work fatigue (p-value 0.000 <0.05). Respondents who had a history of disease had a 2.07 times risk of burnout (PR 2.07 95% CI 1.54-2.79).

Multivariate analysis was carried out to determine the most influential variable on the level of work fatigue by connecting more than 1 independent variable with the dependent variable simultaneously. The requirement for a variable to be included in the multivariate model is to have a p-value <0.25 based on the results of bivariate analysis.

**Table 3. Multivariate Initial Model**

Variable	B	PR(95%CI)	p-values
Age	0.390	1.47 (0.46-4.71)	0.511
Gender	0.002	1.00 (0.54-1.84)	0.995
Length of working	-2,667	0.06 (0.26-0.18)	0.000
Years of service	1.003	2.72(0.94-7.85)	0.063
Disease History	2,349	10.47(3.95-27.70)	0.000

Source: Processed Primary Data, 2022

Based on the table above, it is known that age, gender, length of service, years of service and history of illness are multivariate candidates. These variables are included in the first multivariate model.

For the next model, variables with p-values > 0.05 will be removed gradually until there are no variables with p-values > 0.05. The following is a multivariate final model.

**Table 4. Multivariate Final Model**

Variable	B	PR(95%CI)	p-values
Length of working	-2,649	0.07 (0.02-0.17)	0.000
Years of service	1.295	3.65 (1.99-6.68)	0.000
Disease History	2,333	10.30 (3.90-27.23)	0.000

Source: Processed Primary Data, 2022

Based on table 5, the length of work variable is significantly related to the level of work fatigue, where the length of work is

protective to the level of work fatigue (p-value 0.000 PR 0.07 95% CI 0.02-0.17). The length of service variable is

significantly related to the level of work fatigue, where the work period has a risk of 3.65 times the level of work fatigue (p-value 0.000 PR 3.65 95% CI 1.99-6.68). The variable that has the most influence on the level of work fatigue is history of illness because it has the highest association value, namely PR 10.30 95% CI 3.90-27.23 after controlling for the variables age, gender, length of service and years of service.

The results of the research conducted showed that there was a significant relationship between age and work fatigue, where the p-value was 0.034. Age  $\geq$  35 years has a risk of 1.80 times experiencing high work burnout compared to age  $<$  35 years. The results of this study are consistent with the results of a study conducted by Kanajmi et al., which examined the relationship between age and work experience and work fatigue. The results of the study by Kanajmi, et al stated that there was a significant relationship between age and work fatigue with  $r=0.469$  and in the same direction (positive). That is, the increasing age is positively correlated with the level of work fatigue.<sup>4</sup>

The results of this study are also in line with the research conducted by Deyulmar and Wahyuni who examined factors related to work fatigue. The results of their research stated that there was a significant relationship between age and work fatigue with a p-value of 0.006<sup>5</sup>.

According to the Ministry of Health, both physically and mentally, work capacity

will decrease with age. As you get older, the organs also experience a decrease in function. This decrease is caused by the gradual contraction of body tissues, including muscle tissue, the nervous system, and other organs. The decline in neurophysiological function occurs after the age of 30-40 years with different levels of decline for each person<sup>6</sup>.

The results of this study indicated that there was no significant relationship between gender and burnout (p-value 0.227), where the highest proportion of women experienced high work fatigue (46.8%) compared to men. Research that is in line with this research is research conducted by Perwitasari and Tualeka. The results of his research showed that there was no significant relationship between gender and the incidence of fatigue with a p-value of 0.572.<sup>7</sup>

The results of this study are also in line with research conducted by Astuti et al. Based on his research, there is no significant relationship between gender and work fatigue (p-value 1,000)<sup>8</sup>. Men and women have different abilities in physical condition and strength in work. In general, women only have physical strength 2/3 of the physical abilities or muscle strength of men, but in certain cases women are more thorough than men.<sup>9</sup>. In this study, gender was not proven to be significant on work fatigue, this was because gender was not directly related to work fatigue.

Based on the results of the study, there was no significant relationship

between nutritional status and work fatigue (p-value 0.416). The results of this study are in line with research conducted by Asriyani, et al. Based on the results of his research, there is no relationship between nutritional status and the level of work fatigue with a p-value of 0.921.<sup>10</sup>

The results of this study are in line with the research conducted by Gurusinga, et al which examined the analysis of factors related to work fatigue. According to the results of his research, there is no relationship between nutritional status and work fatigue (p-value 1.00).<sup>11</sup>The results of this study are also in line with research conducted by Apriliani, et al. Based on his research, there is no relationship between nutritional status and work fatigue (p-value 0.921)<sup>12</sup>

Nutritional status can affect productivity and efficiency at work, because in doing work the body needs energy, if the body experiences a lack of energy then one's work capacity will be disrupted so that workers become unproductive, prone to illness and can cause fatigue<sup>5</sup>. Although the results of this study did not reveal a significant relationship between nutritional status and work fatigue, it can be seen that the highest proportion of mild fatigue is in normal nutritional status (60.6%), so controlling nutritional status to normal nutritional status can minimize the risk of work fatigue and can increase work productivity.

Based on the results of the study, there is a significant relationship between

length of work and work fatigue, where work  $\geq 8$  hours/day is a protective factor for work fatigue. (p-value 0.000 PR 0.41 95% CI 0.28-0.59). The results of this study are in line with research conducted by Asriyani, et al who examined the factors associated with work fatigue in PT. Kalla Cacao Industry. The results of his research stated that there was a significant relationship between work duration and work fatigue with a p-value of 0.000.<sup>10</sup>

These results are not in line with the research conducted by Sari. According to him, there is no significant relationship between length of work and work fatigue (p-value 1.000).<sup>13</sup>. A person's efficiency and productivity at work is influenced by several things, one of which is the duration of work. Generally, a good length of work in a day is around 6-8 hours. If workers do work at the workplace for more than 8 hours, this will have an impact on decreasing work productivity, tending to experience fatigue, being vulnerable to various diseases and prone to work accidents.<sup>14</sup>.

The results of this study indicate that there is a significant relationship between work period and work fatigue. Respondents who have worked for  $\geq 5$  years have 2.18 times the risk of burnout. (p-value 0.001 PR 2.18 95% CI 1.33-3.56). The results of this study are in line with the results of research conducted by Asriyani, et al which stated that there is a relationship between length of work and work fatigue (p-value 0.001).<sup>10</sup>

The results of this study are in line with the research conducted by Ningsih and Nilamsari. Based on the results of his research, there is a relationship between length of service and work fatigue with a p-value of 0.03.<sup>15</sup> This research is in line with Sari's research which states that there is a relationship between length of work and job burnout (p-value 0.035).<sup>13</sup>

Tenure is the length of time a person has worked in an agency or organization that is calculated from the first time in that place. Working period of less than one year is the most common complaint felt by workers. Furthermore, complaints decrease after the workforce has worked for one to five years. And complaints will increase after the workforce has worked for more than five years<sup>16</sup>.

The results of this study indicate that there is no significant relationship between workload and work fatigue with a p-value of 0.450. These results are consistent with research conducted by Asriyani, et al, which stated that there was no significant relationship between workload and work fatigue with a p-value of 0.121.<sup>10</sup>

The results of this study are also in line with the research conducted by Perwitasari and Tualeka. Based on the results of his research, there is no significant relationship between workload and work fatigue (p-value 0.618). This is because workload is not a factor that is

directly related to the incidence of fatigue in workers.<sup>7</sup>

Workers can determine the lightness of the workload received through their work activities experienced by determining how long a worker can do his job according to his abilities. Fatigue and physiological disorders will not occur if the workload given to workers does not exceed the ability of workers and working hours are not excessive.<sup>17</sup>.

Based on the results of this study, there is a significant relationship between medical history and work fatigue. Respondents who had a history of disease were 2.07 times at risk of experiencing high work burnout (p-value 0.000 PR 2.07 95% CI 1.54-2.79). Multivariate results show that history of illness is the dominant factor of work fatigue in Jambi City. Based on multivariate results, respondents who had a history of disease had a 10.30 times risk of high work fatigue after controlling for other variables (PR 10.30 95% CI 3.90-27.23).

The results of this study are consistent with research conducted by Amalia, where there is a relationship between a history of illness and work fatigue (r 0.251).<sup>18</sup> The results of this study are in line with the results of Rose et al. based on the results of his research, there is a significant relationship between severe medical illnesses (coronary heart disease, kidney disease, hypertension, etc.) with work fatigue (p-value 0.000)<sup>19</sup>. The history of the disease experienced will



affect the level of fatigue at work. Workers who have a history of diseases such as degenerative diseases (hypertension, coronary heart disease, diabetes, etc.) will experience fatigue more quickly due to decreased organ function.

## CONCLUSION

Based on the results of the study, it can be seen that there is a significant relationship between age, length of work, years of service, and history of illness with

work fatigue in formal and informal sector workers in Jambi City, and there is no significant relationship between gender, nutritional status, and workload. work fatigue in formal and informal sector workers in Jambi City.

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