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# The Effect of Age, Working Period and Workload on Work Productivity Through work Fatigue and Sleep Quality at Employees of Pt. Sarana Usaha Sejahtera Insanpalapa (Telkomedika)



**Abstract:** - Workload that exceeds one's ability, will cause work fatigue, which will disrupt the sleep process. If the sleep process is disrupted, the expected quality of sleep will not be achieved, which will have an impact on work productivity. This study aims to determine the direct and indirect effects of workload on work productivity through work fatigue and sleep quality.

This research is an analytic observational study with a cross-sectional study design and analysis using SPSS and AMOS to determine the path analysis of each variable. This research was conducted at PT Sarana Usaha Sejahtera InsanPalapa (TelkoMedika) with a total sample of 119 people.

The results showed that there was a direct effect between workload and work productivity with a p-value of 0.003 and a contribution of -0.356, which means that there is a negative relationship, namely that the higher a person's workload, the lower his work productivity, and vice versa. And there is also an indirect effect of workload on work productivity through work fatigue, with a p value of 0.012. Companies should pay attention to the workload given to employees because it will affect their health and productivity at work.

**Keywords:** Workload, Work Fatigue, Sleep Quality, Work Productivity.

## I. INTRODUCTION

In a global landscape where Employee performance with workloads that are interrelated with each other, because in an organization to give the right position to employees, they can see the workload first.<sup>1</sup> In other words, every worker is a burden for the person concerned. Employees and workload are both very influential on the company<sup>1</sup>. According to<sup>2</sup> in research conducted that the level of excessive workload can cause work fatigue.

Work Fatigue or what is commonly referred to as fatigue is a subjective feeling of fatigue, temporary loss of attention, and decreased psychomotor response or, related to decreased performance, all of these things can be referred to as fatigue<sup>3</sup>.

There are two types of fatigue, namely physiological and psychological fatigue. Both types of fatigue can interfere with work, reduce productivity, increase errors, and even potentially lead to work accidents.

Based on research conducted by<sup>4</sup> where Education staff at Educational Institution X with a working duration of 8 hours/day with a sitting position in front of a computer can cause fatigue and exposure to computer light which causes fatigue. Fatigue is affected by the quality of sleep because it is related to the adequacy of one's sleep

The impact of poor sleep quality is also felt by many people, such as decreased daily activities, fatigue, weakness, unstable vital signs, poor neuromuscular conditions, slow wound healing process, and decreased body immunity.<sup>5</sup>

Based on research conducted by<sup>6</sup> it can be seen that there is a relationship between sleep quality (p-value <0.05) and work fatigue in construction workers at PT. X City of Semarang. The average sleep time of construction workers at PT. X Semarang City, namely for 6 hours. The workers also experience disturbed sleep patterns caused by waking up at night or early in the morning to go to the bathroom, eating because they feel hungry in the early hours and the presence of insects in the bedroom such as mosquitoes which disturb the comfort while sleeping.

Every company always tries how to the employees can excel and provide maximum work productivity. Basically productivity is influenced by workload, work capacity, and additional burdens due to the work environment. Excessive workload can be a source of stress, which can interfere with work productivity<sup>7</sup>.

Based on research conducted by<sup>8</sup> shows that the test results on the relationship between workload and work productivity get a value of  $p = 0.001$  ( $\alpha = 0.05$ ). The test results on the relationship between work fatigue and work productivity get a value of  $p = 0.001$  ( $\alpha = 0.05$ ). And research conducted by<sup>9</sup> shows that there is a significant

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relationship between driving duration and AMT work productivity at PT Pertamina Patra Niaga TBBM Boyolali because long driving duration results in fatigue so it can reduce work productivity.

The above data is the background of this research conducted at the Head Office of PT. Sarana Usaha Sejahtera InsanPalapa (Telkomedika) Jakarta by looking at the effect of Workload on Work Fatigue and Sleep Quality of TelkoMedika Employees.

## II. MATERIALS AND METHODS

### A. Study Design

This research is an analytical observational study using a Cross Sectional Study research design which aims to analyze the effect of Workload on Work Fatigue, Sleep Quality and Work Productivity of Employees of PT Sarana Usaha Sejahtera InsanPalapa (TelkoMedika) Jakarta. There are two variables in this study, namely workload, age, and tenure as exogenous variables and work fatigue, sleep quality, and work productivity as endogenous variables.

### B. Data Collection

The research was conducted by collecting primary data from field visits directly to workers and secondary data from research locations. Researchers measure Workload and Work Fatigue after workers complete their work using a questionnaire. And the measurement of Sleep Quality is carried out by providing a tool *Polysomnography* that is Sleep Apnea Screening Monitor BM2000A to respondents.

### C. Data analysis

This study uses a path analysis model to analyze direct and indirect influence of Workload on Work Productivity through Work Fatigue and Work Quality on Employees of PT. Sarana Usaha Sejahtera InsanPalapa (TelkoMedika) Jakarta.

## III. RESULT

### 1. Univariate Analysis

#### a. Characteristics of respondents

**Table I.** Univariate Test Analysis Results Based on Characteristics Respondents to TelkoMedika Employees in 2022

Age Group (Years)	Frequency	Percent
	(n)	(%)
20 – 30	41	34
31 – 40	71	60
41 – 50	7	6
<b>Gender</b>		
Man	76	64
Woman	43	36
<b>Working Period (Years)</b>		
1-5	79	66
6-10	35	30
11-15	5	4

Source: Primary Data, 2022

Based on the data in Table 1 above, the frequency of respondent characteristics at PT Sarana Usaha Sejahtera InsanPalapa (TelkoMedika) employees is 119 people. The most common age frequency distribution is the age group of 31-40 years, as many as 71 people (60%), the frequency distribution based on gender is for men as many as 76 people (64%) and women as many as 43 people (36%), while for the frequency distribution based on years of service was the most in the group 1-5 years, as many as 79 people (66%).

#### b. Distribution of Respondents

**Table II.** Univariate Test Analysis Results Based on the Variables Under Study to TelkoMedika Employees in 2022

<b>Workload</b>	<b>Frequency</b>	<b>Percent</b>
	<b>n</b>	<b>%</b>
Low	4	4
Medium	105	88
High	10	8
<b>Work Fatigue</b>		
Not tired	28	24
Tired	88	74
Very tired	3	2
<b>Sleep Quality</b>		
Normal	74	62
Abnormal	45	38
<b>Work productivity</b>		
Low	8	7
High	91	76
Very high	20	17

Source: Primary Data, 2022

Based on the table above, it can be seen in the workload variable, the most respondents experienced a moderate workload, namely 105 people (88%). For work fatigue, there were 88 people (74%) who experienced fatigue, and 74 people (62%) experienced normal sleep quality or did not have significant sleep disturbances. Then from the data from the analysis of work productivity, there are 91 people (76%) who have high work productivity, for very high work productivity there are 20 people (17%) and only 8 people (7%) with low work productivity.

## 2. Bivariate Analysis

Bivariate analysis was used to determine the relationship between two variables.

### a. Age Relationship with Work Productivity

The age group of 31-40 years had the highest productivity, namely 56 people (47%), very high productivity 9 people (7%) and low productivity, namely 4 people (3%) owned by each age group 31-40 years and 41-50 years. As for the 20-30 year old group, none of them have low work productivity.

### b. The Relationship of Working Period with Work Productivity

The group of 1-5 years of service has the highest productivity of 62 people (52%), very high productivity of 11 people (9%) and low productivity of 2 people (2%) belongs to the group of 11-15 years of service, while none of the groups of 6-10 years have low productivity.

### c. Relationship between workload and work productivity

respondents with moderate workloads have the highest productivity, namely 84 people (70%), very high productivity 18 people (15%) and low productivity, namely 1 person (1%) owned by respondents with low workloads, and for respondents with High work no one has very high productivity too.

### d. Relationship between Work Fatigue and Work Productivity

respondents with moderate work fatigue had the highest productivity, namely 72 people (60%), very high productivity 12 people (10%) and low productivity, namely 1 person (1%) owned by respondents who did not experience fatigue, and 3 people (2%) who are very tired.

### e. Relationship between sleep quality and work productivity

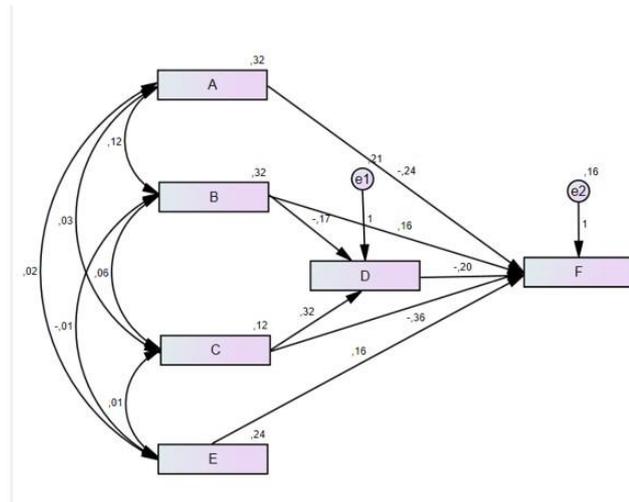
Respondents with Normal Sleep Quality had high productivity, namely 56 people (47%), very high productivity 16 people (13%) and low productivity, namely 2 people (2%). Meanwhile, respondents with abnormal sleep quality had high productivity, namely 35 people (29%), very high productivity 4 people (3%) and low productivity, namely 6 people (5%).

**f. Relationship between Work Fatigue and Sleep Quality**

Respondents with Normal Sleep Quality had high work fatigue, namely 54 people (45%), very tired 1 person (1%) and not tired, namely 19 people (16%). While respondents with abnormal sleep quality had high work fatigue, namely 34 people (28%), very tired 2 people (2%) and not tired, namely 9 people (8%).

**3. Multivariate Analysis**

Based on the conceptual framework proposed in this study, hypothesis testing was carried out through Pathway Analysis testing on structural equations. The results of the path analysis that have been carried out can be seen in the following figure:



**Fig. 1.** Path Analysis  
Source: Primary Data, 2022

Information:

- A: Age variable
- B: Variable Working Period
- C: Variable Workload
- D: Work Fatigue Variable
- E: Sleep Quality Variable
- F: Work Productivity Variable

Tests using path analysis are carried out because the conceptual framework of this research is to look at the effect of each exogenous variable and its effect on endogenous variables. The test criteria state that if the p-value is < significant alpha 5% or 0.05, it means that there is a direct influence between the exogenous and endogenous variables. Overall the results of the path analysis are presented in Table 3:

**Table III.** Tabulation Results of Path Analysis on Exogenous Variables and Endogenous Variables studied at TelkoMedika Employees in 2022

	Estimate	SE	P-Value
<b>D &lt;--- B</b>	-,167	0.077	,031
<b>D &lt;--- C</b>	,324	,129	,012
<b>F &lt;--- C</b>	-,356	,118	,003
<b>F &lt;--- E</b>	,161	,078	,039
<b>F &lt;--- D</b>	-,197	,083	,018
<b>F &lt;--- B</b>	,165	,076	,029
<b>F &lt;--- A</b>	-,245	,072	***

Source: Primary Data, 2022

Table 3 shows that there is a direct effect of working period (B) on work fatigue (D) with a p value of 0.031 (<0.05) and the amount of contribution can be seen in the estimate value, which is -0.167, which means that there

is a negative relationship between tenure and Work Fatigue. Working Period (B) on Work Productivity (F) with a p value of 0.029 and the magnitude of the contribution is 0.165 which means that there is a positive relationship between Work Period and Work Fatigue.

Workload (C) on Work Fatigue (D) has a direct effect with a p value of 0.012 and the magnitude of the contribution is 0.324, which means that there is a positive relationship between workload and work fatigue. While the workload (C) on work productivity (F) has a direct effect with a p value of 0.003 and the magnitude of the contribution is -0.356 which means that there is a negative relationship between workload and work productivity.

Age (A) on work productivity (F) has a direct effect with a p value of 0.001 and the magnitude of the contribution is -0.245 which means that there is a negative relationship between age and work productivity.

Work fatigue (D) on work productivity (F) has a direct effect with a p value of 0.018 and the magnitude of the contribution is -0.197, which means that there is a negative relationship between work fatigue and work productivity.

Sleep quality (E) on work productivity (F) has a direct effect with a p value of 0.039 and the magnitude of the contribution is -0.161, which means that there is a negative relationship between sleep quality and work productivity.

#### IV. DISCUSSION

1. The direct and indirect effect of age on work productivity on employees of PT. Sarana Usaha Sejahtera InsanPalapa (TelkoMedika)

Age (A) on work productivity (F) has a direct effect with a p value of 0.001 and the magnitude of the contribution is -0.245 which means that there is a negative relationship between age and work productivity, namely the higher a person's age, the lower his work productivity will be and vice versa. Most physical performance peaks by the age of 15<sup>10</sup>. Then it will decrease with age And from research conducted Age has no effect through work fatigue and sleep quality.

This is in line with research conducted by<sup>11</sup> where the results of the multiple linear regression test as shown in Table 1 show the results of  $P_{yx1} = 0.622$  with a p-value of  $0.000 < \alpha 0.05$ , so that this means that there is a partial influence of age on employee productivity at UD Puji Jiwa Seni in Penarungan Village of 62.2%.

As for the indirect effect, it was found that Age (A) on work productivity (F) through Work Fatigue (D) and Sleep Quality (E), did not show significant results. Where the result of age (A) through Work Fatigue (D) has a p value of 0.146 and age (A) through Sleep Quality (E) has a p value of 0.314.

2. The direct and indirect effect of tenure on work productivity for employees of PT. Sarana Usaha Sejahtera InsanPalapa (TelkoMedika).

tenure (B) on work productivity (F) has a direct influence with a p value of 0.029 and the magnitude of the contribution is 0.165, which means that there is a positive relationship, namely the higher a person's tenure, the higher his work productivity and vice versa. As for the working period (B) on work fatigue (D) with a p value of 0.031 and the magnitude of the contribution is -0.167, which means that there is a negative relationship, namely the higher a person's tenure, the lower his work fatigue, and vice versa.

This is in line with research conducted by<sup>12</sup> Through the results of the T test, it can be seen that the variable period of service has a sig value of  $0.002 < \alpha = 0.05$ . Meanwhile, the t-count value obtained is 3.370, which is greater than the t-table value, which is 2.02809.

3. The direct and indirect effect of workload on work productivity for employees of PT. Sarana Usaha Sejahtera InsanPalapa (TelkoMedika).

workload (C) on work productivity (F) has a direct influence with a p value of 0.003 and the magnitude of the contribution is -0.356 which means that there is a negative relationship, namely the higher a person's workload, the lower his work productivity, and vice versa. Meanwhile, the workload (C) on Work Fatigue (D) is significant with a p value of 0.012 and the magnitude of the contribution is 0.324, which means that there is a positive relationship, namely the higher a person's workload, the higher his work fatigue, and vice versa.

When task demands are low, employees will be able to carry out tasks easily with a low workload and performance remains at an optimal level<sup>13</sup>. The effect of workload on work productivity is in line with research conducted by<sup>14</sup> where there is a correlation between Workload and Employee Work Productivity, the magnitude of this influence can be expressed qualitatively by testing the coefficient of determination and then the coefficient of determination value is 53.6%, meaning that the effect of workload is quite large, while the remaining 46.4% is influenced by other factors. .

4. The direct and indirect effect of work fatigue on work productivity for employees of PT. Sarana Usaha Sejahtera InsanPalapa (TelkoMedika).

Work fatigue (D) on work productivity (F) has a direct influence with a p value of 0.018 and the magnitude of the contribution is -0.197, which means that there is a negative relationship, namely the higher a person's work fatigue, the lower his work productivity, and vice versa. Fatigue is a body's protective mechanism or signal that signals workers to rest due to decreased efficiency, work capacity and endurance <sup>15</sup>.

This is in line with research conducted by <sup>16</sup> from the results of test f. Based on the results of the f test, the f-count is greater than the f-table, namely  $2,989 \geq 0.05$ . this means that simultaneous work fatigue affects the level of work productivity of Pt.Smart Refinery Tarjun employees. Then for the variable X1 work fatigue, the sig value is obtained: 0.000 (sig value:  $< 0.05$ ) is less than 0.05, which means that partially the work fatigue variable affects the dependent variable employee work productivity As for the indirect effect, it was found that work fatigue (D) on sleep quality (E) did not have a significant effect with a p value of 0.545.

This research is in line with research conducted by <sup>17</sup> where respondents who have a level of subjective fatigue complaints are more with moderate work productivity (70.8%), while respondents who have complaints of mild subjective fatigue are more with moderate work productivity (80.4%).

5. Effect of sleep quality on work productivity of employees of PT. Sarana Usaha Sejahtera InsanPalapa (TelkoMedika).

Based on Research conducted by employees of PT Sarana Usaha Sejahtera Insan Palapa (TelkoMedika) showed that sleep quality (E) on work productivity (F) had a direct effect with a p value of 0.039 and the magnitude of the contribution was 0.161, which means that there is a positive relationship, namely the better the sleep quality. a person's work productivity will be higher, and vice versa. Basically sleep is a subconscious state, when a person can be awakened by giving sensory stimulation or with other stimuli that aim to restore the natural balance between various neuron centers <sup>18</sup>.

This is not in line with research conducted by <sup>19</sup> that the Makassar City online motorcycle taxi drivers mostly have poor sleep quality (67.8%) due to environmental, intensive, and age factors that affect the driver's sleep quality and have a high productivity level (83.3%) due to environmental factors and intensive factors that affect driver work productivity. However, in line with research conducted by <sup>20</sup> where Inadequate or insufficient sleep quality is one of the serious problems associated with a 2.99% decrease in productivity among workers in Japan.

## V. CONCLUSION

1. There are direct and indirect effects age on work productivity through work fatigue on employees of PT. Sarana Usaha Sejahtera InsanPalapa (TelkoMedika)
2. There are direct and indirect effects length of service on work productivity through work fatigue on employees of PT. Sarana Usaha Sejahtera InsanPalapa (TelkoMedika)
3. There are direct and indirect effects workload on work productivity through work fatigue on employees of PT. Sarana Usaha Sejahtera InsanPalapa (TelkoMedika)
4. There is an effect of work fatigue on the work productivity of the employees of PT. Sarana Usaha Sejahtera InsanPalapa (TelkoMedika)
5. There is an effect of sleep quality the work productivity of the employees of PT. Sarana Usaha Sejahtera InsanPalapa (TelkoMedika)

## SUGGEST

1. The company should provide provisions for the workload limit given to employees
2. The company should make a relaxation program in between work breaks to reduce boredom and fatigue at work
3. The company should give more appreciation to employees with high work productivity in order to motivate other employees with low work productivity
4. For further researchers, they can develop the variables studied to see other factors that affect work productivity and use better measuring tools too

## ACKNOWLEDGEMENT

The Author Want to say thank you for the lecturer who have guided the author to finish this research and give the improvement suggest for the author to make this article better, and also for the respondents and the research place, so the Author can do research and finish the research smoothly without any interruption. And all parties that give some help and advise directly and indirectly.

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