

The effect of workload and length of work on the occurrence of fatigue in workers in the informal industry



Merry Sunaryo^{1*}, Ratna Ayu Ratriwardhani¹

ABSTRACT

Introduction: Work fatigue is a condition that can lead to a decrease in vitality and work efficiency. Workers with heavy workloads are at risk of work fatigue, and working too long in a day will also increase the risk of fatigue. Therefore, it is necessary to know the influence that causes fatigue in workers, especially the workload factor and the length of time working. So that this study can provide a work evaluation to prevent fatigue.

Methods: This research method uses quantitative methods with the type of observational research with a cross-sectional design. The population in this study were informal workers in the furniture industry on Semarang Street, Surabaya City, with a sample taking using a total population of 35 people.

Results: The results of this study indicate that most workers often experience fatigue when working with high classification. Based on the results of the analysis, it is influenced by the workload and length of work, it is known from the results of the significance value <0.05 . Fatigue occurs because it is influenced by the length of work in a day that exceeds 7 hours a day (work is done 6 days a week) and the heavy workload factor received by workers.

Conclusion: Can be concluded that giving workers rest time, regulating working hours in a day need to be done, reducing the burden received by workers by dividing the work evenly and so on.

Keywords: length of work, workload, work fatigue, informal sector.

Cite This Article: Sunaryo, M., Ratriwardhani, R.A. 2022. The effect of workload and length of work on the occurrence of fatigue in workers in the informal industry. *Bali Medical Journal* 11(1): 310-314. DOI: 10.15562/bmj.v11i1.3110

¹Safety and Health Occupational Department, Health Faculty, Nahdlatul Ulama University, Surabaya, Indonesia;

*Corresponding author:
Merry Sunaryo;
Safety and Health Occupational Department, Health Faculty, Nahdlatul Ulama University, Surabaya, Indonesia;
merry@unusa.ac.id

Received: 2022-01-15
Accepted: 2022-04-07
Published: 2022-04-19

INTRODUCTION

Rapid industrialization of urban areas, especially big cities in Indonesia, remains a strong attraction and triggers large population flows to big cities. This situation has an impact on various social, environmental and employment opportunities, as well as the limited capacity of cities to absorb workers in the formal sector. The inability of the formal sector to absorb the workforce can lead to the emergence of an alternative sector as a security sector that can accommodate workers, thus creating jobs in the informal sector. According to data from the Central Statistics Agency (BPS), Indonesia's workforce has exceeded 100 million. According to employment status, according to records, about 40% of people are involved in formal activities and about 60% of people are involved in informal activities. Due to the large number of companies closing, this number is also expected to shift to the informal sector,

thereby increasing the number of layoffs.¹

Informal sector work is usually a pacemaker for the target results, because it affects their income level. The more workers work to pursue targets, the greater the risk that workers receive, one of which is fatigue. Work fatigue is part of the common problems that are often encountered in the workforce. According to some researchers, fatigue can significantly affect the health of the workforce and can reduce productivity. Data from the ILO states that every year as many as two million workers die due to work accidents caused by fatigue.²

Motor vehicle accidents account for more than 40% of work-related deaths in the oil and gas extraction Industry. Tiredness of the drivers, which may be due to lack of sleep, long distances to work and long shifts are factors that cause some of these accidents. The National Safety Council reports that 13% of workplace injuries can be attributed to fatigue. More than 2,000 working adults have

experienced an accident, indicating that 97% of workers have at least one risk factor for burnout at work, while more than 80% have more than one risk factor. When these factors combine, the potential for injury on the job increases.³ At toll collectors in Surabaya it was found that 34 workers (50.7%) experienced mild fatigue, 24 workers (35.8%) experienced moderate fatigue and 9 workers (13.4%) experienced severe fatigue.⁴

The level of work-related fatigue experienced by workers can cause discomfort, disruption and reduce satisfaction and decrease productivity as indicated by reduced speed of performance, decreased product quality, loss of originality, increased errors and damage, frequent accidents, slack attention and inaccuracy in carrying out work. Work fatigue can occur as a result of work environment factors, individual factors and work factors.⁵ The working time according to the Manpower Act is for 6 working days a week the working time

is 7 hours a day and 40 hours a week, and for 5 working days a week the working time is 8 hours in one day and 40 hours in a week. Rest time between working hours is a minimum of half an hour after working for 4 hours, then for weekly breaks, namely one day for 6 working days or 2 days for 5 working days in one week. The length of time a person works well in a day is generally 6-10 hours. Extending working time is more than the ability to work for long periods of time, working for a long time creates a tendency to fatigue, health problems, illness and accidents and dissatisfaction.⁶

Excessive workload can have a negative impact on work quality and performance. Adverse effects can include decreased reaction time, increased error in decision making, decreased ability to concentrate, and increased potential for work accidents. It is clear that a physiologically excessive workload will have an impact on health and work productivity.⁷ The workload obtained by the human body must be appropriate or balanced on the ability or physical capacity, cognitive ability and limitations of the human body that receives the burden.⁸ The working ability of the human body differs from one individual worker to another, because it depends on the level of skill, physical fitness, nutritional status, gender, age, and size of the human body.⁹

This study aimed to find out whether workload and length of work can affect fatigue in workers. If these factors affect the occurrence of fatigue in workers, this can provide an appropriate evaluation in regulating the work system so that it can reduce or prevent fatigue. So that the implementation of occupational health and safety in the workplace can be carried out properly.

METHODS

General Background of Research

The dependent variables in this study was the occurrence of fatigue, while the independent variables were the workload

and length of work. This study used quantitative research methods with the type of observational research and cross-sectional approach. This research was conducted on Jalan Semarang, Surabaya City.

Sample of Research and Procedures

The population in this study were workers in the furniture industry on Jalan Semarang, Surabaya City with a total population of 35 furniture workers. The sample in this study is the total population, so there are 35 respondents. The data collection used is primary data with interview techniques with the help of questionnaires and observations.

Data Analysis

Data were analyzed in SPSS version 15.0 and represented as cross tabulation and percentages. The test used in this study is the logistic regression test, to determine the effect between the independent variables (workload and length of work) and the dependent variable (Work Fatigue). Assessment using the results of p value <0.05 then the hypothesis is accepted which means that there is an

influence of the independent variable with the dependent variable.

RESULTS

The following are the results of research on the effect of workload and length of work on the incidence of fatigue in workers

The results show that 57% of respondents have a heavy workload, while 43% of respondents have a moderate workload.

The results show that 60% of respondents have worked more than 8 hours a day, while 40% of respondents have worked less than or equal to 8 hours a day.

The results show that 65% of respondents have a high level of work fatigue, while 35% of respondents have a low level of work fatigue.

The results of the analysis of the effect of workload and length of work on work fatigue

The results of the analysis in the study, the effect of workload and length of work on the occurrence of work fatigue in respondents by using a partial logistic regression test are in the table below:

Table 1. Distribution of respondents based on workload.

	Description	n	%
Workload	Moderate	15	43
	Heavy	20	57
	N	35	100

Table 2. Distribution of respondents based on length of work.

	Description	n	%
Length of Work	≤ 8	14	40
	>8	21	60
	N	35	100

Table 3. Distribution of Work Fatigue.

	Description	n	%
Work Fatigue	Low	12	35
	High	23	65
	N	35	100

Table 4. Analysis of workload factors and length of work on work fatigue.

Variable	B	Wald	Df	Sig	Exp(B) CI 95%	Cox & Snell R Square
Workload	-1.895	5.561	1	0.018	3.800	.218
length of work	-2.380	8.089	1	0.004	6.000	.329

Based on the results of the logistic regression test in Table 4, the results of the workload analysis have a significance value or P value < from the alpha value 0.05, which is 0.018 which means that this factor has a significant influence on the incidence of fatigue in workers. In the results, the workload has an Exp (B) value of 3,800, which means that the workload has a risk of 3.8 times to the occurrence of fatigue in workers.

Then on the length of work factor, it is also known to have a significance value or P value < from the alpha value (α) (0.05), which is 0.004. Based on these results, it can also be seen that the length of work factor has a significant influence on the incidence of fatigue in workers. Then the result of the Exp (B) value on the length of work factor is 6,000, which means that the length of work has 6 times the risk of the occurrence of fatigue in workers.

DISCUSSION

Effect of workload on work fatigue

Fatigue shows different physical and mental states, but will cause a decrease in work motivation and a decrease in body resistance to work. Fatigue can be described as a different situation for everyone, but all of these people experience decreased efficiency, decreased work capacity, and decreased endurance. The risks of job burnout include: reduced work motivation, poor performance, poor quality of work, frequent mistakes, low work efficiency, work-related stress, occupational diseases, work-related injuries, and work-related accidents.⁷

Based on the results obtained in the analysis of the effect of workload on work fatigue experienced by workers, that is, it has a significance value or P value < of the alpha (α) value (0.05), which is 0.018 which means that this factor has a significant influence on the incidence of fatigue. on workers. Then, the Exp (B) value is 3,800, which means that the workload has a 3.8 times risk of fatigue in workers. According to the results of the workload analysis, the most at risk for fatigue is heavy workload. In the Cox & Snell R Square value, the result is .218 or 0.218, which means that the workload has an influence of 21.8% on the occurrence of fatigue in workers, the rest is influenced by other factors.

In the informal sector industry which pays more attention to the amount of production. The furniture industry also pursues production targets which will later affect the income in the industry. Workers who pursue production targets will do quite a lot of work, so this also makes most workers have moderate to heavy loads. For workers in the furniture industry in this study, most of the workers have a heavy workload. The workload is the entire production process activities carried out by workers. The weight of the workload received by a worker can be used to determine how long a worker can carry out his work activities in accordance with the ability or work capacity in question. Where the heavier the workload, the shorter a person's working time to work.¹⁰ There is a relationship between workload and fatigue for workers in the Lumpia Skin Making Section in Kranggan Village, Central Semarang District. Sitting and static work positions for long periods of time, repetitive movements during work, unbalanced comparisons of work time and rest time and taking the workload that is determined based on the individual will of the worker.¹¹

Every job will make the body receive the burden from outside the body. There is a relationship between workload and work fatigue in convection workers, which is influenced by the condition of the physical work environment with less lighting intensity so that complaints of eye fatigue will increase the workload felt by workers, thus increasingly affecting the state of worker fatigue. that are not good will increase the workload on the muscles.⁵ Heavy workload conditions can affect work fatigue. The pulse will immediately change in rhythm with changes in loading, whether originating from mechanical, physical, or chemical loading, causing changes in heart rhythm.¹²

For construction workers in the mechanical workshop renovation project, where there is a significant relationship between workload and work fatigue with P-value = 0.001 or P-value <0.05. The increasing production targets set by the company so that the greater the workload received by the workers themselves, in which the workers must be able to meet the targets set by the company. Workloads

that exceed the worker's ability limit will result in a condition such as fatigue.¹³

Fatigue felt by the body can come from the physical condition of the body itself. The heavier the work, the more oxygen is needed by the body to carry out oxidation and the more blood flow that carries oxygen. This increase in blood flow causes an increase in the pumping activity of the heart. In people with heavy workloads, the pumping activity of the heart changes, so that when the person works, oxygen transport to the muscles is disrupted and workers get tired quickly.¹⁰

The effect of working time on work fatigue

In the results of the analysis of the effect of workload on work fatigue experienced by workers, it is obtained a significance value or P value < from the alpha (α) value (0.05), which is 0.004. Based on these results, it can also be seen that the length of work factor has a significant influence on the incidence of fatigue in workers. Then the result of the Exp (B) value on the length of work factor is 6,000, which means that the length of work has 6 times the risk of the occurrence of fatigue in workers. Based on the analysis of the length of work that has a higher risk of fatigue in workers, namely the length of work > 8 hours of work in a day. In the Cox & Snell R Square value, the result is .329 or 0.329, which means that the length of work has an effect of 32.9% on the occurrence of fatigue in workers and the rest is influenced by other factors.

Based on the results of the influence between length of work and the incidence of fatigue in furniture industry workers in Surabaya. The research that has been obtained is known that the highest number of workers have working hours > 8 hours as many as 60% of workers. Length of work is the length of time a worker does work in one day, the length of time a person works depends on how many targets must be made in one day, in the furniture industry there are those who use a wholesale system, some are on a daily basis and some are weekly, and some are on regular demand. and provide furniture stock. In a day workers have to complete the results according to demand, so many work more than 8 hours per day. Work fatigue is a complete criterion not

only regarding physical and psychological fatigue, but is more related to a decrease in physical performance, a feeling of fatigue, a decrease in motivation, and a decrease in work productivity.¹⁴ Working hours of more than 8 hours per day can cause boredom and fatigue to workers. A person can usually work well for 40-50 hours. More than that, there is a high possibility for negative things to arise for the workforce.⁷ This is supported by the relationship between length of work and fatigue in laundry workers CV.X Tembalang, Semarang in 2019. Workers with working hours above normal are dominated by workers who experience severe work fatigue. The length of a person's working time will affect their work productivity, lack of rest and Lack of sleep duration is one of the causes of work fatigue in employees so that productivity decreases slightly.¹⁵

Working hours of more than 8 hours per day can reduce rest time so that it can raise the risk of fatigue for workers. Proportionate rest and working time can reduce the degree of worker fatigue, the length and timeliness of rest plays a very important role in influencing the occurrence of work fatigue. The health of workers is always well monitored, and adequate nutrition can reduce work fatigue. Working hours of more than 8 hours per day require workers to work at night to complete their work, this makes the time that should be used for other lives forced to be used for work.¹⁶ In line with the research conducted by Dewi, (2019) there is a relationship between length of work and fatigue in transportation workers at the Balai Tengah market. Transport workers at the Balai Tengah Market work an average of 10 hours, with the fastest time being 7 hours and the longest time is 15 hours which can increase the risk of fatigue. Workers experience a lot of fatigue because workers have working hours in a day that are more than 8 hours per day, although not all workers have risky working hours but workers do most of the work manually, repeatedly can cause fatigue to workers.¹⁷

Industry can apply for working hours and rest periods in accordance with the provisions of Law No. 13 of the year. 2003 Regarding working hours, you can also

apply for vacation arrangements to take advantage of days off and entertainment, and you can also use the help of music at work to reduce boredom caused by work. The normal length of time a person works in a day is generally 6-10 hours. The rest is used for family and community life, rest, sleep, etc. The ability to extend hours instead of working long hours does not usually result in the best efficiency, effectiveness, and productivity. In fact, you can usually see a decrease in the quality and yield of the work. Working for long periods of time can cause fatigue, health problems, illness and accidents and dissatisfaction. In a week a person can usually work well for 40-50 hours. More than that, there is a high possibility for negative things to arise for the workforce concerned and the work itself. The longer the working week, the greater the tendency for undesirable things to happen. The number of 40 hours (working hours) in a week can be made of five or four working days depending on various factors, but the facts show that working five days or 40 hours of work a week is a rule that applies and is increasingly being applied everywhere.⁷

CONCLUSION

Fatigue is one of the problems experienced by workers. the prevalence of workers in the informal sector, especially in the furniture industry, all of whom have complaints about work fatigue. Based on the results, the fatigue experienced by these workers is caused by the workload factor and the length of time working in a day. These results were obtained from the analysis of the influence test (logistics regression) with the results of the workload analysis, having a significance value or P value < of the alpha (α) value (0.05), which is 0.018 which means that this factor has a significant influence on the incidence of fatigue. on workers. Then on the length of work factor, it has a significance value or P value < of the alpha (α) value (0.05), which is 0.004, which means that the length of work factor has a significant influence on the incidence of fatigue in workers.

The results of the workload have an Exp (B) value of 3,800 which means that the workload has a risk of 3.8 times to the occurrence of fatigue in workers. on the

incidence of fatigue in workers. Then, the workload has an effect of 21.8% on the occurrence of fatigue in workers and the length of work has an influence of 32.9% on the occurrence of fatigue in workers and the rest is influenced by other factors.

Therefore, it is necessary to improve the work system for workers, namely by improving working time so that it does not pass the predetermined time and then it is better to be able to regulate the amount of production so that the workload received by workers does not become heavier. Workers must rest their bodies for 30 minutes after working for 4 hours to reduce work errors and accidents; for workers who feel tired, they must relax their muscles for 2-3 minutes after completing their respective activities; employees can manage their time and take advantage of work holidays. Rest to reduce fatigue due to work, and adjust the appropriate sleep time (7-8 hours/day) so that they are refreshed or healthy when returning to work. Further studies are needed to validate this finding with larger sample and more comprehensive design.

AUTHOR CONTRIBUTION

All authors equally contribute to the study from the research concepts, data acquisitions, data analysis, statistical analyses, revising the paper, until reporting the study results through publication.

FUNDING

The authors are responsible for all of the study funding without a grant or any external funding source.

CONFLICT OF INTEREST

There is no conflict of interest for this manuscript.

ETHICAL CONSIDERATION

This research was approved by the Health Research Ethics Committee of University Nahdlatul Ulama. Letter of exemption Ref. No. 1903/EC.KEPK/UMS/2020.

REFERENCES

1. Ramdhan, and Iwan M. Improving Health and Safety Conditions of the Informal Sector Through the Corporate Social Responsibility

- Program. *Journal of Health Service Management*. 2012;15.
2. Lahay, Idham H, et al. The Effect of Age and Length of Work on Work Fatigue on Brick Maker Workers in Gorontalo. *National Seminar on Technology and Engineering (SENTRA)*. 2018;2527-6042.
 3. National Safety Council. *Fatigue in The Workplace: Cause and Consequences of Employee Fatigue*. 2017.
 4. Shintian and Endang. *Analysis of Factors Associated with Work Fatigue at Toll Collectors in Surabaya Toll Road Development Company*. *Journal: Airlangga University*. 2015.
 5. Atiqoh J, Ida W, Daru L. Factors Associated with Work Fatigue in the Sewing Section Convection Workers at CV. Various Garments Gunungpati Semarang. *Journal of Community Health (e-Journal)*. 2014;2(2):1-10.
 6. Verawati L. The Relationship between Subjective Fatigue Levels with Productivity in the Packaging Division Worker at CV Sumber Barokah. *The Indonesian Journal of Occupational Safety and Health*. 2016;5(1):51-60.
 7. Suma"mur PK. *Corporate Hygiene and Occupational Health (Hiperkes)*. CV Sagung Seto, Jakarta. 2014.
 8. Iristiadi H and Yassierli. *Ergonomics an Introduction*. Bandung: PT Youth Rosdakarya. 2014.
 9. Purbasari A, and Purnomo AJ. Assessment of Physical Loads in the Manual Assembly Process Using Physiological Methods. *Journal of Sigma Teknika*. 2019;2(1);123-130.
 10. Tarwaka. *Industrial Ergonomics*. Revised Edition 2, Surakarta: Harapan Press. 2014.
 11. Kusgiyanto W, Suroto, and Ekawati. Analysis of the Relationship between Physical Workload, Work Period, Age, and Gender on Work Fatigue Levels in Workers in the Lumpia Skin Making Section in Kranggan Village, Central Semarang District. *Journal of Public Health*. 2017;5(5):413-423.
 12. Oesman TI. The Relationship of Internal and External Factors to Work Fatigue Through Subjective Self Rating Test. Yogyakarta: AKPRIND. 2011.
 13. Wulandari et al. The Relationship between Manual Physical Workload and Work Climate on the Fatigue of Construction Workers in the Mechanical Workshop Renovation Project Section. *Journal. UNDIP FKM*. 2016.
 14. Nugroho GKT, Ulfah N, and Herwanti S. Relationship between Work Attitude and Work Fatigue in Laundry Workers in North Purwokerto District. *Banyumas Regency. Journal of Kesmasindo*. 2015;7(3);209-217.
 15. Narpati JR, Ekawati, and Wahyuni I. The Relationship of Physical Workload, Frequency of Exercise, Sleep Length, Rest Time and Work Time with Work Fatigue (Case Study on Laundry Workers in Production Division at Cv.X Tembalang, Semarang). *Journal of Public Health*. 2019;7(1);337-344.
 16. Setyawati L. *A Brief About Work Fatigue*, Yogyakarta: Amara Books. 2010.
 17. Dewi PA, Lestanttyo, and Widjaasena. Factors Related to Fatigue in Transport Workers at the Balai Tengah Market, North Lintau Buo District, West Sumatra. *Journal of Public Health*. 2019;7(1).



This work is licensed under a Creative Commons Attribution