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Factors Related to Work Fatigue in Production Employees at PT.Y Rubber in 2024

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Abstract
Introduction: *Production employees are at high risk of experiencing work fatigue due to the physical and psychosocial demands inherent in their work activities. Work fatigue can negatively impact productivity, safety, and the health of the employees themselves.* ***Purpose:*** *This study aims to analyze the relationship between knowledge, work of period, implementation of safety talk and safety climate with safety behavior in workers at PT. X PKS Y.* ***Method:*** *The research design is quantitative with a cross-sectional research design. The population in this study is all workers in the production area of PT. Y Rubber Jambi is 68 people. The sample in this study amounted to 58 people.* ***Result and Discussion****: Work fatigue for production employees at PT. Y Rubber Jambi by 62.1%. Factors related to work fatigue were age (p-value=0.002), work attitude (p-value=0.000), workload (p-value=0.03), and length of work (p-value=0.02). As for the noise and lighting variables, it has not been proven to be statistically significant. There was no publication bias on each variable analyzed.* ***Conclusion:*** *Work fatigue among production employees at PT. Y Rubber is influenced by several factors, including age, work attitude, workload, and duration of working hours*

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Introduction

Work fatigue is considered as one of the occupational health problems in developing countries and is a risk factor that triggers the number of work accidents (Yogisutanti, 2019). Work fatigue is a condition in which a person's efficiency and endurance at work are reduced, resulting in a decrease in work capacity and body endurance. (Gaol, Camelia, & Rahmiwati, 2018). Work fatigue will affect work and can cause various problems such as loss of work ability, decreased work limits, and decreased work productivity. Therefore, fatigue is an important problem that needs to be treated properly(Rinaldi, 2019).

The International Labor Organization (ILO) stated that every year, as many as two million workers die due to work accidents caused by fatigue factors. In the study there were as many as 58,115 samples, 18,828 of whom (32.8%) experienced work fatigue(Medianto, 2017). According to the World Health Organization (WHO) in a health model made until 2020, it also states that physical disorders in the form of severe fatigue will be the second leading killer disease after heart disease. Research conducted by the Department of Labor on 12,000 companies with around 16,000 randomly selected workers found that 65% of workers complained of physical fatigue due to daily work, 28% complained of mental fatigue, and 7% complained of stress and feeling left out(Permatasari, Rezal, & Munandar, 2017).

The development of the number of workers in Indonesia from year to year continues to increase, but it is not balanced with efforts from companies to protect the safety and health of workers so that the number of work fatigue in Indonesia is still quite high. The Central Statistics Agency of Indonesia reported in August 2023 that around 42% of employees in Indonesia experience work fatigue. This data, based on the National Labor Force Survey (Sakernas), includes a number of factors based on various workplace fatigue hazards. Global surveys also show that the level of work fatigue continues to increase[2]. In Jambi province, there were 629 cases of work accidents recorded in 2017, 714 cases of work accidents in 2018 and 640 cases of work accidents in 2019 which occurred due to work fatigue caused by work fatigue factors in industry. (Rini & Aswin, 2021).

Indonesia's rubber production is quite high and worthy of consideration in the world market. From year to year, Indonesia's rubber production has increased, until now. Indonesia's natural rubber potential is potential to be developed. Natural rubber can be processed into goods/products to support community activities. Indonesia has the largest rubber plantation area in the world, reaching 3.6 million hectares(Perdana, 2020). As the world's second largest rubber producer, Indonesia has 2.2 million rubber farmers, contributing 2.38 million tons of foreign exchange worth US$4.12 billion. Working for the rubber industry often requires very heavy and tiring physical activity. In addition, the working environment is less conducive such as hot, humid, noisy, dusty and other conditions. To deal with this type of work, employees not only need to have adequate physical capacity or can also apply a number of work design techniques, such as the use of aids, improving work methods, arranging rest periods, and others.(Saris, Desi Kusmindari, Hasmawaty, & Universitas Bina Darma, 2017).

As for some rubber companies in Jambi and the number of their workers, the first is PT Djambi Waras employing 420 workers, PT Hok Tong Jambi employing 68 workers, PT Remco Jambi employing 312 workers, PT Angkasa Raya Jambi employing 214 workers, PT Aneka Bumi Pratama (ABP) has around 1,759 workers, and PT Brahma Bina Bakti in Jambi is estimated to employ around 150 workers. Work fatigue causes a decrease in work quality due to physical fatigue as a result of a workload that is not

balanced with the ability of the workforce, resulting in a decrease in concentration, self-control and work accuracy, which means that the work is not up to standard. Workplace burnout (when employees feel physically, mentally, and emotionally exhausted because of their work) is a problem that is initially related to excessive workload. Every worker has the ability to cope with tasks that demand them physically, mentally, or socially. In the workload standard, there is an equation where each individual can only bear the burden up to a certain limit(W. D. Cahyani, 2017).

Age affects a person's physical condition, younger workers will be able to do heavy work, and older people vice versa. This is in line with the theory put forward by Suma'mur (1996) A person's age affects their physical condition. Someone who is older has the potential to experience increased fatigue while working. Therefore, body function, physical endurance and ability to work can vary due to age factors(Wahyuni & Indriyani, 2019). Workload is a type of task specification used to measure activity and achievement. According to Tillama & Wiraman, workload is a condition when someone is given a task or job that must be completed within the time given. The workload felt by company employees, especially in the production department, is in the form of time burden, mental burden and psychological pressure burden. Research conducted by Gianci Reppi, et al. in 2019 obtained the results of the workload level, namely; moderate workload of 57.1%, light workload of 28.6% and heavy workload of 14.3%.

Work postures that are often done by humans in doing work include sitting, standing, bending, squatting, walking and others. These work postures are carried out depending on the conditions in the existing work system. According to previous research, the most common cause of work fatigue is standing too long. Shifts in industry are usually held for 7 working days, with 8-hour intervals and a 30-minute break. This is what affects employees experiencing fatigue complaints such as drowsiness, back pain, headaches, impaired concentration and pain in the leg muscles(Nurazizah, 2023).

Working hours are defined as the amount of time a person works to earn wages. Articles 77 to 85 of the Job Creation Law No. 11 of 2020 and the Manpower Law No. 13 of 2003 regulate working hours for employees in the private sector. The standard working hours are 7 hours a day and 40 hours a week for 6 working days a week or 8 hours a day and 40 hours a week for 5 working days a week. Some fields or special jobs may require less or more working hours than the standard working hours. Research by Darmayanti et al. (2021) presents statistical results that reject the Ho hypothesis and accept the Ha hypothesis, showing a relationship between working hours and worker fatigue levels(Darmayanti, Handayani, & Supriyono, 2021).

Another factor that causes fatigue in the workplace is noise. Since most manufacturing processes in the industry cause noise, noise cannot be separated from industrial development. Several physical environmental factors, including noise, affect employee health and are one of the factors that can provide additional stress on employees(Norhalizah, Fauzan, & Anggraeni, 2020). One of the physical factors in the workplace is lighting. Poor lighting can make the eyes tired, reduce work productivity, cause stress, and cause eye pain and headaches around the eyes, affect vision and increase the risk of work accidents.

PT. Y Rubber Jambi is one of the industrial companies that focuses on management activities with natural rubber raw materials with the type of slab/cup lumb. PT. Y Jambi is one of the largest crumb rubber export companies in Jambi Province with a fairly large production target of around 2000 tons of SIR-20 per month. If a work accident occurs, it can certainly affect work productivity and have an impact in the form of losses for the

company. This rubber processing process is carried out by changing raw rubber chunks into semi-finished materials that can be further processed to produce a product that is useful in industry and other sectors. The rubber processing process is carried out in several stages of production where each work process contains potential hazards and safety and health risks that can endanger workers such as physical, chemical and ergonomic hazards.

Based on an initial survey by researchers at PT. Y Rubber, shows that many workers experience significant symptoms of fatigue, which can be caused by various factors, including physical conditions, the work environment, and the production process itself. The results of observations show that long working hours without sufficient rest cause decreased energy, worker motivation, and physical complaints, such as back pain and muscle tension that worsen the condition, adding to the mental burden felt by workers. Based on the results of interviews and observations by researchers on independent variables in the initial data survey of PT. Y Rubber, several workers felt fatigue and pain in several parts of their bodies when carrying out processing operations in the production section. Based on this background, it is important to know and analyze so that companies can manage their employees and ensure their performance and well-being. In addition, research can help policy makers in creating policies and programs that can reduce the problem of work fatigue in the workplace.

Method

The type of research used in the study is quantitative research with a cross-sectional study design. This research was conducted at PT. Y Rubber and was conducted from September 2024 to December 2024. Based on this study, the population is all workers in the production department of PT. Y Rubber, totaling 68. The sample in this study was 58 people.

Results and Discussion

1. Results

Univariate Analysis

Table 1
Characteristics of Research Respondents

Respondent Characteristics	n	Percentage (%)
Age		
Old	37	63.8
Young	21	36.2
Workload		
Heavy	25	43.1
Light	33	56.9
Work Attitude		
Not Ergonomic	34	58.6
Ergonomic	24	41.4
Length of working		
Abnormal	36	62.1
Normal	22	37.9
Lighting		
At risk	12	20.7
No Risk	46	79.3
Noise		
Not eligible	25	43.1
eligible	33	56.9
Work Fatigue		
Heavy	36	62.1
Light	22	37.9

Based on the data in table 1 above, it is known that the respondents are old, namely 37 respondents (63.8%), have a light workload, namely 33 respondents (56.9%), have a non-ergonomic work attitude, namely 34 respondents (58.6%), have abnormal working hours, namely 36 respondents (62.1%), are in a work location with non-risk lighting, namely 46 respondents (79.3%), noise meets the requirements, namely 33 respondents (56.9%), and heavy work fatigue, namely 36 respondents (62.1%). In this study, based on the results of the score using the SOFI (Swedish Occupational Fatigue Inventory) questionnaire, there were no results for the moderate fatigue category.

Bivariate Analysis

Table 2
Bivariate Analysis

Variables	Work Fatigue				Total		PR (95%CI)	*P-value*
	Heavy		Light					
	n	%	n	%	n	%		
Age								
Old	29	78.4	8	21.6	37	100	2.351 (1.255-4.406)	0.002
Young	7	33.3	14	66.7	21	100		
Workload								
Heavy	20	80	5	20	25	100	1.650 (1.103-2.468)	0.03
Light	16	48.5	17	51.5	33	100		
Work Attitude								
Not Ergonomic	30	88.2	4	11.8	34	100	3.529 (1.746-7.134)	0.000
Ergonomic	6	25	18	75	24	100		
Length of Working								
Abnormal	27	75	9	25	36	100	1.833 (1.072-3.135)	0.02
Normal	9	40.9	13	59.1	22	100		
Noise								
Not eligible	13	52	12	48	25	100	0.746 (0.481-1.157)	0.27
eligible	23	69.7	10	30.3	33	100		
Lighting								
At risk	7	58.3	5	41.7	12	100	0.925 (0.546-1.567)	0.752
No Risk	29	63	17	37	46	100		

From the table above, it shows that respondents in the old age category (78.4%) are 2,351 times more likely to experience severe fatigue than those in the young category (33.3%), those in the heavy workload category (80%) are 1,605 times more likely to experience severe fatigue than those in the light workload category (48.5%), those in the non-ergonomic work attitude category (88.2%) are 3,529 times more likely to experience severe fatigue than those in the ergonomic work attitude category (25%), those in the abnormal work duration category (75%) are 1,833 times more likely to experience severe fatigue than those in the normal work duration category (40.9%).

Relationship between Age and Work Fatigue in Production Employees of PT. Y Rubber in 2024

Work fatigue in production workers at PT. Y Rubber in 2024. The results of the analysis also obtained a prevalence ratio (PR) value of 2.351 (95% CI = (1.255-4.406)), meaning that respondents in the at-risk age category (≥ 35 years) are 2.351 times more likely to experience severe fatigue than those in the non-risk age category (<35 years).Relationship between Workload and Work Fatigue in Production Employees at PT. Y Rubber in 2024**.** The results of the statistical test showed that there was a relationship between workload and work fatigue in production workers at PT. Y Rubber in 2024. The results of the analysis also obtained a prevalence ratio (PR) value of 1.605 (95% CI = (1.103-2.468)), meaning that respondents in the heavy workload category are 1.605 times more likely to experience severe fatigue than respondents in the light workload category.

Relationship between Work Attitude and Work Fatigue in Production Employees of PT. Y Rubber in 2024.

The results of the statistical test show that there is a relationship between work attitude and work fatigue in production workers of PT. Y Rubber in 2024. The results of the analysis also obtained a prevalence ratio (PR) value of 3.529 (95%CI=(1.746-7.134)), meaning that respondents with a non-ergonomic work attitude category are 3.529 times more likely to experience severe fatigue than respondents with an ergonomic work attitude category.

Relationship between Length of Work and Work Fatigue in Production Employees of PT. Y Rubber in 2024

The results of the statistical test show that there is a relationship between length of work and work fatigue in production workers of PT. Y Rubber in 2024. The results of the analysis also obtained a prevalence ratio (PR) value of 1.833 (95%CI=(1.072-3.135)), meaning that respondents with an abnormal working period category were 1.833 times more likely to experience severe fatigue than respondents with a normal working period category.

Relationship between Noise Disturbance and Work Fatigue in Production Employees of PT. Y Rubber in 2024

Based on the results of statistical tests with the chi square test, a p-value of 0.27 was obtained ($p < 0.05$), this shows that there is no relationship between noise disturbance and work fatigue in production workers of PT. Y Rubber in 2025.Relationship between Lighting and Work Fatigue in Production Employees of PT. Y Rubber in 2024The results of statistical tests with the chi square test obtained a p-value of 0.752 ($p < 0.05$), this shows that there is no relationship between lighting and work fatigue in production workers of PT. Y Rubber 2024.

2. Discussion

Relationship between Age and Work Fatigue in Production Employees of PT. Y Rubber in 2024

In this study, the hypothesis is proven, meaning that there is a relationship between age and work fatigue, where the characteristics of workers aged ⩾ 35 years have a relationship with work fatigue because the capacity of workers has decreased compared to those aged <35 years. The results of this study are in line with several previous studies, including research conducted by Rusila and Edward in 2022 which showed that respondents with high levels of fatigue were young, namely 10 people (31.2%). The results of the study showed a relationship between age and work fatigue as evidenced by the p-value of 0.047 <0.05, this is because at the age of 40 years, both physically and mentally, the capacity of workers will decrease by around 60% -80% compared to the work capacity of someone who is 25 years old, so that with increasing age in each individual causes a decrease in work ability and has an impact on the difficulty of workers concentrating during working hours and can be a factor causing fatigue.(Rusila & Edward, 2022)

Research conducted by Pratama in 2021 also showed that the percentage of those experiencing moderate fatigue in the production unit of PT. Bara Adhi Pratama was more workers aged (18-40 years) as many as 7 employees (13.7%) compared to workers aged (41-60 years) as many as 5 employees (55%). The results of the study showed a

significant relationship between age and work fatigue. This happens because the effect of age on work fatigue is due to changes in body capacity and function. Young people can still do heavy work, but on the other hand, old age experiences a decrease in doing heavy work, due to fatigue and impaired performance. (Pratama, 2021)

However, there are different research results stated by Syah, et al. in 2024 showing that those over 35 years old experienced high levels of work fatigue of 54.1% and the results showed that there was no significant relationship between age and work fatigue at PT. Prima Cahaya Utama, because most of the workers at the research location were under 40 years old, which means they are still young, so there was no relationship between age and work fatigue. These results are in accordance with the theory which states that young workers find it easier to do heavy work, because their body condition is still strong, in contrast to older workers who are limited to moving more strongly and get tired quickly. (Rusila & Edward, 2022)

Age is related to work fatigue because the older a person is, the greater the level of fatigue that occurs when working. Work done by the elderly will feel slow to be ready because they easily feel tired which will result in decreased work performance..(Sitorus, 2022) Komalig and Mamusung in 2020 stated that age is related to fatigue because increasing age will be accompanied by the process of degeneration of body organs, so that organ capacity will decrease, causing workers to become more susceptible to fatigue.(Rino Komalig & Mamusung, 2020).

Relationship between Workload and Work Fatigue in Production Employees of PT. Y Rubber in 2024

In this study, the hypothesis is proven, which means that there is a relationship between workload and work fatigue, where the characteristics of workers with heavy workloads experience work fatigue because heavy workloads cause a decline in poor physical and mental function, resulting in fatigue in workers. The results of this study are in line with several previous studies, including research conducted by Hasan, et al. in 2022 which showed a heavy category of workload, namely 36 (60.0%). The results of this study show a relationship between workload and work fatigue in production workers at PT. Tri Teguh Manunggal, this is because the workload felt by production workers is included in the heavy workload. Workers still work manually, such as the process of making jelly drinks still requires workers such as lifting jelly-making ingredients to be put into the machine, moving ingredients from one room to another process room, the packaging process which is the process of putting ready-to-use jelly drinks into the packaging cardboard. (Hasan, Komara, Putro, & Melizsa, 2022)

Similar results were also conducted by Larasati et al.'s research in 2019, which showed a high workload of 62.2%. The results of the study showed a significant relationship between physical workload and work fatigue. In the results of the study, production employees who experienced high work fatigue with a rather heavy physical workload were 24 respondents with a percentage of 82.8%.(Larasati, Suroto, & Wahyuni, 2019) Similar results were also conducted by Larasati et al.'s research in 2019, which showed a high workload of 62.2%. The results of the study showed a significant relationship between physical workload and work fatigue. In the results of the study, production employees who experienced high work fatigue with a rather heavy physical workload were 24 respondents with a percentage of 82.8%.(Larasati et al., 2019).

The results of this study were also supported by Rusila and Edward in 2022 which showed that workers with light loads were 18 people (56.2%) with a total of 32 workers and based on the test results obtained a p value of p 0.021> 0.05 which means that there is a significant relationship between physical workload and work fatigue in workers at the Subur cracker factory and the Sahara cracker factory in Yogyakarta. This is because the physical work activities carried out by workers do not use assistive devices, so the process of moving production materials is carried out manually in a standing position, bending over. (Rusila & Edward, 2022)

Different research results stated by Larasati, et al in 2019 showed a very high workload of 11.1% with a p-value of 0.331, so this result has no significant relationship between workload and work fatigue. This is because respondents with a low workload category are more likely to experience high fatigue, while the research above is related because employees with a high workload category are more likely to experience work fatigue. Production workers are predominantly exhausted due to the workload they receive being too heavy or because the work they do is repeated every day and still uses a manual material handling system in the process of lifting goods, moving goods, packing goods and so on.(Hasan et al., 2022)

Repetitive involvement of repetitive movements in work fatigue causes health problems, including complaints of muscle pain in the legs, neck, and back. Weak power generally occurs due to increased levels of work errors, especially workers who involve inappropriate workloads.(Putri & Inayah, 2024) Workload is the expenditure of effort through the body to carry out physical or mental activities that must be accepted according to the worker's ability, which if not balanced with work ability, will result in work fatigue due to psychological or physical factors.(Hasan et al., 2022) Fatigue that occurs due to physical or psychological factors generally includes drowsiness, dizziness, difficulty thinking, lack of concentration, reduced work enthusiasm, uncontrolled body posture, and poor physical and mental function. (Hasan et al., 2022)

A large workload causes a decrease in muscle performance that interferes with productivity, work and is likely to cause accidents. If workers have been working for a long time from the normal quantity of time, then workers can experience pain or faint while working due to decreased muscle performance which results in fatigue in workers. This is certainly dangerous for the lives of workers, especially workers who work with great risks. (Permatasari et al., 2022) Based on the results of previous research, theories and studies, it can be said that the workload variable has a relationship with work fatigue in employees of the production department of PT. Y Rubber. This is because most of the respondents in this study had heavy workloads and experienced heavy work fatigue, namely 20 respondents (80%) with repetitive work causing decreased muscle performance which resulted in fatigue in workers.

Relationship between Work Attitude and Work Fatigue in Production Employees of PT. Y Rubber in 2024

In this study, the hypothesis was proven, meaning that there is a relationship between work attitude and work fatigue, where the characteristics of workers with non-ergonomic work attitudes have a relationship with work fatigue because non-ergonomic work causes decreased muscle performance which results in fatigue in workers. The results of this study are in line with several previous studies, including research conducted by Maharani, et al. in 2021 which showed that 22 respondents (57.9%) had a standing work attitude with a very low risk and obtained a p-value of 0.024 (p-value <0.05),

meaning that there is a significant relationship between non-ergonomic work attitudes and work fatigue levels. Standing work attitudes can increase mobility and reduce the risk of injury to workers, but work attitudes that are carried out for a long duration without rest or stretching can cause leg pain, impaired blood circulation, swelling in the feet and lower legs, and can cause fatigue in the leg muscles. (Maharani, Wahyuni, & Widjasena, 2021)

The suitability of this study lies in the non-ergonomic working position. The results of this study were again supported by Utami and Inayah in 2023 which showed that high-risk work attitudes mostly experienced moderate back muscle fatigue, namely 92.6% and as many as 58 people or 60.4% were in the high-risk category and there was a relationship between work attitudes and back muscle fatigue in employees of the Packing process of PT. Bagindo Tuban with a p value <0.05. There is an influence of work attitudes on work fatigue. This is because most of the workers' work attitudes are not ergonomic.(Utami & Syarifah Has, S.KM., M.Epid, 2023) Different research results stated by Yunus, et al in 2019 showed that standing work postures have a very high risk of 3% experiencing work fatigue and this study showed that there was no relationship between standing work postures and work fatigue in workers in the production section of the Yogyakarta Plywood Factory. This is because the Yogyakarta Plywood Factory has implemented a good K3 system, both in terms of management and the equipment used. (Yunus, Sumekar, & Anisah, 2019)

Work attitude becomes a determining point as an analysis of worker effectiveness which if it has been done well and ergonomically, then the results obtained will also be good. Conversely, if the work attitude is not ergonomic, then workers are at risk of work fatigue. (Hermawan, Soebijanto, & Haryono, 2017) The causes of fatigue in industry vary widely. High workloads and non-ergonomic work postures can accelerate fatigue in workers. Work fatigue when associated with ergonomic principles includes the suitability between working conditions and the conditions of the worker himself.(Putri & Inayah, 2024) Ideally, work can be done either by sitting, standing or sitting and standing alternately as a way of avoiding static muscle work which causes fatigue, so it is necessary to design work stations and have appropriate posture patterns for each worker..(Yunus et al., 2019)

Based on the results of previous research, theories and studies, it can be said that the variable of work attitude has a relationship with work fatigue in employees of the production department of PT.Y Rubber, this is because most respondents with non-ergonomic work attitudes and experience severe work fatigue, namely 30 respondents (88.2%). Improper or too long work attitudes cause pain in the limbs, causing fatigue and based on the results of observations made it is known that the average worker in the production department tends to stand too long, doing repetitive movements such as printing rubber, cutting rubber, lifting rubber raw materials, etc.

Relationship between Length of Work and Work Fatigue in Production Employees of PT. Y Rubber in 2024

In this study, the hypothesis is proven, meaning that there is a relationship between working hours and work fatigue, where the characteristics of workers with working hours >8 hours are more likely to experience fatigue due to decreased work effectiveness due to the resulting boredom. The results of this study are in line with several previous studies, including Fatmawati, et al. in 2023 which showed that there is a relationship between working hours and the level of work fatigue in workers at PT. XYZ. The average worker

at PT. XYZ has a working time of more than 8 hours/day due to the extension of overtime hours for 2-3 hours to meet production targets. In addition, if workers feel tired, workers do not leave work, because there is an agreed production target, so there is a high possibility of work fatigue.(Fatmawati, Aswin, & Syukri, 2023) The suitability of this study is that the working hours exceed 8 hours/day are caused by extended working hours (overtime).

The results of this study are supported by Yusuf and Rifai in 2020 which showed that the working hours were at risk and experienced feelings of fatigue as many as 25 workers (83.3%) with a p value of 0.005 (P≤0.05) meaning that there is a relationship between the length of work and feelings of fatigue in Heraton Craft workers. The results of the Prevalence Ratio (RP) were 2.222 with a CI value that did not include the number 1, meaning that workers who had a long working time at risk had a risk of experiencing feelings of fatigue 2.222 times compared to employees who had a long working time that was not at risk and was a risk factor. This is because workers must complete work according to the request of the Heraton Craft owner, which if not fulfilled will continue to work from home, so that the working time is more than 8 hours per day.(Yusuf & Rifai, 2020) The suitability of this study is that the working hours exceed 8 hours/day are caused by the extension of overtime hours. The results of this study were again supported by Darimi, et al. in 2024 which showed that the inappropriate working hours were 60.3% and the appropriate ones were 39.7%, the results of this study showed a very meaningful or significant relationship indicating that the risk of work fatigue tends to increase along with the length of a person's work in a company.(Darimi, Musnadi, Chandra, Nursia, & Rimonda, 2024)

Different research results stated by Malik et al. in 2021 stated that there was no significant relationship between work period and work fatigue. The factors that cause workers with long work periods are not related to fatigue, this is due to the habit factor of someone who has been doing the job so that their body is used to their work. On the other hand, even though someone is new to work, their work is very physically and mentally burdensome, plus activities outside of working hours that are very numerous and heavy, the risk of work fatigue is very high. Different from the results of the study conducted because there is often an extension of working hours that exceeds the capacity of working hours.

Working hours are the length of time an individual is at a place in a day. If workers work more than the normal time specified, there will be a decrease in work efficiency and an increase in work fatigue, work-related illnesses or even work accidents. (Sitorus, 2022) Working hours are the length of time an individual spends in an agency that is correlated with work fatigue, especially chronic fatigue, where the longer an individual works in an uncomfortable work environment, the more fatigue will accumulate and occur over time.(C. I. Cahyani & Sahri, 2024) Working more than 8 hours a day can cause boredom and fatigue in workers. An individual can generally work well for 40-50 hours, more than that there is a big chance for negative things to happen to workers.(Yusuf & Rifai, 2020)

The length of time a worker can work effectively for 6-10 hours a day. Extension of working hours that exceed the capacity of working hours, generally has an impact on decreasing work effectiveness and the emergence of work fatigue, PAK, and KAK..(Fatmawati et al., 2023) The longer an individual works in this environment, the greater the possibility of physical fatigue occurring..(Rimonda, 2024) Based on the results of previous research, theories and studies, it can be said that the variable of length of work has a relationship with work fatigue in employees of the production department of PT.Y

Rubber. This is because workers with a working period category of >8 hours are more likely to experience severe fatigue compared to light fatigue, conversely, workers with a category of <8 hours are more likely to experience mild fatigue than severe fatigue.

The Relationship between Noise Disturbance and Work Fatigue in Production Employees of PT. Y Rubber in 2024

In this study, the hypothesis was not proven, meaning that there was no relationship between noise disturbance and work fatigue, where the characteristics of workers with noise that met the requirements were not related to work fatigue. The results of this study are not in line with several previous studies, including Azzahri and Gustriana in 2021 which showed that noise that was not standard while working, experienced high work fatigue as many as 34 people (85.0%). The results of the study stated that there was a significant relationship between noise factors and the occurrence of work fatigue in production workers at PKS PT.JS. This happens because the intensity of the noise exceeds the requirements, so that workers feel tired.(Azzahri Isnaeni & Gustrianda, 2021)

However, a different study was found, stated by Dewi Gurusinga et al in 2013, showing that there was a relationship between noise and work fatigue in sugar factory operators at PT. Perkebunan Nusantara VII Cinta Manis in 2013. This was caused by sugar factory operators who worked in locations with noise above NAB (>85 dB) being exposed to noise with noise levels ranging from 86 dB-97 dB for 8 working hours and based on field observations, the majority of workers did not use ear PPE while working. Although operators have rest hours during work, during these rest hours they are still exposed to noise because operators take breaks at the location where they work..(Gurusinga, Camelia, & Purba, 2019)

Noise is all sounds that are unwanted by humans and are environmental factors that have a negative impact on health and cause fatigue due to increased heart rate and blood vessel constriction and disruption of worker communication and concentration, resulting in work fatigue.(Sitorus, 2022) Noise is also a physical environmental factor that affects occupational health and is one of the factors causing additional burdens for workers. Noise is an unwanted sound because it does not match the time and space that causes health problems and human comfort.(Azzahri Isnaeni & Gustrianda, 2021)

High levels of noise have both long-term and short-term effects on hearing. The higher the intensity of the noise, the greater the potential for various disorders such as temporary to permanent hearing loss, dizziness, drowsiness, high blood pressure, emotional stress that can be followed by difficulty sleeping, heart disease and loss of concentration.(Amir, Wahyuni, & Ekawati, 2019) The noise-causing factor is caused by the production process in the second stage, namely pattern formation, at this stage the metal is formed by being repeatedly hit for the desired pattern. In this process, if there are more workers, the noise intensity in that place will be higher. Someone who experiences noise is usually unable to focus on what they are doing. Furthermore, to be able to control the causes of noise properly and correctly, it is necessary to reduce the noise intensity.(Azzahri Isnaeni & Gustrianda, 2021)

The discrepancy between the research results and the theory is because in this study the noise did not meet the requirements and experienced severe work fatigue, namely 13 respondents (52%). Meanwhile, respondents with noise met the requirements with severe work fatigue, namely 23 respondents (69.7%), meaning that respondents with noise that still met the requirements were more than those who did not meet the requirements. so it

can be said that there is a difference in research characteristics where there is more noise that meets the requirements than those that do not meet the requirements.

Relationship between Lighting and Work Fatigue in Production Employees of PT. Y Rubber in 2024

In this study, the hypothesis was not proven, meaning that there was no relationship between lighting and work fatigue, where the characteristics of workers with non-risk lighting were not related to work fatigue. The results of this study are not in line with several previous studies, including Husein, in 2022 which showed that 60 (93.8%) workers were at risk of experiencing more eye fatigue than workers who were not at risk, as many as 12 (17.6%) workers but experienced eye fatigue. The results of the study showed a relationship between the intensity of welding light and eye fatigue of workers at PT. MTI. This is because the heat generated from welding produces high or very risky light intensity at a point, so that there is a high light contrast [between the welder and the surrounding environment (Husein, 2022)

However, there are different research results stated by Reynaldi Nurkihsan Gustiana Putra, et al. in 2021 showing a chi-square value of 0.036 or it can be said that 0.036 <0.05, which means that there is a relationship between lighting source conditions and work fatigue. This is because most workers experience complaints of eye fatigue that interfere with daily activities. They feel these complaints at work or at home. This is in accordance with Gradjean's opinion in Tarwaka, lighting that is not designed properly will cause disturbances or visual fatigue during work..(Putra, Nugraha, & Herwanto, 2021)

The discrepancy between the research results and the theory is because in this study respondents with non-risk lighting with severe work fatigue, namely 29 respondents (63%) more than the lighting that is at risk, namely (58.3%), so that it can be said that there is a difference in research characteristics where respondents with non-risk lighting are more than those who are not at risk. Lighting is one of the factors to obtain a safe and comfortable working environment, and is related to work productivity. Poor lighting also results in low quality productivity which causes fatigue, eye pain and so on for worker. (Jasna & Dahlan, 2019)

Healthy and good lighting intensity is the main factor for the entire production process flow related to the strategy of increasing production results and minimizing errors or defects in finished clothing products. The urgency of lighting intensity has a strategic role as a means of lighting a room, while reducing complaints of eye fatigue symptoms in workers. (Khoiriyah, Jayanti, & Widjasena, 2020) Lighting intensity also emphasizes the range of accommodation, if the lighting intensity is low, the far point moves away then the speed and accuracy of accommodation can be reduced. Lighting intensity can have a positive impact on workers, allowing workers to see work objects clearly, quickly and accurately while working. (Sari, 2023)

The lighting intensity value must be in accordance with the level of need or type of work as eye health maintenance and work enthusiasm. Good lighting intensity according to standards can prevent tension, eye fatigue, save work time so as to provide higher efficiency and increase productivity and reduce visual stress on work.(Khoiriyah et al., 2020) If the lighting is lacking, then there will be eye fatigue of workers, reduced work efficiency, headaches around the eyes and cause refractive disorders of the eyes such as myopia, hypermetropia and presbyopia. This forces the eyes to forcefully make maximum accommodation in order to see objects clearly so that if the lighting intensity is lacking then there will be a decrease in the ability of visual acuity. (Khoiriyah et al., 2020)

Based on the results of the research and observations conducted, it was also obtained that the lighting in PT. Y rubber can be said to be good and meets the standards for workers, thus the company needs to maintain good and optimal lighting by conducting routine checks and maintenance every 6 months in accordance with the Regulation of the Minister of Manpower and Transmigration No. 13 of 2011 concerning Health and Safety in the Workplace and cleaning the work area as an assurance that the effectiveness of lighting remains optimal.

Conclusion

Most respondents experienced severe work fatigue (62.1%). Most respondents were old (63.8%), had a workload (56.9%), had an unergonomic work attitude (58.6%), had an abnormal working period (62.1%), were in a work location with non-risk lighting (79.3%), noise met the requirements (56.9%). There is a relationship between age and work fatigue factors in production employees at PT. Y Rubber in 2024. There is a relationship between workload, work attitude, work duration with work fatigue factors in production employees at PT. Y Rubber in 2024. There is no relationship between noise, lighting with work fatigue factors in production employees at PT. Y Rubber in 2024.

Reference

Amir, J., Wahyuni, I., & Ekawati. (2019). Hubungan Kebisingan, Kelelahan Kerja Dan Beban Kerja Mental Terhadap Stres Kerja Pada Pekerja Bagian Body Rangka Pt. X. *Jurnal Kesehatan Masyarakat*, *7*(1), 2356–3346.

Azzahri Isnaeni, L. M., & Gustrianda, E. (2021). Hubungan Intensitas Kebisingan Dengan Kejadian Keluhan Kelelahan Subjektif Pada Pekerja Bagian Produksi Di Pks. *Jurnal Kesehatan Masyarakat*, *5*(1), 434–439. https://doi.org/10.31004/prepotif.v5i1.1640

Cahyani, C. I., & Sahri, M. (2024). ANALISIS FAKTOR YANG BERHUBUNGAN DENGAN KELELAHAN KERJA SUBJEKTIF PADA PEKERJA DI PT . X WORKERS AT PT . X PENDAHULUAN Kelelahan kerja akan menurunkan kinerja dan menambah kesalahan kerja . Menurunnya kinerja sama artinya dengan menurunnya produktivitas k, *8*(1).

Cahyani, W. D. (2017). Hubungan antara beban kerja dengan kelelahan kerja pada pekerja buruh angkut. *Jurnal Lmu Pengetahuan Dan Teknologi*, *19*, 6.

Darimi, Musnadi, J., Chandra, P. B., Nursia, L. E., & Rimonda, R. (2024). Hubungan Waktu dan Masa Kerja Dengan Kelelahan Kerja Pada Karyawan Pabrik di PT.Z, *11*(9).

Darmayanti, J. R., Handayani, P. A., & Supriyono, M. (2021). Hubungan Usia , Jam , dan Sikap Kerja terhadap Kelelahan Kerja Pekerja Kantor Dinas Koperasi Usaha Kecil dan Menengah Provinsi Jawa Tengah. *Prosidang Seminar Nasional UNIMUS*, *4*, 1318–1330.

Fatmawati, F., Aswin, B., & Syukri, M. (2023). Faktor yang Berhubungan dengan Tingkat Kelelahan Kerja Pada Pekerja Bagian Produksi di PT. XYZ. *Jurnal Kesehatan Global*, *6*(2), 72–80. https://doi.org/10.33085/jkg.v6i2.5714

Gaol, M. J. L., Camelia, A., & Rahmiwati, A. (2018). Analisis Faktor Risiko Kelelahan Kerja pada Karyawan Bagian Produksi PT. Arwana Anugrah Keramik, Tbk. *Jurnal Ilmu Kesehatan Masyarakat*, *9*(1), 53–63. https://doi.org/10.26553/jikm.2018.9.1.53-63

Gurusinga, D., Camelia, A., & Purba, I. (2019). Analisis Faktor-Faktor Yang Berhubungan Dengan Kelelahan Kerja Pada Operator Pabrik Gula Pt.Pn Vii Cinta Manis Tahun 2019. *Jurnal Ilmu Kesehatan Masyarakat*, *6*(2), 83–91.

Hasan, H. M., Komara, C. P., Putro, W. G., & Melizsa, M. (2022). Hubungan Antara Beban Kerja Dengan Kelelahan Kerja Pada Pekerja Bagian Produksi Di Pt. Tri Teguh Manunggal Sejati Kota Tangerang. *Journal of Health Research Science*, *2*(01), 1–8. https://doi.org/10.34305/jhrs.v2i1.478

Hermawan, B., Soebijanto, S., & Haryono, W. (2017). Sikap dan beban kerja, dan kelelahan kerja pada pekerja pabrik produksi aluminium di Yogyakarta. *Berita Kedokteran Masyarakat*, *33*(4), 213. https://doi.org/10.22146/bkm.16865

Husein, M. (2022). Hubungan Faktor Pekerja dan Intensitas Cahaya Las dengan Kelelahan Mata Pada Pekerja. *Jurnal Ilmiah Universitas Batanghari Jambi*, *22*(1). https://doi.org/10.33087/jiubj.v22i1.1796

Jasna, J., & Dahlan, M. (2019). Hubungan Intensitas Pencahayaan Dengan Kelelahan Mata Pada Pekerja Penjahit Di Kabupaten Polewali Mandar. *J-KESMAS: Jurnal Kesehatan Masyarakat*, *4*(1). https://doi.org/10.35329/jkesmas.v4i1.235

Khoiriyah, I. A., Jayanti, S., & Widjasena, B. (2020). Hubungan Intensitas Pencahayaan, Kelelahan Mata dan Gangguan Ketajaman Penglihatan Pada Pekerja Bagian Inspecting PT.Tekstil X. *Jurnal Kesehatan Masyarakat*, *7*(4).

Larasati, S., Suroto, & Wahyuni, I. (2019). Hubungan Karakteristik Individu, Beban Kerja Fisik dan Beban Kerja Mental dengan Kelelahan Kerja pada Karyawan Bagian Produksi di PT. X. *Jurnal Kesehatan Masyarakat (e-Journal)*, *7*(4).

Maharani, A. M., Wahyuni, I., & Widjasena, B. (2021). Hubungan Sikap Kerja Berdiri, Karakteristik Pekerja, Dan Penggunaan High Heels Terhadap Tingkat Kelelahan Kerja Pada Sales Promotion Girl (Spg) Di Swalayan Kota Semarang. *Jurnal Kesehatan Masyarakat (Undip)*, *9*(6), 741–746. https://doi.org/10.14710/jkm.v9i6.31343

Medianto, D. (2017). *Faktor-Faktor yang Berhubungan dengan Kelelahan Kerja pada Tenaga Kerja Bongkar Muat (TKBM) di Pelabuhan Tanjung Emas Semarang*. Universitas Muhammadiyah Semarang.

Norhalizah, Fauzan, A., & Anggraeni, S. (2020). Hubungan Kebisingan Dan Tingkat Stress Dengan Kelelahan Kerja Pada Pekerja Di Pt. Mega Utama Khatulistiwa Sepunggur Kab. Tanah Bumbu.

Nurazizah, N. A. (2023). Hubungan antara Sikap Kerja Berdiri terhadap Kelelahan Kerja dan Nyeri Otot Gastropocnemius pada Karyawan Pengolahan Susu Kambing di Turi Yogyakarta.

Perdana, R. P. (2020). Kinerja Ekonomi Karet dan Strategi Pengembangan Hilirisasinya di Indonesia. *Forum Penelitian Agro Ekonomi*, *37*(1), 25. https://doi.org/10.21082/fae.v37n1.2019.25-39

Permatasari, A., Rezal, F., & Munandar, S. (2017). Faktor Yang Berhubungan Dengan Kelelahan Kerja Pada Karyawan Di Matahari Department Store Cabang Lippo Plaza Kendari Tahun 2016, *2*(5), 1–11.

Permatasari et al. (2022). Faktor-Faktor Yang Berhubungan Dengan Kelelahan Kerja Pada Pekerja Bagian Pemasangan Besi Di Pt . X Tahun 2021. *Prosiding Seminar Nasional Kesehatan Masyarakat Universitas Muhammadiyah Pontianak*, *1*(1), 144–160.

Pratama, A. P. (2021). *Hubungan Umur, Masa Kerja dan Shift Kerja dengan Kelelahan Kerja Karyawan di Unit Produksi PT. Bara Adhi Pratama di Kabupaten Bengkulu Utara*.

Putra, R. N. G., Nugraha, A. E., & Herwanto, D. (2021). Analisi Pengaruh Intensitas Pencahayaan Terhadap Kelelahan Mata Pekerja. *Jurnal Teknika*, *15*(1), 81–97.

Putri, A. R., & Inayah, Z. (2024). Analisis Faktor Yang Berhubungan Dengan Kelelahan Kerja Pada Tenaga Kerja Produksi Bagian Sewing Woven Plastik di PT. Wiharta Karya Agung Gresik. *Jurnal Bidang Ilmu Kesehatan*, *14*(2). https://doi.org/10.52643/jbik.v14i2.3920

Rimonda, R. (2024). Hubungan Waktu dan Masa Kerja dengan Kelelahan Kerja pada Karyawan Pabrik di PT.Z. *Jurnal Ilmu Kedokteran Dan Kesehatan*, *11*(9), 1754–1762.

Rinaldi, R. (2019). *Analisis Beban Kerja Karyawan Bagian Mekanik Program Studi Manajemen S-1 Fakultas Ekonomi Universitas Islam Riau Pada Pt . Wahana Wirawan Riau*.

Rini, W. N. E., & Aswin, B. (2021). Analisis, Prediksi Tren dan Pembuatan Kebijakan dari Kasus Kecelakaan Kerja bagi Peserta BPJS Ketenagakerjaan Cabang Jambi. *Jik Jurnal Ilmu Kesehatan*, *5*(1), 122. https://doi.org/10.33757/jik.v5i1.385

Rino Komalig, M., & Mamusung, N. (2020). Hubungan Antara Umur Dan Shift Kerja Dengan Kelelahan Kerja Pada Petugas Karcis Parkir Kawasan Megamas Kota Manado. *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, *3*(1). https://doi.org/10.56338/mppki.v3i1.1015

Rusila, Y., & Edward, K. (2022). Hubungan Antara Umur, Masa Kerja dan Beban Kerja Fisik dengan Kelelahan Kerja pada Pekerja di Pabrik Kerupuk Subur dan Pabrik Kerupuk Sahara di Yogyakarta. *Jurnal Lentera Kesehatan Masyarakat*, *1*(1), 39–49.

Sari, I. W. (2023). *Faktor-Faktor yang Berhubungan Dengan Kelelahan Kerja pada Pekerja Bagian Operator SPBU di Kecamatan Rantau Keloyang Tahun 2011*. Jambi: Sekolah Tinggi Ilmu Kesehatan Harapan Ibu Kota Jambi.

Saris, N., Desi Kusmindari, C., Hasmawaty, H., & Universitas Bina Darma, D. (2017). Hubungan Lingkungan Fisik dan Beban Kerja dengan Tingkat Kelelahan pada Pekerja Perkebunan. *Jurnal Ilmiah TEKNO*, *14*(2), 11–22.

Sitorus, A. R. (2022). *Analisa Faktor Yang Mempengaruhi Tingkat Kelelahan Kerja Pada Pekerja Bagian Produksi di PT Cipta Baja Raya* (Vol. 9). Medan: Sumatera Utara.

Utami, N. D., & Syarifah Has, S.KM., M.Epid, D. F. (2023). Hubungan Sikap Kerja Dengan Kelelahan Otot Punggung Pada Karyawan Proses Packing Pt. Bagindo Tuban. *Journal of Public Health Science Research*, *4*(1). https://doi.org/10.30587/jphsr.v4i1.5633

Wahyuni, D., & Indriyani, I. (2019). Faktor faktor yang Berhubungan dengan Kelelahan Kerja pada Pekerja Bagian Produksi di PT. Antam Tbk. UBPP Logam Mulia. *Jurnal Ilmiah Kesehatan*, *11*(1), 73–79. https://doi.org/10.37012/jik.v11i1.70

Yogisutanti, G. (2019). Pencegahan Kelelahan Kerja dan Stres Kerja pada Guru Pendidikan Anak Usia Dini (PAUD) di Desa Babakan Kecamatan Ciparay Kabupaten Bandung. *Jurnal Abdimas BSI*, *2*(1), 21–31.

Yunus, F. I. y, Sumekar, A., & Anisah, N. (2019). Hubungan Sikap Kerja Berdiri Dan Beban Kerja Fisik Dengan Kelelahan Kerja Pada Pekerja Di Bagian Produksi Pabrik Kayu Lapis Yogyakarta. *Jurnal Formil (Forum Ilmiah) Kesmas Respati*, *4*(2). https://doi.org/10.35842/formil.v4i2.266

Yusuf, M. H., & Rifai, M. (2020). Hubungan Antara Beban Kerja dan Lama Kerja dengan Perasaan Daerah Istimewa Yogyakarta, *5*(2).