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Original Article

Work Fatigue in Transport Workers at Bulog Warehouse, Sub-Divre of Masssar City

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Abstract

Background: Fatigue is one of the problems that are often experienced by workers, so that this condition affects their health and in turn will reduce work efficiency and productivity.
Aim: The purpose of this study was to determine the factors that affect work fatigue on transport workers in the Bulog Warehouse, Makassar City Sub Division.
Method: The research design used was analytic observational with a cross sectional study approach. The total population is 58 resource persons. The sampling technique used the probability sampling method by means of exhaustive sampling, namely taking all members of the population as a sample, namely the entire workforce of 58 people. Data analysis carried out was univariate and bivariate as well as multivariate with chi square test with a significant level (α) = 0.05.
Results: The study showed that the variables related to work fatigue on transport workers at the Bulog Warehouse, Makassar City Division, namely the age of the informant (p = 0.000) < 0.05, working period (p = 0.000) < 0.05 and workload (p = 0.000) < 0.05, while the individual variables that did not have a significant relationship with work fatigue were gender and nutritional status, for the overall work environment variables there was no relationship to work fatigue of transport workers, namely noise, lighting and room temperature. The variables that have the greatest correlation with work fatigue of the transport workers in the Bulog Divre Warehouse in Makassar City are age (p=0.017) and years of service (p=0.004).
Conclusion: There is a relationship between age, period of work and workload with work fatigue on transport workers at the Bulog Warehouse, Sub-Divre Makassar. Also, the age variable or the age of the workforce is the variable that is most closely related to work fatigue on the Transport Workers in the Bulog Warehouse, Makassar Sub-Divisional Division.

INTRODUCTION

Law No. 13 of 2003 concerning manpower states that national development is carried out in the context of complete human development and the development of Indonesian society as a whole to create a prosperous, just, prosperous society, both materially and spiritually based on Pancasila and the Constitution of the Republic of Indonesia. Indonesia in 1945. Manpower has a very important role and position as actors and national development goals (UU 2003).

The purpose of occupational health is to create a healthy and productive workforce. This goal can be achieved if it is supported by a work environment that meets health requirements. One of the objectives of implementing occupational health in operational form is to prevent fatigue and increase enthusiasm and enjoyment of work (Suma'mur 1996).

Fatigue is part of the common problems that are often encountered in workers, especially workers. Fatigue is the accumulation of various activities of the human body that result in a body condition characterized by feelings of tiredness and decreased concentration. Fatigue can also be interpreted in the form of a body protection mechanism so that the body avoids further damage so that recovery occurs after rest (Tarwaka, Bakri & Sudiajeng 2004).

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According to the International Labor Organization (ILO) data shows that in the world almost every year there are as many as two million workers who die due to work accidents caused by fatigue, this data further makes it clear that the contribution of work fatigue to the occurrence of work accidents is quite large (Wurara 2020). The World Health Organization (WHO) in the health model made until 2020 predicts that psychological disorders in the form of feeling heavy tired and leading to depression will become the number two killer disease after heart disease (Astuty, Wahyuning & Yuniar 2013).

The results of a study conducted by the Japanese Ministry of Manpower on 12,000 companies involving about 16,000 workers in the country who were randomly selected showed that 65% of workers complained of physical fatigue due to routine work, 28% complained of mental fatigue and about 7% of workers complained of severe stress and anxiety. feel left out. The results of research conducted at one company in Indonesia, especially in the production section, said that the average worker experienced fatigue by experiencing symptoms of headache, back pain, dizziness and stiffness in the shoulders (Astuty, Wahyuning & Yuniar 2013).

Based on data from the Ministry of Manpower and Transmigration in Indonesia, until 2010, work accidents due to fatigue were dominated by the construction services sector (31.9%), followed by the manufacturing industry (31.6%), transport (9.3%), mining (2.6%), forestry (3.6%), and others (20%). More than 65% of workers in Indonesia come to the company's polyclinic with complaints of work fatigue and the factors that cause fatigue vary greatly which is influenced by workload, work environment, physical problems and health conditions can also be influenced by individual factors such as age, health status, health status. nutrition, diet, gender and psychological conditions (Umyati 2010).

Cases in Indonesia in 2018 of 847 cases of work accidents that occurred 36% were caused by fatigue while 64% of other cases were caused by other things (Deyulman 2018).

Work fatigue is still one of the biggest factors causing work accidents in a workplace, in percentage terms, the work fatigue factor gives a percentage of 50% of the occurrence of work accidents (Maurits 2012). Fatigue is part of the common problems that are often encountered in workers, especially workers. Fatigue is the accumulation of various activities of the human body that result in a body condition characterized by feelings of tiredness and decreased concentration. Fatigue can also be interpreted in the form of a body protection mechanism so that the body avoids further damage so that recovery occurs after rest (Tarwaka et al, 2004) (Tarwaka, Bakri & Sudiajeng 2004).

Meanwhile, another opinion says that fatigue is a variety of conditions accompanied by a decrease in efficiency and endurance at work, which can be caused by the main source being the eyes (visual fatigue), general physical fatigue, nervous exhaustion, fatigue by a monotonous environment and fatigue by a chronic environment continuously as persistent factors (Suma'mur 2009). General fatigue is indicated by a loss of will to work, the cause of which is a state of central nervousness or a psychological-psychological condition. The root of the general fatigue problem is the monotony of work, the intensity and duration of mental and physical work that is not in line with the will of the workforce concerned, environmental conditions that are different from the original estimate, unclear responsibilities, deep concerns and inner conflicts and illness conditions suffered by the workforce. While muscle fatigue is characterized by tremors or pain in tremors (Suma'mur 2009).

Maurits in 2012 revealed that the factors that can affect the occurrence of work fatigue can come from factors that are not adequate for the work environment to work to psychosocial problems that can affect the occurrence of work fatigue. All of which can affect occupational health conditions in general and work fatigue in particular (Maurits 2012). In connection with Suma'mur, in 2014 it was stated that workload determines how long a person can work in accordance with work capacity. Workload is also the amount of work that must be borne by a unit or organizational position as well as the product of the amount of work and working time (Suma'mur 2014).

In order for a person to work without fatigue or distraction, the heavier the workload, the shorter the working time should be. External factors that affect work fatigue are temperature, noise and lighting in the work environment. Based on research by Ferryka (2010) on workers in the Makmur Rice Mill, Munggur Village, Mojogedang District, Karanganyar, there is a relationship between noise and work fatigue. Statistical test results show that there is a very significant relationship between noise and work fatigue. The significant results in this study are in accordance with previous research such as Harwanto (2003) which said that there was a relationship between noise intensity and work fatigue.

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Iskandar (2003) who said that there is an effect of noise intensity on work fatigue. Based on the results of research conducted by Kristina Dede Odi, et al on tailors in Kampong Solor Kupang 2017 concluded that there is a relationship between lighting and fatigue. Based on the research results of (Odi, Purimahua & Ruliati 2018) concluded that there is a relationship between temperature and fatigue in tailors in Solor Village, Kupang 2017. The logistics warehouse of the Makassar Bulog Sub Division of Logistics is one of hundreds of warehouses that employ dozens of workers or transport workers. From the descriptions of several transport workers and foremen, it was found that the workers had muscoskeletal complaints and felt tired after work.

METHOD

Type of Research, Population and Sample

This type of research is analytic observational research, which is research that seeks to find relationships between variables which are then analyzed against the data that has been collected. with a cross sectional study approach. The location of this research was carried out at the warehouse of the Sub-Divre Bulog of Makassar City, with the reason for choosing the place of research, namely, there are still few studies that examine the factors related to muscle fatigue in transport workers in the Warehouse of the Sub-Divre of Bulog Makassar. This research is planned to be carried out in the month of February 2022.

The population in this study is the transportation workers who have manual material handling activities at the Sub-Divre Bulog Makassar warehouse, based on the data obtained from the registration results at the logistics warehouse office, there are 58 workers or transportation workers. The sampling technique used in this study is probability sampling by means of exhaustive sampling, namely the technique of determining the sample by taking all members of the population as respondents or samples. Thus, the researchers took a sample of the entire workforce of 58 people.

Research variable

Work fatigue measured in this study is the physical fatigue felt by the transport workers. The tool used is the Reaction Timer in milliseconds. Classification of fatigue levels based on reaction time to stimuli given in the form of light stimuli. Objective criteria: Not Experiencing Fatigue: reaction time 240.0 milliseconds and Experiencing Fatigue: reaction time > 240.0 milliseconds (Setyawati 2007).

Age in this study is the time spent by transport workers from birth until this research is carried out which is measured based on the last birthday of the resource person using the unit of time of year. Objective criteria: Young: if < 35 years old, Old: if 35 years old (Depkes RI 2009).

The gender referred to in this study is that men and women differ in their physical abilities, the strength of their muscle work. The difference can be seen through the body size and muscle strength of women are relatively less when compared to men. Objective criteria: Men and women.

Nutritional status in this study is the height and weight of the transport workers which determine the amount of Body Mass Index (BMI), namely body weight (BB) divided by the square of height (TB) or BMI = BW/TB^2 with units of kg per m2. Objective criteria: Abnormal nutritional status BMI < 18.5 kg/m^2 or > 24.99 kg/m^2, and normal nutritional status if the BMI value is 18.5 – 24.99 kg/m^2 (Suma'mur 2009).

The working period in this study is the period of workers starting from the beginning of doing work at the Makassar Bulog Warehouse in the unit until the time the research is carried out which is stated in years. Using a questionnaire. Objective criteria: New working period: <5 years and Old working period: 5 years (Suma'mur 2014).

The workload in this study is the load received by the transport worker in carrying out the work using a stopwatch in beats/minute. The pulse rate is measured 30 minutes after work in a way that is 10 beats, divided by the calculation time multiplied by 60. The categories of workload based on the pulse are as follows: Mild < 100 beats per minute; Weight 100 beats per minute (Tarwaka 2010).

Noise in this study is the intensity of unwanted local noise originating from vehicle or machine activity in the loading and unloading warehouse for commodity goods that can cause health problems for workers, which is measured at 4 times. The noise categories are as follows: Normal 85 dBA in 8 working hours and Noisy >85 dBA in 8 working hours (Source:Permenakertrans No. 13 2011).

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The temperature in this study is the local hot climate in the workplace measured by ISBB measurements using a Heat Stress Monitor which is measured at 4 working hours of transport workers in the Bulog warehouse. The threshold value contained in the Bulog warehouse is classified as a medium workload. Objective criteria: 28-31.5 C : Appropriate (moderate workload) and <28 C or >31.5 C Not Appropriate (Source: Permenakertrans No. 13 2011).

The lighting in this study is the amount of light received by the transport workers at the point area where the loading and unloading of commodity goods is carried out and expressed in Lux which is measured at 4 working hours at the Bulog Warehouse, then a comparison is made against the applicable standards. Category : Good lighting if 50 lux and bad lighting if < 50 lux (Source: Permenaker No. 5 2018).

Data collection

Primary data regarding work fatigue is obtained by using the Reaction Timer Application. Primary data on height were obtained using microtois and weight using a scale to calculate BMI or nutritional status. Primary data regarding temperature, noise and lighting of the work environment through Luxmeter, Soundlevel Meter, Thermo Hygrometer, for variables of age, gender, workload and using a questionnaire.

Data analysis

Univariate, bivariate and multivariate analyzes were performed in managing the data of this study.

RESULTS

Table 1. Frequency of Respondents Based on Research Variables

Variable		Labor	
		Total (n)	Percent (%)
Age	Old (≥ 35 years)	31	53.4
	Young (< 35 years)	27	46.6
Nutritional status	Abnormal	21	20.7
	Normal	46	79.3
Years of service	New	23	39.7
	Long	35	60.3
Workload	New	23	39.7
	Long	35	60.3
Work Fatigue	Tired	45	77.59
	Not tired	13	22.41

The age of the workforce is categorized into two, namely old if the age of the workforce is 35 years and young if the age of the workforce is < 35 years. In table 5.13 above, it can be seen that from 58 resource persons, there are 31 people (53.4%) who are categorized as old resource persons (≥ 35 years) and 27 people (46.6%) who are categorized as young resource persons (< 35 years). The statistical results above conclude that the majority of the transportation workers in the Bulog Warehouse, Makassar Sub-Divisional Division, are old. Based on the table above, it can be seen that the largest number of sources in this study were transport workers at the Bulog Sub Drive Warehouse in Makassar with normal nutritional status as many as 46 people (79.3%) while the number of informants whose nutritional status was not normal was 12 people (20.7%).).

The working period of the workforce is categorized into 2, namely new if the working period of the workforce is 5 years and long if the working period of the workforce is > 5 years. In the table above, it can be seen that from 58 resource persons, there are 23 people (39.7%) who are categorized as resource persons with new tenure (≤ 5 years) and 35 people (60.3%) who are categorized as resource persons with long tenure (> 5 years). From the description of the data, it can be concluded that the majority of the transportation workers in the Bulog Warehouse, Makassar Sub-Divisional Division, are old workers. More dominant resource persons have a workload in the heavy category as many as 42 people (72.4%) while the rest are having a light workload as many as 16 people (27.6%).

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Based on the table above, it shows that the level of work fatigue based on reaction time to a given stimulus in the form of light stimulation using a reaction time check tool / Reactiontimer where the results are more dominated by the number of workers in the tired category as many as 45 people 77.5% while 13 people 22.41% in the non-tired category.

Table 2. Relationship with work fatigue on transport workers at the Bulog Warehouse, Makassar Sub-Divisional Division

Variable		WORK FATIGUE			P Value
		Tired n(%)	Not tired n (%)	Total n (%)	
Age	Old	30 (96.8)	1 (3,2)	31(100,0)	
	Young	15 (55.6)	12 (44.4)	27(100,0)	0.000
	Total	45(77.6)	13 (22.4)	58 (100.0)	
Gender	Man	36(73,5)	13 (26.5)	49 (100.0)	
	Woman	9 (100)	0 (0,0)	9 (100.0)	0.186
	Total	45 (77.6)	22 (4)	58 (100.0)	
Nutritional status	Abnormal	12 (100)	0(0%)	12(100,0)	
	Normal	33 (71.7)	13(28.3%)	46(100,0)	0.051
	Total	45(77.6)	13(22,4)	58 (100.0)	
Years of service	Long	34 (97.1)	1 (2.9)	35(100,0)	
	New	11 (47.8)	12 (52.2)	23(100,0)	0.000
	Total	45 (77.6)	13 (22.4)	58 (100.0)	
Workload	Heavy	35(94,6)	2(5,4)	37(100,0)	
	Light	10 (47.6)	11 (52.4)	21(100,0)	0.000
	Total	45 (77.6)	13 (22.4)	58 (100.0)	
Noise	Noisy	14(77,8)	4(22,2)	18(100,0)	
	No Noise	31 (77.5)	9(22,5)	40 (100.0)	1,000
	Total	45 (77.6)	13 (22.4)	58 (100.0)	
Lighting	Bad	9(81.8%)	2 (18.2)	11 (100.0)	
	Well	36 (76.6)	11 (23.4)	47 (100.0)	1,000
	Total	45 (77.6)	13 (22.4)	58 (100.0)	
Temperature	Normal	34 (72.3)	13(27.7)	47 (100.0)	
	Abnormal	11(100)	0(0,0)	11(100,0)	0.055
	Total	45 (77.6)	13 (22.4)	58 (100.0)	

The results of the statistical test (Chi Square) obtained for age, tenure, and workload have a P value < alpha (0.05) thus, it is concluded that H0 is rejected and (Ha) is rejected which means that there is a relationship between age, nutritional status, working period, workload and temperature. Resource persons with work fatigue on transport workers at the Bulog Warehouse, Makassar Sub-Divisional Division.

Table 3. Factors of age, length of work and workload of workers related to work fatigue on Transport Workers in the Bulog Warehouse, Makassar City Sub-Divisional Division

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Variable	P	95% CI	
		Upper limit	Lower limit
Age	0.017	0.615	0.006
Years of service	0.004	0.358	0.004
Constant	0.000		

The results of the multivariate analysis test showed that the variable age of workers in the Bulog Sub-Divisional Warehouse P value = 0.017, the working period of the transportation workers in the Bulog Sub-Divisional Warehouse had a P value = 0.004. The variable age or the age of the workforce is the variable that is most closely related to work fatigue on the Transportation Workers in the Bulog Warehouse, Makassar Sub-Divisional Division.

The results of the multivariate test of age and working period variables, although together they are related to the level of work fatigue on transport workers at the Bulog Warehouse, Makassar Sub-Divisional Division, but statistically the age variable is the most influential role on work fatigue in Transport Workers in the Bulog Warehouse, Makassar Division.

DISCUSSION

The Relationship between Age and Work Fatigue in Transport Workers in the Bulog Warehouse, Makassar Sub-Divisional Division

The age factor or age that has advanced physical abilities also tends to decrease, so that it can affect reaction times and feelings of tiredness or fatigue due to changes in body functions, cardiovascular and hormonal systems. In this case age or age can also affect the physical strength of workers. The physical strength of a worker is not all influenced by the age factor.

The results of the distribution of data indicate that of the total resource persons or the number of transport workers in the Bulog Warehouse, Makassar Sub-Divisional Division, who are over thirty-five years old or are in the old category. The description of the results of the study can be understood that the age or age of the transport workers at the Bulog Warehouse, Makassar Sub-Divisional Division, is more dominated by the old age category. The young age of the transportation workers in the Bulog Warehouse, Makassar Sub-Division, is more dominant in experiencing fatigue, in this case it can be understood that the age factor is not the main determining element causing fatigue for the transportation workers in the Bulog Warehouse, the Makassar Sub-Divre. Apart from the description of fatigue at a young age, other aspects can also be influenced by years of work,

The results of this study are in line with research conducted by Muhammad Rino Komalig, Nicia Mamusung in the 2020 MPPKI (The Indonesian Journal of Health Promotion) research journal, Vol. 3. No. 1 with the research title "The Relationship between Age and Work Shifts with Work Fatigue at Parking Ticket Officers in the Megamas Area of Manado City" The results of the research show that age is one of the individual factors that can cause work fatigue for workers, but in this study there is no relationship between age factor. on work fatigue while work shifts have an influence on work fatigue on parking ticket officers in the Megamas Region of Manado City (Komalig & Mamusung 2020). Regarding the description of age and work fatigue, according to Setyawati (2007), the age factor can affect the reaction time and feelings of fatigue of workers.

The description of the concept can be understood that, in this case the older age decreases muscle strength but if it is balanced with better emotional stability, it can allow old age to be more productive or muscle strength can beat strength at a relatively young age.

The Relationship of the Gender of Workers in Transport in the Bulog Sub-Divre Warehouse with Work Fatigue

The nature of fatigue in each person is subjective because it is influenced by several factors that need special attention as a follow-up so that there are no problems with the health of workers. According to Setyawati

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(2010), that there are many factors that can cause work fatigue, including individual factors, work factors, environmental factors and psychological factors. In relation to gender on work fatigue, where gender is a physical and biological characteristic possessed by informants that distinguishes men and women. Where men are considered physically stronger than the female sex.

The results showed that there was no significant relationship between the female gender and work burnout, where the resource persons or angku workers in the Bulog Warehouse, Makassar Sub-Divisional Division, were more dominated by the male sex. Statistically, it can be understood that the distribution of data or sources has no effect because the number of genders is very small compared to the total number of sources.

The results of this study are in line with the results of research conducted by Eni Karyati Sm, Stella Junus, Hasanuddin, in the Journal of Jambura Industrial Review in 2021, volume 1, No.1 with the research title "The Relationship Between Fatigue and Physical Complaints Based on Gender in Fish Canning Workers where the results of the study indicate that workers have a moderate risk of fatigue with complaints felt by workers. The results of the correlation calculation show that fatigue and physical complaints have a strong relationship, both felt by male workers and female workers (Sm, Junus & Hasanuddin 2021).

The Relationship between Nutritional Status and Work Fatigue in Transport Workers in the Bulog Warehouse, Makassar Sub-Divisional Division

A good nutritional state is one of the characteristics of good health so that a productive workforce can be realized. A worker with a good nutritional condition will have a better working capacity and body resistance.

The results showed that there was no significant relationship between nutritional status and work fatigue, where the resource persons or transport workers in the Bulog Warehouse, Makassar Sub-Divisional Division were more dominated by workers with average nutritional status or normal categories, where from the total number of transport workers resource persons , more dominated by transport workers with normal nutritional status.

The results of the distribution of the data indicate that of the overall resource persons or the number of transport personnel in the Bulog Warehouse, Makassar Sub-Divisional Division, the nutritional status is in the normal category, which is more dominant than the nutritional status which is declared abnormal. From this description, it can be understood that the nutritional status of transport workers in the Bulog Warehouse, Makassar Sub-Divisional Division, is more dominated by the normal category. The description can be understood that normal nutritional status is not or is not a determining element or measure that causes fatigue levels for transport workers at the Bulog Warehouse, Makassar Sub-Division, in this case apart from a person's nutritional status, there are other factors that can simultaneously affect a person's level of fatigue. such as age and years of service.

The results of this study are in line with research conducted by Yuli Suryaningtyas in the journal Health Management Foundation Rs. Dr. Soetomo, 2017 volume 3 No.2 with the research title "Work Climate And Nutritional Status With Work Fatigue On Workers In Ballast Tanks Ship Repair Section PT. "X" Surabaya" the results of this study indicate that work climate and nutritional status affect work fatigue and the most influencing factor is work climate. The conclusion of this study is that work climate and work fatigue have a moderate relationship, and nutritional status and work fatigue have a moderate relationship. The most influential factor on work fatigue is the work climate (Suryaningtyas 2017).

The Relationship of Work Period to Work Fatigue in Transport Workers in Logistic Warehouses, Sub-Divre Bulog Makassar

Length of service is a factor related to the length of time a person works in a place. The working period in this study is the period of workers starting from the beginning of doing work at the Makassar Bulog Warehouse in the unit until the time the research is carried out which is stated in years.

The results of this study are in line with research conducted by Adam Suryaatmaja and Vaninda Eka Pridianata, in the "Journal Of Health Science And Prevention" in 2020 ISSN 2549-919X with the research title "The Relationship between Working Period, Workload, Noise Intensity and Work Fatigue at PT. Nobelindo Sidoarjo", the results of his research show that with a working period of nine years where the perceived workload is included in the workload category, it is not excessive, thus affecting the level of work fatigue of

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workers at work. The results of the statistical test of the relationship between tenure and work fatigue are in the strong category (Suryaatmaja dan Pridianata 2020).

The activities of labor or transportation workers in the Makassar Bulog Warehouse that require physical exertion are identical to the occurrence of muscle or general fatigue. Muscle fatigue can occur due to physical pressure for some time, causing fatigue and often slowing down a person's movement. While general fatigue can be characterized by the emergence of feelings of tiredness and extreme tiredness which can later cause feelings of boredom and drowsiness while working.

The results of the data distribution show that all of the resource persons or transport workers at the Bulog Warehouse, Makassar Sub-Divisional Division, whose working period is relatively new with parameters of less than five years. From this description, it can be understood that the working period of transportation at the Bulog Warehouse, Sub-Divre Makassar is not a single or partial determining element or measure that causes fatigue levels for transport workers in the Bulog Warehouse, Sub-Divre Makassar, in this case apart from the factor of a person's working period there are other factors. which can simultaneously affect a person's level of fatigue.

The Relationship between Workload and Work Fatigue on transport workers at the Bulog Warehouse, Makassar Sub-Divisional Division

Workload is a burden that is accounted for by workers according to the type of work. To determine the workload of the workforce in this study, it was measured by measuring the pulse of workers which was finally categorized as normal recovery pulse, the workload was not excessive.

The results of this study are in line with research conducted by Kartika Wulandari, Baju Widjasena, Ekawati, in the Journal of Public Health (E-Journal) Volume 4 No. 3 of 2016 with the research title: "The Relationship between Manual Physical Workload and Work Climate on Fatigue Construction Workers Mechanical Workshop Renovation Project Section". The results of his research show that there is a relationship between manual physical workload and work fatigue in construction workers in the mechanical workshop renovation project. The results of this study indicate that the factor associated with work fatigue is physical workload (Wulandari, Widjasena & Ekawati 2016).

The description of the research results shows that the physical workload factor has a relationship with work fatigue. Activities on the transport workers at the Bulog Warehouse, Makassar Sub-Divisional Division, are physical work. Measuring heart rate during work is a method for assessing cardiovascular strain. One of the equipment that can be used to calculate the pulse is telemetry by using Electro Cardio Graph (ECG) stimulation. If the equipment is not available, it can be recorded manually using a stopwatch with the 10 beats method (Kilbon 1992).

The Relationship of Lighting to Work Fatigue in Transport Workers at the Bulog Warehouse, Makassar Sub-Divisional Division.

Lighting is one of the factors to create a safe and comfortable environment and is closely related to human productivity. In this case, adequate lighting will give the impression of a better view and a refreshing state.

The results showed that there was no significant relationship between lighting conditions and work fatigue, where the resource person or transport workers at the Bulog Warehouse, Makassar Sub-Divisional Division of the total number of resource persons or transportation workers, where the respondent's response was more dominant stated that the lighting in the Bulog Warehouse Sub-Divre Makassar is quite good. The distribution of the data can be understood that the lighting conditions in the Bulog Warehouse, Sub-Divre Makassar, do not have a significant effect on the level of work fatigue of the transportation workers, because the lighting conditions have given the impression of a better view and a more refreshing condition for the transportation workers to carry out transportation activities.

The description of the respondent's responses is in accordance with the results of lighting measurements using the Hagner Lux Meter at the Bulog Warehouse, Makassar Sub-Divisional Division. Where from the results of measurements carried out three times. The results of measurements using the Hagner Lux Meter can be determined that the lighting conditions in the Bulog Sub Drive Makassar warehouse as a whole

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show good lighting so that it can support the implementation of loading and unloading at the Bulog Sub Divre Makassar warehouse.

The results of research conducted by Kristina Dede Odi, Sintha Lisa Purimahua and Luh Putu Ruliati, in the journal IKSMA (Jurnal of Health Sciences) volume 14 No 1 of 2018 with the research title "The Relationship of Work Attitudes, Lighting and Temperature to Work Fatigue and Eye Fatigue in Tailors In Kampung Solor Kupang", the results of the study showed that work attitude was significantly related to eye fatigue and lighting variables were not significantly related to work fatigue (Odi, Purimahua & Ruliati 2018).

The results of this study can be interpreted that the lighting aspect is one part or factor in getting a safe and comfortable working environment, which in turn has a very close relationship with increasing work productivity (Prayoga, Irwan & Evi 2014) where good lighting enable workers to see the objects they are working on clearly, quickly, and comfortably. Furthermore (Ramdan, 2013) states that lighting management in the workspace is needed to provide efficiency and work comfort for workers, as well as to help create a safe and secure work environment.

The Relationship of Noise to Work Fatigue in Transport Workers in the Bulog Warehouse, Makassar Sub-Divisional Division

Noise is all unwanted sound that comes from the production process tools and or work tools which at a certain level can cause hearing loss. In this study, the intensity of unwanted noise comes from the activity of vehicles or machines in the loading and unloading warehouse of commodity goods that can cause health problems for workers.

The results showed that there was no significant relationship between noise and work fatigue, where the resource persons or transportation workers in the Bulog Warehouse, Makassar Sub-Divisional Division, out of all the transportation workers or sources, more dominantly stated that in the Makassar Bulog Sub-Divre Warehouse there was no noise so that there was no noise. does not interfere with the activity of calm or the concentration of transport workers in carrying out transportation tasks. The distribution of the data can be understood that the noise condition in the Bulog Sub-Divisional Warehouse in Makassar does not have a significant effect on the work fatigue level of the transport workers, because the sound condition in the Bulog Sub-Divre Warehouse does not cause hearing loss, so that the transport workers can carry out transportation activities quietly.

The description of the resource person's responses is in accordance with the results of noise measurements using a Sound level meter, where the researcher takes measurements in four times for three times, the results of these measurements are the noise level in the Bulog Warehouse, Makassar Sub Division, does not interfere with health or affect a person's level of fatigue at work, as in statistical test results.

The description of the research results is in accordance with the results of research conducted by Deny Kurniawan, Rusdi, Ratna Yuliawati and Khaidir Aulia in the Journal of Public Health, Volume 10, Number 01, 2020 with the research title "The Relationship Between Noise Intensity and Work Fatigue in Factory Parts at PT. X." The study used the chi-square test statistical test that there was a relationship between noise intensity and work fatigue on factory workers at PT. X (Kurniawan et al. 2020). With regard to noise in the workplace, WHO (World Health Organization) 2008 in Amir, Wahyuni & Ekawat (2019), reports, it is estimated that nearly fourteen of the total workforce in industrialized countries is exposed to noise. Workers who work in rooms with high noise intensity will experience higher work stress compared to workers who are in lower noise intensity. In connection with the description, according to Anizar (2009) that high-level noise can cause long-term and short-term effects on hearing. The higher the intensity of the noise, the greater the potential to cause various disturbances 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.

The Relationship between Temperature and Work Fatigue in Transport Workers in the Bulog Warehouse, Makassar Sub-Divisional Division

Room temperature is a condition of the working environment that affects the abilities and limitations of workers. In a high-temperature work environment, the workforce will get an additional burden in the form of heat. In this study, the researchers used two measurement approaches, namely through the responses of resource

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persons and measuring room temperature through the Heat Stress Monitor tool where this tool serves to measure heat pressure with the Temperature Index parameter.

The results showed that there was no significant relationship between room temperature and work fatigue in the Bulog Warehouse, Makassar Sub-Division, the overall respondents were transport workers, more dominant. The resource person stated that the room temperature in the Bulog Warehouse was at a fairly good working environment temperature condition or did not interfere with conditions. physical transportation personnel to carry out transportation tasks. The distribution of the data can be understood that the room temperature conditions do not have a significant effect on the level of work fatigue of the transport workers, because the room temperature conditions are considered not to interfere with the transportation work activities in the Bulog Warehouse, Sub-Divre Makassar.

The results of the study are different from the results of research conducted by Dwi Wahyuni and Indriyani, in the Scientific Journal of Health Vol 11 No.1 in 2019 with the research title, "Factors related to work fatigue in Production Section Workers at PT. Antam Tbk. Ubpp Logam Mulia" where the results of his research show that heat pressure or room temperature with a p value is related to the level of work fatigue, in Production Division Workers at PT. Antam Tbk. Precious Metals Ubpp, while the variables of age, years of service, nutritional status are not related to work fatigue. The description of the results of the study shows that the work environment, such as room temperature can also affect the workload, where the physical work environment such as lighting intensity, noise, vibration, air pressure, microclimate (air temperature) (Wahyuni & Indriyani 2019).

CONCLUSION

There is a relationship between age, period of work and workload with work fatigue on transport workers at the Bulog Warehouse, Sub-Divre Makassar. Also, the variable age or the age of the workforce is the variable that is most closely related to work fatigue on the Transportation Workers in the Bulog Warehouse, Makassar Sub-Divisional Division.

SUGGESTION

The Bulog Sub-Divre Building Manager should pay attention to age, gender as the main consideration, hold regular nutritional checks, limit the working period and limit the workload of transport workers.

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Declaration of Conflicting Interest

All authors state that there is no potential Conflict of Interest in this research and article.

References

Amir, Johan, Ida Wahyuni & Ekawat. 2019. "The Relationship of Noise, Work Fatigue and Mental Workload Towards Work Stress on Workers of the Body Frame of PT. X." *Journal of Public Health (e-Journal)* 7 (1).

Anizar. 2009. *Occupational Safety and Health Engineering in Industry*. Yogyakarta: Graha Ilmu.

Astuty, Miranty Siti, Caecilia Sri Wahyuning & Yuniar. 2013. "Machinist Mental Workload Level based on NASA-TLX (Task Load Index) at PT. KAI Daop. II Bandung." *Reka Integra* 1 (1).

Depkes RI. 2009. *Age Classification by Category*. Jakarta: Ditjen Yankes.

Deyulman. 2018. *Improving Our Safety Culture*. Jakarta: Gramedia.

Ferryka, Putri Z. 2010. "The Relationship of Noise with Work Fatigue in the Makmur Rice Mill, Munggur Village, Mojogedang District, Karanganyar." Surakarta: Sebelas Maret University.

Harwanto, Irwan. 2003. "The Influence of Noise Intensity on Labor Fatigue Levels in the Pallet and Inspecting

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Section of PT. Iskandartex." Surakarta: Sebelas Maret University.

Iskandar, Robertus. 2003. "The Effect of Noise Exposure on Work Fatigue Levels at PT. Inka (Persero) Madiun." Surakarta: Sebelas Maret University.

Kilbon, A. 1992. "Measurement and Assessment of Dynamic Work." In *Evaluation of Human Work; A Practical Ergonomics methodology*. Great Britain: Taylor & Francis.

Komalig, Muhammad Rino & Nicia Mamusung. 2020. "The Relationship between Age and Work Shifts with Work Fatigue at Parking Ticket Officers in the Megamas Area of Manado City." *The Indonesian Journal of Health Promotion* 3 (1).

Kurniawan, Deny, Rusdi, Ratna Yuliawati & Khaidir Aulia. 2020. "The Relationship Between Noise Intensity and Work Fatigue in Factory Parts at PT. X." *Journal of Public Health* 10 (1).

Maurits, LSK. 2012. *A Glance About Work Fatigue*. Yogyakarta: Amara Books.

Odi, Kristina Dede, Sintha Lisa Purimahua & Luh Putu Ruliati. 2018. "The Relationship of Work Attitudes, Lighting and Temperature to Work Fatigue and Eye Fatigue in Tailors In Kampung Solor Kupang." *IKSMA (Journal of Health Sciences)* 14 (1).

Permenaker. 2018. Regulation of the Minister of Manpower (Permenaker) RI Number 5 of 2018 concerning Occupational Safety and Health in the Work Environment, issued 2018.

Permenakertrans. 2011. Permenakertrans Number PER.13/MEN/X/2011 concerning Threshold Values of Physical and Chemical Factors in the Workplace, issued 2011.

Prayoga, H. A, B Irwan & W Evi. 2014. "The Relationship between Lighting Intensity and Eye Refractive Disorders with Eye Fatigue in Medical Staff at the Inpatient Department of RSUD dr. Sudirman Mangun Sumarso Wonogiri." *Unnes Journal of Public Health* 3 (4).

Setyawati, L. 2007. *Principles and Methods of Occupational Health*. Yogyakarta: UGM.

Sm, Eni Karyati, Stella Junus & Hasanuddin Hasanuddin. 2021. "The Relationship Between Fatigue and Physical Complaints Based on Gender in Fish Cannery Workers." *Jambura Industrial Review (JIREV)* 1 (1). https://doi.org/https://doi.org/10.37905/jirev.1.1.7-14.

Suryaatmaja, Adam & Vanida Eka Pridianata. 2020. "Relationship between Working Period, Workload, Noise Intensity and Work Fatigue at PT Nobelindo Sidoarjo." *Journal of Health Science and Prevention* 4 (1). https://doi.org/https://doi.org/10.29080/jhsp.v4i1.257.

Suryaningtyas, Yuli. 2017. "Work Climate and Nutritional Status With Work Fatigue on Workers in Ballast Tanks Ship Repair Section PT. 'X' Surabaya." *Journal of Health Management Foundation Hospital Dr. Soetomo* 3 (2).

Tarwaka. 2010. *Industrial Ergonomics*. Surakarta: Harapan Press.

Tarwaka, Solichul Bakri & Lilik Sudiajeng. 2004. *Ergonomics for Occupational Health and Health Productivity*. Surakarta: UNIBA Press.

Umyati. 2010. "Factors Associated with Work Fatigue in Tailor Workers in the Informal Business Sector in the Ketapang Region, Cipondoh Tangerang in 2010." Jakarta: Syarif Hidayatullah State Islamic University.

UU. 2003. Law No. 13 of 2003 Concerning Manpower, issued 2003.

Wahyuni, Dwi & Indriyani. 2019. "Factors Related to Work Fatigue in Production Section Workers at PT. Antam Tbk. Ubpp Logam Mulia." *Scientific Journal of Health* 11 (1).

Wulandari, Kartika, Baju Widjasena & Ekawati. 2016. "The Relationship between Manual Physical Workload and Work Climate on Fatigue Construction Workers Mechanical Workshop Renovation Project Section." *Journal of Public Health (E-Journal)* 4 (3).

Wurara, Mitra Lestari. 2020. "The Relationship between Workload and Work Fatigue on Farmers." *Indonesian Journal of Public Health and Community Medicine* 1 (2).

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