

Factors Associated with Work Fatigue in the Fuel Truck Drivers at Oil Company Padalarang

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Abstract

Fatigue can affect work productivity. Based on data obtained from Oil Company Padalarang in 2013 had 16 fuel truck accidents, work fatigue factor ranks 4th (25%). This study aims to determine the factors associated with work fatigue in fuel truck drivers Oil Company in 2015. The research design used was analytic survey study with Cross Sectional research design. With the number of cases 60 respondents, sampling techniques using Quota Sampling. Data collection using reaction timer, questionnaires and interviews. Data analysis using univariate and bivariate (Chi-Square) analysis. The results showed a description of work fatigue 61.7%, age at risk (≥ 40 years) 65.0%, abnormal nutritional status 45.0%, work period (≥ 5 years) 63.3% and heavy workload 38.3%. It is known that there is a relationship between fatigue and age with P Value (0.002), work period with P Value (0.001), workload with P Value (0.018) and there is no relationship between work fatigue and nutritional status with P Value (0.936). It is recommended to provide a resting place for fuel truck drivers, making a policy to regulate the distance of fuel delivery between drivers who are old and young, do a health check before and after sending fuel and maintain a pattern of rest or sleep for fuel truck drivers.

Keywords: *Work Fatigue, Fuel Truck Drivers, Oil Company, Reaction Timer.*

Introduction

Fatigue is a condition that is often found in every worker, fatigue is one of the causes most often felt or experienced by each worker. Fatigue can occur anywhere and anytime, and in various kinds of work. Work exhaustion cannot be clearly defined but can be felt by workers¹. Fatigue also has significant consequences for society. Several studies have showed that fatigue sustained for a long time can predict future morbidity and mortality². Fatigue also can result in declines in worker productivity due to the debilitating nature of fatigue³.

Based on the International Labor Organization (ILO) in 2013, every year as many as two million workers die from workplace accidents caused by fatigue. The study stated that of the 58,115 samples, 32.8% of them or about 18,828 samples suffered from fatigue. Data from the Ministry of Manpower and Transmigration of Indonesia (DEPNAKERTRANS) about workplace accidents in 2004, in Indonesia every day there were 414 workplace accidents, 27.8% due to high fatigue, 9.5% or 39 people experiencing disabilities. Data from the Indonesian Central Bureau of Statistics (BPS) in 2012 has occurred 117,949 cases of workplace accidents with a total death of 25% and it is predicted that this number does not include the types of work accidents that are not reported (<http://bps.go.id>, obtained on April 5, 2015).

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Fatigue experienced by workers is caused by a variety of factors, both internal self-factors (age, nutritional status) and external factors (work period, workload). Factors that affect work fatigue are internal factors and external factors. Which includes internal

factors include: somatic factors or physical factors, nutrition, gender, age, knowledge and lifestyle. Whereas external factors are physical conditions of the work environment, including: noise, temperature, lighting, chemical factors, biological factors, ergonomic factors, occupational categories, nature of work, company discipline or regulations, wages, social relations and work position or position ⁴

A number of previous studies have indicated that fatigue is one of the most significant factors that contribute to accidents on the job: people who are tired often fail to take safety precautions ⁵. A comprehensive study of accidents showed that 58 percent of commercial vehicle crash were caused by fatigued workers in the workplace.⁶

Data obtained from Oil Company Padalarang (2013) that there have been 105 truck accidents in the working area of Oil Company Padalarang 2010-2013. The data shows that the number of truck accidents at Oil Company Padalarang ranks third (11%) of 22 Fuels terminals managed by Oil Company throughout Indonesia. Reports in 2013 showed that there had been 16 oil truck accidents which caused 6 people to be injured and 2 people died from fatigue factors ranked 4th (15%) after human error, vehicle conditions, and road factors as well as temporary cost losses of Rp. 73,089,750.

The results of a preliminary study of work fatigue using Lakassidaya's L77 Reaction Timer were carried out on 10 fuel truck drivers Oil Company Padalarang in 2015, of which 10 drivers were carrying out work fatigue with an average score above 300,0 milliseconds and 3 others did not experience work fatigue.

Method

This study uses a cross-sectional design and was conducted in May 2015 at Oil Company in the

Padalarang. The respondents in this study were fuel truck drivers. The population was 152 drivers and in this study 60 drivers were used as research samples. The cross sectional design used in this study aims to link work fatigue associated with internal factors (age, nutritional status) and external factors (work period, workload) on fuel trucks drivers at Oil Company Padalarang in 2015. In sampling the researcher used quota sampling technique that is sampling technique by setting a certain amount as a target that must be met in sampling from the population ⁷.

This study uses the Chi-Square test and uses the significance limit of α (alpha) = 0.05 and 95% confidence interval. The primary data of work fatigue is measured by the Reaction Timer, which is to measure fatigue in BBM truck drivers by looking at the driver's excitement towards sound and light stimuli from the Reaction Timer tool. Age by asking the respondent directly and by looking at his identity card (KTP). To measure the nutritional status of the fuel truck drivers based on Body Weight and Height using set of scales and microtoa. To measure the workload of fuel truck drivers by calculating the driver's heart rate/pulse in one minute or by using a digital tensimeter that directly displays the driver's heart rate.

Result

The results of the research are the relationship of internal factors (age, nutritional status) and external factors (work period, workload) with work fatigue on fuel trucks drivers at Oil Company Padalarang using univariate analysis to see an overview of frequency distribution and percentage, and bivariate to see the relationship between independent variables and dependent variables using Chi-Square analysis.

Table 1. Frequency Distribution of Factors Associated with Work Fatigue in The Fuel Truck Drivers at Oil Company Padalarang

Variable	Frequency (N)	Percentage (%)
1. Work Fatigue	37	61,7
• Fatigue	23	38,3
• Not fatigue		
Total	60	100

Cont... Table 1. Frequency Distribution of Factors Associated with Work Fatigue in The Fuel Truck Drivers at Oil Company Padalarang

2.	Age					
•	At risk (≥ 40)	39		65,0		
•	Not at risk (< 40)	21		35,0		
Total		60		100		
3.	Nutritional Status					
•	Abnormal	27		45,0		
•	Normal	33		55,0		
Total		60		100		
4.	Work period					
•	≥ 5 years	38		63,3		
•	< 5 years	22		36,7		
Total		60		100		
5.	Workload					
•	Heavy	23		38,3		
•	Thin	37		61,7		
Total		60		100		

Based on table 1. It was found that fuel truck drivers who experienced fatigue were 37 people (61.7%). Drivers of trucks over 40 years old were 39 people (65.0%), while overcrowded fuel truck drivers (overweight) were 27 people (45.0%). Fuel truck drivers who worked more than 5 years were 38 people (63.3%), while the Fuel truck drivers whose workload was heavy were 23 people (38.3%).

Table 2. Result Relationship between Age, Nutritional Status, Work Period and Workload with Work Fatigue in The Fuel Truck Drivers at Oil Company Padalarang

	Work Fatigue				Total		OR (95% CI)	P Value	
	Fatigue		Not Fatigue						
	n	%	n	%	N	%			
Age									
1.	At risk (≥ 40 yrs)	30	76,9	9	23,1	39	100	2,308 (1,231-4,328)	0,002
2.	Not at risk (< 40 yrs)	7	33,3	14	66,7	21	100		
Total		37	61,7	23	38,3	60	100		

Cont... Table 2. Result Relationship between Age, Nutritional Status, Work Period and Workload with Work Fatigue in The Fuel Truck Drivers at Oil Company Padalarang

Nutritional Status										
1.	Abnormal	16	59,3	11	40,7	27	100	0,931 (0,621-1,937)	0,936	
2.	Normal	21	63,6	12	36,4	33	100			
Total		37	61,7	23	38,3	60	100			
Work Period										
1.	≥5 Years	30	78,9	8	21,1	38	100	2,481 (1,317-4,674)	0,001	
2.	<5 Years	7	31,8	15	68,2	22	100			
Total		37	61,7	23	38,3	60	100			
Workload										
1.	Heavy	19	82,6	4	17,4	23	100	1,698 (1,161-2,484)	0,018	
2.	Light	18	48,6	14	51,4	37	100			
Total		37	61,7	23	38,3	60	100			

Based on table 2 the relationship between the age of fuel truck drivers and the work fatigue occurs was found that as many as 30 fuel truck drivers (76.9%) over the age of 40 experienced work fatigue, based on the results of statistical analysis, the OR value = 2,308 (95% CI: 1,231-4,328) means that the fuel truck drivers aged over 40 years have a risk of 2.3 times experiencing work fatigue compared to fuel truck drivers aged under 40 years.

The relationship between nutritional status of fuel truck drivers and work fatigue was obtained by 16 fuel truck drivers (59.3%) who were abnormally weight, the results of statistical tests show no relationship (P = 0.936) between fuel truck drivers with the nutritional status.

The relationship between work period of fuel truck drivers and the work fatigue was found that as many as 30 fuel truck drivers (78.9%) who worked more than 5 years and above experienced work fatigue, based on the

results of statistical analysis, the OR value = 2.481 (95% CI: 1,317-4,674) means that fuel truck drivers who work more than 5 years and above risk 2.4 times experiencing work fatigue compared to fuel truck drivers who work under 5 years.

The relationship between workload of fuel truck drivers and work fatigue was obtained that as many as 19 fuel truck drivers (82.6%) who had a heavy workload experienced work fatigue, based on the results of statistical analysis, the value of OR = 1,698 (95% CI: 1,161-2,484) means that fuel truck drivers with heavy workloads have a risk of 1,6 times experiencing work fatigue compared to fuel truck drivers with light workloads.

Discussion

Based on the results showed fuel truck drivers who experienced fatigue were obtained as many as 37 drivers and 23 drivers did not experience fatigue in work. Fuel truck drivers who experience fatigue in work are caused

by several factors including age, nutritional status, work period and workload, besides that there are other factors that influence it also to cause the occurrence of work fatigue as a condition of poor drivers caused by lack of rest, suffer from certain diseases, the distance of sending BBM/Fuel is far enough to be delivered plus road conditions that allow to increase driving fatigue (quite long congestion, damaged road conditions, etc.), weather conditions. Drivers often do not realize the fatigue they experience and the longer they are left to have a negative impact, namely the occurrence of chronic fatigue, this is possible because of their minimal level of knowledge about occupational safety and health and allows for accidents to occur at work. Tiredness, although a synonym for fatigue, may not encompass all aspects of fatigue (e.g. weakness or cognitive fatigue).⁸

Age has a significant relationship with work fatigue. The results of the analysis of the relationship between the age of fuel truck drivers and work fatigue on 60 respondents found that, as many as 30 drivers over the age of 40 experienced work fatigue. The results of the analysis prove that the driver of a fuel tank truck with an age of more than 40 years is very risky for the occurrence of work fatigue, because the more a person's age increases, the ability of his organs will also decrease. The results of this study are in line with age directly influences strength muscle which then affects physical ability labor to work. Muscle strength in men and women around the age of 25-35⁹. Also, Study found that almost 30% of the participants in Chinese study population had experienced fatigue, and fatigue is associated with age, marital status, employment status, regular exercise, number of self-reported chronic diseases, number of individual's children and hospitalization in the last year in middle-aged and elderly males¹⁰.

Nutritional status does not have a meaningful relationship with work fatigue. The result of the analysis of the relationship between the nutritional status of fuel truck drivers and work fatigue was found that as many as 16 drivers who were abnormally heavy experienced work fatigue. The researcher argues that nutritional status is not related to the occurrence of fatigue due to the results of BMI which shows that the majority of respondents were normal nutritional status and experienced fatigue. Another factor, which is when the driver starts shipping, looks tired and most of the driver does not rest properly when finished sending. This research is in line with the research conducted by¹¹ on factors related to work fatigue in sewing workers in the sewing section at CV.

Aneka Garment Gunungpati Semarang, the results showed that nutritional status was not related to work fatigue, normal nutritional status was 25 (80.6%). Also, Nutritional status may influence fatigue levels¹²Korea. Fatigue was measured using Piper's Fatigue Scale (PFS), but The high level of work fatigue is only experienced by workers with energy intake in the less category¹³it will affect of the worker's health condition. Work fatigue can be affected by several factors, some of which are energy intake and nutritional status. Objective: The aim of this research was to analyze the correlation between the adequacy of energy intake and nutritional status with the level of work fatigue. Methods: This study was an analytic observational, used cross sectional study with 33 sample from 48 workers of cocoa powder production PT. Multi Aneka Pangan Nusantara Surabaya selected by simple random sampling. Data were collected by food recall 2X24 hours for energy intake, measuring weight and height for nutritional status and Industrial Fatigue Research Committee (IFRC. And in other studies explained older adults with undernourishment in the present study were not experiencing tiredness in activities of daily living¹⁴the information regarding the association between nutritional status and physical performance does not provide a complete picture. Most studies used limited or self-reported measures to evaluate physical performance. The objective of this study was to examine the correlation between nutritional status and comprehensive physical performance measures among undernourished older adults who reside in residential institutions.\\n\\nMETHODS: Forty-seven older adults (26 males, 21 females).

The work period has a significant relationship with work fatigue. The results of the analysis of the relationship between the working period of fuel truck drivers and work fatigue obtained that as many as 30 drivers who worked more than 5 years and over experienced work fatigue. The results of the analysis prove that fuel truck drivers with long working periods will easily experience work fatigue, although many argue that the longer a person's work is, the better their skills will be, but according to the researchers it shows the influence of the length of work of workers with fuel truck driving that are carried out tend to be monotonous so that they will affect the physical and muscle conditions that work statically. The results of this study are in line with working period has a significant effect on work fatigue, which means that the working period increases it will increase work fatigue. Work period is the accumulation of time the worker has

held the job⁹. Also, work period may affect workers both positively and negatively. A longer work period could have a positive impact through the greater amount of experience the worker gains, while conversely it could have a negative impact through causing increased fatigue and boredom¹⁵.

Workload has a meaningful relationship with work fatigue. The results of the analysis of the relationship between the workload of fuel truck drivers and work fatigue was found that as many as 19 drivers who had a heavy workload experienced work fatigue. The analysis proves that fuel truck drivers with heavy workloads will be more susceptible to work fatigue, according to researchers, this is influenced by physical environmental conditions that tend to be hot and also affected by road / traffic conditions such as congestion and others that can cause work fatigue. The results of this study are in line with the physical workload is significantly related to general, physical and mental fatigue but the association was weakest with mental fatigue. This suggests that physical workload primarily affects the physical experience of tiredness and fatigue¹⁶ 9.05 (SD 3.36). And Also, workload increased over the working week and the rating of workload was associated with fatigue which in turn was associated with higher risk of an incident as indicated by the HSE risk Index¹⁷.

Conclusion

Based on the results of research and discussion about factors related to work fatigue in fuel truck drivers at Oil Company Padalarang 2015, conclusions were obtained that there was a significant relationship between age, work period and workload with work fatigue and in this study nutritional status had no effect on work fatigue.

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Conflict of Interest: No conflict interests.

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