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Factors Associated with Work Fatigue on Workers at XYZ Ltd Company Jambi City

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Abstrack

This study attempts to identify the factors associated with work tiredness among employees at one of Jambi City's oil and gas enterprises. This cross-sectional study investigated the link between workload, sleep quality, and job tiredness. This investigation was conducted at a Jambi City oil and gas firm. The research analysis utilized the chi-square test on a sample of 111 individuals. The sample was selected in accordance with preset criteria. According to the findings of this study, there is a correlation between workload and work weariness ($p = 0.000$), there is no correlation between sleep quality and work fatigue ($p = 0.325$), and there is a correlation between workload and sleep quality ($p = 0.015$). It can be concluded from this research that the workload factor has a significant relationship with job fatigue.

Keywords: Work Fatigue, Workload, Sleep Quality.

A. INTRODUCTION

Fatigue is one of the risk factors that contributes greatly to the occurrence of work accidents that can cause death (Aslan, 2022; Barello et al., 2021). Economically, exhaustion of workers in America causes economic losses of up to 18 billion USD/per year. Meanwhile in Indonesia, the nominal claim by BPJS due to work accidents has reached IDR 1.2 Trillion/year with 173,105 cases of work accidents. In the scientific perspective of Occupational Health and Safety, fatigue has become a serious concern for companies or workers to minimize the negative impact it causes (Caldwell et al., 2019; Cavanagh et al., 2020). Workers who experience fatigue will give a negative contribution to the safety performance of workers, a decrease in the level of worker productivity, low quality of work, and an increase in the risk of work accidents and deaths (Bennett et al., 2021; Blafoss et al., 2019; Brooks et al., 2018).

There are numerous causes of fatigue, including lack of sleep, constant mental activity, and extended physical exercise. Exhaustion is connected with weakness in peripheral muscles and the experience of fatigue mediated by signaling pathways in the central nervous system in the case of sustained physical activity (Charonitis et al., 2022; Chen & Eyoun, 2021).

Internal and external variables are categorized as potential causes of work weariness. Age, gender, marital status, and nutritional status are internal determinants, whereas external influences include shift work, monotonous employment, work attitude, unclear responsibilities, anxieties and inner conflicts, and the environment and health circumstances of workers (Demerouti et al., 2019; Dinibuton, 2020).

The older a person is, the risk of experiencing work fatigue when compared to a young age, this can be caused by decreased work ability. In general, male workers are better able to accept heavy work compared to female workers, therefore men are at risk of experiencing heavy work fatigue higher than women in proportion to the workload received (Dorland et al., 2018; Dugani et al., 2018). Marital status is an internal factor that can also affect work fatigue, but this factor is not an important

factor that can affect fatigue when compared to other internal factors (Evanoff et al., 2020). The working period is related to the adaptation of workers, workers with a longer working period are at higher risk of experiencing work fatigue due to the stamina of workers who have begun to decrease as a result of the emergence of excessive body boredom due to the pressure obtained in a prolonged work process (Ferreira et al., 2019; Harma et al., 2019).

Based on the description above, the researcher is interested in conducting a study entitled "Factors Associated with Work Fatigue in XYZ Ltd Jambi Company Workers".

B. METHOD

This study used a cross sectional research design to determine the relationship between workload, sleep quality and work fatigue. This research was conducted in one of the oil and gas companies in Jambi City. Sampling was carried out by taking into account the inclusion and exclusion criteria that had been set and the total number of samples was 111 workers. The study was conducted from April to November 2021. This study used 3 questionnaires, namely: the industrial fatigue research committee (IFRC) questionnaire to measure work fatigue, the PSQI questionnaire to measure sleep quality and the NASA TLX questionnaire to measure workload. In addition, a univariate analysis was conducted to identify the frequency distribution of the research sample based on the independent and dependent variables, and a bivariate analysis was conducted using the chi-square test to determine the association and produce the Odds Ratio value (OR).

C. RESULT AND DISCUSSION

Univariate Analysis

Univariate analysis is an analysis conducted to see the frequency distribution of each variable from the research results. In this study, univariate analysis presents the frequency distribution of the study population based on the main independent variables and covariate variables.

Table 1. Frequency Distribution of Research Population (n=111)

Variable		n	%
Age	At Risk (≥ 35 Year)	99	89.2
	No Risk (<35 Year)	12	10.8
Marital status	Marry	103	92.8
	Not Married	8	7.2
Years of service	Old Worker (≥ 5 Year)	102	91.9
	New Worker (<5 Year)	9	8.1
Workload	Heavy	53	47.7
	Light	58	52.3
Sleep Quality	Bad	72	64.9
	Good	39	35.1
Work Fatigue	Heavy	54	48.6
	Light	57	51.4
	Total	111	100.0

Source: data proceed

Based on table 1 above, it is known that 89.2% of respondents are at risk age (>35 years), almost all of them are married (92.8%) and are old workers (91.9%). Respondents who experience light workloads are 52.3%, poor sleep quality is 64.9% and those who experience light work fatigue are 51.4%.

Bivariate Analysis

Bivariate analysis in this study is used to see the effect or relationship of each variable.

Table 2. Relationship between Workload and Sleep Quality (n=111)

Variable		Sleep Quality				Total	OR (95% CI)	P-Value
		Bad		Well				
		n	%	n	%			
Workload	Heavy	41	77.4%	12	22.6%	53	2.97 (1.30-6.78)	0.015
	Light	31	53.4%	27	46.6%	58		

Source: data proceed

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Based on table 2 above, it can be seen that there is a difference in the proportion of heavy workloads that experience poor sleep quality, which is higher (77.4%) than mild (53.4%). With a p-value of 0.015 (P 0.05) from the statistical test, it can be stated that there is a significant link between the workload variable and sleep quality. Resulting from the bivariate analysis, it was found that the OR value: 2.97 (CI: 1.30-6.78), meaning that workers who have a heavy workload are 2.97 times more likely to experience poor sleep quality than workers who have a light workload.

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Table 3. Relationship between Workload and Work Fatigue (n=111)

Variable		Work Fatigue				Total	OR (95% CI)	P-Value
		Heavy		Light				
		n	%	n	%			
Workload	Heavy	50	94.3%	3	5.7%	53	225.000 (47.967-1055.406)	0.000
	Light	4	6.9%	54	93.1%	58		

Source: data proceed

According to Table 3, there is a significant difference between the proportion of heavy workloads that experience heavy work fatigue (94.3 percent) and the proportion of light workloads that experience heavy work fatigue (6.8 percent) (6.9 percent). With a p-value of 0.000 (P 0.05) from the statistical test, it can be inferred that there is a substantial (significant) link between the workload variable and job tiredness. Resulting from the bivariate analysis, it was found that the OR value: 225,000 (CI: 47,967-1055,406), meaning that workers who have a heavy workload are 225 times more at risk of experiencing work fatigue compared to workers who have a light workload.

Table 4. Relationship between Sleep Quality and Work Fatigue (n=111)

Variable		Work Fatigue				Total	OR (95% CI)	P-Value
		Heavy		Light				
		n	%	n	%			
Sleep Quality	Bad	38	52.8%	34	47.3%	72	1.60 (0.73-3.53)	0.325
	Baik	16	41.0%	23	59.0%	39		

Source: data proceed

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Based on table 4 above, it can be seen that there is a difference in the proportion of poor sleep quality who experience severe work fatigue (52.8%) compared to mild (47.2%). The results of the statistical test obtained a p-value of 0.325 (P > 0.05), it can be concluded that there is no significant (significant) relationship between sleep quality variables and work fatigue. From the results of

bivariate analysis, it was found that the OR value: 1.60 (CI: 0.73-3.53), meaning that workers who have poor sleep quality are 1.60 times more likely to experience severe work fatigue than workers who have good sleep quality.

Table 5. Relationship of Age, Marital Status, and Work Period with Work Fatigue (n=111)

Varable		Work Fatigue				Total	OR (95%CI)	P-Value
		Heavy		Light				
		n	%	n	%			
Age	At risk (>= 35 Year)	50	50.5%	49	49.5%	99	2.04 (0.57- 7.21)	0.413
	No Risk (<35 Year)	4	33.3%	8	66.7%	12		
Marital status	Marry	51	49.5%	52	50.5%	103	1.63 (0.37- 7.19)	0.717
	Not Married	3	37.5%	5	62.5%	8		
Years of Service	Old Worker	52	51%	50	49%	102	3.64 (0.72- 18.36)	0.163
	New Worker	2	22,2%	7	77,8%	9		

Source: data proceed

Based on table 6 above, it can be seen that there is a difference in the proportion of at-risk age (≥ 35 years) experiencing severe work fatigue which is higher (50.5%) than the non-risk age (33.3%). The results of the bivariate analysis showed that the age at risk (≥ 35 years) with the OR value: 2.04 (CI: 0.57-7.21). It is proven that there is no significant relationship with p-value > 0.05 (0.413).

In the marital status variable, there is a difference in the proportion between married categories who experience heavy work fatigue (49.5%) than those who are not married (37.5%). The results of the bivariate analysis showed that the married category had an OR value of 1.63 (0.37-7.19). It is proven that there is no significant relationship with p-value > 0.05 (0.717).

In the variable of working period there is a difference in the proportion where old workers who experience severe work fatigue are higher (51%) than new workers (22.2%). The results of the bivariate analysis showed that the old workers experienced heavy workloads with the OR value: 3.64 (0.72-18.36). It is proven that there is no significant relationship with p-value > 0.05 (0.163).

D. RESULT AND DISCUSSION

Work fatigue is a condition for each individual who is different, but each individual experiences a decrease in work capacity, body resistance and loss of efficiency. The brain regulates fatigue centrally, there is a system of sympathetic activation and parasympathetic inhibition in the central nervous system.

This study was done to identify the Factors Associated with Work Fatigue among XYZ Ltd. employees in Jambi City. Age, gender, and marital status are variables that affect work tiredness, years of service, workload and sleep quality. This study will look for the relationship of independent variables and the main independent variables and covariates through the chi-square test to see the factors associated with work fatigue.

Relationship between Workload and Sleep Quality

The results showed that there was a relationship between workload and work quality (p value = 0.015). From the results of the bivariate analysis, it was found that the OR value: 2.97 (CI: 1.30-6.78), meaning that workers who have a heavy workload are 2.97 times more likely to experience poor sleep quality than workers who have a light workload. This research is in line with research conducted by Salis Fajar, D (2020) regarding the Relationship between Workload and Sleep Quality in Rubber Farmers of Nusantara XII Plantation Ltd in Ajung District, Jember Regency. The study stated that there is a relationship between workload and sleep quality (p value = 0.002). Good sleep quality can affect the performance of workers in carrying out their work, but on the contrary if the sleep quality of workers is poor, workers will have difficulty focusing and are at risk of decreased performance. Workload and sleep quality have a close relationship, where if a worker gets an excessive workload, it can cause fatigue and can have difficulty sleeping (Hsu, 2019; Huang et al., 2019). As stated in the results of this study, the proportion of heavy workloads with poor sleep quality is higher than those with light workloads.

Relationship between Workload and Work Fatigue

The findings revealed a correlation between workload and work tiredness (p -value 0.000). Work tiredness can be caused by a heavy workload because every task requires the body to accept an external burden. According to this study, workers with a severe workload are 225,000 times more likely to experience work tiredness. This study aligns with the findings of Naimah et al. (2019) regarding the factors related to staff weariness at Famous Buana Asri Ltd. There was a correlation between workload and work weariness (p -value = 0.005), according to the findings of this study. However, research by Naimah et al. revealed that the majority of respondents (52.2 percent) had a light workload, while in this study most of the respondents had a heavy workload of 94.3%.

Each job has its own burden, which is the reason a person's workload is said to be heavy or light if the work capacity given is in accordance with or exceeds the person's ability (Hunefeld et al., 2020; Lai et al., 2020). Workers who have a light workload may feel that the work capacity is in accordance with the ability of the worker, on the other hand, if the worker feels that his work capacity exceeds his ability, it can be said that the workload is classified as heavy (Lee & Jang, 2020; Lin et al., 2021).

Relationship between Sleep Quality and Work Fatigue

The correlation between sleep quality and job tiredness was not significant (p = 0.325). According to the result of the Bivariate analysis, the OR value was 1.60 (CI: 0.73-3.53), indicating that workers with poor sleep quality were 1.60 times more likely to experience severe job weariness than those with good sleep quality. This study is inversely proportional to the research conducted by Lu et al. (2018), Marchand et al. (2018), and Moitra et al. (2021) regarding the Relationship between Physical Workload and Sleep Quality with Work Fatigue in Construction Workers at X Ltd Semarang City, where the results of the study indicate a correlation between sleep quality and work fatigue (p = 0.020). However, the research conducted by Virgi et al. has similarities with this study, namely workers who experience higher work fatigue are workers who experience poor sleep quality. The lower the level of fatigue, the better the quality of sleep will be. On the other hand, the higher the fatigue level of the workers, the worse their sleep quality will be. The sleep process can be disrupted if workers experience work fatigue caused by work

that exceeds the worker's ability. If the sleep process is disturbed, the expected quality of sleep will not be achieved (Nafar et al., 2021; Naldi et al., 2021; Redeker et al., 2019).

Relationship of Age, Marital Status, and Work Period with Work Fatigue

The findings revealed that there was no correlation between age and work tiredness ($p = 0.413$). This study is consistent with Iriyani Malik et al (2021) 's research on Factors Associated with Work Fatigue in the Indonesian Ship Industry (Persero) Ltd Makassar. According to the study, there was no correlation between age and work tiredness ($p = 0.05$). In contrast, according to research conducted by Naimah et al (2020) on factors associated to employee weariness at Kondang Buana Asri Ltd, there is a correlation between age and workplace exhaustion (0.000).

Age is one of the major elements that can contribute to work tiredness, as it is closely tied to performance. This is what can lead workers to suffer work tiredness more easily as they age, as the degeneration process of their organs accelerates and their organs' abilities diminish (Roslan et al., 2021; Sasangohar et al., 2020).

The examination of the gender variable revealed that there was no correlation between gender and job exhaustion ($p = 0.05$). This study is consistent with the findings of Serrao et al. (2021), Silva et al. (2018), and Sirois & Owens (2021) on the Relationship between Worker Characteristics and Work Motivation Levels and Subjective Fatigue. In this study, it was determined that there was no correlation between sexes and work tiredness, and the percentage of women who did not suffer exhaustion was significantly higher than the percentage of males (88.5%).

In general, women's physical strength is only 2/3 of men's physical strength. For physical work, women have 15-30% lower oxygen volume than men. The difference in physical strength and oxygen volume is what causes men to be more able to accept heavier workloads than women. Therefore, the results of the study show that men are at a higher risk of experiencing heavy work fatigue than women.

The marital status variable demonstrates that there is no association between marital status and work tiredness ($p = 0.717$). This study is consistent with the research completed by Tan et al. (2020), Tang et al. (2019), and Vidotti et al. (2018) addressing the Relationship Between Individual Factors of Workload and Work Shifts with Work Fatigue in Nurses at Dr. RSJD. According to the study, there was no correlation between marital status and occupational burnout ($p = 0.200$).

Marital status itself is not an important factor when compared to other factors because the workload given to married and unmarried workers is the same, it's just that factors outside of work for married workers can affect the performance of these workers. The working period variable indicates that there is no association between job tenure and work tiredness ($p = 0.05$). This study conforms to the findings of Yu et al. (2019) and Yu et al. (2020) on the Relationship between Individual Characteristics and Sleep Quality with Work Fatigue in Furnace Operations Employees at Inalum Kuala Tanjung Ltd. The study revealed that there was no correlation between length of service and work tiredness ($p = 0.77$). However, this study contradicts the findings of Fitri et al. (2017) about the relationship between length of service and work tiredness ($p = 0.006$).

The length of employment is proportional to the adaptability between the work environment and the people themselves. This is the source of diminished muscular performance, which might manifest as decreased mobility. This is not just due to a hard workload, but rather to the daily demands that mount over an extended

period of time. It can be concluded that workers with a longer working period are at greater risk of experiencing work fatigue because the stamina of workers has begun to decrease.

E. CONCLUSION

There is a relationship between workload and sleep quality ($p = 0.015$), there is a relationship between workload and work fatigue ($p = 0.000$), there is no relationship between sleep quality and work fatigue ($p = 0.321$), and there is no association between age, gender, marital status, and years of service and work fatigue.

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