

Factors Associated with Occupational Fatigue of Gas Station Operators in Palu City

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ABSTRACT: Occupational fatigue is one of the health and safety problems that can be a risk factor for accidents at work. Occupational accident cases in Central Sulawesi have increased sharply from 70 cases in 2014 to 454 cases in 2015. The purpose of this study was to determine the factors associated with occupational fatigue of gas station operators in Palu City. The type of research used was observational with a cross sectional approach. The number of population was 271. The sample in this study was 74 gas station operators in Palu City. Sampling used the Proportional Stratified Random Sampling method. Data collection was done by applying the methods of observation and interviews using questionnaires. The data obtained were analyzed descriptively, namely univariate and bivariate analyses, at 95% confidence level ($p < 0.05$). The results of Chi Square test conducted on the assessment of occupational stress and occupational fatigue relationship obtained the value of $p = 0.021$. It means that there is a relationship between occupational stress and occupational fatigue. The results of Chi Square test conducted on the assessment of employment period and occupational fatigue relationship was obtained $p = 0.302$. It means that there is no relationship between employment period and occupational fatigue. The results of Chi Square test conducted on the assessment of nutritional status and occupational fatigue relationship obtained the value of $p = 0.023$. It means that there is a relationship between nutritional status and occupational fatigue. The conclusion of the study is that not all variables are associated with occupational fatigue. It is recommended to provide more supervision and attention to gas station operators, as well as to hold continuous OSH (Occupational Safety and Health) training in order to reduce fatigue.

Keywords: - Fatigue, Operator, Occupational Stress

I. INTRODUCTION

Data from the International Labor Organization (ILO) in 2013, one worker in the world died every 15 seconds due to occupational accidents and 160 workers experienced work-related illness. One of the main causes of occupational accidents caused by humans is stress and fatigue. Occupational fatigue is defined as the process of decreased efficiency, work performance, and reduced physical strength or endurance to continue activities that need to be carried out[1].

Based on data on occupational accidents recorded in Kompas year 2012, on average, there were 414 work accidents every day in Indonesia, 27.8% of it was due to high-level fatigue. About 9.5% or 39 people sustained disabilities[2]. Occupational fatigue is one of the health and safety problems that can be a risk factor for accidents at work. Occupational fatigue is caused by many factor which generally classified into internal and external factors, such as the work environment[3].

Work situations that are full of stress are very much associated with unpleasant feelings, such as anxiety, tension, lack of enthusiasm, irritability, not working hard, and fatigue[4].

The employment period can also be a cause of fatigue. The longer a person works, the more a person is exposed to the danger arises from the work environment and will induce fatigue and boredom[5].

Higher increase of BMI associated with increased work fatigue as found by a 2-year study on ICF patients who became overweight/obese with lower physical and vitality functions in the population based study[6].

Fuel Filling Station for Public or Gas Station is a public infrastructure provided by PT. Pertamina (Persero) for Indonesian people to meet their fuel needs. Operators in Gas Stations experience fatigue due to work done by standing continuously to refuel and there is also a shift work system which will result in occupational fatigue at the gas station operators. Based on preliminary observation on 10 workers at 5 different gas stations in Palu City, the shortest employment period is known to be 4 months and the longest is 9 years with 8-hour work duration per shift. From the results of initial observations using KAUPK2, which is a standardized questionnaire to measure the level worker fatigue in Indonesia, on 10 workers at several gas stations in Palu City, all of them experienced fatigue, in which 7 people experienced moderate fatigue and 3 people experienced mild fatigue.

From the description above, researchers would like to find out more about the factors associated with occupational fatigue of the Gas Station Operators in Palu City.

II. RESEARCH METODHS

This research is an observational study with a cross sectional approach, namely to observe simultaneously the relationship between occupational stress, employment period, and nutritional status with occupational fatigue of gas station operators in Palu City. This research was conducted in August - September 2017 at all gas stations in Palu City.

The population of this study was all gas station operators in Palu City, as many as 271 people, with a total sample of 74 proportional stratified random sampling respondents. The data used in this study were primary data and secondary data. Primary data included name, age, sex, education and employment period. While secondary data included supporting data for primary data obtained from available documents at 17 gas stations in Palu City.

The data that has been collected was then processed in a univariate and bivariate manner. Furthermore, the data was presented in a table accompanied by a narrative or explanation.

III. RESULTS

This research was carried out at all gas stations in Palu City during August - September 2017 with the aim to find out the factors associated with occupational fatigue of gas station operators in Palu City. The results of the research are presented in the following table:

Table 1. Relationship of Occupational Stress, Employment period, and Nutritional Status with Occupational Fatigue of Gas Station Operators in Palu City

| | Occupational Fatigue | | | | Total | <i>p</i> value |
|----------------------------|----------------------|------|---------------|-------|-------|----------------|
| | Exhausted | | Not Exhausted | | | |
| | n | % | n | % | | |
| Occupational Stress | | | | | | |
| Stressed | 22 | 61.1 | 14 | 38.9% | 36 | 0.021 |
| Not Stressed | 13 | 34.2 | 25 | 65.8% | 38 | |
| Employment period | | | | | | |
| At Risk | 23 | 52.3 | 21 | 47.7% | 44 | 0.302 |
| Not at Risk | 12 | 40.0 | 18 | 60.0 | 30 | |
| Nutritional Status | | | | | | |
| Normal | 19 | 63.3 | 11 | 36.7 | 30 | 0.023 |
| Abnormal | 16 | 36.4 | 28 | 63.6 | 44 | |

Sources: Primary Data

The results of the study in Table 1 show that 36 respondents experienced occupational stress, in which 22 of them (61.1%) were at the risk of experiencing occupational fatigue, while the remaining 14 people (38.9%) were not at risk of experiencing occupational fatigue. Furthermore, 13 of 38 respondents (34.2%) who did not experience stress were at risk of experiencing occupational fatigue, while the remaining 25 people

(65.8%) were not at risk of experiencing work fatigue. Based on the Chi Square statistical test, the results of the analysis showed that the value of $p < 0.05$, which means that there is a significant relationship between the stress experienced by the operators and occupational fatigue that will be experienced by them.

The results of the study in Table 1 show that respondents with a risky employment period amounted to 44 people, in which 23 of them (52.3%) were at risk of experiencing occupational fatigue, while the other 21 people (47.7%) were not at risk of experiencing occupational fatigue. Furthermore, 12 of 30 respondents (40%) with a non-risky employment period were at risk of experiencing occupational fatigue, while the other 18 people (60.0%) were not at risk of experiencing occupational fatigue. Based on the Chi Square statistical test, the results of the analysis showed that the value of $p > 0.05$, which means that there is no significant relationship between the employment period of operators and occupational fatigue that will be experienced by them.

The results of the study in Table 1 show that there were 30 respondents with normal nutritional status, in which 19 of them (63.3%) were at risk of experiencing occupational fatigue, while the other 11 people (36.7%) were not at risk of experiencing occupational fatigue. Furthermore, 16 of 44 respondents (36.4%) with abnormal nutritional status were at risk of experiencing occupational fatigue, while the remaining 28 respondents (63.6%) were not at risk of experiencing occupational fatigue. Based on the Chi Square statistical test, the results of the analysis showed that the value of $p < 0.05$, which means that there is a significant relationship between the nutritional status of operators and occupational fatigue that will be experienced by them.

IV. DISCUSSIONS

4.1 Relationship of Occupational Stress and Occupational Fatigue of Gas Station Operators in Palu City

The results of analysis using the Chi Square test conducted on the assessment of occupational stress and occupational fatigue showed that there is a significant relationship between occupational stress and occupational fatigue of gas station operators in Palu City. The results showed that 14 operators (38.9%) experienced work stress but did not experience occupational fatigue during the study because although there were demands of work and other stress factors, but they had planned their work activities well and they delegate some job responsibilities to colleagues so that they did not experience occupational fatigue. The results also found that there were 13 operators (34.2%) who were exhausted at work but did not experience stress. Those operators understood their duty and responsibility and could maintain good relations with fellow co-workers, so that occupational stress could be avoided.

Occupational stress can cause some impacts on workers, one of which is the changes in physiology. One of the changes in physiology is fatigue felt by workers[7]. Stress is also commonly interpreted as pressure, tension or unpleasant disturbances originating from the outside of someone[8].

The results of this study are in line with previous research which stated that occupational stress has a significant relationship with occupational fatigue because the value in this study is less than a ($0.026 < 0.05$). This means that occupational stress has a significant relationship with occupational fatigue. Therefore, the results of this study are in line with the results of previous study which stated that the occurrence of occupational fatigue is caused by occupational stress[9].

4.2 Relationship of Employment period and Occupational Fatigue of Gas Station Operators in Palu City

The results of an analysis which were carried out on the employment period and occupational fatigue of gas station operators in Palu City using the Chi Square test obtained p value of 0.302, so that $p > 0.05$ or there is no significant relationship between employment period and occupational fatigue of gas station operators in Palu City. This is because 23 (52.3%) of all respondents who have a risky employment period (> 3 years) experienced fatigue and 21 (47.7%) of them were not exhausted. If compared to respondents who have a non-risky employment period (< 3 years), only 12 (40.0%) people who were exhausted and the remaining 18 (60.0%) people were not exhausted. This means that risky and non-risky employment periods are equally potential to suffer from occupational fatigue.

The employment period is the time accumulated by a worker in handling a job from the first day of her/his employment to a certain time. The more information we store, the more skills we learn and the more things we do[10]. The longer a person works, the familiarity with the job will affect the level of body resistance to the fatigue they experience. Work experience will also be able to distinguish the influence of work conditions on the possible impacts on themselves[11].

This research is also in line with previous research about the factors associated with occupational fatigue of workforce in the food production 1 (FPI) / masako packing division. The results found no relation between employment period and occupational fatigue with the value of $p = 0.513$ [12].

4.3 Relationship of Nutritional Status and Occupational Fatigue of Gas Station Operators in Palu City

The results of the analysis using the Chi Square test conducted on the assessment of nutritional status and occupational fatigue obtained the value of p of 0.023 where $p < 0.05$ or there was a significant relationship between nutritional status and occupational fatigue of gas station operators in Palu City. This is because the majority of respondents, or 28 people (63.3%), who have abnormal nutritional status experienced fatigue and there were 26 respondents (63.6%) who have normal nutritional status were not exhausted.

Nutritional status is one of the causes of fatigue. A workforce with a good nutritional status will have better work capacity and body endurance, and vice versa. Under conditions of malnutrition, heavy workloads will interfere with work and reduce the efficiency and body endurance, so that a worker can easily contract disease which can accelerate the onset of fatigue. Nutritional status of a person can be determined through the calculation of BMI (Body Mass Index) value. BMI is calculated by the dividing the weight in kilograms with the square of height in meters [13]. If nutritional intake is less than the needs, the workforce will feel more exhausted than the workers with adequate nutritional intake [14].

This research is in line with the results of previous study which found that the results of bivariate statistical analysis obtained a value of $p = 0.016$ or it means that there was a significant relationship between nutritional status and occupational fatigue of workers in PT. Kalimantan Steel, Kubu Raya District. Value of $r = -0.431$ shows a medium correlation coefficient with a negative relationship direction. The negative relationship direction means that the lower (worse) the nutritional status of a worker, the higher the level of fatigue [15].

V. CONCLUSION AND RECOMMENDATIONS

According to the results of research conducted towards operators of gas stations in Palu City, it can be concluded that occupational stress and nutritional status are associated with occupational fatigue. However, the employment period is not associated with occupational fatigue.

This research recommends the management of each gas station to improve supervision over gas station operators and to control gas station operators in order to reduce the impact of occupational fatigue due to stress by giving leave and modifying working time and also providing mineral waters to avoid dehydration at work.

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