



Research

Factors Influencing Work Fatigue Among Gas Station Operators in Panaikang District

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ABSTRACT

Fatigue is one of the risks leading to decreased worker health, characterized by reduced energy levels when performing tasks or activities. Based on the health data from the 2023 attendance records of gas station operators in Panaikang Subdistrict, Makassar City, which included a workforce of 35 individuals, 12 employees reported frequent illness every month. For the 2024 attendance records from January to April, 9 workers experienced deteriorating health conditions, with symptoms including body pain, headaches, and stiffness in the shoulders. Of the staff, 22 (62.9%) experienced fatigue, while 13 (37.1%) did not. Research Objective: To identify the factors influencing work fatigue among gas station operators in Panaikang Subdistrict, Makassar City. Method: This study employs a quantitative research method, specifically an analytical survey design with a cross-sectional study design, to investigate the impact of length of employment, tenure, and energy intake on work fatigue among gas station operators in Panaikang Subdistrict, Makassar City. Research Results: The study indicates that there is no significant relationship between work fatigue and length of employment ($p = 0.686$), tenure ($p = 0.458$), or energy intake ($p = 0.508$). The findings of the study indicate that there is no substantial correlation between work fatigue and factors such as length of employment, tenure, or energy intake among gas station operators in Panaikang Subdistrict, Makassar City. Based on our findings, it can be inferred that the duration of employment, tenure, energy intake, and work fatigue do not have a significant relationship among gas station operators in Panaikang Subdistrict.

1. Introduction

Work fatigue is one of the important issues in the labor world that affects productivity and workplace safety. Amid technological advances and industrial demands, humans remain the main

element in the execution of tasks. Unfortunately, high workloads, tight schedules, and shift work systems contribute to the physical and mental fatigue of workers. Fatigue is characterized by a decrease in energy, concentration disturbances, and even long-term health issues. Sianturi (2023) states that fatigue is often caused by monotony due to a heavy work routine, while Hikmah (2020) shows that more than 60% of workplace accidents are directly related to worker fatigue.

Work fatigue includes the weakening of activity, work motivation, and physical fatigue, all of which impact the performance and safety of workers (Gaol et al., 2018). According to data from the International Labour Organization (ILO), more than 2.78 million workers die each year due to workplace accidents and occupational diseases, with about 13.7% of these related to fatigue. Additionally, 374 million cases of non-fatal injuries are reported each year, which reduce workers' productive capacity (ILO, 2018). In Indonesia, although the BPJS Employment data shows a decrease in workplace accidents from 2018 to 2019, the long-term trend indicates a significant increase over the last five years, indicating a continued lack of awareness regarding the implementation of occupational safety and health (Salsabillah, 2023).

An imbalanced workload with poor time management increases the risk of burnout. Tarwaka noted that 63% of workers experience burnout due to long working hours, resulting in effects such as insomnia, digestive disorders, and psychological issues (Wiyarso, 2018). The Labor Law No. 13 of 2003 has regulated the limits of normal working hours, but implementation in the field still varies.

Several studies also show a relationship between work shifts and fatigue levels. Priyatna (2020) found that night shift workers experience more fatigue compared to morning shifts, although the research by Ariestiani (2022) states that there is no significant relationship between work shifts and fatigue in production workers.

A gas station is a workplace that operates 24 hours a day, with a shift system and exposure to hazardous chemicals such as benzene. Benzene is a carcinogenic substance that can cause hematological disorders such as leukemia. Exposure to benzene and long working hours are health risk factors for gas station operators (Martiana, 2023). In addition, complaints such as body aches, headaches, and general fatigue are often experienced by gas station staff due to prolonged standing and a lack of personal protective equipment (PPE).

Based on a preliminary study in Panaikang Village, Makassar City, out of 35 gas station operators, 12 individuals frequently fell ill in 2023, and from January to April 2024, 9 individuals reported recurrent health complaints. This indicates the presence of work fatigue that warrants further investigation. Therefore, this study aims to analyze the factors influencing work fatigue among gas station operators in Panaikang Village, Makassar City.

2. Method

The research method used in this study is quantitative, with the type of research being an analytical survey designed as a cross-sectional study. This research was conducted in June 2024 at the Public Fuel Filling Station (SPBU) in Panaikang Village, Makassar City. Data collection involved the use of primary data obtained through interviews with respondents, who were asked to complete questionnaires, and secondary data. The population in this study consists of fuel filling station

operators at the Public Fuel Filling Station (SPBU) in Panaikang Village, Makassar City, totaling 35 individuals.

Initial steps included advocacy meetings with the school principal and teachers to obtain permissions and outline collaborative responsibilities. Students were introduced to the importance of physical activity through theoretical education followed by hands-on practice in the form of stretching exercises and guided aerobic sessions.

A structured questionnaire was developed to assess students' knowledge before and after the intervention (pre- and post-test). The instruments were validated by public health experts. Data collection involved measuring students' understanding of physical activity concepts, its benefits, consequences of physical inactivity, and examples of exercises.

Statistical analysis included descriptive analysis for demographic data and paired sample t-tests to determine significance in knowledge improvement. Normality tests were conducted using the Kolmogorov-Smirnov test. Ethical clearance was granted by the faculty committee after securing informed consent from parents and approval from school authorities.

The empowerment process was divided into four stages: (1) situation analysis and coordination, (2) health education and peer training, (3) implementation of peer-led practice sessions, and (4) evaluation and follow-up. The follow-up included placing informative banners about physical activity at the school to ensure long-term awareness.

3. Results & Discussion

Public fuel stations, or SPBU, are public facilities provided by PT Pertamina (Persero) for the Indonesian people to meet their fuel needs. In the Panaikang area of Makassar City, there are 2 SPBUs located approximately 1 kilometer apart. The two SPBUs are Racing SPBU, with a total of 23 operators, and Panaikang SPBU, with 12 operators, totaling 35 operators between the two SPBUs.

Table 1. *Bivariate Analysis Results*

Variable	Work Fatigue				Total		P Value
	Experience		Not experiencing				
	N	%	N	%	N	%	
Length of service							
Normal	10	45,5	5	38,5	15	42,9	0.686
Not Normal	12	54,5	8	61,5	20	57,1	
Work periode							
Old > 3 Year	9	40,9	7	53,8	16	45,7	0.458
New < 3 Year	13	59,1	6	46,2	19	54,3	
Energy intake							
Fulfill	11	50,0	8	61,5	19	54,3	0.508
Does not Fulfill	11	50,0	5	38,5	16	45,7	

Based on the univariate results observing the percentage of characteristics of 35 respondents, the majority are male, with 25 people, and female, with 10 people. Looking at the length of work, 20 respondents (57.1%) have non-normal working hours, while 15 respondents (42.9%) have normal working hours. Based on the length of service, 19 respondents (54.3%) have recent work experience,

and 16 respondents (45.7%) have long-term work experience. From the perspective of energy intake, there are 19 respondents (54.3%) with energy intake that meets their needs and 16 respondents (45.7%) with energy intake that does not meet their needs. Meanwhile, 22 respondents (62.9%) are recorded as experiencing work fatigue, and 13 respondents (37.1%) do not experience fatigue.

Table 1 shows the bivariate results analyzing the relationship between variables. Based on the working duration of the respondents, out of 15 (42.9%) respondents with normal working duration, 10 (45.5%) experienced fatigue and 5 (38.5%) did not experience fatigue. Meanwhile, out of 20 (57.1%) respondents with abnormal working duration, 12 (54.5%) experienced fatigue and 8 (61.5%) did not experience fatigue. The results of statistical analysis and the chi-square test showed a p-value of 0.686, which is greater than α (0.05). This means there is no relationship between working duration and work fatigue among Gas Station Operator Officers in Panaikang Village, Makassar City. Based on the respondents' tenure, out of 16 (45.7%) respondents with long tenure, 9 (40.9%) experienced fatigue and 7 (53.8%) did not experience fatigue. Meanwhile, out of 19 (54.3%) respondents with short tenure, 13 (59.1%) experienced fatigue and 6 (46.2%) respondents who did not experience fatigue. The results of statistical analysis and chi-square test showed a p-value of 0.458, which is greater than α (0.05). This means there is no relationship between working period and work fatigue among gas station operators in Panaikang Village, Makassar City. Table 5.12 Based on the energy intake of respondents, out of 19 (54.3%) respondents whose energy intake met the requirements, there were 11 (50.0%) respondents who experienced fatigue and 8 (61.5%) respondents who did not experience fatigue. Meanwhile, from 16 (45.7%) respondents whose energy intake did not meet the requirements, there were 11 (50.0%) respondents who experienced fatigue and 5 (38.5%) respondents who did not experience fatigue. The results of statistical analysis and chi-square test showed a p-value of 0.508, which is greater than α (0.05). This means there is no relationship between energy intake and work fatigue among gas station operators in Panaikang Village, Makassar City.

Working hours are the duration of time spent by workers in carrying out their tasks each day. Ideally, a person can work well for 40-50 hours per week, or about 8 hours a day. Working beyond these hours can lead to physical and mental fatigue, especially if not balanced with adequate rest and good sleep patterns. This condition impacts productivity reduction and increases the potential for work-related fatigue (Yusuf & Rifai, 2019).

However, the results of this study indicate that there is no significant relationship between the length of work and work fatigue among gas station operators ($p\text{-value} = 0.686 > \alpha 0.05$). This means that both employees with normal and abnormal working hours can experience fatigue, depending on other factors such as the volume of customers, lack of break time, and the habit of not having breakfast before work. Conversely, some employees with abnormal working hours do not experience fatigue due to relatively light workloads, such as working at a less busy mobile fuel station.

This research is in line with the findings of Hasriwiani Habo Abbas (2021) at PT. Industri Kapal Indonesia Makassar, which also did not find a significant relationship between work duration and fatigue. However, these results differ from the study by Datu (2019) on online motorcycle taxi drivers, which showed a relationship between work duration and work fatigue ($p = 0.023$), primarily due to the physically demanding nature of the job and flexible working hours.

The difference in these results indicates that the influence of working hours on fatigue is not absolute and can be affected by work intensity, service rhythm, and management of rest time. Therefore, even though government policy has set a maximum working limit of 8 hours per day (Law No. 13 of 2003), the implementation of proportional rest time and supervision of workload remains necessary to reduce the risk of work-related fatigue.

The length of service reflects how long a worker has been at an institution or company and is often associated with the level of experience. Generally, a tenure of over 3 years is considered long service, while under 3 years is classified as new service (Rinaldi, 2020). Long service is often associated with burnout, while new service is associated with the inability to adapt to workload and operational rhythm.

In this study, the results of the chi-square test showed that there is no significant relationship between work experience and work fatigue ($p = 0.458 > \alpha 0.05$). These findings indicate that both long-serving and new staff can experience fatigue, depending on how they adjust to working conditions, job pressures, and their ability to manage rest time.

Long-serving staff tend to experience burnout, but they also have better experience and understanding in managing their work rhythm. Conversely, new staff may have high work enthusiasm but are more vulnerable to fatigue due to their still imperfect adaptation to the work environment.

This result is supported by the research of Hasriwiani Habo Abbas (2021), which found no significant relationship between work experience and work fatigue. However, this result differs from the research of Yudi Alief Sakti (2021), who found that work experience has a significant relationship with fatigue among fuel station operator employees in Tamalanrea District, Makassar ($p = 0.034$), along with other variables such as gender, workload, and noise.

The difference in these results indicates that work experience is not the only determinant of work fatigue but rather part of a complex set of factors that includes work pressure, boredom, work environment, and human resource management. Therefore, a more comprehensive approach is needed to understand the dynamics of work fatigue.

Energy intake is related to the total calories obtained by workers from food and beverages. Energy, especially that derived from carbohydrates, proteins, and healthy fats, is needed to support physical and mental activities during work. If energy needs are not met, the body will experience fatigue due to metabolic disturbances and decreased muscle function.

Although theoretically, energy intake plays a crucial role in maintaining stamina and preventing fatigue, this study's results show that there is no significant relationship between energy intake and work fatigue ($p = 0.508 > \alpha 0.05$). Some workers with adequate energy intake still experience fatigue due to busy service activities and a lack of rest time. Conversely, there are also workers with inadequate energy intake who do not experience fatigue, which may be influenced by the consumption of energy drinks or high work motivation.

This condition indicates that energy intake alone is not enough to explain work fatigue comprehensively. Other factors such as heavy physical activity, work stress, and mental pressure also influence fatigue, even when calorie needs are met. Research by Dwi Yuliatin Sholiah also shows

that there is no relationship between energy intake and work fatigue ($p = 0.519$), supporting the results of this study.

However, another study by Yudi Alief Sakti (2021) found a significant relationship between energy intake and fatigue ($p = 0.005$), indicating that unmet calorie needs can directly reduce work capacity.

Adequate energy intake remains important in supporting worker performance. Balanced nutrition, such as complex carbohydrates, lean proteins, healthy fats, vitamins, and minerals, can help maintain body function and prevent fatigue. However, work fatigue is not only a physiological problem but also encompasses psychological and environmental aspects. Therefore, the management of work fatigue should take into account the interaction between physical conditions, mental pressure, and operational work management.

4. Conclusion

Based on the research findings regarding the factors affecting work fatigue among gas station operators in Panaikang sub-district, Makassar City, it can be concluded that there is no significant relationship between working hours, length of service, or energy intake and the level of work fatigue experienced by gas station operators in that area.

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