The Relationship Between Work Stress and Work Fatigue Among Laundry Workers in The Muhammadiyah University of Surakarta Area

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Abstract.

Work stress and work fatigue are occupational safety and health issues frequently experienced by workers in the informal sector, including laundry workers. Physically demanding work activities, performed repetitively, along with long working hours, have the potential to increase work stress and impact work fatigue. This study aimed to determine the relationship between work stress and work fatigue among laundry workers in the area of Muhammadiyah University of Surakarta. This research used a quantitative method with an analytical observational design and a cross-sectional approach. The research population consisted of all laundry workers in the Muhammadiyah University of Surakarta area, with a sample size of 50 respondents taken using total sampling technique. Work stress data was collected using the National Institute for Occupational Safety and Health (NIOSH) questionnaire, while work fatigue was measured using the Industrial Fatigue Research Commit tee (IFRC) questionnaire. Data analysis was performed univariately and bivariately using the chi-square test. The results showed that 50% of respondents experienced high work stress and 44% experienced high work fatigue. The chi-square test results showed a p-value < 0.05, indicating a significant relationship between work stress and work fatigue among laundry workers in the Muhammadiyah University of Surakarta area. The higher the level of work stress experienced by workers, the higher the risk of work fatigue.

Keywords: *Work Stress; Work Fatigue; NIOSH; IFRC and Laundry Workers.*

I. INTRODUCTION

Globalization has led to rapid technological development, providing convenience for everyone in carrying out various activities, especially in the world of work. In the 21st century, the role of technology has become very important, but on the other hand, it also presents challenges for humans in creating high work productivity. In this context, human resources play a very important role in actively completing work, as the success of a enterprise is largely determined by the performance of the human resources involved (1). However, the demand to achieve high productivity is often accompanied by an increased workload, which can lead to occupational health problems, specifically work stress and work fatigue. Both conditions can hinder work progress as they directly impact workforce efficiency and capability.Stress is a stimulus or action from inside or outside the human body that can disturb physical, psychological, and behavioral aspects, thus directly affecting productivity levels (2). Work stress can arise not only from the worker themselves but also from the work environment situation and conditions or from outside the work environment. Job demands such as completing work within set deadlines and having no break time can make workers prone to work stress (3). Work stress not only affects mental aspects but also causes real physical responses as the body's reaction to excessive pressure. Physical stress symptoms include increased heart rate and blood pressure, dry mouth and throat, cold sweats, shortness of breath, headaches, stomach aches, pale face, trembling, difficulty sleeping, and decreased appetite (4).

Fatigue at work is a feeling described as abnormal tiredness or sleepiness and is generally considered a more acute condition. However, over time, this condition can become chronic and cause physical and mental disturbances (5). Fatigue is a condition where one feels tired, lethargic, or lacking energy. Fatigue is a common symptom of many medical conditions, from mild to serious even leading to death (6). Fatigue is

the process of declining work efficiency and decreasing strength or physical endurance to continue necessary activities (7).Persistent work stress can develop into work fatigue. Work fatigue can manifest as physical, mental, or emotional fatigue due to excessive work activities, unsupportive work environments, and lack of rest time. Work stress triggers physiological responses such as decreased concentration, increased muscle tension, and reduced body endurance. If this stressful condition is not managed well and persists for a long time, the body will experience a decline in adaptive capacity.

This condition causes physical energy to be excessively depleted, leading to excessive stress, so work stress develops into work fatigue. The number of laundry businesses in the Muhammadiyah University of Surakarta area is quite high and has a high level of activity due to the significant demand for laundry services from students. The situation causes laundry workers to work with high intensity, especially at certain times, thus potentially increasing the risk of work stress and work fatigue. The laundry service process involves various stages, from washing drying, ironing, to packaging, requiring speed, precision, and high physical endurance. Many studies discuss the relationship between work stress and work fatigue in the formal sector, but studies on informal sector laundry workers, especially in Muhammadiyah University of Surakarta area, are still limited. Therefore, research on the relationship between work stress and work fatigue among laundry industry workers in the Muhammadiyah University of Surakarta area is relevant to examine the relationship between work stress and work fatigue of employees in that laundry industry. This study also aims to prove the existence of a relationship between work stress and the level of work fatigue among laundry employees in that area.

II. METHODS

This study used a quantitative approach with an analytical observational design aimed at determining the relationship between work stress and work fatigue among laundry workers in the Muhammadiyah University of Surakarta area.This research was conducted at laundry businesses located on campus 1 and campus 2, which have high work activity due to the high demand for student laundry services. Data collection was done using a *cross sectional* approach, where measurements of work stress and work fatigue were conducted simultaneously. The population in this study were all laundry employees in the Muhammadiyah University of Surakarta area who agreed to become respondents. The sampling technique used was total sampling, so the entire population of 50 laundry workers became the research sample.

The data used in this study consisted of primary and secondary data. Primary data was obtained through questionnaire filling by respondents. Work stress was measured using the *National Institute of Occupational Safety and Health* (NIOSH) questionnaire, which focuses on workers physiological responses to work pressure. Meanwhile, work fatigue was measured using the *Industrial Fatigue Research Committee* (IFRC) questionnaire. The questionnaire consisted of several main indicators : activity weakening, motivation weakening, and physical fatigue. Data analysis was conducted in stages, starting with univariate analysis to describe the frequency distribution of respondent characteristics, work stress levels, and work fatigue levels. Subsequently, bivariate analysis was performed to determine the relationship between work stress and work fatigue using the *chi-square* test.

III. RESULT AND DISCUSSION

Respondent Characteristics

Table 1. Age

Age	n	%
19-29 years	11	22
30- 44 years	22	44
45-62 years	17	34
Total	**50**	**100**

Based on the univariate analysis results, most respondents were in the 30-44 year age group, amounting to 44%. This age is considered productive, but these laundry workers engage in repetitive physical activity. This result aligns with a study titled “The Effect of Working Hours Length on Physical and Psychological Fatigue of Home Based Laundry Workers” which shows that most respondents (45%) were in

the 30-40 year age range, which is a productive and economically active age group in household economic activities like laundry businesses. That study explains that despite being of productive age, laundry workers remain at risk of physical and psychological fatigue if working hours are long and continuous (8).

Table 2. Gender

Gender	n	%
Male	10	20
Female	40	80
Total	**50**	**100**

Based on the univariate analysis results, most respondents were female, amounting to 80%. Female workers in laundry businesses were associated with job characteristics that require precision and diligence. Research by Rosiana and Saskara focusing on female workers in the home based laundry industry showed that home based laundry sector was one of the work sectors that heavily involves female labor. Women not only played roles as housewives, but social economic household demands pushed women to seek income (9).

Table 3. Work Shift

Work Shift	n	%
Morning	16	32%
Afternoon	7	14%
Night	1	2%
Full shift	26	52%
Total	**50**	**100**

Based on the univariate analysis of work shift, most respondents worked full shifts, amounting to 52% or 26 respondents. A full shift meant working from morning to night. Long working hours reduced rest time, decreased workers rest and increased the risk of work fatigue. This result aligned with research conducted on laundry workers at the Mandau District Hospital, which showed that laundry workers work in a shift system, namely morning and afternoon. In that research, workers had no specific break time and only utilized waiting time for washing linen, while most work activities were performed standing, especially involving the legs. This condition can cause work fatigue in laundry workers (10).

Table 4. Education Level

Education Level	n	%
Junior High School	6	12
Senior High School	22	44
Vocational High School	10	20
D3	2	4
S1	10	10
Total	**50**	**100**

Based on the univariate analysis results, most respondents had a Senior High School as their last education level, totaling 22 respondents (44%). This indicates that most laundry workers have a secondary education background, which aligns with the characteristics of laundry work that emphasize practical skills and physical activity over high formal education. Therefore, the education level in this study is used to describe respondent characteristics and not as a primary factor directly influencing work fatigue.

Univariate Analysis

Table 5. Distribution Based on Work Stress Among Laundry Workers in Muhammadiyah University of Surakarta Area

Work Stress	Frequency	%
Low	25	50
High	25	50
Total	**50**	**100**

Based on the univariate analysis results, it is known that respondents work stress was divided equally between low and high categories, each at 50%. The measurement of work in this study used the NIOSH physiological stress questionnaire, which assesses the effects of work pressure. Several complaints include headaches, sleep disturbances, heart palpitations, muscle tension, shortness of breath, etc. Laundry workers generally perform fairly heavy and repetitive physical activities. Their working conditions can be a source of work stress.

Table 6. Distribution Based on Work Fatigue Among Laundry Workers in Muhammadiyah University of Surakarta Area

Work Fatigue	Frequency	%
Low	28	56
High	22	44
Total	**50**	**100**

Based on the univariate analysis results for work fatigue, 44% of respondents experienced high work fatigue, while 56% of respondents were in the low fatigue category. Work fatigue measurement used the IFRC questionnaire, which assesses fatigue from aspects of activity weakening, motivation weakening, and physical fatigue. Based on this questionnaire, fatigue is characterized by complaints such as tiredness throughout the body, heavy legs, back pain, drowsiness while working, etc.

Table 7. Bivariate Analysis

Work Stress	Work Fatigue						p-value
	Low		High		Total		
	n	%	n	%	n	%	
Low	21	84%	4	16%	25	100%	0.000
High	7	28%	18	72%	25	100%	
Total	**28**	**56%**	**22**	**44%**	**50**	**100%**	

Based on the analysis results of the relationship between work stress and work fatigue among workers, p-value < 0.05 was obtained, meaning there is a significant relationship between work stress and work fatigue. This indicates that level of work stress experienced by workers influences the level of work fatigue felt. Based on the respondent distribution, workers with low work stress mostly experienced low work fatigue, totaling 21 people (84%), while those experiencing high work fatigue were only 4 people (16%). This shows that low levels of work stress tend to be followed by low levels of work fatigue. Conversely, among workers with high work stress, most experienced high work fatigue, totaling 18 people (72%), while those experiencing low work fatigue were only 7 people (28%). This condition illustratres that the higher the level of work stress experienced by workers, the greater likelihood of workers experiencing work fatigue.Overall, out of 50 respondents, 28 people (56%), experienced low work fatigue and 22 people (44%) experienced high work fatigue. This result strengthens the finding that work stress is one of the factors related to the occurrence of work fatigue among workers.

Thus, it can be concluded that work stress is related to work fatigue among laundry employees in the Muhammadiyah University of Surakarta area. The working conditions experienced by laundry workers can accelerate the occurrence of work fatigue because physical energy is used continuously during work. If this condition lasts for a long time, workers will be more prone to fatigue. This indicates that work stress is related to work fatigue among laundry workers. The high work fatigue in workers with high work stress can be caused by a combination of heavy physical demand and minimal rest time in the informal laundry sector, characterized by full work shifts. The relationship aligns with a study titled "The Relationship Between Work Stress and Work Motivation with Feelings of Work Fatigue Among Laundry Workers in Kleak and Bahu Subdistrict, Manado City" which found a p-value of 0.028 (<0.05). This means that there is a Relationship Between Work Stress and Feeling of Work Fatigue Among Laundry Workers in Kleak and Bahu Subdistrict, Manado City. (11).Work fatigue is influenced by various factors, including work related factors such as workload and work stress. Research results show a significant relationship between workload and work fatigue with a p-value = 0.00 (p < 0.05) and an r value 0.662, indicating a strong and positive relationship. A high workload can increase the physical and mental demand on workers, thus triggering work stress. Work stress experienced continuously will impact decreased body endurance and work capacity, ultimately increasing the risk of work fatigue (12)

IV. CONCLUSION

Based on the research results, it can be concluded that most respondents were in the productive age group, dominated by age 30-44 years, female, working full shift (morning-night), and having a Senior High School as their last education level. Univariate analysis results show that work stress among laundry workers

in the Muhammadiyah University of Surakarta area was equally divided between low and high work stress categories, each at 50%. Meanwhile, work fatigue was dominated by the low fatigue category at 56% and high fatigue 44%. Bivariate results using the chi-square test obtained a p-value < 0.05, indicating a significant relationship between work stress and work fatigue. Therefore, it can be concluded that work stress is related to work fatigue among laundry workers in the Muhammadiyah University of Surakarta area.

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