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Working Stress and Its' Predictive Factors among Production Area Workers in PT X

Putri Handayani[1], Izzatu Millah[2], Fierdania Yusvita[3]

Department of Public Health, Universitas Esa Unggul

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Corresponding author:
Name: Putri Handayani
Address: FIKES R.804 Jl Arjuna Utara No 9, Jakarta, Indonesia
E-mail:
putri.handayani@esaunggul.ac.id

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Abstract

Background: Stress is a complaint that workers in the manufacturing industry often feel. The work environment, processes, and equipment can cause work stress. The increase in workload related to the achievement of targets is one of the causes of work stress. **Objective**: This study aims to see the effect of workload on work stress in the production area. The variables analyzed in this study are work stress as the dependent variable, workload as an independent variable, and three confounding variables: work period, work duration, room temperature, and noise. **Method**: This study used an analytic observational method with a cross-sectional design approach. The sample in this study is the total population of workers in the production area, as many as 88 people. **Result**: The results of the bivariate analysis showed that four variables influenced work stress, workload (p=0.012), working period (p=0.002), room temperature (p=0.029), and noise (p=0.002). The results of the multivariate analysis showed that the most dominant variable affecting work stress was tenure (p=0.001 and OR=12.610). **Conclusion**: Management is advised to detect work stress early among employees. **Recommendation**: Management needs to implement an occupational health promotion program in stress management, starting with identifying the causes of stress in the work environment. In addition, it is recommended to detect work stress early in employees.

Keywords: work stress, working period, workload, health promotion

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INTRODUCTION

Work stress is one of the problems related to occupational health that continues to be a concern in various countries. In today's digital era, high work demands and changes in the work environment are often psychosocial factors that impact workers' emergence of stress symptoms. Job stress can appear at different levels in every workplace. Work stress can cause workers to experience depression and conflict (1). Work stress is a significant problem that impacts the emergence of physical and psychological health complaints resulting in decreased productivity, concentration, increased absenteeism, high staff turnover, and reduced performance. Thus, stress becomes a severe problem that affects individual workers and harms the organization (2,3).

Several studies report that work stress accounts for 35% of all work-related illnesses (4). Studies conducted in Bristol City, England, Vietnam, India, Iran, Albania, and Ethiopia show that one in three employees experience job stress (5,(6). The International Labor Organization states that two out of three workers are at risk of experiencing work stress. Previous studies said that at least 45.5% of workers in the construction sector experienced severe stress (7). Other studies stated that at least 40.4% of workers in the manufacturing industry experienced complaints related to work stress (5). Further studies on occupational stress prevalence and related factors in the health sector show that job stress is a significant public health problem in developing countries (8).

Work stress can be caused by many work factors, including work duration of more than 50 hours per week (9), long work durations (10), high work demands, time pressure and workload, career path and role conflict in the organization (11), factors physical environments such as noise (12) and workspace temperature (7). The preliminary study results found that 33% of workers in the production area experienced complaints of severe stress.

OBJECTIVE

This study aimed to assess work-related stress and factors affecting workers in the production area. The information obtained is expected to increase leadership awareness in the workplace to prevent pressure, conduct screening and early detection of stress, and improve employees' quality of life and organizational performance.

METHODS

Design

This research was quantitative research using an observational study with a cross-sectional design.

Sample size and sampling technique

The samples in this study were workers in the production area at one of the manufacturing industries in Jakarta. The selected samples used the probability sampling technique. A simple random sampling technique was used to determine the samples based on the inclusion criteria. The number of samples in this study was 88 workers.

The inclusion criteria of this study included 1) permanent workers in the production division, 2) Actively working when the research was conducted, and 3) willing to be respondents in this study.

The exclusion criteria of this study included 1) workers who are not willing to be respondents in this study, 2) workers who are not present at the study location, and 3) workers who have resigned during the study.

The instrument for data collection

Depression, Anxiety, Stress Scale (DASS 21): The DASS 21 questionnaire measured workers' stress. It consisted of 21 questions and seven questions measuring each depression, anxiety, and stress.

NASA Task Load Index (NASA-TLX): The NASA-TLX method was used to measure and conduct a subjective mental workload assessment. It consisted of six dimensions included 1) mental demand; 2) physical demand; 3) temporal demand; 4) effort; 5) performance; 6) frustration level.

Noise in this study was measured using the sound level meter, and workspace temperature was measured using a room thermometer. Working period and duration were measured using a questionnaire with 1 question for each variable.

Data collection process

The data in this study were obtained by direct measurement using a questionnaire and

a sheet recording the measurement results. Data was collected in September 2021. The leading researcher and assistants carried out the data collection process. The leading researcher plays a role in measuring physical factors, while the assistant collects data using a questionnaire.

Data analysis

The data that has been obtained is analyzed using computer software. The data analysis method used was univariate, bivariate, and multivariate analysis. Univariate analysis was conducted to see the frequency distribution of each research variable with a 95% CI value. Bivariate analysis was performed using the Chi-Square test, with the critical limit of p-value being 0.05. Furthermore, the multivariate analysis uses multiple logistic regression tests with a risk factor model to determine the most dominant factor.

Ethical consideration

Research ethics includes informed consent, anonymity, confidentially, and ethical clearance. This ethical clearance was obtained from Universitas Esa Unggul, Jakarta No. 0282-21.282/DPKE-KEP/FINAL-EA/UEU/VIII/2021

RESULTS

Univariate analysis was conducted to see the frequency distribution of the variable of work stress, workload, working period, working duration, room temperature, and noise. Table 1 shows that the highest proportion of workers experiences stresses (72.7%).

Table 1. Prevalence of Work Stress among Workers

Work Stress	Number	Percentages
Stress	64	72.7%
Normal	24	27.3%

Table 2 shows that the highest proportion is workers with an increased workload (78.4%), workers with a minimum working period of 5 years (80.7), workers with a full eight working hours/day (53.4%), workers working in rooms with temperatures above 28^{o} C (65.9%), and workers working in noisy areas ≥85 dB (61.4%). The results of the subsequent bivariate analysis can be seen in Table 3.

Table 2. Frequency Distribution of Research

Variable	Category	N	%
Workload	High	69	78.4
	Medium	19	21.6
Working Period	≥5 Years	71	80.7
	<5 Years	17	19.3
Working Duration	>8 Hours/day	41	46.6
	≤8 Hours/day	47	53.4
Room Temperature	>28^{o} C	58	65.9
	18 – 28^{o} C	30	34.1
Noise	≥85 dB	54	61.4
	<85 dB	34	38.6

Bivariate analysis was conducted to see the relationship between the variables workload, working period, working duration, room temperature, noise, and work stress of workers in the production area. The results of the bivariate analysis in Table 3 shows that four variables significantly affect work stress, including workload (P-value=0.012), working period (P-value=0.002), room temperature (P-value=0.029), and noise (P-value=0.002). Meanwhile, the variable duration of work was not proven to affect work stress (P-value=0.879).

Furthermore, multivariate analysis was carried out by selecting the candidate model, namely the variable with a p-value of <0.25. Based on the five variables studied, only four variables that can be continued in the multivariate analysis are workload, working period, room temperature, and noise.

Furthermore, the four variables were tested by considering the p-value ≤ 0.05. The results showed that all four had a p-wald value ≤ 0.05, meaning that all variables included in the multivariate model influenced work stress in workers in the production area. The multivariate analysis found that the variable that had the most dominant influence on the incidence of work stress was years of service, as seen in Table 4

Table 3. Risk Factors of Work Stress among Workers

Variable	Category	Job Stress				P-Value	OR (CI 95%)
		Stress		Normal			
		N	%	n	%		
Workload	High	55	79.7	14	20.3	0.012	
	Medium	9	47.4	10	52.6		(1.032–2.743)
Working Period	≥5 Years	57	80.3	14	19.7	0.002	1.950 (1.092–3.481)
	<5 Years	7	41.2	10	58.8		
Working Duration	>8 Hours/day	29	70.7	12	29.3	0.879	0.950 (0.734–1.230)
	≤8 Hours/day	35	74.5	12	25.5		
Room Temperature	>28° C	47	81.0	11	19.0	0.029	1.430 (1.021–2.003)
	18 – 28° C	17	56.7	13	43.3		
Noise	≥85 dB	46	85.2	8	14.8	0.002	1.609 (1.150–2.251)
	<85 dB	18	52.9	16	47.1		

Table 4. Multivariate Modeling of Work Stress among Workers

Variable	B	P-wald	OR	95%CI
Workload	7.329	0.006	1.992	1.762 – 30.475
Working Period	2.535	0.001	12.610	2.844 – 55.920
Room Temperature	1.351	0.010	3.861	1.096 – 13.601
Noise	1.586	0.036	4.885	1.453 – 16.424

-2 Log Likelihood=69.912 G=33.216 P-value=0.000

DISCUSSION

The results showed that most workers who experienced stress (79.7%) had a high workload category. The bivariate analysis results showed an effect of workload on work stress. Workload Excessive occurs when workers feel less able to complete specific jobs because of the expertise factor or the load's incompatibility with the allotted time (13). An increased workload can increase the risk of workers experiencing work stress (14). This study's results align with several studies which show that the workload variable has a significant relationship with the incidence of work stress (1,15).

Another study in America states that increased workload disrupts workers' free time activities, causing physical and mental fatigue (5). Based on the study results, workload affects work stress in workers in the production area due to the demand to produce good products within a predetermined period. This situation gives rise to psychological and physical pressure workers feel, which impacts the emergence of stress symptoms in most workers.

Most of the workers (80.3%) with a working period of more than five years, based on the results of this study, experienced work stress. The bivariate analysis showed the effect of the active period on work stress. This result is in line with the results of previous studies, which showed a relationship between tenure and work stress (5).

However, if the employee has a good fit with the environment during the working period, it will give the employee immunity to strain (16). Based on the research results, tenure has the most dominant influence on the incidence of work stress due to homogeneous work factors. Workers carry out the same work routines, which impacts tension and boredom. In addition, this is also because there is no work rotation system for workers.

Furthermore, the temperature of the workspace is one of the potential physical hazards that exist in place. The results showed that 81% of workers who experienced stress

worked in rooms with temperatures above 28^{o} C. The results of other studies showed that the temperature of a hot workspace could impact the emergence of stress symptoms. Because it can cause workers not to be able to work correctly, correctly raise enthusiasm and pressure to keep getting the job done in a hot work environment (17). This study indicates an influence between workspace temperature and work stress in the production area because workers work around heat sources from production machines and work processes that utilize hot steam energy. Studies show that heat can cause psychological distress in individuals by rapidly changing heart, blood, and core body temperature. Psychological disorders occur in individuals due to changes in core temperature. Therefore, psychological injury occurs in the environment in the presence of unhealthy conditions and can affect the behavior of workers (18).

Noise is a factor in the work environment that can affect work stress. Based on the study results, 85.2% of workers who experience anxiety work in the production area with a noise intensity more significant than 85 dB. Noise in the work environment and impacting hearing loss can also cause stress characterized by changes in the alert response and human psychological imbalance. The results showed an effect of noise on pressure on workers in the production area. Previous research results also show a relationship between noise and work stress (17)(5).

The strength of this study is that it was carried out in the multivariate analysis stage to see which factors are most influential on the incidence of work stress in the production area. While the weakness of this study is that the noise measurement method carried out is the noise of the work environment, and the workload measurement is still using the questionnaire method.

Conclusion

a. Work management is advised to monitor physical environmental hazard factors, especially those impacting workers' complaints.
b. Work management is advised to redesign and measure the load on workers in the production area.
c. Management is advised to create a work stress management program and implement it regularly to minimize the impact of stress experienced by workers in the production department.
d. Management is advised to detect work stress early among employees.

Recommendation

Future research is recommended to conduct personal noise measurements to show the relationship between noise factors and work stress.

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