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The Relationship Between Work Shift, Work Load and Age on Work Stress in Employees at PT. X Batam City in 2024

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Abstract
Introduction: *Work stress is a common issue in the workplace and can be triggered by various factors such as irregular work shifts, employee age, and excessive workloads. Irregular shift changes may disrupt employees' rest periods, while age can influence stress levels, with older employees generally more prone to experiencing work-related stress. Long working hours and high workload demands also contribute significantly to the development of work stress.* ***Objective:*** *This study aims to examine the relationship between work shifts, age, and workload with work stress among employees at PT. X in Batam City.* ***Method:*** *A quantitative research method with a cross-sectional approach was employed. Data were collected using questionnaires and observation sheets. The chi-square test was used for statistical analysis.* ***Results and Discussion:*** *The findings revealed significant relationships between work shifts and work stress (P = 0.002), workload and work stress (P = 0.040), and age and work stress (P = 0.023). These results indicate that the examined variables contribute to the levels of stress experienced by employees.* ***Conclusion:*** *It is recommended that PT. X improve employee welfare by regulating rest periods, minimizing sudden shift changes, and reducing excessive workloads to create a safer, more comfortable, and productive work environment.*

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Introduction

Regulation of the Minister of Manpower of the Republic of Indonesia No. 5 of 2018 concerning Occupational Safety and Health in the Work Environment. This regulation represents the most recent governmental directive regarding Occupational Safety and Health (OSH). OSH, as stipulated in this Ministerial Regulation, encompasses all measures undertaken to ensure and safeguard the safety and health of workers through the implementation of initiatives aimed at preventing occupational illnesses and workplace accidents (Fauzi, Rhomadhoni, Wijaya, & Handayani, 2023). The regulation emphasizes the importance of monitoring and controlling the work environment, which includes physical, chemical, biological, ergonomic, and psychological factors (ISVANDIKA, 2024)

A 2021 health study conducted in Indonesia reported that more than 19 million individuals over the age of 15 were affected by emotional mental disorders, while over 12 million experienced depression (Pham et al., 2024). According to the International Labour Organization (ILO), approximately 2.78 million workers die each year due to work-related causes. Of these, around 2.4 million deaths (86.3%) are attributed to occupational diseases, while more than 380,000 deaths (13.7%) result from workplace accidents (Muslimin & Nursinah, 2023).

Shift work refers to a work schedule that deviates from the conventional working hours. It involves a system of job rotation wherein operational tasks are continuously carried out by rotating work teams to utilize the available time effectively (Cahayu, 2019). According to Article 68 of Law No. 13 of the Republic of Indonesia, the minimum legal age for employment is 18 years. The concept of employee age refers to the number of years a worker has spent in a particular occupation or profession. In various contexts, the factors influencing work performance can be classified into two categories: external and internal factors. External factors include environmental conditions, managerial practices, job design, performance evaluation, and compensation administration. Internal factors encompass competencies, skills, motivation, and professional experience. Employee age has also been found to significantly impact work performance, as demonstrated in the study conducted by E. Lasut et al. (2017).

Workload is a concept that emerged in academic discourse during the 1970s. Numerous scholars have proposed varying definitions, highlighting the multidimensional nature of workload and the difficulty in reaching a singular, universally accepted definition (Ratih, Muliatini, & Suhendi, n.d.). Generally, workload is conceptualized as a result of limitations in an individual's information processing capacity. When facing a task, individuals are expected to achieve a certain performance standard. Should the individual's limitations hinder the attainment of expected outcomes, a discrepancy arises between the required performance level and the individual's capacity, this gap often leads to performance failures. Hence, a comprehensive understanding and accurate measurement of workload are critical for effective human resource and occupational safety management (Hardiansyah, Suliawati, & Sibuea, 2022); (Mara, Kawatu, & Maramis, 2018)

Occupational Stress: A Multidimensional Challenge in the Modern Workforce. Occupational stress is a condition in which an individual experiences excessive physical, mental, or psychosocial pressure that persists over a relatively long period, typically in relation to one’s profession or job-related activities (Mattola, 2020); (Harahap, 2018). Currently, occupational stress is recognized as a global issue affecting workers across all professions in both developed and developing countries. In Indonesia, it is estimated that

approximately 40% of employee turnover cases are attributed to stress-related issues. This estimation aligns with findings indicating that 60% to 90% of doctor visits are linked to stress-related complaints (Pajow, Kawatu, & Rattu, 2020); (Hidayati, 2024). The primary sources of occupational stress include environmental, organizational, and individual factors. This study aims to identify the determinants associated with work-related stress among employees at PT. X (Handayani & Fachrin, 2022)

According to data from the World Health Organization (WHO) in 2014, approximately 8% of occupational diseases in several countries are related to depression. This is further supported by findings from various studies, such as the Labour Force Survey conducted in the United Kingdom in 2014, which reported an incidence rate of occupational stress of approximately 1,380 cases per 100,000 workers. Furthermore, the National Institute for Occupational Safety and Health (NIOSH) has confirmed that work-induced stress has become a prevalent concern in modern workplaces (Yulia Handayani et al., 2022).

In the healthcare sector, the proportion of work-related stress cases represents about 37% of all health-related occupational cases, while 45% of lost workdays are attributable to health issues among employees. Contributing factors to stress, depression, and anxiety include workload pressure, time constraints, excessive responsibility, and lack of motivation. A regional survey conducted in Riau Islands in January 2023 revealed that 60% of workers reported experiencing work-related complaints. Common symptoms included excessive thirst, frequent yawning, heaviness in the legs and head, and generalized fatigue. Demographically, 70% of the affected workers were young adults, 30% were middle-aged; 80% were new employees, while 20% had longer tenure. The study also found that 60% of workers exhibited high levels of occupational stress, while 40% experienced low levels of mental workload.

Several studies have examined the relationship between age, length of service, and mental workload among construction workers at PT. X in Batam City. The findings indicate that mental workload levels among these workers are categorized as follows: 16.4% with low mental workload, 72.7% with moderate, and 10.9% with high mental workload. Tenure also plays a significant role in occupational stress: 60.0% of the workers had 1–5 years of experience, 21.8% had more than five years, and 18.2% had less than one year of experience. Other studies have demonstrated that increased physical activity among workers can offer health benefits, including reduced stress levels. Despite its prevalence, occupational stress often remains overlooked; yet employee health is a critical determinant of long-term organizational effectiveness.

A field survey conducted on March 13, 2024, involving interviews with seven employees, found that two workers experienced sleep disturbances due to excessive working hours—specifically, working more than seven consecutive days without rest. Three workers reported experiencing occupational stress caused by fluctuating weather conditions, which disrupted their concentration during tasks. Additionally, two workers reported loss of regular working hours due to health-related issues. The aim of this study is to investigate the relationship between shift work, workload, and age with occupational stress among employees at Shop A of PT. X in Batam City in 2024.

Method

This study employed a quantitative research design. Primary data were collected through surveys and structured questionnaires, while secondary data were obtained from pre-existing sources, including official documents, websites, books, and other relevant

literature. The research was conducted from February to June 2024 at PT. X, located at Jalan Pattimura, RT 01/RW 04, Kamp Panau, Kabil, Nongsa District, Batam City, Riau Islands, Indonesia.

The target population of this study consisted of employees working under various work schedules at Shop A of PT. X. Specifically, the population comprised 38 workers employed in Workshop A. As the total number of employees in this unit was relatively small, the study utilized a total sampling technique, wherein all 38 employees were included as research subjects. This sampling approach was chosen to ensure comprehensive data collection from the entire available population.

Survey and Questionnaire

An initial survey was conducted to directly observe workers' knowledge and behaviors related to shift patterns and age demographics within PT. X. Additionally, a structured questionnaire was designed and distributed to the employees to gather first-hand information regarding occupational stress, shift work, and worker age.

Data Analysis

Univariate analysis was used to describe variables such as shift type and employee age. To examine potential associations between age, length of employment, and shift work with occupational stress, bivariate analysis was conducted using the Chi-Square test. This statistical method was selected to determine the significance of relationships between the independent variables (age, tenure, and shift work) and the dependent variable (occupational stress).

Results and Discussion

1. Result

Univariate analysis

To determine the frequency of attitudes, sanitation and the application of *housekeeping* based on the variables studied, bivariate analysis was used to explain or categorize each variable.

Distribution of work shifts

Table 1
Distribution of work shifts to work stress

Category	Frequency	Percentage
No Effect	12	31.6%
Has an Effect	26	68.4%
Total	**38**	**100**

Based on table 1 above, it can be seen that there are 12 (31.6%) respondents in the unaffected category while 26 (68.4%) respondents in the influential category

Age distribution

Table 2
Age Distribution to work stress

Category	Frequency	Percentage
18-40 Years	20	52.6%
41-60 Years	18	47.4%
Total	**38**	**100**

Based on table 2, there were 20 (52.6%) respondents in the age category of 18-40 years and in the age category of 41-60 there were 18 (47.4%) respondents.

Workload distribution

Table 3
Distribution of workload to workload

Category	Frequency	Percentage
NO	13	34.2%
YES	25	65.8%
Total	**38**	**100**

Based on the table above, in the "no" category, there are 13 (34.2%) respondents and in the "yes" category, there are 25 (65.8%) respondents.

Distribution of Work Stress

Table 4
Distribution of workload to work stress

Category	Frequency	Percentage
NO	19	50%
YES	19	50%
Total	**38**	**100**

Based on the table, it can be seen that in the "no" category there are 19 (50%) respondents while in the "yes" category there are 19 (50%) respondents.

Bivariate Analysis
The Relationship between Work Shift and Work Stress

Table 4
The Relationship between Work Shift and Work Stress

Work shifts	Work stress				Total		*P-Value*
	NO		YES				
	n	%	n	%	n	%	
No Effect	11	28.9	1	2.6	12	100	0.002
Has an Effect	8	21.1	18	47.4	26	100	
Total	19	50	19	50	38	100	

Based on the table, it can be seen that 12 (31.6%) respondents in the work shift category have no effect, there are 11 (28.9%) respondents who say they do not experience work stress and 1 (2.6%) respondents experience work stress, then it can be seen that from 26 (68.4%) respondents in the work shift category there are 8 (21.1%) respondents who do not experience work stress and 18 (47.4%) respondents experience work stress

The relationship between workload and work stress

Table 5
Relationship between workload and work stress

Workload	Work stress				Total		*P-Value*
	NO		YES				
	n	%	n	%	N	%	
NO	10	26.3	3	7.9	13	100	0.040
YES	9	23.7	16	42.1	25	100	
Total	**19**	**50**	**19**	**50**	**38**	**100**	

Based on the table, it can be seen that of the 13 (34.2%) respondents in the category of not experiencing workload, there are 10 (26.3%) respondents who do not experience work stress and 3 (7.9%) respondents experience work stress, then it can be seen that from 25 (65.8%) respondents in the category without workload, there are 9 (23.7%) respondents who do not experience work stress and 16 (42.1%) respondents experience work stress.

The relationship between age and work stress

Table 6
Relationship between age and work stress

Age	Work stress				Total		*P-Value*
	NO		YES				
	n	%	n	%	N	%	
18-40	14	36.8	6	15.8	20	100	
41-60	5	13.2	13	34.2	18	100	0.023
Total	**19**	**50**	**19**	**50**	**38**	**100**	

Based on table 7 above, it can be seen that out of 20 (52.6%) respondents in the age category of 18-40 there are 14 (36.8%) respondents who do not experience work stress and there are 6 (15.8%) respondents who experience work stress, then in the age category of 41-60 there are 5 (13.2%) respondents who do not experience work stress and there are 13 (34.2%) respondents who experience work stress

2. Discussion

Univariate Analysis

Work Shifts

Based on the univariate analysis of the work shift variable at Shop A, PT. X, Batam City in 2024, out of 38 respondents, 12 individuals (31.6%) perceived that work shifts had no significant impact, while 26 respondents (68.4%) indicated that work shifts had an influence on their work conditions.

Work shifts are defined as employment arrangements in which individuals work outside of conventional working hours over a specified period. Employees may be required to work during the morning, afternoon, or night, including unconventional hours such as weekends. A work shift refers to a structured allocation of time provided by an organization to complete assigned tasks, typically divided into morning, evening, and night shifts (Sobirin & Musi, 2022).

The findings of this study align with those of Maharani Sanari Br. Pinem (2019), who conducted a study titled The Effect of Shift Work on Occupational Stress among Production Unit Employees at PT. Central Proteina Prima Tbk Medan. The results

demonstrated a significant relationship between shift work and work-related fatigue among employees, with a p-value of <0.05 (0.000). The study further observed that employees in the production unit of PT. Central Proteina Prima Tbk were subject to demanding conditions, requiring them to process shrimp, aquaculture products, and probiotic feed for both domestic and international markets. Such conditions were found to contribute to fatigue and potentially lead to a decline in employee performance (Ananda & Mustopa, 2023).

Based on the researcher's assumptions, the shift system implemented at PT. X in Batam City follows a rotational pattern, in which employees transition between different shifts after a predetermined period. This means employees rotate from morning to evening and subsequently to night shifts, resulting in continuous changes in their working hours.

Age

Based on Table 4.2, 20 respondents (52.6%) fell within the age category of 18–40 years, while 18 respondents (47.4%) were within the 41–60 years age group. Age is a significant factor influencing occupational fatigue. It is closely associated with work performance, as increasing age is typically accompanied by degenerative processes in various organ systems, which in turn reduce physiological capabilities. This decline in organ function may increase susceptibility to fatigue among older workers (Betari, 2014).

According to the researcher’s assumption, the relationship between age and occupational fatigue among employees at PT. X in Batam City is attributable to physiological changes that occur with age, which affect physical endurance and work capacity. Therefore, recruiting employees in late adolescence may be an effective strategy to reduce fatigue levels in the workforce.

Workload

Furthermore, as shown in the table, 13 respondents (34.2%) indicated "no" to experiencing work-related fatigue, while 25 respondents (65.8%) indicated "yes." Workload is recognized as an internal factor contributing to unsafe work behavior, also known as unsafe actions. It plays a vital role in influencing an employee’s productivity. Excessive workload may result from external pressures such as authoritative supervision or the imposition of responsibilities beyond one’s capacity (Tarwaka, 2014).

A study by Taufik Hidayat (2020) reported that 20 respondents (30.8%) experienced a light workload, whereas 10 respondents (15.4%) reported a heavy workload. Similarly, research by Ni Wayan Dimkatni (2020) found that the majority of workloads were in the moderate category (54.9%), followed by light workload (44%) and heavy workload (1.1%).

Field interviews conducted by the researcher revealed that most employees worked from morning until evening under heavy workload conditions, which may contribute significantly to occupational fatigue. The study also observed that average heart rate increased during work activities. A rise in heart rate suggests elevated physical demands, warranting rest periods after four hours of continuous work. If heart rate recovery is not achieved within a reasonable time frame, it is recommended that job redesign measures be implemented to mitigate physical strain (Tarwaka, 2010).

Work Stress

As shown in the data, 19 respondents (50%) reported "no" and 19 respondents (50%) reported "yes" when asked about experiencing work-related stress. According to Barus (2021), a decline in relationships with coworkers or family members is a common symptom of occupational stress. Physical manifestations of stress include excessive perspiration, while behavioral symptoms often involve increased consumption of stimulants such as cigarettes or coffee, typically resulting from monotonous work routines.

A study conducted by Martini (2014) at PT. Karebet Mas Indonesia involved 65 respondents. Among them, 48 individuals (73.8%) were classified as experiencing moderate levels of stress, while 17 individuals (26.2%) reported high levels of occupational stress. Contributing factors to employee stress included the isolated nature of the worksite—located deep within a forest and far from urban centers—and the repetitive nature of the tasks, which frequently led to boredom. Many employees were from out-of-town regions and lacked access to social support systems to discuss work- or family-related problems.

Furthermore, the working hours extended from 07:00 to 17:00, with additional overtime when tasks remained unfinished. This prolonged working schedule significantly reduced the available rest time for employees, thereby exacerbating levels of work-related fatigue and stress.

Bivariate Analysis

The Relationship Between Shift Work and Occupational Stress Among Employees of PT. X in Batam City

Based on the findings, 12 respondents (31.6%) were categorized as working under shift schedules perceived to have no effect. Among them, 11 respondents (28.9%) reported not experiencing work-related stress, while 1 respondent (2.6%) did. In contrast, among 26 respondents (68.4%) who indicated that shift work had an impact, 8 respondents (21.1%) did not experience stress, whereas 18 respondents (47.4%) reported experiencing work-related stress.

These results are consistent with the findings of Arnani (2019), who used the Independent T-Test analysis and found a significant relationship indicating that employees working night shifts experienced greater fatigue compared to those on morning or evening shifts. Similarly, Marsela et al. (2020), using the Mann-Whitney U Test, reported a p-value of 0.000, indicating a statistically significant difference in the average level of work fatigue among morning, evening, and night shifts. These results support the conclusion that there is a relationship between shift work and work fatigue (Marsela et al., 2020).

According to Tarwaka (2014), approximately 63% of workers suffer from occupational stress due to the influence of shift work, which can increase the risk of workplace accidents. The consequences of work fatigue associated with shift work include an inability to take daytime naps, reduced appetite, digestive issues, and gastric discomfort.

Based on the researcher's observations, most employees working the evening shift experienced moderate levels of occupational stress. Both male and female employees were affected by work fatigue, although males typically possess greater physical strength. However, the degree of fatigue differed, with female employees being more prone to fatigue—even when not exposed to heavy workloads. Female workers often perceived

their tasks as monotonous, contributing to fatigue, whereas male employees were more likely to engage socially, such as joking with colleagues, which helped to foster a more comfortable work environment and mitigate stress levels.

The Relationship Between Age and Occupational Stress Among Employees at PT. X, Batam City

Among the 20 respondents (52.6%) in the 18–40 age group, 14 respondents (36.8%) reported not experiencing occupational stress, while 6 respondents (15.8%) reported experiencing it. In the 41–60 age category, 5 respondents (13.2%) did not report stress, whereas 13 respondents (34.2%) did experience stress.

An individual's age is generally proportional to their physical work capacity, up to a certain point. The absence of a significant relationship between age and work-related fatigue can be attributed to the fact that peak muscular strength in both men and women occurs between the ages of 25 and 35. At the age of 50 to 60, muscular strength typically decreases by approximately 15–25%, but this decline is often offset by increased work experience and mental maturity (Tarwaka, 2016).

The results of this study are consistent with findings by Chesnal et al. (2014), who, using the Chi-Square test, reported a p-value of 0.807, indicating no significant relationship between age and work-related fatigue. Similarly, Mariana et al. (2018) found that not only older employees in late adulthood experience high levels of fatigue, but younger employees in late adolescence and early adulthood may also experience substantial fatigue.

Work fatigue may be attributed to the monotonous nature of certain job tasks. Repetitive work conditions can lead to boredom, causing employees to feel physically and mentally drained. However, older employees with substantial work experience may develop effective coping strategies that allow them to manage fatigue more efficiently, resulting in lower levels of occupational stress.

The Relationship Between Workload and Occupational Stress Among Employees at PT. X, Batam City

Among 13 respondents (34.2%) who reported having a low workload, 10 (26.3%) did not experience occupational stress, while 3 respondents (7.9%) did. Conversely, of the 25 respondents (65.8%) categorized as having a high workload, 9 respondents (23.7%) did not report stress, while 16 respondents (42.1%) experienced significant levels of occupational stress.

According to Meshkati, as cited in Astianto & Suprihhadi (2014), workload can be defined as the balance between an employee’s capabilities and the demands imposed by their job. Given that human labor involves both mental and physical components, each dimension has distinct thresholds of tolerable workload.

Based on the researcher’s field observations and interviews, most employees were found to work long hours—from morning until evening—under heavy workloads, which likely contributed to elevated levels of occupational stress among workers.

Conclusion

The findings of this study indicate that out of 38 respondents, 12 individuals (31.6%) perceived that shift work had no influence on their occupational stress, while 26 respondents (68.4%) believed that it did have an impact. Regarding age distribution, 20 respondents (52.6%) were in the 18–40 age group, while 18 respondents (47.4%)

belonged to the 41–60 age category. For the workload variable, responses were evenly split, with 19 respondents (50%) indicating that workload did not contribute to stress, and the other 19 respondents (50%) reporting that it did. Statistical analysis revealed a significant relationship between shift work and occupational stress among employees at PT. X in Batam City. Similarly, a significant correlation was found between workload and occupational stress. Furthermore, age was also identified as a significant factor associated with stress levels among the employees.

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