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THE RELATIONSHIP OF WORK DURATION TO MENSTRUAL DISORDERS

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ABSTRACT

Introduction: *The group of hand-rolled cigarette factory workers is a work group that is at risk of experiencing menstrual disorders. Excessive working time can cause employees to feel tired. Irregular menstrual cycles are a hormonal imbalance in the reproductive system between the hormones estrogen and progesterone.*
Objectives: *The aim of this research is to investigate the connection between working duration and the menstrual cycle*
Methods: *This study was based on a quantitative approach and used a cross-sectional design. Data were gathered through questionnaires from two groups: one group consisting of 37 cigarette factory workers and another group of 38 non-cigarette factory workers. The data were collected using a purposive sampling technique. In this study, work duration was the independent variable, and menstrual disorders were the dependent variable. A Chi-Square statistical test was performed to examine the relationship between these variables, with a significance level of <a 0.05.*
Results: *The outcomes of the statistical analysis indicated that in the factory worker group, the p-value was 0.000 < a (0.05). The majority of respondents who did not experience menstrual disorders had a long duration of work, with a proportion of 96%, which was higher than those with a medium duration of work. Meanwhile, in the non-factory worker group, the p-value was 0.718 > a (0.05). Most respondents who did not experience menstrual disorders had a light work duration, with a proportion of 86%, which was higher than those who experienced menstrual disorders due to moderate work duration.*
Conclusions: *A significant association exists between work duration and menstrual disorders.*

Introduction

In today's modern era, women already have a role in the world of work. there are more and more opportunities for women to work in various industrial sectors to improve the quality of life for themselves and their families. According to the Central Bureau of Statistics (BPS), in 2022 there were 52.74 million female workers in Indonesia, where as many as 97% of workers in the tobacco products industry were women, spread from plantations to cigarette factories (Khoirul, 2023). The number of working age women in East Java in 2021 was 16.27 million people. This condition increased by 0.74 percent compared to 2020 which was 16.15 million people.

Long working hours can also cause physical fatigue. Working hours are the length of time a person works in 24 hours. Factory workers are at risk of health problems due to working environment conditions. A study revealed that 20 out of 36 workers had impaired lung function. This condition can be caused by high levels of dust in the work environment and is influenced by other factors such as smoking habits, medical history, and compliance in the use of personal protective equipment such as masks (Diyah, 2017).

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Irregular menstrual cycles can affect infertility both directly and indirectly, as they include gynecological diseases that affect fertility. The relationship between work duration and menstrual disorders has been a concern in various studies. Prolonged work duration, especially if accompanied by a heavy workload, can affect the hormonal balance in the body. Research conducted in a factory in China showed that 10-15% of 363 workers experienced menstrual disorders, with 21.4% having irregular cycles, 15.5% having hypermenorrhea, and 18.9% suffering from dysmenorrhea (Sznajder et al., 2018). Female workers can pay more attention to their physical condition in order to be able to cope with work with a heavy duration, such as stretching between work activities and paying attention to rest time while working.

Menstruation is a process of periodic and cyclic bleeding from the uterus that occurs due to the release or desquamation of the endometrium. This process is caused by a decrease in the hormones estrogen and progesterone, especially progesterone, which usually occurs at the end of the ovarian cycle, about 14 days after ovulation (Novita, 2018).

Menstrual disorders are conditions characterized by changes or abnormalities in the menstrual cycle, duration, or volume of bleeding. Menstrual cycle disorders based on the length of menstruation consist of polymenorrhea, oligomenorrhea, and amenorrhea (Murti, 2016).

The menstrual cycle is a key indicator of women's reproductive health. Irregular cycles can affect fertility directly or indirectly. Risk factors in the workplace, such as chemical exposure, long working hours, and exposure to extreme temperatures, can cause menstrual disorders, including dysmenorrhea, oligomenorrhea, and amenorrhea (Murti, 2016). Companies can consider workers' rest time to minimize work fatigue so as to increase company productivity.

PT X is one of the cigarette industries operating in Indonesia. The company has two production directorates, namely the Directorate of Hand-Rolled Clove Cigarettes (SKT) and Machine-Rolled Clove Cigarettes (SKM), which are distinguished by their manufacturing methods. SKM is produced using machines, while SKT is made manually with the skill of workers' hands.

The relationship between work duration and menstrual disorders has been a concern in various studies. Prolonged work duration, especially if accompanied by a heavy workload, can affect the hormonal balance in the body. This hormonal imbalance is often associated with menstrual cycle disorders, such as irregular periods, menstrual pain (dysmenorrhea), or even amenorrhea. Research conducted in a factory in China showed that 10-15% of 363 workers experienced menstrual disorders, with 21.4% experiencing irregular cycles, 15.5% experiencing hypermenorrhea, and 18.9% suffering from dysmenorrhea (Sznajder et al., 2018).

The outcomes of this study are intended to offer insights to female employees about cigarette factories about the impact of work duration on menstrual disorders, add insight and ability to apply knowledge, and provide information to workers and the public about the relationship between work duration and menstrual disorders.

Methods

This study used a cross sectional research design. the study population was 100 female cigarette factory workers and 100 non-female cigarette factory workers. The sample used in each group was 33 respondents who met the inclusion and exclusion criteria. Inclusion criteria consisted of female hand-rolled cigarette factory workers, not female hand-rolled cigarette factory workers and women of childbearing age. Meanwhile, the exclusion criteria for this study were not willing to become respondents and use birth control. The sample size was calculated using the finite lemeshow formula. The independent variable was defined as work duration, while the dependent variable was defined as menstrual disorders. The sampling technique used purposive sampling. This research was conducted at PT X cigarette factory in August-October

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2024. Data collection was carried out using validated and reliable questionnaires addressing both work duration and menstrual disorders. Data analysis involved using univariate methods to summarize each variable and bivariate analysis using the chi-square test to assess the association between the variables.

Results

Tabel 1 Frequency distribution of two groups by age, occupation and working mass

Characteristic Respondent	Cigarette Factory Workers		Not A Cigarette Factory Workers	
	F	%	F	%
1. Age				
< 20 Years	0	0	8	21
20-35 Years	37	100	31	79
> 35 Years	0	0	0	0
2. Work				
Cigarette Factory Workers	37	100	0	0
Apprentice	0	0	39	100
3. Working Mass				
≤5 Years	26	70	0	0
>5 Years	11	30	0	0
Doesn't Work	0	0	39	100
Total	37	100	39	100

Tabel 1 shows that all respondents in the cigarette factory worker group were aged 20-35 years, totaling 37 individuals (100%). In contrast, in the non-cigarette factory worker group, the majority of respondents were also aged 20-35 years, totaling 31 individuals (79%), while a smaller proportion, 8 respondents (21%), were under 20 years old. Regarding job characteristics, all respondents in the cigarette factory worker group were employed as cigarette factory workers, totaling 38 individuals (100%). Meanwhile, all respondents in the non-cigarette factory worker group were apprentices, totaling 39 individuals (100%). For work duration, most respondents in the cigarette factory worker group had been employed for ≤5 years, comprising 26 individuals (70%), while a smaller number, 11 individuals (30%), had a work duration of >5 years. In the non-cigarette worker group, none of the respondents had a recorded work duration.

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Respondent Characteriss	Cigarette Factory Workers		Not A Cigarette Factory Workers	
	F	%	F	%
1. Working Durastion				
Currently	0	0	37	95
Light	9	24	2	5
Long	28	76	0	0
2. Menstrual Disorders				
Disturbance	9	24	6	15
Normal	28	76	33	85
Total	37	100	39	100

Tabel 2 Frequency distribution of two groups based on work duration and menstrual disorders

Tabel 2, it can be seen that the characteristics of work duration are mostly experiencing long work duration as many as 28 people (76%) and a small portion experiencing moderate work duration as many as 9 people (24%) for the cigarette factory workers group. The group of non-smoking factory workers obtained the results of some experiencing light work duration as many as 37 people (95%) and a small portion experiencing moderate work duration as many as 2 people (5%). The characteristics of menstrual disorders for the cigarette factory workers group can be seen that most have a normal cycle as many as 28 people (76%) and a small proportion have menstrual cycle disorders as many as 9 people (24%). The group of non-cigarette factory workers can be seen that most have a normal cycle as many as 33 people (85%) and a small proportion have a menstrual cycle disorder as many as 6 people (15%).

Working Duration	Menstrual Disorders				Total	
	Yes		No		Amount (n)	Percentage (%)
	Amount (n)	Percentage (%)	Amount (n)	Percentage (%)		
Currently	8	89	1	11	9	100
Long	1	4	27	96	28	100
***Chi-Square P Value* = 0,000**						

Tabel 3 Relationship between Duration of Work and Menstrual Disorders for Female Workers of Hand-rolled Cigarette Factory

Tabel 3, it can be seen that most respondents who do not experience menstrual disorders get heavy work duration 96% greater than respondents who get light work duration, while respondents who experience menstrual disorders get light work duration 89% smaller than respondents with heavy work duration.

The chi-square test for the relationship between work duration and menstrual cycle disorders yielded a p-value of 0.000 (<0.05), signifying a significant association between the two variables.

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Working Duration	Menstrual disorders				Total	
	Yes		No		Amount(n)	Percentage (%)
	Amount (n)	Percentage (%)	Amoint (n)	Percentage (%)		
Currently	3	33	6	67	9	100
Light	12	40	18	60	30	100
***Chi-Square P Value* = 0,718**						

Tabel 4 Relationship of Duration of Work with Menstrual Disorders for Female Non-Workers of Hand-rolled Cigarette Factories

Tabel 4, it can be seen that most respondents who do not experience menstrual disorders experience a light work duration 60% greater than respondents who get moderate work duration, while a small proportion of respondents who experience menstrual disorders have a light work duration.

The chi-square test for the relationship between work duration and menstrual cycle disorders resulted in a p-value of 0.718 (>0.05), indicating that no significant correlation exists between these variables.

Discussion

Duration of Work in Two Groups

Work duration is the length of time a person works, which is generally 6-10 hours a day (Maulina & Syafitri, 2019). Indonesia has an average work duration of 8 hours, the rest is used in family life, society, rest and other purposes. Long work duration has an influence on a person, because when the duration of work every day is very long, the workload gets heavier and the physical will feel more tired and the stress level will also increase (Pebrinawanti & Masni, 2023).

The results showed that the majority of respondents from the cigarette factory workers group (76%) experienced long work duration. In contrast, most respondents from the non-cigarette factory worker group (95%) experienced light work duration. Work duration that exceeds the limits of individual abilities can cause health problems, the onset of disease, work accidents, and reduce the level of job satisfaction (Maulina & Syafitri, 2019).

Menstrual Disorders in Two Groups

The menstrual cycle is often a problem for women. The menstrual cycle that is not treated immediately has an impact on the reproductive system such as impaired fertility, infertility, can result in uterine polyps, uterine cancer, polycystic ovary syndrome, and ovarian cysts (Lestari & Amal, 2019). Based on the results of the study, the results were obtained between the two groups. Most of the respondents had a normal menstrual cycle as many as 28 people (76%). A small proportion of 5 people (14%) experienced amenorrhea, 4 people (10%) experienced poliamenore and amenorrhea with 37 respondents of cigarette factory workers. The results of

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this study are in line with research conducted by Sznajder et al (2018) about 10-15% as many as 367 factory workers complained of menstrual disorders with 21.4% experiencing irregular menstrual cycles, 15.5% experiencing hypermenorrhea and 18.9% experiencing dysmenorrhea. In the non-cigarette factory women workers group, most respondents experienced a normal cycle as many as 33 people (85%). A total of 4 people (10%) experienced amenorrhea, 2 people (5%) experienced polymenorrhea with a total of 39 respondents. Factors that can trigger the menstrual cycle include weight, kb, activity patterns and stress (Kusmiran, 2014).

Relationship between Duration of Work and Menstrual Disorders

The results showed showed a difference between female workers in hand-rolled cigarette factories and women who are not workers in cigarette factories. Based on statistical analysis with the chi-square test, a p value of 0.000 (<0.05) was obtained, indicating a relationship between work duration and menstrual disorders in hand-rolled cigarette factory workers. This finding is in line with research conducted by Someyah (2014), where of the 376 workers studied, most had normal menstrual cycles (21-35 days), while 16 workers experienced cycles of less than 21 days and 33 workers had cycles of more than 35 days.

The relationship between long work duration and menstrual disorders has been the focus of many studies. Heavy workloads and long working hours can affect hormonal balance in the body, contributing to menstrual cycle disorders such as irregular cycles, painful menstruation (dysmenorrhea), or even amenorrhea. Research in a factory in China showed that out of 363 workers, about 10-15% experienced menstrual disorders, with 21.4% having irregular cycles, 15.5% having hypermenorrhea, and 18.9% having dysmenorrhea (Sznajder et al., 2018).

Meanwhile, the results of the chi-square test in the group of women who were not factory workers showed a p value of 0.718 (>0.05), indicating that there was no relationship between work duration and menstrual disorders in this group. Menstrual cycle disorders in this group are more likely to be influenced by hormonal factors, nutritional status, body mass index (BMI), and stress levels (Gharravi, 2009).

The menstrual cycle is an important indicator of female reproductive health, where cycle irregularities can be a sign of menstrual disorders (Silalahi, 2021). The risk of menstrual disorders in female workers may increase due to the duration of continuous work and environmental factors in the workplace

In comparison, the chi-square test results for the non-factory worker group indicated a p-value of 0.718 (>0.05), meaning there was no association between work duration and menstrual disorders in this group. Menstrual cycle disorders in this group are more likely to be caused by hormonal factors, nutritional status, body mass index (BMI), and stress levels (Gharravi, 2009).

Conclusion

1. Most of the respondents had normal cycles, but a small number had amenorrhea and polymenorrhea.
2. Most respondents experienced heavy work duration.
3. A connection exists between the duration of work and disruptions in the menstrual cycle.

Ethics approval and consent to participate

The Health Research Ethics Committee of the Faculty of Medicine, Universitas Airlangga, granted approval for this study, under the reference number 126/EC/KEPK/FKUA/2024.

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