

# Work Fatigue and the Menstrual Cycle of Female Workers in the Formal Sector in Magelang

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**Abstract.** Work fatigue effect from heavy activity can cause hypothalamus dysfunction which can cause trouble on GnRH secretion. It can also make the menstrual cycle dysfunctional. The aim of this research is to know the correlation between work fatigue and menstrual cycle. Method that is used in this research is quantitative survey with cross sectional and questionnaires in instruments research. Samples are women workers of the formal sector in PT. Anugrah Abadi Magelang and PT. Djohartex Magelang, which includes in inclusion criteria's that are 103 peoples. Data processed with Spearman statistic test and resulted in  $p=0.001$  and  $r=0.384$ , and which is a correlation between work fatigue and menstrual cycle on women workers of the formal sector in Magelang 2020 with positivity valent and medium relativity.

**Keywords:** Work fatigue, Menstrual cycle, Female worker, Formal sector

## 1 Introduction

Formal workers with the female gender automatically carry a double predicate, namely as housewives and of course as full time workers. Meanwhile, residents with full employment status or those who work 35 hours or more a week have a higher risk of work fatigue than part-time workers. Work fatigue is a condition in which the body has decreased work performance and reduced energy to carry out an activity [9].

The length or period of work done, as well as excessive physical activity to achieve the target in work are the main factors in the occurrence of fatigue. Women who work as full-time workers will be at risk of experiencing reproductive health problems, one of which is menstrual cycle problems. It is stated that the influence of menstrual disorders in the form of abnormal cycles is caused by pathological conditions (one for example, Polycystic Ovarian Syndrome), unhealthy lifestyles (such as smoking, alcohol consumption), psychological conditions (such as depression and stress), and excessive physical activity (such as a long working period) [4].

Menstruation is a biological change marked by the process of desquamation of the uterine lining that occurs every month and is influenced by reproductive hormones [4]. Changes in bleeding patterns can have an impact on the quality of life of premenopausal and perimenopausal women, namely infertility problems. The irregularity of the menstrual cycle has an impact on the difficulty of getting pregnant for a woman and the difficulty in determining the fertile period. Irregular ovulation (abnormal) is responsible for 30% - 40% of all cases of infertility [23]. Apart from infertile problems with the continuous menstrual cycle can be associated with the risk of diseases such as ovarian cancer and breast cancer.

Workers are very much influenced by age, years of service and work attitudes. Ergonomically, a person's performance equals a balance between work tasks and body capabilities. With a work attitude that is not ergonomic, work fatigue will also increase. Workers who are the object of research are workers at PT. Anugerah and PT. Djohartex with the aim of studying the relationship between work fatigue and the menstrual cycle in Magelang Regency.

## 2 Methods

This type of research used a cross sectional study design and quantitative methods. The population in this study were female formal sector workers in Magelang regency with 103 respondents. All respondents measured the level of fatigue and menstrual cycles using the UWFI questionnaire to obtain data on work fatigue and menstrual cycle questionnaires. Data analysis was performed analytically using the Spearman rank test with a significance level of  $\alpha = 0.05$ .

## 3 Results and Discussion

Respondent characteristic of female workers in the formal sector in Magelang show in Table 1.

**Table 1.** Respondent characteristics of female workers in the formal sector in Magelang

No	Respondent Characteristics	N	Percentage %
1.	<b>Age</b>		
	17 – 24	75	74.3
	26 – 35	23	22.8
	36 – 45	3	3.0
2.	<b>IMT</b>		
	Normal (18,5 – 25)	69	68.3
	Underweight ( $\leq 18,4$ )	18	17.8
	Overweight ( $\geq 25,1$ )	14	13.9
3.	<b>Marital Status</b>		
	Single	78	77.2
	Married	21	20.8
	Widow	2	2.0
4.	<b>Family Planning Programs</b>		
	Not include	96	95.0
	IUD	5	5.0
5.	<b>Work Period</b>		
	>5 Years	53	52.5
	<5 Years	48	47.5
6.	<b>Work Attitude</b>		
	Sit	64	63.4
	Stand up	37	36.6

Table 1 it is known that of the 101 respondents, most of them were aged 17-24 years with the largest percentage (74.3%). Heavy work done in the age range (17-24), describes an increase in workload. Physical workload that exceeds the maximum oxygen intake will cause a decrease

in oxygen supply to the muscles so that anaerobic processes will occur in breaking down muscle glycogen into energy and lactic acid, resulting in work fatigue [13]. Also explained in the Journal of Developmental Medicine & Child Neurology, the effect of age and workload on work fatigue occurs because physiological functions can change due to age affect one's endurance and work capacity. The older a person is, the ability to do heavy work will decrease because they feel tired quickly which is caused by a decrease in their physiological function [7].

The distribution of female formal sector workers based on the highest BMI in this study is indicated by the normal body mass index (18.5-25), which is 68 people with a percentage of 68.3%. A woman of reproductive age with a body mass index or BMI of more than 25 can cause Polycystic Ovaries (PCO). If in normal women without PCO only one egg bag reaches the optimal size, then in women with PCO not a single egg sac has the optimal size. As a result, the eggs in it never mature and the hormonal disturbances that occur also cause the eggs not to break [20]. Women who are malnourished or underweight are generally the result of eating disorders, experience a delay in sexual maturity and put at risk of irregular menstrual cycles. In addition, the disrupted secretion of the LH hormone due to weight loss will also disrupt the cycle by causing a shortening of the luteal phase [22].

Another result shows that as many as 77.2% of female formal sector workers in Magelang District are single. Marital status is claimed to be married to be a factor in fatigue. A worker who is single will not get additional special responsibility in the form of taking care and caring for his family, where someone will be able to use time to rest longer, so as to minimize the occurrence of fatigue [2]. Married status is a burden in itself, because the responsibility is greater than someone who is not married. A married worker will tend to increase his level of fatigue. This is due to the additional physical and psychological workload at home while carrying out special obligations in terms of household affairs [13].

Other supporting data obtained also shows that most respondents do not run the family planning program (95.0%). Hormonal contraceptives contain the hormones progesterone and synthetic estrogen and only contain the hormone progesterone. A person who experiences menstrual cycle disorders due to the use of hormonal contraceptives occurs because of the influence of hormone buildup caused by the use of KB so that the function of hormones and the regulatory system for sending signals to the ovaries to produce eggs is disrupted, automatically the menstrual cycle will be disrupted [24].

Of the total respondents, most of the respondents have worked for >5 years, with a percentage of 52.5%. The condition of working long enough will affect the limit of excessive endurance due to the pressure that is generated in the work process. This is the cause of fatigue which leads to a decrease in psychological and physiological functions, both in the form of reduced muscle performance and low movement that accumulates every day over a long period [5]. The working period can affect workers with a negative effect, namely that the longer a worker works will cause fatigue and boredom, especially with monotonous and repetitive work activities that make employees feel tired and bored. The longer a person works, the greater the dangers arising from the work environment in the form of work stress where work stress can affect the menstrual cycle [15].

The majority of respondents work in a sitting position (63.4%), while the rest work with a standing work attitude (36.6%). Work attitude is a way for a person to carry out his work activities, both by standing, sitting, and how to lift weights. The mismatch between the body's position when working, especially the static position, will block the flow of blood and result in a lack of oxygen and glucose from the blood. This if it happens continuously will cause fatigue [17]. In general, women workers in the production section of textile companies are cutting, sewing, trimming, packing, temple, and computers. Sitting position while working is classified

as a work attitude that tends to be static and not ergonomic. A job that forces workers to be in a non-ergonomic work posture causes the workforce to experience fatigue more quickly and indirectly adds to the workload. Table 2 shows the distribution of work fatigue frequency of female workers.

**Table 2.** Distribution of work fatigue frequency of female workers

<b>Work Fatigue</b>	<b>N</b>	<b>Percentage (%)</b>
Light	25	24.8
Moderate	37	36.6
Weight	37	36.6
Very Heavy	2	2.0
<b>Total</b>	<b>101</b>	<b>100.0</b>

Total respondents show in Table 2, most of the respondents experienced heavy and moderate work fatigue, with the percentage of both of them amounting to 36.6%. Work fatigue is defined as a change from a strong state to a weaker state [19]. The factors that trigger fatigue among female formal sector workers in the Magelang area are long working periods of > 5 years. The working period is closely related to the adaptation process and work performance, with the negative impact that is the limit of excessive body resistance due to pressure exerted during the work process [5].

The tenure is likely to lead to a feeling of boredom with the same routine over the years. A monotonous atmosphere will accumulate into boredom and affect the level of fatigue [1]. The incidence of work fatigue that arises is also triggered by the work attitude of the workers who mostly work in a sitting position (63.4%). Work attitude of workers who are static, such as slouching too long, is very risky to cause health problems due to lack of stretching and relaxation, such as blockage of blood flow and result in a lack of oxygen and glucose from the blood. This if it occurs continuously will cause fatigue [17]. Distribution of the frequency of the menstrual cycle in female workers is shown in Table 3.

**Table 3.** Distribution of the frequency of the menstrual cycle in female workers

<b>No</b>	<b>Menstrual Cycle</b>	<b>N</b>	<b>Percentage (%)</b>
1.	Normal	33	32.7
2.	Un-Normal		
	Polimenorea	53	52.5
	Oligomenorea	12	11.9
	Secondary Amenorea	3	3.0
	<b>Total</b>	<b>101</b>	<b>100.0</b>

Table 3 above of 101 respondents, most of the respondents experienced an abnormal menstrual cycle with a percentage of 67.3% with polimenorea cases being the most cases (52.5%) and secondary amenorrhoea being the lowest cases (3.0%). The main factor that triggers this problem in factory employees in the Magelang area is the excessive activity caused by their work activities. The higher the intensity and frequency of physical activity that is done, the more likely it is that menstrual disorders will occur [25]. It was also explained that physical activity can stimulate Gonadotropin Releasing Hormone (GnRH) inhibition, thereby reducing serum estrogen levels which can cause menstrual cycle disorders [26].

In addition to the factor of excessive physical activity, the incidence of menstrual cycle irregularities in this study was also influenced by abnormal body mass index. This is supported by the primary data obtained, that there are several people who have a BMI overweight (> 25.1). A woman who has an overweight body mass index will increase the risk of disturbances in her menstrual cycle due to a decrease in self-image in a person so that it will reduce her self-esteem. This negative self-image triggers stress, which causes disruption of a person's limbic system, which automatically disrupts a woman's reproductive hormonal system. Relationship between fatigue and the menstrual cycle shown in Table 4.

**Table 4.** The Relationship between work fatigue and the menstrual cycle

Work Fatigue	Menstrual Cycle		Total		R Square	p value
	Normal	Up Normal	N	%		
Light	17	8	25	24,75	0,384	0,001
Moderate	9	28	37	36,63		
Weight	7	30	37	36,63		
Very Heavy	0	2	2	1,98		
Total	<b>33</b>	<b>68</b>	<b>101</b>	<b>100,00</b>		

Table 4. results of bivariate analysis show that there is a relationship between work fatigue and the menstrual cycle in female formal sector workers in Magelang Regency in 2020 ( $p = 0.001$ ;  $r = 0.384$ ). The significance value is  $0.001 < 0.05$ . Work fatigue caused by physical activity is closely related to the menstrual cycle [19]. The results of this study are in line with research which states that the results of the Spearman test analysis at a significant level of 95% with ( $\alpha = 0.05$ ), obtained  $p$  value =  $0.001$  or  $p$  value  $< 0.05$  [26]. Physical activity carried out with heavy loads or excessively every day can have a negative impact on women's health. Strenuous physical activity stimulates Gonadotropin Releasing Hormone (GnRH) inhibition which can reduce serum estrogen levels so that it can disrupt the menstrual cycle. This study shows that there is a relationship between work fatigue and the menstrual cycle in female formal sector workers in Magelang Regency. This conclusion is in line with other studies based on the results of the calculation of the Chi Square test with the Yate correlation approach, namely  $p = 0.008 (< 0.05)$ , or significant in the physical activity variable with the menstrual cycle of women of reproductive age couples [14].

## 4 Conclusion

There is a relationship between work fatigue and the menstrual cycle among female formal sector workers in Magelang Regency in 2020 which is positive with a unidirectional relationship and a moderate level of relationship. Furthermore, this research suggests that female workers in the formal sector are expected to pay more attention to their physical condition by managing their work fatigue, such as stretching between jobs and paying attention to breaks or pauses when they feel indications of work fatigue. Then, the company is expected to be able to consider worker rest periods to minimize the occurrence of work fatigue so as to increase company productivity. Further research is needed related to similar research by taking into account other influencing factors of the menstrual cycle such as psychological factors, nutrition, age of

menarache, and physical environment such as exposure to cigarette smoke which is a weakness in this study.

## References

- [1] Afriansyah, N. N. (2018). Beban Kerja Mental Dan Keluhan Kelelahan Kerja Pada Bidan Di Puskesmas Jetis Yogyakarta. *The Indonesian Journal of Occupational Safety and Health*, 6(2), 166. <https://doi.org/10.20473/ijosh.v6i2.2017.166-176>
- [2] Agustin, N. (2018). Hubungan Faktor Individu Dengan Kelelahan Kerja Pada Karyawan Di PT. Adhi Persada Gedung Bekasi Tahun 2018. *Jurnal Persada Husada Indonesia*, 5(19), 18–30.
- [3] Andriana, N. (2018). Factors Influencing Menstrual Cycle at Female Students of University of Pasir Pengaraian. *Jurnal Maternity and Neonatal*, 2(5), 271–279.
- [4] Anindita, P., & Darwin, E. (2016). Artikel Penelitian Hubungan Aktivitas Fisik Harian dengan Gangguan Menstruasi pada Mahasiswa Fakultas Kedokteran Universitas Andalas. *Jurnal Kesehatan Andalas*, 5(3), 522–527.
- [5] Atiqoh, J., Wahyuni, I., & Lestantyo, D. (2014). Faktor-Faktor yang Berhubungan dengan Kelelahan Kerja pada Pekerja Konveksi Bagian Penjahitan di CV. Aneka Garment Gunungpati Semarang. *Jurnal Kesehatan Masyarakat Universitas Diponegoro*, 2(2), 119–126.
- [6] Badan Pusat Statistik. (2018). Keadaan Ketenagakerjaan Indonesia Februari 2018. Badan Pusat Statistik, (42/05/Th. XXI), 1–16. <https://doi.org/No.74/11/35/Th.XVI>, 5 November 2018
- [7] Brunton, L. K., Timmons, B. W., Bentley, T., & Gorter, J. A. N. W. (2017). Fatigue and its relationship with physical activity , age , and body composition in adults with cerebral palsy. *Developmental Medicine & Child Neurology*, 367–373. <https://doi.org/10.1111/dmcn.13306>
- [8] Budiman, A. (2016). Hubungan Antara Umur Dan Indeks Beban Kerja Dengan Kelelahan Pada Pekerja Di Pt. Karias Tabing Kencana. *Jurnal Berkala Kesehatan*, 1(2), 121–129.
- [9] Cahyani, W. D. (2016). Hubungan Antara Beban Kerja dengan Kelelahan kerja pada Pekerja Buruh Angkut.
- [10] Gaghiwu, L., Josephus, J., Rompas, R. M. (2018). Analisis beberapa faktor penyebab kelelahan kerja pada tenaga kerja bongkar muat di pelabuhan samudera bitung. *Jurnal Kesehatan Masyarakat*, 3(4), 59–70.
- [11] Karundeng, M. (2019). Hubungan penggunaan kontrasepsi pil kb kombinasi dengan perubahan siklus menstruasi di puskesmas sonder kecamatan sonder kabupaten minahasa. *E-Journal Keperawatan*, 7(1).
- [12] Kurniawan, A. F., Trisetiyono, Y., & Pramono, D. (2016). Pengaruh Olahraga Terhadap Keteraturan Siklus Menstruasi Pada Mahasiswi Fakultas Ilmu Keolahragaan Universitas Negeri Semarang Tahun 2016. *Jurnal Kedokteran Diponegoro*, 5(4), 298–306.
- [13] Maharja, R. (2015). Analisis Tingkat Kelelahan Kerja Berdasarkan Beban Kerja Fisik Perawat Di Instalasi Rawat Inap Rsu Haji Surabaya. *The Indonesian Journal of Occupational Safety and Health*, 4(1), 93–102.
- [14] Mahitala, A. (2015). Hubungan Aktivitas Fisik Dengan Gangguan Menstruasi Wanita Pasangan Usia Subur Di Desa Temanggung Kecamatan Kaliangkrik Kabupaten Magelang Tahun 2015. *Jurnal Kesehatan Masyarakat (e-Journal)*, 3(3), 74–80.
- [15] Mamnu'ah, I. (2018). Hubungan Masa Kerja, Tingkat Kecemasan, Penggunaan Masker Dan Paparan Bahan Rokok Terhadap Gangguan Siklus Menstruasi Karyawan Wanita Pabrik Rokok Di Lamongan. *Jurnal Kesehatan Masyarakat*, 6(1), 129–138.
- [16] Mato, R. (2014). Determinan Perubahan Siklus Menstruasi Pada Pengguna Alat Kontrasepsi Suntik Di Wilayah Kerja Puskesmas Taraweang Kabupaten Pangkep. *Jurnal Ilmiah Kesehatan Diagnosis*, 5(1), 4–9.
- [17] Nugroho, G. (2015). Correlation Working Attitude With Working Fatigue In Laundry Workers At North Purwokerto District Banyumas Regency. *Kesmasindo Journal*, 7(3), 209– 217.

- [18] Nurhayuning, R., & Paskarini, I. (2015). Hubungan Posisi Kerja Dengan Keluhan Muskuloskeletal Pada Unit Pengelasan Pt . X Bekasi. *The Indonesian Journal of Occupational Safety and Health*, 4(1).
- [19] Permatasari, A. (2017). Faktor Yang Berhubungan Dengan Kelelahan Kerja Pada Karyawan Di Matahari Department Store Cabang Lippo Plaza Kendari Tahun 2016. *Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat*, 2(5), 1– 11.
- [20] Sen, L. C. (2018). Study on relationship between obesity and menstrual disorders. *Asian Journal of Medical and Biological Research*, 4(3), 259– 266. <https://doi.org/10.3329/ajmbr.v4i3.38464>
- [21] Setiawan, A. (2020). Factors Associated with Fatigue in Workers of the Nipah Building Construction Project Makassar. *Indian Journal of Public Health Research & Development*, 11(01).
- [22] Sunarsih. (2017). Hubungan Status Gizi Dan Aktivitas Fisik Terhadap Keteraturan Siklus Menstruasi Mahasiswa Program Studi Kebidanan Universitas Malahayati Tahun 2017. *Jurnal Kebidanan*, 3(4), 190–195.
- [23] Tombokan, K. C., Pangemanan, D. H. C., & Engka, J. N. A. (2017). Hubungan antara stres dan pola siklus menstruasi pada mahasiswa Kepaniteraan Klinik Madya (co-assistant) di RSUP Prof. Dr. R. D. Kandou Manado. *Jurnal E-Biomedik*, 5(1). <https://doi.org/10.35790/ebm.5.1.2017.15978>
- [24] Wardani, P. K., Ifayanti, H., Nurrofiqoh, S. D., Kebidanan, P. D., Kesehatan, F., & Pringsewu, U. A. (2019). Hubungan Lama Pemakaian Alat Kontrasepsi Hormonal Badan Pada Wanita Usia Subur Di Pmb Wiwit Setiyorini Desa Varia Agung Lampung Tengah Tahun 2019. *Jurnal Maternitas Aisyah*, 15–24.
- [25] Wati, N. K. (2019). Hubungan Aktivitas Fisik Harian Dengan Gangguan Siklus Menstruasi Pada Remaja Putri Di Smpn 2 Ponorogo. *Prosiding 1st Seminar Nasional Dan Call for Paper*.
- [26] Wulan, E. P. (2019). Analyze Stress Factors And Physical Activities On The Menstrual Cycle Of Female Student In Sma Negeri 1 Palembang And Sma Taruna Indonesia. *Seminar Nasional Keperawatan “Penguatan Keluarga Sebagai Support System Terhadap Tumbuh Kembang Anak Dengan Kasus Paliatif.”*