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THE RELATIONSHIP BETWEEN STRESS LEVELS AND SLEEP QUALITY WITH THE MENSTRUAL CYCLE ON NURSING STUDENTS

Dianna Ika Ernawati*, Heny Ekawati, Wahyu Retno Gumelar, Alvi Ramadani

Faculty of Health Sciences, Universitas Muhammadiyah Lamongan, Indonesia

Original Research

A B S T R A C T

Introduction: *Every month's regular menstrual cycle should ideally span 21-35 days. The menstrual cycle is influenced by several factors, namely stress levels and sleep quality. Menstrual cycle disorders indicate metabolic and endocrine system irregularities. The impact that often occurs due to menstrual cycle disorders is infertility and difficulty identifying the fertile period. The purpose of the study was to determine the relationship between stress levels and sleep quality with the menstrual cycle in seventh-semester nursing students at Universitas Muhammadiyah Lamongan.* ***Methods****: This research design uses correlation analytics with a cross-sectional approach using a simple random sampling technique with a sample of 111 respondents. Measured using the Depression Anxiety Stress Scale questionnaire sheet for stress levels and the Pittsburgh Sleep Quality Index questionnaire for sleep quality. After tabulating the data and analyzing it using the Spearmen Rank test.* ***Results****: This study showed that almost half the 43 female students (38.7%) experienced mild stress and more than half of the 60 female students (54.1%) had poor sleep quality.* ***Conclusions****: Based on the results of the analysis using the Spearmen rank test, the value of p = 0.000, where p <0.05 means that there is a relationship between stress levels and sleep quality with the menstrual cycle in nursing students in semester VII of Universitas Muhammadiyah Lamongan. Based on this research, it is expected that female students can reduce stress, get enough sleep 7-8 hours, diet, and control weight so that the menstrual cycle returns to normal.*

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**Correspondence:*
Dianna Ika Ernawati

E-mail :
diannaika8@gmail.com

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INTRODUCTION

Menstruation is a physiological phenomenon experienced by all adolescent girls at the age of 12-13 years and is a sign of maturity of the reproductive organs. This shows that menstruation plays an important role in reproductive health physically and psychologically (Kurrohman, 2019). A normal menstrual cycle occurs every 21-35 days and lasts for 2-7 days. The menstrual cycle occurs in four phases, namely the menstrual phase, proliferation phase, luteal/secretion phase and ischemic phase (Rosydah, 2021). There are several disorders that occur during menstruation. First, polymenorrhea is a condition where the length of the menstrual cycle is shorter than the usual cycle length, which is less than 28 days. Second, oligomenorrhea is a cycle that is longer than normal or more than 35 days. Third, amenorrhea is the length of the menstrual cycle where there is no bleeding for 3 consecutive months (Rahma, 2021). Irregular menstrual cycles are caused by hormonal disorders in the body or can also be caused by diseases of the intimate organs, such as uterine tumors, ovarian tumors, as well as emotional disorders such as stress and sleep quality (Setiawati, 2015).

Menstrual disorders are a common problem among women, with 75% occurring in late adolescence. In 2018, WHO found that 80% of women in the world experience irregular periods. In 2018, the Basic Health Research (Riskesdas) of the Ministry of Health of the Republic of Indonesia reported that 11.7% of Indonesian adolescents experienced irregular menstruation, increasing to 14.9% in urban areas. Based on a preliminary study conducted by researchers at Universitas Muhammadiyah Lamongan on 15 nursing student respondents, 40% of respondents had a normal menstrual cycle and 60% of respondents had an abnormal cycle with 20% experiencing polymenorrhea, 30% experiencing oligomenorrhea, and 10% experiencing amenorrhea.

One of the factors that affect the menstrual cycle is emotional disturbances such as stress. Stress can affect the production of the hormone cortisol which can increase the amount of progesterone hormone in the body. This increase in progesterone hormone can disrupt the menstrual cycle (Fransiska et al., 2017). Students often experience depression due to academic demands and stress (Ibrahim et al., 2013). Currently, students who experience academic stress are increasing in number every semester. During lectures, students experience several stress disorders, because they have to adapt to changes in lecture life, exam conditions, time planning, and personal perceptions of task completion time. This condition is especially experienced by final year students, the stress level is higher because not only course assignments but also have to complete a thesis or thesis

(Ambarwati et al., 2019). The stress faced by students when completing a thesis not only causes emotional disturbances but also sleep disturbances. This causes the quality of sleep to change. Circadian changes, such as sleep-wake disturbances, can affect the menstrual cycle.

A stable circadian rhythm affects the regularity of the menstrual cycle and mood. This can be stabilized by sleep rest. there is a hormone that influences the sleep process, namely the hormone melatonin. The hormone melatonin suppresses steroid production by decreasing the expression of Steroidogenic Acute Regulatory (StAR), P450 side chain cleavage (P450 scc), 3β-hydroxysteroid dehydrogenase (3βHSD), and 17β-hydroxysteroid dehydrogenase (17β-H). and steroidogenic enzymes that are important in the production of cyclic adenosine monophosphate (cAMP) and steroids, especially estrogen, the hormone that regulates the menstrual cycle. So if there is a disturbance in the process, the menstrual cycle can be disrupted (Deaneva et al., 2015). A short menstrual cycle can make it difficult for a woman to ovulate because the egg is overripe and difficult to fertilize. A long menstrual cycle indicates that eggs rarely form or the woman has been infertile for a long time. The irregularity of the menstrual cycle also makes it difficult for women to recognize when they are fertile and when they are infertile (Rezky, Irmayanti, 2019). Menstrual disorders can be overcome by reducing stress through good coping mechanisms, good diet, and nutrition, adequate rest and sleep 7-8 hours a day, exercise, stopping smoking, avoiding alcohol, managing weight, manage time well (Sitoayu et al., 2017)

The purpose of this study was to determine the relationship between stress levels, sleep quality, and menstrual cycle in seventh semester nursing students at Universitas Muhammadiyah Lamongan.

MATERIALS AND METHODS

This study used a correlation research design with a cross-sectional approach to determine the relationship between stress levels and sleep quality with the menstrual cycle. The population in this study were nursing students in the seventh semester of Universitas Muhammadiyah Lamongan, totaling 134 respondents. The sample size was calculated using the finite formula and obtained as many as 111 respondents. The sample was selected using Simple Random Sampling.

The inclusion criteria in this study were nursing students in semester VII of Lamongan Muhammadiyah University and students who were active in lectures by signing an informed consent sheet. While the exclusion criteria of this study are students who are not willing to be respondents and do not fill out the questionnaire completely.

This study used a stress variable instrument the DASS (Depression Anxiety Stress Scale) questionnaire which consists of 42 items. To measure the level of stress, only 14 question items were used, namely numbers 1, 6, 8, 11, 12, 14, 18, 22, 27, 19, 32, 33, 35, 39. Each question has 4 scores, namely 0 = never, 1 = sometimes, 2 = often, and 3 = always. Measurement results: the level of stress in this instrument is normal, mild, moderate, severe, and very. The number of scores from the item statement has a meaning, namely normal: 0-14, mild: 15-18, moderate: 19-25, severe: 26-33, Very heavy: ≥34 with an ordinal scale. The sleep quality variable instrument used the PSQI (Pittsburgh Sleep Quality Index) questionnaire. This instrument produces 7 component scores corresponding to the dominant. Each dominant score ranged from 0 (no problem) to 3 (severe problem). The value of each component is then summed up to obtain a global score which is in the range of 0-21. If the global score is 0-≤ 5, the sleep quality is good and if the score is ≥ 5-21, the sleep quality is poor. Researchers collected data through the licensing process from the nursing study program, after which samples according to the inclusion and exclusion criteria. Data analysis using the Spearman rank test. And this research has been carried out for ethical feasibility with No. 301/EC/KEPK - S1/06/2023.

RESULTS

Table 1. Characteristics Respondent Based on Age, Weight, Menstrual Blood Colour, and Menstrual Cycle Disorder in the Family of seventh-semester nursing students at Universitas Muhammadiyah Lamongan 2023 (n = 111)

Characteristics of Respondents	Frequency (F)	Percentage (%)
Age		
20 Years	2	1.8
21 Years	26	23.4
22 Years	76	68.5
23 Years	7	6.3
Weight	**Frequency (F)**	**Percentage (%)**
40-45	5	4.5
46-49	19	17.1
50-54	24	21.6
55-59	16	14.5
60-64	17	15.3
65-69	12	10.8

Characteristics of Respondents	Frequency (F)	Percentage (%)
Weight		
70-74	8	7.2
75-79	10	9.0
Menstrual Blood Colour	**Frequency (F)**	**Percentage (%)**
Brown/Dark red	66	59.4
Bright red	44	39.6
Light red	1	1
Menstrual Cycle Disorder In the Family		
Yes	106	95.5
No	5	4.5
Total	**111**	**100**

Table 1 shows that more than half (68.5%) of female students were 22 years old. Based on body weight, almost half (21.6%) of female students have a body weight of 50-54 kg. Based on data on the color of menstrual blood, more than half (59.4%) of female students have brown/dark red menstrual blood. Based on data on menstrual cycle disorders in the family, more than half (95.5%) of female students did not experience menstrual cycle disorders in their families.

Table 2. Characteristics Respondent Based on Stress Level, Sleep Quality, and Menstrual Cycle of seventh-semester nursing students at Universitas Muhammadiyah Lamongan 2023 (n = 111)

Characteristics of Respondents	Frequency (F)	Percentage (%)
Stress Level		
Normal	35	31.5
Mild Stress	43	38.7
Moderate Stress	31	28
Severe Stress	2	1.8
Sleep Quality		
Good	51	45.9
Bad	60	54.1
Menstrual Cycle		
Normal	44	39.6
Polimenorrhea	47	42.3
Oligomenorrhea	18	16.3
Amenorrhea	2	1.8
Total	**111**	**100**

Based on table 2. It can be explained that almost half (38.7%) of female college students experience mild stress as many as 43%, more than half (54.1%) of female students experience poor sleep quality as many as 60 female students, and almost half (42.3%) of the students experienced polymenorrhea as many as 47 female students.

Table 3. Relationship Between Stress Level and Menstrual Cycle Disorder of Nursing Student Semester VII at Universitas Muhammadiyah Lamongan 2023 (n = 111)

Stress level	Menstrual Cycle Disorder								Total	
	Normal		Polimenorrhea		Oligomenorrhea		Amenorrhea			
	N	%	N	%	N	%	N	%	N	%
Normal	28	80	6	17.1	1	2.9	0	0.0	35	100
Mild Stress	13	30.2	23	53.5	7	16.3	0	0.0	43	100
Moderate Stress	3	9.7	18	58.1	9	29	1	3.2	31	100
Severe Stress	0	0.0	0	0.0	1	50	1	50	2	100
r=0,587 p=0,000										

Based on table 3. It can be explained that in female students who experience mild stress, more than half (53.5%) as many as 23 female students experience polymenorrhea, and a small portion (16.3%) of as many as 7 female students experience oligomenorrhea.

Based on the results of the analysis with the Spearman rank correlation test using the SPSS, the results obtained with the Spearmen rank statistical test with a significant tariff of p 0.05 obtained a value of p = 0.000 and a correlation coefficient of 0.587 which means there is a strong relationship. H1 is accepted, meaning that there is a relationship between the stress level variable and the menstrual cycle.

Table 4. Relationship Between Sleep Quality and Menstrual Cycle Disorder of Nursing Student Semester VII at Universitas Muhammadiyah Lamongan 2023 (n = 111)

Sleep Quality	Menstrual Cycle Disorder								Total	
	Normal		Polimenorrhea		Oligomenorrhea		Amenorrhea			
	N	%	N	%	N	%	N	%	N	%
Both	35	68.6	10	19.6	5	9.8	1	2	51	100
Bad	9	15	37	61.7	13	21.6	1	1.7	60	100
Total	44	39.7	47	42.3	18	16.2	2	1.8	111	100
r=0,587 p=0,000										

Based on table 4. It can be explained that female students with poor sleep quality mostly (61.7%) experienced polymenorrhea.

Based on the results of the analysis with the Spearman rank correlation test using the SPSS, the results obtained with the Spearmen rank statistical test with a significant rate of p 0.05 obtained a value of p = 0.000 and a correlation coefficient of 0.472 which means there is a strong relationship. H1 is accepted, meaning that there is a relationship between sleep quality variables and the menstrual cycle.

DISCUSSION

Relationship between Stress Level and Menstrual Cycle in Nursing Students of Semester VII, University of Muhammadiyah Lamongan

The results of the Spearmen rank test analysis show that there is a significant relationship between the stress level variable and the menstrual cycle. The results of this study are in line with research conducted by Nathalia (2019) which examines the relationship between stress levels and the menstrual cycle in female students of STIT Diniyyah Puteri Kota Padang which explains that there is a significant relationship between stress levels and the menstrual cycle of female students. Psychological stress is one of the important factors that influence the level of menstrual cycle in female students. The higher it is experienced, the more severe the menstrual cycle disorders that occur. Thus it can be explained that female students who experience psychological stress are in line with the menstrual cycle disorders experienced. In addition to psychological stress, there are still many other factors that affect menstrual cycle patterns and this requires further research.

This study is also in line with Damayanti et al (2022) that there is a relationship between stress levels and menstrual cycles in nursing students at a private university in Tangerang. Stressors that make new demands for a job will result in a delayed menstrual cycle every month. According to Prawiroharjo (2014), a reaction that occurs in the body during stress where the amygdala of the limbic system is activated so that it will stimulate the hypothalamus to produce the hormone Gonadotropin Releasing Hormone (GnRH), where the GnRH hormone will secrete the hormones FSH and LH which are very instrumental in the menstrual cycle.

In a state of stress caused by stressors, there is activation of the HPA axis, resulting in the hypothalamus secreting (Corticotropic Releasing Hormone) CRH. CRH has a negative effect that inhibits hypothalamic GnRH secretion from its production site in the arcuate nucleus, CRH imbalance has an influence on suppressing female reproductive function during stress. The secretion of CRH will stimulate the release of (Adenocorticotropnc Hormon) ACTH by the anterior pituitary which in turn ACTH will stimulate the adrenal glands to secrete cortisol. Cortisol plays a role in inhibiting LH secretion by the brain activity center by inhibiting the anterior pituitary response to GnRH, so stress can cause menstrual cycle disorders (Breen and Karscg in Rahma, 2021).

Relationship Between Sleep Quality And Menstrual Cycle In Seventh-Semester Nursing Students At Muhammadiyah University Of Lamongan

The results of the Spearmen rank test analysis showed that there was a significant relationship between sleep quality variables and the menstrual cycle. This study is in line with Luthfi's (2020) research on the relationship between sleep quality and menstrual cycle in final-year students of the Faculty of Medicine, Sriwijaya University, which found that there was a significant relationship between sleep quality and menstrual cycle.

Sleep quality is influenced by the pineal gland which secretes the hormone melatonin and provides a drowsy effect that will affect the quality and quantity of a person's sleep (Liberman in Sholihah et al., 2022). Poor sleep patterns will cause disturbances in physiological and psychological balance. Physiological disorders such as decreased daily activity, fatigue, weakness, decreased endurance, disruption of vital signs, and hormonal disorders can occur (Poter & Perry A. G., 2015).

Melatonin acts as an antioxidant, antimitotic, antiestrogenic, pro-differentiation, and antimetastatic, modulating the immune system, regulating sleep rhythms and circadian rhythms, and maturation of the reproductive system (Sandra in Bakhri, 2018). Apart from playing a role in the sleep process, the hormone melatonin also plays a role in the menstrual cycle. Through the suprachiasmatic nucleus in the hypothalamus and pars tuberalis, the hormone melatonin affects hypothalamic GnRH in the formation of FSH-LH. The relationship between melatonin and GnRH is very important because melatonin plays a role in ovarian growth, the production of cyclic adenosine monophosphate (cAMP) and estrogen (Sholihah et al., 2022). Poor sleep quality can reduce melatonin production. The hormone melatonin functions as an inhibitor that inhibits steroid production by reducing the expression of Steroidogenic Acute Regulatory (StAR), P450 side chain cleavage (P450 scc), 3β-Hydroxysteroid Dehydrogenase (3β-HSD), and 17β-Hydroxysteroid Dehydrogenase (17β-HSD) which are known as steroidogenic proteins and enzymes and have an important role in the production of cAMP and steroids, especially estrogen which is a hormone that regulates the menstrual cycle. Melatonin can regulate estrogen activity in 3 ways, namely, down-regulation of gonadal synthesis of steroids and lower blood levels, interaction with ER, and down-regulation of the activity of several enzymes such as aromatase (Sánchez-Barceló in Sholihah et al., 2022). High levels of estrogen can cause menstrual cycle disorders (Deaneva et al., 2015).

This research is also in line with Siregar's research (2021) on the relationship between sleep quality and cycle in medical students at the Islamic University of North Sumatra which resulted in a significant relationship between sleep quality and menstrual cycle. Individuals with poor sleep quality will experience obstacles to the production of the hormone melatonin which will affect the synthesis and production of the hormone estrogen. This disruption of melatonin and estrogen hormones will result in disruption of the menstrual cycle. The disruption may be oligomenorrhoea or polymenorrhoea, depending on the amount of estrogen produced.

CONCLUSIONS

There is a significant relationship between stress level and sleep quality with menstrual cycle among seventh-semester nursing students at Universitas Muhammadiyah Lamongan. Based on the results of this study, it is hoped that it can be used as a preliminary study to develop other research, especially in preventing menstrual cycle disorders in female students with a larger sample size. In addition, further research needs to be done by expanding the variables that can affect the menstrual cycle

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