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THE RELATIONSHIP OF STRESS LEVEL WITH MENSTRUAL CYCLE IN HEALTH STUDENTS AT POLTEKKES KEMENKES SEMARANG

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ABSTRACT

Stress triggers 4.7 times the risk, and abnormal nutritional status 2.8 times the risk of experiencing irregular menstrual cycle¹. Stress level is one factor that affects the menstrual cycle and is often felt by final-year health students. This study aimed to determine the relationship between stress levels and the menstrual cycle in health students at Poltekkes Kemenkes Semarang. This type of research is quantitative analytic with a cross-sectional design. The sampling method used simple random sampling with a sample size of 131 respondents. The results of this study are the level of mild stress amounted to 21 respondents (16.8%), moderate stress amounted to 104 respondents (79.4%), and severe stress amounted to 6 respondents (4.6%), and based on the Spearman-rho test showed that there was a relationship between stress levels and the menstrual cycle, p-value = 0.037 (p-value <0.05). The r or correlation coefficient is 0.182 means that the level of strength of the correlation between stress levels and the menstrual cycle in final year health students at Poltekkes Kemenkes Semarang is a weak correlation. The positive relationship contained in the correlation coefficient means that the direction of the relationship is unidirectional, namely the increasing stress level and the more irregular or abnormal menstrual cycle. This study concludes a relationship between stress levels and the menstrual cycle in health students at Poltekkes Kemenkes Semarang.

Keywords: Stress Level; Menstrual Cycle; Adolescent.

Introduction

At the age of adolescence, around the age of 12-16 years, adolescents will experience a physical change, and the function of the reproductive organs in adolescents has also begun to be active, called puberty. In women who have experienced puberty, it will be marked by monthly bleeding from the uterus called menstruation. Menstruation will continue to be shared by women as long as sperm doesn't fertilize the egg². Menstruation occurs due to the progressive shedding of the endometrial lining. The distance between one

menstrual period and the next is known as the menstrual cycle, which normally occurs if each month reaches between 21-35 days, with a normal pattern of 28 days. In general, under 15% of women of regeneration age with a normal menstrual cycle, which occurs within 28 days³. Menstrual cycles might be irregular if the length of the period changes every month and the volume of blood changes⁴

WHO 2018 data states that 80% of women worldwide experience irregular menstruation. According to Basic Health Research Data, as many as 11.7% of adolescents in Indonesia

experience irregular menstruation, and as many as 14.9% in urban areas in Indonesia experience menstrual irregularities, where the presentation irregular reached 15.8% in DIY region⁵.

Irregular menstrual cycles occur due to various factors such as hormonal, nutritional status, Body Mass Index (BMI), and stress levels. Data from a study stated that the results of a bivariate analysis between stress and the menstrual cycle showed that students who experienced stress triggered 4.7 times the risk of experiencing irregular menstrual cycles. Bivariate analysis of nutritional status with menstrual cycles shows that students with abnormal nutritional status begin 2.8 times the risk of experiencing irregular menstrual cycles. And the results of the multivariate analysis show nutritional status and stress levels are factors that greatly influence the menstrual cycle. These two aspects can describe the irregularity of the menstrual cycle by 40.2%, while other factors cause the remaining 50.8%¹.

Stress is an unpleasant condition that occurs in individuals, so it triggers pressure both physically and psychologically that will be experienced by individual⁶. A person's body under stress will produce adrenaline as a defense. The structure of feedback from the hormone cycle can be in the form of stress or the emotions we experience. The explanation of stress theory states that stress has an impact, increasing the secretion of Corticotropin Releasing Hormone (CRH) by the hypothalamus, thereby increasing cortisol in the blood (stress hormone). Feedback from the hormone system will increase cortisol which inhibits Gonadotropin-releasing, which is a factor that has a function of controlling ovulation in women. The impact caused by each individual is influenced by the amount of cortisol in the blood (stress hormone). If this happens to a woman, it can have an impact on menstruation so that it triggers menstrual disorders⁷.

The results of a preliminary study conducted on November 11, 2021, through interviews with ten final year students and the results showed that 5 out of 10 last year students experienced menstrual cycles of more than 35

days (oligomenorrhea) with moderate stress, 2 out of 10 final year students experienced menstrual cycles less of 21 days (polymenorrhea) with moderate stress, and 3 out of 10 last year students experienced normal menstrual cycles and did not experience stress.

Faculty of Medicine, University of Muhammadiyah Semarang, students of blocks 19-20 according to the inclusion criteria, had 17 respondents (35.4%) with mild stress levels. And 6 respondents (12.5%) with severe stress levels. After that, 23 respondents (47.9%) experienced oligomenorrhea menstrual cycles, and 10 (20.8%) experienced polymenorrhea menstrual cycles⁸.

The purpose of this study is to know the Relationship between Stress Levels and Menstrual Cycles in Health Students at Poltekkes Kemenkes Semarang.

Methods

The research design used in this study was quantitative analytic with a cross-sectional approach. The variables in this study include the independent variable, namely the stress level, while the dependent variable is the menstrual cycle. The research was conducted in March 2022 at Campus 1 Poltekkes Kemenkes Semarang. The population in this study is Applied undergraduate health students at the end of semester 8, with as many as 193 respondents. The sampling technique used the Slovin formula and then taken by the simple random sampling method, namely the selection of samples by selecting elements or samples at random. The sample used in this study was 131 respondents. The instrument used in this study is a questionnaire on the perceived stress scale (PSS-10) by Sheldon Cohen in 1983, which has been modified⁹ into 13 questions and a menstrual cycle questionnaire adapted from the questionnaire⁹. Univariate data analysis with descriptive statistics and bivariate using Spearman rho test. Ethical clearance in this study with code of ethics No. 070/EA/KEPK/2022.

Results and Discussion

The results of the study are presented in the form of tables and narratives from the results of univariate and bivariate analysis.

1. Univariate Analysis

a. Characteristics of Respondents

This research was conducted on 131 respondents, namely final years Applied health students at Campus 1 Poltekkes Kemenkes Semarang. Characteristics of respondents include age, BMI, age at first menstruation, place of residence, history of disease, and study program majors.

Table 1. Frequency Distribution of Respondents Characteristics

Characteristics	<i>F</i>	%
Age		
20-22 years old	121	92.4%
23-24 years old	10	7.6%
Amount	131	100%
BMI		
Very Thin (<17)	5	3.8%
Skinny (17-18.5)	16	12.2%
Normal (18.5-25)	98	74.8%
Fat (<25-27)	5	3.8%
Obesity (<27)	7	5.3%
Amount	131	100%
Age of First Menstruation		
10-12 years	77	58.8%
13-15 years old	54	41.2%
Amount	131	100%
Residence		
Live alone (Kos)	88	67.2%
With parents	43	32.8%
Amount	131	100%
Illness History		
There isn't any	131	100%
Amount	131	100%
Study Program		
Bachelor of Applied Midwifery	36	27.5%
Bachelor of Applied Nursing	39	29.8%
Bachelor of Applied Imaging Radiology Engineering	24	18.3%
Bachelor of Applied Dental Therapist	32	24.4%
Amount	131	100%

Table 1 showed that most of the respondents were aged 20-22 years, totaling 121 respondents (92.4%). The BMI of respondents was mostly normal for 98 respondents (74.8%). Most of the respondents experienced menarche between 10-12 years totaling 77 respondents (58.8%). The respondent's place of residence during lectures is that most of them live alone (boarding house), totaling 88 respondents (67.2%). None of the respondents' disease history amounted to 131 respondents (100%). Most of the study programs came from the Bachelor of Applied Nursing Study Program, totaling 39 respondents (29.8%).

b. Category Data for Health Student Stress Levels at Poltekkes Kemenkes Semarang

Table 2. Frequency Distribution of Stress Level Categories

Stress Level	<i>F</i>	%
Mild Stress	21	16%
Moderate Stress	104	79.4%
Heavy Stress	6	4.6%
Amount	131	100%

Table 2 shows the category of stress levels experienced by final year health students at Poltekkes Kemenkes Semarang, namely mild stress levels amounted to 21 respondents (16.8%), moderate stress amounted to 104 respondents (79.4%), and severe stress amounted to 6 respondents (4.6%).

- c. Data on the Distribution of Menstrual Frequency for Health Students at Poltekkes Kemenkes Semarang

Table 3. Distribution of Menstrual Frequency

Characteristics	F	%
Menstruation Length		
Normal	117	89.3%
Abnormal	14	10.7%
Amount	131	100%
Menstrual Cycle		
Normal	68	51.9%
Abnormal	63	48.1%
Amount	131	100%
Number of sanitary napkins		
Normal	118	90.1%
Abnormal	13	9.9%
Amount	131	100%

Table 3 shows the menstrual cycle questionnaire. The length of normal menstruation amounted to 117 respondents (89.3%). The size of abnormal menstruation amounted to 14 respondents (10.7%), normal menstrual cycles amounted to 68 respondents (51.9%), and There were 63 respondents (48.1%) with abnormal menstrual cycles, 118 students (90.1%) with normal sanitary napkins and 13 students (9.9%).

2. Bivariate Analysis

Table 4. Bivariate Analysis Between Stress Levels And Menstrual Cycles

Spearman's rho	Correlations	Correlation Coefficient	Sig.(2-tailed)	N
	Stress Level	0.812	0.037*	131
	Menstrual Cycle			

*Speraman rho test

The bivariate analysis of stress levels and menstrual cycles in health students at Poltekkes Kemenkes Semarang with the Spearman-rho test showed the p-value = 0.037

(p-value <0.05). So it is rejected, and Ha is accepted, meaning there is a significant relationship between stress levels and menstrual cycles in health students at Poltekkes, Ministry of Health, Semarang. The value of r or correlation coefficient of 0.182 means that the level of strength of the correlation between stress levels and the menstrual cycle in final year health students at Poltekkes Kemenkes Semarang is a weak correlation. The positive relationship contained in the correlation coefficient means that the direction of the relationship is unidirectional, namely the increasing stress level and the more irregular or abnormal menstrual cycle.

Characteristics of Respondents

The results showed that most respondents were aged 20-22 years, amounting to 121 respondents (92.4%). In line with other studies, the results obtained most is 21 years old with a total of 27 people (33.75%) while the least is 17 years old with a total of 2 people (2.5%) with the age range of respondents between 17-22 years¹⁰.

According to WHO, the age limit for adolescents occurs at 12-24 years¹¹. In this case, students are in this age range, starting from 20-24 years old. Students at that age are experiencing many activities that cannot separate from stress. The stress experienced by students comes from the demands of academic achievement, food during college, the frequency of exams, uncomfortable lecture classes, and lack of recreation time¹².

BMI most respondents have a normal BMI, as many as 98 respondents (74.8%). In line with the research entitled "Factors Affecting the Menstrual Cycle in Level III Adolescent Girls". The results showed that most of the respondents were 22 people (55%) with normal BMI1. BMI or inadequate nutrition can affect the growth and function of organs, triggering disruption of reproductive function. In this case, the impact on the menstrual cycle experienced¹².

The function of the hypothalamus can decrease if an individual is underweight or

overweight. As a result, the hormones FSH (Follicle Stimulating Hormone) and LH (Luteinizing Hormone) cannot be formed because the hypothalamus cannot send signals to the anterior pituitary. Both of these hormones have an important role in FSH functions to stimulate the growth of follicles in the ovaries. In contrast, LH functions as egg maturation, so these two hormones are vital to the menstrual cycle. If the FSH and LH hormones are not produced, it will disrupt the menstrual cycle¹³.

Research results regarding the age of first menstruation or menarche experienced by most respondents amounted to 77 (58.8%) who experienced menarche aged 10-12 years, in line with the research entitled "The Correlation between Menarche Age with Menstrual Cycle Length and Primary Dysmenorrhea Incidence in Adolescent Girls at SMA Negeri 1 Makassar" (42.2%)¹⁴.

Ovulation often does not occur because there is no positive feedback response to estrogen usually occurs early after menarche. In adolescents, almost 50% of cycles are anovulatory in the first year. The hypothalamic-pituitary and ovarian (HPO) axis is immature until five years after menarche. Menstrual cycles and ovulation can be regular if the HPO is mature and generally occurs after two years after experiencing menarche or the age of the first menstrual period¹⁵. Menarche usually occurs at the age of 12-13 years. The earlier the age of menarche, the faster a person's menstrual cycle can run well or regularly, menarche occurs at the age of 12-13 years, so if it is more than that age, the menstrual cycle can be longer regular¹⁴.

The respondent's place of residence during lectures is that most of them live alone (boarding house), totaling 88 respondents (67.2%). The results showed that 100 people (68.5%) lived alone in a boarding house⁹. Students who live alone (kos) during lectures often eat fast food or fast food. Fast food is an unhealthy eating pattern and factor that triggers menstrual cycle disorders. Fast food is classified as food with vitamins and fiber

that is low but high in sugar, sodium, and fat¹⁶. Also, if consumed continuously in excess, fast food can cause nutritional problems, such as obesity, degenerative diseases, skin diseases, and menstrual cycle disorders due to unbalanced nutritional content¹⁷.

None of the respondents' disease history amounted to 131 respondents (100%). In line with other research, all respondents did not account for gynecological diseases or diseases of the reproductive organs as much 82 respondents (100%)¹⁷. One indicator of the reproductive system's disorders related to the risk of various diseases in the reproductive system, such as uterine cancer and things that can trigger infertility, is an irregular menstrual cycle¹⁷.

Most of the respondents in this study came from the Bachelor of Applied Nursing Study Program, totaling 39 respondents (29.8%). In line with the research entitled "The Relationship between Stress Levels and Physical Activity with Menstrual Cycles in Seventh Semester Nursing Students at the National University of Jakarta 2021," the number of nursing respondents in this study was 99 respondents (100%). One of the sources of stress experienced by final-year students is the obligation to complete the thesis or final project. The process that causes stress becomes a factor that affects the menstrual cycle stress acts as a stimulus to the nervous system to the central nervous system, namely the limbic system, then through the autonomic nerves handle the hormonal (endocrine) glands to secrete pituitary neurohormonal secretions (fluid) through the frontal system to secrete gonadotropins in the form of FSH and LH. The production of these two hormones is influenced by Gonadotropin-Releasing Hormone (GnRH), which is distributed from the hypothalamus to the pituitary¹⁸.

Stress Levels for Health Students at Poltekkes Kemenkes Semarang

Research results show that the category of stress levels experienced by final-level health students at the Health Polytechnic of the

Ministry of Health Semarang experienced moderate stress levels, amounting to 104 respondents (79.4%). This is by previous research conducted on final year students at the Faculty of Nursing, University of North Sumatra, which showed that most respondents experienced moderate stress with a total of 123 students (84.2%)⁹.

In other studies, the results were also obtained, namely from the students of the Faculty of Medicine, Hasanuddin University Batch 2015. The results showed that the degree of moderate stress level occupied the highest position experienced by students, namely as many as 29 students (38.7%), mild stress among 28 students (37.3%), and severe stress among 18 students (24.0%) this shows students as individuals at the age of young adults still often experience stress levels¹⁹.

The results of research released by the Mental Health Foundation in 2018 are that there are 74% of people in the world experience stress. Individuals experience this in the 18-24 year age range according to the age of students who share stress due to the demands of academic success.²¹ Students are in the quarter-life crisis phase. This condition triggers students to be very vulnerable to experiencing stress. A quarter-life crisis is a feeling of fear about life in the future, such as career matters, relationships, and life experienced by individuals when they reach their mid-20s²⁰.

In this study, 6 respondents (4.6%) experienced severe stress, with the main problem point being that it was difficult to rest. The research on the Relationship between Psychological Stress Levels and Menstrual Cycles in Students was conducted at UIN Sunan Ampel Surabaya, which found that 5 students (16.8%) experienced severe stress. Symptoms of stress are physical disorders that often occur due to stress, including chest pain, diarrhea for several days, headaches, nausea, palpitations, fatigue, and sleep disturbances²¹.

Menstrual Cycle in Health Students at Poltekkes Kemenkes Semarang

The results of the study, most of the 68 respondents (51.9%) experienced normal menstrual cycles and 63 people (48.1%). This is supported by the results of a study entitled "Relationship of Stress Levels with Menstrual Cycles in Young Women in Rusunawa Muhammadiyah University Semarang" obtained from the population in Rusunawa Muhammadiyah University Semarang amounting to 200 people, namely the normal menstrual cycle category as many as 75 people with a percentage (50.7%), the polymenorrhea category was 54 people (36.5%), and oligomenorrhea category was 19 people with a percentage (12.8%)²².

In the study entitled "The Relationship between Stress Factors and Menstrual Cycle in Medical Students, University of North Sumatra" the results were obtained. Most students experienced normal menstrual cycles, namely 69 people (86.25%), and abnormal menstrual cycles in as many as 11 people (13,75%)¹⁰. So it can be concluded that final-year health students at Poltekkes Kemenkes Semarang have good coping strategies so that the level of stress they feel does not all have an impact on irregular menstrual cycles.

Irregular menstrual cycles are a problem that many young women encounter, and this can occur due to stress or anxiety it affects the learning activities of young women at school.²⁵ The menstrual cycle is strongly influenced by the LH hormone, where this hormone has a function as a producer of estrogen and progesterone and functions to help in the formation of the corpus luteum. If the LH hormone is decreased, then the development of the corpus luteum is also disrupted. This triggers an imbalance between the hormones estrogen and progesterone, which have a vital function in the menstrual cycle. If the two hormones are not balanced, it will impact irregular menstrual cycles²³.

In a study, it was found that there was a relationship between stress levels and the menstrual cycle. Stress conditions

experienced by students have negative impacts such as decreased interest and effectiveness, resulting in changes in student behavior. In addition, reducing energy to frustration can also affect the neglect of student responsibilities. Stress conditions experienced by students can be overcome by good social interaction in the institutional environment so that they can provide positive encouragement or motivation that has the impact of reducing stress levels. The form of social interaction can be in the form of interactions between students and teachers and among students or employees in the environment institution²⁴.

The Relationship between Stress Levels and Menstrual Cycles in Health Students at Poltekkes Kemenkes Semarang

Based on the results of the spearman-rho test between stress levels and the menstrual cycle, the results obtained are the r value = 0.182 and the p -value = 0.037 (p -value < 0.05). This means that there is a relationship between the menstrual cycle and stress levels in health students at the Health Polytechnic of the Ministry of Health Semarang. This research is in line with the research conducted by Kartini (2020), which shows the results of the Spearman test, that is, the value of r = 0.164 and the value of p = 0.04 indicates that there is an effect of stress levels on the menstrual cycle in final year students at the Faculty of Nursing, University of North Sumatra.

The results of the study are in line with research conducted by Nathalia (2019), entitled "The Correlation of Stress Levels with Menstrual Cycles in STIT Diniyyah Puteri Students, Padang Panjang City" shows the results of the chi-square statistical test obtained a value of p = 0.000 (p ≤ 0.05) so it can be concluded that there is a significant relationship between stress levels and cycles. Menstruation.

The menstrual cycle becomes irregular due to the influence of stress levels which are a form of body response that cannot be specifically explained that occurs due to

stressors or stimulation of factors that threaten the homeostatic defense system²⁶. Still, it also has an effect on systemic changes in the body. Stress can reduce the hormone LH, and the production of the hormone prolactin, which is directly related to basal cortisol activity, can also be disrupted. This is what causes individuals to experience irregular menstrual cycles²⁷.

Conclusion

Most Respondents had moderate stress levels, which amounted to 104 respondents (79.4%). In comparison, those who experienced mild stress were 21 respondents (16%), and severe stress was 6 respondents (4.6%), with the main problem being that it was difficult to rest. Most of the 68 respondents (51.9%) experienced a normal menstrual cycle, and among those who experienced an abnormal cycle were 63 people (48.1%).

Based on the results of the bivariate analysis with the Spearman rho test, it can be concluded that there is a relationship between stress levels and menstrual cycles in health students at Poltekkes Kemenkes Semarang with weak correlation strength. Still, the relationship is unidirectional, or between variables influencing each other, the results obtained are r value = 0.182 and p -value = 0.037 (p -value < 0.05).

Final years health students of semester 8 are expected to remain calm when facing problems, find solutions, and divert stress with practical activities so that the issues faced can be resolved properly, the impact on the stress level experienced by final years health students can be reduced, and the menstrual cycle can occur automatically regular.

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