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Relationship between nutritional status and menstrual cycle and anaemia

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ABSTRACT

Introduction: Adolescence is a period of growth and puberty; adolescents are very concerned about appearance, so they pay attention to their diet until they are strict. This causes the intake needed to be unmet, then impacts the menstrual cycle and anemia.

Objective: This study aims to analyze the relationship between nutritional status, the menstrual cycle, and the incidence of anemia in adolescent girls.

Method: This research is an analytic observational study. The approach in this research is cross-sectional. The population is 447 female students aged 13-15; the sample is 83. Sampling using consecutive sampling. The data collection instrument used a questionnaire to determine the menstrual cycle, measure height and weight, and measure Hb levels with digital tools.

Results: This study uses the Spearman Rank test formula value 0.05. The results of nutritional status with menstrual cycles were $0.016 < 0.05$, and then significant results were obtained; on nutritional status with anemia, the results were $0.00 < 0.05$, then substantial results were obtained, and the results of menstrual cycles with anemia were $0.06 > 0.05$ then the result is not essential.

Conclusion: It can be concluded that there is a relationship between nutritional status and the menstrual cycle and anaemia, but there is no relationship between the menstrual cycle and anaemia. Optimal nutritional status, including adequate iron intake, is essential for maintaining menstrual health and preventing anemia. Nutrition interventions and health education on the importance of balanced nutrition can be a practical step in supporting women's reproductive health.

Keywords: anemia, menstrual cycle, nutritional status.

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INTRODUCTION

Fertility, physique, and mental health are related to the regular menstruation cycle. The menstruation cycle lasts 3-7 days, and blood loss is less than 80 ml (Attia, Alharbi and Aljohani, 2023). A period is a physiological occurring condition that can lead to various types of disturbances like B. Change in that menstruation cycle, change in that amount from menstruation blood leakage. An irregular period can occur due to a hormone imbalance in a woman's reproduction system, which needs the hormones estrogen and progesterone to enter that Well country. A normal menstruation cycle lasts 21 to 35 days (Prior, 2020). Different types of menstruation cycle disturbance also exist, including B. polymenorrhea, oliguria, and amenorrhea (Sreedharan and Vishnu, 2024). Irregular menstruation cycle, such as infertility, womb polyps, womb cancer, polycystic ovaries syndrome, ovary cyst, etc., as uncontrollable, uneven, or irregular menstruation cycle can also become dangerous and possible threaten women if he is fibroids genitals infection, and genetic disease (Kruthica, Iyshwarya and Ramakrishnan, 2024).

The menstruation cycle can become affected by nutrition status because malnutrition or obesity influences hypothalamus hypofunction, which stimulates the front pituitary gland to produce the FSH. Satisfying food income or good and normal nutrition can repair reproduction function and affect the menstruation cycle (Feskens et al., 2022). It can keep the hypothalamus working well so that production from the hormone needed by that body is always a reproduction hormone related to that menstruation cycle. The irregular menstruation cycle can also become affected by a variation from other factors, including emphasis, fatigue from activity, and other factors like a disease because hormones change. Inadequate food income can cause menstruation deviation in most teenage girls. She can become determined by anthropometry measurement by count. Little is known about the income requirements of teenagers, but when calorie and protein intake are adequate, other factors like that must be considered and met. B. Iron, calcium, and several vitamins. Young women need iron again because they experience a monthly period (Benson et al., 2021). Blood loss is accompanied by the top 5-10% loss from iron in that blood, leading to iron deficiency. This is why young women are susceptible to menstruation deviation and anemia (Ekroos et al., 2024).

Anaemia is when a person has lower hemoglobin levels than they should. For a teenage girl, anemia occurs when his blood hemoglobin level drops under 12 g/dl. Teenage anemia can be caused by iron deficiency, deficiency in B vitamins like B9 and B12, chronic infection, and genetics. In addition, a monthly period can also affect that incident from anemia. Iron deficiency is the leading cause of anemia in teenage girls, but this is also affected by iron absorption capacity, which can increase or obstruct iron absorption (Mattiello et al., 2020). Anemia is a nutrition problem that needs special attention. General nutrition problems in a teenager are childhood nutrition problems: iron deficiency, anemia, obesity, and persistent underweight. Diet habits obtained during adolescence influence health after stages (Mizia et al., 2021). Teenagers today worry about body pictures, which makes teenagers want a slim body. It also worries many about body image, and having a slender body results in less consumed food and poor nutrition. On the other hand, teenagers who do not have an active lifestyle and tend to have excessive or stay diet possibly become at risk of obesity (Norris et al., 2022).

Based on a preliminary study held by a researcher from the Kediri City Health Department, there are 9086 teenage girls aged 10-14, 9539 boys aged 10-14, and 9539

girls aged 15-15. 9939, 18 turn around to go out to become the 9310 teenagers. Boy aged 15-18. Then, the data on the nutrition status of middle school teenagers in Kediri city is 633 middle school boys and girls, 287 very lean teenagers, 707 lean teenagers, 1391 fat teenagers, and 1391 fat teenagers. Six hundred seventy-one people, and tall school students and girls. 7239 average youth, 99 skinny youth, 559 lean youth, 1224 fat youth, 482 fat youth, and 796 teenage girls in Kediri city on a stake from anemia. He turns around to go out to become a young man. Based on that data, we can see that adequate nutrition is required, but that data permanently has a deficiency. In other words, data on the nutrition status between teenage girls and boys do not provide detailed information about the level of nutrition status between adolescent boys and girls. This study analyzes the connection between nutrition status, menstruation cycle, and anemia.

RESEARCH METHODOLOGY

The design of this study used an analytic observational study. An analytical observational case study explores how and why a phenomenon occurs through statistical analysis of correlation (testing of relationships) between causative and influencing factors of motion. This research approach is cross-sectional. This research approach is cross-sectional and is used to determine the population of all 77 SMPN 4 Kediri City students. A sequential sampling technique is used for the sample, which will then determine the number of samples using the Slovin formula. Data collection was carried out live on March 30, 2022. Data analysis was carried out after all data was collected, and then the editing process was continued to verify the completeness of respondents and the completeness of responses. Then, some codes or numbers are given to the data to make it easier for researchers to enter the data into the computer (input), and the data is computerized. The univariate analysis aims to characterize the respondent's characteristics, such as age, nutritional status, menstrual cycle data, and anemia data presented in tabular form, frequency, and rate distribution. Bivariate analysis in this study used Spearman Rank and then crosstab to determine the relationship between the independent and dependent variables. This research passed the ethical feasibility test, with registration number 550 / KEPK-POLKESMA / 2022

RESULT

In that 14-year group, the results from that nature analysis were 39.8%. In that nutrition status group, to the top, 49.4% are found to become malnourished. In that menstruation cycle group, we found that most people have an abnormal menstruation cycle: polyuria in 57.8%. In that anemia group, most respondents, in the top 45.8%, had light anemia.

Table 1. Characteristics of Respondents

Characteristics of Respondents	f	%
Age		
13 years old	25	30.1
14 years	33	39.8
15 years	25	30.1
Category Nutritional Status		
Very thin BMI <17	12	14.5
Thin BMI 17-<18.5	41	49.4
Normal BMI 18.5–25.0	11	13.3
Fat 25> BMI 27	6	7.2
Obesity BMI > 27	13	15.5

Menstrual cycle		
Oligomenorrhea >35 days	27	32.5
Polymenorrhea <21 days	48	57.8
Average 21-35 days	8	9.6
Anemia	f	%
Severe Anemia < 8 g/dl	2	2.4
Moderate Anemia 9.9-8 g/dl	33	39.8
Mild Anemia 11.9-10 g/dl	38	45.8
Normal >12 gr/dl	10	12.0
Total	83	100.0

Table 2. Analysis of the relationship between nutritional status and menstrual cycle

		Menstrual cycle			Total	α	p
		Oligomenorrhea	Polymenorrhea	Normal			
Nutritional status	Very thin	3	9	0	12		
	Thin	20	21	0	41	0.05	0.016
	Normal	1	0	10	11		
	fat	1	5	0	6		
	Obesity	2	11	0	13		
Total		27	46	10	83		

		Anemia				Total	α	p
		Severe anemia	Moderate Anemia	Mild anaemia	Normal			
Nutritional status	Very thin	1	10	1	0	12		
	Thin	0	13	28	0	41	0.05	0.00
	Normal	0	0	1	10	11		
	Fat	0	1	5	0	6		
	Obesity	1	9	3	10	13		
Total		2	33	38	10	83		

Table 2 above shows that of the 83 students who became respondents, it showed that most students with irregular menstrual cycles or Polymenorrhea had poor nutritional status. As many as 21 female students during the menstrual cycle had amenorrhea. The Spearman Rank test's statistical analysis showed that p = 0.016 (α > 0.05) means a relationship between nutritional status and the menstrual cycle.

Table 3. Analysis of the relationship between nutritional status and anaemia

| | | Anemia | | | | | | |
		Severe anaemia	Moderate Anemia	Mild anaemia	Normal	Total	α	p
Nutritional status	Very thin	1	10	1	0	12		
	Thin	0	13	28	0	41	0.05	0.00
	Normal	0	0	1	10	11		
	Fat	0	1	5	0	6		
	Obesity	1	9	3	10	13		
Total		2	33	38	10	83		

Table 3 above shows that of the 83 students who became respondents, the nutritional status that most appeared was thin nutritional status. 13 students had moderate anemia and underweight dietary conditions. The students who did not experience anemia were found to have the most normal nutritional status, as many as ten. Statistical analysis results using the Spearman Rank test were p = 0.00 (p <0.05), meaning a relationship between nutritional status and anaemia.

Table 4. Analysis of the relationship between the menstrual cycle and anaemia

| | Anemia | | | | | | |
	Severe anemia	Moderate Anemia	Mild anaemia	Normal	Total	α	p
Oligomenorrhea	0	9	17	1	27		
Menstrual cycle Polymenorrhea	2	24	20	0	46	0.05	0.06
Normal	0	0	1	9	10		
Total	2	33	38	10	83		

Table 4 above shows that of the 83 female students who were respondents, it was found that of the female students who had polymenorrhea menstrual cycles, 24 female students experienced moderate anemia, and 20 female students experienced mild anemia. In contrast, of the female students who had oligomenorrhea menstrual cycles, nine female students experienced moderate anemia, and 17 female students experienced mild anemia. One student does not experience anemia, while for students with a regular menstrual cycle, one student has mild anemia, and nine students do not experience anemia. The Spearman Rank test's statistical analysis results found p = 0.06 (α > 0.05), meaning no relationship between the menstrual cycle and anaemia.

DISCUSSION

Based on Table 1 of the 83 students who became respondents, it was found that 25 students (30.1%) were 13 years old, 33 students (39.8%) were 14 years old, and 25 students (30.1%) were 15 years old. Then, on the nutritional status in Table 4.2, it was found that 49.4% (41 students) had underweight nutritional status, 15.5% (13 students) had obese nutritional status, 14.4% (12 students) had low nutritional status. fragile nutritional status, 13.3% (11 female students) had normal nutritional status, 7.2% (6 female students) had obese nutritional status, 14.4% (12 female students) had obese

nutritional status. Showing that more % of respondents which are 59.0% had normal nutritional status compared to 33.1% of the respondents who had underweight nutritional status (Putri et al., 2021). Malnutrition in teenagers occurs due to limiting their food consumption without paying attention to the nutrition and health contained in these foods to meet the body's nutritional needs. The study proves that good or controlled dietary status can affect growth. If the nutritional quality is poor, harmful impacts will also cause bad things in the body, such as reduced organ function.

Based on Table 1, of the 83 students who had become respondents, it was known that 57.5% (48 students) had an abnormal menstrual cycle or Polymenorrhea, and 32.5% (27 students) had an abnormal menstrual cycle. Namely oligomenorrhea, 9.6% (8 female students) had a regular menstrual cycle. It is known that every woman has a different menstrual cycle depending on other factors. Most women aged 15-19 experience regular or average menstrual cycles; 83.3% and 11.7% experience menstrual cycles. Abnormal menstruation. The results of existing studies show that menstrual cycles that are not smooth or normal can impact the reproductive organs, and this can also cause other diseases. So, it indicates that an excellent menstrual cycle influences the body. Based on Table 1, it was found that of the 83 female students who had become respondents, 45.8% (38 female students) had mild anemia, 39.8% (33 female students) had moderate anemia, 12% (10 female students) had no anemia, and 2.4 % (2 female students) had severe anemia. The research revealed that 59.0% of respondents did not experience anemia, and 41.0% had anemia. The results of her study show that more respondents do not experience anemia which is 73.3%, compared to the number of respondents who have anemia, as many as 26.7. The number of anemia in the world is estimated at 46%. In comparison, the amount of anemia in Indonesia obtained by the Ministry of Health is 30% in young women and 21% in young men (Mevorach *et al.*, 2021).

Anaemia is common in developing countries and occurs in women, causing severe health problems—cases of anemia cause disruption of immune mechanisms, which impacts the cause of death in the world. The data showed that anemia in Indonesia, especially in women, was at 21.7% in patients aged between 5-14 years, in patients aged 15-24 at 26.4% and 18.4% (Ribelles *et al.*, 2024). The results of these studies show that anemia is a serious matter to be followed up on. If someone has anemia but is left alone, it will have a destructive impact on health because anemia is one of the causes of death in the world. Anaemia is when the number of red blood cells or hemoglobin is less than average (Mansueto *et al.*, 2023). Polymenorrhea is one type of abnormal menstrual cycle due to hormonal imbalance, so it can disrupt the ovulation process. Several factors can also cause Polymenorrhea, such as a woman's anatomical organ and physiological and psychological factors (Davidson *et al.*, 2023). Hypothalamic-pituitary-ovarian hormonal imbalance can disrupt the ovulation process. Polymenorrhea is only temporary and can heal by itself. Polymenorrhea itself is a natural thing that happens to a woman in the first years of menstruation (Gordon, Scrooby and Havemann-Nel, 2023). However, if Polymenorrhea has been going on for too long, it can cause hemodynamic disorders and fertility disorders. If this continues, immediately consult a doctor to handle this directly so that other effects do not appear. Rarely experienced Polymenorrhea with mild stress levels, then 25% (5 people) experienced Polymenorrhea and experienced stress, and 5% (1 person) experiencing Polymenorrhea with mild stress levels, it can be seen from the results of this study that a woman's stress level can cause Polymenorrhea (Travali *et al.*, 2023).

Which stated that fat intake is related to the menstrual cycle. Consumption of foods that contain high fat, in addition to the accumulation of fat in the body, can also affect the menstrual cycle, which can affect the work of estrogen in the body (Bonomini, Di Liberato and Sirolli, 2023). The hormone estrogen process occurs in the granulosa cells and fat tissue. Therefore, if there is more fat tissue in the body, a lot of the hormone estrogen is produced to disrupt the balance of other reproductive hormones, which can disrupt the menstrual cycle (Hiremath *et al.*, 2023). Changes in body weight can affect the menstrual cycle. If a person experiences acute weight loss, it will impact ovarian function. Underweight is a pathological condition that can cause irregular menstrual cycles. Being overweight or underweight can affect the hormones in the body and cause the menstrual cycle not to run smoothly. Acute weight loss can cause the gonadotropin hormone to secrete LH and FSH, which then causes the hormone estrogen to drop, impacting the menstrual cycle and ovulation (Mathad, Badiger and Manjunath, 2023).

These studies show that nutritional status and the menstrual cycle are interrelated because hormone function can work well. After all, nutritional intake is fulfilled (Williams *et al.*, 2023). With the fulfillment of nutritional intake in the body, hormone functions will work better without interference caused by lack of nutritional intake or lack of fulfillment of nutritional elements whose components are indispensable for the body (Brittenham *et al.*, 2023). Unstable hormones in the bodies of young women can also cause menstrual cycle irregularities. Nutritional status is closely related to daily food intake, and if the food consumed is good and meets the intake needed by the body, then the nutritional status will also be good (Cooper *et al.*, 2023).

On the contrary, if the intake is not met following the needs, it will cause malnutrition and anemia. There is no relationship between the menstrual cycle and the incidence of anaemia. The studies above show that menstrual cycle abnormalities can always cause anemia in a woman. Various aspects can cause anemia, such as lack of nutritional intake, hormonal factors, and diet. In addition, the limitations of respondents can also cause the data obtained to be less, so the results do not follow what is already in theory.

CONCLUSION

It can be concluded that there is a significant relationship between nutritional status, menstrual cycle, and the incidence of anaemia in women. Good nutritional status is essential in maintaining a regular menstrual cycle and helps reduce the risk of anemia. Women with poor or excessive nutritional status tend to experience disturbances in the menstrual cycle, which can have an impact on the frequency, duration, and volume of menstrual blood. This disorder, in turn, increases the risk of anemia due to excessive blood loss or insufficient iron intake. Optimal nutritional status, including adequate iron intake, is essential for maintaining menstrual health and preventing anemia. Nutrition interventions and health education on the importance of balanced nutrition can effectively support women's reproductive health.

CONFESSION

As one of the requirements for bachelor's graduation, I pray to the Almighty Lord for all her blessing and presence in completing that script titled Connection between Nutrition Status and Menstruation Cycle and Anemia from Student from JUNIOR HIGH SCHOOL country 4 Kediri City. Research Program from Applied Midwifery Kediri

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Conflict of Interest

The authors declare that they have no competing interests.

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