THE RELATIONSHIP BETWEEN EATING HABITS, MENSTRUATION DURATION, AND NUTRITIONAL STATUS WITH ANEMIA INCIDENCE IN ADOLESCENT GIRLS AT MAN 1 OGAN ILIR

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ABSTRACT

The prevalence of anemia in adolescent girls is 32%, which affects their health, such as immune system strength and physical productivity, making the body vulnerable to health problems. Respondents sometimes eat three times a day (57), eat green vegetables (52%), eat breakfast before activities (46%), eat breakfast, lunch and dinner (52%), consume instant noodles (66%). This study aims to determine the relationship between eating habits, nutritional status, and menstruation duration with anemia incidence. This study uses a cross-sectional method with a sample of 100 eleventh-grade female students at MAN 1 Ogan Ilir. Data were collected using a questionnaire, biomedical data using an Hb meter (*easytouch*), stadiometer, and digital scales. Analysis. Data analysis was performed univariate and bivariate using the chi-square statistical test. The results showed that there variable of diet there is a relationship with the incidence of anemia in adolescent girls of (p = 0,013; PR = 11,707; 95% CI = 1,437-95,361). It is recommended for adolescent girls to have a healthy diet such as eating green vegetables, fruits and animal protein, having breakfast before going to school, reducing fast food consumption, and taking IFA (Iron and Folic Acid) supplements which can help increase Hb levels and prevent anemia.

Keywords: Eating Habits, Menstruation Duration, Nutritional Status, Adolescent Girls, Anemia

INTRODUCTION

Anemia is a common problem in adolescent girls, caused by a lack of essential nutrients for hemoglobin (Amalia & Meikawati, 2024). Formation Iron deficiency can inhibit hemoglobin synthesis, which negatively affects energy, endurance, and thinking ability, and can affect learning achievement and can increase susceptibility to infection due to lack of oxygen needed by the muscles and brain (Junita & Wulansari, 2021). According to the 2018 Riskesdas statistics, the prevalence of anemia in adolescent girls aged 15-24 years is 48.9% (Nasruddin et al., 2021).This result shows that adolescent girls are a demographic group vulnerable to anemia, which is caused by irregular eating habits and nutritional deficiencies (Apriyanti, 2019).Other factors that may contribute to anemia include heavy menstrual bleeding, iron deficiency, nutritional status, parental education level, economic conditions, and menstruation duration (Muhayati & Ratnawati, 2019).

Three important nutritional factors that affect the body are type, frequency, and quantity. A poor diet can affect a person's nutritional state, it is caused by the food and drinks consumed. Poor diet such as frequent consumption of foods high in sugar, fast food, fried foods, and sugary drinks, so that the nutrient content of foods consumed in adolescent girls can affect the absorption of iron in the body (Sumantari et al., 2018). In addition, not eating enough vegetables and fruits can affect the body because it lacks fibre, vitamins and minerals. Teenagers also often skip breakfast, which can cause the body to feel weak, not concentrated, so that it has an impact on productivity. Skipping breakfast causes excessive hunger during the day, which leads to irregular eating patterns and consuming high-calorie foods (Nurjannah & Putri, 2021).

Several factors can contribute to the incidence of anemia, one of which is menstruation duration. Adolescent girls typically experience menstruation that lasts 3-7 days with heavier bleeding and a normal menstrual cycle of 21-35 days. If menstrual bleeding lasts longer than 7 days, it can lead to iron deficiency (Permatasari et al., 2020).When iron and red blood cells continue to

decrease during menstruation, the body's organs and tissues do not receive enough oxygen, causing symptoms such as weakness, fatigue, dizziness, and a decrease in concentration for studying and other physical activities. Adolescent girls need more iron intake than adolescent boys due to monthly (Barbara & Karlina, 2019).

Nutrients are one of the components in the formation of haemoglobin, the quality of food consumed is closely related to nutritional status, which can contribute to its decline. If the food consumed is highly nutritious, a person's nutritional status is likely to be good. On the other hand, consuming food with low nutritional value can lead to issues such as malnutrition and anemia (Indrawatiningsih et al., 2021). Lack of nutrients such as vitamin B12 results in adolescent girls not fulfilling the food substances needed in the body, so if it occurs for a long time it will cause Hb levels to decrease and experience anaemia. Most adolescents maintain a normal Body Mass Index (BMI) due to parental supervision over their eating habits and food choices. Adolescents with good nutritional awareness tend to have a positive attitude towards their food. Adolescents with low BMI are often associated with various factors, including irregular eating habits and poor nutritional understanding (Qomarasari & Mufidaturrosida, 2022).

According to the study by(Sari, 2020), the prevalence of regular menstrual habits was 63.6%, poor nutritional status was 50.5%, and non-anemia prevalence was 57.6%, indicating a correlation between menstrual habits, nutritional status, and anemia incidence. Similarly, (Tarigan et al., 2023)reported that the chi-square test results showed a correlation between menstrual cycle and anemia prevalence in adolescent girls ($p = 0.001$). The duration of menstruation can affect the number of red blood cells; prolonged menstruation leads to increased blood loss, which could potentially cause anemia in women. A study by (Marlena et al., 2023)in Ogan Komering Ilir Regency found a statistical correlation between eating habits and anemia prevalence in adolescent girls. The odds ratio (OR)

analysis resulted in an OR value of 3.553, indicating that adolescent girls with irregular eating habits are 3.553 times more likely to experience anemia compared to those with regular eating habits (Fatimah et al., 2024).

Adolescent girls often face social pressure to maintain an ideal body shape. However, in an effort to lose weight, adolescents reduce their food intake, leaving the body deficient in iron, vitamins and minerals. An unbalanced diet such as foods high in sugar, fat, and a lack of consuming vegetables, fruit, and other proteins will cause iron and protein deficiencies, which play an important role in the formation of red blood cells and growth (Marfiah et al., 2023).Iron deficiency can lead to anaemia, which is characterised by weakness, fatigue and difficulty concentrating. In addition, protein is also important for the growth and repair of body tissues, so if its intake is deficient, it can inhibit growth, reduce endurance, and cause muscle and skin disorders (Rorimpandei et al., 2020).

According to statistics from the Health Office of Ogan Ilir Regency, the prevalence of anemia in 2018 was 410 individuals (2.3%) and increased to 965 individuals (5.5%) in 2019. Causes of anemia in adolescent girls include low-protein diets that do not meet iron intake, monthly menstruation resulting in significant blood loss, and the risk of giving birth to children with growth restrictions later in life (Rahmadaniah & Rahmadayanti, 2021). Given the increasing number of cases in Ogan Ilir from 2018 to 2019, the researcher conducted a study at MAN 1 Ogan Ilir in 2024 to determine whether there is a relationship between eating habits, menstruation duration, menstrual cycles, and nutritional status. This study aims to determine the number of anemia cases among adolescent girls at MAN 1 Ogan Ilir.

METHODS

The sample for this study was an analytical observational analysis using a *cross-sectional* study design, The population taken using purposive sampling technique amounted to 100 female students from class XI at MAN 1 Ogan Ilir. The inclusion criteria of the study were those who had experienced menstruation, were

willing to become respondents, and the exclusion criteria were respondents who refused to fill out the questionnaire. The characteristics of the respondents included age, majors of respondents (health, social science, economics, engineering), father's education, mother's education, father's occupation, mother's occupation, family income, and consumption of Iron Tablets (TTD). The variables used in this study were eating habits, nutritional status, menstruation duration, and menstrual cycle with the incidence of anemia. The measurement tools used were a hemoglobin (Hb) meter *(easytouch)*, a *stadiometer*, and a digital scale, and the tool has been calibrated so that it can reduce bias in these measurements. Data was collected by filling out a questionnaire that had been tested on a similar population by respondents, in filling out the questionnaire, it was also explained in advance how to fill it in and accompanied by researchers and enumerators. Hemoglobin measurement (to measure blood Hb level), Height and Weight (to calculate body mass index) that adjusts BMI/U to age and gender, to be more accurate for adolescents under 18 years old (Kemenkes, 2020). For the anemia variable, two categories were used: no anemia (Hb > 12 g/dL) and anemia (Hb < 12 g/dL) (WHO, 2011). Eating habits obtained using a questionnaire with 11 questions eating habits were calculated using the mean, where a good eating pattern was defined as ≥30,75 and a poor eating pattern was <30,74 (Suryanti et al., 2017). Menstrual duration and nutritional status were obtained using a questionnaire with 3 questions, menstruation duration was classified as normal (3-7 days) or abnormal (< 2 days or > 7 days) (Listiana, 2016).Menstrual cycle was classified as normal (21-35 days) and abnormal (< 21 days or > 35 days) (Suhariyati et al., 2020). Nutritional status is obtained from calculating the age of respondents using standard deviation, namely nutritional status (BMI) was categorized as follows: undernutrition (BMI < -2 SD), normal nutrition (-2 SD to +1 SD), overweight (+1 SD to +2 SD), and obesity (> +2 SD (Kemenkes, 2020) The analysis in this study used univariate analysis to identify frequency distribution, and

bivariate analysis to evaluate the relationship between dependent and independent variables using *chi-square* testing. Health Research Ethics Committee of 417/UN9.FKM/TU.KKE/2024.

RESULT AND DISCUSSION

Table 1. Respondent Characteristics, Anemia Incidence, Eating Habits, Menstruation Duration, and Nutritional Status

	Variable	Frekuensi (n= 100)	Persentase (%)
1.	**Respondent Age**		
	15 years	27	27
	16 years	63	63
	17 years	10	10
2.	**Respondent Major**		
	Health	35	35
	Social Science	22	22
	Economics	22	22
	Engineering	21	21
3.	**Father's Education**		
	Didn't finish Elementary School	1	1,0
	Elementary School	30	30
	Junior High School	14	14
	Senior High School	41	41
	College/University	14	14
4.	**Mother's Education**		
	Didn't finish Elementary School	1	1,0
	Elementary School	30	30
	Junior High School	11	11
	Senior High School	46	46
	College/University	12	12
5.	**Father's Occupation**		
	Farmer	25	25
	Merchant	11	11
	Agricultural laborer/worker	18	18
	Civil Servants/PPPK	6	6
	Private company employees	14	14
	Military/Police Member	1	1
	Others....	25	25
6.	**Mother's Occupation**		
	Housewife	70	70
	Farmer	8	8,0
	Merchant	9	9,0
	Civil Servant/PPPK	9	9,0
	Military/Police Member	1	1,0
	Others....	3	3,0
7.	**Family Income (UMK Ogan Ilir)**		
	< Rp 3.456.874	77	77
	≥ Rp 3.456.874	23	23
8.	**Anemia Incidence**		
	Anemia	11	11
	Non anemia	89	89

Variable	Frekuensi (n= 100)	Persentase (%)
9. Eating Habits		
Good (≥mean, mean: 30,75)	59	59
Poor (< mean, mean: 30,74)	41	41
10. Nutritional Status		
Undernutrition: -3 SD to <-2 SD	5	5
Normal nutrition: -2 SD sd +1 SD	82	82
Overnutrition: +1 SD sd +2 SD	4	4
Obesity: >2 SD	9	9
11. Menstruation Duration		
Normal (3-7 days)	80	80
Abnormal (>7 days)	20	20
12. Menstrual Cycle		
Normal (21-35 days)	52	52
Abnormal (>35 days)	48	48
13. Iron Tablet Consumption		
Yes	56	56
No	44	44

Source: Research Data, 2024

Based on Table 1, the respondents' age was predominantly 16 years (21%), with the majority of respondents majoring in health (35%), the majority of respondents did not experience anemia (89%). The majority of respondents had a good eating pattern (59%), the majority had good nutritional status (82%), the majority experienced a normal menstruation duration (3-7 days) (80%), the majority had a normal menstrual cycle (21-35 days) (52%), and the majority of respondents consumed Iron Tablets (18.7%).

Table 2. Frequency Distribution of Eating Habits Among Adolescent Girls at MAN 1 Ogan Ilir

No	Statement	Always	Often	Sometimes	Never
1.	I eat a main meal 3 times a day.	21%	21%	57%	1,0%
2.	I follow a weight loss diet to maintain my body shape*	18%	8%	25%	49%
3.	I consume fruits rich in Vitamin C (pineapples, watermelons, and others	24%	47%	28%	1,0%
4.	I eat rice with iron-rich side dishes (meat, fish, organ meats, eggs) every day	28%	41%	31%	0%
5.	I eat breakfast before starting activities in the morning, such as going to school	30%	19%	46%	5,0%
6.	I eat rice with green vegetables (spinach, broccoli, mustard greens) every day	16%	30%	52%	2,0%
7.	I eat protein sources like tofu and tempeh	26%	41%	32%	1,0%
8.	I eat rice with fish	26%	46%	27%	1,0%

9.	I consume instant noodles every day*	10%	17%	66%	7,0%
10.	I eat rice with eggs	18%	36%	45%	1,0%
11.	I eat vegetables for breakfast, lunch, and dinner	13%	31%	52%	4,0%

Source: Research Data 2024 (negative statements*)

Based on table 2, respondents stated that they only sometimes eat three meals a day (57%), sometimes eat breakfast before morning activities such as school (46%), sometimes eat rice with green vegetables (spinach, broccoli, mustard greens) every day (52%), sometimes eat rice with eggs (45%), sometimes eat vegetables at breakfast, lunch, and dinner (52%).

Table 3. Analysis of the Relationship Between Eating Habits and the Incidence of Anemia Among Adolescent Girls at MAN 1 Ogan Ilir

Eating Habits	Anemia		Non-Anemia		Total	PR	95% CI	p-value
	n	%	n	%				
Poor	10	19,6	41	80,4	100%	11,707	1,437-95,361	0,013
Good	1	2,0	48	98,0	100%			

Source: Research Data, 2024

Based on table 3, there were 10 respondents (19,6%) with anemia but had a poor eating habits and 1 respondent (2,0%) with anemia but had a good eating habits. In addition, there were 41 respondents (80,4%) with no anemia but poor eating habits, and 48 respondents (98,0%) with no anemia but good eating habits. The results of bivariate analysis showed that the *p-value* (0,013) <0.05, indicating that there is a relationship between eating habits and the incidence of anemia among adolescent girls at MAN 1 Ogan Ilir. Adolescent girls with poor eating habits are 11,7 times more likely to experience anemia compared to those with good eating habits.

Table 4. Analysis of the Relationship Between Nutritional Status and the Incidence of Anemia Among Adolescent Girls at MAN 1 Ogan Ilir

Nutritional Status	Anemia		Non-Anemia		Total	PR	95% CI	p-value
	n	%	n	%				
Abnormal	1	5,6	17	94,4	100%	2,361	0,283-19,720	0,683
Normal	10	12,2	72	87,8	100%			

Source: Research Data, 2024

Based on table 4, there is 1 respondent (5,6%) with anemia but had abnormal nutritional status and 10 respondents (12,2%) with anemia but had normal nutritional status. In addition, there were 17 respondents (94,4%) with no anemia but had abnormal nutritional status and 72 respondents (87,8%) with no anemia but had normal nutritional status. The results of bivariate analysis prove that the *p-value* (0,683) > 0,05, meaning that there is no significant relationship between nutritional status and the incidence of anemia among adolescent girls at MAN 1 Ogan Ilir. Adolescent girls with abnormal nutritional status are at 2,3 times greater risk of experiencing anemia compared to those with normal nutritional status.

Table 5. Analysis of the Relationship Between Menstrual Duration and the Incidence of Anemia Among Adolescent Girls at MAN 1 Ogan Ilir

Menstrual Duration	Anemia		Non-Anemia		Total	PR	95% CI	p-value
	n	%	n	%				
Abnormal	4	20,0	16	80	100%	2,607	0,681-9,980	0,223
Normal	7	8,8	73	91,3	100%			

Source: Research Data, 2024

Based on table 5, there are 4 respondents (20%) with anaemia who had abnormal menstrual duration, and 7 respondents (8.8%) with anemia who had normal menstrual duration. In addition, there were 16 respondents (80%) with no anaemia who had abnormal menstrual duration and 73 respondents (91,3%) with no anemia who had normal menstrual duration. The results of bivariate analysis show a *p-value* (0,223) > 0,05, meaning that there is no significant relationship between menstrual duration and the incidence of anemia among adolescent girls at MAN 1 Ogan Ilir. Adolescent girls with abnormal menstrual duration are at 2,6 times greater risk of experiencing anemia compared to those with normal menstrual duration.

Table 6. Analysis of the Relationship Between Menstrual Cycle and the Incidence of Anemia Among Adolescent Girls at MAN 1 Ogan Ilir

Menstrual Cycle	Anemia		Non-Anemia		Total	PR	95% CI	p-value
	n	%	n	%				
Abnormal	4	8,3	44	91,7	100%	0,584	0,160-2,138	0,618
Normal	7	13,5	45	86,5	100%			

Source: Research Data, 2024

Based on table 6, there are 4 respondents (8,3%) with anemia who had abnormal menstrual cycles and 7 respondents (13,5%) with anemia who had normal menstrual cycles. In addition, there were 44 respondents (91,7%) with no anemia who had an abnormal menstrual cycle and 45 respondents (86,5%) with no anemia who had a normal menstrual cycle. The results of bivariate analysis showed a *p-value* (0,618) > 0,05, meaning that there is no significant relationship between menstrual cycle and the incidence of anemia among adolescent girls at MAN 1 Ogan Ilir. Adolescent girls with an abnormal menstrual cycle are at 0,5 times greater risk of experiencing anemia compared to those with a normal menstrual cycle.

The results of the analysis indicate that there is a relationship between eating habits and the incidence of anemia among adolescent girls at MAN 1 Ogan Ilir ($p = 0.013$). These results are consistent with a study conducted at SMA Murni Padang, which found a p-value of 0.028, meaning there is a relationship between the incidence of anemia and eating habits (Manila, 2021). Similarly, research conducted on school-age children aged 6-18 years obtained a value ($p = 1,153$) which means that there is a relationship between diet and the incidence of anaemia in adolescent girls (Verma et al., 2004). Eating habits anemia because adolescent girls do not consume green vegetables, and skip breakfast in the

morning, the habit of adolescents who often eat fried foods, fast food, and sweet drinks, then the iron needs in the body are not fulfilled so that adolescents experience anemia (Margiyanti, 2021).

Eating habits have a significant impact on nutritional intake. A person who eats three meals a day but with a frequency and types of food that are deficient in essential nutrients can influence the occurrence of anemia (Anwar et al., 2021).The income level of parents is a factor that affects diet, the lower the income of parents, the need for nutritionally balanced food is limited, resulting in low nutritional content, for example instant noodles and fried foods (Stabell et al., 2021). From the research data, the majority of respondents reported eating main meals three times a day occasionally, at 57%. This suggests that improving regular eating habits is important. An unbalanced diet can adversely affect adolescent health and increase the risk of anemia in these girls. Poor eating habits lead to a deficiency of essential nutrients, such as iron and protein(Putri et al., 2022). This condition needs serious attention because anemia can negatively impact health, concentration, and the productivity of adolescents. Therefore, efforts to improve adolescents' eating habits through nutrition education, school interventions with the provision of nutritious food, and regular health screenings to detect anemia early are necessary (Armah et al., 2021).

The results of the analysis show no relationship between nutritional status and the incidence of anemia among adolescent girls at MAN 1 Ogan Ilir ($p = 0.683$). These results are consistent with a study conducted at a high school in Badung Regency, which found a p-value of 0.301, indicating no relationship between anemia and nutritional status (Putra, 2019). The nutritional status of adolescents is fulfilled because the body receives adequate and balanced nutrition in accordance with the needs of energy, growth, and daily activities. Adequate protein consumption from sources such as eggs, meat, tofu and beans also plays a role in muscle and tissue building, as well as body development. In addition, calorie intake in accordance

with individual needs helps maintain energy for daily activities (Noviyanti et al., 2024).

Nutritional status does not necessarily have a direct correlation with anemia, as anemia is not only influenced by nutritional status. A person with good nutritional status can still experience anemia if the nutritional intake required for hemoglobin (Hb) formation is insufficient. Additionally, anemia can also be caused by chronic infections, bleeding such as heavy menstruation in adolescent girls. Therefore, nutritional status is not always related to anemia (Contesa et al., 2022).

Good nutritional status will support optimal growth and development, especially in adolescents who are experiencing a period of rapid growth. With adequate and balanced nutritional intake, the body can obtain the energy needed to carry out daily activities and improve concentration. In addition, good nutritional status also plays a role in maintaining healthy bones, muscles and other organs, reducing the risk of health problems such as anaemia, obesity or metabolic disorders. A diet rich in carbohydrates, proteins and healthy fats, vitamins and minerals, ensures that all body functions can run optimally. Thus, adolescents with good nutritional status tend to have better academic performance, high stamina, and maximised physical growth (Kim et al., 2014).

Nutritional status is not necessarily directly related to anaemia because anemia is not only influenced by nutritional status. A person with a good nutritional status can still experience anemia if the intake of nutrients needed for the formation of hemoglobin (Hb) is not sufficient. Even if a person has an overall good nutritional status, anemia can still occur if the intake of certain nutrients needed in the formation of aemoglobin (Hb) is insufficient (NR, 2023). For example, adolescent girls with good nutritional status may still develop iron deficiency anaemia if their intake of iron, which is essential in the formation of haemoglobin, is insufficient (Habtegiorgis et al., 2022). In addition, anaemia can also result from chronic infections, bleeding such as heavy menstruation in adolescent girls, hence nutritional

status is not always related to Hb formation (Putra, 2019).

The findings indicate no correlation between the length of menstruation (p = 0.223) and the menstrual cycle (p = 0.618) and the occurrence of anemia in teenage females at MAN 1 Ogan Ilir. This aligns with a research conducted at SMK Islam Jepara, which revealed a p-value of 0.749, indicating no correlation between anemia and the menstrual cycle (Himawan et al., 2020). Similarly, a study conducted in North West Ethiopia stated that 44% of adolescents who experienced a normal menstrual cycle (Mengistu et al., 2019).

The duration and cycle of menstruation are not related to anemia incidence in adolescent girls. This may be because 56% of the respondents have the habit of taking blood addition tablets. With adequate nutritional intake, the body is able to maintain normal hemoglobin levels, thus preventing anemia and boosting the immune system. Additionally, 89% of the adolescent girls at MAN 1 Ogan Ilir had normal hemoglobin levels due to their consumption of iron supplements, which helped replace lost blood during menstruation, form hemoglobin, and produce red blood cells. If iron supplements are consumed regularly, the body can counter the effects of blood loss during menstruation, especially if the menstrual cycle lasts longer. This highlights the importance of iron consumption for adolescent girls (Jalambo et al., 2018). Other factors such as the intake of a balanced diet and nutrients, such as iron, vitamin B12, folic acid, and vitamin C, can help the body produce healthy red blood cells and cope with the blood loss that occurs during menstruation. Maintaining an iron-rich diet can help with blood loss and prevent anaemia (Anggreiniboti, 2022).

CONCLUSION

The research findings concerning teenage females at MAN 1 Ogan Ilir indicate a correlation between dietary practices and the prevalence of anemia. An imbalanced diet, characterized by insufficient iron and critical nutrients, may increase the risk of anemia. This underscores the need of enhancing good and nutritious dietary practices for

teenage females to avert anemia, since iron is vital for hemoglobin and red blood cell synthesis. The limitations of this research include its reliance on a cross-sectional design, inadequate anemia diagnosis, and the exclusive focus on hemoglobin levels without considering other factors such as iron status, infections, and others. Future research can add other influential factors such as iron status, infection and chronic diseases, these factors in order to get a more accurate understanding, and can analyse the effect of diet in depth in addition to observing the relationship between diet and the incidence of anaemia, further researchers can examine the type of food consumed, the frequency of eating, and the intake of iron and vitamin C which can help iron absorption.

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