ANALYSIS OF THE RELATIONSHIP BETWEEN DIETARY PATTERNS, NUTRITIONAL STATUS, AND MENSTRUAL CYCLE WITH THE INCIDENCE OF ANEMIA AMONG FEMALE ADOLESCENTS AT SMA STATE 3 KOTA GORONTALO SENIOR HIGH SCHOOL

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Abstract: Anemia is characterized by a decrease in hemoglobin (Hb), hematocrit, and red blood cell count below normal levels. The prevalence of anemia in Indonesia remains relatively high. According to the 2018 Basic Health Research (Riskesdas) data, the prevalence of anemia among adolescents is 32%, meaning 3-4 out of 10 adolescents suffer from anemia. Female adolescents are more at risk of anemia compared to males due to monthly menstruation, frequent attempts to maintain appearance, and dieting to achieve an ideal body shape, which leads to reduced food intake. Another issue among adolescents is that almost 50% skip breakfast. These factors affect hemoglobin levels in the body and trigger anemia. This study aims to analyze the relationship between dietary patterns, nutritional status, and menstrual cycle with the incidence of anemia among female adolescents at SMA Negeri 3 Kota Gorontalo Senior High School. This research was conducted using an analytical study with a cross-sectional design. The sample consisted of female adolescents at the mentioned school. The instrument employed a questionnaire. The results showed a significant relationship between dietary patterns (p-value = 0.015), nutritional status (p-value = 0.002), and menstrual cycle (p-value = 0.002) with the incidence of anemia. In conclusion, there is a relationship between dietary patterns, nutritional status, and menstrual cycle with the incidence of anemia. Female adolescents are advised to increase their intake of iron-rich foods to boost hemoglobin levels and prevent anemia. The fulfillment of essential nutrients, such as vitamin C from fruits and vegetables, also needs to be considered to support blood formation.

Keywords: Anemia, Dietary Patterns, Nutritional Status, Menstrual Cycle

INTRODUCTION

Anemia is characterized by a decrease in hemoglobin (Hb) levels, hematocrit, and the number of red blood cells below normal values. According to WHO, the normal hemoglobin level for children aged 5-11 years is 12.0 g/dl, and for males over 15 years old, it is >13.0 g/dl.

The prevalence of anemia in Indonesia remains relatively high. Based on the 2018 Basic Health Research (Riskesdas) data, the prevalence of anemia among adolescents is 32%, meaning that 3-4 out of 10 adolescents suffer from anemia. The prevalence of anemia among female adolescents aged 10-18 years in Indonesia is 57.1%.

Adolescence is a period that requires more energy and double the nutrition during growth compared to other years. According to Riskesdas data, the prevalence of iron deficiency anemia is higher in female adolescents, at 22.7%, while the prevalence among male adolescents is 12.4%.

One of the causes of iron deficiency anemia is blood loss, which in adolescent girls is primarily due to menstruation. This blood loss is influenced by the menstrual pattern, including both the cycle and the duration of menstruation.

Another issue commonly faced by adolescents is that nearly 50% skip breakfast. Female adolescents, in particular, are very concerned with body image, leading them to limit food intake and adopt poor eating habits, such as skipping breakfast and frequently consuming snacks. These behaviors affect hemoglobin levels in the body and can trigger anemia.

Undernourished or overnourished nutritional status is a significant issue among adolescents, caused by improper eating behaviors, where there is an imbalance between nutrient intake and the recommended nutritional requirements.

Adolescent nutritional problems are a serious issue that must be addressed; however, adolescents remain a neglected group. Current government programs primarily target pregnant women to prevent giving birth to anemic infants. Yet, anemia in adolescents can have long-term effects, increasing the risk of bleeding during childbirth and contributing to maternal mortality. Therefore, this study aims to examine the relationship between dietary patterns, nutritional

status, and menstrual patterns with the incidence of anemia among female adolescents at SMA State 3 Gorontalo Senior High School.

METHOD

This study is an observational analytic study with a cross-sectional approach to examine the relationship between dietary patterns, nutritional status, and menstrual patterns among X and XI-grade female students at SMA State 3 Gorontalo Senior High School. All variables were measured and observed simultaneously.

The population comprised X and XI-grade female students at SMA State 3 Gorontalo Senior High School. The sample for this study was drawn from the same population using a total sampling technique.

RESULTS

1. Relationship Between Dietary Patterns and the Incidence of Anemia Among Female Adolescents at SMA State 3 Gorontalo Senior High School

Table 5.6 Relationship Between Dietary Patterns and the Incidence of Anemia Among Female Adolescents at SMA State 3 Gorontalo Senior High School.

Dietary Patterns	Anemia				Total		p-Value
	No		Yes				
	n	%	n	%	n	%	
Good	26	76.5	7	41.2	33	64.7	0.015
Poor	8	23.5	10	58.5	18	35.3	

Source: Primary Data, 2023

Based on Table 5.6 above, the relationship between dietary patterns and the incidence of anemia among female adolescents at SMA State 3 Gorontalo Senior High School showed that most respondents with poor dietary patterns, 10 respondents or 58.5%, experienced anemia, compared to 7 respondents or 41.2% with good dietary patterns. The p-value from the Pearson Chi-Square test was 0.015, less than the significance level of 0.05, thus rejecting the

null hypothesis. It can be concluded that there was a significant relationship between dietary patterns and the incidence of anemia.

2. Relationship Between Nutritional Status and the Incidence of Anemia Among Female Adolescents at SMA State 3 Gorontalo Senior High School

Table 5.7 Relationship Between Nutritional Status and the Incidence of Anemia Among Female Adolescents at SMA State 3 Gorontalo Senior High School

Nutritional Status	Anemia				Total		p-Value
	No		Yes				
	n	%	n	%	n	%	
Normal	31	91.2	8	47.1	39	76.5	0.002
Overweight	0	0.0	1	5.9	1	2.0	
Underweight	3	8.8	8	47.1	11	21.6	

Source: Primary Data, 2023

Based on Table 5.7 above, the relationship between nutritional status and the incidence of anemia among female adolescents at SMA State 3 Gorontalo Senior High School showed that anemia occurred more frequently in respondents with normal and underweight status, with 8 respondents or 47.1% each, whereas only 1 respondent or 5.9% was overweight. The p-value from the Pearson Chi-Square test was 0.002, less than the significance level of 0.05, thus rejecting the null hypothesis. It can be concluded that there was a significant relationship between nutritional status and the incidence of anemia.

3. Relationship Between Menstrual Cycle and the Incidence of Anemia Among Female Adolescents at SMA State 3 Gorontalo Senior High School

Table 5.8 Relationship Between Menstrual Cycle and the Incidence of Anemia Among Female Adolescents at SMA State 3 Gorontalo Senior High School

Menstrual Cycle	Anemia				Total		*p-Value*
	No		Yes				
	n	%	n	%	n	%	
Regular	29	85.3	8	47.1	37	72.5	0.004
Irregular	5	14.7	9	52.9	14	27.5	

Source: Primary Data, 2023

Based on Table 5.8 above, the relationship between the menstrual cycle and the incidence of anemia among female adolescents at SMA State 3 Gorontalo Senior High School indicated that anemia was more prevalent among respondents with irregular menstrual cycles,

with 9 respondents or 52.9%, while 8 respondents or 47.1% with regular cycles experienced anemia. The p-value from the Pearson Chi-Square test was 0.004, less than the significance level of 0.05, thus rejecting the null hypothesis. It can be concluded that there was a significant relationship between the menstrual cycle and the incidence of anemia.

DISCUSSION

Relationship Between Dietary Patterns and the Incidence of Anemia Among Female Adolescents at SMA State 3 Gorontalo Senior High School

The analysis results showed that the proportion of respondents experiencing anemia was higher among those with poor dietary patterns, reaching 58.5%. In contrast, respondents with good dietary patterns had a lower proportion of anemia cases, at 41.2%. These findings highlight the importance of addressing dietary patterns in efforts to prevent and mitigate anemia among female adolescents in this setting.

Characteristics commonly shared by adolescent females involve unhealthy eating habits. These habits include skipping breakfast, insufficient water intake, engaging in unhealthy diets to achieve a slimmer body, frequently snacking on low-nutrient foods, and consuming fast food. These unhealthy dietary patterns impact the body's inability to meet its needs for the synthesis and formation of hemoglobin (Hb).

According to Zubir (2018), if such habits persist for a long period, they can gradually lead to a decrease in Hb levels. Hemoglobin is an essential protein responsible for transporting oxygen throughout the body. Insufficient hemoglobin levels can result in anemia, a condition in which the body lacks healthy red blood cells.

Therefore, it is essential for female adolescents to understand the importance of a balanced diet and to provide the nutrients the body needs, particularly for the formation of hemoglobin. Nutritional education and promoting healthy lifestyles can be crucial steps in addressing this issue and preventing anemia among adolescents.

The study conducted by Muhayati, A (2019) illustrated the respondents' dietary patterns, revealing that the majority, 99 individuals (52.7%), tend to follow poor dietary habits. In contrast,

only 89 individuals (47.3%) were found to have dietary patterns that could be categorized as healthy.

Relationship Between Nutritional Status and the Incidence of Anemia Among Female Adolescents at SMA State 3 Gorontalo Senior High School

Data analysis showed that most respondents experiencing anemia had a normal or underweight nutritional status, with 8 individuals, or approximately 47.1%. Meanwhile, only 1 respondent, or about 5.9%, with an overweight status, was affected. In conclusion, there is a significant correlation between nutritional status and the incidence of anemia among female adolescents at SMA State 3 Gorontalo Senior High School.

In Hapsah's (2022) research, nutritional status plays a crucial role in female adolescents' health, particularly concerning anemia. Adolescents with poor nutritional status are more likely to experience nutrient deficiencies, including iron, which results in anemia. This study contributes to a deeper understanding of the factors influencing adolescent health, and its implications can be used to design more targeted health interventions or programs, especially in efforts to prevent and manage anemia among the female adolescent population.

Relationship Between Menstrual Cycle and the Incidence of Anemia Among Female Adolescents at SMA State 3 Gorontalo Senior High School

The study findings indicated that female adolescents with irregular menstrual cycles experienced a higher incidence of anemia, with 9 respondents, or approximately 52.9%. Conversely, 8 respondents, or about 47.1%, reported having regular menstrual cycles. The study found a significant relationship between the menstrual cycle and the occurrence of anemia among female adolescents at SMA State 3 Gorontalo Senior High School.

These findings were consistent with the study conducted by Hasrati (2015) titled "Hubungan antara Status Gizi dengan Siklus Menstruasi pada siswa SMK Negeri 2 Godean Sleman Yogyakarta." The results revealed a significant relationship between anemia and menstrual cycles. These findings suggested that nutritional status, including nutrients such as

iron associated with anemia, might influence the menstrual cycle in adolescents. This relationship reflected the complex interactions between nutritional factors and reproductive health in female adolescents. However, these findings did not agree with research conducted by Shariff Suchi, which involved female students from the DIII Midwifery program at Universitas Muslim Indonesia, concluding that there was no relationship between menstrual patterns and anemia.

According to the authors, there are other factors that contribute to the causes of anemia in female adolescents, in addition to menstrual patterns. These factors include hormonal aspects, dietary habits, stress levels, and nutritional imbalances. Although most female adolescents tend to maintain a balanced diet in terms of nutrition, a small portion appears less enthusiastic or infrequently consumes fruits and vegetables.

CONCLUSION

1. The p-value from the Pearson Chi-Square test is 0.015, less than the significance level of 0.05, indicating a significant relationship between dietary patterns and the incidence of anemia.
2. The p-value from the Pearson Chi-Square test is 0.002, less than the significance level of 0.05, indicating a significant relationship between nutritional status and the incidence of anemia.
3. The p-value from the Pearson Chi-Square test is 0.002, less than the significance level of 0.05, indicating a significant relationship between menstrual cycles and the incidence of anemia.

Conflict of Interest

The author declares no conflict of interest.

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