



DIETARY PATTERNS ARE RELATED TO THE INCIDENCE OF ANEMIA IN ADOLESCENT GIRLS

Mia Ardina*, Anas Rahmad Hidayat, Siti Fadhilah

Midwifery Study Program, Master's Program, STIKES Guna Bangsa Yogyakarta, Jl. Ring Road Utara,
Condongcatur, Depok, Sleman, Yogyakarta 55283, Indonesia

*miaardina2015@gmail.com

ABSTRACT

Anemia in adolescent girls is a significant public health problem, especially in developing countries like Indonesia. This study aims to analyze the relationship between dietary patterns and the incidence of anemia in adolescent girls in Bogor Regency. The population in this study were adolescent girls aged 11–13 years who were selected through simple cluster sampling technique. Data were collected using a structured questionnaire and hemoglobin level measurements to determine anemia status. The instrument used was a dietary questionnaire with a validity test (r count = 0.23901 < 0.36 1) and the reliability of the dietary questionnaire Cronbach's alpha value = 0.8346 (>0.6). Data analysis was performed using chi-square statistical tests and logistic regression. Adolescents with poor dietary patterns were the most likely to experience anemia, amounting to 125 adolescents or 42%. The chi-square test obtained a p -value = 0.001 (p < 0.05), meaning there is a relationship between dietary patterns and the incidence of anemia in adolescent girls in Bogor Regency in 2025. Adolescents with knowledge of balanced diets tend to have a lower risk of experiencing anemia.

Keywords: adolescent girls; anemia; diet; iron supplements; nutritional knowledge

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INTRODUCTION

The incidence of anemia in adolescents worldwide ranges from 40 to 88%, and in Southeast Asia, the prevalence of anemia in adolescents reaches 45.7%, or approximately 182 million adolescents (Dewi & Hamidah, 2024). Anemia is a condition in which the number of red blood cells is insufficient to meet the body's physiological needs (Chinelo, 2022). This condition is caused by hemoglobin (Hb) levels in the blood that are below normal due to a deficiency of one or more essential nutrients needed for red blood cell formation. Adolescent girls are more susceptible to anemia than boys, primarily due to iron loss during menstruation (Wiafe, 2023).

Global data shows that anemia remains a serious health problem affecting women of reproductive age between 20 and 35, with approximately 1.5 billion women worldwide suffering from anemia, two-thirds of whom live in low- and middle-income countries. Indonesia, as a developing country, also faces this problem (WHO, 2022). Data obtained by the Bogor District Health Office showed 2,638 cases of anemia among seventh-grade female adolescents, with 1,125 cases of moderate anemia and 1,513 cases of mild anemia (Bogor Health Office, 2024).

Untreated anemia can negatively impact the mental and physical abilities of adolescent girls, especially during periods of rapid growth, increased nutritional needs, and menstrual blood loss (Logapriya, 2024). Symptoms of anemia include paleness of the face and eyelids, fatigue, and frequent dizziness (5L). Its effects can also reduce work productivity and academic performance, impair concentration, and lower academic achievement (WHO, 2022).

Health development in Indonesia currently focuses on prevention and health promotion, without neglecting treatment and recovery (Fuadi,2024). Health care begins early, encompassing newborns, toddlers, preschoolers, adolescents, the reproductive years, and the elderly (Ahmaniyah, 2021). A crucial aspect of health development is adolescent health, which aims to prepare them physically and psychologically for adulthood and reproductive age (Amalia et al., 2024).

Several factors contribute to anemia, including poor diet, inadequate nutritional knowledge among adolescents, and the consumption of iron tablets, which young women often fail to recognize the importance of. Other causes include infections and chronic illnesses (Dewi & Hamidah, 2024) . With adequate knowledge, adolescents can be more informed in their food choices. As they age, they consume more food each day. A good diet includes consuming healthy foods containing carbohydrates, protein, vegetables, fruit, and water. Conversely, a poor diet can lead to iron deficiency, which is essential for hemoglobin production (Siska & Masluroh, 2024). Economic, cultural, and social factors also influence adolescent girls' food choices, especially as they begin to choose their own food (Kurniyati, 2021).

One of the midwives' roles in managing anemia in adolescents is providing education, counseling, and screening, or early detection of anemia (Kusuma, 2021). As health educators, midwives will provide information about anemia, its causes, symptoms, and impact on adolescents. Midwives will also explain good nutrition and the benefits of vitamins for anemia prevention (Guzmalisa, 2022). In addition to providing counseling, midwives also provide anemia screening by routinely checking hemoglobin levels. If the examination reveals anemia, midwives will conduct a follow-up to determine if the condition is present. This study aims to analyze the relationship between dietary patterns and the incidence of anemia in adolescent girls in Bogor Regency.

METHOD

This research design is *analytical observational* with approach quantitative *Cross Sectional*. The population in this study was 1,167 with cluster sampling. Samples were taken from 108 junior high schools, consisting of three junior high schools to be studied, namely SMP N 01 Parung with 222 students, SMP N 01 Cigombong with 760 students, and SMP N 1 Bojonggede with 185 students. The sample size in this study was 298 junior high school students in Bogor city. The instrument used was a dietary questionnaire with a validity test (r count = 0.23901 <0.36 1) and the reliability of the dietary questionnaire Cronbach's alpha value = 0.8346 (>0.6). Data analysis used the *chi-square test*. This research has passed ethical testing and has been declared ethically approved by STIKES Guna Bangsa Yogyakarta with Number: 031/KEPK/III/2025

RESULT

Eating patterns in adolescents

Table 1.

Distribution of frequency of eating patterns in adolescents

Dietary habit	Mark	
	f	%
Good	145	48.7
Not good	153	51.3

Based on table 1, it can be seen that the worse the eating patterns of adolescents, the higher the chance of anemia, namely 153 adolescents or 51.3%.

The occurrence of anemia

Table 2.

Distribution of Frequency of Anemia in Adolescents

Anemia in adolescents	Mark	
	f	%
Anemia	171	57.4
No anemia	127	42.6

Based on table 2, it can be seen that the high number of adolescents with anemia is 171 adolescents who are anemic or 57.4%.

The Relationship Between Dietary Patterns In Adolescents And The Incidence Of Anemia

Table 3.

Cross-tabulation of dietary patterns and the incidence of anemia in adolescents

Dietary habit	Anemia		No Anemia		Total	P-value of <i>chi-square test</i>
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)		
Good	46	15.4	99	33.2	145	0.001
Not good	125	42	28	9.4	153	

Based on table 3, it is known that adolescents who have poor eating habits are the most likely to experience anemia, as many as 125 adolescents or 42%. The *chi-square test* obtained a p-value = 0.001 ($p < 0.05$) which means that there is a hypothesis or suspicion that there is a relationship between eating habits and the incidence of anemia in adolescent girls in Bogor Regency in 2025. This means that the better the eating habits of adolescent girls, the lower the chance of anemia, or if the poorer the eating habits of adolescents, the higher the chance of anemia in adolescent girls in Bogor Regency in 2025.

DISCUSSION

The Relationship between Nutritional Patterns and Anemia in Adolescents

Connection Statistical tests show that there is a significant relationship between dietary patterns and anemia in adolescents in Bogor Regency in 2024. Dietary patterns relate to adolescents' methods and efforts to regulate the type, quantity, and variety of food consumed to maintain physical health, meet nutritional needs, and prevent anemia (Hargreaves,2022). Adolescent girls' dietary patterns refer to how they choose and consume food in response to physiological, psychological, cultural, and social factors. Type, frequency, and quantity are three key elements of a successful diet. Adolescents are reaching a point of independence, making food choices crucial. Adolescent girls are free to eat whatever they desire. Adolescents are often influenced by their peers due to their activities outside the home, making it difficult for parents to control what they consume (Kurniawan & Fitriani, 2024) .

Poor adolescent eating habits can lead to anemia due to the consumption of foods that lack iron, and the choice of foods that adolescents often choose, especially those that are popular and fast food. This is especially true for adolescent girls, who are vulnerable to malnutrition during their second peak period of growth and development, due to inadequate nutrient intake due to poor eating patterns and the influence of their social environment and dieting. Iron deficiency is the most common cause (Siska & Masluroh, 2024) .

The relatively rapid growth of adolescents, coupled with poor lifestyle and dietary choices, can lead to iron-deficiency anemia, particularly in girls who have reached menstruation. One cause of anemia in adolescents is reduced portion sizes, which, if continued, can lead to anorexia nervosa, bulimia, and other mental disorders (Dewi & Hamidah, 2024). This research is in line with research conducted by (Siska & Masluroh, 2024) , there is a significant relationship between dietary patterns and the incidence of anemia in female adolescents at SMAN 6 Bogor in 2024 with a p-value = 0.000. One of the factors that causes changes in

adolescent dietary patterns is the many types of new foods around them, this will provide encouragement to try these foods, considering that adolescence is the period most easily influenced by changes, especially in terms of food consumption.

Another study conducted by (Andira & Arlianti, 2025) found a significant relationship between diet and anemia in adolescent girls with a p-value of 0.002. Diet has a risk of anemia because poor diet results in insufficient intake of nutrients needed by the body in the form of iron, folic acid, and vitamin B12 which support the process of HB formation (Kumar, 2022). Anemia can occur due to poor health behavior of adolescent girls. Health behavior is one of the factors that influence human health status. Health behavior *is* a person's response to stimuli related to illness and disease, the health care system, food, drinks, and the environment (Shimazaki, 2023). Researchers hypothesize that adolescents with healthy eating habits will choose the types and amounts of food they eat daily. The food choices they make will influence the formation of red blood cells in the body, which can help prevent anemia. By choosing healthy foods, adolescents will be able to meet the energy needs of the body for hemoglobin formation. A healthy diet will also impact the incidence of anemia. Fast food and skipping mealtimes are major factors in the development of anemia in adolescents.

CONCLUSION

The majority of adolescent girls in Bogor Regency have poor dietary habits. A significant number of them suffer from anemia. There is a link between dietary habits and anemia in adolescents.

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