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Nutritional Status and Anemia: A Study in Adolescent Girls

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ABSTRACT

Introduction: Anemia remains a common public health problem among adolescents, characterized by low hemoglobin levels. This group is more vulnerable due to menstruation, rapid growth, and increased iron requirements, which are often not balanced with a healthy diet. Furthermore, the perception of a less-than-ideal body image encourages adolescent girls to restrict their diet, resulting in suboptimal nutritional status. However, nutritional status plays a crucial role in the incidence of anemia because it is related to iron adequacy in the body. Therefore, it is necessary to examine the relationship between nutritional status and the incidence of anemia in adolescent girls as a preventative measure. **Objective**: This study aims to determine the relationship between nutritional status and the incidence of anemia in adolescent girls. **Method** The study used an analytical observational design with a cross-sectional approach, involving 47 grade VIII female adolescents at SMPN 5 Ciamis in 2026, who were taken using simple random sampling. Nutritional status was measured using Body Mass Index for age (BMI/A), while anemia was measured based on hemoglobin levels (Hb <12 g/dL). Data analysis was performed using the Chi-Square test with a significance level of 0.05. **Result**: The results of the study showed that the majority of respondents had normal nutritional status (48.9%) and did not have anemia (55.3%). However, 38.3% of adolescents had poor nutritional status and 44.7% had anemia. Bivariate analysis revealed a significant association between nutritional status and the prevalence of anemia (p = 0.008). **Conclusion**: This study confirms that nutritional status plays a crucial role in the development of anemia in adolescent girls. Therefore, schools and health professionals should promote balanced nutrition rich in iron and provide targeted health education about anemia prevention to adolescent girls.

Keywords: adolescent girl, anemia, body mass index, iron, nutritional status

Introduction

Anemia is a condition in which the hemoglobin level in the blood is below normal (Yanti et al., 2024). Anemia remains a serious public health problem, particularly among adolescent girls (Rusmiati et al., 2025). This group is more susceptible to anemia than boys due to monthly menstruation, accelerated growth, and hormonal changes that increase iron requirements (Maribeth et al., 2025; Vatica et al., 2025; Yahya & Zakiyyah, 2026; Zurhayati & Hidayah, 2025). Furthermore, dietary factors and insufficient iron intake also contribute to anemia in adolescent girls (Yulianti et al., 2024).

Adolescent girls are at high risk for anemia due to an imbalance between nutrient intake and needs. Unhealthy eating habits, dieting habits aimed at achieving an ideal body, and insufficient consumption of iron-rich foods are all factors that contribute to anemia (Nurhayani et al., 2025). Adolescent girls are often very concerned about their body shape, leading to many dietary restrictions and food restrictions. This condition is related to dissatisfaction with body image, which leads to dieting or restricting food intake to achieve the ideal body (Prameswari et al., 2023; Sakti et al., 2025; Sari et al., 2026).

Eating behavior and perceptions of body image influence the nutritional status of adolescent girls. Diet plays a crucial role in achieving the ideal body. Most adolescent girls are dissatisfied with their physical appearance, particularly regarding their perceived body shape, where a tall and slim figure is often the desired standard. This can lead to inappropriate dietary patterns, potentially increasing the risk of malnutrition or overnutrition (Prameswari et al., 2023; Sinandaka et al., 2025; Zogara et al., 2025).

status is a factor closely related to the incidence of anemia. Nutritional status reflects the body's condition as a result of food consumption and nutrient utilization. Adolescent girls with poor nutritional status tend to experience macro and micronutrient deficiencies, including iron, which plays a vital role in hemoglobin formation (Husnah et al., 2023). Research shows a significant relationship between nutritional status and the incidence of anemia in adolescent girls, with adolescents with abnormal nutritional status being at greater risk of anemia than those with good nutritional status (Husnah et al., 2023).

Furthermore, nutritional imbalances such as iron, vitamin, and mineral deficiencies can disrupt metabolism and iron absorption, increasing the risk of anemia (Andriani & Adyani, 2023). Poor nutritional status is also often associated with poor daily food quality, both in terms of the quantity and types of nutrients consumed. This reinforces the notion that nutritional status is a significant factor influencing the incidence of anemia in adolescent girls (Triana & Saputri, 2024).

Based on these various studies, it can be concluded that nutritional status plays a significant role in the incidence of anemia in adolescent girls. Therefore, special attention is needed to ensure balanced nutrition for adolescents as an effort to prevent anemia. This makes it important to conduct further research to determine the relationship between nutritional status and the incidence of anemia in adolescent girls.

Objective

This study aims to determine the relationship between nutritional status and the incidence of anemia in adolescent girls.

Method

This study used an analytical observational design with a cross-sectional approach. The study was conducted in one of the secondary schools in Ciamis Regency in 2026. The study population was all eighth grade female adolescents at SMPN 5 Ciamis. A sample of 47 respondents was taken using a simple random sampling technique. The independent variable was nutritional status measured using the Body Mass Index according to age (BMI/U), while the dependent variable was the incidence of anemia measured based on hemoglobin levels (Hb <12 g/dL). The instruments used included digital scales, microtoises, hemoglobin meters, and observation sheets. Data analysis was carried out univariately and bivariately using the Chi-Square test with a significance level of 0.05. This study has paid attention to the principles of research ethics such as informed consent, respondent anonymity, data confidentiality, without coercion and institutional approval.

Result

1. Nutritional Status

Table 1. Nutritional Status Based on BMI

Nutritional Status	Frequency (f)	Percentage (%)
Thin	18	38,3%
Normal	23	48,9%
Fat	6	12,8%
Total	47	100%

Based on table 1, the research results show that most respondents have normal nutritional status, but there are still respondents with underweight and obese nutritional status.

2. Anemia

Table 2. Anemia Based on Hb levels

Anemia Status	Frequency (f)	Percentage (%)
Anemic	21	44,7%
Non Anemic	26	55,3%
Total	47	100%

Based on table 2, the research results show that most respondents did not experience anemia.

3. The Relationship Between Nutritional Status and Anemia

Table 3. The Relationship Between Nutritional Status and Anemia

Nutritional Status	Anemic		Non Anemic		Total		P-value
	f	%	f	%	f	%	
Thin	13	27.7	5	10.6	18	38.3	0.008
Normal	6	12.8	17	36.2	23	49.0	
Fat	2	4.2	4	8.5	6	12.7	
Total	21	44.7	26	55.3	47	100	

Based on table 3, the research results show that the statistical test results indicate a significant relationship between nutritional status and the incidence of anemia ($p < 0.05$).

Discussion

Nutritional status in adolescent girls is an important indicator of health and growth during adolescence. Adolescence is a transitional period characterized by increased nutrient needs due to accelerated physical growth, hormonal development, and increased activity. Therefore, optimal nutritional intake is essential to support optimal growth and development (Kementerian Kesehatan Republik Indonesia., 2022; World Health Organization., 2020).

Adolescent girls are a vulnerable group to nutritional problems, both undernutrition and overnutrition. This vulnerability is influenced by various factors, such as an unbalanced diet, perceptions of body image , and physical activity. Research shows that diet is the primary factor contributing to the nutritional status of adolescent girls, followed by psychological factors such as body dissatisfaction, which can lead to unhealthy dieting behaviors (Zogara et al., 2025).

Nutritional status assessment in adolescent girls is generally conducted using several indicators, such as Body Mass Index (BMI), Mid-Upper Arm Circumference (MUAC), and hemoglobin levels. BMI is used to identify nutritional categories (underweight, normal, overweight, or obese), while MUAC can indicate the risk of chronic energy deficiency, and hemoglobin is used to detect anemia. The results of the study indicate that the majority of adolescent girls have normal nutritional status, but a proportion still experience nutritional problems, both underweight and overweight, which have the potential to cause health problems in the future (Sutari et al., 2025).

Problems of overnutrition, such as overweight and obesity, are also starting to increase in adolescent girls along with changes in lifestyle and consumption of high-calorie foods. This condition is a concern because it can increase the risk of non-communicable diseases, such as type 2 diabetes mellitus, later in life. On the other hand, malnutrition remains a classic problem, which can impact immune function, impaired growth, and decreased concentration in learning (Rayhan et al., 2025).

Nutritional status is also closely linked to the reproductive health of adolescent girls. Both undernutrition and overnutrition can affect the menstrual cycle, including delayed menarche and menstrual irregularities. This suggests that nutritional status impacts not only general health but also reproductive function (Karisma et al., 2025).

In addition to biological factors, behavioral factors such as breakfast habits and physical activity also influence nutritional status. Adolescents who do not habitually eat breakfast tend to have insufficient energy intake, putting them at risk for malnutrition. Research shows that nutritional status is significantly associated with the incidence of anemia in adolescent girls, further reinforcing the importance of ensuring a balanced diet from adolescence onward (D. S. Lestari et al., 2023).

Anemia is a health problem still prevalent among adolescent girls, especially in developing countries. According to (World Health Organization, 2020), anemia is defined as a condition where the hemoglobin level in the blood is lower than the normal value for age and gender. Adolescent girls are particularly vulnerable to anemia due to their monthly menstruation and increased iron requirements during growth (Kementerian Kesehatan Republik Indonesia, 2022).

The main cause of anemia in adolescent girls is iron deficiency *anemia* , which is generally caused by insufficient iron intake, low bioavailability of iron in food, and blood loss during menstruation (World Health Organization, 2020). Poor eating habits of adolescent girls and consumption of foods/substances that inhibit iron absorption have a significant influence on the incidence of anemia in adolescent girls, and dietary behavior that is predominantly low

in nutritious foods and high in foods that inhibit iron absorption (e.g. tea, coffee, polyphenols) is a risk factor for anemia (Wati et al., 2023).

Several studies have shown a significant relationship between nutritional status and the incidence of anemia in adolescent girls. Adolescents with poor nutritional status tend to have a higher risk of anemia compared to adolescents with normal nutritional status (D. S. Lestari et al., 2023). This is due to deficiencies in macro and micronutrients, particularly protein, iron, folic acid, and vitamin B12, which play a crucial role in hemoglobin formation.

The impact of anemia on adolescent girls is not limited to physical health but also affects cognitive and productivity. Teenagers with anemia tend to experience fatigue, decreased concentration in school, and decreased immunity (Karisma et al., 2025). In the long term, untreated anemia can impact reproductive health, including increasing the risk of complications during future pregnancies.

Efforts to prevent and manage anemia in adolescent girls require a comprehensive approach. One strategy recommended by the World Health Organization is routine iron supplementation for adolescent girls (World Health Organization, 2020). Iron absorption from iron tablets will be faster when combined with foods containing vitamin C, such as tomatoes. Research shows that tomato juice can accelerate iron absorption and increase red blood cell production, thereby increasing hemoglobin levels (L. Lestari et al., 2024). Furthermore, education about the importance of consuming a balanced, nutritious diet, particularly one rich in iron, also needs to be improved (Kementerian Kesehatan Republik Indonesia, 2022).

Conclusion

This study confirms that nutritional status plays a crucial role in the development of anemia in adolescent girls. Therefore, schools and health professionals should promote balanced nutrition rich in iron and provide targeted health education about anemia prevention to adolescent girls.

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