

*Original Research*

# Relationship Between Diet Patterns and Anemia in Female Adolescents

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Kesehatan Surabaya, Indonesia.Email: [suparjiyozabri@gmail.com](mailto:suparjiyozabri@gmail.com)**How to cite this article:** Widhawati S, Suparji, Handayani TE, Herlina T. Relationship Between Diet Patterns and Anemia in Female Adolescents. *Health Dynamics*, 2024, 1(8), 304-308. <https://doi.org/10.33846/hd10805>**Copyrights:** © 2024 by the authors. This is an open access article under the terms and conditions of the Creative Commons Attribution – NoDerivatives 4.0 International (CC BY-ND 4.0) license (<https://creativecommons.org/licenses/by-nd/4.0/>).**ABSTRACT****Background:** In the process of becoming a mother, a young woman must prepare herself, especially in meeting nutritional needs to prevent anemia, in order to ensure a quality next generation of the nation. Anemia can cause fatigue, decreased productivity, and disorders in cognitive and motor development in children. This study aims to determine the relationship between diet and the incidence of anemia in young women.**Methods:** The research design used was cross-sectional to examine the relationship between diet and anemia status. The population in this study were 127 students of grade VII of SMP Negeri 5 Ponorogo, with samples taken using a total sampling of 127 students. The independent variable in this study was diet, while the dependent variable was anemia. The instruments used included questionnaires and hemoglobin (Hb) level examination tools. Data collection was carried out through Hb level screening and filling out questionnaires distributed via Google Form. Data analysis used cross-tabulation and Chi-square test. **Results:** The results showed that 75.59% of adolescents had good diets, while 24.41% had poor diets. Anemia status showed that 79.53% did not have anemia and 20.47% had anemia. The Chi-square test showed the analysis result  $p = 0.017$ , which indicated a significant relationship between diet and the incidence of anemia in adolescent girls. **Conclusion:** This study shows a significant relationship between diet and the incidence of anemia in adolescent girls. Adolescents with good diets tend to have a lower risk of anemia. It is recommended that adolescent girls continue to maintain a good diet to prevent anemia, which can affect their overall health, including productivity and cognitive development.**Keywords:** Adolescent; diet; anemia

## 1. INTRODUCTION

An unbalanced diet in adolescent girls can have a significant impact on their health, one of which is the risk of anemia.<sup>(1,2)</sup> Anemia, which is often caused by a lack of iron, vitamins, or folic acid, is a condition that can inhibit physical and cognitive development and reduce productivity and quality of life.<sup>(2)</sup> During adolescence, nutritional needs increase along with rapid growth and development, so that an inappropriate diet has the potential to cause a deficiency of important nutrients.<sup>(3)</sup> Research on the relationship between diet and the incidence of anemia in adolescent girls is important to determine the extent to which eating habits affect anemia status and to design appropriate interventions to improve the nutritional health status of adolescent girls.

Anemia in school children is a significant global health problem, with prevalence reaching around 25% in

developing countries and 30% in Indonesia in children aged 5-14 years. The main causes of anemia in this group include iron deficiency due to an unbalanced diet, worm infections, and deficiencies of essential vitamins and minerals.<sup>(4,5)</sup> Symptoms of anemia often include fatigue, paleness, and impaired concentration, with hemoglobin levels below 11 g/dL being the main indicator. The impact of anemia on school children includes decreased ability to learn and concentrate, which has an impact on their academic achievement. In addition, anemia can cause decreased energy and participation in physical activities, as well as slow growth and development. Socially and psychologically, children with anemia often feel lethargic, lack enthusiasm, and experience emotional problems, which can reduce their social interactions and extracurricular activities.<sup>(6,7)</sup>

Anemia in school children is often caused by iron deficiency due to an unbalanced diet, worm infections, and deficiencies in essential vitamins and minerals such as vitamin A and folic acid. This condition can result in symptoms such as fatigue, paleness, and impaired concentration which can have an impact on the child's ability to learn and academic achievement.<sup>(8)</sup> The physical impacts of anemia include decreased energy and participation in physical activities, as well as slowed growth and development. In addition, anemia can reduce social interaction and extracurricular activities, and cause emotional problems such as anxiety and depression. If left untreated, anemia can affect the child's overall quality of life and have long-term impacts on future productivity and health.<sup>(9)</sup>

To overcome the problem of anemia in school children, especially adolescent girls, a comprehensive approach is needed, including improving diet with adequate intake of iron, vitamins, and minerals. Implementation of iron and vitamin supplementation programs, especially in high-risk adolescent girls, can help overcome malnutrition that contributes to anemia (10). In addition, health education on the importance of nutrition and anemia prevention should be provided to students and parents to increase awareness and implementation of healthy diets. Eradication of worm infections with routine deworming programs is also important to improve health status and nutrient absorption. Finally, routine health monitoring in schools, including hemoglobin level checks, can help early detection of anemia and appropriate intervention.

## 2. METHODS

### 2.1. Study Design

This type of research is correlation research with the aim of determining the relationship between dietary patterns and anemia in adolescents.<sup>(7)</sup> The research design used in this study was cross-sectional. This study aims to determine the relationship between dietary pattern variables and the incidence of anemia in groups of adolescent girls which was carried out only once at the same time.

### 2.3 Population, Sample, Sample Size and Sampling Techniques

The population of this study was all female students in grade VII at SMP Negeri 5 Ponorogo, Indonesia. The sample taken in this study amounted to 127 female students, which is the entire population. The sampling technique used was saturated sampling, which means that all members of the population were included as samples.

### 2.4. Research Variables

The variables in this study are the independent variable, namely diet, and the dependent variable is the incidence of anemia.

### 2.5 Data Collection Instruments

The instruments used in this study include the Sejoy digital device for anemia screening and a questionnaire to determine dietary patterns. The Sejoy device is used to measure hemoglobin levels accurately, while the questionnaire is used to collect data on dietary patterns. This study has also obtained ethical approval from the Ethics Commission of the Ministry of Health Polytechnic of Surabaya, Indonesia No.EA/2278/KEPK-Poltekkes\_Sby/V/2024.

### 2.5. Data Analysis

Data analysis using online statistical applications, namely <https://www.statskingdom.com/>.

#### Descriptive statistics

The statistical analysis technique used is descriptive analysis, which includes frequency distribution and percentage. This analysis aims to provide a comprehensive picture of the characteristics and health status of participants. Respondent data, diet, and anemia status are described through data presentation in tabular form.

## Correlation statistic

Based on the objectives and design of the study, the statistical test used was the chi-square test ( $X^2$ ). This test was applied to analyze the relationship between dietary variables and anemia status. The error rate set in the analysis was  $\alpha = 0.05$ .

## 3. RESULTS

The presentation of the results of this study includes an analysis of data that has been collected from respondents. The results have been presented in the form of tables and descriptions to provide a clear picture of the relationship between the variables that have been studied.

### 3.1. Respondent Characteristics

Respondent characteristics are used to identify the diversity of respondents based on age, parents' occupation, and health history. This can provide a clear picture of the respondent's condition related to the problem and the purpose of the examination. The respondent characteristics are shown in the following Table 1.

**Table 1.** Frequency distribution data of respondent characteristics based on age, parents' occupation and health history

Characteristics	Frequency	Percentage
Age		
12 years old	24	18.9
13 years old	81	63.3
14 years old	22	17.3
Parents' job		
Self-employed	105	82.7
Farmers	10	7.9
Private employees	7	5.5
Civil servants	2	1.5
Medical history		
Healthy	123	96.8
Sick	4	3.1
Total	127	100

Table 1 is the data of respondent characteristics showing that the majority of respondents are 13 years old and most of their parents are self-employed. Most respondents have a good health history, with almost all of them declared healthy. In general, the characteristics of respondents in this study are dominated by the 13-year-old age group, self-employed parents, and good

health status. These data provide a representative picture of the population studied.

### 3.2. Dietary Pattern and Anemia Status

The data in Table 2 is a description of information regarding dietary patterns and anemia status of respondents. Table 2, depicting the frequency distribution of diet and anemia status shows that the majority of respondents have a good diet and most do not experience anemia. However, there is a small number of respondents with poor diet who experience anemia. Although good diet dominates, the incidence of anemia still exists, indicating that other factors besides diet may also affect anemia status.

**Table 2.** Frequency distribution of dietary pattern and anemia status

Category	Frequency	Percentage
Diet		
Good	96	75.6
Less	31	24.7
Anemia status		
Anemia	26	20.5
No Anemia	101	79.53
Total	127	100

### 3.3 Results of Analysis of the Relationship Between Dietary Patterns and Anemia Incidence

Table 3 shows that respondents with a good diet have a lower prevalence of anemia, which is 15.6%, compared to those with a poor diet, where the prevalence of anemia reaches 35.5%. This indicates that a good diet is associated with a lower risk of anemia. Conversely, a poor diet increases the likelihood of anemia. Overall, diet plays an important role in determining anemia status in adolescent girls.

**Table 3.** Cross-table of frequency distribution of dietary pattern and anemia status

Variable	Anemia status				Total	
	Non anemia		Anemia		N	%
	N	%	N	%		
Diet						
Good	81	84.4	15	15.6	96	100
Less	20	64.5	11	35.5	31	100
Total	101	79.5	26	20.4	127	100

Table 4, based on the results of the Chi-Square test obtained a  $p$  value = 0.017  $<$   $\alpha$  0.05, it can be concluded that there is a significant relationship between diet and the incidence of anemia in adolescent girls. This means that there is a possibility that poor diet can increase the risk of anemia in adolescent girls. Thus, these results indicate the importance of a healthy diet in preventing anemia in the adolescent girl population.

**Table 4.** Result of chi-square test

Statistic	Value	df	Asymp.Sig
Chi-square	5.68	1	0.017

## 4. DISCUSSION

### 4.1. Eating Patterns in Adolescent Girls and Anemia in Adolescent Girls

Table 3 shows that respondents with a good diet had a lower prevalence of anemia, which was 15.6%, compared to those with a poor diet, where the prevalence of anemia reached 35.5%. These data indicate that a good diet is associated with a lower risk of anemia, while a poor diet increases the likelihood of anemia. This is consistent with the literature stating that adequate nutritional intake, especially iron, is very important in preventing anemia.<sup>(8,9)</sup>

A good diet generally includes the consumption of foods rich in iron, vitamins, and minerals necessary for optimal hemoglobin production.<sup>(10,11)</sup> Conversely, a poor diet is often deficient in these essential nutrients, increasing the risk of anemia. This study emphasizes the importance of a balanced diet in maintaining healthy blood status and preventing anemia in adolescent girls.<sup>(12)</sup>

Although the results of the study showed a significant relationship between diet and anemia, some respondents with good diets still experienced anemia.<sup>(13)</sup> This suggests that there are other factors that may influence anemia status, such as individual health conditions, worm infections, or genetic factors that have not been considered in this study.<sup>(14)</sup> Therefore, in addition to improving diet, additional interventions such as regular health monitoring and supplementation when necessary are also important. Education programs on nutrition and health, as well as more comprehensive monitoring, can help identify and

address anemia problems more effectively among adolescent girls.<sup>(15)</sup>

### 4.2. Relationship Between Diet and Anemia

The results of the study showed a significant relationship between diet and the incidence of anemia in adolescent girls, with a  $p$  value = 0.017 which is smaller than  $\alpha$  = 0.05. This means that poor diet increases the risk of anemia. This is consistent with previous studies indicating that inadequate nutritional intake, especially iron deficiency, can contribute to the development of anemia.<sup>(16,17)</sup> Most respondents with a good diet showed a lower prevalence of anemia compared to those with poor diets. This emphasizes the importance of a balanced diet that includes essential nutrients to prevent anemia. A diet rich in iron, vitamins, and minerals plays a role in maintaining healthy hemoglobin levels, thereby reducing the risk of anemia.<sup>(12,17)</sup>

However, although a good diet is associated with a lower risk of anemia, some respondents with a good diet still experience anemia.<sup>(18)</sup> This suggests that other factors, such as individual health conditions and environmental factors, may also influence the incidence of anemia. Therefore, in addition to improving diet, it is also important to consider additional interventions such as regular health monitoring and supplementation when necessary.<sup>(18,19)</sup>

## 5. CONCLUSION

The conclusion of the study is that there is a significant relationship between diet and the incidence of anemia in adolescent girls. This means that there is a possibility that poor diet can increase the risk of anemia in adolescent girls. It is recommended that to prevent anemia, it is important for adolescent girls to adopt a healthy diet rich in iron, vitamins, and minerals. It is recommended that a comprehensive nutrition education program be carried out in schools and communities to increase understanding of the importance of a balanced diet. In addition, routine monitoring of health status and early intervention can help identify and treat anemia early.

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## Conflict of Interest

The authors declare no conflict of interest.

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