

# Analysis of Factors Related to The Incidence of Anemia in Adolescent Girls in Wetland Areas

Meitria Syahadatina Noor<sup>1</sup>, Andini Octaviana Putri<sup>2</sup>, Mufatihatul Aziza Nisa<sup>3</sup>, Setyo Teguh Waluyo<sup>4</sup>, Fakhriyah<sup>5</sup>

{drmeitria@ulm.ac.id<sup>1</sup>, andiniocavianaputri@ulm.ac.id<sup>2</sup>, mufatihatul.nisa@ulm.ac.id<sup>3</sup>, setyoteguhw@gmail.com<sup>4</sup>, fakhriyah@ulm.ac.id<sup>5</sup>}

Faculty of Medicine and Health Science, Lambung University of Indonesia, Banjarmasin, Indonesia

**Abstract.** Adolescents are a nutritionally vulnerable group due to rapid growth and increased nutrient requirements. In South Kalimantan, anemia prevalence among adolescents reaches 21.60%, including 23.54% in Banjar Regency. This study aims to examine the relationship between knowledge, attitudes, compliance with iron supplementation, and dietary habits with anemia incidence among adolescent girls. This research employed an analytic observational design with a cross-sectional approach, involving 47 participants selected through total sampling. Data were collected using questionnaires to assess independent variables (knowledge, attitudes, compliance, and dietary habits) and a hemoglobinometer to measure hemoglobin levels. Data analysis included univariate frequency distribution and bivariate analysis using the Chi-square test. The results indicate no significant association between knowledge ( $p=0.246$ ), attitudes ( $p=1.000$ ), compliance with iron supplementation ( $p=1.000$ ), or dietary habits ( $p=0.375$ ) and the incidence of anemia among adolescent girls.

**Keywords:** Anemia, adolescent girls, knowledge, attitude, iron tablet supplementation, eating habits

## 1 Introduction

According to the World Health Organization (WHO), adolescents are individuals aged 12–24 years [1]. This group is particularly vulnerable to nutritional problems due to rapid growth and increased nutrient requirements. Adolescent girls experience faster growth than boys and require additional nutritional support for reproductive processes such as menstruation and future pregnancy. However, concerns about body image often lead to restrictive diets, including reduced intake of iron-rich foods, increasing the risk of anemia [2].

Poor nutritional status in adolescent girls can impair physical growth, cognitive development, and immune function, and increase susceptibility to infections [3]. In South Kalimantan, the prevalence of anemia among adolescents is 21.60%, reaching 23.54% in Banjar Regency, which exceeds the 20% threshold for a public health problem [4].

Key factors contributing to anemia include limited knowledge, inadequate iron intake, and unhealthy dietary behaviors [5]. Previous studies indicate that knowledge significantly influences eating behavior and nutritional status [6]. If untreated, anemia in adolescence can lead to long-term consequences, including reduced cognitive performance and increased risks during pregnancy, such as postpartum hemorrhage, low birth weight, preterm birth, and stunting [7].

## 2 Methods

This study employed an analytical observational design with a cross-sectional approach and was conducted in the East Martapura Health Center working area. The sample consisted of 46 adolescent girls selected using total sampling, based on inclusion criteria: willingness to participate, having experienced menstruation, not currently menstruating during data collection, and receiving iron supplementation from the health center.

Data were collected using a structured questionnaire to assess independent variables (knowledge, attitudes, compliance with iron tablet supplementation, and dietary habits), and a hemoglobinometer to measure hemoglobin levels for identifying anemia. Data analysis included univariate analysis using frequency distributions and bivariate analysis using the Chi-square test.

## 3 Results and Discussion

### 3.1 Univariate Analysis

#### 3.1.1 Knowledge

**Table 1.** Distribution and Frequency of Knowledge

| Category     | Frequency | Percentage (%) |
|--------------|-----------|----------------|
| Less         | 2         | 4.3            |
| Good         | 44        | 93.6           |
| <b>Total</b> | <b>46</b> | <b>100</b>     |

Based on the data, of the 46 respondents, only 2 (4.3%) had low knowledge, while 44 (95.7%) demonstrated good knowledge. This indicates that the study population generally possesses an adequate understanding of the topic. The high proportion of respondents with good knowledge suggests that existing education, counseling, or information dissemination has been effective.

### 3.1.2 Attitude

**Table 2.** Distribution and Frequency of Attitude

| Category     | Frequency | Percentage (%) |
|--------------|-----------|----------------|
| Negative     | 1         | 2.1            |
| Positive     | 45        | 95.7           |
| <b>Total</b> | <b>46</b> | <b>100</b>     |

Based on the table data, as many as 1 person (2.1%) of the 46 respondents had negative attitude. Meanwhile, 45 (95.7%) of respondents had positive attitude.

### 3.1.3 Compliance of Iron Tablet Supplementation

**Table 3.** Distribution and Frequency Compliance of Iron Tablet Supplementation

| Category      | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| Less obedient | 5         | 10.6           |
| Obedient      | 41        | 87.2           |
| <b>Total</b>  | <b>46</b> | <b>100</b>     |

Based on the data, 5 respondents (10.9%) were categorized as non-compliant, while 41 respondents (89.1%) demonstrated compliance with iron tablet supplementation. Overall, these findings indicate a strong tendency toward adherence within the study group. However, a small proportion of respondents still require attention to improve compliance with supplementation.

### 3.1.4 Eating Habits

**Table 4.** Distribution and Frequency of Eating Habits

| Category           | Frequency | Percentage (%) |
|--------------------|-----------|----------------|
| Poor eating habits | 15        | 31.9           |
| Good eating habits | 31        | 66.1           |
| <b>Total</b>       | <b>46</b> | <b>100</b>     |

Based on the data, 15 respondents (31.9%) had poor dietary habits, while 31 respondents (68.1%) demonstrated good eating habits. Although the majority exhibited healthy patterns, nearly one-third of the respondents had inadequate dietary practices, indicating an area of concern that requires targeted improvement.

### 3.1.5 Anemia Incidence

**Table 5.** Distribution and Frequency of Anemia Incidence

| Category     | Frequency | Percentage (%) |
|--------------|-----------|----------------|
| Anemia       | 40        | 85.1           |
| No anemia    | 6         | 12.9           |
| <b>Total</b> | <b>46</b> | <b>100</b>     |

Based on the data, 40 respondents (87.0%) were classified as anemic, while 6 respondents (13.0%) were not. These findings indicate a high prevalence of anemia within the study population, suggesting that anemia is a significant public health concern in this group. The high incidence highlights the need for targeted interventions, including improving nutritional intake—particularly iron—and promoting healthier lifestyle practices to prevent and manage anemia.

## 3.2 Bivariate Analysis

### 3.2.1 Knowledge

**Table 6.** Relationship Between Knowledge and the Incidence of Anemia

|           |      | Incidence of Anemia |           | Total | P value |
|-----------|------|---------------------|-----------|-------|---------|
|           |      | Anemia              | No Anemia |       |         |
| Knowledge | Less | 1                   | 1         | 2     | 0.608   |
|           | Good | 5                   | 39        | 44    |         |
| Total     |      | 6                   | 40        | 46    |         |

The data show that among respondents with low knowledge (n=2), one experienced anemia and one did not. Among those with good knowledge (n=44), five experienced anemia, while 39 did not. Statistical analysis yielded a p-value of 0.608, indicating no significant association between knowledge and anemia incidence.

This finding is consistent with Ridwan et al. (2023), which also reported no relationship between nutritional knowledge and anemia among adolescent girls. Although knowledge is a fundamental factor in shaping attitudes and behaviors, including dietary habits, it does not necessarily translate into improved health outcomes. Nutritional information can be obtained from various sources, such as schools, family, peers, and media [9].

Despite the majority of respondents demonstrating good knowledge, the results suggest that knowledge alone is not a determining factor in anemia incidence. Other factors, such as dietary intake, physiological conditions, and lifestyle behaviors, may play a more significant role.

### 3.2.2 Attitude

**Table 7.** Relationship Between Attitudes and the Incidence of Anemia

|          |          | Incidence of Anemia |           | Total | P value |
|----------|----------|---------------------|-----------|-------|---------|
|          |          | Anemia              | No Anemia |       |         |
| Attitude | Negative | 0                   | 1         | 1     | 1,000   |
|          | Positive | 6                   | 39        | 45    |         |
|          | Total    | 6                   | 40        | 46    |         |

The data indicate that the only respondent with a negative attitude did not experience anemia. Among those with a positive attitude (n=45), six experienced anemia, while 39 did not. Statistical analysis yielded a p-value of 1.000, indicating no significant association between attitudes and the incidence of anemia.

This finding is consistent with Saadah et al. (2021), which also reported no relationship between attitudes and anemia among adolescent girls. Although a positive attitude is generally expected to support healthier behaviors, the results suggest that attitude alone is insufficient to influence anemia outcomes. Therefore, other factors may play a more substantial role in determining anemia incidence and warrant further investigation [10].

### 3.2.3 Compliance of Iron Tablet Supplementation

**Table 8.** Relationship Between Compliance of Iron Tablet Supplementation and the Incidence of Anemia

|            |               | Incidence of Anemia |           | Total | P value |
|------------|---------------|---------------------|-----------|-------|---------|
|            |               | Anemia              | No Anemia |       |         |
| Compliance | Less obedient | 0                   | 5         | 5     | 0.831   |
|            | Obedient      | 6                   | 35        | 41    |         |
|            | Total         | 6                   | 40        | 46    |         |

The data show that among respondents who were non-compliant with iron tablet supplementation (n=5), none experienced anemia. In contrast, among those who were compliant (n=41), six experienced anemia while 35 did not. Statistical analysis yielded a p-value of 0.831, indicating no significant association between compliance with iron supplementation and anemia incidence.

Overall, these findings suggest that compliance alone is not directly associated with anemia risk in this group. Other factors, such as dietary intake, absorption, or underlying health conditions, may play a more significant role in influencing anemia status [11].

### 3.2.3 Eating Habits

**Table 9.** Relationship Between Eating Habits and the Incidence of Anemia

|               |                    | <b>Incidence of Anemia</b> |           | <b>Total</b> | <b>P value</b> |
|---------------|--------------------|----------------------------|-----------|--------------|----------------|
|               |                    | Anemia                     | No Anemia |              |                |
| Eating Habits | Poor eating habits | 3                          | 12        | 15           | 0.612          |
|               | Good eating habits | 3                          | 28        | 31           |                |
| Total         |                    | 6                          | 40        | 46           |                |

The data indicate that among respondents with poor dietary habits (n=15), three experienced anemia while 12 did not. Among those with good dietary habits (n=31), three experienced anemia and 28 did not. Statistical analysis yielded a p-value of 0.612, indicating no significant association between dietary habits and anemia incidence.

Overall, these findings suggest that dietary habits alone do not directly influence anemia risk in this group. Other factors, such as nutrient absorption, physiological conditions, or compliance with supplementation, may play a more significant role in determining anemia status [12].

## 4 Conclusions

There were no significant associations between knowledge ( $p=0.246$ ), attitudes ( $p=1.000$ ), compliance with iron supplementation ( $p=1.000$ ), or dietary habits ( $p=0.375$ ) and the incidence of anemia among adolescent girls in the wetland area.

To address anemia, efforts should focus on strengthening health education and behavior change through school-based programs in collaboration with the Banjar Regency Health Office and the East Martapura Health Center. In addition, active support from families and communities is essential to promote sustained improvements in knowledge, attitudes, and health-related practices.

### Acknowledgements.

We would like to thank Lambung University Mangkurat for providing funding for research. East Martapura Health Center, East Martapura District, all respondents and all people who parties involved and assisted in the research implementation process.

## References

- [1] Proverawati A, Kusumawati E. Nutritional Science For Nursing and Giz Health. Yogyakarta : Nuha Medika. 2011
- [2] Department of Nutrition and Public Health, Faculty of Public Health, University of Indonesia. Public Health Nutrition. Jakarta: PT Raja Grafindo 2011
- [3] Ministry of Health of the Republic of Indonesia. South Kalimantan Province Report Riskesdas 2018. Jakarta: Ministry of Health of the Republic of Indonesia, 2018
- [4] South Kalimantan Provincial Health Office. South Kalimantan Provincial Health Office Report. Banjarmasin, 2019.
- [5] Noor MS, Fakhriyah, Putri A, et al . Nutritional status textbook . Yogyakarta: CV. Mine, 2021
- [6] Noor MS, Setiawan MI, Putri AO, et al . The role of youth counselors to improve the nutritional status of youth in Wetland Areas (Experimental Study in Aluh-Aluh District, Banjar Regency). Open Access Macedonian Journal of Medical Sciences 2023; 11(E):132-235
- [7] World Health Organization. *Adolescent pregnancy* . World Health Organization, 2004.
- [8] Riyanto A. Application of health research methodology second edition. Bandung: Nuha Medika, 2011
- [9] Ridwan DF S, & Suryaalamshah II. The Relationship between Nutritional Status and Nutritional Knowledge with the Incidence of Anemia in Adolescent Girls at Triyasa Ujung Berung Junior High School, Bandung. *Muhammadiyah Journal of Midwifery* 2023; 4(1): 8-15.
- [10] Sa'adah IN, Pratami E, Jeniawaty S. Relationships Behavior Teenager With Anemia in Adolescent Girls at SMAN 2 Malang. *Echo of Indonesian Midwives* 2021; 10(3).
- [11] Savitri, MK, et al . Relationship compliance Increased tablet consumption blood with incident anemia in adolescents daughter : a systematic review. *Tambusai Health Journal* 2021; 2(2): 43-49.
- [12] Waluyo D, Daud AC. Relationship Eating Habits with Incident Anemia in Adolescent Girls in Poowo Barat Village, Bone Bolango Regency . *Gema Wiralodra* 2022; 13(1): 34-42.