

# Relationship of Risk Factors for Anemia Incidence in Adolescent Girls

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## Abstract

Anemia is a health problem that causes a person to become tired, appear tired and lethargic which has an impact on their productivity and creativity. Anemia is a condition when the Hemoglobin level in the body is lower than normal below 12 g/dl. In 2018 based on Riskesdas data, the proportion of anemia in adolescent girls in Indonesia was 32%, Data from the Simpang Kanan Health Center showed that the most anemia occurred from SMP Negeri 3 Simpang Kanan as many as 8 people. The purpose of this study was to determine the relationship between menstrual patterns, diet, compliance with consuming iron (Fe) tablets, and physical activity with the risk of anemia in adolescent girls. This study uses a quantitative method approach with a cross-sectional design. A total of 65 adolescent girls became the population of this study, samples were taken using the Total Sampling method. The analysis used univariate and bivariate using Chi Square. The results of the study showed that the total frequency distribution of respondents at risk of anemia was in anemia of 25 (38.5%) and not anemia of 40 (61.5%). The test results showed that there was no relationship between menstrual patterns P value = 0.859, diet P value = 0.699 and physical activity P value of 0.396. While there is a relationship between compliance with Fe tablet consumption P value of 0.004. So it is concluded that the factors of menstrual patterns, diet, and physical activity are not related to the risk of anemia while the compliance factor in consuming Fe tablets or iron is related to the risk of anemia. Suggestions are expected for young women who experience anemia to comply with consuming Fe tablets according to the recommendations of the health center by routinely consuming 4 tablets per month or 1 time a week.

**Keywords:** Anemia; Adolescent; Risk; Chi-Square; Relationship

## Introduction

Anemia is a condition when the Hemoglobin (Hb) level is low from the normal level considering age and orientation. Normal Hb levels in adolescents are between 12 and 15 g/dl for girls, between 13 and 17 g/dl for boys (Aulya et al., 2022). Anemia is a health problem that causes a person to become tired, appear exhausted and become lethargic which has an impact on their productivity and creativity. In addition, anemia can increase the risk of illness in adulthood and when giving birth to offspring with nutritional problems or malnutrition (Asmanidar et al., 2023).

Adolescent girls are a population that is very vulnerable to malnutrition, especially iron. When adolescent girls are at their peak growth phase, they need more iron, especially to meet the basic needs of the body and growth. A year after their growth spurt, adolescent girls usually experience their first menstruation

(minarche). The high need for iron during peak growth will continue because it is very necessary to replace iron lost during menstruation (Indrawatiningsih et al., 2021).

The prevalence of anemia in adolescents in 2018 ranged from 40 to 88% according to the World Health Organization (WHO) in 2018. Based on Riskesdas in 2018, the prevalence in adolescents in Indonesia nationally reached 32%, while in Aceh the prevalence of anemia was 36.93% (Puteri Nur Azizah et al., 2023). Based on initial data from the Aceh Singkil District Health Office in 2022, it was found that the incidence of anemia in adolescent girls was 338 (41.6%). Data from the Simpang Kanan Health Center was obtained, where from the 7 schools under the auspices of the Simpang Kanan Health Center, the most anemia cases were from SMP Negeri 3 Simpang Kanan. From the Hb examination carried out by the health center, from 29 samples, 8 adolescent girls experienced anemia.

Menstrual disorders are when the cycle, duration, and amount of menstrual blood discharge are excessive from normal conditions. If menstruation is longer, the more blood is released so that more iron is lost and can eventually cause anemia (Novrica et al., 2020). Poor nutrition can cause anemia because the body does not get enough of the nutrients it needs. These nutrients include carbohydrates, fats, proteins, Vitamin C, and most importantly iron and folic acid which come from food (Utami & Mahmudah, 2019).

Fe tablets or blood-boosting tablets are supplements consisting of iron and minerals needed by the body to accelerate the formation of red blood cells or increase Hb levels in the blood. Fe tablets have benefits for young women to prevent anemia so it is recommended to consume 4 tablets a month and 1 tablet per day because during menstruation they lose a lot of blood and cause iron deficiency (Savitri et al., 2021).

Physical activity has a causal relationship with anemia. Physical activity is actually very important to know whether the work can change iron status. The amount of tissue containing iron in hemoglobin can change work activity significantly and reduce oxygen transport in the blood, if the hemoglobin concentration decreases physical activity will decrease in proportion to this decrease (Bangun et al., 2023).

Based on the initial data survey conducted by researchers at SMP Negeri 3 Simpang Kanan, out of 10 female students interviewed, there were 4 female students who experienced abnormal menstruation caused by long menstruation of more than 8 days and quite heavy bleeding changing tampons more than 3 times a day, 5 female students who had poor eating patterns where some of the female students consumed too much carbohydrates and some consumed too little carbohydrates, female students also consumed too little animal protein where in one day they only consumed vegetable protein such as tofu and tempeh and consumed too little vegetables and fruit every day. 4 female students who were less obedient in consuming Fe tablets where in one month the female students only consumed 2 to 3 tablets per month and there were 6 female students who did not do enough physical activity such as walking, running, and jogging every day..

## Methods

The approach used in this study is a quantitative approach using a cross-sectional design. Cross-

sectional is used to measure the Y or dependent variable (risk of anemia) and the X or independent variable (menstrual pattern, diet, compliance with Fe tablet consumption and physical activity) which are carried out simultaneously. State Junior high School 3 Simpang Kanan in Simpang Kanan District, Aceh Singkil Regency was the location of this study and was conducted in March 2024. The population of this study was the total number of female students who had menstruated, namely 65 people at State Junior high School 3 Simpang Kanan. Sampling used the Total Sampling technique. The data collection technique used was a questionnaire from the results of the interview which was then tested using univariate and bivariate tests, namely the Chi Square Test.

## Results

### Responden Characteristic

The description of the characteristics of respondents in this study is divided according to age and class. Based on the results of data processing from the respondents' questionnaire answers, the following results were obtained:

**Table 1.** Respondent Characteristics Based on Age

| No    | Age         | F  | %    |
|-------|-------------|----|------|
| 1.    | 12-13 years | 43 | 66.2 |
| 2.    | 14-15 years | 22 | 33.8 |
| Total |             | 65 | 100  |

(Primary data is processed, 2024)

Based on Table 1, the largest number of female students who became respondents were aged 12-13 years, as many as 43 people (66.2%), while the fewest were aged 14-15 years, as many as 22 people (33.8%)

**Table 2.** Respondent Characteristics Based on Class

| No    | Class      | F  | %    |
|-------|------------|----|------|
| 1.    | Class VII  | 23 | 35.4 |
| 2.    | Class VIII | 25 | 38.5 |
| 3.    | Class IX   | 17 | 25.2 |
| Total |            | 65 | 100  |

(Primary data is processed, 2024)

Based on Table 2, the highest number of respondents was in class VII at 25 respondents (38.5%) while the least was in class IX at 17 respondents (25.2%).

### Univariate Analysis

The following are the results of the univariate analysis calculations carried out by the researcher.

**Table 3.** Respondents Based on Observations Using Digital Hb Check Tools on Female Students of SMP N 3 Simpang Kanan, Aceh Singkil Regency in 2023

| No    | Risk of Anemia | F  | %    |
|-------|----------------|----|------|
| 1.    | Anemia         | 25 | 38.5 |
| 2.    | No Anemia      | 40 | 61.5 |
| Total |                | 65 | 100  |

(Primary data is processed, 2024)

Based on table 3, the proportion of respondents who experienced anemia was 25 female students or

38.5% and the other 40 female students or 40.0% did not experience anemia.

**Table 4.** Respondents Based on Menstrual Patterns in Female Students at SMP N 1 Simpang Kanan, Aceh Singkil Regency in 2023

| No    | Menstrual Patterns | F  | %    |
|-------|--------------------|----|------|
| 1.    | Normal             | 29 | 44.6 |
| 2.    | Abnormal           | 36 | 55.4 |
| Total |                    | 65 | 100  |

(Primary data is processed, 2024)

Based on Table 4, the proportion of respondents who have normal menstrual patterns is 29 female adolescent students (44.6%) and those who have abnormal menstrual patterns are 36 female adolescent students (55.4%).

**Table 5.** Respondents Based on Eating Patterns of Female Students at SMP N 1 Simpang Kanan, Aceh Singkil Regency in 2023

| No    | Eating Patterns | F  | %    |
|-------|-----------------|----|------|
| 1.    | Good            | 24 | 36.9 |
| 2.    | Not Good        | 41 | 63.1 |
| Total |                 | 65 | 100  |

(Primary data is processed, 2024)

Based on Table 5, the proportion of respondents who have a good eating pattern is 24 female adolescent students (36.9%), while 41 female adolescent students (63.1%) have a poor eating pattern..

**Table 6.** Respondents Based on Compliance of Fe Tablet Consumption in Female Students at SMP N 1 Simpang Kanan, Aceh Singkil Regency in 2023

| No    | Compliance of Fe Tablet Consumption | F  | %    |
|-------|-------------------------------------|----|------|
| 1.    | Obedient                            | 23 | 35.4 |
| 2.    | Disobedient                         | 42 | 64.6 |
| Total |                                     | 65 | 100  |

(Primary data is processed, 2024)

Berdasarkan Tabel 6 proporsi responden yang yang patuh mengkonsumsi tablet Fe sebanyak 23 siswi remaja putri (35.4%) dan sebanyak 42 siswi remaja putri (64.6%) tidak patuh megkonsumsi tablet Fe.

**Table 7.** Respondents Based on Physical Activity in Female Students at SMP N 1 Simpang Kanan, Aceh Singkil Regency in 2023

| No    | Physical Activity | F  | %    |
|-------|-------------------|----|------|
| 1.    | Good              | 36 | 55.4 |
| 2.    | Not Good          | 29 | 44.6 |
| Total |                   | 65 | 100  |

(Primary data is processed, 2024)

Based on Table 7, the proportion of respondents who had good physical activity was 36 female adolescent students (55.4%) and 29 female adolescent students (44.6%) had poor physical activity..

## Bivariate Analysis

The following are the results of bivariate analysis calculations carried out by researchers.

**Table 8.** The Relationship Between Menstrual Patterns and the Risk of Anemia in Female Students at SMP N 3 Simpang Kanan, Aceh Singkil Regency in 2023.

| Menstrual<br>Patterns | Risk Of Anemia |      |           |      | Total |     | <i>P value</i> |
|-----------------------|----------------|------|-----------|------|-------|-----|----------------|
|                       | Anemia         |      | No Anemia |      |       |     |                |
|                       | f              | %    | f         | %    | f     | %   |                |
| Normal                | 12             | 41.4 | 17        | 58.6 | 29    | 100 | 0,859          |
| Abnormal              | 13             | 36.1 | 23        | 63.9 | 36    | 100 |                |

(Primary data is processed, 2024)

Based on Table 8, out of 29 respondents whose menstrual pattern was in the normal category, 12 female students (41.4%) experienced anemia, and 17 female students (58.6%) were in the normal category but not anemic, while out of 36 respondents whose menstrual pattern was in the abnormal category, 13 female students (36.1%) experienced anemia and 23 female students (63.9%) were in the abnormal category but not anemic.

**Table 9.** The Relationship Between Eating Patterns and the Risk of Anemia in Female Students at SMP N 3 Simpang Kanan, Aceh Singkil Regency in 2023.

| Eating<br>Patterns | Risk Of Anemia |      |           |      | Total |     | P value |
|--------------------|----------------|------|-----------|------|-------|-----|---------|
|                    | Anemia         |      | No Anemia |      |       |     |         |
|                    | f              | %    | f         | %    | f     | %   |         |
| Good               | 8              | 33.3 | 16        | 66.7 | 24    | 100 | 0,699   |
| Not Good           | 17             | 41.5 | 24        | 58.5 | 41    | 100 |         |

(Primary data is processed, 2024)

Based on table 9, out of 24 respondents who had a good eating pattern category, 8 female adolescent students (33.3%) experienced anemia, and 16 female adolescent students (66.7%) were in the good but not anemic category, while out of 41 respondents who had a poor eating pattern category, 17 female adolescent students (41.5%) experienced anemia and 24 female adolescent students (58.5%) were in the poor but not anemic category.

**Table 10.** The Relationship Between Compliance with Consumption of Fe Tablets and the Risk of Anemia in Female Students at SMP N 3 Simpang Kanan, Aceh Singkil Regency in 2023.

| Compliance with Consumption of Fe Tablets | Risk Of Anemia |      |           |      | Total |     | P value |
|-------------------------------------------|----------------|------|-----------|------|-------|-----|---------|
|                                           | Anemia         |      | No Anemia |      |       |     |         |
|                                           | f              | %    | f         | %    | f     | %   |         |
| Obedient                                  | 3              | 13.0 | 20        | 87.0 | 23    | 100 | 0,004   |
| Disobedient                               | 22             | 52.4 | 20        | 47.6 | 42    | 100 |         |

(Primary data is processed, 2024)

Based on table 10, out of 23 respondents, compliance with Fe tablet consumption in the compliant category experienced anemia, as many as 3 female adolescent students (13.0%) and the compliant category did not experience anemia as many as 20 female adolescent students (87%), while out of 42 respondents, compliance with Fe tablet consumption in the non-compliant category experienced anemia, as many as 22 female adolescent students (52.4%) and the non-compliant category did not experience anemia as many as 20

female adolescent students (47.6%).

**Table 11.** The Relationship Between Physical Activity and the Risk of Anemia in Female Students at SMP N 3 Simpang Kanan, Aceh Singkil Regency in 2023.

| Physical Activity | Risk Of Anemia |      |           |      | Total |     | P value |
|-------------------|----------------|------|-----------|------|-------|-----|---------|
|                   | Anemia         |      | No Anemia |      |       |     |         |
|                   | f              | %    | f         | %    | f     | %   |         |
| Good              | 16             | 44.4 | 20        | 55.6 | 36    | 100 | 0,396   |
| Not Good          | 9              | 31.0 | 20        | 69.0 | 29    | 100 |         |

(Primary data is processed, 2024)

Based on Table 3.4, out of 36 respondents whose physical activity was categorized as good, 16 female students (44.4%) experienced anemia and 20 female students (55.6%) were in the good category but not anemic. Meanwhile, out of 29 respondents whose physical activity was categorized as not good, 9 female students (31%) experienced anemia and 20 female students (69%) were in the poor category but not anemic.

## Discussion

### The Relationship Between Menstrual Patterns and the Risk of Anemia in Female Students at SMP Negeri 3 Simpang Kanan

The results of the study showed that statistically, menstrual patterns were not related to the risk of anemia, as evidenced by the P value obtained  $>0.05$  (0.859).

These results are in line with research by Gebby Memorisa, et al. (2020), namely the results of the chi-square test obtained a P-value of 0.875, which means that there is no relationship between menstrual patterns and the incidence of anemia (Memorisa et al., 2020).

The female cycle (menstruation) is influenced by 4 factors, namely chemicals, organs, stress, and health conditions. Menstruation generally occurs at intervals of 21 to 35 days, lasts for 2-8 days, and the blood volume is around 40 to 80 ml (change pads 2-3 times). Menstruation returns to normal when there is no mental burden (stress), adequate nutrition, symptoms of illness, or thyroid disorders (Andriani, 2021).

Based on the assumption of researchers, female adolescents at SMP N 3 Simpang Kanan who experience irregular menstruation but do not experience paleness are caused by several influencing factors, such as the ability of female adolescents to manage stress and consume nutritious food, so that it will allow the chemical substances in the female adolescent's body to be in a stable condition..

### The Relationship Between Diet and the Risk of Anemia in Female Students at SMP Negeri 3 Simpang Kanan

The results of the study showed that statistically, dietary patterns had no relationship with the risk of anemia, as proven by the P value obtained  $>0.05$ , namely 0.699. According to research by Hadriani et al., (2023), the results of the chi square test produced a P value of 0.058, which indicated that there was no significant relationship between the eating habits of female adolescent students at SMA N 7 Palu City and the

risk of anemia. According to researchers, anemia can be caused by non-nutritional factors, including incurable infections (Hadriani et al., 2023).

According to the researcher's assumption, the cause of some female teenagers at SMP N 3 Simpang Kanan with poor eating patterns but no anemia is factors such as food quality and quantity of food and the variety of food eaten to meet the nutritional needs of these female teenagers, even though they have poor eating patterns, female teenagers are able to maintain their nutritional intake such as often consuming carbohydrates in the form of rice. Often consuming fish in one meal, although they rarely eat meat and chicken, their animal protein is fulfilled from fish and eggs, they also usually eat foods that contain vegetable protein such as processed tofu and tempeh because the area is a producer of tofu and tempeh.

### **The Relationship Between Compliance with Consumption of Fe Tablets and the Risk of Anemia in Female Students at SMP Negeri 3 Simpang Kanan**

The results of the study showed that statistically, compliance with consuming Fe tablets was related to the risk of anemia, as evidenced by the P value obtained being  $<0.05$  (0.004). The results of this study agree with Firly's research (2023), that there is a relationship between the consistency of consuming Fe tablets and iron deficiency in adolescent girls. The P-value is 0.040, which is smaller than 0.05 and adolescents who do not consistently consume Fe tablets have a risk 0.204 times greater of experiencing the disease (Agustiaraasih, 2023).

As stated by Putra (2020) that when teenagers experience menstruation, it will also affect hemoglobin levels, so that by consistently consuming Fe tablets, it can increase the reduced hemoglobin levels. The average amount of blood lost during menstruation is 60 ml/month, equivalent to losing 30 mg of iron. Therefore, women need to consume at least 1 mg of iron tablets every day to maintain the iron content in the body. By consuming Fe tablets, young women can avoid disease or overcome weakness (Savitri et al., 2021).

According to the researcher's assumption, compliance in consuming iron tablets is closely related to the risk of anemia, the results of the study on female adolescents at SMP N 3 Simpang Kanan showed that 87% of those who were not at risk of anemia consumed Fe tablets, while 47.6% were at risk of anemia who did not comply with consuming Fe tablets or iron. The health center program supports this by providing 4 Fe tablets every month, which are consumed once a week.

### **The Relationship Between Physical Activity and the Risk of Anemia in Adolescent Girls at SMP Negeri 3 Simpang Kanan**

The results of the study showed that statistically physical activity was not related to the risk of anemia with a p-value of  $>0.05$  (0.396). This result is in line with Yunita Wijayanti's research (2011), namely that there is no relationship between physical activity and the occurrence of anemia in female adolescent students with a p-value of 0.926. This is thought to be because younger female students tend to be more prominent and

exercise both inside and outside the home (Yunita, 2011).

According to the researcher's assumption, from the results of the study at SMP N 3 Simpang Kanan, it was found that many female teenagers who were not good at doing physical activities but did not experience anemia due to dietary factors. The area is a producer of processed tofu and tempeh so that the fulfillment of vegetable protein in female teenagers is quite good, but animal protein such as fish can still be obtained and some female teenagers also consume iron. In addition, some female teenagers also do physical activities such as walking to school and doing basic school gymnastics.

## Conclusion

Based on the results of the research, there is no significant relationship between menstrual patterns, dietary patterns, and physical activity with the risk of anemia. But There is a significant relationship between compliance with Fe tablet consumption with the risk of anemia in female adolescents at SMP N 3 Simpang Kanan, Aceh Singkil Regency in 2023.

Recommendations that researchers can provide : It is expected that female adolescents who experience anemia will comply with consuming Fe tablets according to the recommendations of the health center and the Simpang Kanan Health Center will be able to improve health promotion regarding the risk factors for anemia for female adolescents which cause health problems.

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