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The relationship of energy intake, menstruation duration, and anemia symptoms in adolescent girls

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Abstract

An adolescent girl is categorized into a group prone to anemia. The prevalence of anemia in Indonesia is quite high because the iron nutritional anemia rate in Indonesia is 72.3%. Iron deficiency in adolescents causes paleness, weakness, fatigue, dizziness, and decreased concentration when learning. This study employed a quantitative method with a cross-sectional approach to determine the relationship of energy intake, menstruation duration, and anemia symptoms of adolescent girls at Senior High School 6 Jambi. This study was conducted in December 2020. The research population was 434 adolescent girls in grades 11 and 12 at Senior High School 6 Jambi City. Meanwhile, 70 samples were selected using a random sampling technique. The data were analyzed univariately and bivariately using the chi-square test. The results of the univariate analysis showed that 24.3% of the respondents experienced symptoms of anemia, 74.3% had a lack of energy intake, and 42.9% had long menstrual periods. The bivariate analysis discovered that there was a relationship between energy intake and anemia symptoms of adolescent girls with a p-value = 0.031. Moreover, there was a relationship between the menstruation period and anemia symptoms of adolescent girls with a p-value = 0.018. The school is suggested to improve their students' health by revitalizing the school health unit and the youth red cross and screening students with health problems, especially anemia in young girls.
Keywords: anemia, energy intake, anemia symptoms, menstruation duration

Introduction

Anemia is a nutritional problem found worldwide. This disease occurs not only in developing countries but also in developed countries. It is estimated that two billion anemia sufferers are in Asia and Africa. The World Health Organization (WHO) mentions that anemia is the tenth-biggest health problem in this modern century. Hemoglobin (Hb) levels in in women must be <12.0 g/dL and <13.0 g/dL in men. However, normal Hb distribution varies depending on gender, ethnicity, and physiological status. Groups at high risk for anemia are women of childbearing age, pregnant women, school-age children, and adolescents. However, the male group is also inseparable from the risk of anemia (Cappellini MD., & Motta I., 2015).

Anemia in adolescents can decrease their school performance or academic ability because they are not passionate about learning and concentration (Mosino A, et al. 2020). Anemia can also inhibit the growth of height and weight and decrease the body's immune systems. As a result, people are susceptible to disease. Moreover, anemia can decrease energy production and lactate accumulation in muscles.

Teenagers' eating habits will affect health in the next phase of life, after adulthood, and old age. Iron deficiency can lead to anemia and fatigue; this condition prevents teenagers from seizing work opportunities. Adolescents need more iron, and women need more iron to

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replace the lost one due to menstrual blood (Arisman, 2010). Teenage girls need more iron to replace the iron lost during menstruation. Several studies denote that the amount of blood lost during the menstruation ranges from 20 to 25 cc, iron loss ranges from 12.5 to 15 mg/month or approximately 0.4 to 0.5 mg/day, and total basal iron lost was 1.25 mg per day. If the blood releasing during the menstruation is much, iron anemia will occur (Dieny, 2014). The length of menstruation is usually 3-5 days. Some women get their period for 1-2 days followed by little blood. However, some women get their period up to 7-8 days. The average amount of normal blood released is 33.2 ± 16 cc.

Jambi City Health Office reported that there were 103,053 adolescents in the city in 2016, consisting of 51,166 men and 51,887 women. In 2018 the number of young women suffering from anemia was 1,169 (2.25%). This number significantly increased from 395 girls (1.03%) suffering from anemia in 2016. Based on data obtained from the Jambi City Health Office reported that 404 adolescent girls suffered from anemia in 2018. Meanwhile, Paal V Health Center reported 72 adolescent girls experienced anemia.

Methods

This study was quantitative research and employed a cross-sectional approach because it was conducted at one time and once in 20 to find the relationship between the independent (risk factors) and dependent variables (effects). In this case is the relationship of energy intake, menstruation duration, and anemia symptoms of adolescent girls. The samples were female students of grades 11 and 12 in Senior High School 6 Jambi City. The research sample was selected using a simple random sampling technique. The data were collected using research questionnaires on the Google Form and interviews on video calls. The collected data were then processed using Nutrisurvey software. Meanwhile, the relationship between the independent variables (energy intake and menstruation duration) and the dependent variable (anemia symptoms) was analyzed using the bivariate data analysis and the chi-square statistical test with alpha 0.05.

Results

Anemia symptoms of adolescent girls

Table 1 summarizes the number of adolescent girls at Senior High School 6 Jambi City who suffered from anemia in 2020. The data show that 53 respondents (75.7%) have no anemia symptoms while 17 respondents (24.3%) have anemia symptoms.

Table 1. Frequency Distribution of Respondents Based on Anemia Symptoms

Anemia Symptoms	f	%
Respondents with anemia symptoms	53	75.7
Respondents without anemia symptoms	17	24.3
Total	70	100.0

Respondents' anemia was caused by irregular eating patterns, abstinence from eating eggs/meat/fish, dislike of consuming vegetables, and frequent consumption of fast food and junk food. Adolescents do not care about the nutritional needs of their body, especially iron which can cause anemia if it is insufficient. Anemia can decrease thinking power, concentration, achievement, and enthusiasm for learning. Anemia can also affect the reproductive process and organs and make the sufferer prone to disease. Recovering from

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anemia in adolescents is not easy because it takes 1-2 weeks to get sufficient and standard red blood cells and hemoglobin. Therefore, optimal prevention and improvement can be done by providing complete and accurate information about energy intake for adolescents and factors that influence anemia.

Energy Intake

Table 2 shows that 7 respondents (10.0%) had more energy intake, 11 respondents (15.7%) had good energy intake, and 52 respondents (74.3%) consumed insufficient energy iron. The results of this study indicated that most of the young women's energy intake was still less than the RDA standard. Such a condition can cause anemia because they consumed less energy than needed for daily activities.

Table 2. Distribution of Respondents' Energy Intake

Energy Intake	f	%
Excessive intake (>110% RDA)	7	10.0
Good intake (90-110 % RDA)	11	15.7
Less intake (<90% RDA)	52	74.3
Total	70	100.0

Menstruation duration

The description of the menstruation duration of adolescent girls at Senior High School 6 Jambi City in 2020 is presented in Table 3. The data show that 40 respondents (57.1%) had normal menstruation duration, and 30 respondents (42.9%) had long duration. In other words, the majority of the respondents experienced normal menstrual duration. The respondents with abnormal menstrual duration experienced more blood loss than respondents with normal menstrual duration.

Table 3. Distribution of Respondents' Menstruation Duration

Menstruation Duration	f	%
Short (<3 days)	0	0.0
Normal (3-5 days)	40	57.1
Long (>5 days)	30	42.9
Total	70	100.0

Relationship between energy intake and anemia symptoms

This study revealed that seven respondents had more energy intake (> 110% RDA); five of them (71.4%) did not show anemia symptoms, and the other two respondents (28.6%) had anemia symptoms. Table 4 shows that 11 respondents had good energy intake (90-110% RDA); five of them (45.5%) did not show anemia symptoms while the other six respondents

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(54.5%) showed anemia symptoms. Moreover, Table 4 shows that 52 respondents had less energy intake (<90% RDA); 43 respondents (82.7%) experienced anemia symptoms while the other nine respondents (17.3%) did not show anemia symptoms. To determine the relationship between energy intake and the incidence of anemia in adolescent girls at Senior High School 6 Jambi City in 2020, the Chi-Square analysis test was employed with a 95% confidence level (α = 0.05) and the p-value of (0.031) < (0.05). The test discovered a relationship between energy intake and the incidence of anemia in adolescent girls.

The results of this study are in line with those of Agustina EE (2016) who discovered a significant relationship between energy nutrient intake and the incidence of anemia (p = 0.047). Moreover, the results of this study are also similar to those of Yamin T (2012) who revealed a relationship between energy intake (p = 0.023) and the incidence of anemia.

Table 4. Relationship between Energy Intake and Anemia Symptoms

Energy Intake	Anemia Symptoms				Total		P-value
	Yes		No				
	f	%	f	%	f	%	
Excessive intake (>110% RDA)	5	71.4	2	28.6	7	100	0.031
Good intake (90-110 % RDA)	5	41.5	6	54.5	11	100	
Less intake (<90% RDA)	43	82.7	9	17.3	52	100	
Total	53	75.7	17	24.3	70	100	

The relationship between menstruation duration and anemia symptoms

This study found that 40 respondents had normal menstrual periods (3-5 days); 35 of them (87.5%) did not show anemia symptoms while the other five respondents (12.5%) showed anemia symptoms. Moreover, this study discovered that 30 respondents had a long menstrual period (> 5 days); 18 of them (60.0%) did not have anemia symptoms while the other 12 (40.0%) showed anemia symptoms. To find out the relationship between the length of menstruation and the incidence of anemia in adolescent girls at Senior High School 6 Jambi City in 2020, the Chi-Square analysis test was used with a 95% confidence level (α = 0.05) and the p-value of 0.018 < 0.05. This test discovered that there was a relationship between the length of menstruation and the incidence of anemia in adolescent girls.

Table 5. Relationship between menstruation duration and anemia symptoms

Menstruation Duration	Anemia Symptoms				Total		P-value
	Yes		No				
	f	%	f	%	f	%	
Short (<3days)	0	0	0	0	0	0	0.018
Normal (3-5 days)	35	87.5	5	12.5	40	100	

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Long (>5 days)	18	60.0	12	40.0	30	100
Total	53	75.7	17	24.3	70	100

Discussion

The results of this study are identical to those of Restuti AN and Susindra Y (2016) who discovered that 50 students (70.4%) suffered from anemia while 21 students (29.6%) did not. Another relevant study by Handayani WP (2015) investigated 86 female respondents at Senior High School 8 Pekanbaru and discovered that 51 respondents (59.3%) were not anemic while 35 respondents (40.7%) were anemic. Although it did not show a significant number, it showed that more than half of the female adolescent respondents were not anemic. This finding is quite a good thing considering the impact that can occur on adolescent students if they are anemic.

Lack of nutrients can cause anemia which results in fatigue and difficulty in concentration. As a result, teenagers in their teens become less productive. This study found that anemia symptoms frequently experienced by adolescent girls were weakness (by 16 respondents or 22.9%), dizziness (by 15 respondents or 21.4%), decreased appetite (by 15 respondents or 21.45), pale facial appearance (by 14 respondents or 20.0%), and dizzy eyes (by 12 respondents or 17.1%). The least symptoms of anemia experienced by the respondents were pale eyelids and pale lips (by 4 respondents or 5.7%), pale palms (by 1 respondent or 1.4%), restless performance (by 8 respondents or 11.4%), and heart palpitations, thumping,– and rhythmic pounding (by 5 respondents or 7.1%). Anemia symptoms that did not occur in adolescent girls were short breath, pale tongue, pale skin, ringing ears, and cold feet. Adolescent girls have a high risk of anemia because they lose blood when getting menstruation. Therefore, young women at childbearing age need three times as much daily iron as young men. This is exacerbated by the wrong diet and diet (Arisman, 2010).

The results of this study are supported by those of Yamin T. (2012) who discovered that 123 female students (71.1%) had insufficient energy intake, and 50 female students (28.9%) had sufficient energy intake.

Insufficient food energy causes people to have a lack of energy to move, work, and carry out activities. They become weak and lazy; thus, their activities are non-optimally performed. Young women are expected to pay more attention to their food so that they can meet the nutrition and energy required to perform daily activities.

In contrast, Agustina EE (2016) found that energy nutrient intakes of adolescent girls based on school level were categorized into low and adequate energy nutrient intakes. Most o the respondents (101 respondents or 84.2 %) had sufficient energy intake while a few of the respondents (19 respondents or 15.8%) had low energy intake. Lack of energy intake is caused by improper diet, bad eating habits, and excessive dislike of certain foods. A slim body is often a dream of teenagers, especially teenage women. To maintain slimness, they apply food restrictions incorrectly. As a result, their nutritional needs are not met.

The identical study was also conducted by Agustina E. E. (2016) who categorized the menstrual patterns in adolescent girls based on school level into abnormal and normal menstrual patterns. Most adolescent girls (78 respondents or 65.0 %) had a normal menstruation pattern. Meanwhile, a few respondents (42 respondents or 35.0 %) had an abnormal pattern.

Several menstrual disorders experienced by adolescents are hypermenorrhea, hypomenorrhea, polimenorrhea, and oligomenorrhea. Hypermenorrhea occurs when

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adolescents experience menstruation with more menstrual blood volume (>80 ml/day), and the duration of menstruation is more than eight days. Hypomenorrhea is menstruation with a fewer menstrual volume and shorter duration than usual. Polymenorrhea is a shortening menstrual cycle (<21 days), or menstruation more frequently occurs. Meanwhile, oligomenorrhea refers to a menstrual cycle that comes longer than usual (> 35 days), and menstruation less frequently occurs than usual. The amount of blood lost during one menstrual period is between 20-25 cc. This amount is equivalent to iron loss of 12.5-15 mg/month or 0.4-0.5 mg/day. Most teenage girls experience menstruation for 3-8 days, and this period is considered normal. Irregular menstruation can be caused by fatigue, nutrition, or hormonal factors. Therefore, teenagers are expected to maintain a nutritious diet.

Teenagers need energy for the body's metabolic processes. Insufficient energy nutrient intake occurs because some young women take a lack food. The dense daily activities during online learning allow the students to have free time but take imbalanced food. Insufficient energy intake is mostly caused by consuming various energy-producing food sources and unhealthy breakfast habits. Iron a balanced nutritious diet can be increased by taking various food types, especially animal sources of red meat, fish, chicken, beef or chicken liver, seafood, and eggs that are rich in iron. Therefore, sufficient quantities meet the RDA. In addition, sources of plant foods rich in iron, such as dark green vegetables and nuts, should be increased, even though they have lower absorption than animal foods. To increase the absorption of iron from plant food sources, people must consume fruits that contain vitamin C, such as oranges and guava. The absorption of iron can be inhibited by other substances, such as tannins, phosphorus, fiber, calcium, and phytate (Kemenkes RI, 2014). The respondents with good nutritional intake had suffered from anemia if their eating habits had been not balanced. For example, the respondent rarely consumed vegetables but ate carbohydrates and fats without balancing with foods containing minerals, protein, and vitamins. Nowadays, teenagers often pay less attention to their food consumption and rarely consume vegetables. In contrast, they frequently consume unhealthy food, such as fried food, *pentol*, and, noodles. Whereas nutritional adequacy is substantial because nutritional deficiencies can decrease the formation of red blood cells. Such a condition finally leads to anemia. Energy intake for young women is very important, especially when they are menstruating. Moreover, lack of energy intake will impact their health, especially during menstruation due to a large amount of menstrual blood expenditure. Therefore, energy recovery is needed by consuming nutritional food. Reduced energy intake can cause anemia, weakness, dizziness, and less appetite in young women. Most teenagers prefer consuming junk food and fast food that have very low nutrition and mineral, high salt, as well as more fat and sugar. Such food usually eliminates appetite for other nutritious foods.

The finding of this research was supported by Agustina E. E. (2016) who discovered that there was a significant relationship between menstrual patterns and the incidence of anemia ($p = 0.001$). Teenage girls need more iron to replace the iron lost during menstruation. Several studies showed that the amount of blood lost during a menstrual period ranged from 20 to 25 cc, the iron loss ranged from 12.5 to 15 mg/month or approximately 0.4 to 0.5 mg/day, and the amount of basal iron lost was 1.25 mg per day. If the blood released during menstruation is much, iron anemia will occur (Dieny, 2014).

Conclusion

This study concluded that 53 respondents (75.7%) experienced anemia symptoms. Moreover, 52 respondents had less energy intake (74.3%), and 30 respondents (42.9%) had a long menstruation duration. This study also discovered that there was a relationship between energy intake and anemia symptoms of adolescent girls (p-value = 0.031) as well as the

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relationship between menstruation duration and anemia symptoms of adolescent girls (p-value = 0.018). The school should improve their students' health condition by revitalizing the school health unit and the youth red cross. Therefore, the school can screen if students have health problems, especially anemia in young girls.

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