Research Article

The Relationship Between Knowledge and the Menstrual Cycle with Anemia in Adolescent Girls at SMKN X Sumedang

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ABSTRACT

The incidence of anemia in adolescent girls is still high at 32%. Teenage girls with anemia during the pregnancy period can result in the risk of infant and maternal mortality, as well as low birth weight babies. The study aims to determine the relationship between knowledge and menstrual cycles with the incidence of anemia in adolescent girls at SMKN X Sumedang. The type of study is correlational. The population is all female students who have anemia. The number of samples is 67 female students. Inclusion criteria include adolescent girls with anemia (Hb levels <12 g/dL), not on a diet, not menstruating, and grade X. The sampling technique is simple random sampling. The instrument uses a checklist, observation sheet, and Hb examination (quick check). Data analysis uses the Spearman rank test. The results of the study did not show a relationship between the level of knowledge and menstrual cycles with the incidence of anemia ($p > 0.05$). Evidenced by the level of expertise of respondents included in the good category and experienced mild anemia (19.4%), moderate (32.8%), and severe (3%). Meanwhile, respondents with a low level of knowledge have experienced mild to moderate anemia (22.4%). Meanwhile, adolescent girls experienced normal menstrual cycles and mild anemia (31.3%), moderate (50.7%), and severe (1.5%). Meanwhile, respondents experienced irregular menstrual cycles and mild anemia (10.5%), moderate (4.5%), and severe (1.5%). Future researchers can investigate other factors that cause anemia.

INTRODUCTION

Adolescence is the transition from childhood to adulthood (Mahfiana, Rohmah, & Widyaningrum, 2009; Lubis et al., 2024). Adolescents are between 10-24 years old. Adolescents, if married, are classified as adults (BKKBN, 2023). Adolescence can cause several problems. Health problems in adolescents include nutritional issues, such as anemia, obesity, overweight, wasting, and stunting (Ministry of Health, 2025). According to research by Puspita & Nisman (2018), problems in adolescents include nutritional status (malnutrition and overnutrition), vaginal discharge, and menstrual pain.

Anemia is a health problem in adolescent girls. Anemia is a condition where the hemoglobin (Hb) level in the blood is less than 12 g/dL. Hemoglobin is a component found in erythrocytes. The function of Hb is to bind oxygen and deliver it throughout the body. If oxygen in the muscles and brain is reduced, it can cause the body to become unfit for activities and lack concentration (Ministry of Health, 2016). The incidence of anemia is higher in the age group 15-24 years (32%) and the age group 5-14 years (26.8%). Compliance with consuming iron supplements according to standards is still very low among adolescents at 1.4% in 2018 (BKKBN, 2023). The classification of anemia in women aged ≥15 years according to WHO, namely normal Hb level 12 g/dl, mild anemia 11-11.9 g/dL, moderate anemia 8-10.9 g/dL, and severe anemia <8 g/dL.

Several factors can cause anemia. The most common causes are deficiencies in folic acid, protein, vitamin B12, and iron. The direct causes of anemia are blood loss and insufficient red blood cell production (Ministry of Health, 2016).

Several factors can cause anemia. Risk factors for anemia in adolescents include low nutrient intake, menstrual disorders, large family size, low socioeconomic status, parental education, and living in rural areas (Ariana & Fajar, 2024). Furthermore, according to research by Astuti (2023), knowledge, menstruation, and dietary habits are all contributing factors to anemia.

Signs and symptoms of anemia in adolescent girls include difficulty concentrating, fatigue, blurred vision, tiredness, weakness, headaches, lethargy, drowsiness, inattention, dizziness, and cyanosis of the skin, lips, face, conjunctiva, palms, and nails (Ministry of Health, 2016). According to research by Aulya, Siauta, & Nizmadilla (2022), adolescents with anemia often complain of blurred vision and dizziness. Anemia in adolescent girls has an impact. The impact of anemia during pregnancy includes the risk of infant and maternal mortality, as well as low birth weigt (LBW) (Chitekwe, Torlesse, & Aguayo, 2021).

Anemia in adolescent girls has several impacts. These include reduced physical fitness and poor concentration. Anemic girls who remain anemic during pregnancy are at risk of low birth weight (LBW) and infant and maternal mortality.

A preliminary study was conducted on May 3, 2024, through interviews with seven female students at Sumedang State Vocational High School X. The results showed that three female students stated they did not know what anemia was and did not take iron supplements (two had Hb levels <12 g/dL and one had normal Hb). Two other female students reported that they never ate breakfast in the morning (Hb <12 g/dL). Meanwhile, two other female students did not experience symptoms such as dizziness, lethargy, and difficulty concentrating while studying (normal Hb).

METHOD

The type of research is correlational. The study was conducted from April 1 to 4, 2025. The population consisted of all female students from State Vocational High School X, Sumedang, who had anemia. The sample size was 67 female students. The inclusion

criteria were female adolescents who had anemia (Hb levels <12 g/dL), not on a diet, not menstruating, and in grade X. The exclusion criteria were female adolescents with anemia and comorbidities who had recently completed therapy. The sampling technique was simple random sampling. The instruments used were checklists, observation sheets, and Hb examination tools (Quick check). Data analysis employed the Spearman rank test because the ordinal scale and normality test results were not normal ($p<0.000$). The researcher has obtained ethical clearance from the Ngudi Waluyo University Ethics Commission (No.226/KEP/EC/UNW/2024).

RESULTS

Table 1 Frequency Distribution of Knowledge of Young Women (n=67)

Level of Knowledge	f	%
Good (mean ≥62)	37	55,2
Less (mean <62)	30	44,8
Total	**67**	**100**

Source: Primary Data, (2024)

The results of the study showed that, of the 67 respondents, the level of knowledge was categorized as lacking for 30 people (44.8%).

Table 2 Distribution of Menstrual Cycle Frequency (and=67)

Menstrual Cycle	f	%
Normal (7 days)	56	83,6
Abnormal (>7 days)	11	16,4
Total	**67**	**100**

Source: Primary Data, (2024)

The results of the study showed that of the 67 respondents, the menstrual cycle of the female adolescents in the study was normal for 56 people (83.6%).

Table 3 Relationship between Knowledge and Menstrual Cycle with the Incidence of Anemia (n=67)

	Anemia						p value
	Mild Hb 11-11.9 g/dL		Moderate Hb 8-10.9 g/dL		Weight Hb <8 g/dL		
	f	%	f	%	f	%	
Level of Knowledge							0,160
Good (mean ≥62)	13	19,4	22	32,8	2	3	
Less (mean <62)	15	22,4	15	22,4	0	0	
Menstrual Cycle							0,209
Normal (7 days)	21	31,3	34	50,7	1	1,5	
Abnormal (>7 days)	7	10,5	3	4,5	1	1,5	
Total	**28**	**41,8**	**37**	**55,2**	**2**	**3**	

Source: Primary Data, (2024)

Based on table 4, the results of the bivariate test using the Spearman rank test, show that there is no relationship between the level of knowledge (p 0.160) and the menstrual cycle (p 0.209) with the incidence of anemia. According to the study, the level of knowledge among the 67 respondents falls into the good category, with 13 people (19.4%) experiencing mild anemia, 22 people (32.8%) experiencing moderate anemia, and 2 people (3%) experiencing severe anemia. Meanwhile, respondents with a low level of knowledge and experiencing mild to moderate anemia comprised 15 people (22.4%). Meanwhile, adolescent girls who experience a normal menstrual cycle (7 days) and experienced mild anemia 21 people (31.3%), moderate 34 people (50.7%), and severe 1 people (1.5%). Meanwhile, respondents who experienced an abnormal menstrual cycle (>7 days) and experienced mild anemia 7 people (10.5%), moderate 3 people (4.5%), and severe 1 people (1.5%).

DISCUSSION
Adolescent Girls' Knowledge about Anemia at Sumedang State Vocational School
The results of the study showed that of the 67 respondents, 83.6% experienced a normal

menstrual cycle (7 days). This is because most of the young women in the study did not have a history of comorbidities that affect the menstrual cycle, such as being overweight, obesity, or stress. According to research by Fauziah, Putra, & Khairus (2024), the higher the stress level, the more likely they are to experience menstrual cycle problems. Stress can trigger the release of the hormone cortisol, which can disrupt the balance of reproductive hormones, such as estrogen and progesterone. This imbalance can cause menstrual cycles to become irregular, late, or even stop altogether.

Meanwhile, according to research by Wardani (2023), obesity can affect the menstrual cycle because excess body fat can disrupt the balance of reproductive hormones. Excess body fat, particularly in the abdominal area, can lead to increased estrogen production. This excess estrogen can disrupt the balance of hormones that regulate the menstrual cycle, such as estrogen and progesterone. This hormonal imbalance can cause menstrual cycles to become irregular, late, or even stop altogether.

The Relationship Between Knowledge and Menstrual Cycle with the Incidence of Anemia

The results of data analysis using the Spearman rank test in the study showed that there was no correlation between the level of knowledge and the incidence of anemia (p>0.05). This is because respondents in the study had good and poor knowledge, but experienced anemia. It was proven that from 67 respondents, the level of knowledge was good and experienced mild anemia (19.4%), moderate (32.8%), and severe (3%). Meanwhile, respondents with a low level of knowledge experienced mild and moderate anemia (22.4%). A good level of knowledge does not affect good nutritional intake. This is because the availability of funds must support the provision of nutrition. This is in line with the research of Nadiawati & Susanti (2022), which found that there was no correlation between knowledge and the incidence of anemia (p 0.779). It was proven that from 81 respondents, the level of respondents' knowledge was good, and experienced mild anemia by 37%. Another factor that influences anemia is socioeconomic status. The socioeconomic status of the family greatly influences the incidence of anemia in adolescent girls because those with better socioeconomic status tend to have better access to nutritious foods, including sources of iron, which is important for preventing anemia. Conversely, families with low socioeconomic status may have limited access to healthy food, putting adolescents at risk of iron deficiency and anemia.

However, according to research by Ahdiah, F, & Istiana (2018), a relationship exists between knowledge and the incidence of anemia (p 0.037). Evidenced by 36 respondents, adolescents who are categorized as having poor knowledge and anemia amounted to 33.9%. This is in line with research by Dewi, Basuki, & Marlina (2020) that there is a relationship between the level of knowledge and the incidence of anemia (p 0.024). Evidenced by 77 respondents, adolescents who have good knowledge of anemia amounted to 26%. According to research by Kusnadi (2021), a good level of knowledge in adolescent girls will lead to more caution in preventing anemia. In addition, risk factors for anemia, such as diet and menstruation, thus affect nutritional fulfillment. According to research by Riliyantri, Agustin, & Nurvinanda (2025), increasing the knowledge of adolescent girls can help shape a better quality of life than before. Low knowledge will affect an individual's standard of living, such as short-sighted thinking patterns, a lack of understanding, which can lead to a lack of knowledge of what is best to do in maintaining a regular menstrual cycle.

Meanwhile, the study's results on the relationship between the menstrual cycle and anemia incidence showed no correlation (p 0.209). This was evident from 67 respondents, adolescent girls who experienced a normal cycle (7 days) and had mild anemia (31.3%), moderate anemia (50.7%), and severe anemia (1%). Meanwhile, respondents with an abnormal cycle (>7 days) experienced mild anemia (10.5%), moderate (4.5%), and severe (1%). Therefore, anemia can occur in adolescent girls with both normal and abnormal menstrual cycles. Menstrual duration with low frequency and volume of blood loss does not affect anemia. However, if the menstrual cycle is abnormal and the frequency and volume of blood loss are high (>240 - 270/24 hours), blood loss that is not balanced with adequate iron intake can cause iron deficiency, thus increasing the risk of anemia. This is in line with research by Sriwani, Noorma, & Setyawati (2022), which found no relationship between the menstrual cycle and the incidence of anemia (p 0.436). However, a relationship exists between the frequency of changing sanitary napkins >2 times and the incidence of anemia (p 0.025). This is proven by the number of adolescent girls who changed sanitary napkins >2 times, amounting to 40.6%.

Risk factors that cause anemia in adolescent girls include frequent dieting to lose weight and rapid growth during puberty, requiring more iron (Ministry of Health, 2016). Furthermore, research by Aulya, Siauta, & Nizmadilla (2022) found that anemia in adolescent girls is caused by not consuming iron supplements, heavy menstrual flow, and poor eating and sleeping patterns. Furthermore, research by Vaira, Karinda, & Muflihah (p 2022) found correlations between BMI (p 0.023), diet (p 0.021), menstrual patterns (p 0.026), and MUAC (p 0.012), and the incidence of anemia. The risk of BMI, diet, and menstrual patterns was 4 times higher, and MUAC was 5 times higher for anemia. Adolescents with low BMI are at risk of intrauterine fetal growth restriction. Meanwhile, adolescents with excessive BMI are at risk of iron deficiency. This is because adolescents who are obese have higher iron requirements, increased macronutrient intake, and impaired iron absorption, resulting in decreased hemoglobin and iron levels in the blood, or anemia (Ali et al., 2020).

Anemia is a risk factor for women who are underweight and have a MUAC <23 cm. A healthy diet with adequate nutrition can maintain body health and prevent malnutrition and anemia. Irregular menstrual patterns can lead to anemia. During menstruation, a large amount of fluid is lost, especially iron, so replacement is necessary (Ahankari, Tata, & Fogarty, 2022).

Anemia in adolescents is a condition where the Hb level in red blood cells is abnormal. Adolescent girls are considered anemic if their Hb level is <12 g/dL. Nutritional issues cause anemia in adolescent girls. The impacts of anemia include impaired growth, cognitive function, and reproductive system disorders (Mengistu, Azage, & Gutema, 2019).

However, according to research by Gazali, Hadi, & Shafriani (2024), a significant relationship exists between the menstrual cycle and the incidence of anemia (p 0.869). This is proven by 32 respondents, adolescents who have a 7-day menstrual cycle and Hb less than <12 g/dL by 21.9%. According to research by Susilawati, Fadillah, Budhiana, & Suherman (2024), a relationship exists between the menstrual cycle and the incidence of anemia (p 0.040). This is proven by 73 respondents, adolescents who experience an abnormal cycle and anemia by 45%. According to research by Sari, Herawati, Dhamayanti, & Hilmanto (2022), the duration of menstruation, iron consumption, height, weight, and LILA are associated with the incidence of anemia in adolescent girls

(p<0.05).

Adolescent girls can prevent anemia early. Anemia prevention includes consuming foods rich in vitamin A, vitamin C, folic acid, zinc, and iron, taking iron-boosting supplements, maintaining a healthy lifestyle, and seeking immediate medical attention if signs and symptoms of anemia are experienced to receive early treatment (Ministry of Health, 2025). This finding aligns with research by Sari, Herawati, Dhamayanti, & Hilmanto (2022), which suggests that anemia can be prevented by consuming vitamin A, folate, micronutrients, iron, and zinc. Compliance with iron supplement consumption during menstruation is highly recommended, especially for those with irregular menstrual patterns. Adolescent girls are encouraged to take iron supplements to replace blood loss during menstruation (Mulianingsih et al., 2021).

CONCLUSIONS AND RECOMMENDATION

The results of the study showed no relationship between the level of knowledge (p 0.160) and the menstrual cycle (p 0.209) with the incidence of anemia. Proven by the 67 respondents in the study, the level of knowledge of respondents was categorized as good with 13 people (19.4%) experiencing mild anemia, 22 people (32.8%) experiencing moderate anemia, and 2 people (3%) experiencing severe anemia. Meanwhile, respondents with a poor level of knowledge and experiencing mild to moderate anemia comprised 15 people (22.4%). Meanwhile, adolescent girls who experienced a normal menstrual cycle (7 days) and experienced mild anemia were 21 people (31.3%), moderate 34 people (50.7%), and severe 1 person (1.5%). Meanwhile, respondents who experienced an abnormal menstrual cycle (>7 days) and mild anemia were 7 people (10.5%), moderate anemia in 3 people (4.5%), and severe anemia in 1 people (1.5%). Further research can be conducted on other factors that cause anemia.

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