

Factors That Influence Anemia In Adolescents

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ABSTRACT

Adolescents are a group aged 10–19 years who experience physical and psychological growth and development. During this period, adolescents are vulnerable to various health problems, one of which is anemia. Anemia is a condition where the hemoglobin level in the blood is below normal, making it unable to meet the body's physiological needs. Globally, anemia remains a significant public health problem, with approximately two billion people worldwide suffering from anemia. In Indonesia, the prevalence of anemia among adolescents remains quite high, especially among adolescent girls. The incidence of anemia in adolescents is influenced by various factors, both directly and indirectly, such as low intake of iron, protein, and vitamins that support hemoglobin formation, poor nutritional status, socioeconomic conditions, menstruation, unhealthy lifestyles, and low knowledge about anemia. Lack of understanding of the definition, symptoms, impacts, and prevention of anemia also contributes to the high incidence of anemia in adolescents. The impacts of anemia include decreased immunity, impaired concentration in learning, fatigue, and the risk of reproductive health problems in the future. The government has implemented various prevention efforts, one of which is through a program to provide iron-fortified tablets (TTD) to adolescent girls. However, the success of this program is still hampered by low compliance among adolescents in taking the TTD. Therefore, it is necessary to increase adolescents' knowledge and awareness regarding the causes, impacts, and prevention efforts for anemia. This review article aims to analyze the causes of anemia and efforts to treat anemia in adolescents.

Keywords: anemia, factors, causes, prevention of anemia, adolescents.

INTRODUCTION

Adolescence is the age of 10-19 years, where a person will experience growth or transitional period where changes will occur in physical and psychological members. These changes in adolescence will cause several health problems, one of the health problems in adolescents is anemia.(Rusmaningrum, 2023). Anemia is defined as a condition in which the number of red blood cells or hemoglobin (Hb) levels in the blood is lower than the average for individuals of the same age and gender.(Izzara et al., 2023). Anemia occurs

when the hemoglobin level is below normal so that it cannot meet the physiological needs of the body.(Handayani, Yunita and Kabuhung, 2025).

The World Health Organization (WHO) reported that by 2023, approximately two billion people worldwide will be affected by anemia. Globally, the prevalence of anemia in adolescents is 29.9%, while in Indonesia, the prevalence is 32%, meaning that 3 to 4 out of 10 adolescents suffer from anemia. According to the 2023 Indonesian Demographic and Health Survey (SDKI), the prevalence of anemia in Indonesia is 16.3% in the 5–14 age group and 15.5% in the 15–24 age group, with the highest prevalence among women (18% vs. 14.4%).(Pertiwi, 2025).

The incidence of anemia in adolescents is influenced by various factors, both direct and indirect. Direct factors include inadequate nutritional intake, especially iron, protein, and vitamins that support hemoglobin formation. Indirect factors include nutritional status, knowledge level, socioeconomic conditions, and biological factors such as menstruation, adolescent lifestyle factors, and insufficient knowledge about the incidence of anemia, such as lack of nutritious food intake, irregular rest patterns, physical activity, and excessive use of gadgets.(Ilham, Kurnaesih and S, 2021). Adolescents' limited knowledge about anemia is one factor contributing to the high incidence of anemia. This lack of understanding includes understanding the disease, signs and symptoms, impacts, and prevention methods. Therefore, understanding anemia is important for adolescent girls to reduce the incidence of anemia and improve their health.(Verma and Baniya, 2022).

Anemia can have several negative impacts on adolescents, including weakness, fatigue, lethargy, tiredness, limpness, dizziness, and paleness. Furthermore, it can lead to decreased immunity, impaired concentration in school, and reproductive health problems in adulthood. In adolescent girls, anemia can also increase the risk of pregnancy complications later in life. Therefore, anemia in adolescents requires special attention.(Indrawatiningsih et al., 2021)

Efforts are made to support the program established by the Indonesian government. The provision of Iron Supplement Tablets aims to implement government policies regarding iron supplementation in adolescent girls and reduce the incidence of anemia, especially during menstruation. By reducing the incidence of anemia, it is hoped that complaints such as weakness, lethargy, pain, and decreased concentration that are often experienced by adolescent girls during menstruation can be minimized, so as not to disrupt the learning process at school, although the government has provided iron supplements but the problem

of anemia still exists due to the low awareness of adolescents to consume Iron Supplements in the Ministry of Health.(Indrawatiningsih et al., 2021)We can minimize the various negative impacts of anemia by preventing it through understanding the factors that cause it, allowing for more targeted interventions. The purpose of this review article is to analyze the factors that cause anemia and the management of anemia in adolescents.

METHOD

This research is a type of literature study research, namely a series of activities related to library data collection methods, reading and recording, and managing research materials. In this literature review, the search for articles was carried out using electronic reference libraries through Pubmed, Google scholar. Article searches used keywords "Factor, adolescent anemia", "Factor anemia adolescents", "Risk factor for anemia", "Factors of anemia in adolescents", "Incidence of anemia in adolescents risk factors". The subjects of this study were 16 literatures consisting of 6 national journals and 10 international journals. Data analysis used in this study is descriptive analysis presented in tabular form and then interpreted in narrative form.

RESULTS

ARTICLE TITLE	WRITER	YEAR	RESEARCH PURPOSES	RESEARCH METHODOLOGY	RESULTS AND DISCUSSION
1. A Review of the Risk Factors for Iron Deficiency Anaemia among Adolescents in Developing Countries	(Wiafe, Ayenu and Elicophie, 2023)	January 3, 2023	Identifying the root causes of iron deficiency anemia is a prerequisite for effective management and	The quality of included studies was assessed using the American Dietetic Association Quality Criteria Checklist.	Based on the results of research by(Wiafe, Ayenu and Elicophie, 2023)Studies show that the incidence of anemia in

			prevention in adolescents.		adolescents remains relatively high and is significantly associated with several factors, including low iron intake, an unbalanced diet, female gender, poor nutritional status, and low socioeconomic status. Adolescent girls and adolescents with poor dietary quality are at greater risk of anemia than adolescents with adequate nutritional intake. Therefore, improving dietary patterns and meeting
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					iron requirements is crucial for preventing anemia in adolescents.
2. RELATIONSHIP BETWEEN MENSTRUAL PATTERNS AND THE INCIDENCE OF ANEMIA IN ADOLESCENT FEMALES AT STATE VOCATIONAL SCHOOL 2 PADANG	(Ria Elfira, Susanti, 2025)	December 2, 2025	The aim of this study was to determine the relationship between menstrual patterns and the incidence of anemia in female adolescents at SMKN 2 Padang.	This study is an analytical observational study with a cross-sectional design conducted on June 4, 2025.	Based on the results of research by(Ria Elfira, Susanti, 2025)The results showed that 66.3% of female adolescents at SMKN 2 Padang suffered from anemia. Most respondents had an abnormal menstrual pattern (43.0%). The Chi-Square statistical test showed a p-value of 0.005, indicating a significant

					relationship between menstrual patterns and the incidence of anemia. Adolescents with an abnormal menstrual pattern had a higher risk of anemia compared to adolescents with a normal menstrual pattern.
3. FACTORS RELATED TO THE INCIDENCE OF ANEMIA IN ADOLESCENT FEMALES AT SMPN 6 TANA TIDUNG	(Widya Astutik ¹ , Nur Aini ² , Khoirul Anam ³ , Gita Masyita ⁴ 1, 2, 3, 2023)	2023	To determine the factors related to the incidence of anemia in female adolescents at SMPN 6 Tana Tidung.	The research design used an analytical survey with a cross-sectional approach. The sample used was 99 female adolescents at SMPN 6 using stratified random sampling. The instruments used were Hb test kits and questionnaires, with	Based on the results of research conducted by(Widya Astutik ¹ , Nur Aini ² , Khoirul Anam ³ , Gita Masyita ⁴ 1, 2, 3, 2023)Menstrual patterns are the most dominant

				multiple linear regression analysis.	factor related to the occurrence of anemia because during menstruation, women will lose blood for days if it is not balanced with good nutrition, foods containing iron, so it will increase the risk of anemia.
4. THE RELATIONSHIP BETWEEN DIETARY PATTERNS AND ANEMIA INCIDENTS IN ADOLESCENT FEMALES AT SMPN 2 GEDANGAN SIDOARJO	(Mirza Nabilah Kurnia Agustina ¹ , Hanim Mufarokhah ² , 2010)	2023	Objective: To determine the relationship between eating habits and the prevalence of anemia in female adolescents at SMP 2 Gedangan, Sidoarjo.	Method: This study uses cross-sectional and correlative analysis techniques with a quantitative design.	Based on the results of research by (Mirza Nabilah Kurnia Agustina ¹ , Hanim Mufarokhah ² , 2010) showed a significant relationship between dietary patterns and the incidence of anemia in adolescent

					girls, with a p value of 0.001. Adolescents with inadequate dietary patterns were more likely to experience anemia compared to adolescents with adequate and good dietary patterns. The prevalence of anemia in this study was 37.7%, indicating that anemia remains a serious health problem in adolescent girls and is greatly influenced by the quality of their daily diet.
5. DIETARY PATTERNS ARE RELATED TO THE INCIDENCE OF	(Ardina, 2025)	October 5, 2025	This study aims to analyze the relationship between	This study design was observational and analytical with a cross-sectoral quantitative	Based on the results of research by(Ardina, 2025)showed

ANEMIA IN ADOLESCENT GIRLS			dietary patterns and the incidence of anemia in adolescent girls in Bogor Regency.	approach. The population was 1,167, with cluster sampling.	that of 298 adolescent girls, 57.4% had anemia and 51.3% had poor diets. A chi-square statistical test showed a p-value of 0.001, indicating a significant relationship between diet and anemia. Adolescents with poor diets had a higher risk of anemia than adolescents with healthy diets.
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6. Anemia and associated factors among adolescent girls and boys aged 10–14 years in rural western China	(Zhu et al., 2021)	2021	Identifying determinants of anemia including socioeconomic factors,	Design: Cross-sectional Sample: High school adolescents	Based on the research results from (Zhu et al., 2021) It is known that the prevalence of anemia in adolescents aged 10–14 years in
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			education, and diet.	Analysis: Chi-square and regression	rural China is around 10%, with the rate being higher in girls than boys. The results of the regression analysis showed that socioeconomic status is significantly associated with the incidence of anemia, where adolescents from families with low maternal education and low household wealth have a higher risk of anemia.
7. Analyzing the relationship between dietary factors and anemia to improve preventive behavior in adolescent girls in Denpasar	(Agung et al., 2025)	February 2025	This study aims to determine the relationship between dietary patterns and anemia status in adolescent girls.	This study used a cross-sectional design with a sample of 91 female students at SMA Negeri 4 Denpasar. Hemoglobin levels were measured using a hemoglobinometer, while dietary patterns and nutritional intake	Based on the research results from (Agung et al., 2025) The prevalence of anemia in adolescent girls was 38.5%. Multivariate analysis showed that vitamin C intake was significantly associated with the incidence of anemia (AOR = 1.024; p = 0.020), where

				were collected using a Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ). Data were analyzed using univariate and bivariate methods using the Mann-Whitney U test, and multivariate analysis using logistic regression.	adolescent girls with vitamin C intake below the nutritional adequacy rate had a higher risk of developing anemia. Meanwhile, protein, iron, fiber intake, meal frequency, and menstrual blood loss scores did not show a significant association with anemia status ($p > 0.05$). These findings confirm that vitamin C plays an important role in increasing iron absorption, thus contributing to the prevention of anemia in adolescent girls.
8. ADOLESCENT GIRLS' KNOWLEDGE ABOUT THE CAUSING FACTORS OF ANEMIA AT STATE MIDDLE SCHOOL 1 MERAKURAK	(Rusmaningrum, 2023)	August 2023	The aim of this study was to find out about the factors causing anemia in young women.	The research design was descriptive. The population was 124 eighth-grade students of SMP Negeri 1 Merakurak. A quota sampling	Based on the research results from(Rusmaningrum, 2023)The results of the study showed that almost all female adolescents at SMP Negeri 1 Merakurak had good knowledge

				technique was used to select 95 students. Data collection used a questionnaire.	(54.7%), and a small proportion had poor knowledge (3.2%). The knowledge they received was very extensive and they were able to sort out the right information, understand and comprehend the factors causing anemia in female adolescents. The knowledge received by female adolescents at SMP Negeri 1 Merakurak was very good and female adolescents were able to understand the factors causing anemia by seeking information through various media. This can increase the knowledge of female adolescents in prevention efforts.
9. Perceived Barriers and Enablers	(Hidayanty et al., 2025)	2025	To explore the perceptions of	Design: Qualitative research with a	Research results from(Hidayanty et

for Taking Iron–Folic Acid Supplementation Regularly Among Adolescent Girls in Indonesia			barriers and enablers (supporting factors) in consuming iron and folic acid (IFA) supplements regularly among adolescent girls in Indonesia.	pilot study approach : Involving 32 eighth and ninth grade female students from four junior high schools. Data Collection: Conducted through Focus Group Discussions (FGD) with female students, as well as in-depth interviews with health workers, teachers, and parents for data triangulation. Analysis: Using thematic analysis framed by Social Cognitive Theory (SCT).	al., 2025)This study shows that although the IFA supplement program is available in schools in Indonesia, the level of compliance of adolescent girls to consume it regularly is still relatively low, namely only around 47% of the total informants. This low compliance is caused by several main obstacles, including the taste and aroma of the supplement that is not liked (such as the taste of blood that triggers nausea), negative experiences after consumption (dizziness, vomiting, or headaches), forgetfulness, and prohibitions from parents. In addition, there are myths or cultural beliefs that hinder compliance, where female
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					students are worried that consuming the supplement will increase menstrual blood volume excessively, thus disrupting comfort during school activities.
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10. PHENOMENOLOGICAL STUDY OF THE CAUSES OF ANEMIA IN ADOLESCENTS IN SURABAYA	(Budiarti et al., 2020)	October 2020	This study aims to describe the factors causing anemia in Surabaya using a qualitative phenomenological approach.	Data were collected using a semi-structured interview method and analyzed using the Colaizzi data analysis technique.	Research results from study(Budiarti et al., 2020)This study shows the causes of anemia, such as knowledge, nutrient intake, eating and drinking patterns, menstruation, iron tablets, nutritional status, and socioeconomic status. Nutrition education is emphasized so that students understand and can apply it in real life. In addition, the Student Activity Unit utilizes health programs, such as in implementing programs. giving iron
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					tablets to female students every month to reduce the incidence of anemia
11. Iron Deficiency Anemia and Associated Factors Among Adolescent Girls and Women in a Rural Area of Jatinangor, Indonesia	(Sari et al., 2022)	2022	Aims to explore iron deficiency anemia and its associated factors in adolescent girls and women in rural Jatinangor, Indonesia.	A cross-sectional study involving 95 adolescent girls and 85 women was conducted between April and November 2018. A random, clustered sampling method was used to select participants from seven villages in the Jatinangor district. After obtaining informed consent, we collected sociodemographic data, menstrual history, and related data, including nutritional intake using a 24-hour dietary recall method. Anthropometric data were collected to determine Body Mass Index (BMI), and venous blood samples	The results of the study showed that the prevalence of iron deficiency anemia in adolescent girls was 21.1%, while in adult women it was 9.4%. Puspa Sari (1) The average hemoglobin level in adolescents was 10.75 ± 0.79 g/dL, while in adult women it was 11.20 ± 0.61 g/dL. Most respondents had normal nutritional status and did not experience stunting. Multivariate logistic regression analysis showed that protein intake was a factor significantly associated with the incidence of anemia (OR = 0.25; 95% CI 0.11–0.58), which means that the better the protein intake,

				were analyzed for complete blood count and hemoglobin levels. Descriptive statistics followed by bivariate and multivariate logistic regression were used to identify	the lower the risk of anemia. Overall, the prevalence of anemia in this study falls into the category of mild public health problems.
12. Determinants of anemia in school-going adolescents: a case study in Douala, Cameroon	(Suzanne et al., 2025)	2025	This study aims to assess the factors (determinants) associated with the incidence of anemia in school-aged adolescents aged 10–15 years in Douala City, Cameroon, in order to provide a basis for public health policies and interventions.	This study used a quantitative design with a cross-sectional approach. The sample consisted of 511 adolescents selected from four secondary schools in Douala. Data were collected using a structured questionnaire, anthropometric measurements (weight and height), and hemoglobin levels using a hemoglobinometer. Data analysis was performed using binary and multivariate logistic regression to identify independent risk	The results showed that the prevalence of anemia in adolescents in Douala was 40.3%, with 15.7% having mild anemia, 23.9% having moderate anemia, and 0.7% having severe anemia. Factors that significantly increased the risk of anemia after multivariate analysis were living in rural areas (AOR=8.39), having divorced parents (AOR=2.60) or having both parents deceased (AOR=7.73), having experienced their first menstruation (AOR=6.59), not having consumed iron supplements in the last

				factors for anemia with a significance level of $p < 0.05$.	three months (AOR=1.68), and having a history of illness in the last three months (AOR=3.24). This study confirms that anemia in adolescents is influenced by social, biological, and health factors, and emphasizes the importance of nutritional interventions and iron supplementation, especially in rural areas.
13. The Impact of Anemia on Adolescent Girls in the Future	(Princess, 2024)	2024	Increasing adolescent knowledge about anemia as an effort to prevent the risk of pregnancy and stunting in the future.	Design: Community service (extension/counseling) Participants: 60 junior high school students in Banjarbaru Method: Lecture, discussion, Q&A, poster & video media	The research findings above indicate that health education and counseling activities can improve adolescents' knowledge about anemia, including its causes, symptoms, and prevention methods. This increased understanding is expected to help adolescents prevent anemia and reduce the risk of stunting in the future.

14. Determinants of Nutritional Anemia in Adolescents	(THOMAS, 2015)	2015	To determine the relationship between the severity of anemia and serum ferritin, vitamin B12, and folate levels and to determine demographic, socioeconomic, and nutritional factors associated with anemia in adolescents.	Design: Cross-sectional hospital-based study Sample: 200 adolescents aged 10–18 years with anemia Examination: Hb, ferritin, vitamin B12, serum folate Intake assessment: 24-hour recall Analysis: SPSS (statistical significance test $p < 0.05$)	From the research, the results obtained were: Folate Deficiency (79.5%), Vitamin B12 (50%), Iron (30.5%). Factors significantly related to severe anemia: Vegetarian diet History of worms Already menarche Low intake of iron, folate, and B12
15. Prevalence of anemia and its associated factors among school-going adolescent girls in schools of Dhankuta municipality, Nepal	(Id, Id and Rajbanshi, 2024)	2024	This study aims to determine the prevalence of anemia and factors associated with anemia in school-aged girls in Dhankuta Municipality, Nepal.	This study used a cross-sectional research design and was conducted from June to October 2023 in Dhankuta Municipality, Nepal. The study sample consisted of 405 adolescent girls aged 10–19 years who were selected using a stratified random sampling technique.	showed that the prevalence of anemia was 17.5%, with most cases categorized as mild anemia. Multivariate analysis showed that adolescents with less knowledge about anemia had a 3.3-fold higher risk of developing anemia. Furthermore, adolescents who consumed iron and folic acid tablets for less than 26 weeks had a 26.9-fold higher risk of

					developing anemia. Another significantly associated factor was a lack of dietary diversity, which increased the risk of anemia by 2.5-fold. This study concluded that health education, adherence to iron supplementation, and increasing dietary diversity are important strategies in preventing anemia. in adolescent girls
16. The Relationship Between Menstrual Cycle and Duration and Anemia in Adolescent Girls at SMAN Pulauaut Barat Kotabaru	(Putri et al., 2025)	2025	The aim is to determine the relationship between the menstrual cycle and the length of menstruation with the incidence of anemia in female adolescents at SMAN 1 Pulauaut Barat.	The study used an analytical survey design with a cross-sectional approach. The sample consisted of 76 female students selected using quota sampling. Data were collected through questionnaires and documentation, then analyzed using the Chi-Square test.	The results of the study showed that most respondents experienced long menstrual cycles (39.5%), long menstrual periods (46.0%), and most did not experience anemia (61.8%). Statistical tests showed a significant relationship between menstrual cycles and the incidence of anemia ($p = 0.003$) and between menstrual length and

					anemia (p = 0.000) in adolescent girls.
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DISCUSSION

The teenage era is the transformation from childhood to adulthood, often lasting from the age of 12 or 13 years to the late teens or early twenties.(Pertiwi, 2025). In this phase, teenagers will experience changes both psychologically and physically, this will become one of the health problems in teenagers, namely anemia.(Rusmaningrum, 2023). In research(Id, Id and Rajbanshi, 2024)concluded that health education, iron supplementation compliance, and increasing dietary diversity are important strategies in preventing anemia in adolescent girls.

The impact of anemia on adolescents includes feelings of fatigue, tiredness, lethargy, and weakness. Anemia can typically inhibit growth, affect cognitive and psychomotor function, weaken the immune system, and reduce productivity. In adolescent girls, this condition can have more significant consequences, including stunted growth, premature birth, and an increased risk of stillbirth.(Rusmaningrum, 2023)Therefore, it is important for us to know what factors cause anemia in adolescents.

Factors causing anemia in adolescents:

Unbalanced diet

The results of various studies show that anemia in adolescents is the result of various interrelated factors, such as irregular eating patterns and poor eating habits, as reported by(Ardina, 2025)And(Mirza Nabilah Kurnia Agustina¹, Hanim Mufarokhah², 2010) can reduce the intake of iron and other important nutrients so that adolescents with poor diets have a higher risk of anemia compared to adolescents with good diets. Protein intake is a factor that is significantly associated with the occurrence of anemia (OR = 0.25; 95% CI 0.11–0.58), which means that the better the protein intake, the lower the risk of anemia.(Sari et al., 2022).

Interventions provided to adolescents and their families regarding improved dietary patterns are essential to reduce the prevalence of anemia.(Lasmawanti and Ardilla, 2024)shows that a supportive environment and the provision of health education to

adolescents can reduce the rate of anemia by providing the necessary information such as making healthy food choices and improving eating patterns.

compliance with iron supplement tablet consumption

This study shows that vitamin C intake is associated with the incidence of anemia. This finding confirms that vitamin C has an important role in increasing iron absorption, thus contributing to the prevention of anemia in adolescent girls.(Agung et al., 2025). In addition, one way to overcome anemia in adolescents is by giving iron (Fe) tablets.

Iron is an important element in the process of red blood cell formation. In research(Id, Id and Rajbanshi, 2024)stated that adolescents who took iron and folic acid tablets for less than 26 weeks had a 26.9 times greater risk of developing anemia. However, in the study(Hidayanty et al., 2025)The level of compliance of adolescents in consuming IFA supplements is still relatively low, this is one of the factors that causes anemia in adolescents.

Level of knowledge of anemia in adolescents

Knowledge about anemia reflects adolescents' level of understanding of the definition of anemia, its causes or risk factors, its occurrence, signs and symptoms, and prevention and treatment methods. This understanding will be reflected in adolescents' behavior through various preventative measures to avoid anemia, such as consuming food according to schedule and body needs, avoiding excessive dieting, and adopting a healthy eating pattern.(Princess, 2024)

According to(Rusmaningrum, 2023)Information about anemia can be obtained through various sources, such as print media, electronic media, and information boards. For school-age adolescents, knowledge about anemia can also be obtained from school materials. With this information, it is hoped that adolescents will be able to take preventive measures based on the knowledge they have gained. Furthermore, schools can collaborate with local community health centers to conduct early screening for anemia. This way, if any adolescents are identified as being at risk for anemia, prompt treatment and care can be provided.

Limited health knowledge and lack of education among adolescents and families can exacerbate the problem of anemia.(Budiarti et al., 2020)And(Rusmaningrum, 2023)shows

that a lack of knowledge about the importance of iron and other nutrients leads to inadequate diets. Providing education about nutrients should be emphasized so that it can be applied in real life. Research by (Zhu et al., 2021) indicates that the incidence of anemia, where adolescents who come from families with low maternal education levels and low household wealth have a higher risk of anemia, which has a direct impact on the health of their children.

Menstrual cycle

Menstrual period is the time or duration of blood flow when a woman menstruates. Menstrual period is calculated from the first day of blood flow from the vagina until the bleeding stops. (Putri et al., 2025).

In the research (Putri et al., 2025) The results of the study showed that most respondents had irregular menstrual cycles and menstrual durations. The results of the Chi-Square statistical test showed a significant relationship between the menstrual cycle and the incidence of anemia ($p = 0.003$) and a relationship between menstrual duration and anemia ($p = 0.000$). This indicates that adolescent girls who experience irregular menstrual cycles or longer menstrual periods have a higher risk of developing anemia due to greater blood loss during menstruation, which can reduce hemoglobin levels in the body.

Shorter menstrual cycles (less than 28 days) can cause adolescent girls to lose more blood than those with longer menstrual cycles. Irregular and excessive menstruation can increase the risk of anemia because the body loses a lot of iron-rich blood, reducing iron levels. Therefore, if someone consumes iron-rich foods and supplements, the body's iron needs can still be met even with heavy menstrual bleeding, thus preventing the risk of anemia. Conversely, if iron needs are not met, both excessive menstruation and irregular cycles can increase the risk of anemia.

CONCLUSION

The conclusion of this study indicates that the incidence of anemia in adolescents is influenced by various factors, particularly the level of knowledge about anemia, menstrual status, and dietary habits. Adolescents with low knowledge tend to have unhealthy consumption behaviors, such as not having breakfast, frequently consuming tea and coffee, which can inhibit iron absorption, and consuming energy, protein, vitamin C, and iron that do not meet nutritional adequacy requirements. Furthermore, low compliance with routine

iron tablet consumption also plays a significant role in increasing the risk of anemia. Therefore, the results of this study can serve as a basis for strengthening health education efforts for adolescents and improving sustainable iron tablet supplementation programs to reduce the prevalence of anemia.

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