

THE EFFECT OF MENSTRUAL CYCLE ON HEMOGLOBIN LEVELS AMONG FEMALE ADOLESCENTS AT SMP NEGERI 2 AJUNG IN 2025

Nining Saputri Nurhasanah^{1*}, Anik Sri Purwanti²

¹⁻² Bachelor of Midwifery Study Program, Institute of Science and Health Technology, Dr. Soepraoen Hospital, Malang, East Java and

email correspondent : paudsyariahaldjalel1@gmail.com

ABSTRACT

Hemoglobin (Hb) levels play an important role in maintaining the physiological balance of adolescent girls, particularly during the menstrual period. This study aimed to analyze the relationship between the menstrual cycle and hemoglobin levels among adolescent girls. The research sample was selected using a purposive sampling technique involving female students at SMP Negeri 2 Ajung in 2025. This study employed a correlational analytic design with a cross-sectional approach. Data were collected using questionnaires and hemoglobin level measurements, then analyzed through a normality test followed by the Chi-Square test. The results showed that among 50 respondents, 39 respondents (78%) had normal menstrual cycles, and 39 respondents (78%) did not experience anemia. There was a statistically significant relationship between the menstrual cycle and hemoglobin levels ($p = 0.000 < 0.05$; $PR = 4.310$).

Keywords: Hemoglobin; Menstrual Cycle; Adolescent Girls

INTRODUCTION

According to the World Health Organization (WHO), adolescents are defined as individuals aged 10–19 years. Adolescence is a period characterized by rapid physical growth and development. In female adolescents, physical maturation, particularly sexual development, is marked by the onset of menstruation. The WHO defines menstruation as a natural process in females involving periodic uterine bleeding due to the shedding of the endometrial lining. Menstruation begins during puberty, generally between the ages of 10 and 16 years, and continues until menopause, which occurs at an average age of 51 years. Normally, menstruation occurs every 21–35 days and lasts for approximately 2–7 days per cycle. Prolonged and excessive menstrual bleeding may increase the risk of anemia in women, leading to decreased hemoglobin (Hb) levels.

According to the Ministry of Health of the Republic of Indonesia (Kemenkes RI), a person is classified as anemic when the hemoglobin (Hb) concentration in the blood is below the normal standard. The normal Hb level for adult males is ≥ 13 g/dL, for adult females is ≥ 12 g/dL, and for pregnant women is ≥ 11 g/dL. Individuals with Hb levels below these thresholds are considered to have anemia.

This study was conducted at SMP Negeri 2 Ajung, involving female students from grades VII, VIII, and IX aged 12–16 years, which corresponds to the period of menarche and the early phase of menstrual development.

METHOD

The research method used was a cross-sectional design. The study population consisted of all female students in grades VII, VIII, and IX at SMP Negeri 2 Ajung, with a total sample of 50 respondents selected using a purposive sampling technique. The study was conducted starting on June 1, 2025, at SMP Negeri 2 Ajung, Jember Regency. Data collection was carried out through hemoglobin (Hb) level measurements. Data analysis included univariate and bivariate analyses. The bivariate analysis was performed using the Chi-Square (χ^2) test to determine the relationship between the menstrual cycle and hemoglobin (Hb) levels among adolescent girls at SMP Negeri 2 Ajung, Jember Regency, in 2025.

RESULTS

Table 1. Frequency Distribution of Menstrual Cycles Among Adolescent Girls at SMP Negeri 2 Ajung in 2025

Menstrual Cycle	Frequency (f)	Percentage (%)
Normal	39	78
Abnormal	11	22
Total	50	100

Based on Table 1, the results of the study regarding menstrual cycles among adolescent girls at SMP Negeri 2 Ajung, Jember Regency, in 2025 showed that 39 respondents (78%) had a normal menstrual cycle, while 11 respondents (22%) had an abnormal menstrual cycle.

Table 2. Frequency Distribution of Hemoglobin (Hb) Levels Among Adolescent Girls at SMP Negeri 2 Ajung in 2025 (n=50)

Hemoglobin (Hb) Level	Frequency (f)	Percentage (%)
Not Anemic	39	78
Anemic	11	22
Total	50	100

Based on Table 2, the results of the study regarding hemoglobin (Hb) levels among adolescent girls at SMP Negeri 2 Ajung, Jember Regency, in 2025 showed that 39 respondents (78%) did not experience anemia, while 11 respondents (22%) were classified as anemic.

Table 3. Relationship Between Menstrual Cycle and Hemoglobin (Hb) Levels Among Adolescent Girls at SMP Negeri 2 Ajung in 2025

Menstrual Cycle	Anemia		Not Anemia		Total		p-value
	f	%	f	%	f	%	
Normal	25	86.2	4	13.8	29	100	0.000
Abnormal	2	20.0	8	80.0	10	100	
Total	27	69.2	12	30.8	39	100	

PR (95% CI) = 4.310 (1.237–15.016)

Based on Table 3, the results of the study regarding the relationship between the menstrual cycle and hemoglobin (Hb) levels among adolescent girls at SMP Negeri 2 Ajung, Jember Regency, in 2025 showed that among respondents with a normal menstrual cycle, the majority did not experience anemia. The results of the Chi-Square statistical test obtained a p-value of 0.000 (<0.05), indicating that H_0 was rejected and H_a was accepted. This means that there was a significant relationship between the menstrual cycle and hemoglobin (Hb) levels among adolescent girls at SMP Negeri 2 Ajung, Jember Regency, in 2025.

The PR value = 4.310 with a 95% Confidence Interval (CI) of 1.237–15.016 indicates that respondents with abnormal menstrual cycles had a 4.310 times higher risk of experiencing anemia compared to respondents with normal menstrual cycles.

DISCUSSION

1. Menstrual Cycle Among Adolescent Girls

Based on the results presented in Table 1 regarding the menstrual cycle among adolescent girls at junior high school, involving 50 respondents, it was found that the majority of respondents (39 respondents; 78%) had a normal menstrual cycle. According to the researchers' analysis, most respondents experienced a normal menstrual cycle because they generally had regular menstrual periods each month, with a cycle length ranging from 21 to 35 days. These findings are consistent with a study conducted by Angga Yulia Contesa (2022), which also reported that the majority of respondents had normal menstrual cycles.

The results of this study are also in line with research conducted by Nofianti (2021) regarding the relationship between the menstrual cycle and the incidence of anemia among adolescent girls at SMP Negeri 2 Kerambitan, Tabanan Regency, which showed that among 89 respondents, most of them (45 respondents; 50.6%) had normal menstrual cycles. The menstrual cycle is defined as the interval from the first day of menstruation to the first day of the next menstrual period, while the length of the menstrual cycle refers to the interval between the onset of the previous menstruation and the beginning of the subsequent menstruation. A normal menstrual cycle generally ranges from 21–35 days, with only 10–15% of women experiencing a typical 28-day cycle. The duration of menstruation usually lasts 3–5 days, although it may extend to 7–8 days in some individuals.

The findings indicate that most respondents had normal menstrual cycles, ranging between 21–35 days per menstrual period. This condition may be influenced by the maturity of the reproductive system among respondents, as indicated by the average age of menarche being 12 years old, which occurred when most respondents were in the sixth grade of elementary school.

2. Hemoglobin (Hb) Levels Among Adolescent Girls

Based on the results presented in Table 2 regarding hemoglobin (Hb) levels among adolescent girls at SMP Negeri 2 Ajung, Jember Regency, in 2025, it was found that the majority of respondents did not experience anemia or had hemoglobin levels of ≥ 12 g/dL. According to the researchers' analysis, this finding may be attributed to the routine consumption of iron (Fe) tablets distributed by the school every week. The iron supplementation program is actively implemented in schools as an effort to prevent anemia among students. The distribution and consumption of Fe tablets are monitored by teachers, which helps reduce the number of students who do not take the supplements.

The results of this study are consistent with the research conducted by Angga Yulia

Contesa (2022), which also found that more than half of the respondents had normal hemoglobin levels. These findings are also in accordance with the study by Nofianti (2021) regarding the relationship between the menstrual cycle and the incidence of anemia among adolescent girls at SMP Negeri 2 Kerambitan, Tabanan Regency.

Anemia is a condition characterized by a decrease in the number of red blood cells (erythrocytes) in circulation or a reduction in hemoglobin (Hb) mass, resulting in an inability to adequately transport oxygen to body tissues. The normal hemoglobin level for menstruating women is 12.0 g/dL, while for pregnant women it is 11.0 g/dL. The most common cause of anemia among adolescents is iron (Fe) deficiency. Iron is an essential micronutrient required for hemoglobin synthesis, which functions in transporting oxygen throughout the body. Iron also plays a role in collagen formation and various enzymatic processes. Other causes of anemia include deficiencies of folic acid (vitamin B9) and vitamin B12 (Taufiq, 2020).

The consequences of anemia among adolescents include increased susceptibility to illness due to decreased immune function. In addition, reduced oxygen supply to the brain caused by anemia may impair concentration, leading to decreased academic performance. Adolescents with anemia may also experience weakness, fatigue, and reduced enthusiasm for learning. Anemia during adolescence can continue into pregnancy and increase the risk of adverse birth outcomes, such as preterm birth (<37 weeks) and low birth weight (LBW) (<2500 grams). Infants with LBW are at risk of developing stunting, which may continue into adolescence and future pregnancy, potentially contributing to the cycle of malnutrition across generations. Furthermore, stunting is associated not only with short stature but also with lower intelligence quotient (IQ), psychological problems, and an increased risk of chronic diseases such as diabetes and hypertension later in life.

3. Relationship Between Menstrual Cycle and Hemoglobin (Hb) Levels Among Adolescent Girls

Based on the results presented in Table 3, it was found that there was a significant relationship between the menstrual cycle and hemoglobin (Hb) levels among adolescent girls at SMP Negeri 2 Ajung, Jember Regency, in 2025 ($p = 0.000 < 0.05$; $PR = 4.310$). According to the researchers' analysis, this relationship may occur because an abnormal menstrual cycle can increase the risk of decreased Hb levels among adolescent girls. Therefore, adolescents who frequently experience abnormal menstrual cycles tend to have lower hemoglobin levels or are more likely to develop anemia.

These findings are consistent with the study conducted by Patonah (2018) regarding the relationship between menstrual cycle and hemoglobin levels among adolescent girls, which found a significant association between the two variables. Hemoglobin levels tend to remain normal when adolescent girls experience a normal menstrual cycle, ranging from 21–35 days. Conversely, menstrual cycles that are prolonged (>35 days) or shortened (<21 days) may contribute to abnormal hemoglobin levels.

The results of this study are also in line with research conducted by Silvia (2019) on the relationship between nutrient intake (protein, iron, and vitamin C) and menstrual patterns (cycle and duration) with hemoglobin levels among adolescent girls at SMK Negeri 10 Semarang. The study demonstrated a significant and positive relationship between the menstrual cycle and hemoglobin levels ($p = 0.01$; $r = 0.817$).

Furthermore, this study supports the findings of Nofianti (2021) regarding the relationship between menstrual cycle and anemia among adolescent girls at SMP Negeri 2 Kerambitan, Tabanan Regency, which reported a significant relationship ($p = 0.001 < 0.05$). Adolescent girls who experience menstrual bleeding for more than 8 days and have a

short menstrual cycle (less than 21 days) are at greater risk of losing more iron, which may lead to abnormal Hb levels. Adolescents with menstrual cycles shorter than 28 days tend to lose more iron compared with those having normal cycles because more frequent menstruation results in greater iron loss. Without adequate iron intake, this condition may contribute to the occurrence of anemia.

Meanwhile, prolonged menstrual cycles (more than 35 days) may be associated with inadequate nutritional intake, which can affect menstrual cycle regulation. Nutritional factors involved include protein intake affecting the follicular phase, fat intake influencing reproductive hormone production, and carbohydrate intake contributing to energy availability during the luteal phase.

In addition to causing menstrual disturbances, inadequate nutrition may also contribute to decreased hemoglobin levels. Insufficient nutritional intake among adolescent girls can lead to malnutrition and increase the risk of iron deficiency anemia. Based on the research findings and supported by previous studies, the menstrual cycle among respondents showed a significant association with hemoglobin levels. Respondents with normal menstrual cycles tended to have normal Hb levels, whereas those with abnormal menstrual cycles were more likely to experience decreased Hb levels (anemia).

CONCLUSION

A total of 39 out of 50 adolescent girls at SMP Negeri 2 Ajung, Jember Regency, in 2025 had a normal menstrual cycle (78%).

A total of 39 out of 50 adolescent girls at SMP Negeri 2 Ajung, Jember Regency, in 2025 did not experience anemia (78%).

There was a significant relationship between the menstrual cycle and hemoglobin (Hb) levels among adolescent girls at SMP Negeri 2 Ajung, Jember Regency, in 2025 ($p = 0.000 < 0.05$; $PR = 4.310$).

It is recommended that the school continue to optimize the routine distribution of iron supplementation (Fe tablets) and provide reproductive health education for female students to prevent and reduce the incidence of anemia among adolescent girls.

REFERENCE

- Abd Gafar, S. (2023). Peranan remaja dengan konsep Basimpuah dan Baselo dalam pencegahan risiko HIV/AIDS. PT Nasya Expanding Management.
- Ahmed, M. (2017). Hubungan pola makan dan status gizi dengan keteraturan menstruasi pada mahasiswi Fakultas Kedokteran Gigi Universitas Sumatera Utara tahun 2017. *Jurnal Kedokteran*, 3.
- Angelita Afina Arif Putri, A. S. (2021). Edukasi mengenai anemia defisiensi besi bagi remaja putri dengan media leaflet (hlm. 280).
- Angga Yulia Contesa, F. M. (2022). Hubungan pengetahuan, lama menstruasi dan status gizi dengan kejadian anemia pada mahasiswi kebidanan reguler di Universitas Kader Bangsa Palembang tahun 2022. *Jurnal Dopler*, 6(1), 88–89.
- Apriyanti, F. (2019). Hubungan status gizi dengan kejadian anemia pada remaja putri SMAN 1 Pangkalan Kerinci Kabupaten Pelalawan tahun 2019. *Jurnal Doppler Universitas Pahlawan Tuanku Tambusai*, 3(2), 18–19.
- Bakri, K. (2018). Hubungan pola menstruasi dengan kadar hemoglobin (Hb) remaja siswi SMP Negeri I Lasusua Kabupaten Kolaka Utara tahun 2018. <http://ojs.stikgiamakassar.ac.id/index.php/JIK/article/view/59>

- Cynthia Almaratus Sholicha, L. M. (2019). Hubungan asupan zat besi, protein, vitamin C dan pola menstruasi dengan kadar hemoglobin pada remaja putri di SMAN 1 Manyar Gresik (hlm. 148).
- Dinda Tri Lestari, A. (2022). Asupan protein dan menstruasi dengan status anemia remaja putri berdasarkan status ekonomi di Kabupaten Cianjur. *Public Health Nutrition Journal*, 77.
- Heny Sepduwiana, R. S. (2018). Hubungan lama menstruasi terhadap kadar hemoglobin pada mahasiswi di Prodi D-III Kebidanan Universitas Pasir Pengaraian tahun 2018. *Jurnal Maternal Neonatal*, 2(5), 319.
- Irma Maya Puspita, F. A. (2022). Asuhan kebidanan pada remaja dan perimenopause. Penerbit Rena Cipta Mandiri.
- Marni Br Karo, E. L. (2022). Kesehatan reproduksi remaja dan NAPZA. Penerbit Rena Cipta Mandiri.
- Nasruddin, H. (2021). Angka kejadian anemia pada remaja di Indonesia. *Cerdika: Jurnal Ilmiah Indonesia*, 1(4), 357–364.
- Nofianti, G. A. T. P. (2021). Hubungan siklus menstruasi dengan kejadian anemia remaja putri di SMP Negeri 2 Kerambitan Kabupaten Tabanan I. *WIDYA Biologi*, 12(01).
- Novita, R. (2018). Hubungan status gizi dengan gangguan menstruasi pada remaja putri di SMA Al-Azhar Surabaya. *E-Journal UNAIR*, 173–174.
- Patonah, S. (2018). Hubungan antara siklus menstruasi dengan kadar hemoglobin pada remaja putri. *Asuhan Kesehatan*, 10(2).
- Reni Yuli Astutik, D. E. (2018). Anemia dalam kehamilan. CV. Pustaka Abadi.
- Silvia, A. (2019). Hubungan asupan zat gizi (protein, zat besi, vitamin C) dan pola (siklus, lama) menstruasi dengan kadar hemoglobin (studi pada remaja putri di SMK Negeri 10 Semarang). *Jurnal Kesehatan Masyarakat*, 7(4).
- Suandika, M. (2023). Description of the knowledge level of adolescent women about anemia. *Jurnal Inovasi Penelitian*, 3(9).
- Taufiq, Z. (2020). *Aku sehat tanpa anemia: Buku saku anemia untuk remaja putri*. CV. Wonderland Family Publisher.