



(RESEARCH ARTICLE)



## Relationship between age, menstrual cycle, and length of menstruation with anemia in adolescent girls in the Gresik district

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### Abstract

Anemia in adolescents is defined as a low hemoglobin level (less than 12g/dl) in adolescent blood. The incidence of anemia in Indonesia is still quite high. In adolescents, anemia is more prevalent due to growth spurt, onset of menarche, poor nutrition, and poverty. Age has a significant relationship with the incidence of anemia in adolescents, especially in older girls. The menstrual cycle and length of menstruation play an important role in the amount of blood that flows out. This study aims to analyze the relationship between age, menstrual cycle, and length of menstruation with anemia in adolescent girls in the Gresik District. The type of research was quantitative analytic observational cross-sectional design. Respondents consisted of 661 adolescent girls aged 10-19 years old in elementary, junior high, and senior high school held UKS program in Gresik District. Hb data was obtained by POCT (Point of Care Test) and other data was obtained by questionnaires via google form. The result showed that 29% were diagnosed with anemia, and 71% were not. The category of adolescents was found 8.3% in early, 59.8% in middle, and 31.9% in late adolescents. Menstrual cycle was found 54.6% in the short cycle, 40.7% normal cycle, and 4.7% long cycle category. The length of menstruation was 1.1% in short category, 74.1% normal category, and 24.8% long category. The results of statistical using the chi-square test in analyzing the relationship between age with anemia obtained  $p$ value=0,065, menstrual cycle with anemia obtained  $p$ value=0,128, and length of menstruation with anemia obtained  $p$ value=0,330. There is no correlation between age, menstrual cycle, and length of menstruation with anemia in adolescent girls in Gresik District.

**Keywords:** Age; Menstrual cycle; Length of menstruation; Anemia

### 1. Introduction

According to World Health Organization (WHO), adolescents are individuals aged 10-19 years [1]. Anemia in adolescents is defined as a low hemoglobin level (less than 12g/dl) in adolescent blood [2]. The incidence of anemia in Indonesia is still quite high [3]. In adolescents, anemia is more prevalent due to growth spurt, onset of menarche, poor nutrition, and poverty [4]. Age has a significant relationship with the incidence of anemia in adolescents, especially in older girls, because their preference for eating out, skipping meals, and dieting to maintain a certain body curvature, makes them more susceptible to iron deficiency. Most parents have little control over their daughter's food intake as an adult. Fear of weight gain and low nutritional knowledge affect adolescent eating habits and contribute to iron deficiency anemia [5]. The menstrual cycle and length of menstruation play an important role in the amount of blood that flows out. Anemia is a disease that requires attention as it can cause various impacts that affect life in the long term. Adolescents with anemia may experience decreased immunity, concentration, academic achievement, and productivity, and it can later increase the risk of death during childbirth, premature births, and low birth weight [6].

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## 2. Material and methods

The type of research was quantitative analytic observational with a cross-sectional design, sampling using the total sampling method. Respondents consisted of 661 adolescent girls aged 10-19 years in elementary, junior high, and senior high school programs held UKS in Gresik District. Hb data was obtained by using the POCT (Point of Care Test) and other data was obtained by distributing questionnaires via google form. The information obtained from the questionnaire was in the form of data on anemia status, age, menstrual cycle, and menstrual duration which will be used in this study. Data collection was carried out from April to May 2023. Collected data were recorded for entry and processed using Microsoft Excel and SPSS.

## 3. Results and discussion

The research data and analysis are described in the form of tables and narratives. This aims to find out information about the characteristics of anemia status, age, menstrual cycle, and duration of menstruation in young women in the Gresik District in 2023.

**Table 1** The Characteristics of Respondent

Variable	n	Percentage (%)	Normality
<b>Age</b>			
Early Adolescent	55	8.3%	0.000
Middle Adolescent	395	59.8%	
Late Adolescent	211	31.9%	
<b>Menstrual Cycle</b>			
Short	361	54.6%	0.000
Normal	269	40.7%	
Long	31	4.7%	
<b>Menstrual Length</b>			
Short	7	1.1%	0.000
Normal	490	74.1%	
Long	164	24.8%	
<b>Anemia Status</b>			
Anemia	192	29%	0.000
Non Anemia	496	71%	

The result of this study showed known that most adolescent girls in Gresik Regency are in the middle category with a total of 395 adolescent girls. More than half (59.8%) of respondents are in this category. This shows that most of the respondents in the study had an age range of 13 to 15 years. Meanwhile, the lowest frequency of youth is in the early adolescent category with only 55 girls or around 8.3%. The results of the normality test show that it is not normally distributed because the p-value is  $0.00 < 0.05$ .

The result of this study indicates that the highest frequency of adolescents is in the short cycle category with a total of 361 adolescents. More than half (54.6%) of respondents are in this category. This shows that most respondents in the study had menstrual cycles of less than 21 days. Meanwhile, adolescents with normal menstrual cycles had the second highest frequency with a total of 269 adolescents or 40.7%. Meanwhile, the least frequency of adolescents is in the long cycle category with only 31 adolescents or around 4.7%. The results of the normality test show that it is not normally distributed because the p-value is  $0.00 < 0.05$ .

The result of this study indicates that in the variable length of menstruation, the highest frequency of adolescents is in the normal category with a total of 490 adolescents. More than half (74.1%) of respondents are in this category. This shows that most of the respondents in the study had menstrual periods between 2 and 8 days at most. Meanwhile, adolescents with long menstrual periods had the second highest frequency with 164 adolescents or 24.8%, and the least frequency is in a long category with only 7 adolescents or around 1.1%. The results of the normality test show that it is not normally distributed because the p-value is  $0.00 < 0.05$ .

The result of this study showed that 29% were diagnosed with anemia, and 71% were not diagnosed with anemia. This shows that the number of adolescent girls with anemia in Gresik Regency is quite low. The results of the normality test show that it is not normally distributed because the p-value is  $0.00 < 0.05$ .

**Table 2** Relationship between Age and Anemia in Adolescent Girls

Age	Anemia				Total	P	
	Yes		No			n	%
	n	%	n	%			
Early Adolescent	14	2.12%	41	6.2%	55	8.32%	0.065
Middle Adolescent	104	15.73%	291	44.02%	395	59.76%	
Late Adolescent	74	11.20%	137	20.73%	211	31.92%	
Total	192	29%	469	71%	661	100%	

The result of this study showed that the majority of anemia sufferers were adolescents with the range age of 13-15 years and the lowest in the early adolescent category. Meanwhile, the statistical results of the chi-square test using the SPSS Statistics 22 program showed that the p-value is 0.065. Based on these results, it can be said that the age group has no significant relationship with anemia in adolescent girls in Gresik District in 2023.

The results of this study are in accordance with the research of Indrawatiningsih et al (2021) on 98 adolescent girls in Sidomakmur Village with the sampling technique used, namely proportional random sampling. In this study using a p-value of 0.05, a statistical test of a p-value of 0.224 was obtained so that age did not have a relationship with anemia in adolescent girls. Age in adolescence is the age of children's growth towards the process of maturity of adult humans. In adolescence, changes occur in a person's physical, biological, and psychological and occur continuously during adolescence. An imbalance between intake and nutritional needs results in nutritional problems, both undernutrition and overnutrition [7].

Age refers to the length of time an individual has been alive, starting from their birth until the present moment. The older someone gets, the more their comprehension and mindset mature, resulting in better knowledge. There are several other factors that also affect anemia, namely basic factors (socioeconomic, knowledge, education, and culture) and direct factors (consumption patterns of Fe tablets, infectious and bleeding diseases) [8]. Energy intake in adolescents greatly affects the growth of the body, if the intake is not strong it can cause all functional adolescents to suffer. Among other things, the degree of poor metabolism, level of effectiveness, physical appearance, and sexual maturity. Adolescence is an age when there are hormonal changes where changes in physical and psychological structure undergo drastic changes. The main nutritional problems experienced by adolescents include iron deficiency anemia, overweight/obesity, and nutritional deficiencies. This is related to the increasing consumption of processed foods that have less nutritional value, but have a lot of calories as a trigger factor for obesity in adolescents. Consumption of these types of junk food is the cause of adolescents being very vulnerable to nutritional deficiencies [7].

The result of this study showed that the majority of anemia sufferers were adolescents with a menstrual cycle of less than 21 days. Meanwhile, the proportion of sufferers with anemia with normal menstrual cycles was higher than those with long menstrual cycles, with 11.04% and 0.76% respectively of the total adolescent girls. The statistical results of the chi-square test using the SPSS Statistics 22 program showed that the p-value is 0.128. Based on these results, it can be said that the menstrual cycle has no significant relationship with anemia in adolescent girls in Gresik District in 2023.

**Table 3** Relationship between Menstrual Cycle and Anemia in Adolescent Girls

Menstrual Cycle	Anemia				Total		P
	Yes		No		n	%	
	n	%	n	%			
Short	114	17.25%	247	37.37%	361	54.61%	0.128
Normal	73	11.04%	196	29.65%	269	40.70%	
Long	5	0.76%	26	3.93%	31	4.69%	
Total	192	29%	469	71%	661	100%	

The results of this study are in accordance with research by Andriani (2021) on 65 adolescent girls at the Riau Technology Islamic Boarding School with the sampling technique using accidental sampling. In this study, the statistical value of the chi-square test was obtained at 3.361, so it results that the menstrual cycle has no relationship with anemia in adolescent girls at the Riau Technology Islamic Boarding School. [9]

However, these results are different from the research by Sari, et. al. (2023) on 56 adolescent girls at SMA Pembina Palembang using the total sampling technique. This study used the chi-square test by comparing the p-value obtained with a significance level of  $\alpha = 0.05$ . In this study, a p-value of 0.009 was obtained, which was less than 0.05, indicating that there was a significant relationship between the menstrual cycle and anemia in adolescent girls. [10]

Adolescent girls are a period of transition or movement from childhood to adulthood, this can be marked by the occurrence of several physical and mental changes. The functioning of the reproductive organs such as menstruation is a sign of physical changes that usually occur at the age of 10-19 years. The menstrual cycle is the distance between the start of the last menstruation and the next menstruation and the menstrual cycle is one of the variable indicators of the menstrual cycle [11].

The physiological needs of a person's body vary depending on age, gender, place of residence, and stage of pregnancy. The causes of anemia are generally due to a lack of knowledge about anemia, a lack of iron, folic acid, vitamin B12, and vitamin A. Some other causes that are not common are acute and chronic inflammation, parasitic infections, congenital disorders that affect hemoglobin synthesis, and deficiency of red blood cells [12].

Adolescent girls have a high risk of developing anemia, especially iron deficiency anemia. This happens because adolescence requires higher levels of nutrients, including iron, for growth and development. In addition, young women tend to be very concerned about their body shape so they will limit their food intake and have many restrictions on food such as having a vegetarian diet [13].

The amount of iron lost during menstruation depends on the amount of blood that comes out each menstrual period. Iron loss causes iron reserves to decrease, this condition is called an iron-depleting state. If iron deficiency continues, the iron reserves become completely empty, and the supply of iron for erythropoiesis decreases, causing interference with the formation of erythrocytes but clinical anemia has not occurred, this condition is referred to as iron deficient erythropoiesis. If the amount of iron continues to decrease, erythropoiesis is increasingly disrupted so that hemoglobin levels begin to decrease, resulting in microcytic hypochromic anemia, known as iron deficiency anemia [14].

**Table 4** Relationship between the Length of Menstruation in Adolescent Girls

Menstrual Length	Anemia				Total		P
	Yes		No		n	%	
	n	%	n	%			
Short	1	0.15	6	0.91	7	1.06	0.330
Normal	137	20,73	353	53,40	490	74,13	
Long	54	8,17	110	16,64	164	24,81	

The result of this study showed that the majority of anemia sufferers were adolescents with normal menstrual length, as many as 137 respondents or around 20.73% of the total. The statistical results of the chi-square test using the SPSS Statistics 22 program showed that the p-value is 0.330. Based on these results, it can be said that menstrual length has no significant relationship with anemia in adolescent girls in Gresik District in 2023.

The results of this study are in accordance with the research of Memorisa et al (2020) which was conducted on 46 students at SMK PGRI 3 Kediri with a sampling technique using cluster random sampling using the Spearman rank test (Rho) with a p-value of 0.05, which produced statistical test results The p-value is 0.875 so that the result is that the length of menstruation has no relationship with anemia in adolescent girls at SMK PGRI 3 Kediri. [15]

However, these results are different from the research of Ansari, et. al. (2020) on 50 adolescent girls at SMPN 18 Banjarmasin using a proportional random sampling technique. This study used the chi-square test by comparing the p-value obtained with a significance level of  $\alpha = 0.05$ . In this study, a p-value of 0.000 was obtained, which is less than 0.05, indicating that there was a significant relationship between the length of menstruation and anemia in adolescent girls. [16]

Anemia in adolescent girls is caused by a period of growth that requires higher levels of nutrients, including iron. In addition, during adolescence, a person will experience menstruation. Menstruation is periodic and cyclic bleeding from the uterus accompanied by shedding of the endometrium. The length of menstruation is usually between 3-5 days and some are 1-2 days. Several factors interfere with the smooth flow of menstruation, namely stress, weight changes, excessive exercise, and menstrual complaints. The cycle length can vary for one woman during different moments in her life [17].

The length of menstruation in adolescents is strongly influenced by the condition of the adolescent's body, several conditions can affect the duration of menstruation in adolescent girls, such as fatigue due to busy activities and the influence of high stress, where stress can later affect the hormones in the body and can cause menstrual problems. in women. Menstrual length can be influenced by many things, such as food consumed and physical activity, hormonal factors and enzymes in the body, vascular problems, and genetic factors (heredity). The length of the menstrual process will affect the number of red blood cells in the body, the longer the menstrual process, the more blood will come out, which can cause anemia problems in women [18].

The menstrual cycle, the length of menstruation, and the volume or amount of blood that comes out during menstruation are all caused by hormonal, psychological (stress) factors, and good nutrition. The large number of young women who experience normal menstrual patterns is due to the possibility that the hormones contained in the bodies of these young women are in a stable situation and condition so that they do not affect the menstrual cycle, the length of menstruation, and the volume or amount of blood that comes out during menstruation [9].

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#### **4. Conclusion**

This research draws the conclusion that 29% were diagnosed with anemia, and 71% were not diagnosed with anemia. The category of adolescents was found 8.3% in early, 59.8% in middle, and 31.9% in late adolescents. Menstrual cycle was found 54.6% in the short cycle, 40.7% normal cycle, and 4.7% long cycle category. The length of menstruation was 1.1% in short category, 74.1% normal category, and 24.8% long category. The results of statistical using the chi-square test in analyzing the relationship between age with anemia obtained pvalue=0,065, menstrual cycle with anemia obtained pvalue=0,128, and length of menstruation with anemia obtained pvalue=0,330. There is no correlation between age, menstrual cycle, and length of menstruation with anemia in adolescent girls in Gresik District.

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#### **Compliance with ethical standards**

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##### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### Statement of ethical approval

This study was approved by the health research ethics committee of faculty of medicine, Airlangga University (No.200/EC/KEPK/FKUA/2023) on July 28th 2023.

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### References

- [1] World Health Organization (WHO) Adolescent Health. [Accessed on March 2023]. Available at [https://www.who.int/health-topics/adolescent-health-tab=tab\\_1](https://www.who.int/health-topics/adolescent-health-tab=tab_1).
- [2] Kementerian Kesehatan Republik Indonesia (KEMKES) Remaja Putri Sehat Bebas Anemia di Masa Pandemi. [Accessed on March 2023]. Available at <https://ayosehat.kemkes.go.id/remaja-putri-sehat-bebas-anemia-di-masa-pandemi-covid-19>.
- [3] Kementerian Kesehatan Republik Indonesia (KEMKES) Laporan Nasional Riskesdas 2018. [Accessed on March 2023]. Available at [https://kesmas.kemkes.go.id/assets/upload/dir\\_519d41d8cd98f00/files/Hasil-riskesdas-2018\\_1274.pdf](https://kesmas.kemkes.go.id/assets/upload/dir_519d41d8cd98f00/files/Hasil-riskesdas-2018_1274.pdf).
- [4] Kavthekar, D. S. Association of BMI, socioeconomic status and menarche age with anemia in rural school going adolescent girls. *Pediatric Review: International Journal of Pediatric Research*;2016. 3(7) pp. 486–492. doi: 10.17511/ijpr.2016.i07.04.
- [5] Michael Akenteng Wiafe, Jessica Ayenu, Divine Eli-Cophie. A Review of the Risk Factors for Iron Deficiency Anaemia among Adolescents in Developing Countries. *Anemia*, vol. 2023, Article ID 6406286, 11 pages, 2023. <https://doi.org/10.1155/2023/6406286>
- [6] Kementerian Kesehatan Republik Indonesia (KEMKES) 7 Dampak Anemia pada Remaja. [Accessed on March 2023]. Available at <https://ayosehat.kemkes.go.id/7-dampak-anemia-pada-remaja>.
- [7] Indrawatiningsih, Y. Faktor-Faktor yang Mempengaruhi Terjadinya Anemia pada Remaja Putri. *Jurnal Ilmiah Universitas Batanghari Jambi*. 2021; 21(1), pp. 331–337. doi: 10.33087/jiubj.v21i1.1116.
- [8] Priyanto, L. D. Hubungan Umur, Tingkat Pendidikan, dan Aktivitas Fisik Santriawati Husada dengan Anemia. *Jurnal Berkala Epidemiologi*, vol.6, no.2, page. 139, 2018, doi: 10.20473/jbe.v6i22018.139-146.
- [9] Andriani. Hubungan Pola Menstruasi dengan Kejadian Anemia pada Remaja di Pesantren Teknologi Riau. *Health Care Media* vol.5, no.1, 1th April 2021 (p-ISSN : 2089-4228, e-ISSN : 2721-6993).
- [10] Sari, Intan Permata. Hubungan Status Gizi, Siklus Menstruasi, dan Lama Menstruasi dengan Kejadian Anemia pada Remaja Putri Usia 15-16 Tahun di SMA Pembina Palembang Tahun 2022. *Jurnal Ilmiah Universitas Batanghari Jambi*, vol 23(2), July 2023,2118-2122. doi: 10.333087/jiubj.v23i2.3149.
- [11] Kementerian Kesehatan Republik Indonesia (KEMKES) Pedoman Pencegahan dan Penanggulangan Anemia pada Remaja Putri dan Wanita Usia Subur (WUS); 2018.
- [12] Siska, G.L. Faktor yang Berhubungan dengan Anemia pada Remaja Putri. Jakarta; 2017.
- [13] Almatzier, S. Soertardjo. Gizi Seimbang Dalam Daur Kehidupan. Jakarta: Gramedia Pustaka Utama; 2011.
- [14] Salim, A.M., Kartika, Rini, Puspasari, A. Hubungan Asupan Zat Besi dan Pola Menstruasi dengan Kejadian Anemia di Puskesmas Pakuan Baru Kota Jambi Tahun 2020. *Medic*, Vol 4, no,1. April 2021; page 170-178.
- [15] Memorisa, G, Yuanaringsih, G. P., Aminah, Siti. Hubungan Lama Menstruasi dengan Kejadian Anemia pada Remaja. *Jurnal Mahasiswa Kesehatan* vol.1, no.2, march 2020. doi: <https://doi.org/10.30737/jumakes.v1i2.789>.
- [16] Ansari, M.H, *et al.* Hubungan Pola Menstruasi dengan Kejadian Anemia pada Remaja Putri di SMPN 18 Banjarmasin. *Homeostasis* vol. 3, no.2, August 2020; 209-216.
- [17] Afandi. Buku Panduan Praktis Pelayanan Kontrasepsi. Jakarta: PT Bina Pustaka Sarwono Prawirohardjo; 2012.
- [18] Kumalasari, D., Kameliawati, F., Mukhlis, H., Kristanti, D. A. Pola Menstruasi dengan Kejadian Anemia pada Remaja. *Wellnes and Healthy Magazine* vol.1, no.2, 2019. doi: <https://doi.org/10.30604/well.28122019>.