



# The Effect of Inhibitor Frequency on the Anemia Status of Junior High School Girls in Batu Bara District

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<p><b>Track Record Article</b></p> <p>Accepted: 02 January 2024 Revised: 19 February 2024 Published: 12 March 2024</p> <p><b>How to cite :</b> Nasution, A. D. O., Sudaryati, E., &amp; Lubis, Z. (2024). The Effect of Inhibitor Frequency on the Anemia Status of Junior High School Girls in Batu Bara District. <i>Contagion : Scientific Periodical of Public Health and Coastal Health</i>, 6(1), 324–333.</p>	<p style="text-align: center;"><b>Abstract</b></p> <p><i>To this day, anemia is still a nutritional problem, especially indeveloping countries, including Indonesia. One of the groups most susceptible to anemia is adolescent girls, because adolescent girls menstruate as a physiological condition of a woman. Based on the results of preliminary survey data, 30 adolescent girls were found to have anemia. where more junior high school or MTS girls are found to be anemic 18 people. From the results of preliminary interviews with 15 anemic female students, 46.7 percent, or 7 female students, often consume coffee, or 93.3 percent. or 14 female students often consume tea, and 93.3 percent, or 7 female students often consume tea and coffee. This study used a survey methodology with a case-control design. The research was conducted in junior high schools in Batu Bara District in October-December 2023. This study aims to examine the impact of inhibitor intake on the prevalence of adolescent anemia in the Batu Bara district. The study included a total of 120 samples, consisting of 30 cases and 90 controls, with a ratio of 1:3. The study found no significant correlation between the frequency of inhibitor consumption and the occurrence of anemia in teenage girls attending junior high school girls in the Batu Bara region (OR= 0,571, 95% CI 0,241-1,357). It is necessary to study the amount of iron, protein, and vitamin C, vitamin B12 intake, and morning absorption habits so that the researchers can dig deeper and be more detailed about the quantity of food intake associated with the occurrence of anemia.</i></p> <p><b>Keywords : Anemia, Inhibitor, Junior High School</b></p>
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## INTRODUCTION

Anaemia is a significant worldwide public health issue that specifically impacts young children, menstrual adolescent girls and women, as well as pregnant and postpartum women and around 40% of children aged 6-59 months, 37% of pregnant women, and 30% of women aged 15-49 worldwide suffer from anemia (World Health Organization, 2017). The report presented by the World Health Organization (WHO) to the 65th World Health Assembly (WHA) outlines a comprehensive plan of action and specific objectives for improving nutrition among mothers, infants, and children worldwide. The objective is to decrease the occurrence of anemia in women of fertile age (WUS) by 50 percent or half by the year 2025. Anemia is included in the second and third Sustainable Development Goals (SDGs) initiatives, which seek to decrease all forms of malnutrition and promote overall well-being for individuals of all ages by the year 2030. According to data from Basic Health Research, the prevalence of anemia in women in Indonesia is 27.2%, which corresponds to 6,424 females. Furthermore, the occurrence of anemia among teenage daughters (young girls) has risen from 37.1% in Riskeddas 2013 to 48.9% in Riskeddas 2018 (Kementrian Kesehatan RI, 2019).

As per the data acquired from the Health Ministry of the Province of North Sumatra, the EPPGBM report in 2023 revealed that there were 60,695 adolescent and high school females with anemia, accounting for 54.7% of the total. In the province of North Sumatra, there were 56,604 individuals with mild anemia, 1,018 individuals with moderate anemia, and 60 individuals with severe adolescent anemia out of the total target population of 110,695 adolescent girls in middle and high school.

Based on data obtained from the Batu Bara Health Office, there are 1,180 cases of anemia in Batu Bara in 2023. The most cases occurred in adolescent girls, amounting to 1,001 cases. Anemia cases in middle and high school students were 605 and 396 cases, respectively. Most cases in middle school students

The incidence of anemia has been linked to the consumption of an iron inhibitor food source with anemia incidence (Pratiwi & Widari, 2018). Iron absorption inhibitors include substances such as caffeine, tannins, oxalates, and phytates, which are included in soybean products, tea, coffee, milk, and processed milk. Beverages such as coffee and tea, which include tannins, oxals, and other compounds, are commonly eaten by society, particularly adolescents, when milk is added during processing.

Anemia served as a marker of nutritional status in teenage girls. Menstruation, severe bleeding, iron, folate, and protein deficits, leukemia, and chronic illness were among the contributing factors (Rahmiwati, et al., 2023). One of the populations most susceptible to iron deficiency anemia is adolescent females. Adolescent females with low iron levels have the potential to become future moms if they become pregnant and they run the risk of giving birth to premature and low birth weight babies (Budiyatri, Anjani, Legowo, Syauqy, & Limijadi, 2024).

The preliminary survey was conducted on junior high school students because based on data from the Batu Bara Health Office that the most cases of anemia were found in junior high school students. Preliminary survey conducted on MTs Alawashliyah students (Datuk Tanah Datar region of puskesmas Petatal). The results of the preliminary survey were obtained as many as 15 schoolchildren with anemia, 33.3 percent or 5 students consumed white water after meals, 46.7 percent or 7 students frequently consumed coffee, 93.3 percent or 14 students frequently consumed tea, and 93.3 percent or 7 students often consumed both tea and coffee.

Based on the description, then the formula of the problem in this study is whether there is an influence of inhibitor consumption with the incidence of adolescent anemia in the district of Batu Bara.

## METHODS

This study used a survey methodology with a case-control design. The population in this study consists of all Junior High School girls in four different circumstances in Batu Bara district and this research has been carried out from October to December 2023. The instrument used in this research interview is Utomo's research questionnaire (2019). The sample was obtained using the technique of random cluster sampling, which is a method used to select a sample when the target population or data source is too large within a specific region. One way to determine the number of sample members is by selecting between 25 percent and 30 percent of the total number of research respondents (Arikunto, 2003). The population of this research, which is the location of the study, consists of four circumstances (30% x 12 circumstances). The randomly selected circumstances are Datuk Tanah Datar, Kecamatan Lima Puluh, Kecamatan Air Putih and Sei Suka.

The number of samples of cases of anemia in this study are 30 Junior High School girl I I in the 4 districts selected to be the population. 30 Junior High School girl that are samples are based on data from the screening results carried out by the Department of Health District of Batu Bara. The number of control samples in this research with a ratio of 1 : 3 then for the control sample is 90 so that the total sample of this research is 120.

## RESULTS

**Table 1. Characteristics of Respondents (n=120)**

Characteristics of Junior High School Girls	Case		Control	
	n (30)	%	n (90)	%
<b>First Menarche</b>				
9 Years	0	0	1	0,8
10 Years	3	10,0	11	12,2
11 Years	12	40,0	44	48,9
12 Years	12	40,0	27	30,0
13 Years	3	10,0	7	7,8
<b>Knowledge about Anemia and Nutrition</b>				
Not Good	14	46,7	60	66,7
Good	16	53,3	30	33,3
<b>Last Education Mother of Junior High School Girls</b>				
Primary School	3	10,0	9	10,0
Junior High School	2	6,7	22	20,0
Senior High School	22	73,3	52	61,7
College	3	10	7	8,3

According to table 1, The distribution of Junior High School Girls based on the characteristics of Junior High School Girls in Batu Bara Regency in the case group obtained the distribution of Junior High School Girls on the age of first menarche at the most at the age

of 11 and 12 years at 40%, based on the last educational background, the most mothers were in the high school category as many as 28 young women (73.3%), and the knowledge of young women who were not good amounted to 14 young women (46.7%). The distribution of adolescent girls based on the characteristics of Junior High School Girls in Batu Bara Regency in the control group obtained the distribution of adolescents based on the age of first menarche the most at the age of 11 years (48.9%), based on the last educational background of the mothers of the most young women in the high school category as many as 52 young women (57.8%), and poor knowledge of young women amounting to 60 young women (66.7%).

**Table 2 The Effect of Inhibitor Consumption Frequency on the Incidence of Anemia in Junior High School Girls in Batu Bara District in 2023 (n=120)**

Frequency of consumption of Inhibitors	Incidence of anemia				<i>p- value</i>	<i>OR 95% CI</i>
	Case		Control			
	n	%	n	%		
Infrequently	20	66,7	48	53,3	0,202	0,571 (0,241–1,357)
Often	10	33,3	42	46,7		
Sum	30	100,0	90	75,0		

The statistical analysis using the chi-square test yielded a *p-value* of 0.202, which is greater than the significance level of 0.05. Therefore, it can be concluded that there is no significant relationship between the frequency of inhibitor consumption and the incidence of anemia in Junior High School girls in the Batu Bara district. The odds ratio (OR) value of 0.571 (95% CI 0.241-1.357) indicates that the probability of developing anemia is higher in the group of teenage girls who frequently consume inhibitors compared to those who rarely consume them.

## DISCUSSION

Between the ages of 10 and 13 is when an individual begins to experience adolescence and at the age of 18 to 22, the journey from childhood to adulthood comes to a conclusion (Agustiniingsih, et al., 2020). Teenagers between the ages of 15 and 19 go through fast psychological and physical transformations. It is distinguished by alterations in physical attributes (such as bodily form and proportions) and physiological capabilities (such as the development of sexual organs). The bodily changes that take place during puberty are of utmost significance, happening rapidly, dramatically, sporadically, and fervently. Hormones initiate the production and exert their influence on the reproductive organs, triggering the onset of the reproductive cycle and inducing physiological changes in the body. Subsequent to these physiological alterations, there is a progressive emergence of main and secondary sexual traits. Primary sexual characteristics encompass the maturation of reproductive organs, whereas

secondary sexual characteristics encompass physical transformations that align with gender, such as the onset of menstruation in adolescent females (known as menarche), the growth of pubic hair, the enlargement of breasts, and the widening of hips during adolescence (Iskandarsyah, 2006). Menarche is an early indicator of fertility and reproductive ability.

The study findings indicate that the average age at which junior high school girls in Batu Bara Regency experience menarche is between 9 and 13 years. The most common age for menarche is 11 years, accounting for 46.7% of the participants. The onset of menarche typically occurs within the age range of 10 to 16, with an average age of initiation being 12.4 years. (Marques, et al., 2022). Out of the 120 Junior High School Girls, there was a single individual who experienced menarche at the age of 9. This can be described as an instance of premature menarche. The use of sugary beverages has been identified as a significant factor in early menarche. Research has shown that individuals who consume more than 1.5 sugary drinks per day experience menarche around 2.7 months earlier than those who eat fewer than two sugary drinks per week (Shim, 2015). Another variable that can impact the practice of providing formula to infants in the early stages of life has also been examined as a potential contributor to the occurrence of early onset of menstruation (Lee, 2021). Menarche age is believed to be influenced by various factors including socioeconomic situations, genetics, overall health, nutritional status, physical activity, season, and family size (Lacroix, et al., 2023).

It is important to provide young women with sufficient information prior to their initial menstruation. Menstruation is a significant occurrence in the lives of adolescent females. Inadequate management of menstruation in adolescent girls can result in school absenteeism, school dropouts, and further sexual and reproductive health complications (Sinaga, et al., 2017). It is important to provide young women with sufficient information prior to their initial menstruation. Menstruation is a significant occurrence in the lives of adolescent females. Inadequate management of menstruation in adolescent girls can result in school absenteeism, school dropouts, and further sexual and reproductive health complications.

Knowledge is the outcome of "knowing", which occurs once an individual has perceived a certain object. Following the human sensory system, which encompasses olfaction, gustation, audition, vision, and tactile perception, the majority of human information is obtained through the visual and auditory senses. The influence of information or cognitive factors on one's actions is crucial (Notoatmojo, 2011).

According to the survey findings, 38.3% of junior high school girls possess a substantial understanding of anemia and nutrition. Adolescent girl should possess knowledge about anemia. According to a study conducted by Sulistywati & Nurjanah (2018), adolescent girls

have a limited understanding of anemia. Specifically, they lack knowledge about the definition, signs, causes, effects, and prevention of anemia. Their knowledge, particularly regarding the causes, effects, and prevention of anemia, is extremely minimal. Young women exhibit the following indications of anemia: The individual experiences a tendency to tire quickly, has a pale complexion, frequently shakes, and suffers from lethargy, weakness, and exhaustion. Additionally, they frequently experience dizziness and have a flickering sensation in their eyes. Other symptoms include pale eyelids, lips, tongue, skin, and palms. Severe anemia, defined as having less than 6 grams per deciliter of blood, can lead to pain (Aulia, 2012). Anemia is the term used to describe a condition where the quantity of red blood cells or hemoglobin falls below the normal range. During puberty, when teenagers start to experience menstruation, it is crucial to ensure enough intake of minerals such as iron, vitamin A, and calcium. Menstruating young women have a loss of iron that is up to twice as much as the amount lost by other individuals (Direktorat Gizi Masyarakat, 2016).

The adolescent girl experiencing menarche is experiencing feelings of sadness and confusion. This is due to the fact that the majority of youngsters are oblivious to the underlying transformations occurring within themselves. The varied emotions and reactions of adolescent daughters to menarche often result in individualized interpretations among those who will experience menstruation (Kartono, 2016). Menarche preparedness refers to the state of being ready for the first menstrual period, which is a sign of physical maturity. This event occurs at a specific time and repeats cyclically in females between the ages of ten and sixteen. Adolescents who are unprepared for the onset of menstruation may perceive their menstrual cycle as harsh and menacing, which can result in further adverse consequences. Parents, particularly moms of adolescent daughters, are the primary and most influential social contacts in their children's lives. The messages that parents convey to their children have a profound and fundamental impact. Adolescent females experiencing menarche may experience feelings of melancholy and bewilderment. This occurs due to the lack of awareness among the majority of youngsters regarding the fundamental changes that take place within their bodies. Young women may have varying emotions and reactions to menarche, leading to individualized perspectives on menstruation (Kartono, 2016). Menarche readiness refers to the state indicating a person's physical maturity and their ability to have their first menstruation. This event often occurs cyclically and at a specific age range of ten to sixteen years in women. Adolescents who are unprepared for menarche may view menstruation as harsh and menacing, which might result in more adverse consequences. Mothers, in particular, are the first and most influential

social connection for young women. The messages that parents convey to their children have a strong and lasting impact on the child.

According to a study conducted by Meinarisa, Sari, & Mardiantika (2021), there is a notable correlation between the closeness of mothers and the preparedness of adolescents to experience their first menstruation (menarche) at Senior High Schools 04, 06, and 17 in the cities of Jambi. The statistical analysis yielded a p-value of 0.003, indicating the significance of this link. Research has demonstrated a significant association ( $p < 0.05$ ) between educational attainment and knowledge level. Specifically, higher levels of education are associated with higher levels of knowledge, while lower levels of education are associated with lower levels of knowledge (Damayanti & Sofyan, 2022).

Based on the study findings, the highest percentage of high school graduates (61.7%) is observed among the mothers of the youngest daughters attending secondary school in the Batu Bara district. The level of education within a family, particularly the education of the mother, has a direct impact on the overall health condition of the family, leading to optimal health outcomes (Kubilawati & Warastuti, 2019). Notoatmojo (2011) further asserted that the level of formal education is anticipated to be analogous to the level of health education, since it serves as an intervention particularly in the context of health education. Adolescent daughters must possess adequate understanding of the life processes they are currently experiencing and will encounter in the future. The parents, particularly the moms, have the duty to educate their teenage daughters, who are nearing the age of nine, on different subjects (Sinaga, et al., 2017).

Substances that can impede the assimilation of iron are referred to as inhibitors. Iron inhibitors encompass several substances such as phytates, caffeine, tannins, oxalates, soybeans, as well as tea and coffee. Tea and coffee, which are regularly ingested by individuals, contain tannins and oxalates. Phytates, a compound included in wheat, serve as an extra obstacle to a diet that restricts the accessibility of iron. According to the study findings, 56.3% of Junior High School Girls were susceptible to using inhibitors. Out of the 30 Junior High School Girls with anemia, 12 of them were at risk of using inhibitors. The frequency of consuming foods and beverages that impede iron does not appear to be a contributing factor to the incidence of anemia in the Junior High School Girls in the Batu Bara district. This is because there is a possibility that Junior High School Girls may consume food and drink that hinders the process of absorbing iron. Coffee and tea are the primary sources of iron inhibitors ingested by Junior High School Girls.

The findings of this study align with a previous study conducted on a sample of 60 teens aged 17 to 20 in Surabaya. The study concluded that there is no statistically significant

correlation between the consumption of inhibitors, such as tea, and the prevalence of anemia among girls in Surabaya. The p-value obtained was 0.771 (Akib & Sumarni, 2017). A study conducted in Jakarta revealed that a significant proportion of schoolgirls, specifically 28.8%, continue to exhibit inadequate intake of iron inhibitors (Warda & Fayasari, 2021).

Individuals who consume foods with high levels of iron may not always have enough availability of this nutrient due to the presence of inhibitors or chemicals that hinder absorption (Kurniati, 2020). According to the findings of statistical analysis by conducting the chi-square test, a p-value of 0.957 was obtained, indicating that there is no statistically significant relationship between the frequency of enhancer consumption and the incidence of anemia in adolescent girls in the Batu Bara district. The odds ratio (OR) of 0.571 (95% CI 0.241-1.357) suggests that the probability of anemia occurrence is higher in the group of adolescent girls who consume inhibitors compared to those who do not. The findings of this study are corroborated by prior studies. A study conducted by Jaelani, Simanjuntak, & Yuliantini (2017) found a statistically significant correlation between the frequency of consuming foods that block iron absorption and the occurrence of anemia in adolescent girls ( $p=0.034$ ). According to the findings of the Susantini & Bening (2023), the use of inhibitors was identified as a significant risk factor for anemia in teenage daughters. The statistical analysis revealed a p-value of 0.004, indicating a strong association. Furthermore, the odds ratio (OR) of 4.94 suggests that the intake of inhibitors increases the risk of anemia in teenage daughters by 4.94 times. adolescent girls are strongly advised to increase their intake of food sources of Fe (iron) both animal and vegetable sources and limit consumption of Fe inhibitor foods such as coffee and tea along with mealtimes (Fauziyah & Putri, 2023).

## CONCLUSIONS

Junior High School girls with the first age of menarche are the most at the age of 11 years as much as 39.5%, Junior High School girls' knowledge about anemia nutrition and nutrition with the category of not good is 50% and the education of mothers of Junior High School girls is the most in the high school category as much as 73.7%. Junior High School girls with rarely consumed inhibitors who were anemic as much as 66.7% and Junior High School girls who often consumed inhibitors who were anemic as much as 33.3%. Junior High School girls with infrequent consumption of inhibitors that are not anemic as much as 46.7% and adolescent girls who rarely consume inhibitors that are not anemic as much as 53.3%. There was no effect between the frequency of inhibitor consumption on the incidence of anemia in junior high school girls in Batu Bara Regency with an OR= 0.571 value (95% CI 0.241-



1.357). The Batu Bara district government is promoting health awareness about anemia prevention and its dangers in adolescents through media. Further research is needed on iron, protein, vitamin C, and vitamin B12 intake, as well as investigating other factors influencing anemia in junior high school students.

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