

The association between adolescent girls' elevated hemoglobin levels and blood supplement tablets consumption

Gebby Nadila *, Lestari Sudaryanti and Rize Budi Amalia

Department of Midwifery, Faculty of Medicine, Universitas Airlangga, East Java, Indonesia.

World Journal of Advanced Research and Reviews, 2024, 21(01), 597–602

Publication history: Received on 27 November 2023; revised on 06 January 2024; accepted on 08 January 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.21.1.0039>

Abstract

Background: Anemia is one of the most common diseases affecting adolescent, especially girls. The impact of anemia in adolescent is not only felt now but will also have an impact during pregnancy, childbirth and postpartum.

Purpose: The aims of the research was to determine the relationship between consumption iron supplement tablets 12 tablets and hemoglobin levels in anemic girls.

Method: The design of this study was quantitative pre-experiment using a one group pretest-posttest design approach. This research was conducted on 81 anemic girls in class XI aged 15-17 years at the Mambausholihin Islamic Boarding school, Gresik Regency, the sampling technique used was total sample, the independent variable in this study was blood supplement tablets, and the dependent variable in this study was hemoglobin levels.

Result: The results of this study were that there was a relationship between giving blood supplement tablets 12 tablets and hemoglobin levels in anemic girls. Based on the results of the chi-square statistical test, the value of $p = 0.000 < 0.05$.

Conclusion: These data showed that there was a relationship between consumption iron supplement tablets 12 tablets and hemoglobin levels in anemic girls.

Keywords: Anemia; Blood Supplement Tablet; Adolescent Girl; Increased Hemoglobin; Hemoglobin Levels

1. Introduction

WHO data in 2019 shows that the prevalence of anemia in the world is around 29.9% in women of productive age 'WHO [1]'. Based on Basic Health Research data in 2021, the incidence of anemia in Indonesia is still quite high. The prevalence of anemia in adolescents is 32%, meaning that 3-4 out of 10 adolescents suffer from anemia. This is influenced by non-optimal nutritional intake habits and lack of physical activity 'Indonesian Health Profile [2]'. Anemia can cause various adverse effects on adolescent girls. Anemia caused by iron deficiency can reduce endurance so that it can cause decreased productivity. Iron intake can be obtained through animal protein foods such as liver, fish and meat. However, not all people can consume these foods, so additional iron intake is needed which is obtained from Blood Addition Tablets 'Indonesian Health Profile [3]'. The provision of blood supplement tablets to adolescent girls aims to meet the iron needs of young women who will become mothers in the future. With sufficient iron intake from an early age, it is expected that the incidence of anemia in pregnant women, bleeding during childbirth, LBW, and short toddlers can decrease. The provision of blood supplement tablets to adolescent girls is carried out through educational institutions

* Corresponding author: Gebby Nadila

(junior and senior high school or equivalent) by determining a joint blood supplement tablets drinking day. The dose given is one tablet every week throughout the year during adolescence 'Indonesian Health Profile [2]'.

In 2020 East Java is ranked 13th with a percentage (45.0%), while in 2021 East Java is ranked 17th with a percentage (23.3%). This shows that there has been a decrease in the coverage of Blood Addition Tablets in the last two years in East Java Province 'Indonesian Health Profile [2]'. Blood Addition Tablets are given to adolescent girls and women of childbearing age by means of supplementation containing at least 60 mg of elemental iron and 400 mcg of folic acid. This supplementation is carried out in several settings, namely health care facilities, educational institutions, workplaces and places of worship 'Ministry of Health [4]'.

The compliance of adolescent girls in consuming blood supplement tablets is an indicator of the government's success in reducing anemia rates in Indonesia 'Ministry of Health [4]'. Non-compliance of adolescent girls in consuming blood supplement tablets can hinder the benefits of iron supplementation. Non-compliance of adolescent girls in consuming blood supplement tablets can be caused by several things such as nausea and dislike of the smell of blood supplement tablets, forgetting to drink, laziness, lack of knowledge about the importance of blood supplement tablets consumption and feeling unnecessary. There are also side effects of taking blood supplement tablets such as nausea and vomiting, pain or heartburn, and blackish stools 'Ministry of Health [4]'.

Previous research has shown that adolescent girls who adhere to taking blood supplement tablets regularly can reduce the incidence of anemia. This means that the more obedient in taking blood supplement tablets, the Hb levels of adolescent girls will increase 'Savitri [5]'. Another study also stated the same thing that there was a relationship between consumption of blood-added tablets and hemoglobin levels 'Pramardika and Fitriana [6]'. Reinforced by the results of research 'Risanti [7]' which states that nutritional status, compliance with consumption of blood-added tablets and breakfast have a significant influence on the hemoglobin levels of adolescent girls. The same research results were conducted by other researchers that compliance with the consumption of blood-added tablets and healthy breakfast had a significant effect on the hemoglobin levels of students who participated in the "Nutrition Action" program 'Khoirunnabila [8]'.

The working area of the Sukomulyo Health Center, Manyar District, Gresik Regency, obtained data on junior and senior high school girls at the Mambausholihin Gresik Islamic Boarding School in 2023, who experienced anemia of 215 students. This study was conducted to analyze the relationship between consumption of 12 blood supplement tablets and hemoglobin levels in anemic adolescent girls at the Mambausholihin Islamic Boarding School in Gresik Regency.

2. Methods

This research is a type of quantitative research using pre-experimental and using the one group pretest-posttest design approach. The purpose of this study was to analyze the relationship between the consumption of 12 blood supplement tablets and hemoglobin levels in anemic adolescent girls. The population in the study were all anemic adolescent girls in class XI. The sample in this study were all anemic adolescent girls in class XI who were present at the Hb examination activity. The sampling technique used a total sample with the inclusion criteria of adolescent girls aged 15-17 years, already menstruating, having Hb levels <12 gr/dl, and studying at the Mambausholihin Islamic Boarding School, so that the sample used in this study amounted to 81 respondents. The research location was carried out at the Mambausholihin Islamic Boarding School women's dormitory in January 2023 - October 2023. The independent variable in this study is blood supplement tablets and the dependent variable is hemoglobin levels. Data collection techniques regarding hemoglobin levels were obtained based on the results of the researcher's examination together with the Sukomulyo Health Center using the Easy Touch GCHB digital hemometer. Hemoglobin examination was carried out twice at pre and post, namely before and after consumption of blood supplement tablets. Data on the regularity of consumption of blood supplement tablets was obtained based on direct interviews with respondents. Data processing and analysis techniques in this study are divided into two stages, namely univariate and bivariate analysis. The univariate analysis consisted of respondent characteristics and descriptive analysis, while the bivariate analysis consisted of chi-square statistical test and contingency coefficient c. The data obtained were then processed and presented in the form of tables, diagrams, and analyzed descriptively.

3. Results and discussion

The subjects of this study were anemic adolescent girls in class XI Mambausholihin Islamic boarding school in Gresik Regency. The research conducted was the consumption of blood supplement tablets as much as 12 tablets and examination of hemoglobin levels. The results of the study discuss the relationship between consumption of 12 tablets

of blood supplement tablets and hemoglobin levels in anemic adolescent girls at the Mambausholihin Islamic Boarding School in Gresik Regency in 2023. The presentation of data includes an overview of the research location, characteristics of respondents, frequency distribution and relationship test results as well as a discussion of the relationship between consumption of 12 blood supplement tablets and hemoglobin levels in anemic adolescent girls.

The total number of respondents was 81 with the average age of respondents being 15 years old as many as 10 respondents (12.3%), 16 years old as many as 50 respondents (61.7%), and 17 years old as many as 21 respondents (25.9%). With the highest frequency being at the age of 16 years.

Table 1 Frequency distribution of Hb level values before and after blood supplement tablets consumption

	Hb levels	Frequency	Percentage (%)	Hb Min	Hb Max	Mean
Before (pretest)	< 12 gr/dl	81	100	8.90	11.90	11.1716
After (posttest)	≥ 12 gr/dl	31	38.3	9.10	16.90	11.9049
	< 12 gr/dl	50	61.7			

Based on table 1, it is known that before being given blood supplement tablets (pretest) all respondents (100%) or 81 respondents had hb levels <12 gr/dl or with anemia status. With a minimum hb value of 8.9 gr/dl and a maximum hb value of 11.9 gr/dl. After being given blood supplement tablets (posttest) there was a change, namely 31 respondents (38.3%) experienced an increase in hb to ≥12 gr/dl, while the other 50 respondents (61.7%) had hb levels <12 gr/dl. With a minimum hb value of 9.10 gr/dl and a maximum hb of 16.9 gr/dl. This means that there are changes after being given blood supplement tablets to 31 respondents who experienced an increase in hb to become not anemic.

Anemia that occurs in adolescent girls before being given blood supplement tablets can be influenced by several factors such as menstrual patterns, nutritional status, level of knowledge, socioeconomics, and history of disease. This statement is reinforced by research 'Budiarti [9]' which states that there are several factors that cause anemia in adolescents, namely the lack of knowledge of anemia and nutritional intake so that it affects the selection of nutritious food consumption, not accustomed to breakfast, the habit of drinking tea and coffee by adolescents is the cause of the inhibition of the absorption of iron in the body, as well as the intake of several nutrients such as energy, protein, and vitamin C which are less than the RDA and deficit iron intake in adolescents and the non-routine consumption of blood supplement tablets is the main factor that causes adolescent girls to develop anemia.

After the intervention of consuming blood supplement tablets in adolescent girls, there was a change in a small portion or 31 respondents experiencing an increase in hb to ≥12 gr/dl or not anemic, but most were still anemic. This can be caused by several confounding factors such as irregular consumption of blood supplement tablets, consuming blood supplement tablets together with foods and drinks that contain tannin and phytate, and consuming blood supplement tablets together with hemicellulose fiber which can inhibit iron absorption, so that even though adolescent girls have consumed blood supplement tablets, iron absorption is not optimal and causes adolescent girls to remain anemic.

Table 2 Frequency distribution of blood supplement tablets intake

Consume	Frequency	Percentage (%)
Regularly	34	42
Irregular	47	58
Total	81	100

Based on table 2, it is known that 34 respondents (42%) consume blood supplement tablets regularly, namely 12 tablets. While the other 47 respondents (58%) consumed blood supplement tablets irregularly.

In accordance with the Ministry of Health's recommendation, women and adolescent girls take blood supplement tablets as much as 1 tablet every week for the whole year. Taking blood supplement tablets has several harmless side effects such as nausea and dizziness, so it is recommended to take blood supplement tablets at night before bed, take

blood supplement tablets with water, avoid taking blood supplement tablets together with tea, milk or coffee because it can reduce the absorption of iron in the body so that the benefits are reduced, it is recommended to eat foods containing vitamin C such as oranges, papaya, mangoes, guava, and animal-sourced foods such as meat, fish and poultry to increase iron absorption in the body 'Rahayu [10]'.

Table 3 Frequency distribution of changes in hemoglobin levels

Hb	Frequency	Percentage (%)
Increased	51	63.0
Remained	2	2.5
Decreased	28	34.6
Total	81	100

Based on table 3, it is known that 51 respondents (63%) have increased Hb levels, 2 respondents (2.5%) have Hb levels that remain or are the same as previous Hb levels, while 28 respondents (34.6%) have decreased Hb levels. In 51 respondents who had an increased Hb status, 31 of them already had Hb \geq 12 gr/dl while 20 other students experienced an increase in Hb levels but still remained in anemia status or Hb levels $<$ 12 gr/dl. The average increase in Hb levels was 0.73 gr/dl after the intervention.

The increase in Hb levels experienced by adolescents is influenced by several factors such as a balanced diet, sufficient activity, adolescent awareness of anemia, and most importantly taking blood supplement tablets regularly. To increase Hb levels, adolescent girls need to eat a variety of foods to meet the needs of energy, protein, and micronutrients (vitamins and minerals) because they are used for rapid growth, increased blood volume and increased hemoglobin. The need for iron for adolescent girls is needed to form hemoglobin which has increased and prevent anemia caused by iron loss during menstruation 'Februhartanty [11]'. To increase iron absorption, it is better to take blood supplement tablets together with vitamin C-source fruits such as oranges, papayas, mangoes, guavas, and other fruits that are high in vitamin C 'Ministry of Health [2]'.

Table 4 Relationship between blood supplement tablets consumption and hemoglobin level

No	Hb Levels	Consumption				Total		Asymp.Sig
		Regularly		Irregularly		n	%	
		n	%	N	%			
1	Increased	34	42.0	17	21.0	51	63.0	0.000
2	Decreased and Remained	0	0	30	37	30	37	
	Total	34	42	47	58	81	100	

Based on table 4, it is known that out of 81 respondents (100%), 34 adolescent girls (42%) who consume blood supplement tablets regularly have increased Hb levels. Whereas in 47 adolescent girls (58%) who consumed blood supplement tablets irregularly, 17 people (21%) of them experienced an increase in Hb levels and 30 people (37%) others did not experience an increase in Hb levels or Hb levels decreased and remained.

The relationship between consumption of blood supplement tablets and hemoglobin levels in anemic adolescent girls based on the results of the chi-square statistical test analysis obtained a p value = 0.000 $<$ 0.05, it can be concluded that there is a significant relationship between consumption of blood supplement tablets and hemoglobin levels. It can also be interpreted that there is a relationship between consumption of blood-added tablets and hemoglobin levels in anemic adolescent girls at the Mambausholihin Islamic boarding school in Gresik Regency.

Supplementation of blood supplement tablets in adolescent girls and women of childbearing age is one of the efforts of the Indonesian government to meet iron intake. Giving blood supplement tablets with the right dose of 1 tablet every week can prevent anemia and increase iron reserves in the body. Take blood supplement tablets along with vitamin C

source fruits such as oranges, papaya, mango, guava and animal protein sources such as liver, fish, poultry and meat to help the iron absorption process. Avoid taking blood supplement tablets along with tea, milk and coffee which contain phytate and tannin compounds that can bind iron into complex compounds thus inhibiting iron absorption by the body. To reduce symptoms of nausea and dizziness when taking blood supplement tablets, it is recommended to consume at night before bedtime 'Ministry of Health [4]'.

The results of this study are in line with research conducted by 'Pramardika and Fitriana [6]' which states that there is a relationship between consumption of blood supplement tablets and hemoglobin levels. In their study, it was said that of the total 45 respondents who had a blood supplement tablet consumption compliance of 95.6%, only 28.9% had Hb levels < 12 gr/dl. Another study also stated that nutritional status, compliance with consumption of blood-added tablets and breakfast have a significant influence on the hemoglobin levels of adolescent girls 'Risanti [7]'.

This study is in line with the results of research by 'Cahyaningtyas [12]' with the title Effect of Fe Tablet consumption on Increasing Hemoglobin Levels in Adolescent Girls at SMAN 2 Ngaglik Sleman Regency. Based on statistical test data before giving Fe tablets amounted to 13.14, so that it increased with a difference value of 0.50. when the Paired Sample T-Test statistical test was performed, the p-value (0.002) was obtained $\leq \alpha$ (0.05). The test results show the effect of Fe tablet consumption on increasing hemoglobin levels in adolescent girls.

The same research results were conducted by 'Khoirunnabila [8]' which stated that compliance with the consumption of blood supplement tablets and healthy breakfast had a significant effect on the hemoglobin levels of students who participated in the "Nourishing Action" program. In her research, she encouraged adolescent girls to maintain a culture of obedient consumption of blood-added tablets and healthy breakfast. In line with other research which states that there is an effect of giving blood supplement tablets to adolescent girls every Wednesday on increasing hemoglobin levels at STIKES Muhammadiyah Cirebon in 2019 'Tonasih, [13]'.

4. Conclusion

Based on the results of research that has been conducted in class XI at Mambausholihin Islamic Boarding school, Gresik Regency in 2023, it can be concluded that the average increase in hemoglobin levels is 0.73 gr / dl after intervention in the form of consumption of blood supplement tablets as much as 12 tablets. So that there is a relationship between the consumption of 12 tablets with hemoglobin levels in anemic adolescent girls.

Suggestion

For adolescent girls who already know about anemia and the benefits of consuming blood supplement tablets in an effort to increase hemoglobin levels, it is expected to be able to apply the consumption of blood supplement tablets regularly in everyday life so as to meet the nutritional needs needed by the body, especially the increase in iron to prepare adolescents to become mothers. In addition, it is expected to improve daily nutritional intake to avoid the risk of diseases such as anemia in adolescents.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

- [1] World Health Organization (2022) Anaemia Prevalence. Available at: <https://www.who.int/data/gho/data/themes/topics/anaemia-in-women-and-children>
- [2] Department of Health of the Republic of Indonesia. (2021) Indonesia Health Profile 2020. Jakarta: Ministry of Health of the Republic of Indonesia
- [3] Ministry of Health of the Republic of Indonesia. (2022) Indonesia Health Profile 2021. Jakarta: Ministry of Health of the Republic of Indonesia.
- [4] Department of Public Health. (2018) Guidelines for the Prevention and Management of Anemia in Adolescent Girls and Women of Childbearing Age (WUS). (Chairman: Anung Sugihantono). Jakarta: Ministry of Health of the Republic of Indonesia.

- [5] Savitri, M., Tupitu, N., Iswah, S and Safitri, A (2021) The Relationship between Adherence to Blood Addition Tablet Consumption and the Incidence of Anemia in Adolescent Girls: A Systematic Review. *Tambusai Health Journal* [online] 2(2), 43-49. Available at: <https://journal.universitaspahlawan.ac.id/index.php/jkt/article/view/1784>
- [6] Pramardika, D and Fitriana (2019) The Relationship between Adherence to TTD Consumption and Hemoglobin Levels in Adolescent Girls in the Bengkuring Health Center Area in 2019. *Jurnal Kebidanan Mutiara Mahakam* [online] 792), 58-66. Available at: <https://jurnal.stikesmm.ac.id/index.php/jkmm/article/view/60>
- [7] Risanti, E., Putra, P., Khoirunnabila, A and Dasuki, M (2020) Nutrition, Blood Additive Tablet Consumption and Breakfast in Increasing Hemoglobin Levels in Adolescent Girls. *Publication Manuscript. University of Muhammadiyah Semarang*. Available at : <https://publikasiilmiah.ums.ac.id/handle/11617/12406>
- [8] Khoirunnabila, A., Hernawan B., Agustina T and Risanti, E (2021) The Effect of Adherence to Blood Additive Tablet Consumption and Healthy Breakfast of Unicef's "Nutritious Action" Program on Hemoglobin Levels of Adolescent Girls in Klaten. *Publication Manuscript. University of Muhammadiyah Surakarta*. Available at: <https://publikasiilmiah.ums.ac.id/handle/11617/12623>
- [9] Budiarti, A., Anik, S and Wirani, N. (2020) "Phenomenological Study of the Causes of Anemia in Adolescents in Surabaya". *Mesencephalon Health Journal* [online] 6(2), 137-141. Available at: <https://ejournal.stikeskepanjen-pemkabmalang.ac.id/index.php/mesencephalon/article/view/246>
- [10] Rahayu, A and Yulidasari, F. (2019) The Orkes-ku (My Health Report Card) Method in Identifying Potential Nutritional Anemia Events in Adolescent Girls. First Edition [online] Yogyakarta: CV Mine. Available at: <http://eprints.ulm.ac.id/8898/> (November 23, 2022).
- [11] Februhartanty, J (2019) *Adolescent Nutrition and Health*. Second edition. Jakarta: SEAMEO RECFON Ministry of Education and Culture of the Republic of Indonesia
- [12] Cahyaningtyas, D (2017) The Effect of Fe Tablet Consumption on Increasing Hemoglobin Levels in Adolescent Girls at SMAN 2 Ngaglik Sleman Regency. Thesis. University of 'Aisyiyah Yogyakarta. Available at: <http://digilib.unisayogya.ac.id/2688/>
- [13] Tonasih and Rahmatika, S. (2019) The Effectiveness of Giving Blood Addition Tablets to Adolescents on Increasing Hemoglobin (Hb) at Stikes Muhammadiyah Cirebon. *Journal of SMART Midwifery*, [online] 6(2), 106 - 113. Available at: <http://stikesyahoedsmg.ac.id/ojs/index.php/sjkb> [January 15, 2023]