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Overview of Hemoglobin Level in Teenage Girls after Fe Tablet Supplementation in Batam

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A B S T R A C T

Many factors can cause iron deficiency anemia with iron loss during menstruation, especially in teenagers. This study was aimed to describe hemoglobin levels related to Fe supplementation in teenage girls in Batam. This study is descriptive and observational research. The research was conducted at SMAN 5 Batam from May to July 2021. The inclusion criteria for the participant in this study were girls aged 14 to 17 years old, willing to participate in this study, and signed the informed consent. A total of 47 girls participated in this study. Hemoglobin level was recorded before and after supplementation. Most of the participants were over 15 years old (91.5%) and had normal menstrual cycles. All participants had menstruated and had no history of infectious disease. The results of the Hb level examination showed that before the administration of Fe tablets, 95.7% of the participants had normal Hb levels. However, after Fe supplementation, the number of participants who had normal Hb levels decreased to 87.2% of the total participants who took part in this study. In conclusion, we found a decrease in the number of participants who had normal Hb levels after Fe supplementation.

1. Introduction

Anemia is a condition characterized by a low count of red blood cells or hemoglobin. Normal hemoglobin (Hb) levels in men are 13 g/dL, while normal hemoglobin levels in women are 12 g/dl. Hemoglobin is the central part of red blood cells that binds oxygen.[1-3] A person lacks red blood cells or normal hemoglobin, then the cells in the body do not have enough oxygen; this results in symptoms of anemia. Many factors can cause iron deficiency anemia with iron loss during menstruation. In addition, anemia occurs due to various causes, such as iron deficiency, folic acid deficiency, vitamin B12, and protein. Directly, anemia is mainly caused by insufficient production/quality of red blood cells and blood loss either acutely or chronically.

The global prevalence of anemia among teenagers ranges from 40 to 88 percent. According to the World Health Organization, anemia affects 53.7 percent of all teenage girls in underdeveloped countries.[4] Anemia is generally caused by stress, menstruation, and late eating. At the 65th World Health Assembly, WHO recommended agreeing with the global target plan for child, maternal, and infant nutrition by reducing 50% the prevalence of anemia in women of fertile age by 2025. Following up on this, the government has intensified the prevention and prevention of anemia in

teenage girls and women of fertile age, especially the provision of iron tablets through school institutions. Basic Health Research (Riskesdas) results that in Indonesia the prevalence of iron deficiency anemia was found in teenage girls of 84.6%. The incidence of anemia among teenage girls is 121 people (0.10%) of the total female teenagers in Batam.[5]

Symptoms often found in people with anemia are lethargy, tiredness, weakness, accompanied by headaches and dizziness, easy to sleep, and difficulty concentrating. Clinically, people with anemia are indicated by pallor on the face of the eyelids, lips, skin, nails, and palms. Triggers for anemia in teenage girls include nutritional consumption, parental education, economic level, level of knowledge about anemia from teenage girls, consuming Fe, and duration of menstruation. Teenage girls who experience anemia and are not treated when they become mothers and pregnant will impact giving birth to low birth weight (LBW) and stunting. Iron deficiency anemia is the leading cause of anemia, including the lack of intake of iron-rich foods.[6-8]

In young women who experience anemia, it will impact health and academic achievement at school if anemia is not immediately addressed; later during pregnancy, it can result in non-optimal fetal development and complications of pregnancy and childbirth, and even death of both mother and fetus/infant. The iron supplementation program for young women was carried out in 2014, and at this time, it is also one of the interventions to reduce stunting.[8] The government also supports support for consuming blood-added tablets. The Ministry of Health of the Republic of Indonesia has issued policies in the Healthy Indonesia Development Plan and the 2015 to 2019 national mid-term development plan to improve community nutrition, one of which is the provision of iron tablets for teenage girls; the government's target is 30 percent.[4,5]

Compliance with consuming iron tablets is still considered low, and this causes the program to be considered ineffective. The program is said to be effective if the program can affect the level of compliance, influencing factors such as implementation costs, availability, and other factors. Research related to anemia prevention programs in Indonesia has not been widely carried out; the majority only relates to anemia prevalence. This study was aimed to describe hemoglobin levels related to Fe supplementation in teenage girls in Batam.

2. Methods

This study is descriptive and observational research. The research was conducted at SMAN 5 Batam, Riau Island, from May to July 2021. This study has received ethical approval from the ethical committee of the Faculty of Medicine, Universitas Batam. Data were collected with observational sheets. The inclusion criteria for the participant in this study were girls aged 14 to 17 years old, willing to participate in this study, and who signed the informed consent. A total of 47 girls participated in this study. Hemoglobin level was recorded before and after supplementation. Hemoglobin levels were normal if the levels were 12-14 g/dL, and low hemoglobin levels if the Hb test results were below 12 g/dL.

3. Results and Discussion

Table 1 shows that most of the participants were over 15 years old (91.5%) and had normal menstrual cycles. All participants had menstruated and had no history of infectious disease. The results of the Hb level examination showed that before the administration of Fe tablets, 95.7% of the participants had normal Hb levels. However, after Fe supplementation, the number of participants who had normal Hb levels decreased to 87.2% of the total participants who took part in this study (Table 2).

Table 1. Baseline characteristics of participants.

Characteristics	Frequency (%)
Age	
< 15 years old	4 (8.5)
>15 years old	43 (91.5)
Menarche status	
Yes	47 (100)
No	0 (0)
Menstrual cycle	
Normal	43 (91.5)
Abnormal	4 (8.5)
History of infectious disease	
Yes	0
No	47 (100)

Table 2. Hemoglobin (Hb) level before and after Fe supplementation.

Hb level	Frequency (%)
Before Fe supplementation	
Normal	45 (95.7)
Low	2 (4.3)
After Fe supplementation	
Normal	41 (87.2)
Low	6 (12.8)

The presence of a menstrual cycle every month is part of the factors that influence the incidence of anemia.[2] This is supported by the theory that the longer the period, the more blood is lost, so the iron is also getting less. This condition reduces the amount of iron supplied for erythropoiesis, citing iron deficiency in erythropoiesis. This may cause a decrease in participants who have normal Hb in this study.

The definition of anemia varied significantly with age and sex, and there was also variation in the normal range by ethnicity. When evaluating anemic patients, it is important to ensure proper normative reference ranges. Classifying anemia based on the size of the red blood cells also helps in narrowing the differences. The definitions of microcytic, normocytic, and macrocytic vary with age in the pediatric population, so it is important to ensure that proper reference ranges are used.[4]

In the prevention and prevention of anemia, it is applied by consuming sufficient iron in the body to increase the formation of hemoglobin. One of them that can be applied is to increase the intake of iron sources by consuming balanced nutrition, which is found in animal foods rich in iron. Foods that are rich in iron sources from animal sources are liver, fish, meat, and poultry, while vegetable sources are green vegetables, then fortification of foodstuffs is adding nutrients to food to increase the nutritional value of these foods, foods that have been fortified in Indonesia are wheat flour, rice, coconut oil, butter, and consumption of iron supplementation.

Iron supplementation for teenage girls and women of fertile age is an effort by the government to meet iron intake.[1,3] The provision of blood-added tablets, if consumed at the right dose, can prevent and overcome anemia and increase iron reserves in the human body. For the consumption of blood-added tablets to be more effective in preventing anemia, it must be accompanied by the application of a balanced nutritional intake, sufficient protein and rich in iron, consumption of blood-added tablets by drinking water, consumption of fruit rich in sources of vitamin C (for example oranges, papaya, mango, guava) for more effective absorption of blood-added tablets, do not consume with coffee, milk or tea, because it will reduce iron absorption. Low compliance is due to a lack of supervision and motivation to take blood-boosting drugs at home. In the research of Briawan et al., the program of administering blood-enhancing tablets in Bekasi has fairly good compliance, with a compliance

value of 100 percent of the consumption of blood-enhancing tablets.

4. Conclusion

There was a decrease in the number of participants who had normal Hb levels after Fe supplementation.

5. References

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