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Iron and Vitamin C Supplements for Young Women with Anemia at Islamic Boarding School Addanuriyah Semarang

Witri Hastuti[1(CA)], Amrih Widiati[2]

[1(CA)]Faculty of Nursing, STIKes Karya Husada Semarang, Indonesia; wi3.yahoed@gmail.com (Corresponding Author)

[2]Faculty of Nursing, STIKes Karya Husada Semarang, Indonesia; amrihwidiati@gmail.com

ABSTRACT

Young women are at risk of having anemia higher than young men because every month they had menstruation. The purpose of this study was to determine the effectiveness of giving iron and vitamin C supplements to adolescent girls.This is a quantitative research with true experiment design. Research samples were young women who experienced mild-moderate anemia. The study begins with initial screening by measuring Hb levels. The selected samples were given iron supplements in the control group and given iron supplements plus vitamin C in the treatment group. In weeks I and II Fe tablets and vitamin C were given 1 tablet each. Week III, during menstruation the sample is given 1 tablet of Fe and vitamin C every day during menstruation. In week IV given 1 tablet of Fe and vitamin C.The results showed that there were differences in Hb levels in the groups given Fe and Fe tablets plus vitamin C with significance values $\alpha = 0.000$ and $\alpha = 0.000$. The average increase Hb in the group with Fe was 1.2 g / dL and in the group given Fe plus vitamin C it was 1.7 g / dL. The group that received Fe and vitamin C tablets was more effective than the group with Fe tablets only. Vitamin C can increase iron absorption when given during menstruation, so it can reduce anemia in young women

Keywords: Iron supplements, Vitamin C, Anemia, Young women

INTRODUCTION

Background

The maternal mortality rate is still quite high in the city of Semarang, in 2014 there were 33 cases from 26,992 the number of live births and 22 cases in 2015[(1)]. The highest cause of death in Central Java is due to hypertension and bleeding. Bleeding in the postpartum mother is more likely to occur if during adolescence and pregnancy experience a lack of blood (anemia).

Young women are one group that is prone to anemia, which is common in developing countries. World Health Organization (WHO) stated that more than 30% of the world's population or 1500 million people suffer from mild to severe anemia deficiency iron in Southeast Asia[(2)]. It is estimated that approximately 2.15 billion people in the world suffer from anemia with the prevalence of anemia with the percentage of infants and children <2 years 48%, school children 40%, and pre-school children 25%[(3)].In Indonesia female adolescents with anemia amounted to 26.50%; women of childbearing age 26.09%; pregnant women 40.1%; and under-five children 47.0%[(4)]. The highest proportion of anemia according to gender is women, which is 23.9%. One way to overcome anemia with iron and vitamin C supplements.

Iron and vitamin C supplements during menstruation in young women can increase hemoglobin levels. This is consistent with research conducted by Rosado, *et al* (2010) that the addition of iron supplements, iron and vitamin C supplements, as well as multiple micronutrient supplements in different groups, were significant in increasing hemoglobin levels in infants who were anemic[(5)]. Chaturvedi study in 2014 showed that experimental animals that received iron and vitamin C therapy experienced a significant increase in hemoglobin levels compared to iron supplementation alone. Vitamin C can help the absorption of iron from nutrients consumed, so the addition of a combination of iron and vitamin C supplements can help increase hemoglobin levels[(6)].

The survey in Central Java carried out by the Community Nutrition Guidance Section of the Semarang City Health Office for young women (middle-high school students) in 2013 showed that 25.33% of girls suffering

from anemia[7]. Neny's study in 2012 there were 946 (3.34%) adolescents who suffered from anemia, including in adolescent girls 691 (73%), in young men 255 (26.9%).

Purpose

The purpose of this study was to identify the prevalence and characteristics of anemia in young women, to know the effectiveness of iron supplements to increase hemoglobin levels, to determine the effectiveness of iron and vitamin C supplements to increase hemoglobin levels.

METHODS

This was a quantitative research with true experiment design, where the treatment group was given iron and vitamin C supplements. The research samples to be taken were young women in the Addanuriyah Islamic Boarding School, Semarang who had mild to moderate anemia. Selected samples were given iron supplements in the control group and given iron supplements plus vitamin C in the treatment group for 1 month. In first dan second week before menstruation given Fe tablets and vitamin C each 1 tablet. In third week, during menstruation the sample were given 1 tablet of Fe and vitamin C every day during menstruation. At forth week, after menstruation is given 1 Fe tablet and vitamin C. Post menstruation the sample is measured Hemoglobin.

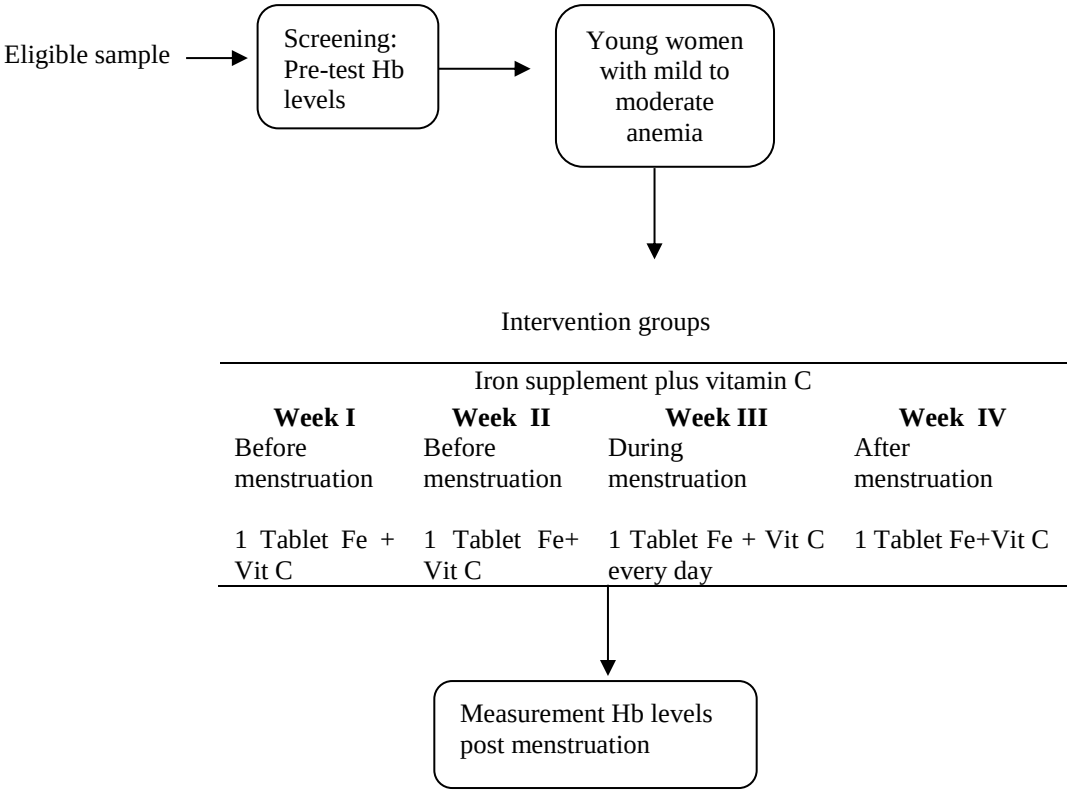

Figure 1. Research flow scheme

RESULTS

The results showed that the average hemoglobin level before being given iron and vitamin C supplements was 10.8 gr / dL, after being given 12.5 g / dL. The minimum value of hemoglobin level before treatment was 8.3 gr / dL with a maximum value of 10.0 gr / dL. After being treated with a hemoglobin level of at least 11.9 gr / dL with a maximum value of 13.7 gr / dL.

Based on the analysis of Wilcoxon ranks statistical test before and after administration of iron (Fe) tablets found that the p value was 0.000 this means ($p < 0.05$), there was a significant difference in hemoglobin levels between hemoglobin pre-test and hemoglobin levels post-test by taking iron supplements for adolescent girls at the Addanuriyah Islamic boarding school in Semarang.

Table 1. Hemoglobin levels in blood before and after iron and vitamin C supplementation were given to anemic young women at the Addanuriyah Islamic boarding school in Semarang in 2018

Groups	n	Mean	Median	SD	Min	Max
Intervention						
Before	30	10.836	11.000	0.967	8.3	11.9
After	30	12.573	12.950	0.942	10.0	13.7
Control						
Before	30	10.826	11.000	0.691	8.9	11.8
After	30	12.050	12.000	0.746	10.0	13.5

Table 2. Differences in Hemoglobin levels before and after administration of Fe and Vitamin C tablets in young women with anemia at Addanuriyah Islamic boarding school in 2018

Hemoglobin levels	n	Mean Rank	P value
Before	30	15.50	
After	30	0.00	0.000

DISCUSSION

The results showed that there is a significant difference in the average between the levels of Hemoglobin before and after being given Fe tablets and Vitamin C. So it can be concluded that there is an effect of iron supplementation on hemoglobin levels in young women with anemia at the Addanuriyah Islamic Boarding School in Semarang.

The average increase in Hemoglobin in the group with Fe alone was 1.2 g / dL and in the group given Fe plus vitamin C it was 1.7 g / dL. The group that received Fe and vitamin C tablets was more effective than the group with Fe tablets only. Vitamin C can increase iron absorption when given during menstruation, so it can reduce anemia in young women. Blood-added tablets contain 200 mg of ferrosulfate, equivalent to 60 mg of elemental iron and 0.25 mg of folic acid. Supplementation of the administration of blood-added tablets in the nutritional control program has been studied and tested naturally for effectiveness when used according to dosage and conditions. For this reason, it is recommended that you start taking tablets with blood. Likewise when entering adolescence, when before premarital, during pregnancy and childbirth and during menstruation[8].Iron supplementation is beneficial because it can improve hemoglobin status in a relatively short time. Until now this method is still the only suitable method for pregnant women and other high-risk groups, such as children under five, school children and workers.

In Indonesia, iron pills commonly used are ferrous sulfate, these compounds are relatively cheap and can be absorbed up to 20%. The dosage used varies depending on the iron status of the person who consumes it. Usually pregnant women prone to anemia are given a higher dose compared to ordinary women.Side effects of iron pills are the digestive tract, such as nausea, vomiting, constipation, and diarrhea. But the frequency of these side effects depends on the dose of iron in the pill, not on the mixture. The higher the dose given, the greater the possible side effects. Iron pills taken in a stomach filled condition will reduce the side effects caused, but this can reduce the absorption rate[9].

Iron has a functionimportant in the body include transportation mediafor oxygen from the lungs to various tissuesthe body and will also function as an inner catalystthe process of energy transfer in cells, component productionoxygen carriers are hemoglobin and myoglobin[10]. Iron absorption is influenced by many factors,animal protein and vitamin C increase absorption.Coffee, tea, calcium salts, magnesium can bindiron thus reducing the amount of uptake. Should,iron tablets are swallowed together with food can increase of absorption, and iron-binding foods should be avoidedor not eaten at the same time. Besidesthat, it is also important to remember, additional iron should be obtainedfrom food because iron tablets are provencan reduce serum zinc levels[11].Vitamin C play a role in increasing nonheme iron absorptionto quadruple. Vitamin C and iron formcomplex iron ascorbate compounds are easydissolved and easily absorbed[12].

Young women who experience menstruation every month more Fe is wasted, so requiring iron is twice as much as men.Therefore women tend to suffer from anemia compared to men. So young women have to consume Fe tablets during menstruation regularly so that hemoglobin levels in the blood remain normal. After the normal hemoglobin level, the body of the young woman at the time of growth is not easily infected, fitness or freshness of the body is maintained, the spirit of learning and work productivity are stable so that when she becomes a mother she will not experience high risk.

CONCLUSION

There was a change in Hb levels in adolescent girls at the Addanuriyah Islamic Boarding School who experienced anemia. This change occurs after iron and vitamin C supplementation is given.Supplementation of iron and vitamin C can be recommended for consumption by young women, especially during menstruation. This is because during menstruation teenagers are more likely to experience anemia due to bleeding quite a lot. Currently iron supplements are widely sold in combination with other minerals such as vitamin C and zinc.

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