HTechJ Health and Technology Journal (HTechJ)

Volume 02 Number 02
April 2024
p-ISSN: 2986-5662
e-ISSN: 2985-959X

Effect of Red Guava Juice Consumption on Hemoglobin Levels in Pregnant Women

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Abstract:
In Indonesia, the number of maternal deaths collected from the family health program records at the Ministry of Health in 2020 showed 4,627 deaths. This study aimed to determine the effect of red guava juice consumption on hemoglobin levels. This study used a quasi-experiment design method with a two-group pretest and posttest approach. The population in this study were anemic pregnant women in the first and third trimesters; the number of pregnant women with anemia in the last three months was 160, and the number of pregnant women with mild anemia was 57. Then, 30 pregnant women were taken as samples based on inclusion and exclusion criteria. Data collection using observation sheet. Data analysis was conducted using a T-dependent test, and results were presented using frequency distribution. The average hemoglobin level of the control group before the administration of Fe tablets was 9.80 gr/dl, and after consumption of Fe tablets was 10.45 gr/dl. The average hemoglobin level of the intervention group before giving Fe tablets + red guava juice was 9.64 gr/dl, and after consuming Fe tablets + red guava juice, it was 11.37 gr/dl. Statistical test results obtained p value = 0.000. Red guava juice consumption affects the hemoglobin levels of pregnant women. Pregnant women are recommended to consume Fe tablets regularly, accompanied by red guava juice, to increase hemoglobin levels.

Article info:
Submitted:
22-01-2024
Revised:
18-03-2024
Accepted:
18-03-2024

Keywords:
red guava juice; Fe tablet; hemoglobin level; anemia

DOI: https://doi.org/10.53713/htechj.v2i2.156

INTRODUCTION

In Indonesia, the number of maternal deaths collected from the family health program records at the Ministry of Health in 2020 showed 4,627 deaths. This number shows an increase compared to 2019 of 4,221 deaths. Based on the cause, most maternal deaths in 2020 were caused by bleeding as many as 1,330 cases; hypertension in pregnancy, as many as 1,110 cases; and circulatory system disorders, as many as 230 cases; one of the causes of bleeding was anemia (Ministry of Health, 2020). Data on anemia in pregnant women in Indonesia is almost half, where 48.9% of pregnant women with anemia were found in 2018; this has increased compared to the five-year data in 2013 of 37.1% (Riskesdas, 2018).

Anemia is a condition where the hemoglobin (Hb) level in the blood is lower than normal in groups of people based on age and gender. In adolescents, the normal Hb level is 12-15 gr/dl, and in adolescent boys, it is 13-17 gr/dl (Novelia et al., 2022). Anemia in pregnancy is a condition of pregnant women with hemoglobin (HB) levels <11 gr/dl in the first and third trimesters, while in the second trimester, HB levels are <10.5 gr/dl. Common symptoms of anemia are weakness, tiredness, lethargy, and weakness. Meanwhile, symptoms of anemia in pregnant women can hurt women; namely, the labor process takes a long time and results in bleeding and shock due to

Volume 02 Number 02
April 2024
p-ISSN: 2986-5662
e-ISSN: 2985-959X

weak contractions and even death of the mother. Anemia in pregnant women is the main cause of bleeding and infection, which is a major factor in maternal death. Adverse impacts on the fetus include abortion, premature birth, low birth weight babies, defects in babies, and even baby death (Carolin et al., 2023).

Pregnant women usually suffer from iron deficiency, so they provide only a small amount of iron to the fetus, which is necessary for normal iron metabolism. Iron is necessary for the formation of hemoglobin, and during pregnancy, blood volume increases due to changes in the mother's body and the blood supply to the baby. Iron deficiency can cause disturbances and obstacles to the growth and development of the fetus as well as body and brain cells, fetal death in the womb, miscarriage, congenital defects, low birth weight (LBW), and anemia in babies. One of the efforts to prevent and treat anemia in pregnant women is to increase knowledge, change attitudes, and be positive through education about nutritional needs during pregnancy, prenatal checks during pregnancy, administering 90 iron tablets, and checking Hb in the first and third semesters, and immediately check the pregnancy if there are abnormal complaints, get food according to the needs of pregnant women, improve the knowledge and behavior of pregnant women and their families, process and provide food, and improve the quality of health and nutrition services (Laiskodat et al., 2021).

Red guava has benefits as a treatment for various diseases, such as improving digestion, lowering cholesterol, being an antioxidant, and relieving dengue fever and canker sores. There are other parts of the red guava fruit that are efficacious, such as the leaves for curing dysentery, vaginal discharge, diarrhea, gastric inflammation, swollen gums, and mouth inflammation. The chemical content in red guava fruit is amino acids, calcium, phosphorus, iron, sulfur, vitamin A, vitamin B, and vitamin C. Its mineral content can overcome anemia sufferers or lack of red blood cells because it contains nutrients that can facilitate the process of forming hemoglobin in red blood cells. One of its minerals is manganese, which is used by the body as an antioxidant enzyme, and copper is needed in the production of red blood cells (Mahmudah, 2023).

METHOD

This study used a quasi-experiment design method with a two-group pretest and posttest approach. This research design has an experimental group, a control group, and a non-random sample determination. The population in this study was I-III trimester pregnant women who experienced mild anemia and visited the Kusuma Tembaga Clinic from October 2023, to January 2024, which was 160 people. The sampling method in this study used purposive sampling technique, which is a sampling technique with certain considerations that meet the inclusion and exclusion criteria. The sample in this study was 30 respondents. Data analysis was carried out using T-dependent test and presentation of results using frequency distribution.

HTechJ Health and Technology Journal (HTechJ)
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RESULT

Average Hemoglobin Levels in Pregnant Women with Anemia Before and After Fe Tablets in the Control Group and Fe Tablets + Red Guava Juice in the Intervention Group

Table 1. Average Hemoglobin Levels in Pregnant Women with Anemia Before and After Fe Tablets in the Control Group and Fe Tablets + Red Guava Juice in the Intervention Group

Groups	Control			Intervention		
	Mean	Difference	SD	Mean	Difference	SD
Before	9.80	-1.03	0.33	9.64	-1.66	0.33
After	10.45		0.02	11.3		0.39

Based on Table 1, it is known that in the control group, before being given Fe tablets, the average hemoglobin level was 9.80 g/dL with a standard deviation of 0.33, and after being given Fe tablets without guava juice, the average hemoglobin level was 10.45 g/dL with a standard deviation of 0.02. The mean difference in the control group before and after was -1.03. Whereas from 15 respondents in the intervention group, before being given Fe tablets and guava juice, the average hemoglobin level was 9.64 g/dL with a standard deviation of 0.33, and after being given Fe tablets and guava juice, the average value of hemoglobin levels was 11.37 g/dL with a standard division of 0.39. The mean difference in the Intervention group before and after was -1.66.

Effect of Fe Tablet Consumption and Red Guava Juice + Fe Tablet on Hemoglobin Levels in Pregnant Women

Table 2. Effect of Consumption of Fe Tablets and Red Guava Juice + Fe Tablets on Hemoglobin Levels in Pregnant Women

Groups	Before		After		Sig.(2-tailed)
	Mean	SD	Mean	SD	
Control	9.8	0.12	10.4	0.11	0.000
Intervention	9.6	0.13	11.3	0.15	0.000

Based on table 2 above shows that the group that was only given Fe tablets had an average maternal HB level of 9.8 g/dL. While after being given Fe tablets, the average maternal HB level was 10.4 g/dL. Based on the results of statistical calculations using the Paired Sample T Test, the Sig. (2-tailed) = 0.000 <α 0.05. Thus, it is concluded that giving Fe tablets increases the hemoglobin level of pregnant women with mild anemia.

Then, the intervention group above shows that of the 15 respondents who were used as samples, the group given Fe tablets and red guava juice had an average maternal HB level of 10.04 g/dL. While after being given Fe tablets and red guava juice, the average maternal HB level was 11.3 g/dL. Based on the results of statistical calculations using the Paired Sample T Test, the Sig. (2-tailed) = 0.000 <α 0.05. Thus, it is concluded that Fe tablets and red guava juice increase the hemoglobin level of pregnant women with mild anemia.

Differences in Hemoglobin Levels in Pregnant Women After Between Intervention Group and Control Group

Table 3. Differences in Hemoglobin Levels in Pregnant Women between the Intervention Group and the Control Group

Groups	After		t-test	Sig.(2-tailed)
	Mean	SD		
Control	10.4	0.11	-18.7	0.000
Intervention	11.3	0.15		

Based on the results of the bivariate analysis in Table 3 above, it is known that the average increase in hemoglobin levels in pregnant women with anemia in the control group who were only given Fe tablets was 10.4 g/dL with a standard deviation of 0.11. While in the intervention group given Fe tablets and guava juice, the average increase in hemoglobin was 11.3 g/dL with a standard deviation of 0.15. The results of statistical tests on each after-treatment obtained a t-test value of 18.7 and Sig. (2-tailed) = 0.000 (<α=0.05), which means a difference in the average value of posttest hemoglobin levels between the control group and the intervention group.

DISCUSSION

Average Hemoglobin Levels in Pregnant Women with Anemia Before and After Fe Tablets in the Control Group and Fe Tablets + Red Guava Juice in the Intervention Group

Research results show that in the control group, before being given Fe tablets, the average hemoglobin level was 9.80 g/dL with a standard deviation of 0.33, and after being given Fe tablets without guava juice, the average hemoglobin level was 10.45 g/dL with a standard deviation of 0.02. The mean difference in the control group before and after was -1.03. Whereas from 15 respondents in the intervention group, before being given Fe tablets and guava juice, the average hemoglobin level was 9.64 g/dL with a standard deviation of 0.33, and after being given Fe tablets and guava juice, the average value of hemoglobin levels was 11.37 g/dL with a standard division of 0.39. The mean difference in the Intervention group before and after was -1.66.

Anemia causes low physical ability because the body cells lack enough oxygen. In pregnant women, anemia increases the frequency of complications in pregnancy and childbirth. The risk of maternal mortality, prematurity, low birth weight, and perinatal mortality increases. In addition, antepartum and postpartum hemorrhage are more common in anemic women and are more often fatal because anemic women cannot tolerate blood loss (Qomarasari, (2023).

According to the results of research conducted by Nufus et al. (2023), the administration of red guava juice and Fe tablets showed that almost all of them experienced increased Hb levels. This is related to iron's pharmacokinetics, which states that Fe in the body is more easily absorbed in ferrous form. One of the substances that help the absorption process of Fe in the body is vitamin C, which is contained in red guava juice.

Effect of Fe Tablet Consumption and Red Guava Juice + Fe Tablet on Hemoglobin Levels in Pregnant Women

The results showed that the average increase in hemoglobin levels of pregnant women in the control group who were only given Fe tablets was 0.11 g/dL, while in the intervention group given Fe tablets + red guava juice, the average increase in hemoglobin levels was 0.15 g/dL. Statistical test results obtained Sig. (2-tailed) = 0.000 (<α 0.05), which means that the consumption of red

Volume 02 Number 02
April 2024
p-ISSN: 2986-5662
e-ISSN: 2985-959X

guava juice affects hemoglobin levels in pregnant women at Kusuma Copper Clinic, Central Jakarta, in 2023. Red guava is very rich in vitamin C and several minerals that can absorb iron, ward off various diseases, and keep the body fit. Red guava fruit also contains B vitamins, iron, phosphorus, and potassium, which maintain and improve capillaries' health and prevent anemia (Arifin et al., 2014).

In line with research conducted by Ningtyastuti (2018) on the effect of red guava consumption on Hb levels, one of the fruits that can increase hemoglobin levels is red guava. The content in red guava is amino acids (tryptophan, lysine), calcium, phosphorus, iron, sulfur, Vitamin A, vitamin B1, and Vitamin C. The mineral content in red guava fruit can overcome anemia sufferers (lack of red blood) because red guava also contains mineral substances that can facilitate the formation of hemoglobin red blood cells. Red guava is very rich in vitamin C and several minerals that can absorb iron, ward off various diseases, and keep the body fit. Red guava fruit also contains B vitamins, iron, phosphorus, and potassium, which maintain and improve capillaries' health and prevent anemia (Lailiyana et al., 2022).

Differences in Hemoglobin Levels in Pregnant Women After Between Intervention Group and Control Group

The results showed that the control group that was only given Fe tablets was 10.4 g/dL with a standard deviation of 0.11. In the intervention group, Fe tablets and red guava juice were given, and the average increase in hemoglobin was 11.3 g/dL, with a standard deviation of 0.15. The results of statistical tests on each after-treatment obtained a t-test value of 18.7 and Sig. (2-tailed) = 0.000 (< α 0.05), which means a difference in the average posttest hemoglobin levels between the control and intervention groups. Consuming red guava juice can also increase hemoglobin levels in pregnant women.

According to the results of research conducted by Nufus et al. (2023), the administration of red guava juice and Fe tablets showed that almost all of them experienced increased Hb levels. This is related to iron's pharmacokinetics, which states that Fe in the body is more easily absorbed in ferrous form. One of the substances that help the absorption process of Fe in the body is vitamin C, which is contained in red guava juice. This is because vitamin C can reduce ferrous ions to ferrous ions so that the iron in it can be absorbed maximally by the body. Giving Fe tablets together with other micronutrients (multiple micronutrients) is more effective in improving iron status than only giving iron supplementation in a single dose. Based on the research by Rina et al. (2020), the hemoglobin level of the control group before giving Fe tablets was 9.98 g/dL, and after consumption of Fe tablets was 10.56 g/dL. The average hemoglobin level of the intervention group before giving Fe tablets + red guava juice was 10.16 g/dL, and after consuming Fe tablets + red guava juice, it was 11.01 g/dL this, there is an effect of consumption of red guava juice on hemoglobin levels of pregnant women.

The researcher assumed that consuming Fe tablets accompanied by red guava juice can increase hemoglobin levels by more than just giving one treatment alone. This is because vitamin C and the fulfillment of optimal nutrition during the reproductive period accompanied by the consumption of Fe tablets can improve the condition of anemia. The increase in hemoglobin levels is more significant in the intervention group than in the control group because in the intervention group, in addition to being given iron supplements, also given red guava juice, which contains a lot of vitamin C, phosphorus, and iron. So, there is a difference in the average value, but both interventions can increase hemoglobin levels. However, giving Fe tablets accompanied by red guava juice is more effective for increasing hemoglobin levels than just giving Fe tablets alone.

Volume 02 Number 02
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p-ISSN: 2986-5662
e-ISSN: 2985-959X

CONCLUSION

Red guava juice affects hemoglobin levels in pregnant women. There is a difference in the average value of posttest hemoglobin levels between the control group and the intervention group. Giving Fe tablets accompanied by red guava juice is more effective in increasing hemoglobin levels than giving Fe tablets alone. It is hoped that the results of this research can provide input for efforts to improve services and management of health problems by providing counseling and management of health problems by providing counseling to pregnant women, especially to overcome anemia in pregnant women by providing health education to pregnant women.

ACKNOWLEDGEMENT

This research is a tribute to the National University.

CONFLICT OF INTEREST

There is no conflict of interest in conducting this research.

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