

PSIDIUM JUICE GUAJAVA LINIMENT AGAINST INCREASED HEMOGLOBIN IN PREGNANT WOMEN

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Abstract

Pregnancy experiences both physiological and psychological changes, such as an increase in blood volume and an imbalance in the number of red blood cells due to a much greater increase in plasma volume, causing a decrease in hemoglobin levels. Anemia in pregnant women has negative impacts on the health of the mother and fetus, such as the risk of postpartum hemorrhage, the risk of premature labor, low birth weight, and impaired fetal growth and development, and can even cause maternal and fetal death. Consuming foods or drinks rich in iron and vitamin C, which can help increase hemoglobin levels in the blood. Red guava juice is contains 1.10 mg of iron and 87 mg of vitamin C per 100 grams. This research determine the effect of red guava juice on increasing hemoglobin levels in pregnant women. This used a quasi-experimental design with a pretest-posttest approach without a control group. The respondents was 33 pregnant women, consisting of 13 primiparous and 20 multiparous. Respondents were given an red guava juice, consisting of 100 grams of fresh red guava in 150 ml of juice, daily for 7 days. Results that the average hemoglobin level before the intervention was 12.6 g/dL, while after the intervention it increased to 13.4 g/dL. This increase indicates a positive effect of red guava juice consumption on hemoglobin levels in pregnant women. The conclusion is that red guava juice has the potential to be a natural alternative to increase hemoglobin levels in pregnant women, both primiparous and multiparous.

Keywords: Hemoglobin, Pregnant, Guava juice

1. INTRODUCTION

Pregnancy It is a normal event for women, a woman will experience changes in himself both physical and psychological. These changes include: enlarged cervical blood vessels and becomes soft, the endocrine glands and cervix widen, secreting a lot of mucus, increased volume blood And amount cell red blood cells are unbalanced because the plasma volume increases much more so that cause decline level hemoglobin (1).

Maternal health is crucial for reducing maternal and infant mortality and ensuring healthy births. One of the most common health problems during pregnancy is anemia, particularly iron deficiency anemia. Anemia is characterized by low hemoglobin levels in the blood, which can potentially lead to various health risks for both mother and fetus, such as prematurity , low birth weight, miscarriage, maternal fatigue, and complications during delivery (2).

There is a number of method overcome anemia among them in a way pharmacological And non pharmacological. Pharmacological methods that is with consume fe tablets , as for non-pharmacological methods of treating anemia include foods that contain high levels of iron such as red meat, eggs, fish, tuna salmon And vegetables like leaf moringa, spinach, tomatoes , dates , fruit bit, fruit dragon, fruit guava seed (3).

Prevalence anemia in mothers pregnant in Indonesia is still high , in 2018. Prevalence anemia decrease to 27.7%. The proportion anemia in mothers pregnant This decrease as much as 21.2% (from 48.9% to 27.7%) (4).

Decreased level hemoglobin in the mother pregnant is one of the disturbance health Which happen on time pregnancy . Hemoglobin own two function that is transport oxygen to network and transport carbon dioxide . Hemoglobin (Hb) play a role important in transportation O₂ And CO₂ between lungs - lungs And network (1).

Condition anemia during pregnancy generally overcome with giving supplement substance iron (Fe tablets) as intervention main . Effectiveness supplement this is greatly influenced by the level absorption substance iron in body . One of the factor important things that can increase absorption substance iron is vitamin C (acid) ascorbate), which functions change form non- heme iron become more forms easy absorbed in the channel digestion . Ascorbic acid nature reduce substance iron ferric (Fe 3+) becomes substance ferrous iron (Fe 2+) so that increase absorption substance the most efficient non- heme iron Because its reducing nature . It Work with reduce substance iron ferry become substance more ferrous iron easy absorbed (5).

Lots of Vitamin C there is in various fruit Among : oranges , tomatoes , dates , beets, guavas , dragon fruit and others. Guava red is one of the lots of fruit contains vitamin C, which is easy grow at each plains , maintenance easy , easy fruitful , and many liked , so that No need care and place special For planting it , the price is cheap , the way The presentation is also very easy . According to (Anggeriani & Yatiliu, 2020: Sugiyono, 2021). Every 100 grams of guava seed red fresh and ripe contain iron 1.10 mg, and vitamin C 87 mg.

Research result previously : giving tomato juice and essence Dates increase hemoglobin levels in pregnant women with anemia (7,8), giving juice fruit dragon And juice fruit bit increase hemoglobin levels in pregnant women with anemia (3,9), administration Moringa leaf extract increases hemoglobin levels in pregnant women. experience anemia (10).

2. METHODOLOGY

The type of research is quasi-experimental research or Quasi Experimental Design with one-way design group Pretest-Posttest (Hidayat, 2019). Before receiving the red guava juice intervention, respondents had their hemoglobin levels checked to determine their average hemoglobin level. Then, they were given 100 mg of red guava juice in 150 ml of boiled water for 7 days. The hemoglobin level was then checked to determine the average. The average values before and after receiving the red guava juice were then compared. This research was conducted ethically. Clearance at KEPK-RS Dr Moewardi Surakarta with No. 2.263/XII/HREC/2023. The population in this study were pregnant women in their first, second, and third trimesters who consumed iron tablets . The study sample was pregnant women who consumed iron tablets . in working area Sidoharjo Community Health Center Which meet the inclusion and exclusion criteria that represent the population. (11)With a total sampling technique of 33 respondents.

Univariate analysis was used to determine the mean before and after the intervention. The Shapiro-Wilk test was used to test the normality of the data before conducting the bivariate analysis. The pre-test and post-test results were 0.234 and 0.090, indicating a normal distribution. The dependent sample t-test was used to test the hypothesis because the data were normally distributed .

3. RESULTS

3.2 Univariate Analysis

3.2.1 Hemoglobin levels before (pre) test) and after (post test) given intervention

Table 1. Frequency distribution of hemoglobin levels in pre- pregnancy women test and post test

	Pretest (gr /dl)	Posttest (gr /dl)	Increased hemoglobin levels
Mean	12,642	13,482	0.839
Median	12,100	13,000	0,8000

Std . Dev	1.9437	1,7971	0.4077
Minimum	9.5	11.5	2
Maximum	17.2	18.0	0.8

Table 1 shows that the average hemoglobin increased by 0.84 g/dl, from 12.642 g/dl to 13.482 g/dl. There was an upward trend in Hb, as seen from the median value, which increased by 0.9. Meanwhile, the standard deviation value decreased, indicating that the Hb data in the post-test was more concentrated around the mean than in the pre-test. Post . The minimum and maximum values also increased, indicating an increase in Hb levels in the blood. Respondents experienced an increase in Hb of approximately 0.8394 ± 0.4077 g/dL.

3.2 Bivariate Analysis

The Effect of Red Guava Juice on Increasing Hemoglobin Levels in Pregnant Women

Table 3. Normality test using Shapiro-Wilk

Time	Statistics	df	Sig	Note
Pretest	0.175	33	0.234	Normal
Posttest	0.212	33	0.090	Normal

Normality test was conducted to determine the type of test to be used. From Table 3, the sig . (p) value is >0.05 for both pre and post-test. test and post test , this indicates that the data is normally distributed

Table 4. Results of hypothesis testing using the dependent test sample t- test .

Mean	Std . Deviation	P value
-0.8394	0.4077	0.000

Table 4 data shows that the mean is written as -0.8394 gr / dL , meaning the Hb pre value test is smaller than post test , there was an increase of 0.8394 gr / dL . The standard deviation value shows how spread out the Hb difference is between subjects. A small value (0.4077) indicates that most subjects had a similar increase change, which is close to 0.8394 gr / dL . The p value (0.000) indicates a significant value, a value of 0.000 means <0.05 which means the hypothesis is accepted (Ho is rejected, Ha is accepted)

4. CONCLUSIONS

Physiological changes in pregnant women include: increased nutritional needs for both mother and fetus, increased oxygen, iron, folic acid , and other nutrients, and increased blood volume. This condition causes decreased hemoglobin levels. This is due to the presence of a fetus in the womb. Pregnant women generally experience a decrease in hemoglobin concentration due to hemodilution . Increased oxygen demand stimulates increased erythropoietin production , and increased blood plasma, thus decreasing blood concentration. This condition causes decreased hemoglobin levels.(12–15)

The study results showed that the lowest Hb measurement was 9.5 g / dL , and the average was 12.6 g / dL . This is due to several factors, including increased blood volume, oxygen demand, and increased nutritional needs such as iron, folic acid , calcium, and potassium (13,16,17).

Red guava contains compounds that can increase hemoglobin levels in the blood. 100 grams of fresh, ripe guava contains 1.10 mg of iron and 87 mg of vitamin C. These compounds play a significant role in increasing hemoglobin (18,19).

The body of a pregnant woman experiences many physical and psychological changes, such as an increase in the pregnancy hormone Human Chorionic Gonadotropin (hCG), increased oxygen needs, irritability, and so on. Increased hCG can cause dizziness, nausea, fatigue, and changes in smell. Therefore, young pregnant women (Maslin) often complain of fatigue, nausea, or when smelling something increases nausea or even vomiting. This condition causes pregnant women to experience a loss of appetite, so that nutritional intake is reduced, especially protein, vitamins, and minerals. This can trigger a decrease in Hb and if not immediately treated will cause anemia. This agrees with several researchers who agree that the higher the hCG hormone, the lower the nutritional intake of pregnant women, resulting in a decrease in Hb.(16,20)

Some pregnant women experience psychological disorders such as anxiety, depression, and stress, especially in early pregnancy and pre-pregnancy, which can lead to a reluctance to eat or drink. This condition can also lower immunity, making them susceptible to disease. This condition can also lead to decreased hemoglobin levels. This finding aligns with research findings (21,22) that stress, depression, and anxiety affect the immune system in pregnant women, resulting in decreased hemoglobin levels.

Guava juice in 250 ml of boiled water for 7 days, there was an increasing trend in Hb, with the minimum Hb level increasing to 11.5 g / dL and the mean to 13.48 g / dL . The mean value was 0.8394 and the standard deviation was 0.4077, indicating that the respondents experienced an increase in hemoglobin. around 0.8394 ± 0.4077 g/ dL .

This is because red guava juice contains a lot of vitamin C. This vitamin C will accelerate the absorption of iron (Fe) in the intestines, because vitamin C is a powerful agent. When an Fe tablet comes into contact with vitamin C, the vitamin C will reduce the absorption of iron. Fe³⁺ ion Ferrous ions (Fe²⁺) in the stomach and intestines . These ions are easily absorbed by DMT1 (Divalent Metal Transporter 1) in intestinal wall cells.

Iron absorption occurs in the duodenum, which is more alkaline than the stomach. The alkaline conditions cause the iron to precipitate and become insoluble. Vitamin C functions here by forming an ascorbate-iron complex, which remains soluble and stable, thus maintaining the Fe²⁺ remains in a dissolved state, preventing it from precipitating, so that the iron can be available longer and more optimally absorbed before entering the further parts of the intestine.

Iron that has been absorbed by the intestines will be released into the blood. Then it is bound by a transport protein (Transferrin) and taken to the bone marrow for synthesis Heme , heme containing Fe atoms binds to the globin protein , forming hemoglobin molecules.

Pregnant women who consume iron tablets and red guava, which is rich in vitamin C, will produce more hemoglobin molecules, increasing the bond between heme and globin , thus increasing Hb levels in the blood. This ensures adequate nutrition and oxygen supply for both the mother and her fetus.

Researchers: (23–25)believe that vitamin C (ascorbic acid) plays an important role in iron absorption, especially those containing iron inhibitors, so it can overcome anemia.

Researchers (26)say that giving healthy children vitamin C in orange juice speeds up iron absorption.

(27)found that giving tomato juice, guava juice and honey to pregnant women all increased Hb, but the highest increase was in honey, this is because honey, besides containing ascorbic acid , also contains iron, thus causing the availability of iron in the body to increase.

Wienk et al., (2007)research with anemic rat respondents, that giving Vitamin C can help release iron from the mucosa so that it remains soluble and easy to absorb.

(29)proved that the effect of ascorbic acid on non- heme iron absorption was higher from single meals than from a complete diet .

In the results of this study, there was an increase in HB levels, both minimum, maximum and mean values in post-operative period. test after being given red guava juice. This is because pregnant women consume iron tablets and red guava juice. The vitamin C in guava juice acidifies the duodenum of

pregnant women, allowing iron 2+ to remain soluble and readily available for extended periods. This allows for optimal iron absorption by the intestines. The iron then enters the bloodstream and enters the bone marrow, where heme is formed, which binds to globin to form hemoglobin, increasing blood Hb levels.

This result is proven by the results of the bivariate test which shows a P value of 0.000 ($p < 0.05$), which means that giving red guava juice and Fe tablets to pregnant women has an effect on increasing hemoglobin levels in the blood significantly. The average difference (mean difference) of -0.8394 g/dL with a standard deviation of 0.4077 , which means that respondents experienced an increase in hemoglobin around 0.8394 ± 0.4077 g/dL . This shows that the intervention of administering Fe tablets and red guava juice is effective in increasing hemoglobin levels in pregnant women. This indicates that the intervention of administering iron tablets and red guava juice is effective in increasing hemoglobin levels in pregnant women. This is because red guava juice contains vitamin C, which binds iron. Vitamin C can also increase the pH in the stomach, thereby enhancing iron absorption. In addition to vitamin C, red guava juice also contains vitamins B2, E, A, phosphorus, and B6, which maintains red blood cells, thereby increasing blood hemoglobin levels (19,30)

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