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## Research Article

# Effectiveness of Giving Red Guava Juice and Mung Bean on Hemoglobin Levels Among Post-Partum Mothers with Anemia

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### Abstract

**Aims:** to determine the effectiveness of giving red guava juice and mung bean porridge to increase HB levels in postpartum women with anemia.

**Methods :** The study was quasi-experimental, with a pretest-posttest design for two groups. The sample for this study consisted of all postpartum women who developed anemia between June and July 2023 at the Cikampek Health Center, which may be up to 40 participants. The sampling approach is complete sampling.

**Results :** The red guava juice intervention group had an average HB level of 10.220 gr/dl pre-test and 12.460 gr/dl post-test. The green bean porridge intervention group had an average HB level of 10.230 gr/dl before testing and 12.440 gr/dl after testing. Giving red guava juice and mung bean porridge can successfully improve Hb levels in anemic postpartum women (p-value = 0.000).

**Conclusions :** Red guava juice and mung bean porridge can significantly boost Hb levels in anemic postpartum women. It is believed that postpartum women who have anemia will take red guava juice and mung bean porridge as an alternative to prevent anemia.

### Keywords:

**Anemia, Hemoglobin, Mother, Post Partum, Red Guava Juice.**

## INTRODUCTION

Anemia in postpartum women is a lack of red blood cells after childbirth. This disorder develops when hemoglobin levels fall below 110 g/L one week after giving birth and below 120 g/L eight weeks later. Generally, anemia after childbirth is caused by persistent iron shortage (1).

According to a WHO report from 2020, the prevalence of postpartum anemia in underdeveloped countries ranges from 50% to 80% (2). In Indonesia, postpartum moms with anemia account for 54.8% of all births (3). In the year 2021, the data on the incidence of anemia in postpartum mothers in West Java Province reached 56.7%. On the

other hand, the incidence of anemia in postpartum mothers in Karawang Regency was 62.3% of the 51,001 mothers who gave birth (4).

The loss of blood during childbirth makes postpartum moms prone to anemia. Factors that contribute to anemia in postpartum moms include physical impairment, postpartum blues, diminished cognitive capacities, and fatigue. A lack of iron, folic acid, pyridoxine, or vitamin C, as well as hemolysis, bleeding, or inhibition of the bone marrow, are among the causes of anemia. Some of the symptoms that mothers may experience when they have anemia

include: weakness, lethargy, exhaustion, frequent dizziness and impaired vision, pale eyelids, lips, skin, and palms (1).

In addition, the main cause of anemia in postpartum mothers is inadequate intake of Fe sources, increased Fe needs during pregnancy and breastfeeding (physiological needs). Adequate Fe intake is not only met by consuming Fe sources (beef, chicken, fish, eggs, etc.), but is influenced by variations in Fe absorption. In addition to protein, fat, carbohydrates that have been met from food, breastfeeding mothers also need additional iron and folic acid of around 300 kcal or 30 cc per day in one serving containing 60 grams (5).

Postpartum anemia has several negative effects on mothers, including making it difficult for them to move around and take care of their new baby, making it harder for them to breastfeed consistently (particularly when they are exclusively breastfeeding), affecting their nutritional status, and making it harder for them to bond with their infant through physical contact (the mother may appear pale and exhausted due to the anemia) (6)

Postpartum moms are need to take iron supplements in order to fulfill their iron requirements. It is recommended by the government that iron tablets be administered to postpartum women who are up to forty days after giving birth. In order to evaluate how the body reacts to the administration of iron tablets, improvements in hemoglobin readings with a minimum increase of 0.3 gr/dl are used as a monitoring tool. Along with the administration of iron tablets, postpartum mothers are also provided with high doses of vitamin A (200,000 IU). These high doses are taken in the form of one tablet immediately following delivery, followed by another tablet the following day, and no later than the 42nd day after delivery. Furthermore, all midwives have been provided with hemoglobin examination tools in the hope

that they will be able to perform routine examinations on both pregnant and postpartum mothers (7).

In addition, efforts that can be made to increase Hb levels using non-pharmacological methods to complement the therapy or treatment given, one of which is by consuming red guava juice. Red guava juice contains compounds that can increase hemoglobin levels in the blood, including: iron, vitamin C, vitamin A, copper and phosphorus. The complete nutritional content in 100 grams of fresh ripe guava is 0.9 grams of protein, 0.3 grams of fat, 12.2 grams of carbohydrates, 14 grams of calcium, 28 mg of phosphorus, 1.1 mg of iron, 25 IU of vitamin A, 0.02 mg of vitamin B1, 87 mg of vitamin C, and 86 grams of water with a total of 49 calories (7). In addition to red guava, green bean porridge can also overcome anemia in postpartum mothers. The iron content in green beans can overcome complaints of blood deficiency or anemia which are usually complained of by mothers after giving birth (8).

According to the Cikampek Health Center's monthly report from January to May 2023, there were 287 moms giving birth at the Cikampek Health Center, with more than half experiencing postpartum anemia, namely 148 persons (51.57%). The results of a preliminary study conducted on May 9, 2023 at the Cikampek Health Center by interviewing 10 postpartum mothers with anemia found that 6 people routinely took FE tablets but did not like to eat vegetables and fruits (red guava), and rarely ate nuts such as green bean porridge, while 4 other people said they often forgot to take FE tablets and rarely ate fruit, vegetables and additional foods such as green bean porridge. From this background, the author is interested in conducting research on "The effectiveness of giving red guava juice and green bean porridge on increasing HB levels in postpartum mothers with anemia at the Cikampek Health Center in 2023".

## METHODS

Qualitative study using a pretest-posttest design with two groups. Forty women who sought treatment for anemia at the Cikampek Health Center between June and July 2023 made up the study's sample. Total sampling was the method used for sampling. Univariate and bivariate analysis using the paired simple t test was the approach employed for analysis.

## RESULTS

**Table 1. Average HB Levels of Postpartum Mothers Before and After Being Given Red Guava Juice and Green Bean Porridge at Cikampek Health Center**

Variable	Jenis Intervensi	Mean		Std. Deviation		Min - Maks	
		Pre test	Post test	Pre test	Post test	Pre test	Post test
Level HB	Red guava juice	10.220	12.460	0,4200	0,4946	9,4 - 10,9	11,5 - 13,2
	Green bean porridge	10.230	12.440	0,3278	0,4903	9,7 - 10,7	11,5 - 13,2

In the group that was given red guava juice, the results reveal that the average HB level was 10.220 gr/dl before being given red guava juice, and after being given red guava juice, the average HB level was 12.460 gr/dl. This information is based on the table that is located above. Prior to receiving green bean porridge, the average HB level in the group that was given green bean porridge was 10.230 gr/dl, however after receiving green bean porridge, the average HB level was 12.440 gr/dl. In the intervention group that received red guava juice, the pre-test value was 0.4200 gr/dl, and the post-test value was 0.4946 gr/dl. On the other hand, the pre-test value for the green bean porridge intervention group was 0.3278 gr/dl, and the post-test value was 0.4903gr/dl. In the intervention group that received red guava juice, the minimum-maximum levels of HB ranged from 9.4 gr/dl to 10.9 gr/dl before the test, and they ranged from 11.5 gr/dl to 13.2 gr/dl after the test. On the other hand, the minimum-maximum values for the green bean porridge intervention group ranged from 9.7 gr/dl to 10.7 gr/dl before the test, and they ranged from 11.5 gr/dl to 13.2 gr/dl after the test.

**Table 2. Effectiveness of Giving Red Guava Juice and Green Bean Porridge on Increasing HB Levels in Postpartum Mothers with Anemia at Cikampek Health Center**

Variable	Types of Interventions	Mean		Std. Deviation		Mean Difference	SD Difference	P value
		Pre test	Post test	Pre test	Post test			
HB Levels	Red guava juice	10.220	12.460	0,4200	0,4946	2,240	0,0746	0,000
	Green bean porridge	10.230	12.440	0,3278	0,4903	2,210	0,1625	0,000

The findings obtained from the paired sample t-test, which was used to examine the changes in HB levels after administering red guava juice and green bean porridge for a period of 14 days, were found to have a significant value of 0.000 (<0.05). This can be witnessed by referring to the table that is shown above. Based on these findings, it can be concluded that there is a shift in the levels of HB in postpartum women both before and after they were given green bean porridge and red guava juice. In the column labeled "mean difference," it is observed that postpartum women who consume red guava juice exhibit an increase in HB levels of 2.240 gr/dl, whereas postpartum

mothers who consume green bean porridge exhibit an increase in HB levels of 2.210 gr/dl. Based on the information presented above, it is possible to draw the conclusion that an increase in HB levels in postpartum women can be achieved through the consumption of green bean porridge and red guava juice. From the two interventions that were designed to raise HB levels in postpartum moms, the difference in the means of the pre-test and post-test reveals that the increase in HB levels in postpartum mothers who consume red guava juice is bigger than the increase in HB levels in postpartum mothers who consume green bean porridge.

## DISCUSSION

### Average Hb Levels in Anemic Postpartum Mothers Before and After Giving Red Guava Juice and Green Bean Porridge

According to the findings of the research, the average HB level in the group that was given red guava juice was 10.220 gr/dl before they were given red guava juice, and after they were given red guava juice, the average HB level was 12.460 gr/dl. This was discovered in the group that participated in the study. Prior to receiving green bean porridge, the average HB level in the group that was given green bean porridge was 10.230 gr/dl, however after receiving green bean porridge, the average HB level was 12.440 gr/dl. In the intervention group that received red guava juice, the pre-test value was 0.4200 gr/dl, and the post-test value was 0.4946 gr/dl. On the other hand, the pre-test value for the green bean porridge intervention group was 0.3278 gr/dl, and the post-test value was 0.4903gr/dl. The intervention group that received red guava juice had a range of minimum-maximum HB levels that ranged from 9.4 gr/dl to 10.9 gr/dl before the test and 11.5 gr/dl to 13.2 gr/dl after the test. On the other hand, the intervention group that received green bean porridge had a range of minimum-maximum values that ranged from 9.7 gr/dl to 10.7 gr/dl before the test and 11.5 gr/dl to 13.2 gr/dl after the test.

Hemoglobin is a globular protein that contains iron. Hemoglobin has two groups, namely the globin group and the heme group. Globin is a protein formed from four polypeptide chains, while heme is a non-protein group containing iron. Every four heme groups in the hemoglobin molecule

can reversibly transport one oxygen molecule, and produce hemoglobin oxygenation. Oxygen binds to Fe<sup>2+</sup> by charge transfer and forms oxyhemoglobin in red blood cells. Through this function, oxygen is carried from the lungs to the tissues (9).

The results of this study are in line with the results of Agustina's study (10) which stated that there was a difference in the average HB levels before and after consuming guava juice, namely a pre-test of 10.16 and a post-test of 11.01. The results of this study are also in line with the results of Istiqomah study (11), which stated that there was an increase in HB levels in pregnant women after drinking green bean juice, namely a pre-test of 10.33 and a post-test of 11.79. Preliminary data suggests that postpartum moms with mild anemia who took red guava juice for two weeks saw an average difference of 2.240, which is in line with the researcher's expectations. Because participants were also given iron tablets, the administration of red guava juice to postpartum moms resulted in an elevation of HB levels. Iron supplements alone will not cure postpartum anemia in women, as the iron in these pills is insufficient to match their body's demands. Consuming guava juice can help postpartum moms with anemia boost their hemoglobin levels and avoid anemia since guavas provide vitamin C, maintain the immune system, and are high in folic acid. When postpartum women with anemia consume green bean porridge, their hemoglobin levels rise noticeably. In fact, after two weeks of this diet, the hemoglobin levels of these same women return to normal. Porridge made from green beans, which are rich in iron and vitamin C, can help postpartum women with anemia bring their

hemoglobin levels back to normal. Postpartum women who eat green beans not only raise their hemoglobin levels, but they also make it easier for their bodies to produce breast milk. For these reasons, green bean porridge is a great food choice for these women (10,12).

### **Effectiveness of Giving Red Guava Juice and Green Bean Porridge on Increasing HB Levels in Postpartum Mothers with Anemia**

The findings of the study indicate that the paired sample t-test, which was used to examine the effects of red guava juice and green bean porridge on HB levels over a period of 14 days, yielded results that were statistically significant, with a total value of 0.000 (<0.05). After comparing the levels of HB in postpartum women before and after they were given red guava juice and green bean porridge, these findings indicate that there is a correlation between the two. Postpartum moms who drink green bean porridge show a rise in HB levels of 2.210 gr / dl, while postpartum mothers who consume red guava juice show an increase in HB levels of 2.240 gr / dl. This information is presented in the column showing the mean difference between the two groups. Taking into consideration the information presented above, it is possible to draw the conclusion that the consumption of red guava juice and green bean porridge can successfully raise the levels of HB in postpartum women. The difference between the pre-test and post-test means revealed that the increase in HB levels in postpartum moms who had red guava juice was bigger than the increase in HB levels in postpartum mothers who consumed green bean porridge. This came about as a result of the two interventions that were designed to raise HB levels following childbirth (13,14).

There is a significant relationship between the presence of vitamin C and iron absorption. Vitamin C has the ability to assist in the reduction of ferric iron to ferrous iron in the small intestine, which makes iron

more readily absorbed by the body. It is possible that the decrease process will be considerably more pronounced if the pH level in the stomach continues to rise. It is possible for vitamin C to improve the absorption of non-heme iron by a factor of four, and a dose of 200 milligrams of vitamin C will result in an increase of at least thirty percent in the absorption of medical iron. 87 milligrams of ascorbic acid per one hundred grams of guava fruit is equivalent to the amount of ascorbic acid found in oranges (15).

Iron is present in green beans at a concentration of 2.25 milligrams per half cup of green beans. Additionally, green beans have a phytate content of 2.19%. Therefore, it is recommended that green beans be soaked before being processed since phytate has the ability to limit the absorption of iron. In order to facilitate the absorption of iron, which is necessary for the maturation of blood cells, the processing of mung beans by preceding soaking is intended to be done (16). Mung bean seeds that have been boiled or processed and then consumed have high digestibility and low flatulence. Hemagglutinin can agglutinate red blood cells and is toxic. Hemagglutinin toxicity can be destroyed by heating at a temperature of 100°C. Phytic acid can form a complex with Fe or mineral elements, especially Zn, Mg, and Ca into an insoluble form that is difficult for the body to absorb, thus reducing its availability in the body because it becomes very difficult to digest (17). The fermentation process can improve the availability of iron in the body. This is necessary to avoid iron deficiency anemia. Mung beans also contain vitamin C, which helps with the absorption of Fe in the body by changing the form of ferric to ferrous (18).

Lastri Mei Winarni (19) conducted a study which found that pregnant women who had red guava juice together with Fe pills experienced an average increase in hemoglobin levels of 10.23 gr% and 11.6 gr% between the pretest and posttest. The

study conducted by Suheti revealed a disparity in the mean hemoglobin levels before and after the administration of green bean intervention (20). The findings of this study are corroborated by the findings of Nadiya Fatimah Perdana's analysis, which indicated that pregnant women with anemia who received red guava juice for a duration of 14 days exhibited a significant disparity in mean values between the pre-test and post-test, amounting to a difference of 2.56 (21).

Based on the researcher's assumptions and the research results from the two interventions in this study, namely red guava juice and green bean porridge, the paired sample t-test for both interventions yields the same result: a significant value of 0.000 ( $<0.05$ ). This indicates that both interventions affect postpartum mothers with anemia to increase their Hb levels. However, the results of this study found a difference in the average increase in Hb levels of postpartum mothers between the intervention groups of red guava juice and green bean porridge. In which anemic postpartum mothers who were given red guava juice for 14 days (2 weeks) had an average difference in pre-test and post-test Hb levels of 2.240 hr/dl, while anemic postpartum mothers who were given green bean porridge for 14 days (2 weeks) had an average difference in pre-test and post-test Hb levels of 2.210 hr/dl. From these two treatments, there was an average difference in pre-test and post-test of 0.030 hr/dl. So it can be concluded that giving red guava juice has a higher increase in Hb levels compared to giving green bean porridge. In this study, anemic postpartum mothers, in addition to being given the intervention of guava juice and green bean porridge, anemic mothers still consumed Fe tablets every day so that they could produce a significant increase in Hb levels within two weeks. From the research results, it can be concluded that giving red guava juice is more effective in increasing Hb levels compared to giving green bean porridge, because the average increase is greater in the intervention with red guava juice.

## CONCLUSIONS

The research results show that the average HB level in the red guava juice intervention group was 10.220 gr/dl prior to the intervention, and it had increased to 12.460 gr/dl following the intervention. Before the intervention, the average HB level in the green bean porridge intervention group was 10.230 gr/dl. Subsequently, it had increased to 12.440 gr/dl. The administration of red guava juice and green bean porridge to anemic postpartum women has the potential to significantly increase the hemoglobin level, with a p-value of 0.000.

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