



---

## **Effect of Guava Juice and Papaya Juice on Increasing the Hemoglobin Levels among Pregnant Women**

**Sri Yati<sup>1</sup>, Rizky Amelia<sup>2</sup>, Dhita Aulia Octaviani<sup>3</sup>, Maya Erisna<sup>4</sup>**

<sup>1,2</sup>Program Sarjana Terapan, Poltekkes Kemenkes Semarang, Indonesia

<sup>2,3</sup>Jurusan Kebidanan Semarang, Poltekkes Kemenkes Semarang, Indonesia

<sup>4</sup>Postgraduate Midwifery Program, Poltekkes Kemenkes Semarang, Indonesia

---

### **Article info**

#### **Article history:**

Received: June 26<sup>th</sup>, 2020

Revised: July 29<sup>th</sup>, 2020

Accepted: August 25<sup>th</sup>, 2020

---

#### **Correspondence author:**

Sri Yati

E-mail: [sriyatibdn@gmail.com](mailto:sriyatibdn@gmail.com)

---

#### **DOI:**

<http://doi.org.10.35654/ijnhs.v3i6.347>

---

**Abstract.** Anemia is a significant public health problem with a prevalence of about 2 billion around the world. Consuming the iron (Fe) tablets or foods containing iron were strategies for preventing iron deficiency. Vitamin C or ascorbic acid can increase iron absorption 4-fold, and an amount of 200 mg will increase iron absorption by at least 30%. Guava (*Psidium Guajava*) and papaya (*Carica Papaya Linn*) are examples of fruits that contain lots of ascorbic acids. The study aimed to investigate red guava juice and papaya juice on hemoglobin levels in pregnant women. This study applied the pre-experimental research with two groups, pre-test and post-test, without the control group. Thirty pregnant women were divided into two groups, such as group 1 received the Guava (n=15), and group 2 received the papaya (n=15). A paired T-test was used to test the mean value of pre-test and post-test within the group. An Independent t-test was done to determine the difference between groups. This study showed an increase in hemoglobin after two weeks of guava juice and papaya juice supplementation. However, the Independent t-test showed no significant difference between the two groups with a value of 0.617 ( $p > 0.05$ ). Both supplementations of 200 ml/day red guava juice and papaya juice with iron tablets for 14 weeks are equally effective in increasing hemoglobin levels in second and third-trimester pregnant women.

**Keyword:** guava juice, papaya juice, hemoglobin, pregnant women



This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License CC BY - 4.0

## INTRODUCTION

Anemia is a significant public health problem with a prevalence of about 2 billion worldwide (1). The prevalence of anemia in pregnant women was around 33-75%. Anemia is associated with maternal mortality. It contributes 28% to maternal mortality, either directly or indirectly (2-3). Anemia affects both pregnant women and infants. Anemia in pregnancy increases the risk of fetal growth retardation and low birth weight, premature delivery, perinatal mortality, postpartum bleeding, and stunting(4). Anemia also results in decreased work capacity, including reduced caregiving and general productivity (5).

Anemia is a condition of the number of erythrocytes or hemoglobin levels in the bloodless than normal (<12gr / 100 ml)(6). Iron deficiency anemia is the most common type of anemia, mainly due to nutritional deficiency (7). Consuming iron (Fe) tablets and foods containing iron such as red meat and vegetables were recommended. Iron is a microelement that is essential for the body. This substance is needed in hemopoiesis (blood cell formation) to synthesize hemoglobin (8). However, Oral iron supplements may result in gastrointestinal complications such as nausea, vomiting, gastric cramps, heartburn, dizziness, diarrhea, and constipation (9).

One of the substances that helps the absorption of iron is vitamin C or ascorbic acid (AA). Ascorbic acid can be obtained from vitamin C tablets or naturally found in fruits and vegetables. Vitamin C can increase iron absorption 4-fold, and an amount of 200 mg will increase iron absorption by at least 30% (8). Moreover, vitamin C from fresh fruit is more easily absorbed (5 times faster than vitamin C supplements) and can last longer in the body (10).

Guava (*Psidium Guajava*) and papaya (*Carica Papaya Linn*) are examples of fruits that contain lots of ascorbic acids. In 100 grams of red, Guava includes 87 mg of ascorbic acid, 49 calories, 0.9 grams of protein, 0.3 grams of fat, 12.2 grams of carbohydrates, 14 mg of calcium, 28 mg of phosphorus, 1.1 mg of iron, and 86 grams of water. While in 100 gr papaya contains 62 mg of ascorbic acid, 43 calories, 10.8 carbohydrates, 0.47 grams of protein, 0.26 grams of fat, 20 mg of calcium, 10 mg of phosphorus, 0.08 mg of iron, and 88 grams of water. The boy would better absorb ascorbic acid mixed with iron tablets. Therefore, pregnant women would obtain maximum iron (11). A previous study showed that guava juice and papaya juice effectively increased the hemoglobin levels in pregnant women and female students with iron deficiency anemia (1,3,12). Previous studies examined the effect of guava juice on increasing hemoglobin levels in pregnant women. At the same time, this study aimed to investigate the impact of red guava juice and papaya juice on pregnant women's hemoglobin levels.

## METHODS

This study is a pre-experimental with two group pre-test and post-test without control group design. In this study, the population was 228 pregnant women in the second and third trimester in the public health center of Gubug I, Grobogan Districts. A total of 30 pregnant women was divided into group 1 who received the Guava (n=15), and group 2, who received the papaya (n=15). The samples were selected by using purposive sampling.

The inclusion criteria were pregnant women in the second and third trimester who regularly consume iron tablets, no food restrictions, no infection history and no complication in pregnancy, no bleeding history during pregnancy, and willingly participate in this study. Pregnant women with Diabetes Mellitus were excluded from this study.

The instruments in this study were: a questionnaire to record characteristic data, an observation sheet, a Hemoglobin Digital measurement device (Easy Touch GCHb), Food scales, and a measuring cup. Food scales and measuring cups were used to measure the volume of guava juice and papaya. Measuring cups and food scales used were new and had been checked to function correctly. Fifteen participants in the guava group were given 200 ml per day of red guava juice for two weeks. Meanwhile, fifteen participants in the papaya group

were given with 200 ml of papaya juice once a day for two weeks. Both groups received a daily dose of iron tablets, 200mg, equivalent to 60 mg of iron and 0.25 mg folic acid. Hemoglobin levels were measured in the first week before the intervention and 2nd week after intervention. Monitoring of iron tablets and both Guava and papaya juice consumption were carried out by WhatsApp application.

The SPSS software (version 22.0 for windows) was used for statistical data analysis. Data normality was analyzed using the Shapiro Wilk-test. To understand the mean difference within the group, we used a paired T-test. An Independent t-test was done to determine the difference between groups.

## RESULT

Table 1 Respondents Characteristic

Table 1 showed the characteristic of respondents. The majority of respondents in group 1 were 21-34 years (86.66%), with a high school education level (46.66%). Most of them worked as Housewives (93.33%). More than half of the participants were primipara (60%) with the parity status, within the third trimester (66.66%). In contrast, the second group was 21-34 years (93.33%) with a high school education level (46.66%). Regarding the participants' occupation, most of them were Housewives (93.33%) with multipara status (53.33%) and in the third trimester (53.33%).

Characteristic	Guava Group f(%)	Papaya Group f(%)
<b>Age</b>		
≤ 20th	1(6.67)	1(6.67)
21-34th	13(86.66)	14(93.33)
≥ 35th	1(6.67)	0(0)
<b>Education</b>		
Primary School	0(0)	1(6.67)
Middle School	5(33.33)	6(40)
High School	7(46.66)	7(46.66)
University	3(20)	1(6.67)
<b>Occupation</b>		
Housewife	14(93.33)	14(93.33)
Private	1(6.67)	1(6.67)
<b>Parity</b>		
Primipara	9(60)	7(46.67)
Multipara	6(40)	8(53.33)
<b>Gestational Age</b>		
Second Trimester	5(33.33)	7(46.67)
Third Trimester	10(66.66)	8(53.33)

Table 2 showed the effect of guava juice and papaya juice on hemoglobin levels. The results showed an increase in Hemoglobin (HB) levels in both groups, with p value=0.009<0.05 for the guava group and p value=0.002<0.05 for the papaya group. However, the average score between the two groups showed no significant difference with p value=0.617>0.05.

Table 2 The Effect of guava juice and papaya juice on Hemoglobin Levels

Hemoglobin Levels	Guava Group (Mean±SD)	Papaya Group (Mean±SD)	p-value <sup>b</sup>
Pre	11.26±1.40	11.44±1.19	
Post	12.61±1.44	12.35±1.32	0.617
Δ	1.31	1.09	
p-value	0.009	0.002	

<sup>a</sup>Paired T-Test <sup>b</sup>Independent T-Test

## DISCUSSION

The study suggests that the supplementation of 200 ml/ day guava juice and papaya group for two weeks maximize the absorption of iron and can increase Hb levels in pregnant women. Guava and papaya contain vitamin C or ascorbic acid (AA), increasing iron absorption up to four times. Vitamins are one of the antioxidants from outside that are needed by the body. It was consistent with the previous study, which stated that vitamin C, as an antioxidant, could prevent erythrocyte damage, ultimately avoiding a decrease in hemoglobin (13).

After the supplementation of iron tablets plus red guava juice, there was an increase in hemoglobin by 1.35 gr/dl. This result is in line with the research that stated consuming iron tablets with guava juice 200ml/day for two weeks increased the hemoglobin levels in pregnant women with anemia (3). Other studies that compare the effectiveness of guava juice and red dragon fruit showed that red guava supplementation is more effective in increasing hemoglobin levels in postpartum anemia women. The increase of hemoglobin was 2.45 gr/dl in the red guava juice group and 1.44 gr/dl in the red dragon fruit juice group (10).

The supplementation of guava juice can increase HB levels because it prevents hemolysis of red blood cells. Also, the antioxidant in red guava juice can control the process of lipolysis. Red Guava contains antioxidants, vitamin C, vitamin A, iron, calcium, and phosphorus. Moreover, the vitamin C content in red Guava is five times higher than in oranges (14). After the supplementation of iron tablets plus red guava juice, there was an increase in hemoglobin by 1.09 gr/dl. This result was consistent with the study by Ersila that reported the supplementation of iron tablets with papaya juice was sufficient to increase hemoglobin levels in an adolescent girl (15).

Supplementation of iron tablets and papaya juice or guava juice to pregnant women in the second and third trimesters could increase hemoglobin levels. The vitamin C content of papaya and red Guava can help the absorption of iron in the body that plays a role in ferric iron reduction. It becomes ferrous in the small intestine. The reduction process will be even greater if the pH in the stomach is more acidic. Vitamin C can make stomach acid increase so that it can increase iron absorption (16)

## CONCLUSION

In Conclusion, both supplementations of 200 ml/day red guava juice and papaya juice with iron tablets for 14 weeks are equally effective in increasing hemoglobin levels in second and third-trimester pregnant women. It is recommended for pregnant women to take iron tablets together with drinks containing a vitamin C source, such as papaya juice or guava juice, to increase absorption of these iron tablets. In addition to its high vitamin C content, papaya and red Guava are easy to obtain, tastes sweet, and the price is affordable.

## ACKNOWLEDGMENT

We want to thank all the respondents who willing for participating in this study.

## REFERENCES

- (1) Mega, Wijayanegara H, Hartiningsih SS, Welcome MO, Dane S. Effects of Red Guava Juice on Hemoglobin and Hematocrit Levels in Female Adolescent Students with Anemia. *Journal of Research in Medical and Dental Science* [Internet]. 2019;7(3):107–12. Available from: <https://www.jrmds.in/abstract/effects-of-red-guava-juice-on-hemoglobin-and-hematocrit-levels-in-female-adolescent-students-with-anemia-44017.html>
- (2) Indonesia PK. *Profil Kesehatan Indonesia 2017*. 2018;
- (3) Wahyuntari E, Wahtini S. The effect of guava juice on hemoglobin levels in pregnant women. *International Journal of Research in Medical Sciences*. 2020;8(2):508.
- (4) Rahman MM, Ngadan DP, Arif MT. Factors affecting satisfaction on antenatal care services in Sarawak, Malaysia: evidence from a cross-sectional study. *SpringerPlus*. 2016;5(1).
- (5) Satyam P, Khushbu Y. Maternal Anemia in Pregnancy: An Overview. *International Journal of Pharmacy & Pharmaceutical Research*. 2015;2(2):144–55.
- (6) Wiknjosastro G.H. *Ilmu kebidanan*. Jakarta; 2009. 133–135 p.
- (7) Pasricha SR. Anemia: A comprehensive global estimate. *Blood*. 2014.
- (8) Brunton LL, Chabner BA, Knollmann BC. *Goodman&Gillman The Pharmacological Basic Of Therapeutics*. Goodman and Gilman's *The Pharmacological Basis of Therapeutics*. 2011.
- (9) Jafarbegloo E, Tehran HA, Tehrani TD. Gastrointestinal complications of ferrous sulfate in pregnant women: A randomized, double-blind placebo-controlled trial. *Iranian Red Crescent Medical Journal*. 2015;17(8).
- (10) Barirah, Runjati, Widyati MN, Pujiastuti SE. Differences Effect of Supplement Red Guava Juice with Red Dragon Fruit Juice to Increase Hemoglobin Levels in Postpartum Mother with Anemia. *International Journal of Science and Research (IJSR)* [Internet]. 2018;7(9):374–8. Available from: <https://www.ijsr.net/archive/v7i9/ART20191185.pdf>
- (11) Ani LS. *Buku Saku Anemia Defisiensi Besi: Masa Prahamil dan Hamil*. Jakarta: EGC; 2013.
- (12) Pada H, Hamil I, Anindita AR, Novyriana E. Penerapan Pemberian Tablet Zat Besi Ditambah Papaya ( *Carica Papaya Linn* ) Terhadap Peningkatan Kadar. In: *The 10th University Research Colloquium 2019*. 2019. p. 288–94.
- (13) Garcia-Bailo B, El-Sohemy A, Haddad PS, Arora P, Benzaied F, Karmali M, et al. Vitamins D, C, and E in the prevention of type 2 diabetes mellitus: Modulation of inflammation and oxidative stress. *Biologics: Targets and Therapy*. 2011.
- (14) Apollo Sinaga F, Risfandi M. The Effect of Giving Red Guava Fruit Juice Towards Haemoglobin and Vo2max Contents on Maximum Physical Activity. *International Journal of Science and Research*. 2015;6(9):1185–9.
- (15) Ersila W, Prafitri LD. Efektifitas Pemberian Tablets Zat Besi Ditambah Pepaya (*Carica Papaya L*) Terhadap Peningkatan Kadar Hemoglobin Pada Remaja Putri Anemia Di Stikes Muhammadiyah Pekajangan Tahun 2016. In: *The 4 th Univesity Research Coloquium 2016* [Internet]. 2016. p. 67–75. Available from: <http://hdl.handle.net/11617/7778>
- (16) Eliagita C, Kuntjoro T, Sumarni S, Suwondo A, Hadisaputro S, Eliagita C, et al. Effect Of Consuming Papaya (*Carica Papaya Linn.*) On The Level Of Hemoglobin And Hematocrit In Pregnant Women With Anemia. *Belitung Nursing Journal*. 2017;3(2):120–5.