ISSN. 2338-7475
E-ISSN. 2620-7869
Hearty
Jurnal Kesehatan Masyarakat
Berinan, Tulus, Sepenuh Hati,Berbesar Hati, Jujur, Sehat dan Kuat
Vol. 13 No. 4, Agustus 2025, Hal. 972-979

THE EFFECT OF RED GUAVA JUICE AND DRAGON FRUIT JUICE ON HEMOGLOBIN LEVELS IN THIRD TRIMESTER PREGNANT WOMEN AT MANDALAWANGI HEALTH CENTER

Siti Masnu'ah *, **Asep Barkah**
Sekolah Tinggi Ilmu Kesehatan Abdi Nusantara
Jl. Swadaya No.7, RT.001/RW.014, Jatibening, Kec. Pd. Gede, Kota Bks, Jawa Barat 17412, Indonesia
Email: sitimasnuah18@gmail.com

Abstract

The aim of this research is to determine the influence of red guava juice and dragon fruit juice on the increase of hemoglobin levels in pregnant women with anemia in the Mandalawangi Public Health Center area in 2023. The research design employed is a quasi-experimental design with a pretest and posttest without a control group design, specifically a quasi-experimental design dividing participants into two groups: the red guava juice group and the dragon fruit juice group. Both groups undergo a pre-test before the experiment is administered and a post-test afterward. The hypothesis of this study investigates whether there is an effect of administering a combination of red guava juice and dragon fruit juice on the increase of hemoglobin levels in pregnant women with anemia in the Mandalawangi Public Health Center area.

Keywords: Anemia, Combination of Red Guava Juice, Dragon Fruit Juice, Pregnant Women

Introduction

The World Health Organization (WHO) states that maternal and child health is a global concern. WHO estimates that there are 210 million pregnancies worldwide each year. Out of this total, 20 million women experience complications due to pregnancy and childbirth. In the United States, 2,300 lives are recorded to be lost due to complications during the delivery phase. WHO also estimates that every year, approximately 500,000 individuals die as a result of pregnancy and childbirth (WHO, 2016).

The Maternal Mortality Rate (MMR) in Indonesia continues to decline, although overall maternal mortality rates related to pregnancy, childbirth, and postpartum are still high. Despite a decrease from 359 per 100,000 live births in the 2014 Indonesia Demographic and Health Survey to 273 per 100,000 live births in 2016, it remains far from the targeted 125 per 100,000 live births for the year 2025 (DepKes RI, 2016).

During pregnancy, anemia can have adverse effects, especially during pregnancy, childbirth, and postpartum. High prevalence of anemia negatively impacts growth, both of body and brain cells, and a lack of hemoglobin in the blood results in insufficient oxygen transfer to the body and brain cells. Pregnant women with anemia are more likely to experience postpartum hemorrhage (Depkes RI, 2018).

Hemoglobin is a complex protein found in red blood cells. Chemical analysis of hemoglobin and the amount of Hb per 100 ml of blood can be used as an indicator of oxygen transport in the blood. Low hemoglobin levels indicate anemia (Sari et al., 2021). Hemoglobin is essential for oxygen transport, and if a pregnant woman has too few or abnormal red blood cells or insufficient hemoglobin, the blood's ability to carry oxygen to body tissues is reduced, leading to symptoms such as fatigue, weakness, dizziness, and shortness of breath (Puspita, 2019).

Submitted: January-2024 Received: October-2024 Available Online: August-2025

Pregnancy-related anemia is often caused by iron deficiency, posing a significant health challenge for women worldwide, particularly in developing countries (Chendriany et al., 2021).

Third-trimester anemia in pregnant women can lead to premature birth, prolonged labor due to uterine muscle fatigue (uterine inertia), post-delivery bleeding due to the absence of uterine muscle contractions (uterine atony), shock, infections during and after delivery, and severe anemia (<4 g%) can lead to cardiac decompensation. Hypoxia due to anemia can result in shock and maternal death during childbirth (Muthalib, 2018).

Considering the low consumption of iron supplements (Fe) and the insufficient coverage of the iron supplement distribution program, efforts are needed to increase coverage and consumption through community empowerment and proactive engagement by healthcare professionals to reach pregnant women early for ANC services (Depkes RI, 2019).

According to the 2018 Basic Health Research (Riskesdas), the prevalence of anemia in pregnant women in Indonesia was 45.1%. Iron tablet distribution in Indonesia in 2018 was 88%, showing an increase compared to 83.3% in 2017. Despite the government's anemia prevention program, providing 90 iron tablets to pregnant women during pregnancy to reduce maternal anemia, the incidence remains high (Ministry of Health RI, 2018).

Various studies indicate the negative impact of iron deficiency anemia on pregnant women and fetuses, leading to a loss of concentration, pale appearance, frequent fatigue and low energy, feeling lethargic, and easily succumbing to illness (Sulistiowati, 2018).

A study conducted by Usman and Kurnaesih (2019) found a significant increase in hemoglobin levels in adolescent girls with anemia who were given dragon fruit juice. The results of the paired t-test showed a p-value of 0.000, indicating a significant effect of dragon fruit juice on hemoglobin improvement.

The 2016 health profile data revealed an increase in K4 service coverage from 80.26% in 2012 to 86.04% in 2013. However, the coverage of iron tablet provision to pregnant women decreased from 66.03% in 2012 to 48.14% in 2013 (Zulaikah, 2016).

The target for anemia coverage in 2022 is 85%, yet data from all villages in the Mandalawangi Health Center's working area indicate low anemia coverage, particularly in Nembol Village, which stands at 64% in 2022. Out of 35 pregnant women with anemia, 25 have mild anemia, and 9 have moderate anemia (Mandalawangi Health Center, 2022).

Based on the background described, the research problem in this study is the various negative impacts of anemia due to iron deficiency on pregnant women and fetuses. The influence of iron deficiency anemia in pregnant women includes a loss of concentration, pale appearance, frequent fatigue and low energy, feeling lethargic, easily becoming sleepy, and reducing immune system resistance, making them susceptible to illness. Therefore, the researcher is interested in conducting this study with the title "The Effect of Red Guava and Dragon Fruit Juice on Hemoglobin Levels in Third-Trimester Pregnant Women at Mandalawangi Health Center."

Research Methods

This research employs a quasi-experimental research design with a pretest and posttest with a control group approach, specifically using a quasi-experimental design by dividing the participants into treatment and control groups. Both groups undergo a pre-test before the experiment is administered, followed by a post-test after the experiment is completed (Notoatmodjo, 2016).

The population for this study consists of all pregnant women visiting the Mandalawangi Health Center from December 1 to December 31. The sample selected for this research includes 50 respondents who are pregnant women experiencing anemia. Total Sampling is a method chosen by accurately selecting samples that truly represent the entire research population.

The data collection procedure in this study involves gathering primary data directly from the pregnant women. Additionally, data is obtained from observations conducted before and after patients are given a combination of red guava juice and dragon fruit juice, with the observations being filled out directly by the mothers.

Data processing is performed manually through various techniques such as editing, coding, entrying, and cleaning. Moreover, data analysis involves both univariate and bivariate analysis methods.

Research Results

A. Univariate Analysis Results

1. Frequency Distribution of Hb Levels Before Intervention in Third Trimester Pregnant Women at Mandalawangi Health Center, Pandeglang Regency, Banten 2021

Table 1 Frequency distribution of Hb levels before intervention

Hb levels	Frequency	Percentage (%)
Mild Anemia	42	84,0%
Moderate Anemia	8	16,0%
Total	**50**	**100,0%**

Based on Table 1, it can be observed that before the intervention, out of 50 third-trimester pregnant women with anemia at Mandalawangi Community Health Center, 42 pregnant women (84%) had mild anemia, and 8 pregnant women (16%) had moderate anemia.

B. Results of Bivariate Analysis

1. The Effect of Red Guava Juice on Hb Levels of Third Trimester Pregnant Women at Mandalawangi Health Center, Pandeglang Regency, Banten 2023

Table 2 The effect of giving red guava juice on Hb levels of pregnant women in the third trimester

Hb levels	*Mean*	*Std. Deviation*	*Std. Error*	*P value*	N
Before Intervention	8,996	0,807	0,561	0,000	25
After Intervention	11,360	0,997	0,881		

Based on Table 2, it is known that the average Hb before the intervention of red guava juice administration is 8.996 g/dL with a standard deviation of 0.807, while after receiving dragon fruit juice intervention, the average Hb is 11.360 with a standard deviation of 0.997. The difference in mean values before and after the intervention is 2.364 with a standard deviation of 0.787.

The statistical test results yielded a p-value of 0.000; at an alpha level of 0.05, p < alpha, thus it can be concluded that there is an influence of dragon fruit juice intervention on the Hb levels of pregnant women in the third trimester at Mandalawangi Health Center, Pandeglang Regency, Banten Province in 2023.

2. The Effect of Dragon Fruit Juice on Hb Levels of Third Trimester Pregnant Women at the Mandalawangi Health Center, Pandeglang Regency, Banten 2023

Tabel 3 The effect of giving dragon fruit juice on Hb levels of pregnant women in the third trimester

Kadar Hb	*Mean*	*Std. Deviation*	*Std. Error*	*P value*	N
Before Intervention	7,996	0,607	0,561	0,000	25
After Intervention	10,360	0,897	0,881		

Based on Table 3, it is known that the average Hb before receiving Dragon Fruit Juice intervention is 7.996 g/dL with a standard deviation of 0.607, while after receiving Dragon Fruit intervention, the average Hb is 10.360 with a standard deviation of 0.897. The difference in mean values before and after intervention is 2.364 with a standard deviation of 0.787.

The statistical test results yielded a p-value of 0.000. At an alpha of 0.05, the obtained p-value is less than alpha, thus it can be concluded that there is an influence of Dragon Fruit Juice intervention on the Hb levels of pregnant women in the third trimester at Mandalawangi Public Health Center, Pandeglang Regency, Banten Province in 2023.

3. Differences in Average Hemoglobin Levels of Pregnant Women Before and After Treatment in the Provision of Red Guava Juice and Dragon Fruit Juice

Table 4 Differences in Average Hemoglobin Levels of Pregnant Women Before and After Treatment in the Provision of Red Guava Juice and Dragon Fruit Juice

Groups	*Pre-Test*		*Post-Test*		*t-test*	*Sig. (2-tailed)*
	Mean	*SD*	*Mean*	*SD*		
Dragon Fruit Juice	9,98	0,80	10,56	0,84	-15,19	0,000
Red Guava Juice	10,16	0,62	11,01	0,77	- 12,46	0,000

Based on Table 4, it is known that in the control group before being given Dragon Fruit, the average hemoglobin level was 9.98 g/dL with a standard deviation of 0.80. After being given Dragon Fruit, the average hemoglobin level increased to 10.56 g/dL with a standard deviation of 0.84. The statistical test results yielded a t-test value of -15.191 and a two-tailed significance value of 0.000 (< α 0.05), indicating a significant difference in the average hemoglobin levels between pre-test and post-test in the control group.

In the intervention group, before being given Dragon Fruit, the average hemoglobin level was 10.16 g/dL with a standard deviation of 0.62. After being given red guava, the average hemoglobin level increased to 11.01 g/dL with a standard deviation of 0.77. The statistical test results showed a t-test value of -12.464 and a two-tailed significance value of 0.000 (< α 0.05), indicating a significant difference in the average hemoglobin levels between pre-test and post-test in the Red Guava Juice group.

Discussion

a. Hb levels before and after the intervention of giving red guava juice to third trimester pregnant women at the Mandalawangi Health Center, Kab. Pandeglang Banten in 2023

Based on Table 1, it can be observed that prior to the intervention, out of 50 third-trimester pregnant women suffering from anemia at Mandalawangi Community Health Center, 42 pregnant women (84%) had mild anemia, and 8 pregnant women (16%) had moderate anemia.

Anemia is a condition characterized by a decrease in hemoglobin levels, hematocrit, and the number of red blood cells below normal values. Individuals with anemia are often referred to as having low blood levels due to below-normal levels of red blood cells (hemoglobin/Hb) (Yeyeh et al., 2016).

The findings of this study align with the theory explained by Saefudin (2016), who stated that pregnant women are one of the high-risk groups for experiencing anemia. This is attributed to the increased nutritional requirements during pregnancy and the changes that occur in blood and bone marrow. Most cases of anemia during pregnancy are caused by iron deficiency, and acute bleeding often exacerbates the condition; both factors are frequently interconnected.

Anemia during pregnancy can have detrimental effects, especially during pregnancy, childbirth, and the postpartum period. The impact of anemia during pregnancy may include miscarriage, preterm delivery, and premature rupture of membranes. Women require higher iron levels than men due to menstruation, with a monthly blood loss of 50–80 cc and an iron loss of 30–40 mg. Additionally, pregnancy necessitates additional iron to increase the number of red blood cells and form fetal red blood cells and the placenta. The more frequently a woman experiences pregnancies and childbirth, the greater the loss of iron. If the body's iron reserves are minimal, each pregnancy will deplete the iron stores, eventually leading to anemia in subsequent pregnancies (Manuaba, 2014).

b. Hb levels before and after giving red guava juice to third trimester pregnant women at Puskesmas Mandalawangi Kab. Pandeglang

Based on Table 2, it is known that the average Hb before receiving Red Guava Juice intervention is 8.996 g/dL with a standard deviation of 0.807. Meanwhile, after receiving the intervention of Red Guava Juice, the average Hb is found to be 11.360 with a standard deviation of 0.997. The difference in mean values between before and after the intervention is 2.364 with a standard deviation of 0.787.

The statistical test results yield a p-value of 0.000. At an alpha level of 0.05, the obtained p-value is less than alpha, therefore it can be concluded that there is an influence of Red Guava Juice intervention on the Hb levels of pregnant women in the third trimester at Mandalawangi Health Center, Pandeglang Regency, Banten Province in 2023.

The findings of this study are also consistent with previous research conducted by Haddad A. El Rabey (2013), who experimented on rats and observed a significant increase in hemoglobin levels in the blood of rats consuming red guava juice.

c. Hb levels before and after giving dragon fruit juice to third trimester pregnant women at the Mandalawangi Health Center, Pandeglang District, Banten in 2023

Based on Table 3, the average Hb before receiving Dragon Fruit Juice intervention is 7.996 g/dL with a standard deviation of 0.607. The difference in mean values before and after the intervention is 2.364 with a standard deviation of 0.787.

The statistical test results yield a p-value of 0.000. At an alpha level of 0.05, the obtained p-value is less than alpha, thus it can be concluded that there is an influence of dragon fruit juice intervention on the Hb levels of third-trimester pregnant women at Mandalawangi Public Health Center, Pandeglang Regency, Banten Province in 2023.

To address the issue of anemia due to iron deficiency, women commonly consume iron supplements in the form of tablets pharmacologically. However, the problem lies in the side effects of iron (Fe) tablets, which include nausea, vomiting, hardened and darkened stools.

An alternative to address iron-deficiency anemia is by administering dragon fruit juice therapy. Dragon fruit juice contains essential minerals such as calcium, phosphorus, potassium, sodium, iron, magnesium, and copper. Other contents include 75% glucose, 8% organic acids, proteins, enzymes, 18% mineral salts, vitamins, tiny seeds, and oil (Yuziani, 2014). The high iron (Fe) content in dragon fruit juice can effectively treat anemia because iron is a crucial trace element in the body, playing a key role in red blood cell formation. The iron content can synthesize the formation of heme, which stimulates hemoglobin levels (Kirana, 2016).

Another important component in dragon fruit juice that aids in iron dissolution is vitamin C. Iron with vitamin C forms a soluble iron ascorbate complex that is easily absorbed by the organs in the human body. The conversion of non-heme iron in the form of Ferri compounds into Ferro increases in an acidic stomach environment. Vitamin C contributes to acidity, thereby enhancing iron absorption by up to 30%. Additionally, the presence of folic acid, crucial for new cell formation, can influence blood iron levels, leading to an increase in hemoglobin (Kirana, 2016).

d. Differences in Average Hemoglobin Levels of Pregnant Women Before and After Treatment on Giving Red Guava Juice and Dragon Fruit Juice

Based on Table 4, it is known that in the control group before being given Dragon Fruit Juice, the average hemoglobin level was 9.98 g/dl with a standard deviation of 0.80, and after being given Dragon Fruit, the average hemoglobin level was 10.56 g/dl with a standard deviation of 0.84. The statistical test results obtained a t-test value of -15.191 and a 2-tailed significance value of 0.000 (< α 0.05), meaning that there is a difference in the average hemoglobin levels between the pre-test and post-test in the control group.

In the intervention group, before being given Dragon Fruit Juice, the average hemoglobin level was 10.16 g/dl with a standard deviation of 0.62, and after being given red guava juice, the average hemoglobin level was 11.01 g/dl with a standard deviation of 0.77. The statistical test results obtained a t-test value of -12.464 and a 2-tailed significance value of 0.000 (< α 0.05), meaning that there is a difference in the average hemoglobin levels between the pre-test and post-test in the Red Guava Juice group.

This research proves that dragon fruit juice can increase Hb levels in the body. This is in line with the theory proposed by Kirana (2016), which explains that dragon fruit juice contains Fe or iron, which has the ability to increase the number of red blood cells or erythrocytes, thereby increasing hemoglobin levels.

Kirana (2016) also explains that dragon fruit juice contains vitamin C, which plays a crucial role in dissolving iron. Iron with vitamin C forms a soluble iron ascorbate complex that is easily absorbed by organs in the human body. The conversion of non-heme iron in the form of Ferri metabolites into Ferro will be greater when the pH in the stomach becomes more acidic. Vitamin C can increase acidity, thus helping to increase iron absorption by 30%. In addition, the presence of folic acid is also important for the formation of new cells, influencing iron in the blood and leading to an increase in hemoglobin.

The results of this study are also in line with the research by Islamiyah (2017) at SMKN 01 Mempawah Hilir, which concluded that there is an influence of red guava juice on the hemoglobin levels of female high school students in Grade X who experience anemia. Therefore, the content of dragon fruit juice can be considered as a nutritional supplement for adolescents with decreased hemoglobin levels.

The results of this study are also consistent with previous research conducted by Haddad A. El Rabey (2013), who conducted experiments on rats and found a significant increase in hemoglobin levels in the blood of rats consuming red guava juice.

Conclusion

1. The average hemoglobin level in the group before being given dragon fruit juice was 9.98 g/dL, and after being given, the average hemoglobin level was 10.56 g/dL. The average hemoglobin level in the group before being given red guava juice was 10.16 g/dL, and after being given red guava juice, the average hemoglobin level was 11.01 g/dL.
2. There is a difference in the average pretest and posttest hemoglobin levels in the dragon fruit group, with a two-tailed significance value of 0.000 (< α 0.05).
3. There is a difference in the average pretest and posttest hemoglobin levels in the red guava juice group, with a two-tailed significance value of 0.000 (< α 0.05).
4. There is an influence of red guava juice consumption on hemoglobin levels in pregnant women at Mandalawangi Public Health Center, Pandeglang Regency, Banten Province in 2023, with a Sig. value (2-tailed) = 0.000.
5. The administration of red guava juice is more effective in increasing hemoglobin levels compared to just giving dragon fruit alone.

References

[1] Price, Sylvia Anderson. 2015. Patofisiologi: Konsep Klinis Proses ± Proses Penyakit. Edisi 6 Volume 2. Jakarta: EGC Hoffbrand, AV et al 2005 Kapita Selekta Hematologi. Jakarta, EGC, hal 25 – 34

[2] Sianturi C. 2018. Pengaruh Vitamin C Pada Penyerapan Zat Besi Non Heme. Medan. FMIPA.UNM

[3] Rusilanti. 2007. Sehat dengan Jus Buah. Jakarta: PT. Agromedia Pustaka Thaipong, Kriengsak, et al .2006. Comparisonof ABTS, DPPH, FRAP, and ORAC Assays for estimating antioxidant activity of guajava fruit extracts. Journal of Food Composition and Analysis.

[4] Asgary S, Nadery GH, Askari N. 2015. Protective Effect of Flavonoids Against Red Blood Cell Hemolysis by Free Radicals. Exp Clin Cardiology Vol. 10 (p.88 ± 90)

[5] Sambau NC, dkk, 2014. Uji Efektivitas Jus Buah Jambu Biji Merah (Psidium Guajava, Linn) terhadap kadar hemoglobin (HB) tikus putih Jantan galur wistar (Rattus norvegicus L). Pharmacon, Jurnal Ilmiah Farmasi, UNSRAT (p. 220 ± 224) USDA 2013. Guava (Psidium guajava) Fresh, Nutritive Value per 100 g

[6] Wirawan S, dkk. 2015. Pengaruh Pemberian Tablet Besi dan Tablet Besi Plus Vitamin C Terhadap Kadar Hemoglobin Ibu Hamil. Buletin Penelitian Sistem Kesehatan Vol 18 (p. 285 ± 292).

[7] Finkelstein .FO, et al. 2016. Haemoglobin and Plasma Vitamin C Levels in Patient in Peritoneal Disease Paniandy, JC, Chane Ming, J, and Prestibatesti, J.C. 2000.

[8] Chemical Composition of The Essential Oil and Headspace Solid Phase Microextraction of the guava fruits (Psidium guajava L). Journal of essential Oil Research, 12 (2): 153 – 158

[9] Larlykova Iuv, Ivanova SM, Labetskala OI. 2005. Effect of UV-Radiation On Metabolism And Structural – Functional Status of The Rats Erytrocyt Membranes, Anakosm Ekolog Med Vol 39 No.2

[10] Sulastri D, Keswani RR; 2019, Pengaruh Pemberian Isoflavon terhadap Jumlah Eritrosit dan Aktivitas Enzim Katalase Tikus yang Dipapar Sinar Ultra Violet, Majalah Kedokteran Andalas Vol. 33 No.2. (p.169 ± 178)
[11] Rejon RF, et al. 2013. Plasma Status of Retinol, Alpha and Gamma Tocopherols and Main Carotenoids to First Myocardial Infarction: Case Control and Follow Up Study. Nutrition Journal Vol. 18 (p 26-31).