

THE EFFECT OF RED GUAVA FRUIT ON HEMOGLOBIN (HB) LEVELS OF ADOLESCENT FEMALES IN THE WORK AREA OF TANJUNG BALAI PUBLIC HEALTH CENTER

Herbina Br Sembiring¹, Susanti²

herbina81.tbk@gmail.com¹, shanty1107@univbatam.ac.id²

^{1,2}Midwifery Study Program, Faculty of Health Sciences, Batam University

uploaded:12/08/2026 revised:10/09/2026 accepted:16/09/2026 published: 30/09/2026

ABSTRACT

Anemia among adolescent girls remains a health issue that impacts growth, academic concentration, and future reproductive health. One non-pharmacological approach to increasing hemoglobin (Hb) levels is the consumption of red guava; rich in vitamin C, it enhances iron absorption. This study aims to determine the effect of red guava consumption on the hemoglobin levels of adolescent girls within the working area of the Tanjung Balai Community Health Center. This study employed a quasi-experimental design with a one-group pretest-posttest approach. The sample consisted of 30 adolescent girls selected using purposive sampling. The intervention involved the administration of 250 ml of red guava juice daily for 10 days. Hemoglobin levels were measured before and after the intervention using a Quick Check Digital device and subsequently analyzed using a paired t-test at a 95% significance level. The study results indicate that the mean hemoglobin level was 9.9 g/dL prior to the intervention, whereas it increased to 10.2 g/dL following the intervention. Statistical analysis demonstrates that the consumption of red guava has a significant effect on increasing hemoglobin levels among adolescent girls ($p < 0.05$). It can be concluded that consuming red guava is effective in raising hemoglobin levels, making it a viable non-pharmacological intervention for the prevention and management of anemia in adolescent girls.

Keywords: *Anemia, Hemoglobin, Red Guava, adolescent girls, vitamin*

INTRODUCTION

Adolescence is a period vulnerable to nutritional issues, as it marks the transition from childhood to adulthood. The adolescent years (ages 10–18) constitute a nutritionally critical period due to several factors: first, adolescents require higher nutrient levels to support rapid physical growth; and second, lifestyle changes and eating habits influence both their nutrient intake and their nutritional requirements (Wirjatmadi, 2016).

Anemia is a global health issue, particularly in developing countries, with an estimated 30% of the world's population affected. It is prevalent across

the population, especially among adolescents and pregnant women. The prevalence of anemia among adolescent girls remains high; according to the World Health Organization (WHO, 2013), global prevalence ranges from 40% to 88%. The WHO reports that over 30% or 2 billion people worldwide are anemic, a condition prevalent in developing nations, including Indonesia. Results from the 2018 Basic Health Research (Riskesdas) indicate an increase in anemia in Indonesia to 48.9%, with the highest prevalence (84.6%) observed among pregnant women aged 15–24 years (Riskesdas, 2018).

The proportion of anemia in the 15–24 age group was 18.4% in 2013. Data from Riskesdas 2018 show a higher proportion of anemia among females (27.2%) than males (20.3%), with the prevalence in the 15–24 age group reaching 32% (Riskesdas, 2018; Ministry of Health RI, 2013).

Anemia is a condition characterized by a drop in the number of red blood cells (erythrocytes) and hemoglobin levels within those cells to below-normal values. An individual is considered anemic if their hemoglobin level is below 13.5 g/dL for men and below 12.0 g/dL for women (Proverawati, 2013).

Anemia among adolescents hinders optimal growth and impairs academic performance due to rapid fatigue, a lack of vitality, and an inability to concentrate. Anemia in adolescent girls has particularly serious consequences, given that they are future mothers who will conceive and give birth; the condition increases the risks of maternal mortality, preterm birth, low birth weight, and infant mortality (Syamsianah, 2013). Individuals with anemia are more susceptible to infectious diseases, a factor that can compromise the quality of human resources (Sayogo, 2015).

Iron is a mineral essential for the formation of red blood cells and myoglobin, a protein that transports oxygen to the muscles; it is obtained through diet, and a deficiency in one's daily intake can lead to iron-deficiency anemia. Dietary sources of iron include meat, poultry, fish, eggs, legumes, and green vegetables (Almatsier, 2013).

Hemoglobin levels can be increased through the use of supplements and dietary intake. Supplements that boost hemoglobin levels include iron tablets, folic acid, and vitamin C. Beyond supplementation, there are two approaches to managing anemia:

pharmacological and non-pharmacological. The pharmacological method involves taking one iron (Fe) tablet daily; however, many adolescents refuse to take them due to side effects such as nausea, vomiting, and hard, blackish stools.

The second approach is non-pharmacological; given the abundance of red guava plants in the surrounding area, they can be utilized to treat anemia. Red guava contains two to four times as much vitamin C as oranges, which aids in the absorption of the iron present in the fruit itself. Furthermore, red guava is easily accessible and affordable (Sianturi, 2012). Dietary choices can also raise hemoglobin levels, and red guava is one such option.

Guava contains a higher level of vitamin C compared to other fruits; it provides 87 mg of vitamin C per 100 g, whereas sweet oranges contain only 49 mg. In addition to vitamin C, guava contains other nutrients such as vitamin A and vitamin B2. The vitamin C in guava enhances the body's absorption of iron, thereby optimizing bodily function and increasing hemoglobin levels (Rista, 2018).

A preliminary survey conducted among adolescents in the working area of the Tanjung Balai Community Health Center (Puskesmas) revealed that, out of ten adolescents tested, eight had low hemoglobin levels (below the normal range of <12 g/dL). Based on this background, the researcher is interested in investigating the effect of red guava consumption on the hemoglobin levels of adolescent girls in the Tanjung Balai Community Health Center's working area.

RESEARCH PURPOSES

To determine the effect of red guava consumption on the hemoglobin levels of adolescent girls in the working

area of the Tanjung Balai Community Health Center.

RESEARCH METHOD
This study employs a quantitative approach using a one-group pre-test/post-test research design. It was conducted within the service area of the Tanjung Balai Karimun Community Health Center (Puskesmas) between March and May 2024. The study involved a total of 30 participants. Data analysis was performed using SPSS.

RESEARCH RESULT

Table 1 Shapiro–Wilk normality test

Variable	Statistic	df	Sig. (p value)
Before	0,964	30	0,338
Intervention	0,957	30	0,214

Based on the Shapiro–Wilk test, the significance value for Hb levels before the intervention was 0.338, while the significance value after the intervention was 0.214. Both *p*-values were greater than 0.05, indicating that the Hb level data before and after the intervention were normally distributed. Therefore, the data met the normality assumption for parametric analysis and were considered appropriate for further analysis using the paired-samples *t*-test to assess differences in Hb levels before and after the red guava fruit intervention.

Table 2 Mean Hemoglobin Levels Before Consumption of Red Guava

Variable	N	MEAN	SD	MIN	MAX
Before Intervention	30	9,9	0,58	9,1	11,0

Based on Table 2, the mean hemoglobin level among adolescent girls before the consumption of red guava was 9.9 g/dL, with the lowest level being 9.1 g/dL and the highest being 11.0 g/dL.

Table 3 Mean Hemoglobin Levels After Consumption of Red Guava

Variable	N	MEAN	SD	MIN	MAX
After Intervention	30	10,2	0,6	9,3	11,3

Based on Table 3, the mean hemoglobin level among adolescent girls before the consumption of red guava was 10.2 g/dL, with a minimum level of 9.3 g/dL and a maximum level of 11.3 g/dL.

Table 4 Effect of Red Guava on The Increase in Hemoglobin Levels Among Adolescent Girls

Variable	N	MEAN	SD	T	p-Value
The effects of guava	30	0,315	0,093	-15,09	0,000

Based on Table 4, the paired-sample t-test results for adolescent girls before and after the consumption of red guava yielded a p-value of 0.000 (< 0.05). This indicates that the null hypothesis (H_0) was rejected and the alternative hypothesis (H_a) was accepted; thus, it can be concluded that the consumption of red guava has an effect on increasing hemoglobin levels among adolescent girls in the working area of the Tanjung Balai Community Health Center.

DISCUSSION

1. Mean Hemoglobin Levels Before Consuming Red Guava

This study aligns with research conducted by Haninda et al. (2020) regarding the administration of red guava juice. In that study, the mean blood Hb level prior to red guava consumption was 10.26 g/dL, and the mean level following consumption was 10.98 g/dL; the p-value was 0.001, leading to the rejection of the null hypothesis (H_0) and indicating that red guava has an effect on Hb levels.

Hemoglobin is an iron-rich protein component found in red blood cells (erythrocytes) that functions to bind oxygen and transport it to all body tissues. Low hemoglobin levels can lead to anemia. For adolescent girls, the normal hemoglobin level is 12 g/dL; a level below this is classified as anemia.

Measuring hemoglobin is the most common method used to detect anemia. Hemoglobin in the blood carries oxygen from the lungs to body tissues and transports carbon dioxide back from the cells to the lungs for exhalation. It also acts as an oxygen reservoir, accepting, storing, and releasing oxygen within muscle cells. A hemoglobin level that is low or below normal is known as anemia.

Based on the researchers' analysis, the respondents' low hemoglobin levels were attributed to a lack of knowledge and an iron-poor diet. Additionally, the levels were influenced by dietary habits that did not meet the specific nutritional needs of adolescent girls, as well as a lack of dietary variety and a tendency to consume ultra-processed foods.

2. Mean Hemoglobin Levels After Red Guava Consumption

This study demonstrates that red guava has the potential to increase hemoglobin levels. Hemoglobin levels showed a significant increase after the consumption of red guava juice compared to levels prior to consumption.

This is attributed to the fact that red guava contains vitamin C and iron, both of which can boost blood hemoglobin levels. Guava (*Psidium guajava* L.) is a fruit known for its high vitamin C content relative to other fruits, and red guava specifically contains higher levels of vitamin C than white guava.

100 grams of red guava contains 183.5 mg of vitamin C, 0.31 mg of iron, 51 kcal of energy, 0.82 g of protein, 25 mg of phosphorus, 14 mcg of folic acid, and 10 mg of magnesium.

Vitamin C and iron form a soluble iron-ascorbate complex that is easily absorbed; therefore, consuming fresh vegetables and fruits rich in vitamin C is beneficial for preventing anemia.

This study aligns with research conducted by Anggani et al. (2016) regarding the administration of red guava juice. The average blood hemoglobin (Hb) level before consuming red guava was 11.4 g%, and the average level after consumption was 11.8 g%; with a p-value of 0.000, the null hypothesis (H_0) was rejected, indicating that red guava has an effect on hemoglobin levels.

Based on the researcher's analysis, the observed increase in hemoglobin levels among adolescent girls following the consumption of red guava juice is attributed to their adherence to the study protocol specifically, consuming one plastic cup of red guava juice daily for 10 days. Each serving contains 100 grams of red guava, which is rich in Vitamin C (183.5 mg) and iron (0.31 mg) nutrients capable of raising blood hemoglobin levels thereby resulting in the observed increase.

3. The effect of red guava on increasing hemoglobin levels in adolescent girls.

The research results indicate a significant effect of consuming red guava juice on increasing hemoglobin levels among adolescent girls. A paired t-test yielded a p-value of 0.000 (with a significance level of $p < 0.05$), demonstrating that red guava juice consumption influences the increase in hemoglobin levels in this demographic.

This study aligns with research conducted by Suharjiman and Iden regarding measurements taken before

and after the administration of red guava juice. In the experimental group, the mean hemoglobin level was 10.02 ± 0.88 g/dL before the intervention and 10.62 ± 1.10 g/dL after. In contrast, the mean hemoglobin level in the control group was 9.98 ± 0.82 g/dL before the intervention and 9.39 ± 1.02 g/dL after.

The results of this study align with research conducted by Ningtyastuti et al. (2017), which found an effect of red guava juice consumption on hemoglobin levels in adolescent girls with anemia; the statistical test yielded a p-value of 0.002 ($\alpha = 0.05$), indicating that consuming red guava influences the increase in hemoglobin levels among adolescent girls in Bandung Village, Ngrampal District, Sragen. The mechanism by which red guava juice increases hemoglobin levels relates to the fact that two-thirds of the iron in the body exists in the form of hemoglobin.

Regarding absorption mechanisms, dietary iron exists in two forms: heme iron and non-heme iron; the primary sources of heme iron are hemoglobin and myoglobin. Iron absorption does not occur in the stomach but rather in the small intestine. However, gastric acid plays a crucial role in the absorption of non-heme iron by facilitating the conversion of ferric iron (Fe^{3+}) to ferrous iron (Fe^{2+}), thereby making it easier for the small intestine to absorb.

After being absorbed into the small intestine, iron can be stored in the liver. In the bloodstream, iron is transported to other areas by a transport protein called transferrin. Transferrin then binds to cell receptors and enters the cell via endocytosis. Cellular lysosomes release the iron from the transferrin, allowing it to bind with other molecules to form enzymes, hemoglobin, myoglobin, or ferritin.

When there is an excess of iron in the body, hemosiderin, another type of protein, binds to the surplus iron. Most of the iron is used to form hemoglobin, which binds oxygen within red blood cells. Although red blood cells eventually die, the body is able to recycle the majority of the iron they contain.

Based on the research conducted, the researchers posit that the consumption of red guava juice leads to an increase in hemoglobin levels among adolescent girls. The mineral content of the guava fruit can help address anemia; this is because red guava contains not only vitamin C but also minerals that accelerate the process of hemoglobin formation in red blood cells.

The vitamin C content in red guava can accelerate the body's absorption of iron; consequently, optimal iron absorption is expected to boost blood hemoglobin levels. Red guava also serves as an easily accessible, natural, and highly affordable alternative for increasing hemoglobin levels, making it convenient for consumption by everyone, especially adolescent girls and all family.

CONCLUSION

Based on the results of the study on the effect of red guava consumption on increasing hemoglobin levels among adolescent girls in the working area of the Tanjung Balai Community Health Center, the following conclusions can be drawn:

1. The mean hemoglobin level among adolescent girls in the working area of the Tanjung Balai Community Health Center before the intervention was 9.9 g/dL.
2. The mean hemoglobin level among adolescent girls in the

Tanjung Balai Community Health Center's service area following the intervention was 10.2 g/dL, with all participants showing an increase in hemoglobin levels.

3. There is an effect of red guava juice consumption on the increase in hemoglobin levels among adolescent girls in the working area of the Tanjung Balai Community Health Center.

SUGESTION

For Respondents

It is hoped that young women can add fruits such as red guava to their diet because red guava juice is rich in vitamin C and iron to increase hemoglobin levels in young women.

For Research Places

It is hoped that it can increase food education and socialization that can increase HB and the importance of adequate nutrition for young women.

For future researchers

It is hoped that it can become basic data for further research.

REFERENCES

- Adriani. (2012). Peranan Gizi Dalam Siklus Kehidupan. Jakarta: Kencana Prenada Media Group.
- Afryan, R. (2016). Madu Sebagai Peningkatan Kadar Hemoglobin Pada Remaja Putri Yang Mengalami Anemia Defisiensi Besi. Majority, 49-53.
- Ahmad, M. (2014). Dinamika Perkembangan Anak Dan Remaja . Bandung: Refika Aditama.
- Annisa, N. (2016). Pengaruh Jus Jambu Biji Merah Dalam Meningkatkan Kadar Hemoglobin. Media Farmasi Indonesia, 12(1), 1151, 1154.

- Astari, Y. (2019). Perbedaan Kadar Hemoglobin Sebelum Dan Sesudah Pemberian Jus Jambu Biji Merah (*Psidium Guajava* L) Pada Remaja Putri Di Smk Nu Eprints.Unw.Ac.Id. [Http://Eprints.Unw.Ac.Id/236/](http://Eprints.Unw.Ac.Id/236/)
- Budiarti, A., Anik, S., & Wirani, N. P. G. (2021). Studi Fenomenologi Penyebab Anemia Pada Remaja Di Surabaya. *Jurnal Kesehatan Mesencephalon*, 6(2). <https://doi.org/10.36053/Mesencephalon.V6i2.246>
- Cahyani, I. M., Sulistyarini, I., & Ivani, R. A. (2017). Pengaruh Jus Jambu Biji Merah Dalam Meningkatkan Kadar Hemoglobin. *Media Farmasi Indonesia*, 12(2), 1189–1198.
- Damayanti, D. (2020). 'Efektifitas Pemberian Jus Jambu Biji Terhadap Perubahan Kadar Hemoglobin Pada Remaja Putri Di Pondok Pesantren Nurul Jadid Kumpai Kabupaten Kubu Raya', *Jurnal Kebidanan Khatulistiwa*, 6(1), Dieny, F. F. (2014). Permasalahan Gizi Pada Remaja Putri . Yogyakarta: Graha Ilmu.
- Handayani, T. Y., Tarigan, R. A., & Sari, D. P. (2022). Pengaruh Jus Jambu Biji Merah (*Psidium Guajava*) Terhadap Meningkatkan Kadar Hemoglobin Pada Remaja Putri. In *Window Of Health : Jurnal Kesehatan* (Pp. 177–185). Universitas Muslim Indonesia. <https://doi.org/10.33096/Woh.Vi.253>
- Indrawatiningsih, Y., Hamid, S. A., Sari, E. P., & Listiono, H. (2021). Faktor-Faktor Yang Mempengaruhi Terjadinya Anemia Pada Remaja Putri. *Jurnal Ilmiah Universitas Batanghari Jambi*, 21(1), 331. <https://doi.org/10.33087/Jiubi.V21i1.1116>
- Junita, D., Wulansari, A., Studi, P., & Gizi, I. (2021). Pendidikan Kesehatan Tentang Anemia Pada Remaja Putri Di SMA N 12 Kabupaten Merangin. 3(1), 41–46.
- Mega, W. H., Hartiningsih, S. S., & ... (2019). Effects Of Red Guava Juice On Hemoglobin And Hematocrit Levels In Female Adolescent Students With Anemia. In *Journal Ofresearch....Researchgate.Net*. https://www.researchgate.net/profile/Senoldane3/publication/335929409_Effects_Of_Red_Guava_Juice_On_Hemoglobin_And_Hematocrit_Levels_I_Female_Adolescent_Students_With_Anemia/links/5f273a1c458515b729fe387d/Effects-Of-Red-Guava-Juice-Onhemoglobin-And-He
- Ramini Harahap Dosen, N. D., Farmasi Dan Kesehatan, F., & Kesehatan Helvetia, I. (2018). Faktor-Faktor Yang Berhubungan Dengan Kejadian Anemia Pada Remaja Putri The Related Factors To The Occurrence Of Anemia In Teenage Girls Artikel History. In *78 Nursing Arts: Vol. Xii* (Issue Desember).
- Restipa, Ledia. (2018). Pengaruh Pemberian Tablet Fe Plus Vitamin C Dibandingkan Tablet Fe Plus Jus Jambu Biji Merah Terhadap Peningkatan Kadar Hemoglobin Pada Remaja Putri

Di Smk Negeri 2 Padang Tahun 2017. In Jik- Jurnal Ilmu Kesehatan (Vol. 2, Issue 1, Pp. 75–78). Stikes Alifah Padang. <https://doi.org/10.33757/jik.v2i1.85>

Rusdi, P. H. N. (2020). Pengaruh Pemberian Jus Jambu Biji Merah (Psidium Guajava.L) Terhadap Kadar Hemoglobin Penderita Anemia Remaja

PUTRI. In Human Care Journal (Vol. 5, Issue 3, P. 603).

Universitas Fort De Kock. <https://doi.org/10.32883/hcj.v5i3.806>

Rusdi, P. H. N., Oenzil, F., & Chundrayetti, E. (2018). Pengaruh Pemberian Jus Jambu Biji Merah

(Psidium Guajava.L) Terhadap Kadar Hemoglobin Dan Ferritin Serum Penderita Anemia Remaja Putri. In Jurnal Kesehatan Andalas (Vol. 7, Issue 1, P. 74). Universitas Andalas