



IMPROVEMENT OF HEMOGLOBIN LEVELS IN PREGNANT WOMEN WITH ANEMIA THROUGH DRAGON FRUIT CONSUMPTION

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ABSTRACT

Anemia frequently manifests in pregnant women as a consequence of alterations in the cardiovascular system, leading to hemodilution and a subsequent decline in blood oxygen levels. The augmented iron demands during pregnancy arise from the needs of the fetus and placenta, coupled with physiological shifts like heightened blood volume and red blood cell count. This elevation in levels may contribute to diminished hemoglobin and hematocrit levels, consequently escalating the prevalence of anemia and iron deficiency during pregnancy. A viable solution for averting anemia in pregnant women involves the consumption of fruits rich in iron and vitamin C, such as dragon fruit, crucial for hemoglobin synthesis. The research method employed in this study followed a quantitative approach, specifically utilizing quasi-experimental research with a pretest-post-test design, including a control group. The study population comprised all pregnant women attending TPMB N Depok, West Java, during October-December 2023. Inclusion criteria involved pregnant women aged 16-34 weeks who visited TPMB N and exhibited signs of anemia. The study sample consisted of pregnant women willing to consume 200 cc of dragon fruit juice daily for a duration of 14 days. Bivariate data analysis was conducted using the Mann-Whitney Test. The intervention implemented involved administering dragon fruit juice, prepared by blending 200g of dragon fruit with 200cc of water and adding 3 tablespoons of sugar. The findings reveal a statistically significant difference in Hb levels among pregnant women before and after the consumption of dragon fruit juice, with a P value of 0.001.

Keywords: anemia; dragon fruit; hemoglobin

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INTRODUCTION

Pregnancy is a natural biological phenomenon, marked by physiological changes rather than pathological ones (Yani & Sahara, 2023). Anemia, characterized by a deficiency of red blood cells in the bloodstream, poses potential complications for mothers during pregnancy, childbirth, and the postpartum period due to a scarcity of hemoglobin (Dai, 2021). Anemia is one of the most common complications associated with pregnancy. Even severe anemia has a bad impact on the mother and fetus. As many as 75% of anemia in pregnancy, the most common of which is iron deficiency anemia (Nurbadriyah, 2019). Iron deficiency anemia in the mother Pregnancy is a health problem experienced by women all over the world, especially in developing countries, for example Indonesia (Angrainy, 2017).

Maintaining the health of pregnant women can be done by inspection hemoglobin (Hb). The hemoglobin value low is associated with clinical problems such as anemia. Anemia is a condition with hemoglobin levels in the blood less than 12gr%. Meanwhile, anemia in

pregnancy is the condition of the mother with hemoglobin levels below 11gr% in trimester I and trimester III or levels <10.5gr% in the second trimester (Sartika et al., 2022). Globally, the occurrence of anemia in pregnant women is reported to be 41.8% (Astriana, 2017). In Indonesia, data from the 2018 Basic Health Research (Indonesian: Riset Kesehatan Dasar) reveals a concerning trend, showcasing an 11.8% increase in the prevalence of anemia among pregnant women from 2013 to 2018. The proportion rose from 37.1% in 2013 to 48.9% in 2018. Anemia stands out as a prominent health issue in Indonesia (Suryani et al., 2015).

Reducing the occurrence of anemia in pregnant women falls under the purview of healthcare professionals, particularly midwives. A critical aspect of the midwives' role is preventive care, which includes supplying a minimum of 90 iron (Fe) tablets during pregnancy to mitigate potential complications (Agustina, 2019). Despite the government's ongoing initiative to address anemia in pregnant women through the distribution of 90 Fe tablets during pregnancy, the prevalence of anemia persists. Multiple factors contribute to this, such as insufficient iron intake from dietary sources and incorrect administration of Fe tablets. Issues include irregular tablet consumption, simultaneous intake with coffee or milk, and aversion to side effects like nausea, vomiting, and changes in stool color (Astuti & Ertiana, 2018). Recognizing the causes of anemia in pregnant women, the intervention focuses on enhancing iron absorption through supplements and dietary adjustments. An alternative approach to elevate iron levels in the bloodstream involves the consumption of fruits rich in iron and vitamin C (Indrayani et al., 2023). Dragon fruit stands out as a noteworthy option, containing 0.16-0.20 mg of iron, along with essential vitamins such as B1, B2, and C (Azizah, 2020).

Dragon fruit is rich in iron, contributing to the elevation of hemoglobin levels in pregnant women. Specifically, dragon fruit contains an iron content ranging from 0.55 to 0.65 mg per 100 grams (Khuzaimah et al., 2023). In addition to iron, 100 grams of dragon fruit provides nutritional components such as 11.5 g of carbohydrates, 0.15-0.22 g of protein, 0.21-0.61 g of fat, 13-18O brix sugar content, 0.2-0.9 g of fiber, 0.005-0.01 g of carotene, 6.3-8.8 mg of calcium, 30.2-31.6 mg of phosphorus, 60.4 mg of magnesium, vitamins B1, B2, and C, and 82.5-83 g of water (Aulya et al., 2021). It's worth noting that due to its high water content of 90%, dragon fruit has a limited storage life, lasting only 7-10 days at a temperature of 14°C (Susanty & Sampepana, 2017). The efficacy of dragon fruit in boosting hemoglobin (Hb) levels among pregnant women in their third trimester has been substantiated with a significance level of 0.05, as demonstrated by the findings of Puspita R, R in her 2019 study. The research concluded that administering dragon fruit had a discernible impact on elevating hemoglobin levels in pregnant women attending the Community Health Center Sindang Jaya, evidenced by a significance level below 0.005 (Mutoharoh et al., 2023). The aim of this study was to determine the difference in hemoglobin levels before and after administering dragon fruit juice to pregnant women.

METHOD

This research employed a quantitative methodology, specifically utilizing a quasi-experimental design with a pretest-posttest approach, incorporating a control group. The primary objective of this study is to examine potential differences in hemoglobin levels before and after the administration of dragon fruit juice. The study population consisted of all pregnant women attending TPMB N Depok in West Java. Inclusion criteria involved pregnant women aged 16-34 weeks who visited TPMB N and were diagnosed with anemia. The study sample comprised pregnant women willing to consume 200 cc of dragon fruit juice daily for a duration of 14 days. Bivariate data analysis was conducted using the Mann-Whitney Test. The

intervention involved providing dragon fruit juice, prepared with 200g of dragon fruit mixed with 200cc of water and 3 tablespoons of sugar.

RESULTS

Table 1.

Frequency Distribution of HB Levels among Pregnant Women with Mild Anemia Before and After the Administration of Dragon Fruit

Variables	f	%	Mean	Min	Max
Before	30	100	9.17	7	10
After	30	100	10.15	8	11

Table 1 displays that the highest hemoglobin level in pregnant women prior to receiving dragon fruit juice was recorded at 10 g%. In contrast, the highest hemoglobin level for pregnant women following the consumption of dragon fruit juice reached 11 g%.

Table 2 .

Frequency Distribution of HB Levels in Pregnant Women with Mild Anemia Before and After the Administration of Dragon Fruit

Variables	Mean	SD	SE	P Value	f
Before	9.17	0.834	0.152	0.001	30
After	10.15	0.800	0.146		

Table 2 presents the mean hemoglobin level of pregnant women before the administration of dragon fruit juice as 9.17 gr% with a standard deviation of 0.83 gr%. In contrast, the average hemoglobin level of pregnant women after consuming dragon fruit is 10.15 gr% with a standard deviation of 0.800 gr%. The calculated mean difference before and after the dragon fruit intervention is -0.983, accompanied by a standard deviation of 0.278. The statistical test result is 0.001, indicating a noteworthy and significant difference in hemoglobin levels before and after the administration of dragon fruit.

DISCUSSION

The consumption of dragon fruit over a 14-day period in the morning has been found to contribute to the elevation of hemoglobin levels. This effect is attributed to dragon fruit's mineral content, including iron, and its composition of vitamin B complex, which plays a crucial role in the formation of hemoglobin and red blood cells. This study involved 30 pregnant women, with Hb levels measured both before and after the consumption of dragon fruit juice. The research, assessing the effectiveness of dragon fruit juice in increasing hemoglobin levels in pregnant women with mild anemia, utilized the Mann-Whitney Test. The obtained p-value (<0.001) reveals a significant difference between the Hb levels of pregnant women before and after the administration of dragon fruit juice. The consequences of anemia in pregnant women extend to the risk of maternal and fetal bleeding, potentially leading to fatal outcomes. Additionally, anemia is associated with low birth weight (LBW) in infants (Labir et al., 2013). Intrauterine bleeding is another adverse effect attributed to anemia (Barros et al., 2023). Anemia, being a prevalent health condition, stems from various causes, including nutritional deficiencies, infections, and genetic factors. It is defined as a reduction in the overall mass of circulating red blood cells to an extent where the capacity to carry oxygen becomes insufficient to meet the body's physiological requirements (Karakochuk et al., 2022).

Dragon fruit, identified as *Hylocereus Polyrhizus*, is abundant in iron, a vital component for red blood cells. This characteristic makes dragon fruit effective in both preventing and treating anemia (Singh & Kumar, 2023). Beyond its iron content, dragon fruit is a rich source of essential nutrients, including vitamin C, vitamin B1 (thiamine), vitamin B2 (riboflavin),

carbohydrates, protein, antioxidants, fiber, and iron. These constituents contribute to the elevation of hemoglobin levels and fortify immunity or endurance (Sasabone et al., 2023). Moreover, the consumption of dragon fruit proves beneficial in preventing constipation (Steels et al., 2023), a quality that can address concerns of constipation in pregnant women who are also supplementing iron. According to Ruzlan et al. (2010) dragon fruit boasts numerous phytochemicals, including polyphenols, flavonoids, and vitamin C, conferring robust antioxidant properties to the fruit (Arivalagan et al., 2021). The presence of Betacyanin in the red-fleshed dragon fruit has been observed to safeguard mice against diet-induced obesity and associated metabolic disorders (Sharma et al., 2023). A 100-gram serving of dragon fruit contains 0.7 grams of iron and 2.5 milligrams of vitamin C. The red dragon fruit notably enhances the process of iron absorption, facilitated by its substantial vitamin C content. This high vitamin C concentration aids in the mobilization of iron within the body (Tenrirawe, 2022). Furthermore, it contributes to an increase in stomach acidity, potentially boosting iron absorption by up to 30% (Suryani et al., 2015).

This aligns with a study (reference 3) indicating that the consistent consumption of 500 grams of dragon fruit over 14 days can contribute to an elevation in body hemoglobin levels. This effect is attributed to the iron content present in dragon fruit, with 100 grams providing 0.16 mg of iron. Notably, the daily iron requirement for pregnant women is 0.8 mg. The assimilation of this iron into red blood cells proves advantageous for pregnant women susceptible to anemia. The literature also affirms that dragon fruit, rich in both iron and vitamin C, significantly boosts hemoglobin levels during pregnancy (Trinumasari et al., 2023). Megasari's research findings in 2021 reveal that the average hemoglobin level among pregnant women prior to dragon fruit consumption is 9.17 gr%, whereas after consuming dragon fruit, the average hemoglobin level rises to 10.15 gr%. The statistical test outcome indicates a significance level of 0.001, signifying a notable disparity in hemoglobin levels before and after dragon fruit consumption. These research results find support in a study titled "The Effect of Dragon Fruit Juice on Increasing Hemoglobin Levels in Third Trimester Pregnant Women," affirming the positive impact of dragon fruit juice on elevating hemoglobin levels in pregnant women (Paseru et al., 2023).

CONCLUSION

The effectiveness of dragon fruit juice in raising hemoglobin levels is evident in pregnant women with mild anemia. This efficacy stems from the rich nutritional composition of dragon fruit juice, encompassing water, protein, fat, crude fiber, calcium, phosphorus, iron, niacin, and vitamin C. These constituents play a crucial role in stimulating the production of red blood cells, thereby serving as a preventive measure against anemia.

REFERENCES

- Agustina, W. (2019). Perbandingan Kadar Hemoglobin Pada Ibu Hamil Yang Mengonsumsi Tablet Besi Dengan Dan Tanpa Vitamin C Di Wilayah Kerja Puskesmas Langsa Lama Tahun 2019. *Jurnal Nasional Ilmu Kesehatan*, 2(2), Article 2.
- Angrainy, R. (2017). Hubungan Pengetahuan dengan Sikap Ibu Hamil dalam Pencegahan Anemia Pada Kehamilan Di Puskesmas Rumbai Bukit Tahun 2016. *Jurnal Endurance : Kajian Ilmiah Problema Kesehatan*, 2(1), 62–67. <https://doi.org/10.22216/jen.v2i1.1654>
- Arivalagan, M., Karunakaran, G., Roy, T. K., Dinsha, M., Sindhu, B. C., Shilpashree, V. M., Satisha, G. C., & Shivashankara, K. S. (2021). Biochemical and nutritional characterization of dragon fruit (*Hylocereus* species). *Food Chemistry*, 353, 129426. <https://doi.org/10.1016/j.foodchem.2021.129426>

- Astriana, W. (2017). Kejadian Anemia pada Ibu Hamil Ditinjau dari Paritas dan Usia.
- Astuti, R. Y., & Ertiana, D. (2018). Anemia dalam Kehamilan. Pustaka Abadi.
- Aulya, Y., Silawati, V., & Margareta, E. (2021). Efektifitas Jus Buah Naga Terhadap Peningkatan Kadar Hemoglobin pada Ibu Hamil Trimester III. *Jurnal SMART Kebidanan*, 8(1), 54. <https://doi.org/10.34310/sjkb.v8i1.430>
- Azizah, D. I. (2020). Asupan Zat Besi, Asam Folat, dan Vitamin C pada Remaja Putri di Daerah Jatinangor. *Jurnal Kesehatan Vokasional*, 4(4), 169. <https://doi.org/10.22146/jkesvo.46425>
- Barros, V. V. de, Hase, E. A., Salazar, C. C., Igai, A. M. K., Orsi, F. A., & Margarido, P. F. R. (2023). Abnormal uterine bleeding and chronic iron deficiency: Number 11 – December 2022. *Revista Brasileira de Ginecologia e Obstetrícia*, 44, 1161–1168. <https://doi.org/10.1055/s-0042-1760235>
- Dai, N. F. (2021). ANEMIA PADA IBU HAMIL. Penerbit NEM.
- Indrayani, T., Pratewi, P., Sulminah, S., Rachmah, I. Y., Yustisia, C. R., Sholihah, H., & Istiqomah, E. S. (2023). Edukasi dan Intervensi Pencegahan Anemia dengan Pemberian Jus Jeruk Madu (JerDuMia) pada Ibu Hamil di Posyandu Apel. *Jurnal Peduli Masyarakat*, 5(2), Article 2. <https://doi.org/10.37287/jpm.v5i2.1744>
- Karakochuk, C. D., Zimmermann, M. B., Moretti, D., & Kraemer, K. (2022). Nutritional Anemia. Springer Nature.
- Khuzaimah, U., Sulistiarini, R., Rija'i, H. R., & Alfiani, R. (2023). The effect of giving combination boiled chicken egg and red dragon fruit (*Hylocereus polyrhizus*) to increase hemoglobin levels in women during menstruation. *The North African Journal of Food and Nutrition Research*, 7(16), Article 16. <https://doi.org/10.51745/najfnr.7.16.46-53>
- Labir, I. K., Widarsa, I. K. T., & Suwiyoga, K. (2013). Anemia ibu hamil trimester I dan II meningkatkan risiko kejadian berat bayi lahir rendah di RSUD Wangaya Denpasar. *Public Health and Preventive Medicine Archive*, 1(1), Article 1. <https://doi.org/10.15562/phpma.v1i1.153>
- Mutoharoh, S., Ramadhani, W., & Dewi, A. P. S. (2023). Jus Buah Naga Merah untuk Meningkatkan Kadar Hemoglobin pada Ibu Hamil dengan Anemia. *Prosiding University Research Colloquium*, 1558–1563.
- Nurbadriyah, W. D. (2019). Anemia Defisiensi Besi. Deepublish.
- Paseru, A. E. P., Tini, T., & Astuti, D. R. (2023). Pengaruh Pemberian Jus Buah Naga Merah Terhadap Kadar Hemoglobin Pada Ibu Hamil Di Wilayah Kerja Uptd Puskesmas Bumi Rahayu Kecamatan Tanjung Selor. *Aspiration of Health Journal*, 1(3), Article 3. <https://doi.org/10.55681/aohj.v1i3.193>
- Sartika, W., Suryarinilsih, Y., & Herwati. (2022). Daun Kelor: Alternatif dalam Meningkatkan Hemoglobin Remaja Putri. Penerbit NEM.

- Sasabone, R., Siauta, J. A., Adinda, P. N. S., Sagala, K., Venancyana, M. C., Purba, R., Bonita, B., & Anggraeni, D. (2023). Community Services at SMP Bina Siswa Kotabaru Sub-district West Bekasi District in 2023. *International Journal of Community Services*, 1(1), 28–35. <https://doi.org/10.61777/injcs.v1i1.5>
- Singh, S., & Kumar, S. (2023). A Review on Nutritional, Medicinal and Bio-active Compound of Dragon Fruit *Hylocereus polyrhizus* (F.A.C. Weber) Britton & Rose. *International Journal of Biochemistry Research & Review*, 32(5), Article 5. <https://doi.org/10.9734/ijbcurr/2023/v32i5817>
- Steels, E., Erhardt, R., Harnett, J. E., Vigar, V., & Steadman, K. J. (2023). Efficacy of a prebiotic formulation for treatment of functional constipation and associated gastrointestinal symptoms in adults: A randomised controlled trial. *Advances in Integrative Medicine*, 10(2), 43–50. <https://doi.org/10.1016/j.aimed.2023.05.001>
- Suryani, D., Hafiani, R., & Junita, R. (2015). Analisis Pola Makan Dan Anemia Gizi Besi Pada Remaja Putri Kota Bengkulu | *Jurnal Kesehatan Masyarakat Andalas*. <http://jurnal.fkm.unand.ac.id/index.php/jkma/article/view/157>
- Susanty, A., & Sampepana, E. (2017). Pengaruh Masa Simpan Buah terhadap Kualitas Sari Buah Naga Merah (*Hylocereus polyrhizus*). *Jurnal Riset Teknologi Industri*, 11(2), 76–82. <https://doi.org/10.26578/jrti.v11i2.3011>
- Tenrirawe, A. N. M. (2022). Formulasi dan Analisis Kandungan Zat Gizi Bakso Berbasis Hati Ayam dan Daun Kelor (*Moringa oleifera*) sebagai Pangan Sumber Zat Besi bagi Remaja Putri = Formulation and Analysis of Nutritional Content of Chicken Liver and Moringas Leaves-Based Meatballs as a Food Source of Iron for Adolescents Girls [Other, Universitas Hasanuddin]. <http://repository.unhas.ac.id/id/eprint/14116/>
- Trinumasari, A., Pramono, J. S., & Suryani, H. (2023). Pengaruh Pemberian Kombinasi Jus Buah Pepaya Dan Serbuk Daun Kelor Terhadap Kadar Hemoglobin Ibu Hamil. *Bunda Edu-Midwifery Journal (BEMJ)*, 6(2), Article 2. <https://doi.org/10.54100/bemj.v6i2.110>
- Yani, D., & Sahara, E. (2023). Asuhan Kebidanan Pada Ibu Hamil Ny. A G1p0a0 Usia Kehamilan 28 Minggu 2 Hari Dengan Indikasi Diabetes Melitus Gestasional Di Klinik Fifi Rahatu Amd.Keb Kota Tanjung Balai Tahun 2023: Asuhan Ibu Hamil Pada Ny. A G1A0P0 dengan Diabetes Melitus Gestasional. *Jurnal Teknologi Keilmuan Bengkulu-Multidisiplin*, 2(1), Article 1.