E-ISSN: 2987-209X
International Journal of Midwifery and Health Sciences
Vol. 4, Issue 1 (2026), March

The Effect of Giving Dragon Fruit Juice (*Hylocereus Polyrhizus)* And Honey (*Apis Mellifer*) on Hemoglobin Levels of Pregnant Women in Bogor Regency

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Submission date: 03/02/2026; Date of receipt: 15/03/2026

Abstract

Anemia is a body condition characterized by lower than normal hemoglobin levels in the blood. Low hemoglobin levels in the blood can cause miscarriage, prolonged labor due to uterine inertia, postpartum hemorrhage, and shock. Anemia can be treated pharmacologically with iron tablets and non-pharmacologically with dragon fruit juice and honey. This study aims to determine the effect of a combination of dragon fruit juice and honey on hemoglobin levels in pregnant women in Bogor Regency, West Java Province, in the intervention and control groups. This type of research is a quantitative study with a quasi-experimental method with a one-group pretest-posttest with a control group design. The sample in this study amounted to 30 pregnant women, consisting of 15 people in the intervention group and 15 people in the control group. The sampling technique used was a purposive sampling technique. The research instruments consisted of observation sheets, SOPs for making dragon fruit juice and honey, SOPs for administering dragon fruit juice and honey, SOPs for checking hemoglobin, measuring cups, measuring spoons, blenders, and digital hemoglobinometers (Easy Touch GCHb). Data were analyzed using normality tests, homogeneity tests, paired t-tests, and independent t-tests. The results of the study showed that the combination of dragon fruit juice and honey had a strong influence on increasing the hemoglobin levels of pregnant women in the third trimester in Bogor Regency in 2025. Pregnant women are advised to consume dragon fruit juice and honey as a complementary therapy to help increase hemoglobin levels and prevent anemia during pregnancy.

Keywords: Anemia, Hemoglobin, Dragon Fruit Juice, and Honey

Introduction

Anemia is a condition characterized by lower-than-normal hemoglobin levels in the blood. Hemoglobin functions to carry oxygen and deliver it to all body tissues. Lack of oxygen in the tissues results in decreased concentration, reduced productivity, and decreased immunity (1). The risk of anemia varies, but there are several periods of greater vulnerability throughout life. This variation is due to changes in iron reserves, iron consumption levels, and iron needs or losses. The population groups most susceptible to anemia are children under 5 years of age, especially infants and children under 2 years of age, adolescent girls and women who are menstruating, pregnant women, and postpartum women (2).

Anemia in pregnancy is a condition in which the mother has a hemoglobin level below 11 gr% in the 1st and 3rd trimesters or a level <10.5 gr% in the 2nd trimester. 10 gr% is the limit value and the difference with the condition of non-pregnant women occurs due to hemodilution, especially in the 2nd trimester. (3)Low hemoglobin levels in the blood can cause more serious complications for the mother during pregnancy, childbirth, and postpartum, including miscarriage, preterm labor, prolonged labor due to uterine inertia, postpartum hemorrhage, shock, and intrapartum and postpartum infections. Complications can also occur in the fetus, including stillbirth, perinatal death, preterm birth, congenital defects, and low iron stores (4).

The global prevalence of anemia is estimated at 40% of all children aged 6-59 months, 37% of pregnant women, and 30% of women aged 15-49 years are affected by anemia (2). Based on data from the Bogor Regency area, 49 pregnant women were found in 2025, including 30 pregnant women in their third trimester, 17 pregnant women in their second trimester, 2 pregnant women in their first trimester, and 6 pregnant women who experienced anemia in their third trimester. The causes of anemia in pregnant women are low Hb levels, poor diet, knowledge, and lifestyle.

Iron deficiency in pregnant women can be addressed through pharmacological and non-pharmacological approaches. Pharmacological approaches include iron supplementation (Fe) tablets. Non-pharmacological approaches include consuming dragon fruit juice and honey. Dragon fruit contains a rich array of phytochemicals, which can aid in hematopoiesis. (5)Iron absorption requires vitamin C. During pregnancy, mothers need sufficient vitamin C to protect themselves from various diseases (6). Therefore , this study investigated the effect of a combination of dragon fruit juice and honey on hemoglobin levels in pregnant women in Bogor Regency, West Java Province.

Method

Method should be structured as follows:

1. *Research design*

This research is quantitative with *a quasi-experimental method* using *a one-group pretest-posttest with control group* design . The intervention group consisted of pregnant women who were given iron tablets and a combination of dragon fruit and honey juice; the control group consisted of pregnant women who were given iron tablets.

2. *Setting and Sample*

The study population was 30 pregnant women in their third trimester in Bogor Regency. They were divided into 2 groups, namely 15 intervention groups and 15 control groups. Sampling was done by purposive sampling. Inclusion criteria: 1) pregnant women in their third trimester (28-40 weeks of gestation), 2) able to communicate well, 3) willing to be respondents. Exclusion criteria: 1) suffering from mental disorders, 2) suffering from chronic diseases (TB, thalassemia, KEK, malaria, worms, and blood disorders). This study was conducted in Bogor Regency in 2025 from December 13 to 27, 2025. The independent variable was the making of dragon fruit juice and honey, and the dependent variable was Hemoglobin levels.

3. *Intervention*

The research intervention was the administration of a combination of dragon fruit juice (*Hylocereus polyrhizus*) and honey (*Apis mellifera*) to 15 pregnant women in their third trimester (intervention group). 200 grams of dragon fruit juice was given, mixed with 3 tablespoons of honey, and blended without heating. The combination of dragon fruit juice and honey was given to the respondents in the intervention group once a day in the same amount throughout the intervention period. Administration was carried out regularly and controlled by the researcher to ensure respondent compliance with the intervention. The control group did not receive dragon fruit juice and honey, but still received iron tablets (Fe) in accordance with the standard program for pregnant women's health services. Hemoglobin levels were measured before the intervention on day 1 and after the intervention on day 14 using a Digital Hemoglobinometer (*Easy Touch GCHb*).

4. *Measurement and data collection*

The research instruments used were observation sheets, hemoglobin measurement result recording sheets, SOP for making dragon fruit and honey juice, SOP for giving dragon fruit and honey juice, and SOP for checking Hb (attached), measuring cups,

measuring spoons, blenders, and *Digital Hemoglobinometer* (Easy Touch GCHb).

5. *Trustworthiness/rigor (applies to qualitative studies)*

Data analysis in this study was conducted in stages using SPSS. Descriptive statistical analysis was conducted using a normality test, with the results showing normally distributed data , a homogeneity test, and a statistical confidence level.

Results

Univariate Analysis

Table 1
Average Hb Levels Before Dragon Fruit Juice and Honey For Pregnant Women in Citeureup Village in 2025

Group	N	Min (Max)	Mean	Mean Difference	Median	Elementary School
Pre-test intervention	15	8.80 (12.50)	11.00	1.12	11.20	1,021
Post test	15	10.50 (13.90)	12.12		12.50	1,078
Control				0.32		
Pre-test	15	11.10 (13.00)	12.28		12.30	0.512
Post test	15	11.90 (13.90)	2.60		12.50	0.507

Description. N: Number of respondents. Mean: average. SD: Standard Deviation

Table 1 shows the average hemoglobin (Hb) levels of pregnant women in the third trimester in the intervention group and the control group before and after treatment. In the intervention group, the average Hb level before treatment was 11.00 g/dL with an SD of 1.021 and increased to 12.12 g/dL with an SD of 1.078 after administration of the combination of dragon fruit juice and honey, with a mean difference of 1.12 g/dL. This indicates a clinically significant increase in Hb levels after the intervention. In the control group, the average Hb level before treatment was 12.28 g/dL (SD 0.512) and increased to 12.60 g/dL (SD 0.507) after administration of Fe tablets, with a mean difference of 0.32 g/dL. This increase is relatively smaller than that of the intervention group.

Table 4.2
The Effect of Dragon Fruit Juice Combination on Hb Levels Before and After in the Intervention Group and Control Group

Level Hb	Group Intervention		Group Control		*t*	*P*
	Mean	Elementary School	Mean	Elementary School		
Pre-test	11.00	1.02	12.28	0.512	-4.79	<0.001
Post-tes	12.12	1.07	12.60	0.507	-4.96	<0.001

Description. N: Number of respondents. Mean: average. SD: Standard Deviation. t: difference in average *p: p value*

Table 4.2 shows the results of the *paired t- test* on Hb levels between the intervention and control groups. At the pre-test, there was a significant difference between the two groups ($p < 0.001$). After treatment (post-test), the difference in Hb levels between the intervention and control groups also showed a p-value < 0.001, indicating a statistically significant difference in Hb levels between the two groups after the intervention.

Table 4.3
Differences **in the Effect of Giving a Combination of Dragon Fruit Juice and Honey on Hemoglobin Levels in Third Trimester Pregnant Women in the Intervention Group Compared to the Control Group**

Hb levels	N	Mean	Elementary School	SE	Mean	Elementary School	SE	P Value
Intervention	15	8.26	9.39	0.26	12.28	1.02	2.42	0.050
Control	15	3.13	2.53	0.27	12.60	0.50	0.65	

Description. N: Number of respondents. Mean: average. SD: Standard Deviation. SE: Standard Error *p* : *p* - value

Discussion

The Effect of Dragon Fruit Juice and Honey on Hemoglobin Levels in Pregnant Women in the Third Trimester in 2025

This study aimed to determine the effect of a combination of dragon fruit juice and honey on hemoglobin levels in pregnant women in their third trimester. The results showed that the combination of dragon fruit juice and honey significantly increased Hb levels in the intervention group. This increase was greater than that in the control group, which only received iron tablets. Although the increase in Hb levels in the control group was relatively lower than in the intervention group, indicating that the increase was likely influenced by routine factors such as iron tablet consumption and daily nutritional intake, rather than by the intervention. There was already a significant difference in Hb levels between the two groups before the intervention began.

Dragon fruit belongs to the cactus family. It's oval-shaped and has red skin. It has a sweet, refreshing taste. It's consumed fresh as a thirst quencher, as it contains a high water content of approximately 90% of its weight (7). Dragon fruit juice is easy to digest, especially for pregnant women. It can also increase appetite due to its content of vitamins B2 and B1. To date, no side effects have been found with dragon fruit (8).

Dragon fruit also contains several phytochemical compounds that can be beneficial for health, such as polyphenols, flavonoids, and vitamin C. These compounds have the potential to act as powerful antioxidants in dragon fruit. The high iron and

vitamin C content in dragon fruit makes iron more easily absorbed by the body, up to four times faster than in a diet without vitamin C. (9). According to the research results of Febriyanti (2023), all parts of the dragon fruit show antibacterial activity because there are secondary metabolite compounds found in dragon fruit plants such as flavonoids, saponins, steroids, alkaloids, terpenoids, polyphenols, tannins and phenols (10). In line with the research of Kurniati, D (2021) stated that Vitamin C sourced from fruit lasts longer in body tissues compared to vitamin C obtained from supplements. Vitamin C in the form of juice (such as strawberry juice) is absorbed more quickly by the body with an assimilation time into the blood of only about 15-30 minutes (11). The magnesium content in honey is apparently the same as the magnesium content in the human body. In addition, the Fe content in honey can increase the number of erythrocytes in human blood and can increase hemoglobin levels (12).

Honey contains compounds called organic acids. These organic acids demonstrate the honey's resistance to microbial growth, particularly pathogenic and toxin-producing bacteria.(13)

The results of research from Aulya, Y et al., (2021) regarding the effectiveness of dragon fruit juice on increasing Hb found that the intervention group experienced a greater increase in hemoglobin levels than the control group, meaning that pregnant women who consumed dragon fruit juice had higher hemoglobin levels compared to pregnant women who did not consume dragon fruit (14). In line with Chendriany's research. EB et al., (2021) stated that dragon fruit is very effective in increasing Hb levels in pregnant women, the Hb level in the intervention group was 11.107 with a standard deviation of 1.1392 while in the control group the average value was 9.120 with a standard deviation of 1.4473 (15). According to research by Rianti, R *et al.,* (2021) stated that of 30 pregnant women before the intervention of giving honey was 10.29 gr / dl with the lowest Hb of 9 gr / dl and the highest Hb of 11 gr / dl, while after the intervention the average Hb of pregnant women was 12.8gr / dl with the lowest Hb of 10 gr / dl and the highest Hb of 14 gr / dl. This means that there is an effect of giving honey on Hb levels in pregnant women carried out at BPM Tuti Nurmayam, Subang Regency in 2020. (16)According to research by Rianti.P. et al., (2022) stated that the results of research conducted on 22 pregnant women in the second trimester at the Tulang Bawang Health Center which was given once a day for 14 days showed that the average Hb level before and after giving honey was 9.0 and after 11.16 which means there is an effect before and after giving honey on increasing hemoglobin levels in pregnant women in the third trimester. In line with the research of Rahmawati.A (2024), it was stated that there was a

significant influence between the consumption of date palm juice and honey on the incidence of anemia in pregnant women in the third trimester at the Bangetayu Health Center, Semarang City with a p value of 0.002 <0.05 (17).

Based on the Independent Sample t-test statistical test, the Independent t-test results showed a p value = 0.050 (p = 0.05) and the control group after being given a combination of dragon fruit juice and honey, there was no statistically significant difference between the hemoglobin levels of pregnant women in the third trimester in the intervention group compared to the control group. The insignificant results of this study can be caused by several factors, one of the factors suspected of having an influence is the pattern of consuming dragon fruit juice and honey which is not done simultaneously with iron tablets, so the process of iron absorption in the body becomes less than optimal so that the increase in hemoglobin levels that occurs has not shown a statistically significant difference between the two groups. An insignificant difference does not mean that the intervention has failed, but rather shows that the intervention has succeeded in bringing the group of respondents at risk of anemia (the intervention group) to a hemoglobin level equivalent to the control group.

When dragon fruit juice and honey are combined with Fe tablets, the Fe tablets provide iron while the dragon fruit and honey increase its absorption and utilization. This is what causes the increase in Hb in the intervention group to be much higher than the group that only consumes Fe tablets. According to Nurjannah's research, the group of pregnant women who were given dragon fruit juice and honey had a difference in Hb increase before and after being given intervention at the UPT Cilodong Health Center, Depok City in 2023 with visit 1 Hb levels of 10.8 gr / dl and visit 2 (Day 14) Hb levels were better at 11.5 gr / dl. Dragon fruit juice and honey were given at a dose of 200 gr / 1 glass of 200 cc / day and 3 spoons of honey / day for 2 weeks (18).

The results of this study are supported by a strong scientific mechanism that dragon fruit juice and honey act as a complementary therapy to iron tablets by increasing iron absorption and supporting hemoglobin formation, thus effectively increasing hemoglobin levels in pregnant women with anemia. Overall, this study proves that the combination of dragon fruit juice and honey has a strong effect on increasing hemoglobin levels in third-trimester pregnant women in Bogor Regency in 2025.

Limitation

This study has several limitations. First, the sample size is relatively small, so the results cannot be widely generalized. Second, the relatively short duration of the

intervention means that the long-term effects of dragon fruit juice and honey administration may not yet be apparent. Third, other factors that could influence Hb levels, such as daily diet, adherence to iron tablet consumption, and nutritional status, could not be fully controlled.

Conclusion

This study shows that the combination of dragon fruit juice and honey increases hemoglobin levels in third-trimester pregnant women in Bogor Regency. The increase in Hb levels in the intervention group was greater than in the control group, which only received iron tablets. These results suggest that the combination of dragon fruit juice and honey can be used as a non-pharmacological complementary therapy in preventing and managing anemia in pregnant women. Future research is recommended to involve a larger sample size, a longer intervention duration, and control for confounding factors to obtain more comprehensive results.

Ethical Considerations

This study complies with ethical principles of health research. All respondents were provided with an explanation of the purpose, procedures, benefits, and risks of the study before data collection. Written informed consent was obtained from all respondents who agreed to participate. This study has received approval from the Health Research Ethics Committee of the Faculty of Health Sciences, National University, with approval letter number 143/e-KEPK/FIKES/XII/2025. Respondents' identities were strictly maintained, and the data obtained were used solely for research purposes.

Acknowledgment

The authors would like to thank the Bogor Regency Government, cadres, midwives, and health workers for their support and assistance in ensuring the smooth implementation of this research. They also thank all pregnant women who volunteered to be respondents and actively participated in this study. They also thank the Faculty of Health Sciences, Universitas Nasional, for their academic guidance, facilities, and support, which enabled this research to be completed.

Conflict of Interest

The author declares that there is no conflict of interest in this research, either financial or non-financial, that could influence the results, interpretation, or preparation of this manuscript.

Author contribution

The research concept and design were formulated jointly by IF, DK, and RK. IF conducted data collection, analysis, and manuscript preparation. DK and RK contributed to data interpretation and critical revision of the manuscript.

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