

EFFECTIVENESS OF GIVING DRAGON FRUIT JUICE AND MUNG BEAN PURPOSE ON HEMOGLOBIN LEVELS OF PREGNANT WOMEN IN THE 3RD TEMPO IN THE WORKING AREA OF SADABUAN PUBLIC HEALTH CENTER

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Abstract

Anemia in third-trimester pregnant women remains a health problem that increases the risk of maternal and perinatal complications, necessitating alternative interventions based on local food. This study aims to analyze the effectiveness of dragon fruit juice and mung bean porridge on hemoglobin levels in third-trimester pregnant women. The study used a quasi-experimental design with a two-group pretest-posttest. The population consisted of 30 third-trimester pregnant women at the Sadabuan Community Health Center, with a sample of 30 respondents selected using consecutive sampling. Data were collected using observation sheets and a digital hemoglobin meter, then analyzed univariately and bivariate using paired sample t-tests. The results showed that both interventions significantly increased hemoglobin levels ($p = 0.000$), with a higher increase in the mung bean porridge group than in the dragon fruit juice group. It was concluded that mung bean porridge is more effective as a companion to iron supplementation to increase hemoglobin levels in third-trimester pregnant women.

Keywords: Anemia, Dragon Fruit, Green Bean, Hemoglobin, Pregnancy

INTRODUCTION

Pregnancy with anemia remains a public health problem that impacts the health of both mother and fetus. In Indonesia, the prevalence of anemia in pregnant women reaches 48.9% (Dai, 2021). The WHO defines anemia as a condition where the red blood cell count is below normal, resulting in a decreased ability of the blood to carry oxygen (WHO, 2022). Pregnant women are considered anemic if their hemoglobin levels are below 11 g/dl, while iron requirements during pregnancy increase up to twofold compared to pre-pregnancy levels (Directorate of Community Nutrition, 2020; Priyanti, 2020).

Globally, approximately 40% of pregnant women experience anemia (WHO, 2022). In Southeast Asia, Indonesia has the highest proportion of anemic pregnant women compared to Singapore, Malaysia, and Vietnam, while the 2018 Basic Health Research (Riskesdas) showed a prevalence of 48.9%, with the majority of cases occurring in children aged 15 to 24 years (Ministry of Health, 2022). This condition increases the risk of maternal and fetal health problems, including low birth weight and perinatal mortality (Wibowo et al., 2021; Directorate of Community Nutrition, 2020).

Anemia is treated through the administration of iron tablets and adequate nutritional intake. However, consuming iron tablets often causes side effects such as nausea, vomiting, and constipation, so non-pharmacological alternatives such as iron-rich foods are needed to support increased hemoglobin levels (Kurniasih, Atrie, and Devy Kurniawati, 2018; Ministry of Health, 2022; WHO, 2021).

Mung beans contain iron, protein, vitamin C, vitamin A, and phytochemicals that play a role in hemoglobin formation (S et al., 2017; USDA, 2019; Choirunnisa and Manurung, 2020). Research by Rabiah (2023) and Sarl (2020) shows that giving mung bean porridge or juice with iron tablets can increase hemoglobin levels in pregnant women. Furthermore, red dragon fruit also contains iron and vitamin C, which aid iron absorption and have been shown to increase hemoglobin levels in pregnant women (Mulyani, 2020; Soleha N et al., 2020; Megasari M and Risa, 2021).

A preliminary study at the Sadabuan Community Health Center (Puskesmas) showed that 6 out of 10 pregnant women in their third trimester experienced anemia. Most pregnant women were also unaware of the benefits of dragon fruit and mung bean porridge in increasing hemoglobin levels, and no research had previously been conducted on the effectiveness of these two interventions in this location.

Based on these conditions, this study aims to analyze the effectiveness of administering dragon fruit juice and green bean porridge on hemoglobin levels of pregnant women at the Simpang Kiri Community Health Center in Subulussalam City in 2025. This study is important as a non-pharmacological alternative in treating anemia in pregnant women. The novelty of the study lies in the analysis of the effectiveness of administering dragon fruit juice and green bean porridge to pregnant women at the Simpang Kiri Community Health Center in Subulussalam City, which has never been studied before.

METHOD

This study used a quantitative approach with a quasi-experimental method and a two-group pre-test-post-test group design to analyze the effectiveness of dragon fruit juice and mung bean porridge on hemoglobin levels in pregnant women. Hemoglobin levels were measured before and after the intervention for seven days in each group (Creswell, 2019; Portney, 2019).

The research instruments used were observation sheets and a digital hemoglobin meter. Data were processed through editing, coding, data entry, and cleaning. Then, univariate and bivariate analyses were performed using paired sample t-tests or Mann-Whitney tests based on data distribution, with a significance level of $\alpha = 0.05$.

The study population consisted of 30 pregnant women in their third trimester in the Simpang Kiri Community Health Center in Subulussalam City from March to April 2025 (Hidayat, 2019). The sample was selected using consecutive sampling, consisting of 15 respondents in the dragon fruit juice group and 15 respondents in the mung bean porridge group, according to the research criteria.

The research procedure began with respondent consent, followed by measuring initial hemoglobin levels, administering intervention for seven days according to group, then measuring hemoglobin levels again as a post-test to assess changes after the intervention.

RESULTS AND DISCUSSION

Table 1 Characteristics of Respondents Based on Age, Parity, Education and Mother's Occupation in the Work Area of Sadabuan Health Center

No	Respondent Characteristics	Giving Dragon Juice		Giving Green Bean Porridge	
		<i>F</i>	(%)	<i>F</i>	(%)
Age					
1	<20 to and >35 years	4	26.7	3	20.0
	20-35 years	11	73.3	12	80.0
Amount		15	100	15	100

2	Parity				
	Primigravida	6	40.0	4	26.7
	Multigravida	9	60.0	11	73.3
	Amount	15	100	15	100
3	Education				
	Elementary School	2	13.3	1	6.7
	JUNIOR HIGH SCHOOL	4	26.7	5	33.3
	SENIOR HIGH SCHOOL	7	46.7	6	40.0
	College	2	13.3	3	20.0
	Amount	15	100	15	100
4	Work				
	Nok betorja	10	66.7	9	60.0
	Betorja	5	33.3	6	40.0
	Amount	15	100	15	100

Based on Table 1, the majority of respondents in both groups were in the reproductive age range of 20–35 years, namely 73.3% in the dragon fruit juice group and 80% in the mung bean porridge group. Most respondents were multigravida, at 60% and 73.3%, respectively. The respondents' education level was predominantly high school, at 46.7% in the dragon fruit juice group and 40% in the mung bean porridge group. In addition, the majority of respondents in both groups were unemployed, at 66.7% and 60%, respectively.

Table 2 Average Intensity of HB Levels in Pregnant Women in the Third Month of Pregnancy Before and After Being Given Dragon Fruit Juice in the Sadabuan Community Health Center

Work Area					
Giving Dragon Juice	N	Mayan (gr/dl)	Elementary School	n – Max	95% CI
Before	15	10.47	0.2257	10.1 – 10.8	10,342 – 10,592
After	15	11.18	0.2242	10.7 – 11.5	11,056 – 11,304

Based on Table 2, the average hemoglobin level of pregnant women in their third trimester before being given dragon fruit juice was 10.47 ± 0.2257 with a range of 10.1–10.8. After the intervention, the average hemoglobin level increased to 11.18 ± 0.2242 with a range of 10.7–11.5. These results indicate an increase in the average hemoglobin level after being given dragon fruit juice.

Table 3 Average Intensity of HB Levels in Pregnant Women in the Third Month of Pregnancy Before and After Being Given Green Bean Porridge in the Work Area Sadabuan Community Health Center

Giving Green Bean Porridge	N	Mean	Elementary School	n – Max	95% CI
Before	15	10,353	0.2696	9.7 – 10.8	10,204 – 10,503
After	15	11,420	0.2908	10.6 – 11.7	11,259 – 11,581

Based on Table 3, the average hemoglobin level of pregnant women in the third trimester before being given mung bean porridge was 10.35 ± 0.2696 with a range of 10.0–10.6. After the intervention, the average hemoglobin level increased to 11.42 ± 0.2908 with a range of 10.6–11.7. These results indicate an increase in the average hemoglobin level after being given mung bean porridge.

Bivariate Analysis

Table 3 Results of the Shapiro-Wilk Normality Test in the Treatment Group

Variables	<i>P value</i>	Information
Selbellulm in the dragon juice group	0.154	Normal distribution
Selbellulm in the group given green bean porridge	0.200	Normal distribution
Selsuldah in the dragon juice group	0.100	Normal distribution
Selsuldah in the group given green bean porridge	0.200	Normal distribution

Based on Table 3, the results of the Shapiro-Wilk normality test indicate that the data in the dragon fruit juice and mung bean porridge groups had a *p*-value > 0.05 before and after the intervention, indicating a normal distribution. Therefore, bivariate analysis was continued using a paired t-test.

Table 4 Differences in HB Level Intensity in Pregnant Women in the Third Month of Pregnancy in the Papaya Fruit Group and the Red Dragon Fruit Group in the Region Sadabuan Community Health Center Work

Toyounpok Treatment	N	Mean	Elementary School	MD	P value
Dragon Juice	15	11,180	0.2242	0.2400	0,000
Green bean porridge	15	11,420	0.2908		

Based on Table 4, the results of the paired t-test show a difference in hemoglobin levels in pregnant women in the third trimester before and after the intervention in the dragon fruit juice and mung bean porridge groups with a *p* value of 0.000 (*p* < 0.05). These results indicate that mung bean porridge is more effective in increasing hemoglobin levels than dragon fruit juice.

Discussion

Respondent Characteristics

1. Age

Based on the research results, the reproductive age range in the group of respondents given red dragon fruit juice in this study was mostly aged 20-35 years, namely 11 people (73.3%), and the age range in the group given green bean porridge was mostly aged 20-35 years, namely 12 people (80%).

In line with research conducted by Nelly Mariati (2022), it can be seen that the majority of respondents were aged 20–35, namely 27 people (90%). The age group of 20–35 is considered a healthy reproductive age, so the tendency for complications is lower than for pregnant women aged <20 and >35.

Similarly, Yulni Sulbhi's (2020) research stated that the chi-square test results in the table showed that the majority of pregnant women in the risk age group (<20 years or >35 years) experienced

anemia, namely 8 pregnant women (42.11%) and those who were not anemic were 11 pregnant women (57.89%). Then, the majority of pregnant women in the non-risk age group (20–35 years) experienced anemia, namely 48 pregnant women (51.61%) and those who were not anemic were 45 pregnant women (48.39%).

Age is an indicator of maturity. As a person ages, their knowledge and experience regarding healthy eating habits increase. A young mother's age can also influence the sources of nutrients she consumes (Blachman & Lukacs, 2019).

According to theory, the ideal maternal age for pregnancy is 20–35 years. At this age, mothers have healthy reproductive health and are at lower risk of pregnancy complications. Those aged <20 years are at risk of anemia because reproductive development is not yet optimal. According to Soebroto (2018), pregnancy in the age group >35 years is associated with decline and decreased immunity, as well as various diseases that often arise at that age (Amirruddin, 2018). Pregnancy in the age group >35 years is considered a high-risk pregnancy because chronic health problems are common at this age, one of which is the risk of anemia.

Researchers assume that the results of the study indicate that the majority of respondents are in a healthy reproductive period. Age is one factor that can affect hemoglobin levels in pregnant women in the third trimester. The ideal maternal age during pregnancy is 20–35 years because it has a healthy reproductive health and a lower risk of pregnancy complications. The age group <20 years is at risk of anemia because reproductive development is not yet optimal. According to Soebroto (2019), pregnancy in the age group >35 years is associated with decline and decreased immunity as well as various diseases that often occur at that age (Amirruddin, 2019). Pregnancy in the age group >35 years is also a high-risk pregnancy because it is at greater risk of chronic health problems, including anemia.

2. Parity

Based on the research results, the majority of respondents in the dragon juice group were multigravida, 9 people (60%), while in the green bean porridge group, the majority were also multigravida, 11 people (73.3%).

This is in line with previous research which stated that anemia often occurs in the third trimester with an average prevalence of more than 30%. Based on research conducted by Jwa et al., it was found that 4.5% of mothers experienced anemia in the first trimester, 44.1% in the second trimester, and 45.7% in the third trimester. In the third trimester, hemodilution and a decrease in hemoglobin levels occur, starting at 6–8 weeks of gestation and peaking at 32–34 weeks of gestation. In late pregnancy, hemoglobin levels below 11.0 g/dl are abnormal and not related to the increase in blood volume (hypervolemia) that occurs as a physiological adaptation in pregnancy.

According to theory, having more than three children is a risk factor for anemia, associated with closely spaced pregnancies, typically less than two years. This is because frequent pregnancies can deplete the mother's nutritional reserves. In developing countries, particularly in rural areas, mothers with low socioeconomic status, large numbers of children, close pregnancies, and prolonged breastfeeding without adequate nutritional intake are at higher risk of anemia.

Researchers assume that mothers who have had more than four pregnancies are at higher risk of anemia. Parity 2–3 is the safest in terms of maternal mortality risk, while parity greater than 3 carries a higher risk of maternal mortality, one of which is caused by anemia. The results of this study indicate that the majority of respondents were multigravida.

3. Education

Based on the research results, the majority of respondents in the dragon juice group had a high school education of 7 people (46.7%), while in the green bean porridge group the majority also had a high school education of 6 people (40%).

In line with research conducted by Nelly Mariati (2022), the majority of respondents were at the secondary level (junior high school-senior high school), amounting to 19 respondents (63.33%). Pregnant women with higher levels of education and insight are more likely to pay attention to and care for their bodies during pregnancy by consuming the right foods.

Research conducted by Ermawati (2019) found that the prevalence of mild anemia was lower in mothers with low levels of education, at 25%, compared to 75% in mothers with high levels of education. Meanwhile, the prevalence of moderate anemia was higher in mothers with low levels of education, at 90.3%, compared to 9.7% in mothers with high levels of education.

The research results align with the theory that education influences all aspects of human life, including thought patterns, attitudes, and behavior. The higher a person's education, the broader their knowledge and ways of thinking, including understanding information about anemia. Education also influences a mother's ability to receive and process health information.

According to Budiono (2019), a person's education influences their ability to think and make rational decisions. Pregnant women with higher levels of education tend to be more receptive to new information, while those with lower levels of education have limited knowledge about anemia and its associated factors, particularly iron deficiency.

Researchers assumed that the majority of respondents had a high school education. The higher a person's education, the greater their knowledge of how to increase hemoglobin levels. However, this study still encountered obstacles in increasing hemoglobin levels because many respondents had primary and secondary education, while only a small proportion had higher education.

4. Work

Based on the research results, the majority of respondents in the dragon juice group were unemployed, 10 people (66.7%), while in the green bean porridge group, the majority were also unemployed, 9 people (60%).

Based on previous research conducted by Yulni Sulbhi (2020), 47 pregnant women (48.96%) were unemployed and had anemia, while 49 (51.04%) were not anemic. Of the employed pregnant women, 9 (56.25%) had anemia, while 7 (43.75%) did not.

Similarly, research conducted by Nelly Mariati (2022) found that the majority of respondents, 20 people (66.67%), had an income of 1.2–2.4 million rupiah. According to Arisman (2020), family income levels influence the fulfillment of nutritional needs for pregnant women. If family income is insufficient, pregnant women's nutritional needs cannot be optimally met.

According to the researchers' assumptions, the results show that most pregnant women spend more time as housewives than working outside the home. Even though they don't work, housewives with more than one child still have a significant workload. Therefore, pregnant women need to pay attention to their health, as excessive activity during pregnancy can increase the risk of anemia.

5. Intensity of HB Levels in Pregnant Women in the Third Month of Pregnancy Before Being Given Dragon Fruit Juice and Green Bean Porridge

The results showed that the average hemoglobin level of pregnant women in their third trimester before the intervention in the dragon fruit juice group was 10.47, while in the mung bean porridge group it was 10.35. These results indicate that both groups had low hemoglobin levels before the intervention.

The results of this study align with Sari's (2020) study, which found that administering iron tablets with the addition of mung bean juice increased hemoglobin levels in pregnant women. Research by Soleha N et al. (2020) and Megasari M and Risa (2021) also concluded that administering dragon fruit juice increased hemoglobin levels in pregnant women.

Iron is an essential microelement required for hemoglobin formation. Iron requirements increase during pregnancy, particularly in the second and third trimesters, so dietary intake is often insufficient to meet the body's needs, necessitating iron supplementation. This is supported by research by Rifki (2020), which found a significant relationship between iron supplementation and hemoglobin levels in pregnant women in the third trimester.

This is consistent with the theory that hemodilution occurs during pregnancy due to a 30% to 40% increase in blood volume, peaking at 32–34 weeks. This condition causes hemoglobin levels to decrease, putting pregnant women at risk of physiological anemia.

Dragon fruit contains iron, vitamin C, protein, and various minerals that play a role in hemoglobin formation, while mung bean porridge is also a source of iron that can help increase hemoglobin levels (Mulyani, 2020). Therefore, these two foods have the potential to be used as non-pharmacological alternatives to prevent anemia in pregnant women.

According to researchers, decreased hemoglobin levels are a common health problem during pregnancy. One way to increase hemoglobin levels in pregnant women is by consuming foods rich in iron and vitamin C, such as dragon fruit juice and mung bean porridge, which can help meet iron requirements during pregnancy.

6. Intensity of HB Levels in Pregnant Women in the Third Month of Pregnancy After Giving Dragon Fruit Juice and Green Bean Porridge

The results showed that the average hemoglobin level of pregnant women in the third trimester after receiving dragon fruit juice was 11.18, while after receiving mung bean porridge it was 11.42. These results indicate that both interventions were able to increase hemoglobin levels, with the average hemoglobin level in the mung bean porridge group being higher than in the dragon fruit juice group.

The results of this study are supported by Rabiah's (2023) study, which showed that administering Fe tablets and mung bean porridge to pregnant women in their third trimester with moderate anemia had an effect on increasing hemoglobin levels with a p value of 0.000. Nelly Mariati's (2022) study also concluded that administering dragon fruit juice had an effect on increasing hemoglobin levels in pregnant women with a significance value of 0.011 (<0.05).

Mung beans are a source of plant-based protein that contains iron, vitamin A, vitamin C, vitamin B6, magnesium, phosphorus, and various other nutrients that play a role in hemoglobin formation. Vitamin C aids iron absorption, while vitamin A plays a role in the mobilization of iron reserves and the formation of red blood cells. Therefore, consuming mung beans is recommended to help prevent iron deficiency anemia in pregnant women (USDA, 2019; Sari and Rahyuda, 2020; Rahmi, 2022).

This is consistent with the theory that hemodilution occurs during pregnancy due to a 30% to 40% increase in blood volume, peaking at 32–34 weeks. This condition causes hemoglobin levels to decrease, putting pregnant women at risk of physiological anemia.

Dragon fruit is also a source of iron, vitamin C, protein, fiber, and various minerals needed in the formation of red blood cells so that it can help increase hemoglobin levels in pregnant women (Panjuang Tiningrum in Risnayanti et al., 2015; Al-Mekhlafi et al., 2021).

According to researchers, the increase in hemoglobin levels after administering dragon fruit juice and mung bean porridge suggests that these two foods can be a non-pharmacological alternative to help meet iron needs during pregnancy. The iron and vitamin C content in both foods plays a role in hemoglobin formation, thus helping to increase hemoglobin levels in pregnant women in the third trimester.

7. Analyzing the Difference in HB Level Intensity in Pregnant Women in the Third Month of Pregnancy in the Group Given Dragon Fruit Juice and Green Bean Porridge

The results of the study showed a difference in hemoglobin levels in third-trimester pregnant women before and after the intervention between the dragon fruit juice group and the mung bean porridge group with a p value of 0.000 ($p < 0.05$). These results indicate that the administration of mung bean porridge is more effective in increasing hemoglobin levels than the administration of dragon fruit juice.

Mung beans have many benefits, including helping prevent anemia and playing a role in red blood cell formation. Furthermore, mung beans can improve nutrient absorption, strengthen bones, act as an antioxidant, control blood sugar levels, and help lower blood pressure and cholesterol (Ministry of Health of the Republic of Indonesia, 2022).

The results of this study are in line with the research of Choirunnisa and Manurung (2020) which showed a difference in hemoglobin levels of pregnant women in the group given mung bean juice with a p value = 0.036. Research by Karlinah and Irianti (2022) also reported that hemoglobin levels increased from 10.51 g/dl to 11.51 g/dl after giving mung bean juice with a p value = 0.014, while

Hidayati and Holila (2021) stated that giving mung beans increased hemoglobin levels of pregnant women in the second trimester from 9.3 g/dl to 12.1 g/dl.

Mung beans are a source of plant-based protein, minerals, vitamin C, iron, and vitamin A, which play a role in hemoglobin formation (USDA, 2019). Vitamin C helps increase the absorption of nonheme iron, while protein, carbohydrates, fat, and vitamin A support hemoglobin synthesis and red blood cell formation.

Furthermore, Santy's (2019) research also demonstrated that administering iron supplements along with consuming dragon fruit resulted in a significant increase in hemoglobin levels in pregnant women with a p-value of 0.000. These results indicate that both dragon fruit and mung beans are beneficial in helping increase hemoglobin levels, although in this study, mung bean porridge provided a higher increase.

Based on this description, researchers believe that consuming mung bean porridge is more effective in increasing hemoglobin levels because the iron, vitamin C, vitamin A, and protein it contains play a role in increasing iron absorption and hemoglobin formation. These results align with this study, which showed that mung bean porridge is superior to dragon fruit juice in increasing hemoglobin levels in pregnant women in the third trimester.

CONCLUSION

This study shows that administering dragon fruit juice and mung bean porridge are both able to increase hemoglobin levels in pregnant women in the third trimester. The results of statistical tests showed a significant difference between hemoglobin levels before and after the intervention with a p value = 0.000 ($p < 0.05$). Compared with dragon fruit juice, administering mung bean porridge resulted in a higher increase in hemoglobin levels, making it considered a more effective non-pharmacological intervention in helping to overcome anemia in pregnant women. These findings strengthen the belief that the use of local foods rich in iron, vitamin C, and other supporting nutrients can be an alternative to support efforts to prevent and treat anemia during pregnancy.

This study still has limitations, namely the relatively small sample size and only conducted at one community health center, so the results cannot be generalized widely. Furthermore, the study did not consider other factors that can affect hemoglobin levels, such as daily diet, compliance with iron tablet consumption, nutritional status, or the health conditions of the respondents. Therefore, further research is recommended involving a larger sample size, a wider area of coverage, and controlling for confounding factors to obtain more comprehensive results. Practically, the results of this study can provide input for health workers, especially midwives in antenatal care, to utilize mung bean porridge or dragon fruit juice as an adjunct to iron tablet supplementation in an effort to increase hemoglobin levels in pregnant women and reduce the risk of anemia during pregnancy.

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