THE EFFECT OF RED SPINACH JUICE AND HONEY ON CHANGES IN HEMOGLOBIN LEVELS AMONG PREGNANT WOMEN AT THE SENAPELAN COMMUNITY HEALTH CENTER (PUSKESMAS)

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Abstract

Anemia is a condition characterized by a decrease in hemoglobin (Hb) levels or a reduction in the number of red blood cells in the blood. The most common type of anemia among pregnant women is iron-deficiency anemia, which arises from an insufficient intake or inadequate stores of iron to meet the body's requirements during pregnancy. This study aims to analyze the effect of consuming red spinach juice mixed with honey on increasing hemoglobin levels in pregnant women in their second and third trimesters within the working area of the Senapelan Community Health Center (Puskesmas) in 2026. The study employs a quantitative approach with a pre-experimental, one-group pretest-posttest design. The sample consists of 30 pregnant women, selected using a total sampling technique. The study was conducted at the Senapelan Community Health Center from June 1 to June 21, 2026. Data analysis was performed using univariate and bivariate methods, while hypothesis testing was conducted using a paired-sample t-test. The intervention involved the consumption of 250 ml (approximately one glass) of red spinach juice once daily, before a meal, for 7 consecutive days. Hemoglobin levels were measured using an "Easy Touch" Hb monitoring device. The results show a mean change of 1.487 g/dL (11.460 – 9.973 = 1.487 g/dL), with a p-value of <0.001. This indicates a significant increase in hemoglobin levels among pregnant women in their second and third trimesters following the consumption of red spinach juice and honey. These findings are expected to serve as a reference for utilizing red spinach juice and honey as a non-pharmacological intervention to help increase hemoglobin levels in pregnant women, and to provide a foundation for future research.

Keywords: Pregnancy; Anemia; Hemoglobin; Amaranthus Tricolor; Honey.

1. INTRODUCTION

Anemia is a condition in which the volume of red blood cells in peripheral circulation falls below the normal range, thereby hindering the adequate transport of oxygen to tissues and impairing the body's normal physiological functions. Anemia has a significant impact on population health, hindering physical and cognitive growth, and ultimately affecting socio-economic development. This condition represents a serious global public health issue, particularly in low- and middle-income countries[1].

Approximately one-quarter of the world's population suffers from anemia. Children and women—especially pregnant women—are at a higher risk[2]. Based on its underlying causes, anemia can be classified into three types: anemia resulting from nutritional deficiencies, anemia associated with underlying diseases, and anemia caused by genetic factors. Deficiencies in iron,

folate, vitamin B12, vitamin A, vitamin C, and other nutrients can lead to nutritional-deficiency anemia—a condition frequently encountered in low- and middle-income countries [3].

Iron deficiency (ID) is a primary cause of anemia, accounting for approximately 50% of all cases. The occurrence of iron deficiency and iron-deficiency anemia (IDA) can be influenced by geographical, cultural, dietary, economic, and genetic factors (such as single-nucleotide polymorphisms in the *TMPRSS6* gene) [1]. IDA during pregnancy is linked to adverse health outcomes for both the mother and the infant, including preterm birth, infants who are small for their gestational age, low birth weight, and even perinatal mortality. Common preventive and management strategies for addressing iron deficiency and IDA during pregnancy include the administration of iron-containing supplements, medical treatment, and nutritional counseling regarding diet [4].

Anemia is a major public health issue, primarily affecting young children, pregnant and postpartum women, adolescent girls, and women of reproductive age who are menstruating. Globally, it is estimated that 40% of all children aged 6–59 months, 37% of pregnant women, and 30% of women aged 15–49 years suffer from anemia. It is estimated that anemia affects half a billion women aged 15–49 years and 269 million children aged 6–59 months worldwide. In 2019, 30% (539 million) of non-pregnant women and 37% (32 million) of pregnant women aged 15–49 years were affected by anemia. According to the WHO, the African and Southeast Asian regions are the most severely affected, with an estimated 106 million women and 103 million children suffering from anemia in Africa, and 244 million women and 83 million children in Southeast Asia. The WHO notes that low- and middle-income countries, such as Indonesia, are at the highest risk for high rates of anemia. This is supported by 2019 data, which indicates that Indonesia is among the countries with a high number of pregnant women suffering from severe anemia [5].

According to the Indonesian Ministry of Health (Kemenkes RI) in 2023, maternal and infant mortality rates in Indonesia remain the third highest in the ASEAN region, with anemia identified as a contributing factor to these high figures [6]. Data from the Riau Province Health Office indicates that there were 18,756 cases (34.23%) of anemia among pregnant women in 2021, 15,634 cases (21.15%) in 2022, and 19,187 cases (39.18%) in 2023, resulting in a three-year average of 31.52% [7].

The demand for iron increases significantly during the second and third trimesters of pregnancy as the pregnancy progresses. This increased iron requirement is essential to meet the mother's nutritional needs, support fetal growth and development, and prevent the onset of anemia. Although the expansion of blood volume in the second and third trimesters is not as pronounced as it is in early pregnancy, the need for iron continues to rise due to an increase in the mother's hemoglobin mass, the transfer of iron to the fetus, and a greater demand for oxygen driven by the fetus's rapid growth. If these iron requirements are not met, pregnant women are at risk of developing anemia, which can lead to various adverse health outcomes for both the mother and the fetus [8].

Anemia can have detrimental effects on both the mother and the fetus. In the mother, it may cause complications such as frequent dizziness, fainting, miscarriage, prolonged labor due to suboptimal uterine contractions, and postpartum hemorrhage. For the fetus, the consequences of maternal anemia include stunted fetal growth, premature birth, and the occurrence of congenital defects [9].

One non-pharmacological approach that can be used to help increase hemoglobin (Hb) levels in pregnant women is the consumption of red spinach juice. Iron deficiency during pregnancy is a primary cause of anemia, necessitating an intake of iron-rich foods.

Red spinach offers several advantages over other natural alternatives for boosting Hb levels in pregnant women. It contains iron, folic acid, vitamin C, and antioxidants—all of which play a crucial role in the formation of red blood cells. Furthermore, the vitamin C content in red spinach enhances optimal iron absorption, thereby supporting a more effective increase in hemoglobin levels. Additionally, red spinach is easily accessible, affordable, and can be prepared as a juice. Beyond its benefits for the mother, the nutrients in red spinach also support fetal growth and development throughout pregnancy [10].

Research conducted by Hayati (2025) indicates that, prior to the intervention, the average Hb level among the pregnant women studied was 9.63 mg/dL. Following the regular consumption of a blend of red spinach juice and honey, the average Hb level rose to 11.19 mg/dL—an increase of approximately 1.563 mg/dL—demonstrating that this juice is effective in raising Hb levels in anemic pregnant women. The study employed a pretest-posttest design without a control group, with a sample of 16 anemic pregnant women selected based on specific criteria (purposive sampling). The intervention consisted of a 150 ml mixture of red spinach juice and honey, consumed twice daily. Red spinach can thus serve as a natural alternative for addressing anemia during pregnancy [11].

The high prevalence of anemia among pregnant women during the second and third trimesters is a health issue that warrants significant attention. If left untreated, anemia can lead to complications for both the mother and the fetus. This can increase the risk of low birth weight and hemorrhaging, which may lead to morbidity and mortality for both mother and infant. A lack of awareness and understanding regarding the importance of nutrition and iron intake during pregnancy highlights the need for preventive measures and interventions to address anemia among pregnant women. Consequently, the researcher is interested in conducting a study titled "The Effect of Red Spinach Juice and Honey on Increasing Hemoglobin Levels in Pregnant Women in the Second and Third Trimesters."

2. METHODOLOGY

This study employs a pre-experimental design, specifically a one-group pretest–posttest design, without a control group. The materials and tools used to prepare the red spinach juice include 100 grams of red spinach, 250 ml of water, 1 tablespoon of honey, and an observation sheet. The intervention consists of the consumption of 250 ml (equivalent to one glass) of red spinach juice daily for seven days.

The study was conducted at the Senapelan Community Health Center (Puskesmas Senapelan) from June 1 to June 21, 2026. The population comprised all pregnant women in their second and third trimesters experiencing anemia within the working area of the Senapelan Community Health Center, totaling 30 individuals. A total sampling technique was used, meaning all members of the population who met the study criteria were included as participants. The final sample consisted of 30 respondents.

1. Inclusion Criteria

a. Pregnant women in their second or third trimester with mild anemia (hemoglobin levels of 9–10 g/dL)

b. Within the reproductive age range of 20–35 years

c. Willing to participate as respondents

d. Willing to consume 250 ml (equivalent to one glass) of red spinach juice once daily, before meals, for 7 consecutive days

3. RESULTS

a) Respondent Characteristics

Table1. 1. Respondent Characteristics by Age

Range Usia	F	Persentase
20	1	**3.3 %**
21	1	**3.3 %**
22	2	**6.7 %**

23	2	**6.7 %**
24	2	**6.7 %**
25	4	**13.3 %**
26	3	**10.0 %**
27	3	**10.0 %**
28	2	**6.7 %**
29	3	**10.0 %**
30	3	**10.0 %**
31	2	**6.7 %**
32	1	**3.3 %**
33	1	**3.3 %**
TOTAL	**30**	**100 %**

Based on Table 1.1, the characteristics of respondents by age in the working area of the Senapelan Community Health Center (Puskesmas) show a total of 30 respondents, ranging in age from 20 to 33 years old. The largest group of respondents is 25 years of age, consisting of 4 individuals (13.3%).

1) Analisa Univariat

a. **Average Hemoglobin Levels Before and After Administration of Red Spinach Juice**

The research results regarding the distribution of average hemoglobin levels among pregnant women in their second and third trimesters who were given red spinach juice—conducted within the working area of the Senapelan Community Health Center (Puskesmas) in 2026—are outlined as follows:

Table 1. 2. Distribution of Average Hemoglobin Levels Before and After the Administration of Red Spinach Juice and Honey

Perlakuan	N	Mean	Std.Dev	Min	Max
Sebelum diberikan jus bayam merah & madu	30	9.973	0.5078	9	10.8
Sesudah diberikan jus bayam merah	30	11.460	0.3035	11	12

Based on Table 1.2, it can be concluded that among 30 pregnant women in their second and third trimesters within the working area of the Senapelan Community Health Center (Puskesmas) in 2026, the mean hemoglobin level prior to the administration of red spinach juice was 9.973 g/dL, with a minimum value of 9 g/dL and a maximum value of 10.8 g/dL. Furthermore, it was found that among the same 30 pregnant women in their second and third trimesters in the Senapelan Community Health Center working area, the mean hemoglobin level following an

intervention consisting of red spinach juice and honey was 11.460 g/dL, with a minimum value of 11 g/dL and a maximum value of 12 g/dL.

2) Analisa Bivariat

The Effect of Red Spinach Juice Consumption on Increasing Hemoglobin Levels

The study results indicate an effect of consuming red spinach juice and honey on hemoglobin levels in pregnant women in their second and third trimesters at the Senapelan Community Health Center (Puskesmas) in 2026 :

Tabel 2.1 Analysis of the Effects Before and After the Administration of Red Spinach Juice and Honey

Perlakuan	N	Mean	Std. Dev	Sig
Sebelum	30	9.973	0, 2403	0.000
Sesudah		11.460	0, 2825	

Based on Table 4.4, it can be concluded that the mean hemoglobin level before the administration of red spinach juice and honey was 9.973 g/dL, while the mean hemoglobin level after the administration of red spinach juice and honey was 11.460 g/dL. Statistical analysis using a T-test yielded a p-value of 0.000 ($p < 0.05$), indicating that the administration of red spinach juice and honey has an effect on the hemoglobin levels of pregnant women in their second and third trimesters at the Senapelan Community Health Center (Puskesmas).

4. DISCUSSION

a) Analisa Bivariat

1) The Effect of Red Spinach Juice and Honey on Increasing Hemoglobin Levels

Based on Table 4.4, the mean hemoglobin level of pregnant women before the intervention—consisting of the administration of red spinach juice and honey—was 9.973 g/dL, which increased to 11.460 g/dL following the intervention. Statistical analysis using a Paired T-test yielded a p-value of 0.000 ($p < 0.05$), indicating a significant effect of the red spinach juice and honey intervention on increasing hemoglobin levels among pregnant women in the second and third trimesters within the working area of the Senapelan Community Health Center (Puskesmas) in 2026.

These findings are consistent with research conducted by Hayati, Sari, and Nasution (2025) at the Sumiariani Midwife Clinic. That study demonstrated an increase in hemoglobin levels among pregnant women following the administration of a combination of red spinach juice and honey. Prior to consuming the mixture, the mean hemoglobin level was 9.63 mg/dL, which rose to 11.19 mg/dL after the intervention. An average increase of approximately 1.563 mg/dL was observed, suggesting that this juice is effective in raising hemoglobin levels in pregnant women suffering from anemia. The statistical analysis resulted in a p-value of 0.000, confirming that the combination of red spinach juice and honey has a significant effect on increasing hemoglobin levels in pregnant women with anemia [11].

The results of this study are consistent with the research conducted by Intiyaswati and Primihastuti (2026) in the Darmo sub-district, Surabaya. The study showed that the mean hemoglobin level among pregnant women was 9.99 g/dL before consuming red spinach juice and honey, and 10.44 g/dL after the intervention. The mean difference between the measurements taken before and after the intervention was -0.45, indicating that the consumption of red spinach juice and honey has an effect on increasing hemoglobin levels. Both red spinach

and honey are considered to have a relatively high iron content. Their efficacy is further supported by their abundance of iron, folic acid, and vitamin C, which assist in the formation of red blood cells, the prevention of anemia, and the elevation of hemoglobin levels [12].

These findings also align with the study by Mizawati and Maigoda (2023), which indicated that the intervention variables (red spinach juice combined with iron tablets, or iron tablets alone) and parity had a similar effect on the hemoglobin levels of pregnant women at a private midwifery clinic (PMB) in Bengkulu City [13].

Based on the research conducted, it is concluded that the administration of red spinach juice combined with honey has a significant effect on increasing hemoglobin levels in pregnant women during the second and third trimesters. This increase is likely due to the iron (Fe) content in red spinach, which serves as a primary component for hemoglobin synthesis, while the vitamin C present in both red spinach and honey enhances iron absorption in the body. Furthermore, vitamin B12 and folic acid contribute to the formation of new red blood cells, thereby accelerating the rise in hemoglobin levels. Consequently, red spinach juice and honey can serve as a non-pharmacological, complementary therapy alongside iron tablet supplementation for the prevention and management of anemia in pregnant women.

5. CONCLUSIONS

The Mean Hemoglobin Level Among Pregnant Women In Their Second And Third Trimesters Prior To The Intervention—Consisting Of Red Spinach Juice And Honey—Was 9.973 G/Dl. Following The Intervention, The Mean Hemoglobin Level For This Group Was 11.460 G/Dl. There Is A Significant Effect Of Administering Red Spinach Juice And Honey On The Increase In Hemoglobin Levels Among Pregnant Women In Their Second And Third Trimesters Within The Working Area Of The Senapelan Community Health Center (Puskesmas) In 2026, With The Paired T-Test Yielding A P-Value Of 0.000 ($P < 0.05$).

ACKNOWLEDGEMENTS

Thank you to Puskesmas Senapelan and Universitas Hang Tuah Pekanbaru.

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