



## The effect of beet juice (*beta vulgaris*) to increase hemoglobin levels in pregnant women at The Kuala Tadu Health Center Tadu Raya Sub-District, Nagan Raya District

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### ABSTRACT

Anemia is a condition where the body experiences a lack of hemoglobin levels in the blood which will cause reduced oxygen flow to the organs of the body. To find out if drinking beet juice helps pregnant women have more hemoglobin. In this study, we used an experimental design involving testing one group of subjects before and after the intervention. A total of 32 pregnant women were sampled using total sampling technique. They were given 200 grams of beetroot juice in 250 ml/day for 7 days. Shows The statistical tests, using a paired sample t-test, showed a P value of 0.000, which is less than 0.05. This means there was a noticeable difference in hemoglobin levels before and after the treatment. These results suggest that giving beet juice greatly helps increase hemoglobin levels in pregnant women with mild to moderate anemia. It can be concluded that the administration of beet juice can be made a reference as an intervention for pregnant women who experience problems with anemia or lack of hemoglobin levels in the blood from mild to moderate categories. The researcher hopes that the health center can increase its role in supporting pregnant women in treatment and how to prevent or handle the occurrence of anemia during pregnancy by increasing the mother's knowledge related to the handling and prevention of anemia by utilizing plants and other alternatives that are cheap and easy to obtain.

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## 1. Introduction

Anemia happens when the body doesn't have enough hemoglobin in the blood this can cause less oxygen to reach the body's organs. Currently, anemia is a widespread health problem in both developing and developed countries associated with an increased risk of morbidity and mortality, especially in pregnant women. Anemia refers to the number and size of red blood cells (erythrocytes) or hemoglobin concentration below normal limits. It can therefore impair the blood's ability to carry oxygen throughout the body. Pregnant women are said to be anemic when the hemoglobin level in the blood is below 11 gr/dl (Syari et al., 2023).

Based on data collected from (world health organization (WHO), 2023) There is a link between anemia and maternal mortality in developing countries, About 40% of people have it, and it is often caused

by not having enough iron or by bleeding a lot Anemia is common in developed countries in pregnant women reaches 13%. It is estimated that About 32 million pregnant women around the world have anemia, and another 496 million women who are not pregnant also have anemia. Anemia is classified into three levels based on how serious it is: mild (10.0-10.9 gr/dl), moderate (7.0-9.9 gr/dl), and severe (<7.0 gr/dl).

In Indonesia, pregnant women who suffer from anemia are still quite high as much as 48.9%, this condition shows that there is a severe health problem detected with a prevalence rate of more than 40%. The incidence of anemia not only affects This affects both the mother and the baby she will have. Newborn babies might not have enough iron stored in their bodies, or they might have none at all. This can cause the baby to develop anemia. (kementrian kesehatan RI, 2022). Based on (Riskesdas, 2018), The number of anemia patients in Indonesia has increased since 2013 with a Anemia affected 37.1% to 48.9% of people In 2018, the average age of people with anemia was 15 to 24 years, then 25 to 34 years. There are many reasons why more pregnant women are getting anemia. One reason is that pregnant women need more iron because their bodies and metabolism change. Other reasons include not getting enough iron, folic acid, and vitamin B12; problems absorbing nutrients; infections like malaria and worms; having many pregnancies; and genetic conditions like thalassemia and sickle cell disease. Social, economic, and cultural factors, as well as the mother's education, can also play a role.

In Aceh Province in 2018, 34.23% of anemia cases were recorded, with 12,500 pregnant women with anemia per year. While in 2022 the prevalence of anemia was 12.84%, Anemia was most common in the 15-19 year age group, affecting 36.93 percent of people in that group. With the lowest incidence of anemia in Banda Aceh City at 11% and the highest incidence of anemia in Aceh Besar district at 24.09% (Nichols et al., 2022). According to data from the (Dinas Kesehatan Nagan Raya, 2024) Health Office, there were 2289 pregnant women who were tested for hemoglobin was 2116 people (77.4%) and those who experienced anemia were (11%) mild anemia and 9% of pregnant women experienced severe anemia. Whereas in 2024, data input from January to July shows that more pregnant women are becoming anemic. This means more pregnant women have mild anemia 16% and severe anemia is 5% with a target of 3251 pregnant women.

The main causes of anemia are iron deficiency and folic acid deficiency. Estimates that the incidence of anemia in families with moderate and low economic status reaches 42%. If left untreated, anemia can inhibit the growth of cells in the body and brain, resulting in hypoxia (lack of oxygen) both to the body and to the brain. For pregnant women, anemia can lead to postpartum hemorrhage due to uterine atony (poor uterine contraction) (Octavia & Ramie, 2022).

Anemia is when the amount of hemoglobin (Hb) in the body is lower than what is considered normal for certain groups of people. Anemia in pregnant women is bad for both the mother and the baby. It can also cause problems during childbirth, such as a long labor, bleeding, and shock from contractions. The baby can also be affected lead to premature where the baby is born with low body weight or the onset of disability and even infant death (SaThierbach et al., 2023).

Non-pharmacological management and You can prevent anemia by regularly eating a healthy diet. fruit that can help provide an increase in hemoglobin levels commonly known as beets, Beets are a type of fruit that has a lot of folic acid, about 108 mg, which is more than other fruits have (Suesti, 2024). The root part of beets contains copper, which is great for helping a baby's brain develop and for preventing anemia. Beetroot has many things in it, such as 27.0 mg of calcium, 43.0 mg of phosphorus, 43 mg of vitamin C, 23 mg of magnesium, 9.6 carbohydrates, and 1.0 mg of iron (Khairiah & Butar-Butar, 2023).

Management of anemia in pregnant women usually involves iron supplementation and increased intake of iron-rich foods. Efforts to prevent and treat anemia are basically with pharmacological therapy, That is, give pregnant women tablets It has 60 mg of iron and 50 nanograms of folic acid. Taking Fe tablets at least 1-90 tablets is a must for pregnant women, but it is unfortunate that taking Fe tablets is often ignored by pregnant women for various reasons such as fear of nausea vomiting and dislike of Fe tablets (Nursela et al., 2021).

Several studies have examined the effects of beetroot consumption on hemoglobin levels. Research suggests that regular consumption of beetroot can help increase hemoglobin levels and

improve anemia status in susceptible populations. A paired t-test was used in the study. The t value that was found was 23.939, and the p-value was 0.000, which is smaller than  $\alpha$  (0.05). Because of this, we can say that the hemoglobin levels in pregnant women with anemia changed in a way that was easy to see. This change was seen after they were given beet juice, lemon juice, and extra Fe tablets to help their hemoglobin levels go up (Mesi Setiana & Lailaturohmah, 2022)

According to (Fadillah et al., 2023), This study used a method where people were tested before and after, and there was also a control group. The people in the study were 129 pregnant women who were in the last three months of their pregnancy. Before the women in the experimental group drank beet juice, Their hemoglobin level was 9.160 on average. After they drank beet juice, their hemoglobin level went up to 10.807. In the control group, the average hemoglobin level started at 8.933 and ended at 9.813 after the intervention. Bivariate analysis showed a p-value of 0.000, which is lower than 0.05.

Based on observations made by researchers, there are 5-10 marriages that occur every month in kuala tadu village. Then, we looked at the results from a first study of 10 pregnant women in the area where the Puskesmas kuala tadu, kuala tadu District showed that 7 out of 10 pregnant women experienced mild anemia and did not overcome it by taking Fe tablets. From the phenomenon of the problem that occurred, the researcher conducted a study on The Effect of Giving Beet Fruit Juice (*Beta Vulgaris*) on Increasing Hemoglobin Levels in Pregnant Women at the Kuala Tadu Health Center, Tadu Raya District, Nagan Raya Regency.

Therefore, the researcher wanted to conduct a study with the aim of determining whether there was an increase in hemoglobin levels when pregnant women consumed beetroot (*Beta Vulgaris*) at the Kuala Tadu Community Health Center in Tadu Raya District, Nagan Raya Regency, with a total of 35 pregnant women. Given the observed phenomenon, the researchers conducted a study on the effect of beetroot juice (*Beta Vulgaris*) consumption on hemoglobin levels in pregnant women at the Kuala Tadu Health Center in Tadu Raya Subdistrict, Nagan Raya District.

## 2. Methods

This study took place from January 30, 2025 to February 05, 2025 at the Kuala Tadu Health Center in the Tadu Raya District, Nagan Raya Regency. This study is a type of research that is like an experiment, using a single group that is tested before and after. This study shows how giving pregnant women Beet Fruit Juice (*Beta Vulgaris*) changes their hemoglobin levels at the Kuala Tadu Health Center, Tadu Raya District, Nagan Raya Regency, using a single group of women. the subject group was observed before the action was taken, then observed again after the intervention was given. We test cause and effect by looking at the differences between the pre-test and post-test results. This study included 32 people. The sampling method used is Total Sampling, which means the sample size is the same as the size of the whole group (Sugiyono, 2019). Respondents will be given a pretest to measure hemoglobin levels at the posyandu before treatment using a hemoglobinometer, then given treatment in the form of giving beet juice by SOP and taken 2x1 a day in the morning and evening and given a posttest to measure hemoglobin levels again after treatment.

## 3. Results and Analysis

### 3.1. Univariate analysis

#### 1. Respondent Characteristics

**Table 1**  
Frequency Distribution of Respondent Characteristics of Kuala Tadu Health Center in 2024 (n = 32)

Respondent Characteristics		
Age	F	%
19-25 year	13	40,6
26-32 year	13	40,6
33-39 year	6	18,8
Education		
SD	1	3,1

SMP	7	21,9
SMA	18	56,3
Perguruan Tinggi	6	18,8
Jobs		
Work	9	28,1
Not Working	23	71,9
Trimester of Pregnancy		
Trimester 1	12	37,5
Trimester 2	14	43,8
Trimester 3	6	18,8
Total	32	100

Source: Primary Data (Processed, 2024)

Table 4.1 In summary, most of the people who answered were between 19-25 years old and 26-32 years old, with 13 people in each group (40.6%). Most of them, 18 people (56.3%), had finished high school. Also, most of them, 23 people (71.9%), were not employed. Looking at the stage of pregnancy, most of the people who answered were in their second trimester, with 14 people (43.8%) in this group.

**Table 2.**

Distribution of Pre Test and Post Test Hemoglobin Levels Giving Beet Fruit Juice (*Beta Vulgaris*) to Pregnant Women in Kuala Tadu Community Health Center, Tadu Raya District, Nagan Raya Regency (n = 32)

Hemoglobin level	Min	Max	Mean	SD
Pre test	8.2	10.9	9.9	.6765
Post-test	10.9	14.4	12.1	.8368

Source: Primary Data (Processed, 2024)

Table 4.2 A simple analysis showed that hemoglobin levels in pregnant women changed after they drank beet juice (*beta vulgaris*). Before they drank the juice (pretest), their hemoglobin levels were about 9.909 g/dL. After drinking the juice (posttest), their hemoglobin levels went up to about 12.097 g/dL.

### 3.2. Bivariat analysis

**Table 4.5**

The Effect of Giving Beet Fruit Juice (*Beta Vulgaris*) on Increasing Hemoglobin Levels in Pregnant Women in Kuala Tadu Community Health Center, Tadu Raya District, Nagan Raya Regency (n=32)

Pengetahuan dan Sikap	N	Mean	Std Deviation	Min	Max	Peningkatan rerata	Asym. Sig (2-tailed)
Pre	32	9,9	6,7	8,2	10,9	2,216	0,000
Post	32	12,0	8,3	10,9	14,4		

Source: Primary Data (Processed, 2024)

According to the table, the average HB level of the pregnant women was 9.9 g/dl before the treatment. The statistical test (paired samples test) results showed a significance value of p-value 0.000, which is less than 0.05. This means that giving beet juice had a significant effect on increasing hemoglobin levels in pregnant women at the Kuala Tadu Health Center, Tadu Raya District, Nagan Raya Regency.

### 3.3. Analysis

This study found that giving beet juice (*beta vulgaris*) raised blood hemoglobin levels by 2.216 g/dL in pregnant women with anemia at the Kuala Tadu Health Center. A statistical test (paired samples test) showed a p-value of 0.000, which is less than 0.05 (p-value 0.000 < 0.05). This means that beet juice made a big difference in the hemoglobin levels of pregnant women at the Kuala Tadu Health Center.

Anemia is a condition where there is a lack of red blood cell supply and The amount of hemoglobin and the number of red blood cells in the body goes down. Anemia in pregnant women is known as “potential danger to mother and child”. Because of this, anemia needs to be taken very seriously by everyone involved in healthcare going forward (Hernida et al., 2023).

Pregnant women often get anemia because the amount of fluid in their blood increases more quickly than the number of red blood cells, causing physiological hemodilution. In addition, other factors such as insufficient iron intake, low frequency of consumption of nutritious foods and non-optimal adherence to iron supplements are also the main causes of decreased hemoglobin levels in pregnant women.

Hemoglobin is a protein that contains the iron compound heme. Hemoglobin has the ability to bind to oxygen and carbon dioxide. In doing its job to transport oxygen throughout the body, hemoglobin in the human circulatory system binds to oxygen through a special chemical bond. Iron is found in many food sources including beetroot (Syari et al., 2023). Beetroot is known to have a high iron content, This is important for hematopoiesis, which is the process of making red blood cells. Also, beetroot has folic acid, which helps with DNA synthesis and cell division, including the production of new erythrocytes. The vitamin C content in it also helps increase the absorption of non-heme iron from the digestive tract, so that the effectiveness of iron absorption becomes more optimal (Nursela et al., 2021).

Several studies have examined the effects of beetroot consumption on hemoglobin levels. Research suggests that regular consumption of beetroot can help increase hemoglobin levels and improve anemia status in susceptible populations. The study used a paired t-test. The t value was calculated to be 23.939, and the p-value was 0.000, which is less than  $\alpha$  (0.05). Therefore, We can say that the hemoglobin levels of pregnant women with anemia changed in a way that we could see. This happened after they drank beet juice and lemon juice and took more Fe tablets to help their hemoglobin levels go up (Mesi Setiana & Lailaturohmah, 2022).

According to (Fadillah et al., 2023), This study used a method where people were tested before and after, and there was also a control group. The people in the study were 129 pregnant women who were in their last three months of pregnancy. Before the women in the experimental group drank beet juice, their hemoglobin level was 9.160 on average. After they drank beet juice, their hemoglobin level went up to 10.807. In the control group, the average hemoglobin level was 8.933 before anything was done, and 9.813 after. The bivariate analysis showed a p-value of 0.000, which is lower than 0.05.

Based on assumptions from field observations, it can be concluded that most anemic pregnant women did not know about the benefits of beet juice as a natural source to increase hemoglobin levels. They only learned about this benefit after participating in the study, indicating that education about nutrition during pregnancy is still lacking. In addition, it was assumed that the respondents consumed beetroot juice at the prescribed dose and time, and did not take iron supplements or other therapies that could affect hemoglobin levels during the study. This study also assumes that the respondents' health condition is stable and the hemoglobin measurement tool used is accurate, so that the data obtained is valid.

This study's findings could be very helpful in preventing and treating anemia in pregnant women. Beetroot juice can be used as an effective, safe, and affordable alternative non-pharmacological intervention to increase hemoglobin levels. This is a distinct advantage compared to iron supplements that often cause side effects such as nausea, constipation, and metallic taste in the mouth. Overall, his study shows that regularly drinking beetroot juice might be a good way to raise hemoglobin levels in pregnant women, support maternal health and fetal development, and reduce the risk of pregnancy complications associated with anemia.

This study has several limitations that need to be addressed to provide a more comprehensive understanding of the results obtained. One of the main limitations is the small

sample size, which may limit the generalizability of the study results to a wider population. Additionally, there is a possibility of external factors that cannot be fully controlled during the intervention process, such as differences in daily nutrient intake, respondents' adherence to consuming beetroot juice, and other unidentified medical conditions that may potentially influence hemoglobin levels.

In addition, this study also has important practical implications, particularly in maternal health care. The use of beetroot juice as an alternative intervention could serve as a natural, affordable, and easily implementable solution in efforts to address anemia among pregnant women. Therefore, it is important to include a discussion on the potential application of the findings of this study within the context of public health programs, as well as to serve as a foundation for further research involving larger samples and stronger designs.

#### 4. Conclusion

The pretest results showed that the hemoglobin (Hb) levels of pregnant women were in the mild anemia category as many as 15 respondents (46.9%) and moderate anemia as many as 17 respondents (53.1%). After the intervention in the form of giving beet juice, all respondents experienced a significant increase in Hb levels, so that they fell into the category of not having anemia. The Paired Sample t-Test results showed a p-value of 0.000 ( $p < 0.05$ ). This means that Hb levels were significantly different before and after the treatment. These results suggest that beet juice is very effective at increasing hemoglobin levels in pregnant women who have mild to moderate anemia. Based on the results of research on the effect of beetroot juice on increasing hemoglobin levels in pregnant women, it is recommended that beetroot juice be used as a complementary intervention in maternal health programs, particularly in the prevention and treatment of anemia. This implementation can be carried out through: integration into the Pregnant Women's Nutrition Education Program: Beetroot juice can be introduced in regular classes for pregnant women held at community health centers or integrated health service posts. Education can include the nutritional benefits of beetroot, how to prepare it, and recommended safe daily consumption. Engagement of Health Cadres and Nutrition Personnel: The involvement of Posyandu cadres and nutrition personnel at healthcare facilities is essential in promoting beetroot juice consumption, whether through direct education or via printed and digital media.

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