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The effect of red guava juice provision on hemoglobin levels in anemic pregnant women

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ABSTRACT

During pregnancy, women must maintain nutritional intake to avoid anemia. Anemia occurs due to lack of iron, folic acid, and vitamin B12. To increase hemoglobin levels in the body, non-pharmacological therapy can be done by consuming red guava juice. This study aimed to determine the difference in hemoglobin levels before and after giving red guava to pregnant women with anemia. This study uses a pre-experimental method with a one group pretest posttest design. The population in this study was all pregnant women in second trimester with the incidence of anemia at Dina Maternity Home Medan. The sample in this study was 10 pregnant women with mild anemia taken by purposive sampling technique. Analysis of univariate and bivariate data was done by using paired sample T-test. The results showed that the hemoglobin level before administration of red guava juice had a mean value of 10.01 g/dl, while the hemoglobin level after administration of red guava juice had a mean value of 11.68 g/dl, with a mean difference of -1.670 and p-value 0.000. The conclusion of this study showed that there was a difference in the effect of giving red guava juice on hemoglobin levels in anemic pregnant women.

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1. Introduction

In women who are pregnant must maintain nutritional intake in themselves so that amenia does not occur during pregnancy, one of the causes of anemia in pregnant women is insufficient nutritional intake for blood formation, pregnant women need nutrients to meet the needs of the body in themselves and their fetus. Iron is one of the important components in hemoglobin, hemoglobin functions to carry oxygen in red blood cells from the lungs to all body tissues (Mardalena, 2017).

Anemia will occur when there is a lack of substances necessary for the formation of red blood cells (erythrocytes). For example, iron, folic acid and vitamin B12. When pregnant, the volume of blood in the body increases. In addition to meeting the needs of the body of pregnant women, iron is also needed by the fetus. The increase in blood volume during pregnancy causes the amount of iron the mother needs to produce red blood cells to gradually increase. Blood is channeled from mother to fetus through the placenta, which acts as an intermediary will carry nutrients and oxygen needed by the fetus (Roosleyn, 2016).

Pregnant women who experience anemia can cause fetal death in the womb, abortion, birth defects, low birthweight, and anemia in newborns, this causes higher maternal mortality and mortality

and perinatal death. Pregnant women with more severe anemia can cause the risk of the possibility of giving birth to low weight babies and prematurity is also greater (Nurrizka, 2019).

Pregnant women, who need more iron, are at risk of developing anemia if they do not have enough iron. Pregnant women generally experience iron deficiency so they only provide a small amount of iron to the fetus. This will then become anemia when the mother's hemoglobin level falls below 11 grams per deciliter during the third trimester of pregnancy. Iron deficiency is a condition when there are no iron stores that can be used and there are signs of disruption of the iron supply to the tissues. However, according to Abbaspour et al., some functional changes may occur in the absence of anemia, but most functional deficits appear to occur as anemia develops. In fact, they say, mild and moderate forms of iron deficiency anemia may be associated with functional disorders that affect cognitive development, immune mechanisms, and work capacity. Abbaspour et al. It is also stated that iron deficiency during pregnancy is associated with various adverse effects for the mother and baby, including an increased risk of sepsis (blood poisoning), maternal death, perinatal death, and low birth weight. Iron deficiency and anemia also reduce learning ability and are associated with increased morbidity rates. Oranges can be used as snacks during pregnancy.

This orange fruit is rich in vitamin C, folic acid and fiber. Vitamin C can help absorb iron and prevent cell damage. Meanwhile, folic acid can help prevent neural tube defects that cause conditions such as spina bifida. Almost 90 percent of citrus fruit contains water so it can help meet fluid needs and keep the body hydrated. Orange fruit can be recommended to pregnant women In increasing hemoglobin levels (Proverawati, 2018).

The researchers concluded that giving red guava juice with fe tablets was more effective given to anemic pregnant women because red guava, apart from its cheap price, red guava also contains high levels of vitamin C and iron, can be obtained easily, tastes good, contains lots of nutrients, and can be consumed directly from the fruit or can also be juiced without adding sugar or other ingredients because the taste is sweet and delicious to consume (Jayanti et al., 2018).

Anemia can also cause disorders during labor, such as his, impaired straining strength, the first time that lasts a long time, the second time that is long so that it can tire the mother and often results in surgery, the third time followed by placental retention and postpartum hemorrhage due to uterine atony, or secondary post partum hemorrhage and uterine atony at the fourth time (Pratami, 2019).

Anemia in pregnancy cannot be separated from physiological changes that occur during the process of pregnancy, fetal age, and the condition of previous pregnant women. At the time of pregnancy, the body will experience significant changes, the amount of blood in the body increases by about 20-30%, thus requiring an increased need for iron and vitamin supplies to make hemoglobin (Hb). When pregnant, the mother's body will make more blood to share with her baby. The body needs up to 30% more blood than before pregnancy. Some factors that can cause pregnancy anemia include gravid, age, parity, education level, economic status and adherence to Fe tablet consumption (Astriana, 2017).

Very important strategies and periodic solutions to overcome the problem of anemia in pregnant women, including the provision of iron vitamins starting with the administration of 1 tablet a day as soon as possible after the nausea disappears. Each tablet contains Fe So4 320 mg (iron 60 mg) and folic acid 500 mg, at least 90 tablets each. Iron tablets should not be taken with tea or coffee because it will interfere with absorption (Suryani, 2019).

The prevalence of anemia in pregnant women in Indonesia is 37.1%, the highest in rural areas, namely 37.8%, and the lowest in urban areas, 36.4%. Mothers with anemia in the second trimester are at greater risk of LBW babies than mothers who are not anemic (Harna et al., 2020). However, in other studies, the risk of LBW babies was lower in mothers who were anemic in the third trimester compared to those who were not anemic. Besides, it's a baby girl Those born to anemic mothers have a birth defect that is greater than mothers who are not anemic. IUGR is a condition where the fetus does not develop properly caused by genetic or environmental factors. The common cause of IUGR is chronic malfunction of the placenta which disrupts the supply of oxygen and nutrients to the fetus, causing abnormal fetal development. Fetal death is a condition where the fetus dies spontaneously in the womb. Mothers with anemia have a risk to the baby Stillbirths are higher than mothers who are not

anemic. This risk also increases if the mother has poor nutritional status (BMI <18 kg/m2). In addition, mothers with anemia weight has a higher chance of stillbirth than mothers who suffer from moderate anemia or those who are not anemic. If it is related to gestational age, The fetus is more susceptible to death in mothers who experience anemia in the 2nd and 3rd trimester (Nurrahman et al., 2020).

According to the WHO (World Health Organization) in 2018, defines pregnancy anemia as hemoglobin levels of less than 11 grams or less than 33% at any time in pregnancy considering normal hemodilution occurs in pregnancy where hemoglobin levels are less than 11 grams in the first trimester. According to WHO, globally the prevalence of anemia in pregnant women worldwide is 41.8%, according to WHO, 40% of maternal deaths in developing countries related to anemia in pregnancy are caused by iron deficiency and acute bleeding (Proverawati, 2018).

According to the Indonesian Ministry of Health (2018), as many as 48.9% of pregnant women in Indonesia experience anemia. The percentage of pregnant women who experience anemia in Indonesia increased compared to the 2013 Riskerdas data of 37.1% (Kemenkes, 2018). Maternal mortality in Indonesia is generally caused by several factors. First, direct obstetric causes include bleeding 28%, preeclampsi / eclampsy 24%, infection 11%, while indirect causes of nutritional problems include anemia in pregnant women 40%. Chronic energy deficiency 37%, and pregnant women with energy consumption below the minimum requirement 44.2%. (Ministry of Health of the Republic of Indonesia, 2018) (Alamsyah, 2020).

One substance that greatly helps the absorption of iron is Vitamin C (ascorbic acid). Ascorbic acid can be obtained from vitamin C tablets or naturally found in fruits and vegetables. Vitamin C can increase nonheme iron absorption fourfold and an amount of 200 mg will increase the absorption of medicinal iron by at least 30%. Fruits that contain ascorbic acid are not always yellow, in guava (psidium guajava) contains 2 times ascorbic acid than oranges, which is about 87 mg / 100 grams guava. In addition, every 100 grams of guava also contains 49 cal calories, 0.9 grams of protein, 0.3 grams of fat, 12.2 grams of carbohydrates, 14 mg of calcium, 28 mg of phosphorus, 1.1 mg of iron, 87.00 mg of vitamin C, 87.00 mg of vitamin A25, 0.05 mg of vitamin B1 and 86 grams of water. Vitamin C contained in guava increases the absorption of iron by the body, so that the body is expected to absorb iron optimally and increase hb levels in the body (Rimawati et al., 2018).

The results of research by Yulia Fitriani, et al (2017) entitled The effect of guava juice on hb levels in anemic pregnant women in Polindes Krebet, Bululawang District, Malang Regency. Using one group pre-test post-test design technique, the number of samples was 15 people (Fitriani et al., 2017).

Based on research by Delvi Suryani (2019) entitled "The effect of red guava juice on increasing Hb levels of pregnant women". This type of research is quasi-experimental using One Group Pretest-Posttest Design. The sample in this study amounted to 20 people. So there is an influence on Hb levels of pregnant women before and after being given red guava juice (Suryani, 2019).

Based on the results of an initial survey conducted by researchers by conducting interviews with 5 pregnant women, an examination using Easy Touch obtained the results of 3 pregnant women in the second trimester experiencing anemia with a result of 10% gr, and the mother said during pregnancy did not consume iron tablets or other blood-boosting supplements, the complaints felt by the mother were quickly tired, weak and dizzy. 2 pregnant women did not experience anemia because the Hb of the 2 pregnant women in the second and third trimesters was normal 11.8% gr. based on the results of interviews obtained the results that, pregnant women have never consumed red guava juice and do not know that consuming red guava juice can increase hemoglobin levels. Based on the background above, the author is interested in researching how the effect of giving red guava juice on hemoglobin levels in anemic pregnant women

The urgency of this research is that efforts to overcome iron deficiency anemia in pregnant women are carried out through increased coverage of iron tablet supplementation. Other efforts that can be made by paying attention to the consumption patterns of pregnant women which must still refer to a healthy and balanced diet contained in the general message of balanced nutrition (PUGS). Eating arrangements for pregnant women are not based on amount or quantity but rather on the quality or composition of the nutrients, because this factor is more effective and functional for the health of the

mother and fetus. For example, to upgrade consume foods high in iron such as milk, meat and green vegetables or Fruit. One of the fruits that can increase hemoglobin levels is fruit guava and the chemical content in guava are amino acids (tryptophan, lysine), calcium, phosphorus, iron, sulfur, vitamin A, vitamin B1, and vitamin C. Mineral content in guava fruit Can treat anemia sufferers (lack of blood red) because red guava fruit also contains mineral substances can facilitate the process of forming hemoglobin in red blood cells

2. Research Method

This research design uses a pre experimental method using a one group pretest posttest design. This research was conducted in the working area of the Dina Midwife Clinic, which was conducted from April to November 2022. The population in this study was all second trimester pregnant women (4-6 months gestational age) who checked pregnancy with the incidence of anemia in pregnant women A total of 17 second trimester pregnant women. Sampling techniques use Purposive Sampling where a certain consideration is made by the researcher himself. The number of sample members to be studied is 12 people who meet the criteria. Before and after giving red guava juice, hemoglobin (Hb) levels are checked using easy touch. The purposive technique is a technique for determining samples with certain considerations. Meanwhile, the reasons for the researchers taking a sample of 12 people This is because sampling only takes the majority of members who fall into the category of anemia in pregnant women and want to consume guava fruit juice. This is also a consideration. energy, time and funds so that we cannot take more samples. Giving red guava juice is an activity to give red guava juice to the mother, red guava juice is given for 7 days with a frequency of 1 time a day weighing 330 ml and given in the afternoon. Data analysis using univariate analysis and bivariate analysis. If the data is distributed normla using a parametric test, namely paired sample T-test to determine the difference in hemoglobin levels before and after giving red guava juice. Meanwhile, if the data is abnormally distributed using a non-parametric test, namely the Wilcoxon test. The exclusion criteria in this study were: Mothers who had a history of allergies to dragon fruit and/or guava, pregnant women in the third trimester who were uncooperative, pregnant women in the third trimester with complications that required special care so intervention could not be given. The inclusion criteria in this study were: Pregnant women with a gestational age of 28-36 weeks, Pregnant women in the third trimester with Hb levels < 11 g/dL, Pregnant women who experience hypotension, Pregnant women in the third trimester who are willing to consume guava juice regularly.

3. Results And Discussion

Result

Responden Characteristics; Based on Table 1 above it is known that from 10 respondents teh majority of respondents in age group 23-28 years namely 10 respondents (80,0%) and 2 respondents (20,0%) in teh age group 29-38 years. From table 1. above it is known that of the 10 respondents it can be seen that the majority of respondents were secundigravida as many as 7 respondents (50,0%), and minority of primigravida were as many as 1 respondents (10,0%).

Table. 1
Frequency Distribution of Respondents' Characteristics Based on Age and Gravida in Dina Midwife Clinic Medan

Responden Characteristics	f	%
Age		
23-28 tahun	8	80.0
29-38 tahun	2	20.0
Parity		
Primigravida	1	10.0
Secundigravida	7	70.0
Multigravida	2	20.0

Univariate Analysis; Based on table 2, it is known that before being given red guava juice, all respondents were in the category of mild anemia (9-10 g / dL) and after being given red guava juice it

was known that most were not anemic (>10 g / dL), namely as many as 8 respondents (80.0%), and mild anemia (9-10 g / dL) as many as 2 respondents (20.0%).

Table.2
Frequency Distribution Based on Hb of Pregnant Women Before and After Given Red Guava Juice

Hemoglobin Level	Pre-test		Post-test	
	f	%	f	%
Normal level (>10 g/dL)	0	0	8	80.0
Mild Anemia (9-10 g/dL)	10	100.0	2	20.0
Total	10	100.0	10	100.0

Bivariate Analysis, Based on table 3, it can be seen that the sig value in each variable > 0.05, it can be concluded that the data is normally distributed, so the researcher uses the paired sample t test.

Table 3.
Summary Of Data Normality Test Results

Variable	*Shapiro-Wilk*		
	Statistic	*Df*	*Sig.*
Hb levels before consumption of red guava juice	.826	10	.060
Hb levels after consumption of red guava juice	.963	10	.816

Based on table 4, it is known that the average difference in hemoglobin levels of pregnant women is -1,670 g / dl, with a 2-tailed sig value of 0.000 so that it can be concluded that the results of the test are differences in hemoglobin levels before and after giving red guava juice.

Table.4
Uji Paired Sample T-Test

Variabel	*N*	*Mean*	*Mean diference*	*Sig (2-tailed)*
Pre test	10	10.01	-1.670	.000
Post test	10	11.68		

Discussion

Hemoglobin levels before and after administration of red guava juice in anemic pregnant women

Anemia is a condition in which red blood cells decrease or decrease hemoglobin, so that the capacity of oxygen carrying for the needs of vital organs in pregnant women and fetuses becomes reduced. The low capacity of blood to carry oxygen spurs the heart to increase cardiac output. A heart that is constantly being pushed to work hard can lead to heart failure and other complications such as preeclampsia.

Anemia is more common in pregnancy, this is because in pregnancy the need for food substances increases and there are changes in the blood and bone marrow. Blood increases in pregnancy, but the increase in blood cells is less than the increase in plasma, resulting in blood thinning. Factors that affect anemia in pregnancy include consumption of Fe tablets, nutritional status of pregnant women, infectious diseases and bleeding (Dai, 2021).

Iron for pregnant women is important for the formation and maintenance of red blood cells, the adequacy of red blood cells will ensure the circulation of oxygen and metabolism of nutrients needed by pregnant women (Jayanti et al., 2018).

One of the nonpharmacological therapies that can be used to increase hemoglobin levels is red guava juice, in red guava fruit contains compounds that can increase hemoglobin levels in the blood. Guava fruit contains potassium and iron, the content of vitamin C in guava serves to maintain and improve capillary health, prevent anemia, increase hemoglobin levels, canker sores and bleeding gums. The nutritional content contained in guava includes iron, vitamin C, vitamin A, copper and phosphorus, iron and vitamin C to form a complex iron ascorbate that can dissolve and be easily absorbed by organs

in the human body. Vitamin A can help in the formation of iron to be included in hemoglobin to lift oxygen, vitamin C also helps in the absorption of iron as much as 30%. Copper helps in iron metabolism, while phosphorus helps hemoflobin in oxygen delivery to body tissues (Jayanti et al., 2018).

In accordance with the results of Dwi Estuning Rahayu's research in 2020, the effectiveness of giving red guava juice on hemoglobin levels of second trimester pregnant women with anemia at Aura Syifa Hospital Kediri. The results of the normality test showed that the data was normally distributed, while the paired t test results showed that the sig value was 0.000 (0.05) which means there was a difference in Hb levels before and after giving red guava juice (Rahayu, 2020).

The effect of guava juice on increasing hemoglobin levels is also associated with the nutritional content of guava juice itself. According to Sianturi (2012) red guava fruit contains compounds that can increase hemoglobin levels in the blood, among others, iron 1.1 mg, vitamin C 87 mg, vitamin A 25 IU, vitamin B1 0.02 mg phosphorus 28 mg (Sianturi, 2012).

Based on research conducted by Saidah et al in 2018, the effect of giving red guava juice on increasing hemoglobin levels in pregnant women at the saketi health center. Statistical test results obtained a t test value of -12.464 and a significant 2-tailed value of 0.000 0.05) which means that there is an effect of consumption of red guava juice on hemoglobin levels in anemic pregnant women at the Saketi Health Center, Pandeglang Regency, Banten Province in 2020 (Rina Agustina, Triana Indrayani, 2020). Based on the results showed that the average difference in hemoglobin levels of pregnant women was -1,670 with a standard deviation of 0.383 g / dl, statistical test results obtained sig 0.000 which means there is a difference in hemoglobin levels before and after giving red guava juice to anemic pregnant women.

A pregnant woman who has an Hb level of less than 10 gr% according to Herlina and Djamilus is said to suffer from anemia in pregnancy. Anemia in pregnancy or lack of hemoglobin levels in the blood can cause more serious complications for the mother in pregnancy, childbirth and postpartum, namely it can result in abortion, premature parturition, prolonged labor due to uterine inertia, post partum bleeding due to uterine atony, shock, intra partum infection or post partum. Severe anemia with Hb less than 4 gr% can result in decompensation cordis (Nufus et al., 2023). Meanwhile, complications can occur in the products of conception, namely embryo death, perinatal death, prematurity, congenital defects and insufficient iron reserves. This is in accordance with the opinion of Admin who states that low HB levels are mostly caused by diet. For example, there is a lack of nutrients or important substances such as iron, vitamin B12, vitamin C and folic acid as part of red blood cell production. Furthermore, the result of bleeding after surgery or for women is usually menstruation or mothers who are pregnant. The rest are caused by diseases or disorders such as intestinal inflammation, gastrisis, chronic inflammation and thalassemia. In general, those who experience low Hb levels are pregnant women whose food or nutritional needs are lacking due to nausea or vomiting (Rahmayanti et al., 2019).

The results of research (Rusdi et al., 2018) show that from the results of statistical tests it was found that there was an effect of giving Red guava juice on serum hemoglobin and ferritin levels of anemia sufferers in adolescent girls. The results of research on the blood of male white Wistar rats showed that red guava fruit juice had the effect of increasing blood hemoglobin levels based on statistical tests in each group. treatment (KP) where each KP had a significant difference in the blood hemoglobin levels of male Wistar white rats. According to other research findings, it is stated that giving red guava juice (Psidium guajavaL.) to teenage girls throughout their menstrual cycle has an impact on their blood hemoglobin (Hb) levels. In a study conducted by stated the test results statistics are used to analyze univariate and bivariate data (Rusdi et al., 2018). Before being given guava juice, the average Hb value the average for young women is 11.0500 with a standard deviation of 0.52063. After receiving guava juice, the average hemoglobin level for female adolescents was 11.6200 with a standard deviation of 0.53567. Give guava juice Seeds can increase hemoglobin levels, and work best when combined with diet balanced. Apart from that, it was explained through research conducted by (Herdiani et al., 2019) that guava juice has an impact on increasing the hemoglobin levels of pregnant women. Anemia during pregnancy can be treated from the start with suggestions for pregnant women to make guava juice as an alternative solution to increase hemoglobin levels. Based on the results of several studies related to

the effect of giving red guava juice (Psidiumguajava L) on increasing hemoglobin levels in pregnant women, teenage girls or experiments carried out on male white rats, it shows that there is an effect in increasing hemoglobin levels (Aulia, 2020). Researchers used red guava juice which is rich in vitamin C to facilitate iron absorption. Where the administration of fruit juice is quite effective, it is necessary to continue providing education regarding the benefits of red guava fruit as an alternative for preventing and managing anemia (Yanuaringsih & Nikmah, 2018).

According to the researchers' assumption of the effect of increasing hemoglobin levels in anemic pregnant women by consuming red guava juice for 7 days as much as 350 ml, in this study can be seen when researchers measure hemoglobin levels of pregnant women on day 8 after consuming red guava juice and the results pregnant women experience an increase in hemoglobin levels. Red guava fruit contains compounds that can increase the increase in hemoglobin levels in the blood such as iron, vitamin C, vitamin A, copper, phosphorus which can help the formation of iron, iron absorption, help in iron metabolism, help hemoglobin in the delivery of oxygen to body tissues and facilitate the process of forming red blood cell hemoglobin.

Giving red guava juice is an alternative that can help anemic pregnant women to increase hemoglobin levels for pregnant women who do not consume Fe tablets so that it can increase hemoglobin levels and increase likes.

4. Conclusion

Based on research conducted by researchers on the effect of giving red guava juice on hemoglobin levels of anemic pregnant women. The average difference in hemoglobin levels after being given red guava juice was -1.670, with a 2-tailed sig value of 0.000 (<0.05), so it can be concluded that the results of the test are There is an effect of giving red guava juice on hemoglobin levels in anemic pregnant women. This research is in line with Rimawati (2018) who stated that Increased consumption of blood supplement tablets with foods that can increase absorption of iron such as vitamin C proven to increase Hb levels in pregnant women. The use of additional vitamin C, can increases iron absorption 5x, and able to last longer body. This research was supported by Andaruni and Nurbaety (2018) who revealed that the average increase Hb levels of pregnant women who have been given Blood enhancing tablets combined with guava juice seeds are higher when compared with blood supplement tablets and vitamin C only. Guava fruit is known to contain lots of vitamin C and several types a mineral capable of repelling various types of illnesses and maintaining fitness body. Leaves and bark contains antibacterial substances cure several types of diseases. Apart from vitamin C, guava fruit too contains potassium and iron. Besides antioxidants, vitamin C here has maintenance and improvement functions capillary health, preventing anemia, mouth ulcers and bleeding gums. Consume guava fruit as a source. The theoretical implication is as a change communally in social practices that spread from one society to another, by influencing the process through adoption and innovation after going through the process of knowledge, interest, namely someone who begins to be interested in the stimulus, evaluation is a state of considering the pros and cons of the stimulus (decision making), implementation after trial, namely having tried a new behavior and confirmation, namely a person who has behaved in a new way in accordance with knowledge, awareness and attitude (the ability to adapt in increasing the HB of pregnant women through giving guava juice. The practical implication is that this research can be used as input as strategic steps for overcoming anemia in pregnant women in improving services and managing health problems regarding the dangers of anemia in pregnant women, providing additional knowledge and insight to various educational groups and can be used as learning material in implementation. midwifery care for pregnant women with anemia. The limitations in this research are: Limited space and time for research causes researchers to be less than optimal in carrying out research. Difficulties faced by researchers in finding or searching journal that matches the research title. Literature Study is classified as new research, so the researcher experienced a little difficulty in discussing it. There is a need for information by health workers to give guava juice to pregnant women with anemia and increase knowledge information for further researchers regarding the administration of guava juice for anemia in pregnant women. The contributions to this research are: It is hoped that the results of this

research can provide information as a basis for consideration, support and contribution of thought to decision makers in an effort to increase income and carry out business development in increasing the HB of pregnant women.

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