

## Effect of Guava Juice on Changes in Hemoglobin Levels in Third Trimester Pregnant Women Who Consume Fe Tablets

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### Abstract

*Anemia is a condition where there is a decrease in hemoglobin, hematocrit, and erythrocyte levels below normal values. In people with anemia, which is often called lack of blood, the levels of red blood cells (hemoglobin / Hb) are below normal values. The maternal mortality rate in Indonesia is currently quite high. Bleeding accounts for the highest percentage of maternal deaths, one of which is anemia. The decline in maternal mortality in Indonesia has occurred in recent years, but the decline is still considered very slow. This study aims to 1) To determine the Hb level of third-trimester pregnant women who consume Fe tablets. 2) To determine the effect of guava juice on changes in the Hb levels of pregnant women in the third trimester who consume Fe tablets. This study used a Quasi Experiment method and used a nonrandomized control group Pre-test - Post-test design approach. This research was conducted at the Air Joman Public Health Center (Puskesmas), Asahan District. The research location was chosen because Air Joman Puskesmas is a health service that provides MCH services, especially services for pregnant women. The population in this study were all third-trimester pregnant women in the working area of Air Joman Health Center, as many as 56 people. Data collection techniques in this study were interviews and direct observation to pregnant women while Hb examination data were obtained by direct measurement techniques for pregnant women. The data analysis technique used in this research is a quantitative analysis using the SPSS program. From the paired t-test, it is known that the Hb level of pregnant women produces a*

*significance value of 0.000 <0.05, it can be concluded that there is a significant difference between the Hb levels of pregnant women in the third-trimester who consume Fe tablets in the control and experiment groups (pre-test and post-test). From the independent t-test, it is known that there is a significant effect of 0.000 <0.05 between the provision of guava juice on changes in the Hb levels of pregnant women in the third trimester who took Fe tablets in the control and experiment groups (pre-test and post-test).*

**Keywords:** hemoglobin, guava juice, Fe tablets, third-trimester pregnant women

## **INTRODUCTION**

In pregnancy, anemia occurs due to changes in the increased circulation of the placenta and breast. Plasma volume increases by 45-65% in the second trimester of pregnancy, which peaks at the ninth month with an increase of 1000 ml. Anemia in pregnant women is a problem in the world because anemia in pregnant women is closely related to maternal and infant mortality and morbidity, including the risk of miscarriage, stillbirth, prematurity, and low birth weight (WHO, 2014).

According to WHO, 40% of maternal deaths in developing countries are related to anemia during pregnancy, and most of these conditions are caused by iron deficiency and acute bleeding, and sometimes even the two interact. The maternal mortality rate in Indonesia is currently quite high, according to 2012 Indonesian Demographic and Health Survey (IDHS), the maternal mortality rate related to pregnancy, childbirth, and postpartum amounting to 359 per 100,000 live births, this figure is still quite far from the target achieved (Siswanto, 2010). Bleeding occupies the highest percentage of maternal deaths, one of which is anemia (Almatsier, 2009).

According to Wirawan et al., (2015) giving Fe tablets with the addition of vitamin C can help increase hemoglobin levels in pregnant women. One of the fruits that are very rich in vitamin C is guava. The content of Vitamin C in guava is equivalent to 6 times the vitamin C content in oranges, 10 times the vitamin C content in papaya, 17 times the vitamin C content in water guava, and 30 times the Vitamin C content in bananas. (Hadieti et al., 2015).

In addition, ANC services in accordance with the policy of the antenatal care program must also comply with the 14 T standard, which includes a Hb examination. If the Hb level of a pregnant woman is below 10, the development of the fetus will be disturbed and can cause the risk of bleeding in the mother during labor later (IBI, 2016).

Based on the description above, researcher are interested in conducting research with the title **Effect of Guava Juice on Changes in Hemoglobin Levels in Third Trimester Pregnant Women Who Consume Fe Tablets at Binjai Serbangan Public Health Center, Air Joman Subdistrict, Asahan Regency in 2019.**

## RESEARCH METHODS

This study used a Quasi Experiment method and used a non-randomized control group pre-test - post-test design approach. The statistical test used to determine the difference in hemoglobin levels before and after both in the control group and the treatment group used the paired t-test and to determine the difference in the effectiveness of guava juice on the increase in hemoglobin levels using the independent t-test.

This research was conducted at Binjai Serbangan Public Health Center, Air Joman Subdistrict, Asahan Regency. The population in this study were all third-trimester pregnant women in the Air Joman Health Center, totaling 56 respondents. The sample of this study is the entire population, which is divided into two groups (control and treatment group).

## RESEARCH RESULT

### Frequency Distribution between Control and Experimental Groups

**Table 1. Frequency distribution**

Control Group	n	Min	Max	Mean	SD	Difference	Difference between Control and Experimental Group	
Pre-test	28	9.0	12.0	10.607	0.8317			
Post-test	28	10.5	13.5	11.732	0.7635	1.125		
Experiment Group	n	Min	Max	Mean	SD	Difference	1.571	
Pre-test	28	9.0	12.0	11.000	0.7201			
Post-test	28	13.0	15.0	13.696	0.6137			2.696

### Normality Test Between Control and Experimental Groups for Pre-test and Post-test Data

**Table 2. Normality test**

		Pre-test Control	Post-test Control	Pre-test Eksperiment	Post-test Eksperiment
N		28	28	28	28
Normal	Mean	10.607	11.732	11.000	13.696
Parameters <sup>a,b</sup>	Std. Deviation	0.8317	0.7635	0.7201	0.6137
Significance		0.314	0.133	0.153	0.247

### Homogeneity Test of Control and Experimental Groups for Pre-test and Post-test Data

**Table 3. Homogeneity test**

Pre-test				Post-test			
Levene Statistic	df1	df2	Significance	Levene Statistic	df1	df2	Significance
1.885	1	54	0.175	0.771	1	54	0.384

### Paired T-Test to Find Out the Hb Levels of Third-Trimester Pregnant Women Consuming Fe Tablets

**Table 4. Paired t-test**

Hb levels for pregnant women	Mean	SD	Significance	95% Confidence Interval of the Difference	
				Lower	Upper
	-1.9107	1.0750	0.000	-2.1986	-1.6228

### Independent T-Test to determine the effect of guava juice on changes in hemoglobin levels in third-trimester pregnant women who consume Fe tablets

**Table 5. Independent t-test**

Effect of Guava Juice on Hb Levels of Pregnant Women	Mean Difference	Std. Error Difference	Significance	95% Confidence Interval Of The Difference	
				Lower	Upper
	-1.91071	0.19303	0.000	-2.29326	-1.52817

## **Hb Levels of Third-Trimester Pregnant Women Who Consume Fe Tablets**

Efforts to overcome Fe nutrition anemia in pregnant women are carried out by increasing the coverage of iron tablet supplements. Other efforts that can be made by paying attention to the consumption pattern of pregnant women, which continue to refer to PUSG. Diet regulation in pregnant women is not on the amount but on the composition of nutrients, because this factor is effective and functional for the health of the mother and her fetus. For example, for the consumption of high-iron foods such as milk, meat, and green vegetables or fruit (Fanny et al., 2012).

This study resulted in a significance value of  $0.000 < 0.05$ , it can be concluded that there was a significant difference between the Hb levels of pregnant women in the third trimester who took Fe tablets in the control and intervention groups (pretest and posttest). And it can also be concluded that pregnant women who consume Fe tablets can increase hemoglobin levels in third-trimester pregnant women with an average value of -1.9107 and the difference between -2.1986 to -1.6228. Researchers argue that the lack of adequate nutritional intake and diet so as to reduces nutrient deficits in pregnant women, therefore it is necessary to increase Hb levels by eating high iron such as milk, meat, vegetables, and fruit. This is in accordance with Proverawati's opinion supported by Asfuah (2009) and Linder (2007) in Ningtyastuti and Suryani (2013) which states that the hemoglobin level of pregnant women is said to be normal if  $Hb > 11\%$  and hemoglobin is formed in erythroblasts and then continued a little in the stage normality.

Consumption of foods high in iron is very good for the body because they contain nutrients needed by the body and vice versa, inhibitors of iron absorption (inhibitors), namely tannins, oxalate phytates, and polyphenols are found in foods such as nuts, bananas, spinach, chocolate, coffee and tea (Fitri et al., 2016). In addition, it is also known that phosphate and calcium minerals are substances that can reduce iron bioavailability (Dini and Pandu, 2016). According to WHO, there needs to be an intervention to increase the source of iron with high bioavailability in the diet of women of reproductive age. In addition, there is a need for food diversification, iron supplementation, and universal money fortification to prevent iron deficiency (Fitri et al, 2016).

### **Effect of Guava Juice on Changes in Hb Levels of Third-Trimester Pregnant Women Who Consume Fe Tablets**

Differences in hemoglobin levels in pregnant women who consume guava juice get a significant value of  $0.000 < 0.05$  between giving guava juice to changes in hemoglobin levels for pregnant women who consume Fe tablets in the control and intervention groups (pre-test and post-test). Furthermore, from the table above it can be seen that the difference value is  $-1.91071$  between the control and intervention groups (pre-test and post-test) and the difference between these differences is  $-2.29326$  to  $-1.52817$ . Researchers assume that guava juice is a fruit that increases Hb levels because in red guava fruit contains minerals that can accelerate the process of forming red blood cells. This research is in line with research conducted by Yunsaini (2014) which states that there is an effect of consumption of red guava (*Psidium guajava*) on changes in the increase in blood Hb levels of anemic pregnant women. This study is also in line with research on the effectiveness of guava juice on changes in Hb levels in pregnant women in the third trimester in the Bacem Public Health Center, Blitar Regency, which shows that there are differences in Hb levels with a significant value of  $0.000 < 0.05$  (Prasetyanti and Putri, 2015).

This research is in line with the opinion of Fathimah et al., 2011 in Ningtyastuti and Suryani (2013) which states that consumption of guava fruit as a source of vitamin C can help increase iron absorption, on the other hand, low consumption of guava fruit can have implications for the hemoglobin level of pregnant women. The high vitamin C content in guava can be used by pregnant women for the formation of red blood cells, because according to the Department of Nutrition and Public Health (2011) during pregnancy the concentration of vitamin C in the blood drops as a result of hemodilution of red blood cells.

Guava fruit contains compounds that can increase hemoglobin levels in the blood, including iron, vitamin C, vitamin A, copper, and phosphorus. Iron is a mineral that is needed to carry oxygen throughout the body. Lack of iron in the body can make a person experience a decreased immune system and often feel lethargic. This is also one of the causes of anemia (Sianturi, 2012).

## CONCLUSION

From the paired t-test, it is known that the Hb level of pregnant women produces a significance value of  $0.000 < 0.05$ , it can be concluded that there is a significant difference between the Hb levels of pregnant women in the third-trimester who consume Fe tablets in the control and experiment groups (pre-test and post-test).

From the independent t-test, it is known that there is a significant effect of  $0.000 < 0.05$  between the provision of guava juice on changes in the Hb levels of pregnant women in the third trimester who took Fe tablets in the control and experiment groups (pre-test and post-test).

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