



Effect Of Guava Juice On Hb Levels In Pregnant Women With Anemia

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Abstract. Anemia in pregnant women is a world problem. Various efforts are made to increase the Hb levels of pregnant women with anemia. One of the fruits that contain enhancers is the red guava fruit. The purpose of this study was to determine the effect of guava juice administration on increasing Hb levels in pregnant women with anemia. The sample of this study was pregnant women with anemia who were divided into 2 groups (intervention: guava juice + blood-boosting tablets, control: only blood-boosting tablets) each totaling 16 respondents. Guava juice is given 1 time a day for 7 days in a row. Hb levels were measured before and after the intervention. The results of the study in the intervention group showed that the average increase in Hb levels of 8.769 g/dl increased to 10.788 g/dl with a difference in Hb level increase of 2.019 g/dl higher than that of the control group of 0.6 g/dl. The results of the Wilcoxon Signed Rank Test obtained a p-value = 0.000 which means that there was a difference in Hb levels before and after the intervention was given in the intervention group and the control group. The results of the Mann-Whitney Test showed a p value = 0.000 which means that there was a difference in the average Hb level between the intervention group and the control group. The effect of guava juice on increasing Hb levels in pregnant women. Guava juice is recommended for consumption by pregnant women with anemia.

Keywords: Guava juice, Hb Levels, Pregnant Women, Anemia.

INTRODUCTION

Worldwide, anemia is a significant public health problem, especially in developing countries such as Indonesia. In the long term, anemia can affect social, economic, and health well-being. Infectious diseases, insufficient nutrient intake, blood loss (menstruation), and lack of knowledge can lead to anemia [1]. An increase in the amount of plasma fluid that thins the blood (hemodilution) during pregnancy is known as gestational anemia. Pregnant women with anemia if the Hb level is below 11.0 g/dl. Iron nutrient anemia is the most common gestational anemia [2]. Maternal and child health is essential to prevent anemia during pregnancy. Risk factors such as parasitic infections, history of malaria, consumption of tea and coffee after meals, eating less than twice a day, eating meat once a week, eating vegetables less than three times a week, multiple pregnancies, multiparity, low household income, never having a pregnancy checkup, living in the countryside, and underweight should be considered [3]. Anemia in pregnant women is closely related to morbidity and morbidity of the mother and baby. The risk of complications for pregnant women with anemia can occur during pregnancy and childbirth such as the risk of miscarriage, prematurity, low birth weight babies, antepartum and postpartum hemorrhages, and perinatal death [4].

Half a billion women aged 15 to 49 and 269 million children aged 6 to 59 months worldwide are estimated to be affected by anemia. In 2019, 30% (539 million) of non-pregnant women and 37% (32 million) of pregnant women aged 15 to 49 years were affected by anemia [5]. The incidence rate of pregnant women in Indonesia based on Riskesdas data in 2018 was 48.9%,

showing an upward trend in cases due to an increase from 2013 of 37.1% [6]. Anemia data for pregnant women in Indonesia in 2023 is 27.7% [7]. Data on pregnant women with anemia in Riau Province in 2021 was 13.1% with the achievement of giving blood supplement tablets for 90 days (FE3) as much as 75.1% [8]. If the intake of iron and vitamin C is sufficient, hemoglobin levels will increase, which means the number of anemia will decrease. The body needs antioxidant compounds from fruits and vegetables in addition to vitamins and minerals. Guava is one of the foods that can prevent and control iron deficiency anemia [9]. Poultry or chicken, beef, mutton, fish, eggs, liver or offal, oranges, tomatoes, mangoes, papayas, guava, and bananas are all nutrient-boosting food ingredients [10].

The community believes guava fruit (*Psidium guajava*L.) can increase hemoglobin levels and become cheaper. In addition, guava fruits have a lot of nutritional content. However, it should be noted that the flesh of guava fruits varies, some are white and some are red. Although red guava has the same nutritional value, red guava contains more vitamin C than orange, and papaya, seventeen times as guava, and white orange [11]. In addition to helping the cardiovascular and digestive systems, guava has antianemia, antioxidant, and anti-inflammatory properties [12]. Based on the 2020 Indonesian Food Composition Table, there are 1.1 mg of iron per 100 g of guava, 42.9 mg of Vitamin C, and 17.12 ppm of antioxidants [13], [14]. Hemoglobin synthesis and maturation of red blood cells depend on iron. In iron pharmacokinetics, vitamin C functions as a promoter that aids in the absorption of non-heme iron in the small intestine through the process of reducing ferrous ferrous (Fe^{3+}) to ferrous (Fe^{2+}). This process makes iron easily absorbed, aids in the release of iron from transfer into body tissues, and prevents the formation of hemosiderin, which is a blood protein that is difficult to mobilize during iron release, and promotes blood formation. Antioxidants also help erythrocyte membranes that are susceptible to free radicals [15]. Vitamin C also acts as a food source enhancer (booster) that functions to accelerate the absorption of iron nutrients [10].

Guava juice increases hemoglobin and hematocrit levels in people with anemia in the same way as iron supplements [16]. One of the best ways to consume guava fruit is to make juice. Juice makes the fruit easier to consume and increases the absorption of nutrients. Juice is a liquid obtained from fresh fruits through a mechanical process so that it has a taste, color, and aroma like the original fruit. Based on the above background, the researcher wanted to find out the increase in Hb levels in pregnant women with anemia by administering guava juice at the Independent Practice of Midwife Yasmita Nora.

METHODS

This study is a quantitative study with a quasi-experimental design that examines the effect of guava juice administration on Hb levels in pregnant women with anemia. Hb levels were measured before the intervention (pre-test) and after the intervention (post-test). This research was conducted at the Yasmita Nora Midwife Independent Practice (PMB), in May - June 2024. The research sample was pregnant women who experienced anemia with a total of 32 people divided into 2 groups, namely the intervention group of 16 pregnant women and the control group of 16 pregnant women. This research has received an ethical permit from the STIKes Tengku Maharatu Ethics Committee with No.040/STIKes-T.MHRT/KEPK/IV/2024. Researchers prepare juice drink products in 1 cup (14oz) with 100 grams of red guava. The intervention group was given guava juice 1 time a day for 7 days and added to a blood supplement tablet drink (Fe). The control group only received blood supplement tablets. The data obtained was in the form of ratio data by conducting a normality test using the Shapiro-Wilk Test with results that were not normally distributed. The statistical test used was the Non-parametric Wilcoxon Signed Rank to see the increase in Hb in each group before and after and the Mann-Whitney test to see the difference in the average increase in Hb in the intervention group and the control group.

RESULTS AND DISCUSSION

The results of the statistical analysis of univariate and bivariate can be seen in the table below:

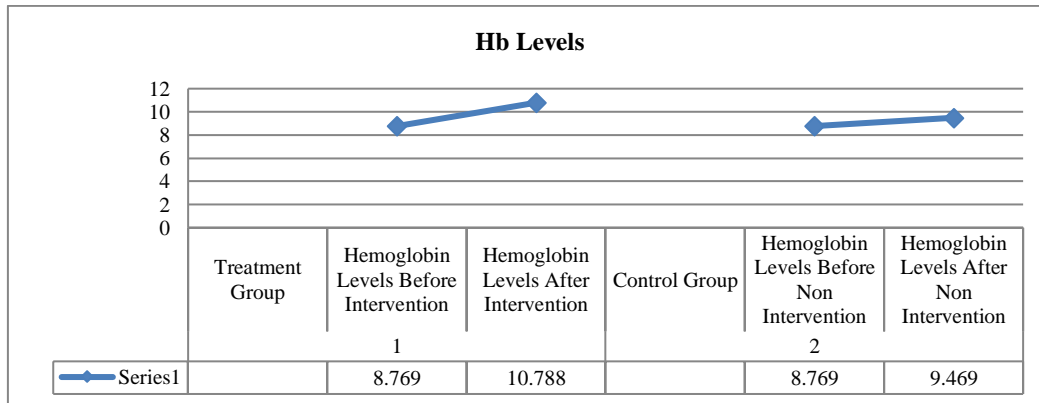
Table 1. Frequency Distribution of Respondents' Characteristics with Anemia

No	Characteristics	Treatment Group		Control group	
		Frequency	%	Frequency	%
1	Age				
	<20 and >35 years old	1	6.2	0	0
	20-35 years old	15	93.8	16	100
	Total	16	100	16	100
2	Education				
	Low	6	37.5	6	37.5
	Middle	0	0	10	62.5
	High	10	62.5	0	0
	Total	16	100	16	100
3	Trimesters of pregnancy				
	Trimester I	1	6.3	2	12.5
	Trimester II	13	81.2	11	68.8
	Trimester III	2	12.5	3	18.7
	Total	16	100	16	100

In Table 1, the majority of respondents in 2 groups were 20-35 years old, with the majority of education in higher education in the intervention group while the control group was majority in secondary education. The majority of respondents were in the second trimester of pregnancy in both groups.

Table 2. Hemoglobin Levels in Anemic Pregnant Women Before and After Being Given to the Treatment Group and Control Group.

No	Grup	Min	Max	Mean	P value
1	Treatment Group				Uji Wilcoxon Signed Rank = 0,000
	Hemoglobin Levels Before Intervention	7.0	10.0	8.769	
	Hemoglobin Levels After Intervention	9.4	12.1	10.788	
2	Control Group				Uji Mann Whitney : 0,000
	Hemoglobin Levels Before Non-Intervention	7.0	10.0	8.869	
	Hemoglobin Levels After Non-Intervention	8.0	10.5	9.469	



In Table 2, the results of the study in both groups before the intervention showed the lowest Hb levels of 7.0 gr/dl and the highest 10.0 gr/dl. The results of the study in the intervention group after being given guava juice and Fe tablets had the lowest Hb levels of 9.4 gr/dl and the highest 12.1 gr/dl while in the control group after being given Fe Tablets, the lowest Hb levels were 8.0 gr/dl and the highest was 10.5 gr/dl.

The results showed that the average Hb level of the respondents in the intervention group before being given guava juice and Fe tablets was 8.769 gr/dl and increased to 10.788 gr/dl after being treated with a difference in Hb level increase of 2.019 gr/dl. The average Hb level in the control group that was only given Fe tablets was 8.869 gr/dl and after taking Fe tablets became 9.469 gr/dl with a difference in Hb level increase of 0.6 gr/dl. The results of the Wilcoxon Signed Rank Test to see the increase in each group obtained a p value = 0.000 which means that there was a difference in Hb levels before and after the intervention was given to the intervention group and the control group. The results of the Mann-Whitney Test to see the difference in the average Hb levels in the two groups showed a p value = 0.000 which means that there was a difference in the average Hb levels between the intervention group and the control group. This shows the effect of guava juice on increasing Hb levels in pregnant women.

The results of this study are supported by the research of [17] which stated that the administration of guava juice increased hemoglobin levels in 15 pregnant women with anemia in the first trimester at BPS Lolita Puspita Sari Punggur Central Lampung. Stated that after being given guava juice as much as 250 ml/day for 7 days, there was an increase in hemoglobin levels of 2.89 gr/dl. Hb levels can increase higher with the consumption of Fe tablets and some factors affect the absorption of Fe tablets such as the consumption of fruits that contain vitamin C, namely red guava. This is because the breakdown of iron in the stomach will increase or get bigger if the pH of the stomach is more acidic. Vitamin C can increase the acidity of the pH of the stomach so that it can help increase the absorption of iron in the stomach. Vitamin C contained in guava juice has a very important role in increasing iron absorption and can increase maternal hemoglobin levels. Therefore Fe tablets are more effective if taken together with foods that contain vitamin C than just Fe tablets alone [18].

The results showed that in the control group that was only given iron tablets, the hemoglobin levels of pregnant women increased by an average of 0.57 grams per second, and in the intervention group that was given iron tablets plus guava juice increased by an average of 0.84 grams per second. The results of the statistical test showed that Sig. (2-tailed) = 0.000 ($<\alpha$ 0.05), which showed that there was a relationship between the consumption of guava juice by pregnant women at the Saketi Health Center, Pandeglang Regency, Banten Province in 2020 [19]. The research conducted showed that the average difference in Hb levels in the iron tablet + guava juice group was 2.13 gr/dL, the iron + vitamin C tablet group was 1.23 gr/dL, and the iron tablet group was 0.83 gr/dL in adolescent girls [20].

According to the researcher's assumption, after giving guava juice to pregnant women with anemia for 7 days, as many as 100 grams of guava fruit used as juice were drunk 1 glass a day in pregnant women, anemia experienced an increase in hemoglobin levels because guava juice

has a lot of vitamin C content so that it can help the absorption of Fe tablets quickly which has an impact on accelerating the increase in Hb levels of pregnant women.

CONCLUSIONS

The administration of guava juice 100 g + blood supplement tablets given for 7 days has been proven to further increase the Hb level of pregnant women compared to only being given blood supplement tablets. A significant increase in Hb levels occurs due to the content of vitamin C, iron and other minerals contained in guava fruit. Vitamin C contained in guava can help accelerate iron absorption so that it can increase the Hb levels of pregnant women quickly.

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