

Analysis of Hemoglobine Levels in Sweet Potatoes (*Ipomoe Batatas*) Processing for Multiparous Pregnant Women at Minasa Upa Public Health Centre of Makassar

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Abstract.

Anemia is a health problem in this world, especially in developing countries where an estimated 30% of the world population suffers from anemia. Pregnant women are the most vulnerable to malnutrition because there is an increase in nutritional needs to meet the mothers and a fetus needs during pregnancy. One of the alternatives to overcome iron deficiency anemia is the fortification of foods that are consumed by many people, namely sweet potatoes. The aims of this research was to determine the effect of consumption of sweet potatoes processing on hemoglobin levels of multiparous mothers. This research was conducted for 1 year consisting of the first stage, namely determining the research sample based on the criteria of 32 samples, the second stage was giving informed consent and determining the intervention given, the third stage with the type of research used Quasi-Experimental research with pretest-posttest only control group design, The design was to measure the hemoglobin levels before and after the intervention giving sweet potatoes for 2 weeks in the control group and the intervention group. The fourth stage was processing the data by using the paired T-test and independent T-test. The results of statistical tests used the paired T-test showed that in the control group the value of $p = 0.005 < \alpha = 0.05$ and the intervention group $p = 0.000 < \alpha = 0.05$. And the results of statistical tests used the independent T-test obtained a value of $p = 0.008 < \alpha = 0.05$, which means that there is an influence between sweet potatoes procesing and an increase of Hb levels for multiparous pregnant women at Minasa Upa Public Health Center of Makassar.

Keywords: Hemoglobin levels, sweet potatoes, multiparous pregnant women

1. INTRODUCTION

Anemia is a health problem in whole the world, especially in developing countries where an estimated 30% of the world population suffers from anemia. An indirect cause of death for pregnant women is anemia. The top five causes of death are still dominated by bleeding (32%), hypertension in pregnancy (25%), infection (5%), prolonged labor (5%), abortion 1%, and other causes (32%). Thus anemia in pregnancy increases the risk of maternal death (1).

Pregnant women are the most vulnerable to malnutrition because there is an increase of nutritional needs to meet the mother and fetus needs during pregnancy. During pregnancy, the cause of anemia is an increase oxygen demand. As a result, red blood cells (erythrocytes) increase by 20-30% (2).

The anemia occurrence is caused by some factors. The risk factors for anemia are low iron intake, low iron absorption, which can be caused by consuming foods containing phytates and phenols. In addition, anemia is also caused by chronic fatigue, gestational age, parity, nutritional status, consumption patterns and compliance with consuming iron tablets by pregnant women (3)

The efforts to reduce the pregnant women anemia rate are by giving iron supplements as many as 90 tablets during the third trimester and fulfilling the right nutritional intake during pregnancy. So that iron needs are met, to increase the number of red blood cells and form fetal and placental red blood cells. Some studies have shown that the administration of Fe tablets alone does not immediately

resolve cases of anemia. Because iron from supplements can only be absorbed by the body about 1-6%. The absorption of non-heme iron can be increased by the presence of absorption boosters such as vitamin C from fruits or vegetables and supplements as well as from other food factors that facilitate absorption such as meat, fish, and chicken. Conversely, avoid foods and drinks that can inhibit iron absorption such as tea, coffee, milk, and so on (4).

One of the alternatives to overcome iron deficiency anemia is fortification of food which is consumed by many people. The sweet potato was chosen as fortified food because the low-income group has higher consumption of sweet potatoes than the middle and upper economic groups. Based on Susenas data, the fortification that will be done is the addition of iron and vitamin A because various studies show that iron deficiency anemia is also found in vitamin A. Vitamin A deficiency causes impaired iron absorption, iron metabolism, and impaired mobilization of iron from iron stores for erythropoiesis (5).

Sweet potatoes contain 4 mg of iron in 100 grams, so the use of sweet potatoes can be consumed by pregnant women, which can increase hemoglobin levels in red blood cells that prevent and treat anemia because they have much iron (6).

II. METHODS

This research was conducted at the Minasa Upa Public Health Center of Makassar starting on 6th July – 29th September. This research used was a Quasi-Experimental study with a pretest-posttest only control group design and a sample of 32 multiparous pregnant women who were obtained using purposive sampling technique with the inclusion criteria of pregnant women in the third trimester, age > 20 years and gestation distance > 2 years. The analysis of data collection was processed analytically using the T-Paired test and the independent T-test.

III. RESULT AND DISCUSSION

This research was conducted in Minasa Upa Public Health Center Makassar. The total sample was 32 respondents of multiparous pregnant women, and from 32 samples, they were divided into 2 groups, namely the control group as many as 16 mothers consuming only Fe tablets and the intervention group as many as 16 samples by consuming Fe tablets and sweet mothers processing.

Table 2. Analysis of Hemoglobin Levels with Sweet Potatoes (*Ipomoea Batatas*) Processing in Multiparous Pregnant Women.

Variable	Hemoglobine Levels in Pregnant Women							
	Pre		Post		ρ	Deviation	ρ	A
	Mean	SD	Mean	SD				
Control	10,50	0,311	10,63	0,345	0,005	0,13	0,008	0,05
Intervension	10,46	0,268	11,16	0,456	0,000	0,7		

The results of research showed that the average value of hemoglobin for pregnant women in control group before the intervention was 10.50 ± 0.311 and after the intervention with the consumption only Fe tablets for 2 weeks, the average value was 10.79 ± 0.345 from the results of the examination. and after the intervention, the increase of Hb levels in multiparous pregnant women was 0.293. Whereas for the intervention group before being given the intervention the average value was 10.46 ± 0.268 and after being given the intervention with the consumption of Fe and sweet potato tablets for 2 weeks, the average value was 11.20 ± 0.456 . From the results of the examination, it was found that there was difference between before and after the intervention to increase Hb levels in multiparous pregnant women was 0.737.

Based on the statistical test using Paired t-test, the control group value of $\rho = 0.005 < \alpha = 0.05$ indicated that there was an effect of consumption of Fe tablets with an increase Hb levels of multiparous pregnant women at Minasa Upa Public Health Center Makassar. Whereas the intervention

group value of $p = 0.000 < \alpha = 0.05$, which indicated that there was an effect of consumption of Fe tablets and sweet potato with an increase Hb levels of multiparous pregnant women at Minasa Upa Public Health Center Makassar.

From the results of research showed that both control group and the intervention group value $p < \alpha$, but Those could be seen from the difference value for 2 groups where the difference from the intervention the group was higher than the difference from the control group. So, it can be concluded that giving Fe tablets with sweet potato processing is more effective to accelerate the increase Hb levels of multiparous pregnant women at Manasa Upa Public Health Center of Makassar.

Pregnant women daily iron requirement is different per trimester. There is a decrease in the need for iron due to the absence of menstruation during the first trimester of pregnancy, but there is an increase in demand afterward with the estimated need to increase about 1000 mg during pregnancy, so that the daily need for iron becomes 0.8 mg Fe in the first trimester, 4 to 5 mg in the 2nd trimester, and > 6 mg in the 3rd trimester (8)

Research conducted by Yanuar Eka Pujiatutik, et al (2020) found that the effect of sweet potato biscuits on the increase Hb levels for pregnant women with a significance value of $\alpha < 0.05$, namely the α value is 0.007 with hemoglobin levels of pregnant women before being given an average intervention 9.87 and after being given intervention an average of 11.89 (9)

During pregnancy, iron is needed by pregnant women more than when they were not pregnant. The hemodilution process that occurs in pregnant women from 10 weeks of pregnancy and reaches peak at 32–36 weeks of pregnancy, it will increase the nutritional needs of the mother and the fetus, and if the lack of iron intake can cause decrease hemoglobin levels of pregnant women. (7)

Iron for pregnant women is needed to meet basal loss, as well as for more red blood cells formation and the fetus and placenta. As gestational age increases, more iron is needed, thus the risk of iron anemia increases. To prevent this incident, the need for iron tablets must be met. (11)

Prevention and treatment of anemia can be determined by considering the factors that cause it, if the cause is nutritional problems, an assessment of nutritional status is needed to identify the nutrients that play a role in cases of anemia. Nutritional anemia can be caused by a variety of important nutrients in the formation of hemoglobin. Anemia can be caused by lack of iron intake, infection, vitamin A deficiency, folate deficiency, vitamin B12 deficiency, B6 deficiency, and increased needs of women of reproductive age (9)

Pregnant women should be screened at the ANC visit and routinely every trimester (12). Extra iron is required during pregnancy. The need for iron in pregnancy with a single fetus was 200–600 mg to meet the increase in red blood cell mass; 200–370 mg for fetuses depending on birth weight; 150–200 mg for external loss; 30–170 mg for the umbilical cord and placenta; 90–310 mg to replace blood lost during childbirth, so to overcome this loss, pregnant women need an average of 3.5–4 mg of iron per day. The administration of sweet potatoes in the intervention group showed an average increase in hemoglobin levels because Sweet potato has iron, so it can prevent anemia or blood deficiency. Sweet Potatoes can increase hemoglobin levels because those have an iron content of 4 mg per 100 grams of sweet potatoes. (13)

Sweet potatoes have a high carbohydrate, making them a great source of calories. In addition, the carbohydrate of sweet potatoes is classified as Low Glycemic Index (LGI 54), which is a type of sweet potato carbohydrate if it was consumed, it would not increase blood sugar levels drastically. Therefore, sweet potatoes are very good if consumed by pregnant women with a history of diabetes sufferers (10). Sweet potatoes contain energy (123 kcal), protein (2.7 g), fat (0.79 g), mineral calcium (30 mg), phosphorus (49 mg), iron (4 mg), vitamin B-1 (0.09 mg), vitamin B-2 (0.32 mg), vitamin C (2–20 mg), and water (68.5%). These results were obtained from conducting research on 100 grams of sweet potatoes, the amount that can be eaten as much as 100% afterwards. (14)

IV. CONCLUSION

From the results of the research, it can be seen that control group, there are pregnant women without consuming sweet potatoes, their Hb levels increase because besides consuming Fe tablets, researchers do not check mothers dietary. Whereas there are samples that experienced an increase in Hb levels but not normal in the intervention group, because pregnant women who work have a double workload, namely as housewives and as working mothers. House wife can be called to be quite heavy and coupled with work outside the home that requires mothers to work long hours, which possibly gets anemia because of an increase workload for them.

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