



Article

THE EFFECT OF POTATO CONSUMPTION ON PREGNANT WOMEN HEMOGLOBIN LEVELS

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A B S T R A C T

Pregnancy is physiological period of women's life, but can develop into problems or complications at any time. Hemoglobin is a protein found in red blood cells that are rich in iron. Potatoes are bulbs that contain iron and vitamin C. Iron is needed to boost hemoglobin levels. Iron was formed by Heme and non heme substances. Vitamin C which will help maximizes the absorption of iron. This study aims to determine the effect of potato consumption on hemoglobin levels in pregnant women at the Lubuk Basung Health Center in 2019. This type of research was a quantitative study that used Pre-Experimental Design method with the pretest-posttest control group design. The populations in this study were all third trimester pregnant women in the working area of the Lubuk Basung Public Health Center in 2019. The total sample was 18 people, 9 control groups and 9 intervention groups, sampling using non-probability techniques, purposive sampling. Each respondent in the intervention group was given steamed potatoes for 6 days in the morning. Measurement of hemoglobin levels was done 2 times, day 1 before consuming potatoes, and day 8 after consumption of potatoes. The results showed an increase in hemoglobin levels of pregnant women on average 1.0 g / dl /. In analyzing the data used the Independent T-Test test, obtained p value of 0.049, this shows a significant difference between the control group and the intervention group. This proves that there is an effect of consumption of Fe tablets with steamed potatoes on hemoglobin levels in pregnant women in the working area of Lubuk Basung Health Center in 2019. Potatoes can be used as an alternative to increasing hemoglobin levels in pregnant women.

I. INTRODUCTION

Pregnancy is something that is physiological, but every pregnancy can develop into problems or complications at any time. That is why pregnant women need monitoring during pregnancy (Saifuddin, 2010).

One complication that often occurs in pregnancy is anemia. Anemia is a condition where the number of red blood cells or the amount of hemoglobin in the body is very low or less than normal (Nur Fadillah, 2013). World Health Organization (WHO) states anemia in pregnant women is the condition of mothers with hemoglobin levels in the blood less than 11.0 g%, whereas according to Saifuddin anemia in pregnancy is a condition of pregnant women with hemoglobin levels below 11.0 gr% in trimesters I and III or < 10.5 gr% in the second trimester (Ertiana & Reni, 2016).

According to WHO, the incidence of pregnancy anemia ranges from 20% to 89% by setting Hb 11 gr% (g / dl) as the basis. The incidence of anemia is quite high. Hoo Swie Tjiong found pregnancy anemia rates of 3.8% in the first trimester, 13.6% in the second trimester and 24.8%.

Decreasing hemoglobin levels during pregnancy is physiological as long as it is within normal limits. According to Mochtar (2011), almost all the bodies of pregnant women experience changes, especially changes in the blood circulation system in which the total blood volume and plasma volume have risen rapidly since the end of trimester I. Blood volume will multiply, approximately 25% with a peak in pregnancy 32 week, followed by increased cardiac output (cardiac output) which increases by less than 30%. During pregnancy, the increase in plasma volume exceeds the increase in the volume of red blood cells, this causes hemodelusi, thereby reducing the concentration of hemoglobin. Lack of hemoglobin levels in pregnancy has an unfavorable effect on infants and mothers, in pregnancy, childbirth, and the puerperium and subsequent periods, including molahidatidosa, hyperemesis gravidarum, antepartum hemorrhage, premature rupture of membranes (PROM), uterine atony, postnatal anemia, among other things molahidatidosa, hyperemesis gravidarum, antepartum hemorrhage, premature rupture of membranes (PROM), uterine atony, postpartum anemia, shock, both intrapartum and postpartum infections, premature parturition and old parturition. Dangers to the fetus include abortion, LBW, intrauterine death, birth with anemia, congenital defects, low intelligence (Manuaba, 2010).

According to Soetjningsih (2007), one of the causes of low levels of hemoglobin in the blood is one of which is inadequate intake. Daily nutritional intake is strongly influenced by eating habits. Other causes are the lack of adequate food and the lack of consuming food sources that contain iron, besides consuming sufficient food but the food consumed has low

bioavailability of iron so that the amount of iron absorbed by the body is less (Ikhmawati et al, 2013).

In normal pregnancy without iron supplementation, the hemoglobin concentration decreases from an average of 12.5-13.0 g / dl to an average of 11.0-11.5 g / dl. Therefore, pregnant women should consume foods rich in iron to increase the number of red blood cells and form red blood cells of the fetus and placenta in supporting pregnancy (Roosleyn, 2016).

Iron in food can be in the form of heme associated with protein and found in food derived from animal origin. More than 35% of this heme can be absorbed directly. Another form is in the form of non-heme, which is a complex inorganic iron compound found in foods derived from vegetable, which can only be absorbed as much as 5%. Non-heme iron absorption can be increased if there are sufficient levels of vitamins C (Mulyawati, 2003).

The government has launched an equal distribution of Fe (iron) tablets to health-care services to be distributed to all pregnant women for free. Pregnant woman's need for iron increases by 200-300% which is used for the formation of the placenta and red blood cells. Therefore iron supplementation is very important, even in women whose nutritional status is good. The addition of iron has been shown to prevent a decrease in hemoglobin due to hemodilution. Without supplementation, iron reserves in a woman's body will be exhausted by the end of pregnancy. The administration of iron begins after the nausea and vomiting disappear, i.e. entering 16 weeks' gestation, consumed one tablet a day for at least 90 days (Ministry of Health of the Republic of Indonesia. Directorate General of Community Health Development, Guidelines for Integrated Antenatal Services, 2009).

This study aims to determine the effect of Potato Consumption Effect on Hemoglobin Levels of Pregnant Women in Lubuk Basung Health Center in 2019.

II. METHODS

This type of research was a quantitative study that used Pre-Experimental Design method with the pretest-posttest control group design. The populations in this study were all third trimester pregnant women in the working area of the Lubuk Basung Public Health Center in 2019.

The total sample was 18 people, 9 control groups and 9 intervention groups, sampling using non-probability techniques, purposive sampling. Each respondent in the intervention group was given steamed potatoes for 6 days in the morning. Measurement of hemoglobin levels was done 2 times, day 1 before consuming potatoes, and day 8 after consumption of potatoes.

Data collection tools used in this study were observation sheet made by researchers and Sahli Hemoglobin Kit Test for measuring hemoglobin levels. The analysis was done by univariate and bivariate using SPSS for Windows applications. Data were normally distributed based on the normality test with Saphiro Wilk, so the data was processed by Paired T-Test to see the difference in the mean difference between the two paired samples and the Independent T-Test for the difference in the mean difference in the control group and the intervention group.

III. RESULT

Table 1. Average Hemoglobin Levels of Pregnant Women in the Control Group before Observation in the Work Area of Lubuk Basung Health Center in 2019

Hb Levels	Mean	SD	Min-Max
Pretest	11.20	0.739	10.5 – 12.7

Based on Table 1 we know that the average pretest hemoglobin level in pregnant women in the control group before observation was 11.200 with 0.739 deviation standard. Hemoglobin levels in pregnant women are influenced by various factors including maternal biomedical factors such as age, parity and gestational age and also socioeconomic factors including education, employment and the level of knowledge of the mother

Table 2. Average Hemoglobin Levels of Pregnant Women in the Control Group after Observation in the Work Area of Lubuk Basung Health Center in 2019.

Hb Levels	Mean	SD	Min-Max
Posttest	11.23	0.665	10.4 – 12.4

Based on Table 2 we know that the average pretest hemoglobin level in pregnant women in the control group after observation was 11.23 with 0.665 deviation standard. This shows that the average hemoglobin level in third trimester pregnant women in the working area of the Lubuk Basung Public Health Center has increased but only 0.03 g / dl.

Table 3. Average Hemoglobin Levels of Pregnant Women in the Intervention Group before Observation in the Work Area of Lubuk Basung Health Center in 2019.

Hb Levels	Mean	SD	Min-Max
Pretest	11.23	1.339	9.1 – 13.3

Based on Table 3 we know that the average pretest hemoglobin level in pregnant women in the intervention group before intervention was 11.23 with 1.339 deviation standard. This shows that the average hemoglobin level of pregnant women in the intervention group in the working area of Lubuk Basung Health Center in 2019 is within normal limits.

Table 4. Average Hemoglobin Levels of Pregnant Women in the Intervention Group after Observation in the Work Area of Lubuk Basung Health Center in 2019.

Hb Levels	Mean	SD	Min-Max
Posttest	12.23	1.107	10.9 – 14.1

Based on Table 4 we know that the average pretest hemoglobin level in pregnant women in the intervention group after intervention was 12.23 with 1.107 deviation standard. The average hemoglobin level in pregnant women has increased after consuming Fe and potato tablets.

Table 5. Mean Difference of Hemoglobin Level on Control Group

Control Group	Paired T-Test			
Hemoglobin Level Pretest-Posttest	Mean	Sd	Se	P value
	0,033	0,150	0,050	0,524

Based on Table 5, we know that p value 0.524 (> 0.05), it means that there was no significant difference between pretest and posttest hemoglobin levels in the control group in third trimester pregnant women in the working area of Lubuk Basung Health Centre where the control group only consumed Fe tablets.

Table 6. Mean Difference of Hemoglobin Level on Intervention Group

Intervention Group	Paired T-Test			
Hemoglobin Level Pretest-Posttest	Mean	Sd	Se	P value
	1,000	0,606	0,202	0,001

Based on Table 6, we know that p value 0.001 (< 0.05), it means that there is a significant difference between the pretest and posttest hemoglobin levels in the third trimester of pregnancy in the intervention group in the working area of the Lubuk Basung Puskesmas. Where, the intervention group consumed Fe tablets with steamed potatoes.

Table 7. Mean Difference of Hemoglobin Level in Both Control and Intervention Group

Intervention Group	Paired T-Test			
Hemoglobin Level Pretest-Posttest	Mean	Sd	Se	P value
	1,000	0,606	0,202	0,001

Based on Table 8, we know that p value 0.049 (< 0.05), it means that there are significant differences between the control group and the intervention group. This shows that the hemoglobin levels of the pregnant women in the control group did not increase, while the hemoglobin levels of the pregnant women in the intervention group experienced a significant increase. This proves that there is an influence of consumption of Fe tablets with steamed potatoes on hemoglobin levels of pregnant women in the working area of Lubuk Basung Health Center in 2019.

IV. DISCUSSION

From the results of a study of 9 pregnant women in the control group, the age of the majority of respondents was aged 20-30 years, amounting to 55.6%, and the remaining 44.4% were respondents aged 31-35 years. This illustrates that all respondents in the control group are in the age range of 20-35 years, and this is the ideal age for a woman to get pregnant.

Of the 9 respondents in the control group, 4 (44.4%) of them had junior high school education, and 5 (55.6%) had high school education. Researchers assume education can be a determining factor in a person's hemoglobin level, because according to researchers if people have high education then they will have high knowledge too. With high levels of knowledge, a person will realize that health, especially during pregnancy is very important. A pregnant woman must be aware of the importance of good health for herself and her fetus. If the pregnant woman knows about the health of herself and her fetus, then she will try to always be healthy by consuming healthy and nutritious foods and containing iron to maintain hemoglobin levels within normal limits during her pregnancy.

From observations made by researchers for 6 days to the control group, namely the group that only consumed Fe tablets, there were differences in the increase or decrease in hemoglobin levels in the respondents. Increased hemoglobin levels experienced by 6 respondents with the same increase in the amount of 0.1 gr / dl. While the decrease in hemoglobin levels ranged from 0.1 to 0.3 g / dl, this was experienced by 2 respondents. And 1 respondent hemoglobin level did not increase or decrease. Once observed, the control group only consumed Fe tablets alone not accompanied by consumption of vitamin C. Each Fe tablet contained 200 mg of ferrosulfate and 0.25 mg of folic acid. If Fe tablets are consumed regularly, then the need for iron in pregnant women will be fulfilled. However, this research can be caused by the absorption of iron which is different between each respondent. Iron absorption can be influenced by food or drinks consumed by respondents.

Researchers assume, if the respondents consume Fe tablets along with vitamin C which will help absorption such as oranges, guava, and potatoes, the absorption of iron will be more maximal and will increase hemoglobin levels. However, if the mother consumes Fe tablets together with tannin contained in tea and coffee, then iron will become difficult to absorb and there will be no significant increase in hemoglobin levels.

As much as 66.7% of respondents in the intervention group were respondents with parity ≥ 2 , and 33.3% were parity 1. We can conclude that the higher the parity of a mother, the lower the hemoglobin level. According to Manuaba, if someone gives birth then he will lose blood in labor

so that the more often women give birth then their hemoglobin levels tend to be low (Manuaba, 2010).

In terms of education, from table 5.1 it can be seen that 55.6% of the respondents in the intervention group had a junior high school education, 33.3% had a high school education, and 11.1% had an elementary school education. According to researchers, the higher a person's level of education, the easier it is to receive information so that the more knowledge they have both in preventing pregnancy anemia, meeting the nutritional needs of pregnant women, and utilizing existing health services. Conversely low education will hinder the development of a person's attitude in receiving information, this causes the mother does not know about the needs of iron pregnant women and does not utilize the health services available.

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Based on the type of work, from the table it can be seen that the intervention group respondents all work as housewives, the same as respondents from the control group. The lowest hemoglobin level in the intervention group before being treated was in Ny.Y, where the hemoglobin level was 9.1gr / dl. From the results of the study note that respondents are parity three, this is in line with Manuaba which says if someone gives birth then he will lose blood in labor so that the more often women give birth then their hemoglobin levels tend to be low (Manuaba, 2010). Respondents also often consume Fe tablets adjacent to their time consuming tea. According to Almatsier, substances that can inhibit iron absorption or inhibitors include caffeine, tannins, oxalates, phytates, which are found in soy products, tea and coffee (Almatsier, 2002). According to the researchers 'assumptions, the low hemoglobin level in these respondents was caused by parity and inadequate consumption patterns due to the lack of respondents' knowledge about behavior that is not recommended when pregnant women, especially when consuming Fe tablets.

Researchers in the study took 9 treatment samples. All samples were given treatment in the form of consuming Fe tablets and steamed potatoes with flavor (salt, celery and fried onions) for 6 consecutive days in the morning. Respondents also consumed Fe tablets after consuming potatoes. The results showed that examination of hemoglobin levels after 6 days of treatment, an increase in the average hemoglobin level of 1.0 gr%.

From the research that has been done, it was found that all respondents experienced an increase in hemoglobin but with varying magnitude increases namely 0.3, 0.6, 0.7, 0.8, 1.0, 1.8,

2.2. Based on the information obtained, some respondents said that before they had consumed Fe tablets but were not always accompanied by potatoes or other foods containing vitamin C, so when they consumed Fe tablets together with potatoes containing tablet Fe and also vitamin C, eating absorption would be optimal. According to the researchers' assumptions, the increase in hemoglobin levels was indeed influenced by how consuming Fe tablets. Iron absorption will be maximal if consuming Fe tablets together with vitamin C. This is related to the pharmacokinetics of iron which states that Fe in the body is more easily absorbed in ferrous form. And one of the substances that helps the process of absorption of Fe in the body is vitamin C which is contained in guava juice. That's because vitamin C can reduce ferric ions to ferrous ions. So that the iron contained in the body can be optimally absorbed by the body.

Potatoes are tubers that are familiar to the community. Potatoes contain iron, folic acid and vitamin C which are very useful for the health of pregnant women and fetuses. According to the researchers' assumptions, an increase in hemoglobin levels after potato consumption meant that there was an influence of potato consumption on hemoglobin levels in third trimester pregnant women in the working area of the Lubuk Basung Health Center in 2019.

Fe tablets contain 200 mg of ferrous sulfate and 0.25 mg of folic acid. As it is known that iron is one of the factors forming red blood cells. Researchers assume, the more iron in a person's body, the higher a person's hemoglobin level.

According to Bobak (2004) in Nuraysih (2015) Iron is one of the nutrients that cannot be obtained in adequate quantities from food consumed during pregnancy. Because it is a substance that is difficult for the body to absorb, vitamin C is needed so that iron can be absorbed optimally. This is in accordance with the results of Zulaekah's study (2007) which states that the administration of iron supplements and vitamin C is more effective in increasing hemoglobin levels and red blood cell counts compared with iron alone or vitamin C alone. Vitamin C can increase stomach acidity so that it can increase iron absorption by up to 30%. The absorption of non-heme iron increases four times when there is vitamin C. Vitamin C also plays a role in transferring iron from transferrin in plasma to liver ferritin.

Organic acids such as ascorbic acid (vitamin C) can help the absorption of iron by reducing ferric to ferrous materials that are easily absorbed 3-6 times. Source of vitamin C mostly comes from vegetables and fruit (Arab et al, 2009). One of them that has vitamin C and beneficial compounds for health is potatoes. Every 100 grams of potato contains about 6% iron, 4% folic acid and 24% vitamin C. Besides containing iron, folic acid and vitamin C, potatoes can also be used as a substitute for staple foods. Therefore, researchers assume the combination of Fe and potato tablets will be able to increase hemoglobin levels in the body.

In this study, the control group only consumed Fe tablets and the intervention group consumed Fe tablets and steamed potatoes, flavored steamed potatoes (salt, sliced celery and fried onions) given to respondents for 6 days. 250 grams of steamed potatoes for 30 minutes, after being cooked add salt, sliced celery and fried onions to taste. Consumption of potatoes is done in the morning before consuming Fe tablets. From this study it was found that consumption of steamed potatoes can increase hemoglobin levels in pregnant women with an average increase of 1.0 gr%.

V. CONCLUSION

Potatoes contain iron, folic acid and vitamin C which are very useful for the health of pregnant women and fetuses. It can be advised to pregnant women to consume potato as one of haemoglobin booster during pregnancy.

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