



The Effect of Soy Milk on Increasing Hemoglobin (Hb) Levels in Pregnant Women

^KHajar Nur Fathur Rohmah¹

¹Prodi Sarjana Kebidanan & Pendidikan Profesi Bidan Universitas Medika Suherman
Corresponding authors email: hajar@medikasuherman.ac.id

ABSTRACT

Anemia is a condition in which hemoglobin (Hb) levels in the blood are below normal. However, the compliance of pregnant women with the consumption of iron tablets for 90 days is very low at 38%, citing unpleasant side effects (UNICEF, 2019). Alternative food sources that contain high iron are dates and soybeans. Date palm fruit contains carbohydrates, fiber, calcium, vitamins, potassium, iron which serves to replace lost energy. Based on a preliminary survey conducted by researchers in Bantarjaya Village by conducting hemoglobin tests on 5 pregnant women, it was found that 3 pregnant women had anemia and 2 pregnant woman was not anemic. The purpose of this study was to determine the effect of giving date soy milk on increasing hemoglobin (HB) levels in pregnant women in Bantarjaya Village, Bekasi Regency in 2023. The research method was carried out using quantitative research methods with a Quasi-Experimental approach using Wilcoxon statistical tests (Abnormally Distributed). The population in this study was all pregnant women in Bantarjaya Village which was 29 people. The sample in this study was pregnant women in Bantarjaya Village using total sampling technique. Data collection by questionnaire. Data analysis is univariate and bivariate analysis. The results showed that of 29 pregnant women, HB levels during the pretest, the most in mothers who were not anemic, which was 62.1% compared to mothers who had anemia 37.9%. After being given date soy milk (post test), mothers who experienced no anemia increased to 29 people (100%). Meanwhile, mothers who had anemia reduced to 0%. The results of statistical tests are known to Asymp. Sig is 0.000 ($P < 0.05$), hence it can be concluded that the hypothesis is accepted. This means that there is a difference between the Pretest and Posttest results, so it can also be concluded that there is an influence on the provision of date soy milk on increasing HB levels in pregnant women in Bantarjaya Village, Pebayuran District, Bekasi Regency in 2023. There needs to be a role from health workers, health cadres, local village leaders and the Health Office to increase the knowledge of pregnant women, especially about anemia and how to prevent it.

Keywords: Pregnant, Date Soy Milk, hemoglobin

Article history :

Received: 16 Juni 2023

Received in revised form: 23 Juli 2023

Accepted: 10 September 2023

Available online: 1 December 2023



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INTRODUCTION

Anemia is a condition where the hemoglobin (Hb) level in the blood is below normal. According to WHO, anemia in pregnancy is confirmed if the Hb level is <11 g/dL, whereas according to the Center of Disease Control and Prevention, it is <11 g/dL in the first trimester, <10.5 g/dL in the second trimester, and <10 g/dL in during postpartum ¹.

Pregnant women need 100 mg of iron/day, and iron needs will continue to increase, especially in the second and third trimesters. During pregnancy, blood volume increases by 50%, so that pregnant women's iron requirements can increase by around 500 mg for Hb formation. This increased need for iron can put pregnant women at high risk of experiencing iron deficiency. Anemia in pregnant women can increase the risk of complications in pregnancy and childbirth, maternal death, prematurity rates, and low birth weight babies ².

One of the causes of anemia in pregnant women is a lack of nutritional intake which affects meeting iron needs. The government has implemented a program of 90 Fe tablets during pregnancy. However, the compliance of pregnant women with consuming iron tablets for 90 days is very low, namely 38%, due to unpleasant side effects.³ Pregnant women who take iron tablets can experience several side effects including nausea and even vomiting, constipation and heartburn.

Increases internal hemoglobin (Hb) levels the body, namely increasing consumption of nutritious foods, namely foods that contain lots of iron from animal foods (meat, fish, chicken, liver, eggs) and plant foods (dark green vegetables, nuts, tempeh). The source of iron is colored meat. red (beef, goat, lamb), beans, green vegetables, eggs, nuts, seafood ⁴.

Among the types of nuts, soybeans are the best source of protein, vitamins, minerals, fat and fiber, but soybeans are more often processed as food, namely tempeh or tofu and are rarely used as drinks such as milk. Soy milk is a supplement drink that is recommended to be drunk periodically and regularly according to the body's needs. Apart from that, soy milk is a processed soybean that is rarely consumed by rural communities in particular. To increase food diversity and consumer interest, efforts need to be made to introduce the benefits of soy milk, especially to pregnant women as an alternative drink that is rich in nutrients ⁵.

Soybeans are the best source of protein, vitamins, minerals, fat and fiber, however soybeans are more often processed as food, namely tempeh or tofu and are rarely used as drinks such as soy milk. Soy milk is a drink made from soy beans where the protein content of soy milk is the highest compared to other types of beans, where the protein functions to help absorb iron. Soy milk is a supplement drink that is recommended to be drunk periodically and regularly according to the body's needs. Looking at the benefits of soy milk, which are very important, and the main ingredients are easy to get and the price is affordable, pregnant women are strongly encouraged to consume soy milk ⁶.

The iron content contained in soybeans is quite high compared to other types of nuts such as cashew nuts, green beans, red beans and others. Apart from that, processed soybean products have quite high nutritional value. The content of iron, calcium, carbohydrates, phosphorus, vitamin B complex, water and lecithin can be absorbed more quickly and well in the bodies of children and pregnant women⁷. An alternative food source that contains iron and high fiber besides soybeans is dates. Dates contain carbohydrates, fiber, calcium, vitamins, potassium, iron which function to replace energy lost when experiencing anemia with its complaints. However, dates are still rarely consumed in society unless it is during the month of Ramadan, even though dates are easy to get at economical prices⁶. Based on the results of a survey conducted by examining hemoglobin (HB) levels, it was found that of the 5 pregnant women examined, 3 pregnant women had anemia and 2 pregnant woman did not experience anemia.

Based on the description above, researchers are interested in conducting research "The effect of date soy milk on increasing hemoglobin (Hb) levels in pregnant women in Bantarjaya village, Pebayuran subdistrict, Bekasi district in 2023."

METHOD

The research method used was quantitative research methods with a quasi-experimental approach using the Wilcoxon statistical test. The population in this study was all pregnant women in Bantarjaya Village, namely 29 people. The sample in this study was pregnant women in Bantarjaya Village using total sampling technique. Data collection using observation sheets. Data analysis is univariate and bivariate analysis.

RESULTS

Table 1 Percentage of Increase in HB Levels Pre-Post Intervention

HB Levels	Pretest		Posttest	
	F	%	f	%
Anemia	11	37,9	0	0
Normal	18	62,1	29	100
Total	29	100 %	29	100 %

Based on table 1 above, it shows that the HB levels during the pretest were highest in mothers who were not anemic, namely 62.1% compared to the Hb levels of mothers who were anemic. After giving date soy milk, the HB levels of mothers who were not anemic increased to 29 (100%). Meanwhile, the HB level of mothers who experience anemia is 0 (0%).

Table 2 Effect of date soy milk on increasing HB levels in pregnant women

HB Levels	Asymp. Sig	Negative Rank	N	Positive Rank Mean Rank	Sum of Rank	Ties
Pretest Posttest	0,000	7 ^a	18 ^b	16,28	293,00	4 ^c

Based on table 2 above, it shows that the statistical test results are known to be Asymp. Sig has a value of 0.000 ($P < 0.05$), so it can be concluded that the hypothesis is accepted. This means that there is a difference between the results of the Pretest and Posttest, so it can also be concluded that there is an effect of giving date soybean milk on increasing Hb levels in pregnant women in Bantarjaya Village, Pebayuran District, Bekasi Regency in 2023.

DISCUSSION

In general, the high prevalence of anemia is caused by low intake of iron and other nutrients such as vitamins A, C, Folate, Riboplafin and B12, apart from that, consuming enough food but the food consumed has low bioavailability of iron so that the amount of iron absorbed by the body not enough⁸. Iron maintains cell function, one element of hemoglobin which carries oxygen to tissues by blood circulation, another benefit of iron minerals is to prevent anemia. Anemia often occurs due to iron deficiency because in pregnant women there is a two-fold increase in iron requirements due to an increase in blood volume without expansion of plasma volume, to meet the mother's needs (prevent blood loss during childbirth) and fetal growth⁹.

The nutrients needed for the formation of hemoglobin are iron, vitamin C and folic acid in sufficient quantities. Folic acid forms red blood cells, iron for the maturation of erythrocytes or red blood cells, vitamin C can increase the absorption and metabolism of iron, and protein contains globin which will later bind with heme to become hemoglobin¹⁰.

Consuming oral tablets can cause side effects such as nausea, constipation and so on, where constipation can be anticipated by increasing fluid intake and fiber obtained from fruits and nuts such as soybeans and dates.

Soy milk contains iron high enough to increase the hemoglobin levels of anemic pregnant women. The benefit of soy milk is that it is healthy for the body because it does not contain cholesterol but contains the phytochemicals perthioleatelinoleate and linolenate and is easily digested¹¹.

Soy milk contains crude fiber and does not contain cholesterol so it is quite good for health. Apart from that, soybeans do not contain lactose so they can be consumed by lactose intolerant sufferers. The iron content in soybeans is higher than other nuts, such as cashews, green beans and red beans. The content

of iron, carbohydrates, phosphorus, vitamin B complex, water and lecithin can be absorbed more quickly and well in the bodies of children and pregnant women ¹².

Soy milk is milk that is cheap, has high nutritional value and is suitable for young and old age groups. Soy milk has nutritional content that is no less than cow's milk because its composition is almost the same as cow's milk so it can be used as an alternative to cow's milk, which is good for people who cannot digest cow's milk ¹³.

Providing soy milk can fulfill iron needs that cannot be met adequately through food every day. The iron in soy milk is useful for increasing red blood cells in pregnant women. This research is in line with research

According to Yuni (2019), giving Fe tablets and soy milk can increase Hb levels with an average increase of 0.42 gr/dl. Giving soy milk contains not only iron but also protein which can increase hemoglobin levels ¹⁰.

The protein in soy milk builds globin which will later bind to heme to form hemoglobin. Giving soy milk to pregnant women with anemia can be used as an alternative additional nutritional intake for mothers who experience side effects from Fe tablets such as nausea and vomiting. Soy milk has the advantage that apart from containing high iron, protein and vitamin C, it is also easy to obtain and the price is quite affordable ¹⁰.

One way to fulfill the nutrients in the body is fruit and vegetables, one of which is dates. Unlike most other fruits, dates contain high carbohydrates so they can provide sufficient energy. Some of the sugar content consists of glucose, fructose and sucrose, although the sugar content in dates is high, reaching 70%, namely 70-73g per 100g dry weight, the sugar content has been processed naturally and is not harmful to health. So consuming dates can prevent anemia in pregnant women. ¹⁴.

The results of this study are in line with Maulidanita and Mardiah (2021) that there is a difference in the average hemoglobin levels of third trimester pregnant women who experience anemia through the intervention of giving date palm juice of 1.8667 g/dL with a significance of 0.000. Researchers stated that the iron content in the dates studied was able to meet 5% of the daily iron requirements of pregnant women, in addition to the content of carbohydrates, protein, vitamins (A, B complex, C, thiamine, riboflavin, niacin and folic acid), minerals (potassium, calcium, iron, phosphorus, selenium, magnesium, sodium, cobalt and zinc), as well as fiber which can meet the nutritional needs of pregnant women and their fetuses. The content of various minerals and vitamins in dates is believed to have potential as anti-cancer, anti-inflammatory, analgesic, and plays a role in protecting the kidneys and liver. Minerals contained in dates include zinc, phosphorus, calcium, iron, magnesium and fluorine. Various studies show that giving dates can increase Hb levels ¹⁵.

Dates, which are often called date palms, have various nutritional content. Dates contain high energy and contain nutrients such as carbohydrates, tryptophan, omega-3, vitamin C, vitamin B6, vitamin E, calcium, zinc, iron, potassium, manganese, phosphorus, sulfur and magnesium. Vitamin B6 in dates acts as a catalyst in hemoglobin synthesis, vitamin C affects the absorption and release of iron from transferrin into body tissues, and vitamin E affects the stability of red blood cell membranes. Dates have also been shown to contain other properties that are useful in the treatment or prevention of disease and have anti-cancer properties and are a good source of natural antioxidants ¹⁶.

Date juice which is rich in iron can increase hemoglobin levels. Hemoglobin synthesis begins in proerythroblasts and continues to a lesser extent in the reticulocyte stage. When reticulocytes leave the bone marrow and enter the bloodstream, they still form a small amount of hemoglobin. The iron content can synthesize the formation of heme which can increase hemoglobin levels. The protein, carbohydrate and fat content in date juice supports the hemoglobin synthesis process. Carbohydrates and fats form succinyl CoA which then together with glycine will form protoporphyrin through a series of porphyrinogen processes. The protoporphyrin that is formed then together with heme molecules and globin protein forms hemoglobin ¹⁷.

Dates contain excellent nutrition. The sugar content in dates can be directly absorbed by the body. The sugar content in this fruit is different from the sugar content in other foods, because the sugar content usually has to be broken down first before it is absorbed by the body. Diet experts consider dates to be the best food for pregnant women and breastfeeding mothers. The effect of giving dates on the progress of labor is that pregnant women should consume dates in the right amount and at the right time ¹⁸.

In this study, there were several respondents who did not experience changes in the increase in hemoglobin levels, some even experienced a decrease. This may occur due to impaired absorption of iron in the body. Factors that can hinder iron absorption are the habit of consuming tea at the end of a series of meals. Tea contains tannin compounds which can inhibit the process of iron absorption by binding to iron. If iron in the body is not too high, it is best not to consume foods that contain tannin because it can cause iron deficiency which can lead to anemia.

Fulfillment of balanced nutrition during pregnancy is needed by the mother and fetus for growth and development. Pregnant women's iron needs are met by consuming 90 Fe tablets during pregnancy. However, the effects of nausea and constipation that can arise cause pregnant women to disobey in drinking according to the recommended recommendations. Considering the important role of iron in transporting oxygen throughout the body, pregnant women need alternative food sources of iron and fiber which are obtained from dates and soybeans.

The consumption pattern of foods containing iron, apart from being able to get heme iron such as meat, liver, chicken, fish, can also be obtained from non-heme iron and high protein which helps the absorption of iron, including grains such as dates and soybeans which can increase iron ⁶.

Based on the results of this research, date soy milk has an effect on increasing the hemoglobin levels of pregnant women. Giving date soy milk can be used as additional nutrition for pregnant women.

CONCLUSION

Based on the results of bivariate analysis the author concludes that there is an influence of date soy milk on increasing HB levels in pregnant women in Bantarjaya Village, Pebayuran District, Bekasi Regency in 2023.

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