

THE EFFECT OF MUNG BEAN EXTRACT ON THE INCREASE OF HEMOGLOBIN LEVELS IN PREGNANT WOMEN IN TRIMESTERS II AND III

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ABSTRACT

Anemia is a common blood disorder that occurs when the level of red blood cells in the body becomes too low. The incidence of anemia in pregnant women at Bandar Negeri Suoh Primary Health Care in 2020 was 72 cases; it was 85 cases in 2021; and it was 87 cases in 2022. One way to help increase hemoglobin levels in pregnant women is by consuming mung bean extract. Mung bean extract contains iron, which can help with oxygen circulation and increase hemoglobin levels. To determine the effect of mung bean extract on the increase of hemoglobin levels in pregnant women in trimesters II and III in the working area of Bandar Negeri Suoh Community Primary Health Care in 2023. This research was a quantitative study using a pre-experimental design and a one-group pretest and posttest design. The population of this study consisted of pregnant women in trimesters II and III with anemia in the working area of Bandar Negeri Suoh Community Primary Health Care. The total was 38 people, with 30 people as the sample. The sampling technique used in this study was purposive sampling, and the data analysis involved the Wilcoxon test. The average hemoglobin level before consuming mung bean extract was 10.243 g/dL, and after consuming mung bean extract, it increased to 11.37 g/dL. The Wilcoxon test result yielded a p-value of $0.000 < 0.05$, indicating that there was an effect of mung bean extract on the increase of hemoglobin levels in pregnant women in trimesters II and III in the working area of Bandar Negeri Suoh Primary Health Care in 2023. There was an effect of mung bean extract on the increase of hemoglobin levels in pregnant women in trimesters II and III in the working area of Bandar Negeri Suoh Primary Health Care in 2023.

Keywords: Hemoglobin Level, Mung Bean Extract, Pregnant Women

INTRODUCTION

Anemia is one of the common blood disorders that occurs when the level of red blood cells in the body becomes too low. Anemia in pregnancy usually occurs in the 1st and 3rd trimesters with Hb levels below 11gr% and in the 2nd trimester with Hb levels below 10.5gr%. Several factors cause anemia that often appears in pregnant women,

such as malnutrition and lack of iron, malabsorption, blood loss during past deliveries, and chronic diseases such as tuberculosis, lung, intestinal worms, and malaria, so iron anemia in pregnancy can lead to increased mortality. Mother (MMR) and Infant Mortality Rate (IMR) (Proverawati, 2018).

World Health Organization (WHO) shows that it is estimated that around 33% of people worldwide suffer from anemia, with iron deficiency considered the primary cause, and anemia accounts for almost 9% year over year with disability problems. It is also estimated that 32 million pregnant women worldwide are anemic, and 496 million non-pregnant women are anemic (World Health Organization, 2020).

The incidence of anemia or lack of blood in pregnant women in Indonesia is still relatively high, namely as much as 48.9%. This condition indicates that anemia is relatively high in Indonesia and is close to a severe public health problem, with an anemia prevalence limit of more than 40% (Kementerian Kesehatan RI, 2018).

Data obtained from the Lampung Provincial Health Office from January to December 2018 showed the prevalence of anemia in pregnant women is still relatively high, namely 100 pregnant women out of 500 pregnant women (33.29%) (Kemenkes RI, 2019). Meanwhile, the prevalence of anemia in West Lampung Regency has increased from 4031 cases (26.9%) in 2019 to 4079 (27.6%) in 2020 (West Lampung District Health Office, 2020).

Anemia in pregnancy can cause decreased body resistance which can cause death to the fetus in the womb; LBW, abortion, and congenital disabilities in childbirth can also cause uterine inertia; the mother becomes weak, causing prolonged labor, whereas during the puerperium bleeding can occur, and during this condition, the body cannot tolerate like a healthy mother who does not suffer from anemia. This can cause morbidity and mortality and higher perinatal mortality. Based on data at the Bandar Negeri Suoh Health Center, it

was found that out of 87 pregnant women who experienced anemia, 13 (14.9%) experienced postpartum hemorrhage, 4 (4.6%) experienced LBW, and 7 (8.1%) experienced parturition (Bandar Negeri Suoh Public Health Center, 2022).

The government attempts to prevent and treat anemia by supplementing iron tablets with a daily dose of 1 item (60 mg iron and 0.400 mg folic acid) consecutively for at least 90 days during pregnancy. The government program that has been implemented can be seen in the coverage rate for giving blood supplement tablets (TTD) to pregnant women in Indonesia in 2018, amounting to 81.16%. This figure has yet to reach the target of the 2018 Strategic Plan, which should have amounted to 95% (Kemenkes RI, 2019).

Iron tablet supplementation is effective because the iron content is solid and equipped with folic acid, which can simultaneously prevent and treat anemia due to folic acid deficiency. To overcome the problem of anemia, increasing food intake can be attempted by consuming foods that contain high nutrients and increasing iron absorption. Food ingredients rich in iron include red meat, poultry, liver, fish, milk, yogurt, green fruits and vegetables, and nuts (Proverawati, 2018).

One type of legume that contains high iron is green beans (*Phaseolus radiatus* L). Green beans are very beneficial for the health of pregnant and lactating women and support the child's growth period. The iron content in mung beans is most abundant in the embryo and seed coat, with an iron content of as much as 6.7 mg per 100 grams (Nisa et al., 2020).

Green beans contain iron which functions to help circulate blood oxygen. Vitamins A and C

function as anti-oxidants that protect the body and brain from toxins and populations. Vitamin C helps absorb iron for immune system processes. In addition, green beans also contain folic acid and vitamin B12, which form new blood cells that can increase hemoglobin (Wulan & Vindralia, 2021).

Mung beans in this study were processed into mung bean extract. This is supported by Jannah's research (2018) which shows that consumption of mung bean extract is more effective in increasing Hb levels in pregnant women. Judging from the average increase in hemoglobin in the group that consumed mung bean extract for 14 consecutive days, it was 2.15 g/dl, while for the group drinking date juice, there was no significant increase because the result was -0.14 gr/dl (Jannah & Puspaningtyas, 2018).

The incidence of anemia in pregnant women at the Bandar Negeri Suoh Health Center in 2020 was 72 cases; in 2021, there were 85 cases, and in 2022 there were 87 cases. The results of a pre-survey conducted on ten third-trimester pregnant women in Suoh Village through interviews found 6 (60%) pregnant women with low Hb, namely nine gr% and 4 (40%) pregnant women with normal Hb. The interviews with pregnant women found four pregnant women said they did not take Fe tablets because of nausea and did not like taking drugs, two pregnant women said they took Fe tablets but not regularly, and four pregnant women took Fe tablets.

Based on the background description above, the formulation of the problem in this research is "Is there an effect of green bean juice on increasing hemoglobin levels in pregnant women in the second and third trimesters in the Bandar Negeri

Suoh Health Center Work Area in 2023?"

LITERATURE REVIEW

Anemia

Anemia is a condition where the body has too few red blood cells (erythrocytes), where the red blood cells contain hemoglobin which functions to carry oxygen to all body tissues (Proverawati, 2018). Anemia in pregnancy is defined as a pregnant woman's hemoglobin level <11 g/dL. Meanwhile, the Center for Disease Control and Prevention defines anemia as a condition with Hb levels <11 g/dL in the first and third trimesters, Hb <10.5 g/dL in the second trimester (Kemenkes RI, 2022).

Green Beans

Green beans are very beneficial for the health of pregnant and breastfeeding mothers, as well as supporting the growth of children. The iron content in green beans is mostly found in the embryo and seed coat. with the amount of iron content in green beans being 6.7 mg per 100 grams of green beans and one of the most effective forms of serving green beans is with green bean juice, where the water and dregs are filtered and separated so that the drink is nutrient dense (Retnorini et al., 2017).

RESEARCH METHOD

This type of research uses quantitative research using a pre-experimental design and one group pretest and posttest design. The population in this study were pregnant women in the second and third trimesters who experienced anemia in the working area of the Bandar Negeri Suoh Public Health Center, with a total of 38 people and a sample of 30 people. The sampling

technique in this study used purposive sampling. The intervention in this study was giving 200 ml of green bean extract twice a

day, namely in the morning and evening, for seven days. Data analysis in this study used Wilcoxon.

RESULT

Table 1

The average hemoglobin level before consumption of mung bean extract in pregnant women in the second and third trimesters

Hemoglobin levels	n	Means	Standard Deviation	Min-Max
Before consumption mung bean extract	30	10.243	0.4569	9.2 - 10.9

Based on the table above, it is known that the average hemoglobin level before consuming mung bean extract is 10.243 gr/dl, the standard

deviation is 0.4569 gr/dl, the minimum hemoglobin level is 9.2 gr/dl, and the maximum hemoglobin level is 10.9 gr/dl.

Table 2

The average hemoglobin level after consumption of mung bean extract in pregnant women in the second and third trimesters

Hemoglobin levels	n	Means	Standard Deviation	Min-Max
After consumption mung bean extract	30	11,370	0.8197	10 - 12.9

Based on the table above, it is known that the average hemoglobin level after consuming mung bean extract is 11.37 gr/dl, the standard

deviation is 0.8197 gr/dl, the minimum hemoglobin level is 10 gr/dl, and the maximum hemoglobin level is 12.9 gr/dl.

Table 3

The effect of mung bean extract on increasing hemoglobin levels in pregnant women in the second and third trimesters

Hemoglobin levels	n	Means	Negative Rank	Positive Rating	P-value
Before consumption mung bean extract	30	10.243			
After consumption mung bean extract	30	11,370			

Based on the table above, it is known that the average Hb level before consuming mung bean extract was 10.243 gr/dl, and after drinking mung bean extract, it increased to 11.37 gr/dl. Positive rank values

were obtained for all respondents with an increase in Hb levels between before and after being given the intervention. The results of the Wilcoxon test obtained a p-value of 0.000 <0.05, meaning that there is

an effect of mung bean extract on increasing hemoglobin levels in pregnant women in the second and

third trimesters in the Work Area of the Bandar Negeri Suoh Health Center in 2023.

DISCUSSION

1. The average hemoglobin level before consumption of mung bean extract in pregnant women in the second and third trimesters

The results of this study showed that the average hemoglobin level before consuming mung bean extract was 10.243 gr/dl, the standard deviation was 0.4569 gr/dl, the minimum hemoglobin level was 9.2 gr/dl, and the maximum hemoglobin level was 10.9 gr/dl.

Anemia in pregnant women is caused due to deficiency and low nutritional intake and can also be caused by ignorance about proper diet. Iron is needed to develop the baby's brain at the beginning of its birth. Iron deficiency before pregnancy, if not treated, can result in pregnant women suffering from anemia (Roosleyn, 2016).

Prevention and treatment of anemia can be determined by considering the factors that cause it; if the cause is a nutritional problem, an assessment of nutritional status is needed to identify nutrients that play a role in cases of anemia. Various essential nutrients in the formation of hemoglobin can cause nutritional anemia. Efforts that can be made to assist in the construction of hemoglobin is iron. Fe tablets are one of the supplements that can prevent anemia because Fe supplements are a strategy to increase Fe intake, which is successful only if individuals adhere to the consumption rules. One way to overcome anemia

with food fortification. Fortification of widely consumed and centrally processed foods is at the core of anemia control in many countries.

This research aligns with a study by (Mas'amah & Utami, 2022), which showed that measuring the average level of HB levels before being given Fe and mung bean extract to 10 people in the intervention group obtained an average of 10.3 gr%. It is supported by the research of (Novelani et al., 2021), which showed that the average hemoglobin (Hb) level before being given green bean drink from 15 pregnant women obtained an average of 9.65 gr/dl, with a standard deviation of 1.06.

According to researchers, anemia in pregnant women occurs due to high nutritional needs for fetal growth and sharing of iron in the blood to the fetus, reducing the mother's iron reserves. Anemia harms the mother and fetus, so it must be addressed so that complications do not occur during childbirth. Judging from the characteristics of the respondents, it was found that 24 (80%) of the respondents were aged 20-35 years, and 6 (20%) of the respondents were aged <20 years or >35 years. Aging less than 20 years or more than 35 years will trigger anemia because women under 20 years old have their reproductive organs not ready enough, which will affect the supply of nutrients in pregnant women. Meanwhile, pregnant women over 35 years

old will also affect their nutritional needs because organ function is less than optimal, and they have a higher risk of bleeding which will later cause anemia.

Regarding parity, there were 19 (63.3%) respondents with multipara parity and 11 (36.7%) respondents with primipara parity. Anemia can occur in mothers with high parity related to the mother's biological condition and iron intake. Equality is more at risk when associated with a short gestation interval. Anemia, in this case, will be related to previous pregnancies. If iron reserves are reduced, pregnancy will deplete iron stores and cause anemia in subsequent pregnancies.

2. The average hemoglobin level after consumption of mung bean extract in pregnant women in the second and third trimesters

The results of this study showed that the average hemoglobin level after consuming mung bean extract was 11.37 gr/dl, with a standard deviation of 0.8197 gr/dl, a minimum hemoglobin level of 10 gr/dl, and a maximum hemoglobin level of 12.9 gr/dl.

One of the foods that can prevent iron deficiency is green beans. Green beans are a food ingredient that contains substances needed to form blood cells to overcome the effect of decreasing Hb. Green beans can play a role in the shape of red blood cells and prevent anemia because the phytochemical content in green beans is complete, which can help the process of hematopoiesis. Green beans also contain vitamins and minerals. Minerals such as

calcium, phosphorus, iron, sodium, and potassium are abundant in green beans (Astawan, 2016).

In addition to green beans, they contain iron, vitamin C, and zinc which play a role in treating iron deficiency anemia. Green beans also contain seven mcg of vitamin A in half a cup. Vitamin A deficiency can make iron deficiency anemia worse. Vitamin A supplementation has a beneficial effect on iron deficiency anemia (Novelani et al., 2021).

This research is in line with a study conducted by (Mayasari et al., 2021), which showed that the average Hb level in TM III pregnant women before consuming mung bean extract was 9.747, with a minimum Hb level of 9.0, and a maximum of 11.0. While the average Hb level in TM III pregnant women after consuming mung bean extract was 10.240, the minimum Hb level was 9.4, and the maximum was 11.6.

According to the researchers' assumptions, the need for iron to increase hemoglobin in pregnant women, besides being able to get it from supplementing iron tablets, is also obtained from food ingredients. One way is to consume foodstuffs that are sources of iron, such as green beans. The iron content in mung beans is most abundant in embryos, with the amount of iron content in mung beans as much as 6.7 mg per 100 grams of mung beans, and one of the most effective forms of serving mung beans is with mung bean extract, namely filtered water, and dregs. And it is separated so that the drink is nutrient dense.

3. The effect of mung bean extract on increasing hemoglobin levels in pregnant women in the second and third trimesters

The results of this study showed that the average Hb level before consuming mung bean extract was 10.243 gr/dl, and after drinking mung bean extract increased to 11.37 gr/dl. Positive rank values were obtained for all respondents with an increase in Hb levels between before and after being given the intervention. The results of the Wilcoxon test obtained a p-value of 0.000 <0.05, meaning that there is an effect of mung bean extract on increasing hemoglobin levels in pregnant women in the second and third trimesters in the Work Area of the Bandar Negeri Suoh Health Center in 2023.

Hemoglobin is one of the benchmarks describing whether a person has anemia. Hemoglobin is influenced by substances the body needs, including iron. One food ingredient that contains substances needed for the formation of blood cells to overcome the effect of lowering Hb is green beans. Green beans can play a role in the shape of red blood cells and prevent anemia because the phytochemical content in green beans is complete, which can help the process of hematopoiesis. Green beans also contain vitamins and minerals. Minerals such as calcium, phosphorus, iron, sodium, and potassium are abundant in green beans (Ahmad, 2019).

Green beans are very beneficial for the health of pregnant and lactating women and support the child's growth

period. The iron content in green beans is most abundant in the embryo and seed coat. With the amount of iron content in green beans as much as 6.7 mg per 100 grams of green beans, one of the most effective forms of serving green beans is with mung bean extract, namely water and dregs are filtered and separated so that the drink is nutrient dense (Retnorini et al., 2017).

In addition to green beans, they contain iron, vitamin C, and zinc which play a role in treating iron deficiency anemia. Green beans also contain seven mcg of vitamin A in half a cup. Vitamin A deficiency can make iron deficiency anemia worse. Vitamin A supplementation has a beneficial effect on iron deficiency anemia. Vitamin A has many roles in the body, including the growth and differentiation of progenitor-erythrocyte cells, the body's immunity against infection, and the mobilization of iron reserves in all tissues. The interaction of vitamin A with iron is synergistic. Based on the amount, protein is the second central arrangement after carbohydrates. Green beans contain 20-25% protein. The protein in raw green beans has a digestibility of about 77%. Digestibility that is not too high is caused by the presence of anti-nutritional substances, such as anti-trypsin and tannins (polyphenols). To increase the digestibility of this protein, green beans must be processed first through a cooking process, such as boiling, steaming, and sangria (Astawan, 2016).

The protein, carbohydrates, and fat content in green beans supports the synthesis of hemoglobin. Carbohydrates and fats form succinyl-CoA, which,

together with glycine, includes protoporphyrin through a series of porphyrinogen processes. Protofirin, developed jointly with heme molecules and globin proteins, forms hemoglobin. The glycine content is 0.9% of the 22% total amino acid in mung beans, so mung beans, apart from being able to help heme synthesis in terms of iron, can also help heme synthesis as a building block for heme synthesis. Iron absorption also requires vitamins to maintain dietary iron in the ferrous form to increase iron absorption. Iron absorption also requires vitamin C. Vitamin C assists in iron absorption and helps release iron from its storage sites. Vitamin C can play a role in increasing the absorption of non-heme iron to 4 times. Vitamin C and iron form complex iron ascorbic compounds, readily soluble and easily absorbed (Aulia et al., 2018).

Mung bean extract drink can increase hemoglobin levels in the blood significantly because it contains iron, vitamin C, and zinc, and vitamin A has many roles in the body, including for the growth and differentiation of progenitor-erythrocyte cells, the body's immunity against infection and the mobilization of reserves of substances iron the whole network. Mung bean drink is recommended for consumption by pregnant women as a preventive effort/prevention of anemia in pregnant women (Sari et al., 2020).

This research is in line with the study conducted by Sari (2020), which shows that there is an effect of giving Fe tablets with the addition of mung bean extract in increasing Hb levels in pregnant women in the Work

Area of the Nanti Agung Health Center, Kepahiang Regency in 2019. They are supported by Misrawati's research (2019) which shows that there is an effect of mung bean extract and Fe tablets on increasing Hb levels in anemic pregnant women where the value of $p = 0.00 < \alpha = 0.05$ and the sig value or value of $.002 < \alpha = 0.05$. which means H_0 is rejected and H_a is accepted.

According to the researchers' assumptions, the increase in Hb was good after being given the intervention of mung bean extract because mung bean extract has the same content, namely ferrous sulfate and folic acid, which function in overcoming nutritional anemia. Besides that, the increase in hemoglobin levels in this study was also due to pregnant women's food consumption patterns, such as those who consume vegetables, fruit, and other foods that can increase Hb levels. So that pregnant women who experience anemia can be more obedient in consuming Fe tablets and foods rich in iron and vitamin C, such as green bean extract.

CONCLUSION

The average hemoglobin level before consumption of mung bean extract in pregnant women in the second and third trimesters in the Work Area of the Bandar Negeri Suoh Health Center in 2023 was 10,243 gr/dl with the number of respondents with below average Hb levels there were 15 people and above the average there were 15 people.

The average hemoglobin level after consuming mung bean extract in pregnant women in the second and third trimesters in the Work Area

of the Bandar Negeri Suoh Health Center in 2023 was 11.37 gr/dl with the number of respondents with below average Hb levels there were 17 people and above the average there were 13 people.

Mung bean extract affects increasing hemoglobin levels in pregnant women in the second and third trimesters in the Work Area of the Bandar Negeri Suoh Health Center in 2023 with a p-value of 0.000.

It is hoped that future researchers can add comparison variables with different interventions and use a larger research sample so that more effective research results can be obtained.

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