Consumption of Moringa Leaf Tea (Moringa oleifera) on Hemoglobin Levels of Pregnant Women

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Abstract: Anemia is a common health problem throughout the world, especially in pregnant women. Tasikmalaya Regency, the percentage of pregnant women with Anemia in 2020 was 17.65%. U.P.T.D. Salawu Health Center Tasikmalaya Regency, in 2021, the number of frail pregnant women was 127 out of 1102 pregnant women or 11.5%. The number of frail pregnant women in Margalaksana village is 12 out of 73, or 16.43%. This study aims to evaluate the effect of consuming moringa leaf tea (Moringa oleifera) on hemoglobin levels in pregnant women. This research is an experimental research with a quasi-experimental research design and a one-group pretest-posttest design, which is carried out on one group without a control group. The sample size was 20 pregnant women. The intervention that will be given is consuming Moringa leaf tea. The data analysis used is univariate analysis, and the bivariate analysis uses paired tests. The average hemoglobin level of pregnant women before giving Moringa leaf tea was 11.645, while the average hemoglobin level of pregnant women after giving Moringa leaf tea was 12.330, so there was an average increase in hemoglobin level of 0.685. The p-value of 0.002 is smaller than the research significance level (alpha) of 0.05, so Ha is rejected, so there is an influence of Moringa leaf tea consumption on the hemoglobin levels of pregnant women in Margalaksana Village, Tasikmalaya Regency.

Keywords: Moringa leaves, Hb levels

INTRODUCTION

Anemia is a common health problem throughout the world, especially in pregnant women. The World Health Organization (WHO) estimates that more than 40% of pregnant women worldwide suffer from anemia, which is mainly caused by iron deficiency (World Health Organization (WHO), 2021). In Indonesia, the prevalence of anemia in pregnant women is still relatively high. Based on the 2018 national riskesdas report, around 48.9% of pregnant women in Indonesia experience anemia, which shows that almost half of the population of pregnant women faces this problem(Kementrian Kesehatan RI, 2022). West Java Province, in 2018, the percentage of anemia in pregnant women was 6.40%. (Dinas Kesehatan Jawa Barat, 2022)

Meanwhile, in Tasikmalaya Regency, the percentage of pregnant women with anemia in 2020 was 17.65% (Dinas Kesehatan Jawa Barat, 2022). Based on health profile data from the Salawu Community Health Center U.P.T.D., Tasikmalaya Regency, in 2021, the number of anemia pregnant women was 127 out of 1102 pregnant women or 11.5%. The number of anemic pregnant women in Margalaksana village is 12 out of 73 pregnant women or 16.43% (Puskesmas Salawu, 2021).

Although the prevalence of anemia in pregnant women is a global health problem, this situation also significantly affects Indonesia, with almost half of pregnant women experiencing this condition. The high incidence of anemia in pregnant women, both in Indonesia and throughout the world, shows how important it is to treat this condition properly. Anemia during pregnancy is not just a problem of nutritional deficiencies but also a serious condition that can cause various health complications. If not appropriately treated, anemia can hurt the health of the mother and the development of the fetus she is carrying, causing multiple risks that threaten the safety of both.

Anemia in pregnant women is a severe condition, and if not treated properly, it can have various significant negative impacts on both the mother and the fetus she is carrying. Anemia in pregnancy, especially iron deficiency anemia, occurs when the hemoglobin level in a pregnant woman's blood falls below the average threshold, reducing the blood's ability to carry oxygen to body tissues. Anemia in pregnant women that is not treated can have various negative impacts on the mother and fetus; the adverse effect is the Risk of Premature Birth and Low Birth Weight (L.B.W.) Babies: Anemia increases the risk of premature birth and low birth weight babies because the supply of oxygen and nutrients to the fetus is reduced (Rahman et al., 2016). Increased Risk of Maternal and Fetal Death: Severe anemia in pregnant women can increase the risk of maternal and fetal death by worsening pregnancy complications such as bleeding and infection. Research by Daru et al. (2018) found that mothers with severe anemia were more susceptible to postpartum death because their bodies were less able to fight infections and recover from blood loss. Able to fight infections and recover from blood loss (Daru et al., 2018). Fetal Growth and Development Disorders: Untreated anemia in pregnant women can cause fetal growth and development disorders. Iron deficiency anemia during pregnancy is associated with cognitive development problems in the baby due to insufficient oxygen supply to the fetal brain, which is essential for brain development. A study by Georgieff (2020) shows that maternal iron deficiency during pregnancy can hurt the child's neurocognitive development (Georgieff, 2020). Increased Risk of Infection: Anemia can weaken the immune system of pregnant women, increasing the risk of postpartum infections, which can cause serious complications (Daru et al., 2018).Fatigue and Reduced Quality of Life: Anemia in pregnant women can cause fatigue, dizziness, and shortness of breath, which reduces quality of life and increases the risk of pregnancy complications. Mwangi et al. (2018) showed that anemia in pregnant women significantly reduces energy, mood, and ability to carry out daily activities (Mwangi et al., 2015).

Anemia in pregnant women is caused by various factors, with iron deficiency being the leading cause. However, several other risk factors contribute to the high incidence of anemia in pregnant women. These factors include inadequate nutritional intake, parasitic infections such as malaria and worms, and chronic health conditions such as kidney disease or digestive disorders that affect iron absorption and other essential nutrients. Vitamin B12 and folic acid deficiency also play an important role in developing

anemia in pregnant women, especially in populations with low diets in meat, fish, eggs, and green vegetables (Allen, 2000).

Although the prevalence of anemia in pregnant women is a global health problem, the situation is particularly worrying in Indonesia, with almost half of pregnant women experiencing the condition. The high incidence of anemia in pregnant women, both in Indonesia and throughout the world, shows how important it is to treat this condition properly. Anemia during pregnancy is not just a problem of nutritional deficiencies but also a serious condition that can cause various health complications. If not appropriately treated, anemia can hurt the health of the mother and the development of the fetus she is carrying, causing multiple risks that threaten the safety of both.

Anemia in pregnant women is mainly caused by iron deficiency. Still, several other risk factors contribute, including malnutrition, parasitic infections (such as malaria and worms), and chronic health conditions (such as kidney disease or digestive disorders). These factors influence the absorption and availability of iron and other essential nutrients in the body. Deficiency of vitamin B12 and folic acid can also cause anemia, especially among pregnant women with an unbalanced diet. Preventing and treating anemia in pregnant women using a multi-aspect approach, including providing iron supplements, monitoring hemoglobin levels, and improving nutritional intake, is essential. This is important to reduce the risk of health complications for the mother and fetus, including the risk of premature birth, low birth weight, and increased risk of perinatal death. Health guidelines in the U.K. recommend early detection and appropriate intervention to prevent the adverse effects of anemia in pregnancy (Pavord et al., 2020).

One potential solution to overcome anemia in pregnant women is increasing iron intake through supplements and iron-rich foods. Moringa leaves (Moringa oleifera) are widely known as a nutritional source rich in iron, vitamin A, vitamin C, calcium, and protein. Research shows that Moringa leaves contain higher iron levels than spinach, making them a potential natural source for increasing hemoglobin levels in the blood (Gopalakrishnan et al., 2016). Similarly, research conducted by Yulastini, F. et al. (2023), consuming moringa leaf capsules (Moringa oleifera) was more effective in increasing hemoglobin levels in young women compared to just consuming iron supplements (Yulastini et al., 2023). Research conducted by Cholashotul I'anah, F. et al. (2023) shows that Moringa leaf extract affects increasing hemoglobin levels in adolescent girls (Cholashotul I'anah et al., 2023)

This study aims to evaluate the effect of consuming moringa leaf tea (Moringa oleifera) on hemoglobin levels in pregnant women. This research is important considering the high prevalence of anemia in pregnant women in Indonesia and the lack of natural food-based interventions that are effective in increasing hemoglobin levels.

METHOD

This research is experimental research with a quasi-experimental research design and a one-group pretest-posttest design, which is carried out in one group without a control group. The research instruments used in this study were observation sheets, Moringa leaf tea, and a digital Hb examination tool. The population in this study was 30 pregnant women in Margalaksana Village, Tasikmalaya Regency. The sampling technique used was a purposive sampling method with inclusion criteria: pregnant women with no history of illness and pregnant women with Hb more than eight g/dl. Whether they wanted to or not consume blood supplement tablets during the intervention, the sample size was 20 pregnant women. The intervention that will be given is consuming Moringa leaf tea, which is given 1 x 2 glasses per day and is drunk in the morning and evening. Each tea bag contains 2.5 grams of Moringa leaf powder you prepared and gave for 21 days. This research was conducted in the work area of the Salawu Community Health Center, Tasikmalaya Regency, in Margalaksana village, with research time from 8 June 2022 to 6 July 2022.

The data analysis used is univariate analysis and bivariate analysis. Univariate analysis was carried out to describe the research data. The results of the univariate analysis will provide an overview of the hemoglobin levels of pregnant women before and after treatment. Bivariate analysis was conducted to determine the relationship and influence between the independent variable, namely Moringa leaf tea, and the dependent variable, namely the hemoglobin level of pregnant women. Before bivariate analysis, the data normality assumption was first tested using the Shapiro-Wilks test with average data distribution results; then, the analysis used the paired t-test.

RESULTS

This research was conducted to determine the effect of consuming Moringa leaf tea on the hemoglobin levels of pregnant women in Margalaksana Village, Tasikmalaya Regency, in 2022. The sample in this study consisted of 20 pregnant women. Data collection took place for approximately four weeks, starting with initial data collection for one week, beginning on 8 June 2022, to 14 June 2022, then continued with providing interventions carried out on research respondents for 21 days, starting on 16 June 2022 until by 6 July 2022. The assessment was carried out by measuring the respondent's hemoglobin level before being given treatment (pretest) and after being given treatment (posttest) using a digital Hb examination tool on the first day and twenty-first day, with the following results:

Table 1. Hemoglobin levels of pregnant women

Hemoglobin levels	N	Mean	Min	Max	SD
Before being given Moringa leaf tea	20	11,645	10,0	12,8	0,84
After being given Moringa leaf tea	20	12,330	10,7	13,8	0,91

Based on the research results presented in Table 1, there were differences in hemoglobin levels before and after giving Moringa leaf tea to respondents. Before being given Moringa leaf tea, the average hemoglobin level of respondents was 11.645 g/dL with a minimum value of 10.0 g/dL and a maximum value of 12.8 g/dL. The standard deviation obtained was 0.84 g/dL. After administering Moringa leaf tea, the average hemoglobin level increased to 12,330 g/dL with a minimum value of 10.7 g/dL and a maximum of 13.8 g/dL. The standard deviation obtained was 0.91 g/dL.

Table 2 Effect of Moringa leaf tea on changes in hemoglobin levels of pregnant women.

Hemoglobin levels	N	Mean	Different Means	SD	*P-Value*
Before being given Moringa leaf tea	20	11,645	0,685	0,832	0,002
After being given Moringa leaf tea	20	12,330			

Based on Table 2, the average hemoglobin level of pregnant women before giving Moringa leaf tea was 11.645, while the average hemoglobin level of pregnant women after giving Moringa leaf tea was 12.330, so there was an average increase in hemoglobin levels of 0.685. The p-value of 0.002 is smaller than the research significance level (alpha) of 0.05, so Ha is rejected. These results indicate that based on sample data obtained from 20 pregnant women in Margalaksana Village, Tasikmalaya Regency, there is sufficient evidence to state that giving Moringa leaf tea increases the hemoglobin levels of pregnant women. In other words, giving Moringa leaf tea increases the hemoglobin levels of pregnant women.

DISCUSSION

Based on the results of the analysis that was carried out, it was found that there was an increase in hemoglobin levels after consuming Moringa leaf tea, which was indicated by the rise in the average hemoglobin level before and after the intervention. In this study, the intervention involved consuming Moringa leaf tea, 1 x 2 glasses per day, and drinking it in the morning and evening. Each tea bag contains 2.5 grams of Moringa leaf powder prepared by yourself, given consistently for 21 days. The research results showed that the average hemoglobin level of pregnant women before giving Moringa leaf tea was 11.65, while the average hemoglobin level of pregnant women after giving Moringa leaf tea was 12.33, so there was an average increase in hemoglobin levels of 0.685. This increase indicates that Moringa leaf tea can be an effective natural alternative in increasing hemoglobin levels. The results of the paired

t-test show that the p-value = 0.002 < α (0.05). So, it can be concluded that there is an effect of increasing hemoglobin levels before and after consuming Moringa leaf tea in pregnant women.

The results of this study are research conducted by Hikmah, N. et al. (2021) regarding Moringa oleifera tea on hemoglobin and hepcidin levels of pregnant women at the Pangkajene Health Center and Lawawoi Health Center, Sidenreng Rappang Regency with the result that there was an increase in the average hemoglobin level in the intervention group. Before being given iron tablets and Moringa leaf tea, the average hemoglobin level was 10.53 g/dL, while after the intervention, the average hemoglobin level increased to 11.78 g/dL. This shows that giving iron tablets and Moringa leaf tea effectively increases hemoglobin levels in the intervention group (Hikmah et al., 2021).

This aligns with research by Hartati and Sunarsih (2021) examining the consumption of Moringa Leaf Extract in Increasing Hemoglobin Levels in Pregnant Women. The results were that the average hemoglobin level of pregnant women in the third trimester before being given Moringa leaf extract was 9,642; after consuming Moringa leaf extract, the average was - The average hemoglobin level of pregnant women was 10,648. The statistical test results showed that the p-value was 0.000 < 0.005, so there was an effect of consuming Moringa leaf extract on increasing hemoglobin levels in pregnant women (Hartati & Sunarsih, 2021).

Moringa leaves contain essential nutrients to prevent various diseases. In addition, Moringa leaves contain all the amino acid elements (essential) that are very important and needed by the body. Consuming Moringa leaves is an alternative for treating cases of anemia. Many pregnant women recovered from anemia after consuming Moringa leaves (Winarno, 2018). The nutritional content contained in Moringa leaf powder per 100 g is 27.1 g protein, 38.2 g carbohydrates, 19.2 g fiber, 2003 mg calcium, 368 mg magnesium, 1324 mg potassium, 28.2 mg iron, 17.3 mg vitamin C (Rani et al., 2021). The vitamin C content in Moringa leaves can increase iron absorption. The iron contained in Moringa leaf tea functions as a reducing agent that can convert ferric to ferrous, maintains intestinal pH low, thereby preventing iron precipitation, and acts as a monomeric chelator, which forms iron-ascorbate chelate, which is more easily absorbed by the body. (Prihati 2015).

After research and based on previous research, it can be concluded that Moringa leaves are rich in nutrients, one of which is a higher iron content than other foods. Consuming Moringa leaf tea with pregnant women has been proven to increase hemoglobin levels, so pregnant women's risk of anemia can be prevented.

CONCLUSIONS

The results of measuring the hemoglobin levels of pregnant women in Margalaksana Village, Tasikmalaya Regency, show that before being given Moringa leaf tea, the average was 11.645 gr/dl, and after being given Moringa leaf tea, the average was 12.330 gr/dl, so there was an increase of 0.685 gr/dl. Moringa leaf tea affects the hemoglobin levels of pregnant women in Margalaksana Village, Tasikmalaya Regency. To increase hemoglobin levels, pregnant women are advised to consume Moringa leaf tea as an alternative non-pharmacological prevention of anemia, in addition to blood supplement tablets.

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