MORINGA OLEIFERA LEAF JUICE INCREASES HEMOGLOBIN LEVELS IN PREGNANT WOMEN WITH ANEMIA

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Abstract

Background: Anemia during pregnancy is characterized by low hemoglobin (Hb) levels, with levels below 11g% in the first and third trimesters and below 10.5g% in the second trimester. Anemia in pregnant women can lead to various complications, including abortion, premature birth, prolonged labor, trauma, and postpartum hemorrhage. Objective: This study aim to evaluate the effectiveness of Moringa oleifera leaf juice in increasing hemoglobin levels in pregnant women diagnosed with anemia. Methods: This quantitative research employed a Quasi-Experimental design with a one-group pretest-posttest approach. The study was conducted in Gate Sari Kampar village, Riau province, from February to June 2023. The sample included 30 pregnant women with anemia. The participants were administered Moringa oleifera leaf juice. Results: The research findings indicated that the average pretest hemoglobin level among the pregnant women was 9.28 g%. After the intervention involving the consumption of Moringa oleifera leaf juice, the average hemoglobin level increased to 10.33 g%. Statistical analysis using a paired sample t-test resulted in a p-value of 0.000, signifying the significant effectiveness of Moringa oleifera leaf juice in increasing hemoglobin levels in pregnant women with anemia. Conclusion: The study demonstrates that Moringa oleifera leaf juice is an effective means to elevate hemoglobin levels in pregnant women experiencing anemia. As a result, it is recommended that pregnant women with anemia consider incorporating Moringa leaves into their diets as a natural remedy to improve their hemoglobin levels

Keywords : Pregnant women; Moringa oleifera Leaf Juice ; Anemia; Hemoglobin;

INTRODUCTION

According to the World Health Organization (WHO), the prevalence of iron deficiency among pregnant women ranges from 35% to 75%. As gestational age increases, 30% to 40% of pregnant women experience iron deficiency.(Smith JR & Brenann BG, 2012) In Indonesia, nearly half, specifically 48.9% of pregnant women, suffer from anemia (Riau Province Health Office Profile, 2020).

The government's strategy to combat anemia in pregnant women involves providing iron supplementation tablets (TTD), with a minimum of 90 tablets. The percentage of pregnant women in Riau province who received TTD increased from 65% in 2019 to 77.3% in 2020.

Several alternatives exist for increasing hemoglobin levels, including TTD consumption. Another option for pregnant women to boost their hemoglobin levels is by consuming Moringa oleifera leaf juice, which is prepared by processing Moringa leaves into a juice for consumption.

Moringa leaves (Moringa oleifera) are a tropical plant that flourishes in regions like Indonesia. They have been known for centuries as a versatile, nutrient-rich, and medicinal plant. These leaves contain a diverse array of natural compounds, including substantial amounts of vitamins A, B, and C, as well as calcium, potassium, iron, and easily digestible protein. The iron content in dried Moringa oleifera leaves 5,4 mg (Onyekwere, 2014), or in the form of Moringa oleifera leaf flour, is remarkably high, equivalent to 25 times that of spinach. This makes it a natural alternative for treating anemia in pregnant women(Suheti, Indrayani, & Carolin, 2020). Moringa leaves are particularly effective in treating anemia due to their iron content of 28.2 mg(Siagian et al., 2023),(Susiyanti & Hartini, 2021).

Research conducted by (Hartati & Sunarsih, 2021) There was influence in consuming Moringa Leaf extracts toward enhancement of hemoglobin level on pregnant woman. demonstrated an increase in hemoglobin levels after the consumption of Moringa oleifera leaves. The average hemoglobin level rose from 9.642 g% before consumption to 10.648 g% after consumption, resulting in an average increase of 1.006 g%. The longer the duration of Moringa oleifera leaf consumption, the greater the increase in hemoglobin levels, as observed in a 12-week study which reported an increase of 1.39 g%. (Susiyanti & Hartini, 2021), (Rismawati, Jana, Latifah, & Sunarsih, 2021)

In an initial study conducted by the author in a private midwife's practice, out of 20 respondents, 15 were found to have anemia. Among them, 9 were classified as having mild anemia with hemoglobin levels ranging from 9 to 10 g%, and 6 were classified as having moderate anemia with hemoglobin levels ranging from 7 to 8 g%. Notably, the respondents were unaware of the nutritional richness of Moringa leaves (Moringa oleifera) in iron, which could help increase their hemoglobin levels. The study aims to contribute valuable insights into addressing anemia in pregnant women and the potential role of Moringa oleifera as a natural solution to this critical health concern.

RESEARCH METHODS

Study Design

This research is a quantitative study that utilizes a quasi-experimental approach, specifically a one-group pre-post test design. It involves the evaluation of the impact of Moringa oleifera leaf juice intervention on the hemoglobin levels of pregnant women with anemia. The research includes pre-intervention (pretest) hemoglobin level assessment, the administration of Moringa oleifera leaf juice with alternating days, and post-intervention (post-test) hemoglobin level measurement.

Participants

The study was conducted in the working area of a private midwifery practice in Gerbang Sari

Village, Kampar Regency, Riau Province, Indonesia. The study population comprised 31 pregnant women from Gerbang Sari Village who had been diagnosed with anemia. The total population of eligible individuals was included as participants. The inclusion criteria for participants encompassed women aged 20-35 years, not taking iron tablets, hemoglobin levels between 8-11 mg/dL, severe anemia with hemoglobin levels below 7 mg/dL, and the absence of tuberculosis and hepatitis.

Data Collection

Hemoglobin levels were measured as a part of data collection, using the Quick Check HB/Easy Touch device. Data were collected during two phases: the pre-intervention (pretest) and post-intervention (post-test) stages. The preparation of Moringa oleifera leaf juice for intervention included washing Moringa oleifera leaves, blending them with water, and adding honey for palatability. The Moringa oleifera leaf juice was administered to participants three times a day for one week.

Data Analysis

Data analysis involved the comparison of hemoglobin levels before and after the Moringa oleifera leaf juice intervention. Statistical methods, including measures of central tendency and dispersion, were employed to assess the significance of observed changes.

Trustworthiness/Rigor

The study ensured rigor by adhering to established research protocols. Ethical considerations were observed, and data were collected using standardized instruments. The total population sampling method enhanced the representation of the study's population.

Ethical Consideration

Ethical approval was obtained from the relevant institutional ethics committee before the commencement of the study. Informed consent was obtained from each participant to ensure that they were fully aware of the study's purpose and the procedures involved, thereby safeguarding their rights and privacy. These comprehensive methods were employed to assess the effect of Moringa oleifera leaf juice intervention on the hemoglobin levels of pregnant women with anemia while upholding ethical standards and ensuring data reliability.

RESEARCH RESULT

Table 1 presents the demographic characteristics of the pregnant women participating in the study. It is crucial to understand the composition of the sample population to interpret the study's findings accurately.

Table 1. Characteristics of Pregnant Women with Anemia (n=31)

Variable	Frequency (F)	Percentage (%)
Gestational Age		
13-27 weeks (Trimester II)	14	46,7
28-41 weeks (Trimester III)	17	53,03
Occupation		
Unemployed	21	66,7
Trader	8	26,7
Civil Servant (PNS)	2	6,6
Education		
Intermediate (SMP, SMA)	29	93,3
Higher Education (S1)	2	6,7

Source: Data Analysis from Primary Data, 2023

Gestational Age: The sample included pregnant women across different gestational ages. Notably, 17 of the participants (53.3%) were in the third trimester (28-41 weeks), a critical period when the risk of anemia tends to be higher due to hemodilution. Hemodilution involves a significant increase in blood volume during pregnancy, which often results in a reduction in hemoglobin levels.

Occupation: The occupational distribution of the participants shows that a substantial portion (66.7%) were unemployed, primarily homemakers. Homemakers typically have a demanding workload associated with household and familial responsibilities. This can contribute to the risk of anemia, as the physical demands may affect their health.

Education: The education level of the pregnant women is a significant factor indirectly influencing anemia. In this study, the majority (93.3%) had intermediate education levels (SMP, SMA). Education plays a pivotal role in increasing awareness of anemia during pregnancy, affecting dietary habits and behaviors that are crucial for anemia prevention.

Table 2. Effectiveness of Moringa Leaf Juice in Reducing Hemoglobin Levels in Pregnant Women (n=31)

Mean (x)	Standard Deviation (Sd)	Standard Error (SE)	p-value	95% Confidence Interval (CI)
Pre 06.43	0,7717	0,1992	0,000	
Post 07.55	0,7316	0,1889		(-0,906) (-1,186)

Pre: Before the intervention, the mean hemoglobin level was 9.28, with a standard deviation of 0.7717 and a standard error of 0.1992.

Post: After the intervention, the mean hemoglobin level increased to 10.33, with a standard deviation of 0.7316 and a standard error of 0.1889. The paired sample t-test yielded a p-value of 0.000, signifying that the administration of Moringa leaf juice was highly effective in increasing hemoglobin levels in pregnant women.

These results illustrate the potential of Moringa leaf juice as an intervention to alleviate anemia in pregnant women, and its significance in improving maternal health during pregnancy.

DISCUSSION

The results of the study indicate that more than half of the pregnant women were in the third trimester (28-41 weeks) of pregnancy. During the third trimester, pregnant women are at risk of developing anemia due to hemodilution, where blood volume increases by 30-40%, peaking around weeks 32-34 of pregnancy. This physiological change can lead to anemia, particularly if the mother's initial hemoglobin levels were around 11%, as hemodilution may decrease it to 9.5-1(Tessa Sjahriani, 2019). In the early stages of pregnancy (trimester I), women may require additional nutritional intake due to loss of appetite or morning sickness, which can make them vulnerable to anemia (Benson, Shah, Frise, & Frise, 2021)

The majority of pregnant women with anemia in this study were not employed, with 66.7% being homemakers. Homemakers often bear a significant workload related to household and family responsibilities, which can be physically demanding. supports this, highlighting that even homemakers, particularly those with multiple children, might have a heavier workload (Isnaini, Yuliaprida, & Pihahey, 2021). Activities that help pregnant women stay active during early pregnancy can provide energy and enhance their overall strength for labor. However, strenuous work, especially during pregnancy, may lead to fatigue, stress, and a decline in hemoglobin levels, which can contribute to anemia.

The study also revealed that the majority of pregnant women had an intermediate education level (Junior High School, Senior High School) at 93.3%. Education indirectly influences anemia, as higher education levels tend to improve knowledge about anemia during pregnancy. Knowledge plays a role in shaping a pregnant woman's attitude and behavior towards daily food consumption, which can prevent anemia during pregnancy (Chandra, Junita, & Fatmawati, 2019). According to the researcher's assumption, knowledge is essential in various situations, especially during pregnancy. The level of education indirectly affects the likelihood of anemia in pregnant women. Higher education levels are associated with a lower risk of anemia during pregnancy, whereas lower education levels may increase the risk.

This aligns with the findings of (Sasono, Husna, Zulfian, & Mulyani, 2021) (Senjani Yulfani Putri, Sulistiawati, & Ardian Cahya Laksana, 2022) which indicate that higher education levels are linked to fewer cases of anemia in pregnant women. Highly educated pregnant women are more likely to adopt behaviors that prevent anemia during pregnancy compared to those with basic education levels. Education empowers pregnant women to think critically and find solutions to the challenges they may face.

Bivariate analysis was conducted to determine whether there was a significant difference in the mean hemoglobin levels before and after the administration of Moringa oleifera leaf juice for one week with three doses. The study found that the mean hemoglobin level increased from 9.28 before the treatment to 10.33 after the administration of Moringa leaf juice. The statistical test resulted in a p-value of 0.000, which is less than 0.05 (α), indicating that Moringa leaf

juice is effective in increasing hemoglobin levels in pregnant women with anemia.
Moringa oleifera leaves are rich in protein, iron, vitamin and other essential nutrients. The result of analysis shows that the percentages (%) of proteins, moisture, fat, carbohydrate of the leaves are respectively 11.9; 73.9; 1.1 and 10.6% for the cool matter. For the dry matter, the contents in proteins, moisture, fat and carbohydrate are respectively 27.2; 5.9; 17.1 and 38.6%. The result of the mineral composition expressed in mg for 100 g of matters are 847.1; 151.3; 549.6; 17.5; 1.3 and 111.5 in the cool matter respectively for the Calcium, Magnesium, Potassium, Iron, Zinc and Phosphor. The contents of same minerals analyzed for the dry matter are respectively 2098.1; 406.0; 1922.0; 28.3; 5.4 and 351.1. The result showed a satisfactory composition and a significant variability between the nutrients contents of different sectors. This plant can be valorized for a balanced nutrition of populations.(Yameogo, Bengaly, Savadogo, Nikiema, & Traore, 2011)
This research is in line with a study by (Laiskodat, Kundaryanti, & Novelia, 2021) The results showed that the average hemoglobin of pregnant women before the intervention in the experimental group was 9.813 g/dl with a standard deviation of 0.57. The hemoglobin level of pregnant women after being given Moringa leaf soup in the experimental group was 11.494 g/dl with a standard deviation of 1.24.

CONCLUSIONS AND SUGGESTIONS

The research findings reveal a substantial improvement in hemoglobin levels among pregnant women following the administration of Moringa oleifera leaf juice. The study indicated that the mean hemoglobin level before the intervention was 9.28, which significantly increased to 10.33 after the intervention. The p-value of 0.000 suggests a highly significant difference. Therefore, it can be concluded that Moringa oleifera leaf juice is effective in increasing hemoglobin levels in pregnant women. This intervention offers promise as a nutritional approach to address anemia among pregnant women, contributing to improved maternal health and potentially better outcomes for both mothers and their babies.

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