

**THE EFFECT OF CAVENDISH BANANA ADMINISTRATION ON HEMOGLOBIN LEVELS IN PREGNANT WOMEN WITH ANEMIA IN THE WORKING AREA OF BALOI PERMAI COMMUNITY HEALTH CENTER, BATAM CITY**

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**ABSTRACT**

*Anemia during pregnancy remains a significant public health problem in developing countries, including Indonesia. Maternal anemia increases the risk of adverse maternal and perinatal outcomes. Cavendish banana (*Musa paradisiaca*) is a tropical fruit containing nutrients that may support hemoglobin formation. In the working area of Baloi Permai Community Health Center, Batam City, 66 of 94 pregnant women recorded in 2025 had hemoglobin levels ranging from 8 to 11 g/dL. This study aimed to determine the change in hemoglobin levels following Ambon banana administration among pregnant women with anemia. A quasi-experimental study with a one-group pretest-posttest design was conducted at Baloi Permai Community Health Center from June to August 2025. The population consisted of 66 pregnant women with anemia, with 40 participants selected using purposive sampling. Hemoglobin levels were measured using a capillary blood sample with a Bloodtest Easy Touch GCHb device before the intervention and after 7 days. Participants received two medium-sized Ambon bananas (approximately 320 g) per day, divided into two doses after meals, for 7 consecutive days. The intervention was monitored by a midwife, and adherence was recorded using an observation sheet. Data were analyzed using SPSS. The mean hemoglobin level increased from 10.0 g/dL before the intervention to 11.8 g/dL after the intervention. Statistical analysis showed a significant difference between pre- and post-intervention hemoglobin levels ( $p = 0.001$ ). These findings indicate that Ambon banana administration was associated with an increase in hemoglobin levels among pregnant women with anemia. Pregnant women are encouraged to undergo regular antenatal screening and maintain adequate nutritional intake as part of anemia prevention and management.*

**Keywords: Anemia, Pregnant Women, Cavendish banana**

**INTRODUCTION**

Anemia in pregnancy remains a significant health problem in developing countries, including Indonesia. This condition affects not only maternal health but also fetal growth. A comprehensive understanding of the definition and epidemiology of anemia in pregnancy is essential for its appropriate management (Romauli Sipayung et al., 2024).

The global prevalence of anemia among pregnant women is estimated at 43.9%. By region, prevalence is estimated at 49.4% in Asia, 59.1% in Africa, 28.2% in the Americas, and 26.1% in Europe. Across developing countries as a whole, approximately 40% of pregnant women experience anemia; in Indonesia the prevalence is 37.1%, with the highest rate recorded in rural areas (37.8%) and the

lowest in urban areas (36.4%) (Yanti et al., 2022).

According to data from the Maternal Perinatal Death Notification (MPDN) system of the Ministry of Health, the number of maternal deaths increased from 4,005 cases in 2022 to 4,129 cases in 2023. The Maternal Mortality Ratio (MMR) in Riau Islands Province showed a declining trend over the 2015–2019 period, reaching 98.3 per 100,000 live births in the most recent three years. According to 2022 data from the Batam City Health Office, there were 38,778 pregnant women, with an MMR of 62.9 per 100,000 live births and 21 recorded maternal deaths. Anemia was identified as one of the contributing causes of maternal death (Rokom, 2024).

Anemia during pregnancy can adversely affect the delivery process, including postpartum hemorrhage (28%), shock (24%), prolonged labor (20%), uterine atony (11%), uterine inversion (8%), and other causes (5%), while its effects on the newborn include low birth weight (11%) and congenital defects (7%). Long-term consequences may include altered brain and cellular function resulting from intrauterine iron deficiency, as well as impaired growth, including stunting (Yanti et al., 2022).

Despite government prevention and control efforts, anemia rates continue to rise. Data from the Batam City Health Office recorded 1,844 cases of anemia among pregnant women in 2023, increasing to 1,931 cases in 2024, an increase of 87 cases. This rising trend is closely associated with maternal adherence to iron (Fe) tablet supplementation and inadequate consumption of iron-rich foods (Kesehatan Keluarga, 2024).

Anemia in pregnancy is largely attributable to iron deficiency, which is essential for red blood cell formation. Folate and vitamin B12 deficiencies also contribute to its occurrence. Additional contributing

factors include bleeding during pregnancy and multiple pregnancy, both of which increase iron requirements, as well as an imbalanced diet and certain chronic conditions such as digestive disorders. Without appropriate prevention, anemia in pregnancy can lead to complications such as pre-eclampsia, preterm birth, and impaired fetal development. Early management and education on anemia prevention are therefore essential for improving maternal and child health (Ratna Widhiastuti et al., 2025).

Pharmacologically, anemia can be prevented or treated with iron tablets, commonly referred to as blood-boosting tablets. Iron serves an essential physiological function as an electron carrier within cells and as an integral component of various enzymatic reactions in body tissues. Regular consumption of iron tablets also reduces the risk of anemia during pregnancy (Utami & Elytasari, 2020). For the management of anemia during pregnancy, women are generally advised to consume one Fe tablet (60 mg) per day; however, those already diagnosed with anemia are advised to take two tablets daily to accelerate recovery (Ministry of Health of the Republic of Indonesia, 2023).

Non-pharmacological interventions to increase hemoglobin levels in pregnant women include improving maternal nutrition through the consumption of Cavendish banana. Cavendish banana is widely cultivated in Indonesia, grows rapidly, and yields abundant fruit. It contains vitamin B6, which helps neutralize gastric acid, improves digestion, and provides energy for pregnant women. Regular consumption of Cavendish banana can increase hemoglobin levels in pregnant women with anemia (Pipih Napisah et al., 2024).

In addition, a medium-sized Cavendish banana contains approximately 23.5 mcg of folic acid, or about 5% of the daily requirement, helping to meet the increased

folate needs of pregnant women. Folic acid plays a key role in red blood cell formation; without adequate folate intake, red blood cell production remains below normal, increasing susceptibility to anemia. Folic acid acts together with vitamins C and B12 in supporting red blood cell synthesis. Banana consumption may therefore serve as a practical approach to managing anemia in pregnant women. Two Cavendish bananas per day may provide additional nutritional support for pregnant women with anemia as part of a balanced diet (Ana Yulia Safitri et al., 2024).

## **RESEARCH OBJECTIVES**

1. To determine the mean hemoglobin level before Cavendish banana administration in pregnant women in the working area of the Baloi Permai Community Health Center, Batam City.
2. To determine the mean hemoglobin level after Cavendish banana administration in pregnant women in the working area of the Baloi Permai Community Health Center, Batam City.
3. To determine the effect of Cavendish banana administration in the working area of the Baloi Permai Community Health Center, Batam City.

## **METHODS**

This study employed a quantitative quasi-experimental design using a one-group pretest-posttest approach. The study was conducted at Baloi Permai Community Health Center, Batam City, from June to August 2025. The population consisted of 66

pregnant women with anemia, and 40 participants were selected using purposive sampling. Inclusion criteria were pregnant women with Hb <11 g/dL who attended antenatal care, agreed to participate, and were willing to consume Ambon bananas for seven consecutive days. Participants who did not comply with the prescribed intervention were excluded.

Hemoglobin levels were measured using a Bloodtest Easy Touch GCHb with a capillary blood sample. The pretest was performed before the intervention, and the posttest was conducted after seven days. Participants received two medium-sized Ambon bananas (approximately 320 g) daily, divided into two doses after meals, for seven consecutive days. The intervention was monitored by a midwife, and adherence was recorded on an observation sheet. Participants were considered compliant when they completed the prescribed daily consumption.

Ethical approval was obtained from the Research and Community Service Institute of Universitas Batam (LPPM Universitas Batam), No. 107P/LPPM-UNIBA/PI-EC/VII/2025. Written informed consent was obtained from all participants after they received an explanation of the study procedures, benefits, confidentiality, voluntary participation, and right to withdraw.

Data were analyzed using SPSS. The normality of Hb data was assessed before selecting the appropriate paired analysis. A paired-sample *t*-test was used for normally distributed data, while the Wilcoxon signed-rank test was used otherwise, with statistical significance set at  $p < 0.05$

## RESULTS

### 1. Univariate Analysis

**Table 1 Characteristic respondents**

| Characteristic                    | Frequency | Percentage (%) |
|-----------------------------------|-----------|----------------|
| Age                               |           |                |
| <20 years and >35 years           | 21        | 52.5           |
| 20–35 years                       | 19        | 47.5           |
| Education                         |           |                |
| Elementary school (SD)            | 6         | 15             |
| Junior high school (SMP)          | 5         | 12.5           |
| Senior high school (SMA)          | 26        | 65             |
| Diploma/Bachelor's degree (D3/S1) | 3         | 7.5            |
| Occupation                        |           |                |
| Employed                          | 30        | 75             |
| Housewife                         | 10        | 25             |

Based on the table, the majority of respondents were within the higher-risk age range (<20 years and >35 years), comprising 21 respondents or 52.5% of all respondents, while 19 respondents (47.5%) were within the lower-risk age range of 20–35 years. Maternal age is one of the important risk factors influencing the occurrence of anemia during pregnancy. Pregnant women younger than 20 years and older than 35 years tend to have a higher risk of anemia compared with those aged 20–35 years.

In terms of education, 26 respondents (65%) had completed senior high school, 6 respondents (15%) had completed elementary school, 5 respondents (12.5%) had completed junior high school, and 3 respondents (7.5%) held a diploma or bachelor's degree. A higher level of education helps improve maternal understanding in addressing anemia.

Regarding occupation, 30 respondents (75%) were employed and 10 respondents (25%) were housewives. Physically demanding work can reduce rest time, thereby impairing optimal red blood cell formation.

### 2. Bivariate Analysis

#### a. Normality Test

**Table 2 Normality Test of the Effect of Cavendish banana Administration on Hemoglobin Levels in Pregnant Women with Anemia**

| Data Group        | Significance Value (Shapiro-Wilk) | Alpha Value |
|-------------------|-----------------------------------|-------------|
| Pretest Hb level  | 0.127                             | 0.05        |
| Posttest Hb level | 0.191                             | 0.05        |

The Shapiro-Wilk normality test yielded a significance value of 0.127 for the pretest and 0.191 for the posttest. As both values exceeded 0.05, the data were considered normally distributed.

**Table 3 Difference in Mean Hemoglobin Levels of Pregnant Women Before and After Cavendish banana Administration**

| Variable | N  | Mean | SD     | Min  | Max  |
|----------|----|------|--------|------|------|
| Pretest  | 40 | 10.0 | 0.5399 | 9.0  | 10.9 |
| Posttest | 40 | 11.8 | 0.5114 | 11.0 | 12.8 |

The analysis showed that the mean Hb level before Cavendish banana administration was 10.0 g/dL, increasing to 11.8 g/dL after administration—an increase of 1.8 g/dL in mean Hb level following the intervention.

### **b. Paired Sample t-Test**

**Table 4 Effect of Cavendish banana Administration on Hb Levels in Pregnant Women with Anemia**

| Hemoglobin | N  | Mean | SD     | p-value |
|------------|----|------|--------|---------|
| Pretest    | 40 | 10.0 | 0.5399 | 0.001   |
| Posttest   | 40 | 11.8 | 0.5114 |         |

A p-value of 0.001 ( $p < 0.05$ ) was obtained, indicating a statistically significant difference between the mean Hb levels before and after Cavendish banana administration. This means that  $H_a$  was accepted and  $H_0$  was rejected, and it can therefore be concluded that Cavendish banana administration has an effect on increasing Hb levels in pregnant women with anemia.

## **DISCUSSION**

### **1. Mean Hemoglobin Level in Pregnant Women Before Cavendish banana Administration**

Statistical analysis of the 40 respondents showed that the mean Hb level before the intervention was 10.0 g/dL (mild anemia), with a standard deviation of 0.5399. This mean value remained below the normal Hb threshold for pregnant women, which should ideally be  $\geq 11$  g/dL, indicating the need for intervention to improve anemia status.

Maternal age is closely related to the condition of the female reproductive organs. The healthy and safe reproductive age range is 20–35 years. Pregnancy before the age of 20 years may increase the risk of anemia, as women in this age group are often

biologically and emotionally immature, more prone to instability, and mentally less mature, making them more susceptible to psychological strain and, consequently, less attentive to meeting their nutritional needs during pregnancy. Pregnancy after the age of 35 years is associated with declining physical resilience and reduced iron absorption capacity, as well as a higher prevalence of comorbid conditions at this age (Iin Wahyuni & Dita Selvia Aditia, 2022).

Consistent with this theory, the majority of respondents in this study were within the higher-risk age group (<20 years and >35 years), which carries a greater risk of anemia. This finding is in line with the study of Senja Atika Sari HS et al. (2021), which found that pregnant women under 20 years of age and those over 35 years of age had a 3.921-fold higher risk of developing anemia

during pregnancy compared with women aged 20–35 years.

These results are also consistent with the study of Nour Hayati et al. (2025), which found that of 116 pregnant women in the higher-risk age group, 93 (80.2%) experienced anemia, while of 160 pregnant women in the lower-risk age group, only 23 (19.8%) experienced anemia. Chi-square analysis yielded a p-value of 0.000 ( $<0.05$ ), indicating a significant association between maternal age and the occurrence of anemia among pregnant women at Puskesmas Batulicin in 2024.

Socioeconomic status considerably influences pregnancy outcomes, as it relates to the fulfillment of maternal needs during pregnancy, including healthy food, delivery preparation supplies, medication, healthcare services, and transportation. This may lead pregnant women to seek employment to help meet family needs; however, many working pregnant women experience fatigue that leads them to neglect their own health status (Iin Wahyuni & Dita Selvia Aditia, 2022).

The majority of pregnant women in this study were employed. Employment status can influence maternal health condition, as working pregnant women tend to have higher physical activity and stress levels, which, if not balanced with adequate nutritional intake and rest, may lead to decreased hemoglobin levels and increased risk of anemia. In addition, work-related demands may affect adherence to healthy dietary habits, sometimes resulting in the consumption of less nutritious or fast food.

This finding is consistent with the study of Desi Haryani Aulia & Purwati (2022), which found that excessive workload leads to inadequate rest among pregnant women, resulting in suboptimal red blood cell production and an increased risk of anemia. Their chi-square test results indicated a significant association between occupation

and the occurrence of anemia in pregnant women.

## **2. Mean Hemoglobin Level in Pregnant Women After Cavendish banana Administration**

The results showed that the mean Hb level increased from 10.0 g/dL before the intervention to 11.8 g/dL after Cavendish banana administration. Statistical testing yielded a p-value of 0.001 ( $\alpha < 0.05$ ), indicating a statistically significant difference in mean Hb levels before and after the intervention. It can therefore be concluded that Cavendish banana administration has an effect on increasing hemoglobin levels in pregnant women with anemia.

Anemia in pregnancy remains a matter of particular concern for healthcare providers, especially midwives, given the persistently high prevalence of anemia in Indonesia. Contributing factors include young gestational age with inadequate nutritional intake, occupation, birth spacing, maternal age and parity, and varying economic conditions leading to imbalanced nutrient fulfillment. The effects of anemia in pregnancy include an increased risk of hemorrhage, impaired fetal growth, low birth weight, prolonged labor, impaired postpartum wound healing, and maternal and fetal weakness (Endang Wahyuningsih et al., 2023).

Education represents an effort to broaden an individual's knowledge and insight. It begins with a learning process aimed at understanding a subject and subsequently applying that knowledge in daily life. Higher levels of education are generally associated with greater ease of accessing information and knowledge, as education shapes an individual's attitudes and responses toward the information received (Ratna Juwita, 2023).

In this study, the majority of pregnant women had completed senior high school. Educational attainment plays an important role in influencing maternal hemoglobin levels. Pregnant women with higher levels of education tend to have better Hb levels, as they generally possess greater knowledge regarding the importance of nutrition and healthy dietary practices, such as daily fruit and vegetable consumption, as well as greater adherence to health-promoting behaviors, including regular consumption of Hb-boosting foods. Conversely, women with lower educational attainment often have diets dominated by staple foods and instant food products, with insufficient fruit and vegetable intake, and may have limited ability to plan healthy and nutritious meals.

The study of Lamia A. S. Ali et al. (2024) concluded that each increase in educational level was associated with increased knowledge and higher mean Hb levels. Education enhances maternal awareness and understanding of the importance of nutrition and health during pregnancy. With higher educational attainment, mothers are generally better able to access information regarding nutritious food consumption, iron supplementation, and good health practices, thereby improving their health status and Hb levels. In addition, higher education is associated with increased income and better access to healthcare services, which together may reduce the prevalence of anemia.

According to Christina Magdalena T et al. (2025), the high prevalence of anemia among pregnant women is attributable to limited maternal understanding of the effects of hemoglobin deficiency. Education influences all aspects of human life, including thought, emotion, and attitude. Higher levels of education are generally associated with more realistic and broader thinking patterns, including knowledge about anemia. Educational attainment also

underlies maternal attitudes in absorbing and processing health-related information.

Cavendish banana is a non-pharmacological therapeutic option consumed as a staple food in tropical regions. It is enriched with iron that is effectively utilized to address iron deficiency, with the mineral content being almost entirely absorbable by the body. Bananas are also rich in water-soluble folic acid and vitamin B6, which are required for nucleic acid and hemoglobin synthesis in red blood cells. Banana enriched with vitamin B6 can help neutralize gastric acid and improve digestion. In addition, bananas contain approximately 467 mg of potassium, while pregnant women require approximately 2,000 mg of potassium daily. Cavendish banana also contains vitamin C, which helps increase iron absorption; a combination of 200 mg of ascorbic acid (vitamin C) with iron salts can increase iron absorption by 25–50%. Consuming two Cavendish bananas daily after meals, either as dessert or as a preferred fruit choice, for 30 consecutive days, is highly beneficial for pregnant women in helping to manage anemia (Ani T Prianti et al., 2024).

Cavendish banana administration can increase hemoglobin levels in pregnant women because it contains essential nutrients involved in red blood cell formation, including iron, vitamin C, and protein, which can increase hemoglobin levels. The iron content of 100 g of Cavendish banana is approximately 0.50 mg. When combined with vitamin C, Cavendish banana can help enhance iron absorption in the body, thereby increasing maternal hemoglobin levels.

This is consistent with the study of Friska Sinaga et al. (2023), which found that mild anemia among pregnant women was associated with several factors, including low educational attainment (elementary school level), leading the researchers to emphasize the importance of maternal knowledge

through regular antenatal visits, which provide access to information about the effects of anemia. Pregnant women with mild anemia who consumed Cavendish banana regularly for 7 days, at a dose of two medium-sized bananas per day, showed a change in Hb status from mild anemia to normal. Chi-square testing yielded a p-value of 0.000 ( $<0.05$ ), indicating a significant association between Cavendish banana administration and hemoglobin levels among first-trimester pregnant women with mild anemia at TPMB Susi, Dolok Merawan, Serdang Bedagai Regency.

The study by Enny Widayati & Siti Aisah (2021), titled "Cavendish banana Administration to Increase Hemoglobin Levels in Third-Trimester Pregnant Women with Anemia," concluded that regular Cavendish banana consumption for 7 days produced a positive effect on improving anemia status. Vitamin C in Cavendish banana enhances dietary iron absorption, while vitamin B6 contributes to protein metabolism and red blood cell production.

An increase in hemoglobin levels was observed following regular Cavendish banana administration. The study, conducted on two pregnant women with anemia given Cavendish banana twice daily (320 g/day) for 7 days, found an increase in Hb from 9.7 g/dL to 11.3 g/dL in one participant and from 8.8 g/dL to 9.9 g/dL in the other (Enny Widayati & Siti Aisah, 2021).

The study by Nilda Yulita Siregar et al. (2022) found that regular Cavendish banana administration, twice daily for one consecutive week, significantly increased hemoglobin levels in pregnant women with anemia. The greater mean increase in Hb level in the intervention group compared with the control group indicates that the nutrient content of Cavendish banana, including iron, vitamin C, and vitamin B6, can more effectively stimulate hemoglobin production and absorption. Statistical testing yielded a p-

value  $<0.005$ , confirming a significant change in Hb levels before and after the Cavendish banana intervention.

In the intervention group, the mean Hb level increased from 9.09 g/dL to 10.13 g/dL after one week of Cavendish banana consumption, while in the control group, the mean Hb level increased from 8.95 g/dL to 9.42 g/dL.

According to the study by Rismawati et al. (2023), the incidence of anemia among pregnant women in Cianjur Regency increased annually, with the highest incidence in 2022 recorded at Puskesmas Naringgul (14.11%). Pregnant women remained at high risk of anemia despite Fe tablet supplementation. The study found that the mean hemoglobin level before Cavendish banana intervention was 9.72 g/dL, increasing to a mean of 11.02 g/dL after the intervention, with a significant effect of Cavendish banana on hemoglobin levels (p-value  $0.000 < 0.05$ ). The study concluded that Cavendish banana administration twice daily can increase hemoglobin levels in pregnant women with anemia, although it did not specify the duration required to achieve this increase.

In contrast, the case study by Ana Yulia Safitri et al. (2024) reported that in one respondent given Cavendish banana intervention, the initial Hb level of 10.6 g% (mild anemia) increased to 11 g% (no anemia) on day 7 and to 11.4 g% (no anemia) on day 14. In a second respondent given Fe intervention, the initial Hb level of 10.3 g% (mild anemia) increased to 10.6 g% (mild anemia) on day 7 and further increased to 11.1 g% (no anemia) on day 14. This indicates a difference in the time required to achieve increased Hb levels between Cavendish banana intervention and Fe supplementation.

As a significant increase can already be observed within 7 days, it may be assumed that a longer intervention period, such as 14

days as reported in some studies, could yield more optimal and stable improvement in hemoglobin levels. A 7-day duration is therefore considered sufficiently effective as an initial approach in managing anemia through Cavendish banana consumption. Accordingly, pregnant women with mild anemia can gain insight into the importance of Cavendish banana as a complementary therapy for anemia and may implement it independently at home. For midwives, this finding may support the development of varied approaches to Cavendish banana administration in anemia prevention among pregnant women.

To increase Hb levels in pregnant women, Cavendish banana was administered at a dose of 320 g (equivalent to two medium-sized bananas) daily for 7 days. Regular consumption of Cavendish banana can increase hemoglobin levels in pregnant women with anemia ( $p = 0.001$ ). Cavendish banana contains potassium, magnesium, phosphorus, calcium, iron, vitamins, carbohydrates, fiber, protein, and fat. A single ripe Cavendish banana contains 99 kcal, 1.2 g protein, 0.2 g fat, 25.8 g carbohydrate, 0.7 g fiber, 8 mg calcium, 28 mg phosphorus, 0.5 mg iron, and 72 g water. Nearly all of the mineral content of Cavendish banana is absorbable by the body, particularly iron, which reaches approximately 2 mg/100 g in dry weight, along with 0.8 mg zinc. Cavendish banana was found to be effective in increasing Hb levels in pregnant women, with an increase of 3.5 g/dL (Pipih Napisah et al., 2023).

A study of 14 pregnant respondents found a significant improvement following Cavendish banana consumption, with mean hemoglobin levels increasing from 10.50 g/dL (mild anemia) to a maximum of 12.0 g/dL. Statistical analysis using the dependent t-test yielded a  $p$ -value  $<0.05$  (0.000), confirming a significant effect between hemoglobin levels before and after

Cavendish banana consumption (Nanda Pratama Tampubolon et al., 2021).

The study by Susanti et al. (2024) demonstrated that consuming two Cavendish bananas daily for 7 days effectively increased hemoglobin levels in pregnant women with mild anemia, with maternal hemoglobin increasing from 10.2 g/dL to 11.6 g/dL.

Iron requirements increase during pregnancy, with a recommended dietary intake of approximately 27 mg/day. WHO recommends 30–60 mg/day of elemental iron supplementation for pregnant women, while higher therapeutic doses may be required for women diagnosed with anemia. Therefore, Ambon bananas should be considered a complementary nutritional source rather than a substitute for iron supplementation. In addition to iron supplementation, adequate consumption of iron- and protein-rich foods is essential. Such foods include animal-based sources such as meat, poultry, fish, and eggs, as well as plant-based sources such as legumes, green vegetables (e.g., water spinach, spinach, broccoli), and various fruits such as oranges, papaya, and banana (Susanti et al., 2024).

Cavendish banana is a food source that can be consumed for its high iron and vitamin C content. Vitamin C is required for iron absorption and, consequently, contributes to hemoglobin formation, thereby accelerating anemia recovery. Cavendish banana can be consumed by individuals of all ages without notable side effects, and is easily accessible and relatively inexpensive compared with other fruits (Siti Fatimah et al., 2024).

Although Cavendish banana consumption is rich in iron, vitamin C, and vitamin B6, all of which support hemoglobin synthesis, the resulting increase in hemoglobin levels among pregnant women may vary. This variation is primarily attributable to differences in iron absorption efficiency, which is influenced by dietary patterns, intake of other supporting nutrients,

maternal metabolic and health status, and consistency of consumption.

Field challenges encountered during the study included reduced appetite or reluctance among some pregnant women to consume Cavendish banana. In addition, bananas prepared for the study were occasionally consumed inadvertently by other family members, resulting in maternal intake that did not conform to the prescribed dosage. To address this, the researchers conducted intensive educational outreach to pregnant women and their families regarding the importance of adherence to Cavendish banana consumption for increasing maternal hemoglobin levels. Regular monitoring and counseling were also provided to motivate consistent consumption, with family involvement serving as a key strategy to ensure that the bananas were not consumed by others, thereby supporting optimal intervention outcomes and improved maternal hemoglobin levels.

Cavendish banana administration was supervised by midwives for 7 days, at a dose of two medium-sized bananas (approximately 320 g) per day. Administration was considered adherent if respondents consumed the bananas according to the midwife's instructions, and non-adherent if a respondent missed one dose or one day without banana consumption. The increase in hemoglobin (Hb) was assessed after 1 week (7 days), or upon completion of the Cavendish banana consumption period. A respondent was considered to have achieved an increase in Hb if her anemia status changed from mild anemia to normal (no anemia).

## **CONCLUSION**

1. The mean hemoglobin level in pregnant women before Cavendish banana administration was 10.0 g/dL.

2. The mean hemoglobin level in pregnant women after Cavendish banana administration was 11.8 g/dL.
3. There was a significant difference in mean hemoglobin levels before and after Cavendish banana administration in pregnant women with anemia ( $p$ -value = 0.001;  $p < 0.05$ ), indicating that Cavendish banana administration has an effective influence on increasing hemoglobin levels in pregnant women with anemia.

## **RECOMMENDATIONS**

### **1. For Respondents**

Pregnant women are encouraged to be more proactive in attending antenatal care visits to receive education on managing anemia during pregnancy.

### **2. For Healthcare Institutions**

The results of this study may serve as a guide for healthcare professionals, particularly midwives, in managing anemia among pregnant women without relying solely on pharmacological therapy.

### **3. For Future Researchers**

The findings of this study may serve as a foundation for future research, which can be further developed with a larger sample of respondents.

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