Increasing haemoglobin level of pregnant women: potential of corn cookies and purple sweet potato cookies

Meningkatkan Kadar Hemoglobin Ibu Hamil: Potensi Cookies Jagung dan Cookies Ubi Ungu

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ABSTRACT

Background: *Iron deficiency anemia is common in pregnant women and can cause premature birth, low birth weight, and labor complications. Corn and purple sweet potatoes are foods rich in iron, folic acid, and antioxidants.*

Objective: *The study aimed to determine the effect of consuming corn cookies and purple sweet potato cookies on increasing hemoglobin levels in pregnant women.*

Methods: *The method used was a quasi-experimental design with a pre-post test only with a control group. After the initial hemoglobin examination (pre-test) in the three groups, an intervention was given: corn cookies and purple sweet potato cookies for 14 days in the intervention group, and a repeat Hb examination in the 3 groups (Post-Test). The study sample was 30 respondents and was analyzed using Kruskal-Wallis.*

Results: *The results showed a statistically significant difference in average hemoglobin (Hb) value after treatment between the three study groups, namely the purple sweet potato cookies group (19.40), the corn cookies group (16.30), and the control group (10.80). The results of the calculation of the nutritional value of corn cookies per serving (100 gr), obtained energy results of 171.2 Kcal, Protein 3.66 g, Fat 11.94 g, carbohydrates 14.26 g, and Iron (Fe) of 1.32 mg while the nutritional value of purple sweet potato cookies per serving (100 gr), shows energy of 180.1 Kcal, protein 3.18 g, fat 12.22 g, carbohydrates 16.14 g, and Iron (Fe) of 1.58 mg.*

Conclusion: *Purple sweet potato cookies and corn cookies have the potential to increase hemoglobin levels in pregnant women.*

Keywords: *anemia, corn cookies, pregnant women, purple sweet potato cookies,*

ABSTRAK

Latar Belakang: Anemia defisiensi besi umum terjadi pada wanita hamil dan dapat menyebabkan kelahiran prematur, berat badan lahir rendah, dan komplikasi persalinan. Jagung dan ubi jalar ungu merupakan makanan yang kaya akan zat besi, asam folat, dan antioksidan, yang dapat meningkatkan kadar hemoglobin.

Tujuan: Tujuan penelitian untuk mengetahui pengaruh konsumsi cookies jagung dan cookies ubi ungu terhadap peningkatan kadar hemoglobin pada ibu hamil. Metode yang digunakan adalah kuasi eksperimen dengan desain *pre-post test only with control group*. Setelah pemeriksaan hemoglobin awal (*pre-test*) pada ketiga kelompok kemudian dilakukan intervensi pemberian cookies jagung dan cookies ubi ungu selama 14 hari pada kelompok intervensi, dan dilanjutkan pemeriksaan Hb ulang pada ke-3 kelompok (*post-test*). Sampel penelitian sebanyak 30 responden dengan metode *purposive sampling*. Data dianalisis dengan *Kruskal-Wallis*.

Hasil: Hasil penelitian menunjukkan adanya perbedaan yang signifikan secara statistik pada nilai rata-rata hemoglobin (Hb) setelah perlakuan antara tiga kelompok studi, yaitu kelompok cookies Ubi Ungu sebesar (19,40), kelompok cookies jagung (16.30), serta kelompok kontrol (10.80). Hasil perhitungan nilai gizi cookies jagung per porsi (100 gr), diperoleh hasil energi sebesar 171.2 Kkal, Protein 3.66 g, Lemak 11.94 g, karbohidrat 14.26 g, dan Zat Besi (Fe) sebesar 1.32 mg sedangkan nilai gizi cookies

ubi ungu per porsi (100 gr), menunjukkan energi sebesar 180.1 Kkal, protein 3.18 g, lemak 12.22 g, karbohidrat 16.14 g, dan Zat Besi (Fe) sebesar 1.58 mg.

Kesimpulan: Dengan demikian cookies Ubi Ungu dan cookies Jagung berpotensi meningkatkan kadar Hemoglobin pada ibu hamil.

Kata kunci: anemia, ibu hamil, cookies jagung, cookies ubi ungu

INTRODUCTION

Anemia in pregnant women remains a significant public health problem in developing countries. Globally, approximately 38-42% of pregnant women suffer from anemia. This condition is defined as hemoglobin levels below 11 g/dL during the first and third trimesters or below 10.5 g/dL in the second trimester. [1]

In Indonesia, the prevalence of anemia among pregnant women aged 15-24 is estimated to range from 36% to 48.9%, highlighting the severity of this issue locally[2]. Anemia increases the risk of adverse outcomes such as preeclampsia, low birth weight, and maternal mortality. Young maternal age (especially under 20 years old) and first-trimester pregnancies are associated with higher rates of anemia [3]. Purple sweet potato has been shown to have significant iron (Fe) content and has the potential to help meet the Nutritional Adequacy Rate (RDA) needs, ranging from 1.85 to 2.77 mg per 100 grams of dry weight.[4] and the research [5] Sri Lanka (4.2-6.3 mg/100g), Malaysia (5.45 mg/100g) and Ethiopia (8.7-11.45 mg/100g) concluded that iron plays an important role in various metabolic reactions of the body, including as components such as hemoglobin and myoglobin, as well as enzymes such as cytochromes, catalases, and peroxidases. Other research [6] on biofortified corn has more than doubled the iron content, reaching 70.5 mg/kg (7.05 mg/100 g).

Several factors contribute to this high prevalence include maternal age, parity, and nutritional status, with significant correlations found between these characteristics and the incidence of anemia [7]. Anemia affects not only mothers but also contributes to increased neonatal morbidity and mortality by causing adverse outcomes such as low birth weight, preterm birth, and postpartum complications, including hemorrhage and preeclampsia. Therefore, early detection and proper management of anemia are crucial in preventing these complications [8]. Anemia during pregnancy significantly impacts both maternal and fetal health, leading to a variety of adverse outcomes. Studies show that anemia is prevalent among pregnant women, with varying degrees of severity, including mild, moderate, and severe forms [9]. The condition is associated with an increased risk of low birth weight, preterm labor, and neonatal complications such as higher rates of NICU admissions [10]. The effects of anemia in pregnant women correlate with complications such as postpartum hemorrhage and preeclampsia, highlighting the need for early diagnosis and treatment [11].

Maternal anemia remains a significant public health concern associated with increased maternal and child mortality; therefore, the government has implemented iron (Fe) supplementation programs for pregnant women. As a preventive measure, the government and the World Health Organization recommend daily iron (Fe) tablet supplementation for pregnant women for 90 days. Although iron is essential during pregnancy, Fe tablets often cause side effects such as nausea and vomiting, especially during the first trimester [12]. In addition to iron and folic acid supplementation, interventions based on dietary modifications and health education are highly recommended. Research indicates that iron supplementation, especially when combined with other micronutrients or natural sources such as moringa, significantly reduces the prevalence of anemia [13]. Community-based awareness campaigns and family empowerment initiatives are essential to improve nutrition knowledge and

adherence to dietary recommendations [14]. Integration of health services and regular check-ups facilitates early detection and effective management of anemia[15].

However, the main challenge in iron tablet supplementation is poor adherence due to uncomfortable side effects, including nausea, vomiting, abdominal pain, diarrhea, constipation, dizziness, and black stools. This non-adherence increases the risk of anemia by up to 5.87 times. Untreated anemia can result in premature birth (before 37 weeks), fetal distress, labor complications, as well as low birth weight (<2500 grams) and short stature (<48 cm) infants [16], [17]

To address these challenges, this study investigates the potential of cookies made from corn and purple sweet potato as an alternative intervention to increase hemoglobin levels in pregnant women. Corn-purple sweet potato cookies are an innovative way to raise hemoglobin in pregnant women. Unlike prior trials that used one food. The unique study employs cookies as a practical snack that pregnant women enjoy. Corn contains non-heme iron, folate, vitamin B6, and zinc, which help synthesize hemoglobin[18]. Purple sweet potato is rich in anthocyanins, vitamin C, and antioxidants that can increase iron absorption and protect red blood cells from oxidative damage [19].

This research has the potential to provide a sustainable solution to anemia in pregnant women by utilizing locally available food sources in an acceptable format [20]. Conventional approaches to address anemia in pregnant women generally rely on iron tablet supplementation, which often causes side effects such as nausea, vomiting, and constipation. Low supplement compliance necessitates creative, more acceptable, and effective alternatives. Therefore, this study aims to evaluate the effectiveness of corn and purple sweet potato cookies in improving hemoglobin levels in pregnant women as a more acceptable and practical alternative intervention for anemia.

METHODS

Study design

This study employed a quantitative research approach involving numerical data analysis to address the research problem. A quasi-experimental design with a pretest–posttest control group framework was utilized. The intervention consisted of administering cookies made from corn and purple sweet potato at a dose of 100 grams per day. The study was conducted at Lowu-Lowu Health Center, Baubau City, Southeast Sulawesi, from August to October 2024.

Data source and sampling procedure

The total population consisted of 30 anemic pregnant women at Lowu-Lowu Health Center. A total sampling technique was applied, in which all eligible participants who met the inclusion criteria were included, resulting in 30 participants in this study[26]. The participants were then allocated into three groups, consisting of one control group and two intervention groups, with 10 participants in each group. Inclusion criteria included willingness to participate, pregnant women in trimesters I–III, and those diagnosed with anemia. Exclusion criteria included pregnant women with degenerative diseases such as diabetes, infections, Chronic Energy Deficiency (CED), and those consuming certain herbal foods or drinks. Dropout criteria included irregular consumption of cookies and the occurrence of sensitivity reactions.

Variables of the study

The independent variable in this study was the type of nutritional intervention administered to pregnant women, namely corn cookies and purple sweet potato cookies, as well as standard iron (Fe) supplementation in the control group. The dependent variable was the hemoglobin (Hb) level of pregnant women, which was

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measured before (pre-test) and after (post-test) the 14-day intervention period. The changes in hemoglobin levels were used to assess the effectiveness of the nutritional interventions in improving anemia status among pregnant women.

Data Collection

Data collection tools included a consumption monitoring sheet and interviews. A daily consumption diary was used to monitor participants' compliance with the intervention. Hemoglobin levels were measured before (pretest) and after (posttest) the intervention using a digital Hb meter.

Measurement and instruments

The intervention cookies (corn and purple sweet potato) were given at a dose of 100 grams per day to each group. To monitor the level of compliance of the subjects, a daily consumption diary was used. The intervention group received purple sweet potato and corn cookies after the control and intervention groups measured Hb (pre-test). The production of purple sweet potato and corn cookies involves specific tools, ingredients, and steps. The tools are categorized for grinding (knife, grinder, sieve, bags), biscuit preparation (mixer, gloves, bowls, oven, cutters, jars), and hemoglobin analysis (Hb meter, strips, lancets, notebook). The ingredients of corn cookies and purple sweet potato cookies can be seen in table 1 and table 2:

Table 1. Ingredients of Corn Cookies

Ingredients	Total Ingredient/ One recipe
Corn Flour	200 gr
Margarine	160 gr
Fine Sugar	100 gr
Egg Yolk	3 eggs
Cornstarch	40 gr
Vanilla	0.5 gr
Milk Powder	20 gr
Salt	0.5 one teaspoon

Source:[21]

Table 2. Ingredients of Purple Sweet Potato Cookies

Ingredients	Total Ingredient/ One recipe
Purple Sweet Potato Flour	200gr
Margarine	160 gr
Fine Sugar	100 gr
Egg Yolk	3 eggs
Cornstarch	40 gr
Vanilla	0.5 gr
Milk Powder	20 gr
Salt	0.5 one teaspoon

Source:[21]

The process entails three main stages: First, drying the sorted, washed, peeled, and sliced ingredients. Second, producing flour by grinding and sifting the dried pieces. Finally, making the biscuit dough by mixing the wet and dry ingredients, shaping the dough, and baking it at 160–170°C for approximately 15 minutes until the cookies are ready to be served. Based on the weighing results, the average weight per piece for both types of cookies (corn and purple sweet potato) is 50 grams. Proximate tests were not used in this study because the research location did not have adequate laboratory facilities.

The results of the calculation of nutritional value in Table 3, namely the nutritional value of corn cookies per portion (100 gr), obtained energy results of 171.2 Kcal, Protein 3.66 g, Fat 11.94 g, Carbohydrates 14.26 g, and Iron (Fe) of 1.32 mg. Table 4,

namely the nutritional value of purple sweet potato cookies per portion (100 gr), shows the results of energy 180.1 Kcal, Protein 3.18 g, Fat 12.22 g, carbohydrates 16.14 g, and Iron (Fe) of 1.58 mg. This research explains that one recipe of corn cookies produces about 40 pieces of cookies with an average weight of 50 grams per piece, while one recipe of purple sweet potato cookies produces 38 pieces of cookies with a similar weight. The intervention group was given cookies made from corn and purple sweet potato at a dose of two pieces per day (equivalent to 100 grams) for 14 days[23]. The cookies were given as snacks after morning and evening meals [24] [25]. The following is a product visualization of biscuits made from corn and purple sweet potato, formulated for pregnant women with anemia.

Table 3. Nutritional Composition of Corn Cookies Based on the Indonesian Food Composition Table [22]

Material	Weight (g)	Energy (kcal)	Proteins (g)	Fat (g)	Carbohydrates (g)	Iron/ Fe(mg)
Corn Flour	200	710	18.4	7.8	147.4	4.8
Margarine	160	1152	0.96	129.6	0.64	0
Fine Sugar	100	394	0	0	94.0	0.1
Egg Yolk	3 eggs	1065	48.9	95.7	2.1	21.6
Constrach	40	0.4	0.12	0	34	0.6
Vanilla	0.5	0 kcal	0	0	0	0
Milk Powder	20	102.6	4.92 g	6	7.24	0.12
Salt	0.5 one teaspoon	0	0	0	0	0
Total Nutritional Value / 1 recipe		3424	73.3	239.1	285.3	26.6
Total Nutritional Value/piece		85.6	1.83	5.97	7.13	0.66
Total Nutritional Value / 100 gr (Portion)		171.2	3.66	11.94	14.26	1.32

Table 4. Nutritional Composition of Purple Sweet Potato Cookies Based on the Indonesian Food Composition Table [22]

Material	Weight (g)	Energy (kcal)	Proteins (g)	Fat (g)	Carbohydrates (g)	Iron/ Fe(mg)
Purple Sweet Potato Flour	200	708	5.6	1.2	168.8	7.8
Margarine	160	1152	0.96	129.6	0.64	0
Fine Sugar	100	394	0	0	94.0	0.1
Egg Yolk	3 eggs	1065	48.9	95.7	2.1	21.6
Constrach	40	0.4	0.12	0	34	0.6
Vanilla	0.5	0	0	0	0	0
Milk Powder	20	102.6	4.92 g	6	7.24	0.12
Salt	0.5 tsp	0	0	0	0	0
Total Nutritional Value / 1 recipe		3422	60.5	232.5	306.7	30,2
Total Nutritional Value / piece		90.05	1.59	6.11	8.07	0.79
Total Nutritional Value / 100 gr (Portion)		180.1	3.18	12.22	16.14	1.58

Figure 1. Corn Cookies and Purple Sweet Potato Cookies

The control group received the standard intervention of blood supplementation (Fe) tablets at a dose of 1 tablet per day (usually containing 60 mg of iron and 400 mcg of folic acid), which was also taken for 2 weeks. Furthermore, Hemoglobin levels were measured using a digital Hb meter by taking blood samples before (pre-test) and after (post-test) the intervention.

Ethical Considerations

This research has been reviewed and approved by the Baubau Polytechnic Research and Community Service Center (LPPM) with ethical approval number 93/PL.B/D.KPS4/IV2025. Informed consent was obtained from all participants prior to the intervention. Participants were also provided with education regarding the benefits of the study, particularly the use of local foods such as purple sweet potato and corn.

Data Analysis

Data analysis was performed using SPSS version 23. The Kruskal–Wallis test was used to analyze differences between groups, while the paired t-test was conducted to assess differences between pretest and posttest within each group. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 5. Characteristics of Study Participants

Variable	Intervention Group 1 (Corn Cookies)		Intervention Group 2 (Purple Sweet Potato Cookies)		Control Group (Standard Fe Tablet)		Total	
	N	%	N	%	n	%	n	%
Age								
< 20 years	1	10	2	20	1	10	4	13.3
≥ 20 years	9	90	8	80	9	90	26	86.7
Education level								
Primary school	1	10	2	20	1	10	4	13.3
Junior high school	2	20	2	20	2	20	6	20.0
Senior high school	5	50	4	40	5	50	14	46.7
Diploma	1	10	1	10	0	0	2	6.7
Bachelor's degree	1	10	1	10	2	20	4	13.3
Occupation								
Homemaker	8	80	9	90	8	80	25	83.3
Employed	2	20	1	10	2	20	5	16.7
Mode of Delivery								
Vaginal Delivery	8	80	9	90	8	80	25	83.3
Cesarean section	2	20	1	10	2	20	5	16.7
Pregnancy Status								
Primigravida	4	40	5	50	4	40	13	43.3
Multigravida	6	60	5	50	6	60	17	56.7
Total	10	100	10	100	10	100	30	100

Table 5 shows that 30 pregnant women with anemia were randomly assigned into three groups: Intervention Group 1 (fortified corn cookies, n=10), Intervention Group 2 (fortified purple sweet potato cookies, n=10), and a Control Group (Fe tablets, n=10). Participant characteristics were relatively homogeneous across groups, allowing valid comparisons. Most participants (86.7%) were aged ≥20 years, with a balanced distribution, although Intervention Group 2 had slightly more younger mothers (<20 years, 20%). In terms of education, the majority had completed senior high school (46.7%), followed by junior high school (20%) and bachelor's degree (13.3%),

indicating adequate literacy. Most participants were homemakers (83.3%), especially in Intervention Group 2 (90%), reflecting common socioeconomic conditions.

Regarding obstetric history, most had previous vaginal deliveries (83.3%), and pregnancy status was fairly balanced between primigravida (43.3%) and multigravida (56.7%), suggesting prior pregnancy experience in most participants. The study outcomes are further illustrated in the following figure 1.
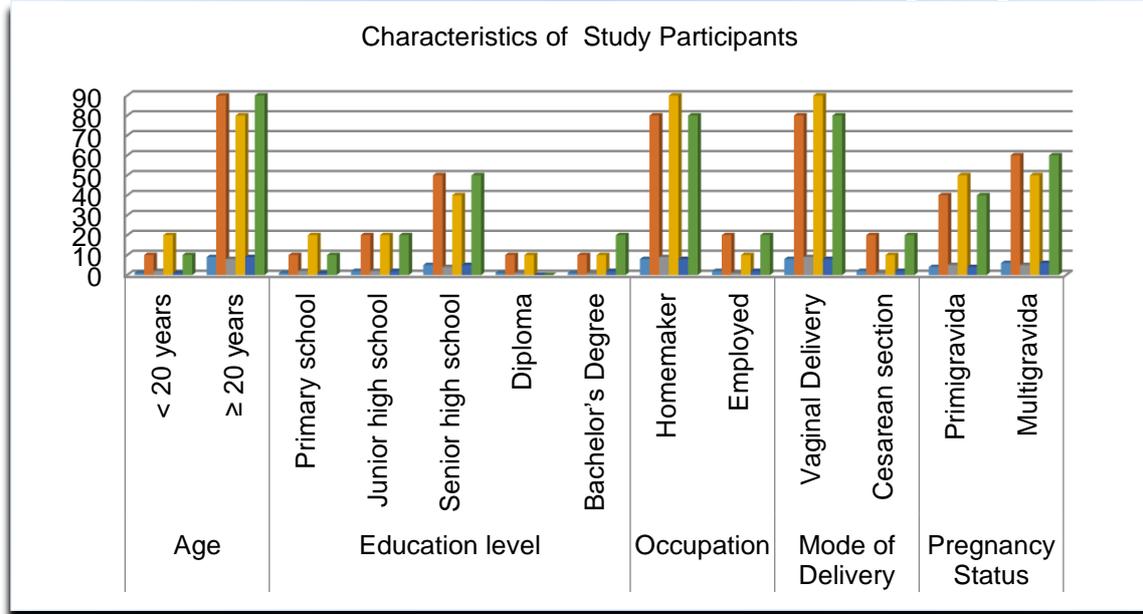

Figure 1. **Visualization of Respondent Characteristics**

Table 6. **Mean Hemoglobin (Hb) Value Before and After Treatment**

Group	N	Mean rank	p-value
Before treatment			
Purple sweet potato	10	16	
Corn	10	16	0.87
Control	10	14.5	
After treatment			
Purple sweet potato	10	19.4	
Corn	10	16.3	0.04
Control	10	10.8	

Source: Analysis with Kruskal-Wallis

Table 6 shows no significant difference in baseline haemoglobin (Hb) levels among the purple sweet potato, corn, and control groups (p=0.87>0.05). However, after treatment, there was a significant difference between groups (p=0.04<0.05). Mean rank analysis indicated that the purple sweet potato group had the highest increase (19.40), followed by the corn group (16.30), while the control group had the lowest (10.80). This suggests that the purple sweet potato intervention was the most effective in increasing Hb levels, followed by corn, with minimal change in the control group.

DISCUSSION

In pregnancy, anemia occurs when red blood cell (Hb) levels are low, reducing oxygen transport throughout the body and the baby. The normal limit for Hb is ≥ 11 g/dl. This anemia commonly arises during pregnancy because fetal development and the mother's bodily changes need more iron, folate, and other nutrients [27]. In this

study, significant differences in hemoglobin levels were observed among the three groups after intervention (p= 0.04 < 0.05). At baseline, the majority of participants in the intervention and control groups experienced mild to moderate anemia: 50% in the intervention group and 70% mild anemia plus 30% moderate anemia in the control group. After 14 days of treatment, there was a notable improvement in Hb levels (≥11 g/dL) with 80% of participants in the purple sweet potato group, 60% in the corn group, and only 20% in the control group reaching non-anemic status.

The results of this study are in line with [28],[29], regular consumption of purple sweet potatoes or processed cookies can be an alternative or complement to iron supplementation to prevent and overcome anemia in pregnant women. Another research fact purple sweet potatoes are quite high in iron (about 2-4 mg/100g), as well as vitamin C, which helps the absorption of non-heme iron[30],[29]. Corn-based interventions helped reduce anemia, but the effect was not as strong as the high bioavailability of purple sweet potatoes' iron source [31]. Research indicates that the efficacy of iron absorption in pregnant women is influenced by several determinants, including limited educational attainment, insufficient prenatal care, dietary deficiencies, and socioeconomic status. These interrelated factors are key contributors to the high incidence of iron-deficiency anemia, which subsequently exerts a considerable impact on both maternal and child health outcomes [32].

Complementary therapies in midwifery refer to alternative or additional approaches to support the health care of pregnant women. These therapies do not replace conventional medical care but are complementary in nature. One part of obstetric complementary therapy is plants or natural ingredients to support maternal and fetal health [33]. Local sweet potatoes are abundant. The purple sweet potato intervention group had an average rise in haemoglobin levels of 8 responders (80%) with Hb levels ≥ 11 g/dl. This is research by Novidha & Zuriah (2023) in pregnant women, purple sweet potato (Ipomoea batatas) boosts hemoglobin levels, notably in the second and third trimesters. A Merangin regency research found that pregnant women's hemoglobin levels rose from 10.4 to 11.8 g/dl after eating purple sweet potatoes [19].

In addition, a review of the literature shows that purple sweet potatoes contain iron (0.7 mg per 100 grams) and vitamin C, which increases iron absorption, thereby contributing to increased hemoglobin levels [34]. Due to increasing blood needs for the developing baby, pregnant women need iron and folic acid to avoid iron deficiency anemia [35]. Sweet potatoes are purple because anthocyanins, antioxidants, protect red blood cells from free radical damage, promoting a healthy circulatory system [36]. According to [37], purple sweet potato may be utilized as an alternate diet to increase hemoglobin and avoid anemia. Purple sweet potatoes are an iron-rich food that pregnant women should eat together with Fe pills.

Corn may help pregnant women with anemia. Most responders in the corn intervention group had a 60% rise in haemoglobin levels, with Hb values ≥ 11 g/dl. Corn provides fiber, Fe, and beta-carotene, which are beneficial to its nutrition. This matches the research [38], which demonstrated required iron fortification of wheat flour and corn reduced pregnancy-related anemia. Fortification reduced second- and third-trimester anemia compared to previously. Additionally, post-fortification pregnant women had greater hemoglobin concentrations, notably in the second and third trimesters. An alternative view [39] local food products based on instant bose corn fortified with iron (Fe) as an effort to overcome anemia in adolescent girls. The two-month intervention showed that consumption of instant Bose corn, whether fortified or not, significantly increased hemoglobin (Hb) levels. Corn is a food source that is easily accessible, affordable, and can be processed in various forms, one of which is made

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into cookies. In addition to iron and folic acid, corn consumption can help control blood sugar levels, support digestive health, and provide a variety of nutrients needed during pregnancy. Research conducted by [40], contrary to trimester I pregnancy concerns, suggests that corn is used. A combination of corn and date pudding also showed positive effects on Hb levels in anemic pregnant women [41]. These findings suggest that various plant-based foods can potentially help prevent and manage anemia during pregnancy. The studies emphasize the importance of addressing anemia in pregnant women due to its potential risks for both mother and child, including miscarriage, premature birth, low birth weight, and developmental issues in children [42].

Based on the results of this study, purple sweet potatoes and corn can elevate hemoglobin levels faster than iron supplements. The mean rank of 19.40 shows that purple sweet potato cookies were more successful than the other two groups in this investigation. Thus, purple sweet potato and corn may be used with Fe pills to treat anemia in pregnant women.

The implications of this study for the health of pregnant women are consumption of corn and purple sweet potato during pregnancy provides good nutritional benefits, ranging from preventing anemia, maintaining the immune system, supporting fetal development, to helping digestive and eye health. This is in line with the research Ulfiana (2019) stated consume purple sweet potatoes (tubers/leaves) regularly as an effective natural supplement to increase Hb and support healthy weight gain in pregnant women [43]. Combine with corn as a source of folic acid and antioxidants, and support the pregnant woman's diet with other sources of protein and vegetables. In addition, according to Mardha (2023), giving purple sweet potato decoction has a significant effect on increasing hemoglobin (Hb) levels in pregnant women[44]. Mean rank analysis confirmed that purple sweet potato cookies (19.40) were more effective than corn cookies and iron tablets alone, suggesting that nutrient-rich local foods can complement iron supplementation in managing anemia during pregnancy.

These cookies have potential as a supportive intervention; however, the study's generalizability is limited by its specific setting (Lowu-Lowu, Baubau City), small sample size, and short intervention period (14 days). Future studies should involve larger, more diverse populations and longer durations to assess long-term effects. Further research is also needed to optimize formulation—such as iron fortification and adding micronutrients (folic acid, vitamin C, vitamin B12)—and to evaluate safety, acceptability, and optimal dosage for broader implementation in maternal health programs.

CONCLUSION

The study showed a significant difference in post-treatment hemoglobin (Hb) levels among the three groups—purple sweet potato cookies, corn cookies, and control (p=0.04≤0.05). Mean rank analysis indicated the highest increase in the purple sweet potato group (19.40), followed by the corn group (16.30), and the control group (10.80). Nutritional content per 100 g showed that corn cookies contained 171.2 kcal, 3.66 g protein, 11.94 g fat, 14.26 g carbohydrates, and 1.32 mg Fe, while purple sweet potato cookies contained 180.1 kcal, 3.18 g protein, 12.22 g fat, 16.14 g carbohydrates, and 1.58 mg Fe.

These findings indicate that both purple sweet potato (Ipomoea batatas L.) and corn (Zea mays) cookies have potential to increase Hb levels in pregnant women, with purple sweet potato showing greater effectiveness. This supports the use of local, nutrient-rich foods as complementary therapy for anemia and highlights the role of functional food diversification to improve maternal nutrition, particularly iron intake.

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