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The Effect Of Purple Sweet Potato Processed Product Innovation On The Nutritional Status And Hemoglobin Levels Of Pregnant Women In Mongeudong Village, Lhokseumawe City

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Abstract

Food innovations based on local ingredients have the potential to improve the nutritional status and health of pregnant women. One of the local foods rich in nutrients is purple sweet potato, which contains complex carbohydrates, iron, and antioxidants. This study aims to analyze the effect of purple sweet potato product innovations on the nutritional status and hemoglobin levels of pregnant women in Mongeudong Village, Lhokseumawe City. This study used a quasi-experimental design with a pretest–posttest approach without a control group. The sample consisted of 34 pregnant women in their second and third trimesters selected using a total sampling technique. Nutritional status data were measured using BMI/MUI and hemoglobin levels were measured using a digital Hb device. Data analysis included univariate and bivariate analyses using paired t-tests. The results showed an increase in the nutritional status of pregnant women from 44.1% to 67.6% after the intervention. In addition, the proportion of pregnant women with normal hemoglobin levels increased from 41.2% to 70.6%. The statistical test results showed a significant effect of purple sweet potato product innovations on nutritional status (p = 0.002) and hemoglobin levels of pregnant women (p = 0.001). The conclusion of this study shows that the innovation of processed purple sweet potato products is effective in improving the nutritional status and hemoglobin levels of pregnant women.

Keywords: Data Science, Python, Big Data, Customer Transactions, Clustering.

INTRODUCTION

Maternal nutrition remains a major public health concern, particularly in developing countries. Poor nutritional status and anemia during pregnancy contribute significantly to maternal and neonatal morbidity and mortality. Inadequate nutrient intake during pregnancy can increase the risk of complications such as low birth weight, preterm birth, postpartum hemorrhage, and impaired fetal development. Therefore, improving maternal nutrition is a critical strategy to ensure the health of both mother and fetus.

Anemia in pregnancy is one of the most prevalent nutritional problems worldwide and is commonly caused by iron deficiency, inadequate dietary intake, and poor absorption of nutrients. According to the World Health Organization, anemia affects a substantial proportion of pregnant women globally and remains a persistent challenge in maternal health programs. Efforts to reduce anemia often focus on iron supplementation; however, dietary-based interventions are increasingly recognized as sustainable and culturally acceptable solutions.

Utilization of local food resources represents an effective approach to improving maternal nutrition. Local foods are generally more accessible, affordable, and culturally acceptable compared to fortified or imported products. Purple sweet potato is a widely available local food that contains carbohydrates, dietary fiber, iron, vitamin C, and anthocyanins, which function as antioxidants. These nutrients play an important role in supporting energy needs, improving iron absorption, and enhancing overall health during pregnancy.

Product innovation is essential to increase the acceptability and consumption of nutritious local foods among pregnant women. Processing purple sweet potato into various innovative food products can improve taste, texture, and shelf life, thereby increasing its appeal and regular consumption.

Innovative food products may also help overcome monotony in daily diets and encourage pregnant women to consume nutrient-dense foods consistently.

Previous studies have shown that dietary interventions using local food sources can positively influence nutritional status and hemoglobin levels among vulnerable populations, including pregnant women. However, evidence regarding the effectiveness of processed purple sweet potato products specifically targeted at pregnant women remains limited, particularly in the local context of Lhokseumawe City.

In addition, socioeconomic factors such as education level, employment status, and gestational age influence dietary patterns and nutritional outcomes among pregnant women. Understanding these characteristics is important for designing appropriate nutrition interventions. Most pregnant women in rural and semi-urban areas rely on household-based food sources, making local food innovation highly relevant.

Furthermore, the second and third trimesters of pregnancy are critical periods characterized by increased nutritional requirements to support rapid fetal growth and maternal physiological changes. Insufficient nutrient intake during these stages may exacerbate the risk of anemia and poor nutritional status.

Based on these considerations, this study aims to examine the effect of processed purple sweet potato product innovation on the nutritional status and hemoglobin levels of pregnant women in Mongeudong Village, Lhokseumawe City. The findings are expected to contribute to evidence-based recommendations for community-based nutrition interventions utilizing local food resources.

RESEARCH METHODS

This study employed a quasi-experimental design with a one-group pretest–posttest approach without a control group. The research was conducted in Mongeudong Village, Lhokseumawe City. The study population consisted of all pregnant women in their second and third trimesters residing in the study area. A total of 34 pregnant women were included as samples using a total sampling technique.

The intervention involved the regular consumption of innovative processed purple sweet potato products over a specified intervention period. The independent variable was processed purple sweet potato product innovation, while the dependent variables were nutritional status and hemoglobin levels. Nutritional status was assessed using body mass index (BMI) and/or mid-upper arm circumference (MUAC). Hemoglobin levels were measured using a digital hemoglobin analyzer.
Univariate analysis was conducted to describe respondent characteristics, nutritional status, and hemoglobin levels before and after the intervention. Bivariate analysis was performed using a paired t-test to determine the effect of the intervention on nutritional status and hemoglobin levels, with a significance level set at 0.05.

RESULTS AND DISCUSSION

Table 1. Characteristics of Pregnant Women Respondents

Characteristics	Frequency (n)	Percentage (%)
Age		
20–25 years	10	29,4
26–30 years	14	41,2
31–35 years	10	29,4
Education		

Characteristics	Frequency (n)	Percentage (%)
Junior High School	8	23,5
Senior High School	18	52,9
College	8	23,5
Occupation		
Third Trimester		
Housewife	22	64,7
Working	12	35,3
Pregnancy Trimester		
Second Trimester	16	47,1
Third Trimester	18	52,9

Table 2. Univariate Analysis Distribution of Nutritional Status of Pregnant Women Before and After Intervention

Nutritional status	Pretest n (%)	Posttest n (%)
Good	15 (44,1)	23 (67,6)
Not enough	19 (55,9)	11 (32,4)
Total	34 (100)	34 (100)

Table 3. Distribution of Hemoglobin Levels in Pregnant Women Before and After Intervention

Hemoglobin Level	Pretest n (%)	Posttest n (%)
Normal (≥11 g/dL)	14 (41,2)	24 (70,6)
Anemia (<11 g/dL)	20 (58,8)	10 (29,4)
Total	34 (100)	34 (100)

Table 4. Bivariate Analysis The Effect of Purple Sweet Potato Product Innovation on the Nutritional Status of Pregnant Women

Variabel	Mean ± SD Pretest	Mean ± SD Posttest	p-value
Nutritional status (IMT/LILA)	18,9 ± 1,4	20,3 ± 1,2	**0,002**

Table 5. The Effect of Purple Sweet Potato Processed Product Innovation on Hemoglobin Levels in Pregnant Women

Variabel	Mean Hb Pretest (g/dL)	Mean Hb Posttest (g/dL)	p-value
Hemoglobin Level	10,4 ± 0,8	11,6 ± 0,7	**0,001**

Discussion

The characteristics of respondents showed that most pregnant women were aged 26–30 years (41.2%), had a senior high school education (52.9%), and were housewives (64.7%). In terms of gestational age, the majority of respondents were in the third trimester of pregnancy (52.9%). These characteristics indicate that most respondents were within a productive reproductive age but still required adequate nutritional support during pregnancy.

Univariate analysis demonstrated an improvement in nutritional status after the intervention. The proportion of pregnant women with good nutritional status increased from 44.1% before the

intervention to 67.6% after the intervention. This improvement suggests that the consumption of processed purple sweet potato products contributed positively to maternal nutritional status.

Similarly, hemoglobin levels showed a notable improvement following the intervention. The proportion of pregnant women with normal hemoglobin levels increased from 41.2% at pretest to 70.6% at posttest. This finding indicates that the processed purple sweet potato products may have played a role in reducing the prevalence of anemia among pregnant women.

Bivariate analysis revealed a significant effect of processed purple sweet potato product innovation on nutritional status, as indicated by an increase in mean BMI/MUAC from 18.9 ± 1.4 to 20.3 ± 1.2 ($p = 0.002$). This result supports the hypothesis that local food-based interventions can effectively improve maternal nutritional indicators.

In addition, there was a significant increase in mean hemoglobin levels from 10.4 ± 0.8 g/dL before the intervention to 11.6 ± 0.7 g/dL after the intervention ($p = 0.001$). The iron content of purple sweet potato, combined with vitamin C, may enhance iron absorption and contribute to improved hemoglobin synthesis.

The improvement in nutritional status and hemoglobin levels observed in this study is consistent with previous research highlighting the benefits of utilizing local food sources to address maternal nutrition problems. The antioxidant properties of anthocyanins in purple sweet potato may also support overall maternal health and reduce oxidative stress during pregnancy.

Moreover, the acceptability of processed purple sweet potato products likely influenced compliance and regular consumption among pregnant women. Food innovations that align with local tastes and dietary habits are more likely to be adopted and sustained within communities.

These findings suggest that community-based nutrition interventions utilizing innovative local food products can serve as a practical and sustainable strategy to improve maternal nutrition and prevent anemia during pregnancy.

CONCLUSIONS

Processed purple sweet potato product innovation has a significant effect on improving the nutritional status and hemoglobin levels of pregnant women in Mongeudong Village, Lhokseumawe City. The intervention increased the proportion of pregnant women with good nutritional status and normal hemoglobin levels. Therefore, the utilization of local food-based innovations such as processed purple sweet potato products is recommended as an effective nutritional intervention for pregnant women.

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