

Effect of Red Bean Consumption on Breast Milk Production Among Postpartum Mothers at Budi Setia Langowan Hospital

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Abstract. Breastfeeding is a fundamental strategy for improving infant survival, growth, immune protection, and neurodevelopment. Nevertheless, many postpartum mothers experience delayed lactogenesis, perceived insufficient milk supply, and inadequate maternal nutrition, all of which may compromise early breastfeeding success. This study analyzed the effect of red bean consumption on breast milk production among postpartum mothers at Budi Setia Langowan Hospital using secondary data derived from a one-group pretest-posttest design. The study included 31 postpartum mothers with complete paired measurements before and after the nutritional intervention. Data were analyzed descriptively and inferentially using the Wilcoxon signed-rank test because the outcome variable was paired and ordinal. Before the intervention, 24 mothers (77.42%) were in the 10-15 mL category and 7 mothers (22.58%) were in the 16-30 mL category. After the intervention, the distribution shifted to 30-40 mL in 7 mothers (22.58%), 41-60 mL in 10 mothers (32.26%), and 61-80 mL in 14 mothers (45.16%). The mean ordinal score increased from 1.23 to 2.23, and the Wilcoxon test demonstrated a significant pretest-posttest difference ($W = 0.00$; $Z = -4.49$; $p < 0.001$). These findings indicate that red bean consumption was associated with improved breast milk production and may represent a practical food-based nutritional intervention in postpartum care.

Keywords: Breast Milk Production; Lactation; Nutrition Intervention; Postpartum Mothers; Red Beans.

1. BACKGROUND

Breastfeeding is the biological foundation of infant nutrition during early life because human milk provides energy, essential nutrients, immunologic protection, and bioactive compounds that support growth, immunity, and neurological development. Despite global advocacy for exclusive breastfeeding during the first six months of life, breastfeeding outcomes remain suboptimal in many settings. The problem is not limited to maternal knowledge alone, but also includes delayed lactogenesis, maternal fatigue, suboptimal latch, perceived insufficient milk supply, and inadequate postpartum nutrition.

Perceived insufficient milk supply remains one of the most frequently reported reasons for early supplementation and discontinuation of breastfeeding. In addition, delayed onset of lactogenesis has been consistently associated with reduced exclusive breastfeeding success and earlier cessation of breastfeeding. These challenges are clinically important because low milk output in the early postpartum period can trigger formula supplementation, reduce infant suckling stimulation, and further weaken prolactin and oxytocin responses. As a result, a self-reinforcing cycle may develop in which low milk production, maternal anxiety, and suboptimal feeding practices interact and compromise breastfeeding continuation.

Maternal nutrition is one of the modifiable factors that may support lactation in the early postpartum period. Food-based interventions are particularly relevant because they are more feasible, culturally acceptable, and affordable than many commercial products. Red beans (*Phaseolus vulgaris*) contain plant protein, iron, folate, magnesium, complex carbohydrates, and other bioactive components that may help improve maternal metabolic recovery and support milk synthesis. Previous studies have suggested that red bean preparations and other natural galactagogues may increase milk volume among postpartum mothers, although the strength of evidence varies across studies.

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This topic is relevant in maternity services because nutritional interventions based on local foods may offer a practical option for mothers with concerns about low milk production. The tabulated data available from Budi Setia Langowan Hospital documented breast milk production before and after red bean consumption among postpartum mothers, providing an opportunity for scientific analysis. Therefore, this study aimed to analyze the effect of red bean consumption on the improvement of breast milk production among postpartum mothers based on the available secondary data and to interpret the findings in relation to previous scientific evidence.

2. THEORETICAL REVIEW

Breast milk production is regulated by a complex interaction of endocrine stimulation, infant suckling, maternal nutritional status, and psychosocial factors. During the postpartum period, adequate prolactin secretion, effective breast emptying, maternal recovery, and sufficient dietary intake are all important for the maintenance of lactation. Delayed lactogenesis may occur when these processes are disturbed, and this condition has been associated with lower breastfeeding confidence and a higher risk of early breastfeeding failure.

The concept of perceived insufficient milk supply is also central to understanding breastfeeding difficulties. In many mothers, the perception that breast milk is inadequate leads to early formula use even when physiological lactation may still be developing. This perception is influenced not only by actual milk output, but also by maternal knowledge, prior breastfeeding experience, social support, and professional guidance. Therefore, interventions intended to improve breastfeeding outcomes should not be interpreted narrowly as pharmacologic or nutritional measures alone, but as part of comprehensive postpartum support.

Natural galactagogues derived from food and plants have drawn increasing attention because they may support lactation with relatively low cost and good cultural acceptability. Red beans are nutritionally attractive because they provide plant-based protein, iron, folate, and complex carbohydrates, all of which may contribute to postpartum recovery and metabolic readiness for lactation. Although the exact biological pathway has not been directly measured in this dataset, it is biologically plausible that improved nutritional intake may help optimize conditions for milk production.

Previous studies have reported promising results from local food-based galactagogues. Case-based and quasi-experimental studies have shown increased milk output following red bean juice, combinations of fish soup and red beans, and other nutrient-rich postpartum drinks. Systematic reviews of natural galactagogues suggest potential benefits, although the evidence remains heterogeneous and sometimes methodologically limited. Even so, the consistency of positive findings across several food-based interventions supports further investigation of red beans as a practical nutritional strategy in postpartum care.

3. RESEARCH METHODS

This study was prepared as an analytic quantitative study with a quasi-experimental approach using a one-group pretest-posttest design. The design was selected because the available dataset documented breast milk production in the same postpartum mothers before and after a red bean consumption intervention, without a separate control group. This approach was considered suitable for examining changes in milk production categories following the nutritional intervention.

The target population comprised postpartum mothers who might receive interventions aimed at improving breast milk production at Budi Setia Langowan Hospital. The accessible population in this study consisted of all postpartum mothers recorded completely in the research tabulation sheet. Based on the available data file, 31 respondents met the completeness criteria for paired pretest and posttest measurements. Accordingly, the study operationally used total sampling of all available respondents.

The available respondent characteristics included maternal age, educational level, and occupation. The primary study variables were breast milk production before the intervention and breast milk production after the intervention. Milk production was recorded in ordinal volume categories. Before the intervention, the available categories were 10-15 mL and 16-30

mL. After the intervention, the categories were 30-40 mL, 41-60 mL, and 61-80 mL. The original tabulation also included numerical coding, which enabled paired nonparametric analysis.

Data collection in this study was secondary in nature because the analysis relied on tabulated data prepared previously. The scientific work therefore focused on checking data consistency, reorganizing the coding for analysis, calculating frequency distributions, and interpreting the statistical and substantive findings. Univariate analysis was used to describe respondent characteristics using frequencies, percentages, mean, median, standard deviation, and age range. The distribution of breast milk production before and after the intervention was also summarized descriptively, and category transitions were examined using cross-tabulation.

Because the main outcome was paired ordinal data from the same respondents before and after the intervention, bivariate analysis used the Wilcoxon signed-rank test. This test was more appropriate than a parametric approach because the data were ordinal and did not require assumptions of interval scale measurement or normal distribution. Statistical significance was set at $\alpha = 0.05$. A p-value below 0.05 was interpreted as evidence of a significant difference in breast milk production before and after red bean consumption.

4. RESULTS AND DISCUSSION

Respondent characteristics

Thirty-one postpartum mothers were included in the analysis. Respondent age ranged from 17 to 42 years, with a mean age of 25.77 ± 7.06 years, a median of 24 years, a lower quartile of 20.5 years, and an upper quartile of 31 years. Most respondents were aged 21-35 years, accounting for 19 mothers (61.29%), followed by 8 mothers aged ≤ 20 years (25.81%) and 4 mothers aged >35 years (12.90%). This distribution indicates that the sample was dominated by women in the generally safe and productive reproductive age range, although adolescent and older mothers were also represented.

In terms of education, the largest proportion had completed senior high school, namely 16 respondents (51.61%), followed by junior high school with 12 respondents (38.71%), a bachelor's degree with 2 respondents (6.45%), and elementary school with 1 respondent (3.23%). Regarding occupation, most respondents were homemakers, accounting for 26 women (83.87%), while 3 respondents (9.68%) worked in the private sector and 2 respondents (6.45%) were civil servants. These characteristics are relevant because education and occupation may influence access to health information, breastfeeding knowledge, and the ability to adopt household-based nutritional interventions.

Table 1. Characteristics of the respondents.

Variable	Category	n	%
Age	≤ 20 years	8	25.81
Age	21-35 years	19	61.29
Age	>35 years	4	12.90
Education	Elementary school	1	3.23
Education	Junior high school	12	38.71
Education	Senior high school	16	51.61
Education	Bachelor's degree	2	6.45
Occupation	Homemaker	26	83.87
Occupation	Private sector	3	9.68
Occupation	Civil servant	2	6.45

From a practical perspective, these findings suggest that the respondents were largely mothers living within a domestic context in which household food-based interventions are feasible. Red beans are relatively affordable, familiar, and easy to process, which makes them socially realistic as a postpartum nutritional intervention. In maternity care, interventions that can be adopted at home often have greater sustainability than those relying on costly or complex products.

Breast milk production before and after the intervention

The univariate findings for the primary outcome showed a clear upward shift in breast milk production after red bean consumption. Before the intervention, none of the respondents were in a high milk-production category. Most mothers were in the 10-15 mL category, namely 24 respondents (77.42%), while 7 respondents (22.58%) were in the 16-30 mL category. This pattern indicates that the entire sample began the observation period with relatively low breast milk production.

After the intervention, no respondent remained in the initial categories. Seven mothers (22.58%) were in the 30-40 mL category, 10 mothers (32.26%) were in the 41-60 mL category, and 14 mothers (45.16%) reached the 61-80 mL category. Descriptively, this distribution already indicates a strong positive change in milk output following red bean consumption.

Table 2. Distribution of breast milk production before and after the intervention.

Measurement time	Breast milk production category	n	%
Before	10-15 mL	24	77.42
Before	16-30 mL	7	22.58
After	30-40 mL	7	22.58
After	41-60 mL	10	32.26
After	61-80 mL	14	45.16

When the data were examined as category transitions, all respondents moved to a higher production category after the intervention. Seven respondents moved from 10-15 mL to 30-40 mL, 10 moved from 10-15 mL to 41-60 mL, 7 moved from 10-15 mL directly to 61-80 mL, and 7 moved from 16-30 mL to 61-80 mL. No respondent showed a decline in category. This is an important result because the improvement was not limited to a change in the group average; it reflected a consistent favorable pattern across individuals.

Table 3. Transition of breast milk production categories from before to after the intervention.

Breast milk production before	Breast milk production after	n
10-15 mL	30-40 mL	7
10-15 mL	41-60 mL	10
10-15 mL	61-80 mL	7
16-30 mL	61-80 mL	7

Inferential analysis using the Wilcoxon signed-rank test showed that the difference between pretest and posttest milk production scores was statistically significant. The mean ordinal score increased from 1.23 at pretest to 2.23 at posttest, with $W = 0.00$, $Z = -4.49$, and $p < 0.001$. If the magnitude of change is interpreted using the Z value relative to the square root of the sample size, the approximate effect size is strong. These findings strengthen the descriptive interpretation that red bean consumption was associated with improved breast milk production among the postpartum mothers in this dataset.

Table 4. Wilcoxon test results for breast milk production before and after the intervention.

Variable	n	Mean score	Statistic	Value
Breast milk production before	31	1.23	W	0.00
Breast milk production after	31	2.23	Z	-4.49
Difference	31	+1.00	p-value	<0.001

Clinically, the shift from predominantly low categories to predominantly moderate and higher categories suggests a meaningful practical benefit. In the postpartum period, increased milk output may improve infant feeding effectiveness and reinforce the physiological feedback loop involving prolactin release, oxytocin reflexes, and repeated suckling. Although the dataset did not include hormonal measurements, breastfeeding frequency, or maternal psychological indicators, the consistent increase in milk volume categories supports the interpretation that the intervention may have contributed positively to lactation readiness.

Discussion in relation to previous studies

The present findings are consistent with the broader view that natural food-based galactagogues may support lactation when integrated into postpartum care. Previous work involving red bean preparations has reported increases in breast milk output among postpartum mothers, and other nutrient-rich dietary interventions have also shown favorable results. The current study adds to this body of evidence by demonstrating a statistically significant pretest-posttest difference in a sample of 31 postpartum mothers, with no observed deterioration in any respondent.

The findings are also in line with studies evaluating combined food-based interventions, including red beans and protein-rich postpartum meals, which have reported significant increases in milk production. While some randomized studies of other natural galactagogues have shown less consistent statistical significance, the overall direction of evidence suggests that nutritional support can play an important complementary role in breastfeeding management. This is especially relevant in settings where simple, low-cost, locally available interventions are needed.

From a biological standpoint, red beans may support postpartum lactation through several mechanisms. Their plant protein may contribute to tissue recovery and metabolic function, complex carbohydrates may support maternal energy requirements, and micronutrients such as iron and folate may facilitate postpartum physiological recovery. However, because this study relied on secondary tabulated data and categorized milk volume rather than continuous biochemical or hormonal measures, the interpretation should remain appropriately cautious. The results support an association between red bean consumption and improved milk production, but they should not be interpreted as proof of a fully isolated causal mechanism.

This study also has several limitations. First, the dataset was secondary, so detailed information on duration of intervention, breastfeeding frequency, parity, mode of delivery, family support, and other maternal dietary factors was not available. Second, breast milk production was categorized ordinally rather than measured as a continuous variable, which limited the precision of analysis. Third, the absence of a control group means that natural postpartum physiological recovery cannot be fully separated from the observed improvement. Nevertheless, the consistency of category transitions and the strong statistical result remain important strengths of the analysis.

The practical implications are clear. Health professionals working in postpartum wards and maternity services may consider red beans as part of contextualized postpartum nutrition education because they are inexpensive, accessible, and culturally familiar. However, such use should be positioned as a supportive intervention within comprehensive breastfeeding care, including early breastfeeding counseling, correct latch assessment, adequate maternal rest, family support, and clinical monitoring during the first postpartum days.

Table 5. Summary of six relevant previous studies.

Authors	Design and sample	Intervention/object	Main findings	Relevance to this study
Sugianti et al. (2022)	Midwifery case study	Red bean juice in postpartum mothers	Breast milk volume in the observed case increased from approximately 30 mL to 80 mL	Supports the potential of red beans as a natural galactagogue
Elo et al. (2026)	Quasi-experimental study, 32 postpartum mothers	Patin fish soup and red beans	$Z = -4.904$, $p = 0.001$; breast milk production increased significantly	Shows findings consistent with the present dataset
Foong et al. (2020)	Cochrane review, RCTs	Natural and pharmacological galactagogues	Potential benefit was found, but evidence remained heterogeneous and of low certainty	Places the present findings within the broader global evidence base
Fungtammasan and Phupong (2022)	Double-blind RCT, 88 mothers	<i>Moringa oleifera</i> capsules	Breast milk volume was 47% higher, but not statistically significant on day 3	Indicates that natural interventions are not always

							uniformly effective
Tahiru al. (2025)	et	RCT, postpartum mothers	75	Ginger-spiced soya drink	millet-	Breast milk volume and prolactin increased significantly (p < 0.001)	Supports nutrient-rich local food interventions in postpartum care
Ammar al. (2025)	et	Systematic review, 8 studies		<i>Moringa oleifera</i> supplementation		Potential increase in milk volume and prolactin	Provides theoretical support for natural nutritional galactagogues

5. CONCLUSION AND RECOMMENDATIONS

Based on the analysis of 31 postpartum mothers at Budi Setia Langowan Hospital, red bean consumption was associated with a statistically and clinically meaningful increase in breast milk production. Before the intervention, all respondents were in low milk-production categories, whereas after the intervention the distribution shifted toward higher categories, especially 41-60 mL and 61-80 mL. The Wilcoxon signed-rank test showed a highly significant difference between pretest and posttest measurements ($p < 0.001$), and no respondent experienced a decline in category.

These findings support the view that red beans, as a local food rich in plant protein and micronutrients, may be used as a simple nutritional intervention to help improve breast milk production during the postpartum period. Even so, this intervention should not be considered the sole determinant of breastfeeding success. Breastfeeding outcomes are also influenced by latch technique, infant suckling frequency, maternal psychological condition, family support, and the quality of professional care. Future studies with stronger designs, continuous milk-volume measurement, and better control of confounding factors are recommended to provide more robust evidence for clinical application.

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