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Mung Bean Porridge and Changes in Expressed Breast Milk Volume Among Breastfeeding Mothers

Erlina Pratiwi[1]*, Lia Yulianti[2], Dewi Sulastri Sutaran[3]

[1,2,3]Applied Bachelor of Midwifery Program, Politeknik Bhakti Asih Purwakarta, Indonesia; Email: erlinapratiwi2026@gmail.com

** Corresponding Author: Erlina Pratiwi, Politeknik Bhakti Asih Purwakarta; Purwakarta, Indonesia; Email: erlinapratiwi2026@gmail.com*

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Abstract

Background: Perceived low milk supply may reduce mothers' confidence in continuing breastfeeding. Nutritional support is one component that can sustain lactation, and mung beans provide energy, protein, vitamins, and minerals. Purpose: This study described expressed breast milk volume before and after mung bean porridge administration in the intervention group, described changes over the observation period in the control group, and compared milk-volume changes between groups. Methods: A *quasi-experimental pretest-posttest* control-group design was used. Seventy-two breastfeeding mothers were recruited *consecutively* and allocated into an intervention group (n=36) and a control group (n=36). The intervention group received 250 g of mung bean porridge twice daily for seven days. Expressed milk volume was measured with a standardized double electric pumping procedure. Data were assessed with the *Shapiro-Wilk* test and compared using the *Mann-Whitney* test. Results: Median expressed milk volume in the intervention group increased from 48.5 mL to 58 mL, while the control group increased from 47.5 mL to 50 mL. Median change was 7 mL in the intervention group and 3.5 mL in the control group. The between-group difference in change was significant (p=0.004). Conclusion: Mung bean porridge administration was associated with a greater change in expressed breast milk volume than observation without the intervention.

Keywords: breastfeeding mothers, expressed breast milk, lactation, milk volume, mung bean porridge

Introduction

Breast milk is the primary source of nutrition in early life because it delivers nutrients together with biological components that support infant growth and protection. The World Health Organization recommends exclusive breastfeeding for the first six months, followed by continued breastfeeding with appropriate complementary feeding until two

years of age or beyond.[1] Despite this recommendation, mothers may introduce formula or other feeds earlier when they perceive that their milk supply is inadequate.

Low expressed milk volume is not determined by a single factor. Maternal diet, breastfeeding pattern, effective breast emptying, rest, breast care, and family support have been associated with milk production.[2] Maternal conditions and breastfeeding practices also contribute to variation in supply,[3] while feeding frequency helps sustain the stimulation required for ongoing milk synthesis.[4] Local program records in the study setting indicated that a number of breastfeeding mothers still reported low or unsatisfactory milk flow, supporting the need for practical strategies that can complement appropriate breastfeeding management.

Mung bean is a locally available food containing carbohydrates, plant protein, vitamins, minerals, and several bioactive constituents.[5] In lactation care, it is more appropriately considered a nutritional support than a direct hormonal stimulant. Previous studies have reported improvements in milk adequacy or smoothness after mung bean preparations, including juice and porridge.[67] Other work using directly measured milk volume also reported increases after mung bean-based interventions.[8] However, evidence using porridge while comparing changes in expressed milk volume with a control group remains limited.

This study aimed to describe expressed breast milk volume before and after mung bean porridge administration in the intervention group, describe milk volume before and after the observation period in the control group, and analyze differences in milk-volume change between the two groups.

Method

1. Research design

A *quasi-experimental pretest-posttest* control-group design was applied. Both groups were assessed at baseline and at the end of the study period. The intervention group received mung bean porridge, while the control group did not receive the study food and continued its usual dietary pattern.

2. Setting and samples

The study was conducted from May to August 2026 at a public primary health-care facility in Purwakarta Regency, West Java, Indonesia. The target population comprised

86 breastfeeding mothers with infants aged 0-5 months. Participants were recruited *consecutively*. A Slovin calculation with a 5% error margin yielded a minimum of 71 participants; the number was balanced to 72 participants, with 36 in each group. Key eligibility criteria included active breastfeeding, a healthy mother and infant, willingness to complete the seven-day protocol, and no history of mung bean allergy. Mothers with severe breast problems, health conditions affecting lactation, infants with acute illness or feeding problems, or concurrent use of specific lactation-enhancing interventions were excluded.

3. Intervention

Participants in the intervention group received 250 g of mung bean porridge per serving, twice daily after breakfast and in the afternoon for seven consecutive days. Ingredient composition, preparation, portion weight, and administration schedule followed the same operating procedure. The control group did not receive mung bean porridge during the observation period. Both groups were asked to avoid medications, herbal products, supplements, lactation massage, or other products specifically intended to increase milk production.

4. Measurement and data collection

Expressed breast milk volume was measured before and after the study period using the same type and specification of double electric breast pump. Both breasts were pumped simultaneously for 15 minutes, with a target interval of two hours from the previous breastfeeding or pumping episode. *Pretest* and *posttest* measurements were scheduled at the same time of day or within a 30-minute difference. Flange size was adjusted to the nipple and kept consistent at the subsequent measurement. Flange fit and pumping conditions are relevant because equipment characteristics and technique can influence comfort and the amount of milk removed.[14,15] Milk from the right and left breasts was read from graduated containers and summed as the total volume for one session.

5. Data analysis

Data were processed using *SPSS*. The distribution of milk volume and change scores was examined with the *Shapiro-Wilk* test. All main variables had $p<0.05$ and were considered non-normally distributed. Descriptive statistics included mean, standard deviation, median, and range, with the median used as the principal measure of central tendency. The difference in milk-volume change between the intervention and control

groups was analyzed using the *Mann-Whitney* test at a significance level of 0.05.

Results

Seventy-two breastfeeding mothers completed the measurement sequence, with 36 participants in the intervention group and 36 in the control group. All milk-volume variables and change scores had *Shapiro-Wilk* p values below 0.05; therefore, medians were emphasized and the between-group analysis used a nonparametric test.

Table 1
Expressed breast milk volume before and after the study period

Group	Measurement	n	Mean (mL)	SD (mL)	Median (mL)	Min-Max (mL)
Intervention	Before	36	52.11	13.6	48.5	31-98
Intervention	After	36	61.69	16.72	58	29-99
Control	Before	36	50.31	13.92	47.5	30-95
Control	After	36	53.75	16.45	50	29-101

In the intervention group, median expressed milk volume increased from 48.5 mL to 58 mL. The control group also showed an increase, from 47.5 mL to 50 mL. Change scores were then calculated as *posttest* minus *pretest* values and compared between groups.

Table 2
Change in expressed breast milk volume between intervention and control groups

Group	n	Mean (mL)	SD (mL)	Median (mL)	Min-Max (mL)	p-value
Intervention	36	9.58	11.27	7	-7-50	0.004
Control	36	3.44	8.01	3.5	-11-32	

Median milk-volume change was 7 mL in the intervention group and 3.5 mL in the control group. The *Mann-Whitney* test yielded p=0.004, indicating a significant difference in change between the two groups.

Discussion

The principal finding was a larger change in expressed milk volume among mothers who received mung bean porridge than among controls. This direction is consistent with previous studies reporting improved milk production, adequacy, or breastfeeding smoothness after mung bean preparations.[6-8] Other studies using mung bean juice have also documented increases in measured volume or production indicators after the intervention.[9-11] These findings support mung bean porridge as a potential complementary snack for breastfeeding mothers, rather than a substitute for core lactation management.

Physiologically, milk-volume change cannot be attributed to a single food. Milk production is maintained through breastfeeding stimulation and effective breast emptying, while maternal nutrition supplies the energy and substrates needed for metabolism during lactation. Mung beans contain protein, carbohydrates, minerals, vitamins, and bioactive compounds that can enrich dietary intake.[5] National nutrition guidance likewise emphasizes dietary variety and adequate fluid intake during breastfeeding.[16] Because prolactin and oxytocin were not measured, the intervention should be interpreted as nutritional support rather than evidence of a direct hormonal effect.

The control group also showed an increase in expressed milk volume despite receiving no mung bean porridge. This finding reflects the dynamic nature of lactation. Feeding frequency, breast emptying, maternal rest, food and fluid intake, family support, and psychological comfort may vary from day to day and affect pumping output.[2-4] Technical factors are also relevant; flange fit, individual response to the pump, pumping timing, breast massage, and comfort can alter the amount of milk removed.[14,15] Therefore, an increase in the control group does not negate the intervention finding; it underscores the importance of comparing the magnitude of change between groups.

Earlier studies are not fully comparable because they differ in preparation type, dose, intervention length, research design, and outcome measurement. Rostiani and colleagues reported improved breastfeeding smoothness following mung bean porridge,[12] whereas Sunarsih and colleagues found higher smoothness scores after mung bean juice.[13] The present study adds information by using porridge as the intervention and expressed milk volume in milliliters as a numerical outcome. Nevertheless, the finding should not be interpreted as proof that mung bean porridge alone caused the observed change, because the *quasi-experimental* design still permits residual confounding.

Differences between groups can also be understood in the context of breastfeeding mothers' daily experiences. Mothers may postpone meals, lose sleep because of nighttime feeding, have little time to prepare snacks, or pay less attention to their own fluid intake while focusing on infant care. Providing porridge twice daily offered the intervention group a more regular additional food intake. At the same time, variation in infant feeding frequency, formula use, family assistance, fatigue, stress, and familiarity with pumping may explain why responses differed among individuals. Mung bean porridge is therefore best positioned within a broader lactation-support package that includes effec-

tive breast emptying, adequate hydration, rest, and breastfeeding assistance.

Limitation

The study was conducted at a single site and the intervention lasted only seven days, limiting generalizability and assessment of longer-term effects. Milk volume was based on one standardized pumping session rather than total 24-hour production. Several factors, including day-to-day feeding frequency, overall dietary intake, fluid consumption, sleep quality, psychological state, and family support, could not be fully controlled. Adaptation to pump use may also have influenced the *posttest* measurement.

Conclusion

Expressed breast milk volume increased after mung bean porridge administration in the intervention group, while the control group also showed an increase during observation. The change was greater in the intervention group and differed significantly from the control group. Mung bean porridge may be considered a complementary nutritional snack for breastfeeding mothers, but it should be used alongside effective breastfeeding practices and adequate maternal self-care. Future studies should consider longer interventions, repeated or 24-hour milk measurements, and stronger control of potential confounding factors.

Ethical Considerations

Prior to data collection, permission to conduct the study was obtained from the relevant institution. All participants received information regarding the purpose and procedures of the study, confidentiality, voluntary participation, and their right to withdraw at any time. Written informed consent was obtained from all participants before data collection. Ethical clearance was not required by the authors' academic institution for this study.

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Conflict of Interest

The authors declare no conflict of interest related to this manuscript.

Author contribution

Erlina Pratiwi contributed to conceptualization, data collection, data processing, interpretation, and preparation of the initial draft. Lia Yulianti contributed to supervision, methodological refinement, scientific interpretation, and critical review. Dewi Sulastri Sutaran contributed to supervision, content validation, interpretation, and manuscript revision. All authors approved the final manuscript.

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