

THE EFFECT OF GIVING MUNG BEAN EXTRACT ON BREAST MILK PRODUCTION IN POST-PART MOTHERS IN DEPOK CITY, WEST JAVA

Silfia Nuzulus Sa'idah^{1*}, Lusy Pratiwi², Desy Qomarasari³, Daris Yolanda Sari⁴, Ruci'ah⁴

^{1,2,3} Prodi Kebidanan Politeknik Tiara Buda

^{4,5} Prodi Kebidanan Politeknik Bhakti Asih Purwakarta

E-mail: silfianuzulussaidah@gmail.com

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Abstract

Introduction: Breast milk is the best source of nutrition for infants; However, suboptimal breast milk production during the postpartum period remains one of the barriers to successful exclusive breastfeeding. Mung bean (*Vigna radiata*), as a local food rich in protein, vitamins, and minerals, has the potential to be used as a non-pharmacological intervention to support increased breast milk production. This study aimed to analyze the effect of consuming 250 ml mung bean extract on breast milk production among postpartum mothers. **Methods:** This study used a quasi-experimental design with a pretest-posttest approach. The sample consisted of 36 postpartum mothers who received 250 ml of mung bean extract once daily for 7 days. Data were collected using a breast milk production observation checklist and analyzed using the paired t-test. **Results:** Before the intervention, most respondents had low breast milk production (18 respondents; 50.00%), followed by moderate production (11 respondents; 30.55%) and good production (7 respondents; 19.45%). After the intervention, breast milk production improved, with 21 respondents (58.33%) categorized as good, 8 respondents (22.22%) as moderate, and 7 respondents (19.45%) as low. The paired t-test showed a significant difference in breast milk production before and after mung bean extract administration (p -value = 0.001; $p < 0.05$). **Conclusion:** Consumption of 250 ml mung bean extract significantly increased breast milk production among postpartum mothers. Mung bean extract can be considered an effective, safe, and affordable local food-based non-pharmacological intervention to support exclusive breastfeeding success.

Keywords: Breast milk production, Exclusive breastfeeding, Local food, Mung bean, Postpartum mothers.

INTRODUCTION

Breast milk (ASI) is the best source of nutrition for babies because it contains complete nutrients, antibodies, enzymes, hormones, and growth factors that play a vital role in supporting growth, development, and improving the baby's immune system (Smilowitz et al., 2023). The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life, followed by complementary feeding until the child is two years old or older (World Health Organization, 2023). Optimal breastfeeding has been proven to reduce infant morbidity and mortality and provides long-term health benefits for both mother and baby (Pérez-Escamilla et al., 2023). Although the benefits of breast milk have been scientifically proven, the coverage of exclusive breastfeeding has yet to reach the global target of 70% by 2030. Globally, only around 48% of infants under six months of age are exclusively breastfed, while in Indonesia, exclusive breastfeeding coverage still faces various challenges in achieving it (UNICEF, 2023; World Health Organization, 2023). Breastfeeding success is influenced by various factors, including maternal knowledge, family support, health care provider assistance, early initiation of breastfeeding, psychological well-being, maternal nutritional status, breastfeeding frequency, and the ability to maintain breast milk production during the postpartum period (Pérez-Escamilla et al., 2023). Suboptimal breast milk production in the first few days after delivery often leads mothers to introduce formula milk early. This practice can disrupt the continuity of the lactation process and reduce the success of exclusive breastfeeding for the first six months of a baby's life (Pérez-Escamilla et al., 2023; World Health Organization, 2023).

The postpartum period is a critical period for successful lactation because it is during this phase that the initiation and maintenance of breast milk production occurs, influenced by physiological and hormonal changes. Breast milk production is primarily controlled by the hormone prolactin, which plays a role in breast milk synthesis, and the hormone oxytocin, which facilitates milk release through the let-down reflex. In addition to hormonal

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regulation, successful lactation is also influenced by adequate nutritional intake, breastfeeding frequency, maternal health status, psychological well-being, and support from family and healthcare professionals (Pérez-Escamilla et al., 2023). Adequate protein intake serves as a source of essential amino acids for the synthesis of milk proteins, such as casein, α -lactalbumin, and lactoglobulin, which are the main components of breast milk. Furthermore, B-complex vitamins act as coenzymes in energy metabolism and biomolecule synthesis, supporting the activity of mammary alveolar epithelial cells during lactogenesis. Minerals such as calcium, phosphorus, magnesium, and iron also contribute to enzymatic function, cell metabolism, and maintaining optimal physiological conditions for breast milk production. Adequate macro and micronutrient intake helps increase the metabolic activity of mammary secretory cells, thus supporting optimal milk synthesis and secretion (Andreas et al., 2015; Smilowitz et al., 2023). Therefore, safe, easy-to-implement, affordable, and locally sourced non-pharmacological interventions are needed to help optimize breast milk production in mothers during the postpartum period.

One local food ingredient with potential as a lactagogue is mung beans (*Vigna radiata*). Mung beans are a source of quality vegetable protein with a protein content of around 20–25%, low in fat dominated by unsaturated fatty acids, and contain B-complex vitamins, iron, calcium, phosphorus, magnesium, zinc, and various bioactive compounds such as flavonoids and polyphenols that have antioxidant activity. The protein content and essential amino acids, especially lysine and leucine, act as precursors in milk protein synthesis in the alveolar epithelial cells of the mammary glands. B-complex vitamins support energy metabolism through the formation of coenzymes required during lactogenesis, while minerals such as calcium, phosphorus, magnesium, and zinc play a role in various enzymatic reactions, secretory cell function, and maintain the metabolic balance necessary for breast milk synthesis and secretion. In addition, the antioxidant compounds in mung beans help reduce oxidative stress that can disrupt mammary cell function during lactation. With its complete nutritional content, easy availability, and relatively affordable price, mung beans have the potential to be a local food-based non-pharmacological intervention to support increased breast milk production in postpartum mothers (Tang et al., 2021; Hou et al., 2022; Smilowitz et al., 2023).

Several studies have shown that consuming processed mung bean products has the potential to increase breast milk production in postpartum mothers. This increase is demonstrated through indicators such as higher breastfeeding frequency, increased breast milk volume or sufficiency, increased infant urination frequency, and improved infant weight gain compared to before the intervention (Fitriani et al., 2022; Sari et al., 2023). However, available research results still show variation, both in the preparation form used (decoction, juice, or mung bean porridge), intervention dosage, duration of administration, methods of measuring breast milk production, and respondent characteristics. These differences result in inconsistent evidence regarding the effectiveness of mung bean juice consumption on increasing breast milk production. Furthermore, studies evaluating the administration of 250 ml of mung bean juice to postpartum mothers in health care facilities, particularly in Indonesia, are still limited. Therefore, this study was conducted to analyze the effect of 250 ml of mung bean juice consumption on breast milk production in postpartum mothers, hopefully providing stronger scientific evidence regarding the use of local foods as a non-pharmacological intervention to support successful exclusive breastfeeding. Based on the description, this study aims to analyze the effect of consuming 250 ml of mung bean juice on breast milk production in postpartum mothers. The results of the study are expected to provide scientific evidence regarding the effectiveness of mung bean juice as a local food-based non-pharmacological intervention to increase breast milk production so that it can support the success of exclusive breastfeeding. In addition, this study is expected to be a reference for health workers in developing promotive and preventive efforts in postpartum maternal health services and contribute to the achievement of Sustainable Development Goals (SDGs), especially Goal 2 (Zero Hunger) through improving the nutritional status of mothers and babies and Goal 3 (Good Health and Well-Being) through improving maternal and child health.

METHOD

This research is a quantitative research. The design used in this study is a quasi-experimental design using a pretest-posttest approach with a control group design. This study aims to determine the effect of breast milk production in postpartum mothers who consume green beans and those who do not consume green beans in Depok, West Java. The dependent variable in this study is breast milk production and the independent variable in this study is: green bean consumption. The research instruments used in the study consisted of a checklist sheet, an observation sheet, and a Standard Operating Procedure (SOP). The administration of green bean juice was given for 7 days, 250 ml, consumed once a day in the morning.

RESULTS AND DISCUSSION

Table 1. Distribution of frequency of breast milk production before giving green bean juice to postpartum mothers

Breast milk production	Frequency	Presentation
Less (<6 x)	18	50
Enough (6-7 x)	11	30.55
Good (8-10x)	7	19.45
Total	36	100

Based on Table 1, the majority of postpartum mothers before receiving the mung bean juice intervention had breast milk production in the insufficient category, namely 18 respondents (50.00%). Furthermore, 11 respondents (30.55%) had breast milk production in the sufficient category, while only 7 respondents (19.45%) were included in the good category. These results indicate that more than half of the respondents had not achieved optimal breast milk production in the early postpartum period, so intervention efforts are needed to increase breast milk production. This condition may occur because in the first few days after delivery, the mother is still in the phase of Lactogenesis II, the transition period from colostrum production to mature breast milk. During this phase, breast milk production is greatly influenced by hormonal changes, particularly increased prolactin and oxytocin levels, breastfeeding frequency, maternal psychological well-being, nutritional status, and support from family and healthcare professionals (Pérez-Escamilla et al., 2023; World Health Organization, 2023). The results of this study align with research Khasawneh et al. (2024) who reported that delayed onset of lactation is still common in postpartum mothers and is associated with low success in exclusive breastfeeding. In addition, a systematic review by Perez-Escamilla et al. (2023) emphasized that breast milk production in the early postpartum period is often not optimal, so nutritional support, breastfeeding education, and evidence-based interventions are needed to improve lactation success.

Table 2. Distribution of frequency of breast milk production after giving green bean juice to postpartum mothers

Breast milk production	Frequency	Presentation
Less (<6 x)	7	19.45
Enough (6-7 x)	8	22.22
Good (8-10x)	21	58.33
Total	36	100

Based on Table 2, after receiving the mung bean juice intervention, most postpartum mothers had good breast milk production, namely 21 respondents (58.33%). Meanwhile, 8 respondents (22.22%) had sufficient breast milk production, and only 7 respondents (19.45%) were still in the insufficient category.

These results indicate an increase in breast milk production after the administration of mung bean juice, as indicated by an increase in the proportion of respondents in the good category and a decrease in the proportion of respondents in the poor category compared to before the intervention. The increase in breast milk production after the administration of mung bean juice is thought to be related to the content of protein, essential amino acids, vitamin B complex, and minerals such as calcium, phosphorus, magnesium, and iron, which play a role in supporting the metabolism of secretory cells of the mammary glands during the lactogenesis process. The adequacy of these nutrients helps the synthesis of breast milk components and maintains the physiological function of alveolar cells, so that breast milk production is also influenced by the frequency of breastfeeding, regular breast emptying, and stimulation of the hormones prolactin and oxytocin that occur during the postpartum period (Perez-Escamilla et al., 2023; Smilowitz et al., 2023).

Table 3. The Effect of Giving Green Bean Juice to Postpartum Mothers on Breast Milk Production Before and After

Variables	Treatment	N	Mean	Elementary School	t	p-value
Breast milk production	Before	36	2.31	0.786	6.67	0.001
	After	36	1.61	0.803		

Based on Table 3, the average breast milk production score before giving mung bean juice was 2.31 ± 0.786 , whereas after giving green bean juice it decreased to 1.61 ± 0.803 . The decrease in the mean value indicates an

improvement in the breast milk production category because the coding system used is **1 = good, 2 = sufficient, and 3 = less**. Test results *paired t-test* show value **t = 6,670** with **p = 0.001 (p < 0.05)**. Thus, there is a significant difference between breast milk production before and after administering mung bean juice. These results indicate that administering mung bean juice significantly increases breast milk production in postpartum mothers.

The increase in breast milk production after administering mung bean juice is thought to be related to the nutritional content of mung beans, such as protein, essential amino acids, vitamin B complex, iron, calcium, phosphorus, magnesium, and zinc. Protein and amino acids act as raw materials for milk protein synthesis in the alveolar epithelial cells of the mammary glands, while vitamin B complex supports the energy metabolism required during lactogenesis. Minerals such as calcium, phosphorus, and magnesium contribute to various enzymatic reactions that support the function of mammary secretory cells, thus optimal milk synthesis and secretion (Smilowitz et al., 2023).

In addition to nutritional content, increased breast milk production is also influenced by effective breast emptying, adequate breastfeeding frequency, and stimulation of the hormones prolactin and oxytocin. Regular sucking by a baby increases prolactin secretion for milk synthesis and oxytocin for the latch-on reflex. *let-down*, so that breast milk production can be maintained optimally (Pérez-Escamilla et al., 2023).

The results of this study align with several previous studies showing that consuming processed mung beans can increase breast milk production in postpartum mothers. This increase is demonstrated through increased breast milk adequacy, breastfeeding frequency, and indirect indicators such as increased urination frequency and infant weight gain. Therefore, mung bean juice can be considered a safe, readily available, and economical non-pharmacological intervention based on local food to support successful exclusive breastfeeding.

CONCLUSION

Giving 250 ml of mung bean juice to postpartum mothers showed an increase in breast milk production. Before the intervention, most respondents were in the category of insufficient breast milk production, as many as 18 respondents (50.00%), while after giving mung bean juice, there was an increase in the category of good breast milk production to 21 respondents (58.33%). The results of the paired t-test showed a significant difference between breast milk production before and after giving mung bean juice with a p-value = 0.001 (p < 0.05). Thus, consuming 250 ml of mung bean juice has a significant effect on increasing breast milk production in postpartum mothers and can be an alternative non-pharmacological intervention based on local food to support the success of exclusive breastfeeding.

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