

Benefits of green noodles with long bean leaves (*Vigna sinensis* L.) on bowel movements frequency in infants aged 0-6 months

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Research Article

Keywords: breastfeeding, bowel movement, digestive health, Vigna sinensis L.

Posted Date: May 5th, 2025

DOI: <https://doi.org/10.21203/rs.3.rs-6408424/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background: Infant digestive health is crucial for parents and healthcare providers to focus on, as healthy digestion supports optimal growth and development in babies. One indicator of healthy digestion is an expected bowel movement frequency.

Aims: This study aims to determine the benefits of consuming green noodles made from long bean leaves (*Vigna sinensis* L.) in improving bowel movement frequency in infants aged 0–6 months.

Methods: This quasi-experimental study used a Nonrandomized Control Group Pre-Posttest design, consisting of two groups: the experimental group (consuming green noodles containing 5% long green leaves) and the control group (consuming plain noodles). Each group included 10 breastfeeding mothers with infants aged 0–6 months. Statistical tests used the Shapiro-Wilk test and Wilcoxon test.

Results: In both groups, no sample experienced a decrease in bowel movement frequency. The mean increase in bowel movement frequency in the intervention group was higher (3.50) compared to the control group (2.50). The p-value in the intervention group was $p = 0.020$, while in the control group, it was $p = 0.66$. Therefore, there was a significant difference in the mean bowel movement frequency between the intervention and control groups.

Conclusion: Long bean leaves in green noodles can be promoted as a healthy food option for breastfeeding mothers to enhance breast milk production and maintain infant digestive health.

Introduction

Breast Milk (ASI) is the best food for babies up to the age of 2 years. Choosing to provide Exclusive Breastfeeding, which means giving only breast milk without any additional food or drinks (no other liquids or solid foods, not even water, except for oral rehydration solutions or drops/syrups of vitamins, minerals, or medications) to newborns up to 6 months of age, is a wise and appropriate decision. This practice has been recommended by the World Health Organization (WHO) to achieve optimal growth, development, and health for children and reduce infant mortality rates in various countries worldwide, including Indonesia ¹.

Suboptimal breastfeeding practices contribute to 16% of child deaths annually. A survey conducted between 2016 and 2022 reported that 46% of newborns started breastfeeding within the first hour after birth. Meanwhile, 71% of mothers continued breastfeeding their babies for at least one year, up to the age of two years. In 2023, it was reported in Indonesia that the percentage of infants under 6 months receiving exclusive breastfeeding reached 72.99% for male infants and 75.02% for female infants, with a rate of 76.39% in Jakarta. In 2022, East Jakarta was noted as one of the regions with the lowest exclusive breastfeeding rates for infants under 6 months, at 15.6%, with an average breastfeeding duration of 11.19 months. ²

Breastfeeding offers numerous health benefits for both mothers and babies. Breast milk contains all the nutrients a baby needs in the first six months. Breastfeeding helps protect and improve the baby's digestive health, preventing diarrhea and other common childhood illnesses such as asthma and pneumonia. It also provides long-term health benefits, such as reducing the risk of overweight and obesity during childhood and adolescence ³. Furthermore, breastfeeding has been reported to mitigate the adverse effects of asthma exposure, including air pollution and psychosocial stress. It has also been proven to support lung growth and enhance lung function. Other studies indicate that breastfeeding positively impacts reducing the risk of wheezing and asthma in infants ⁴. The benefits of breastfeeding for mothers are clear. They include aiding recovery by accelerating uterine involution, preventing postpartum bleeding, improving maternal mental health through the close bond formed during lactation, and other advantages.

A healthy digestive system is one of the key factors supporting healthy growth and development in infants. The digestive tract serves as a barrier between the external environment and the infant's internal body. Therefore, its functionality must be maintained in an optimal state, particularly when the immune system is weakened. The most significant factor in maintaining a healthy digestive system in infants is the provision of optimal breastfeeding ⁵.

Indicators of a healthy infant digestive system are standard frequency of bowel movements (BMs). Babies around 6 weeks old typically have 2–5 bowel movements daily, often after each feeding. After 6 weeks, the frequency of bowel movements usually decreases. ⁶ Infants who receive sufficient breast milk are reported to have more frequent bowel movements, with soft, yellow stools, compared to formula-fed infants with brownish stools and less frequent bowel movements.^{7–9} Bowel movement frequency is associated with the quantity and composition of a healthy gut microbiota community ¹⁰.

Infants with fewer than three bowel movements (BMs) per day with soft stool consistency are categorized as having insufficient breast milk intake. After 4–6 months of age, the frequency of defecation tends to decrease. Some infants may not have BMs for several days or even weeks. This condition is often diagnosed as constipation, false constipation, infrequent bowel movements, or "scarce stools" in breastfed infants, even though there is no discomfort (e.g., no hard stools, crying, or difficulty during defecation) ¹¹. A healthy infant digestive system affects the maturation of the immune system, reduces the risk of allergic diseases, and even impacts cognitive function in adulthood ^{12, 13} Maintaining the health of a child's digestive system is essential, as it is linked to overall health from the prenatal period through childhood and into adulthood ¹⁴

Breastfeeding, a natural prebiotic, can support a healthy digestive system in newborns. Breast milk influences gut microbiota and immune system development, functioning as a bioactive food containing all essential nutrients, immune components, hormones, human milk oligosaccharides (HMO), and microbiota. These components are critical in metabolic and immune system homeostasis and development during early life ⁴

Adequate breast milk production is influenced by sufficient maternal nutritional intake, both in quantity and quality. One type of food known to enhance breast milk production by increasing prolactin levels in the mother's blood is long bean leaves, also known as "lembayung leaves" (*Vigna sinensis* L)¹⁵. The long bean plant (*Vigna sinensis* L) stimulates oxytocin and prolactin hormones through alkaloids, saponins, polyphenols, steroids, flavonoids, and other compounds, thereby increasing milk production.^{16–18} In Indonesia, particularly in the western regions, lembayung leaves are commonly recognized for boosting breast milk production. Beyond this, lembayung leaves offer other health benefits, such as preventing anemia, improving blood circulation, strengthening bones, joints, and teeth, enhancing brain function, improving eye clarity, acting as a diuretic, preventing hair loss, and alleviating breast engorgement¹⁷. However, further research is needed to explore the full benefits of lembayung leaves.

The composition of 100 grams of lembayung leaves contains 34 kilocalories of energy, 4.1 grams of protein, 5.8 grams of carbohydrates, 0.4 grams of fat, 134 milligrams of calcium, 145 milligrams of phosphorus, and 6 milligrams of iron. Additionally, lembayung leaves contain 5,240 IU of vitamin A, 0.28 milligrams of vitamin B1, and 29 milligrams of vitamin C.¹⁷ Previous research has investigated the benefits of lembayung leaves in various forms, such as pudding, green noodles, and vegetables consumed directly, with increasing breast milk production or infant weight gain. However, no studies have established a link between the consumption of lembayung leaves and infant bowel movement frequency. This study aims to determine the benefits of breastfeeding mothers consuming green noodles containing 5% lembayung leaves extract on the bowel movement frequency of infants aged 0–6 months.

Methods

This study is quasi-experimental research using a Nonrandomized Control Group Pre-test-Post-test design, which consists of two groups: the experimental group, which consumes 5% lembayung leaves / long bean leaves - based green noodles, and the control group, which consumes plain noodles without lembayung leaves. The study population includes all breastfeeding mothers with infants aged 0–6 months in the working area of Jatinegara Health Center, East Jakarta. The sample consists of breastfeeding mothers with infants aged 0–6 months. The sampling technique used is total population sampling, with 20 breastfeeding mothers, 10 in each group. The inclusion criteria for this study are all breastfeeding mothers with infants aged 0–6 months who are willing to participate in the study from start to finish. The exclusion criteria include breastfeeding mothers with issues in the breastfeeding process such as mastitis, abscesses, babies who have a breast milk allergy, and mothers with postpartum psychological problems.

The independent variable or treatment in this study is the 5% lembayung leaves / long bean leaves incorporated into green noodles, and the dependent variable is the frequency of bowel movements in infants. Data collection is carried out through observations of the infant's bowel movement frequency made by breastfeeding mothers, and the data is recorded in a format provided by the researcher before and after the intervention. The intervention lasts for 14 consecutive days in October 2024, during which

breastfeeding mothers consume 100 grams of green noodles twice daily, in the morning and evening. Monitoring the consumption of green noodles by the breastfeeding mothers is conducted through a WhatsApp Group (WAG), where mothers send photos of the green noodles they have prepared, which are monitored by the research team.

Ethics and Consent to Participate declarations were obtained after the breastfeeding mothers were given an explanation of the purpose of the study and the benefits of green noodles for breastfeeding mothers. Then the breastfeeding mothers who agreed to participate in this study signed the informed consent provided by the researcher.

The research team produced the green noodles from a previous study by Nurhidayah et al. (2025)², which involved preparing 5%, 8%, and 10% green and plain noodles. Organoleptic testing was conducted with three panellists and nutrition experts from Binawan University. The results of the organoleptic test showed that the 5% green noodles were chosen for the intervention. Subsequently, a phytochemical test was performed to determine the polyphenol and proximate content of the green noodles. The next step involved producing the green noodles daily and distributing them to the respondents, ensuring that the breastfeeding mothers consumed fresh green noodles daily.

Results and Discussion

Here are the results of monitoring the frequency of infant bowel movements in the intervention and control groups.

Table 1
Comparison of Defecation Frequency in Pre and Post Intervention

Frequency of Baby Defecation		N	Mean	Median	Standard Deviation	Minimal - Maximal
Intervention Group	Pretest	10	2,20	1,00	3,048	0–10
	Posttest	10	2,90	2,00	2,807	1–10
Control Group	Pretest	10	1,40	1,00	0,516	1–2
	Posttest	10	2,20	2,00	1,229	1–5

In graphs 1 and 2 and Table 1 above, it can be seen that the average frequency of defecation in both intervention and control groups increased. However, the average value of the frequency of defecation in the pre and post intervention groups was higher by 0.7 (2.90) compared to the control group (2.20). The following presents the results of the Wilcoxon analysis to see the significance of the differences in the two groups.

Table 2
Ranks

		N	Mean Rank	Sum of Rank
Post-Pre Defecation Frequency in Intervention Group	Negative Rank	0 ^a	0,00	0,00
	Positive Rank	6 _b	3,50	21,00
	Ties	4 ^c		
	Total	10		
Post-Pre Defecation Frequency in Control Group	Negative Rank	0 _d	0,00	0,00
	Positive Rank	4 ^e	2,50	10,00
	Ties	6 ^f		
	Total	10		

In Table 2 above, it can be seen that in both sample groups, none experienced a decrease in the frequency of defecation. The increase in the frequency of defecation in the intervention group was more significant, namely six babies with a higher mean (mean 3.50), compared to the control group, which was four babies (mean 2.5). Likewise, the similarity in the frequency of defecation in babies in the intervention group was lower (4 babies) compared to the control group (6 babies).

Table 3
Wilcoxon Analysis Results

	Post-Pre Defecation Frequency in Intervention Group	Post-Pre Defecation Frequency in Control Group
Z	-2.333b	-1,841b
Asymp. Sig. (2-tailed)	0,020	0,66

Based on the results of the Wilcoxon test above, it can be seen that the p value in the intervention group is $p = 0.020$ ($< \alpha 0.05$). In contrast, in the control group, the p value = 0.66 ($> \alpha 0.05$), so there is a significant difference in the average frequency of defecation between the intervention group and the control group. Thus, it can be concluded that the consumption of green noodles based on 5% cat's whiskers is beneficial for increasing the frequency of defecation in infants aged 0–6 months.

In general, people in Indonesia know long beans as a horticultural plant of the legume type. This plant is widely cultivated in India, Bangladesh, Southeast Asia, and Oceania, then spread throughout the tropics

as additional vegetables, and is included in the category of Leguminosae plants in the form of shrubs that are wrapped around by climbing and wrapping around poles that farmers usually provide. The long bean leaves consist of three strands and are processed into vegetables that stimulate breast milk production. Previous research by Nurhidayah et al. (2024) proved that 5% butterfly leaves packaged in green noodles and consumed twice a day by postpartum mothers for two days has increased breast milk production. Likewise, a study conducted by Adnin et al. (2023) where before consuming butterfly leaves, the average breast milk production was 100.56 ml and after consuming butterfly leaves for a week every day increased to 120.56 ml ^{2, 16}

Other studies have also reported similar findings, namely that administering 200 grams of lembayung leaves in vegetable packaging daily for 14 days can increase breast milk production, consequently impacting infant weight gain ($t = 5.529$, $p = 0.00$) ¹⁸. Another relevant study showed that the consumption of *lembayung* leaves contributed to a 10% increase in breast milk production ($p = 0.00$) ¹⁹. Similarly, Idealistiana and Yanuarti (2021) reported that the consumption of *lembayung* leaves in postpartum mothers significantly supported milk production at 98.2%, which resulted in a 19.8% increase in infant weight gain.

In this study, it was once again demonstrated that consuming the same food product, in the same quantity and timing, could increase the frequency of infants' bowel movements. The research team prepared 5% lembayung-based green noodles daily, ensuring that the noodles consumed were always fresh. It can be assumed that if the content of *lembayung* leaves were higher than 5%, it would lead to an even greater breast milk production by nursing mothers. The preparation of these noodles was entirely entrusted to the postpartum mothers. The advantage of this method is that the *lembayung* green noodles could be processed according to each mother's preference. On the other hand, the drawback is that, since the research team did not process the noodles, the nutritional content beneficial for milk production could be compromised, for example, if the noodles were made into fried noodles that became too dry. This study limitation could serve as a foundation for future researchers with similar interests to improve the method to better preserve the *lembayung* content in any packaged form. This would allow for more excellent milk production and result in better outcomes for infant health, particularly in terms of digestive health, as indicated by the smoothness of infant bowel movements. Statistical tests were performed using the Shapiro-Wilk and Wilcoxon tests.

Conclusion

Based on the data analysis and discussion above, it can be concluded that the consumption of *bean leaves* 5% in green noodle packaging can increase breast milk production and the frequency of infant bowel movements. The 5% *leaves long bean leaves* based green noodles can be promoted as a healthy food option for postpartum mothers to add variety to their diet and stimulate their appetite. Future research with the same interests and focus on this finding can refine its methodology to enhance the impact of *lembayung* leaves on the digestive health of both infants and mothers.

Limitations

The limitation of this study was the limited sample size, so they may be limited to the location of the Jatinegara Primary Health Care, East Jakarta where the research was conducted. In addition, there may be lack in filling in the data on the frequency of infant defecation by the mother due to her busyness as a housewife.

Declarations

Ethics approval and consent to participate All experimental protocols were approved by Health Research Ethics Committee Binawan University with the following number 160/KEPK-UBN/VI/2024 in accordance with the Declaration of Helsinki.²⁰

Consent for publication All authors listed have consent to publish this manuscript in the Discovery Social Sciences and Health Journal.

Competing interest The authors declare no competing interest.

Funding Not Applicable

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Figures

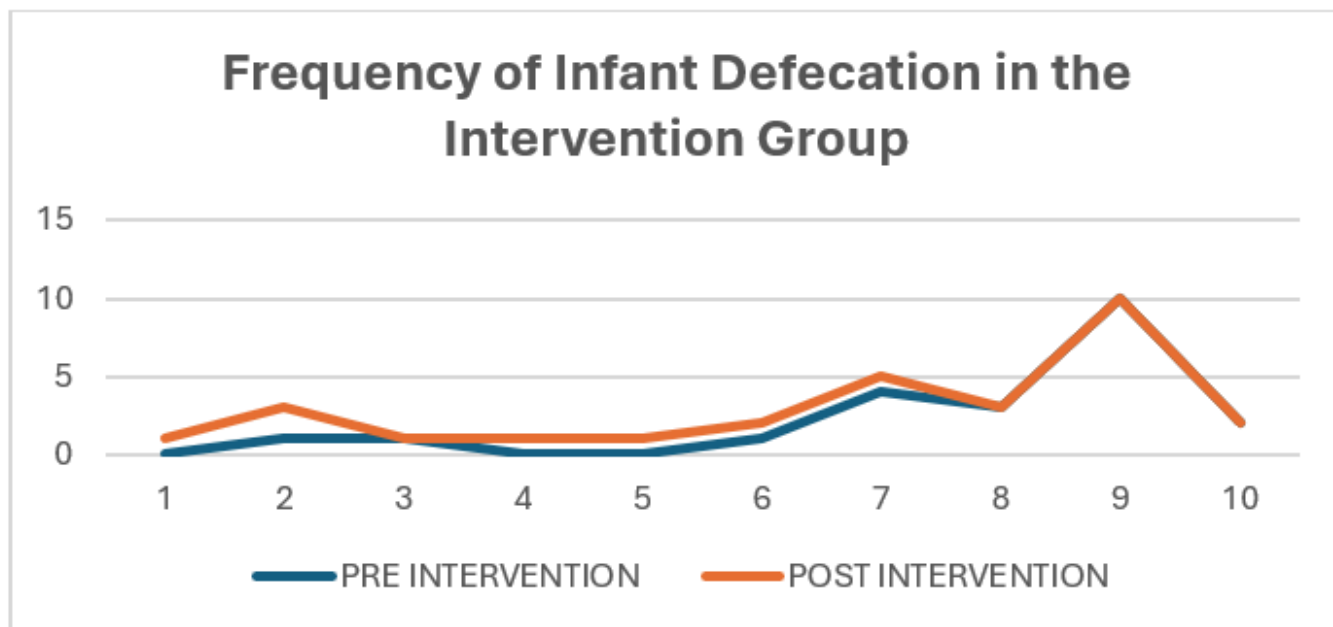


Figure 1

Frequency of Infant Defecation in the Intervention Group

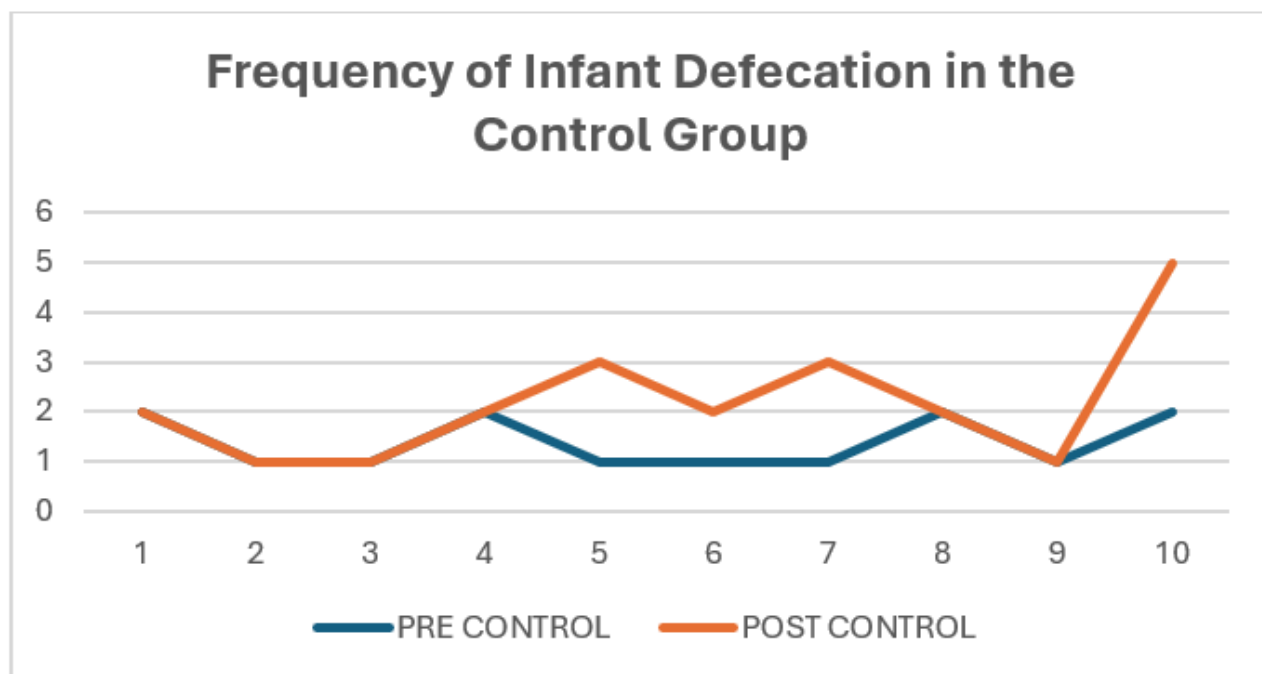


Figure 2

Frequency of Infant Defecation in the Control Group