Journal Educational of Nursing (JEN)
Vol. 8 No. 1 – January – June 2025; page 25-33
p-ISSN: 2655-2418; e-ISSN: 2655-7630
journal homepage: https://ejournal.akperrspadjakarta.ac.id
DOI : 10.37430/jen.v8i1.248

Article history:
Received: June 7th, 2025
Revised: June 9th, 2025
Accepted: June 12nd, 2025

The Effect of Moringa Oleifera Leaves on Increasing Breast Milk Production in Postpartum Mothers: A Scoping Review

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Abstract

Moringa leaves are a very promising local food ingredient to be processed into dishes for postpartum mothers. This is because moringa contains phytosterol compounds which are known to increase and facilitate breast milk production. A scoping review was conducted with the primary aim of investigating the extent to which moringa leaves influence the increase in breast milk production in mothers after childbirth. This study only included articles that presented quantitative evidence regarding the effect of moringa leaves on increasing breast milk. In its execution, this review utilized the scoping review method, a technique that functions to map all relevant literature in a research field. The results of the review revealed that regular consumption of moringa leaves, in any form, has significant potential to increase breast milk production in nursing mothers, thus ensuring an adequate breast milk supply.

Keywords: Moringa Oleifera, Breast Milk Production, Local Food, Postpartum Mothers

Introduction

Improving breast milk production is key to promoting exclusive breastfeeding coverage. Sufficient breast milk production positively impacts the increase in exclusive breastfeeding percentage. With increased breast milk production, mothers can more easily meet their baby's nutritional needs during the first six months of life, thus supporting efforts to optimally increase the percentage of babies receiving exclusive breastfeeding.

According to WHO data, global exclusive breastfeeding coverage was around 44% during 2015-2020, falling short of the 50% exclusive breastfeeding target. Exclusive breastfeeding coverage in Central Africa was 25%, Latin America and the Caribbean 32%, East Asia 30%, South Asia 47%, and developing countries 46%. Low exclusive breastfeeding rates impact the quality and survival of future generations. Globally in 2019, an estimated 144 million toddlers experienced stunting, 47 million were wasted, and 38.3 million were overweight or obese (WHO, 2019).

Based on data from the Health Profile, out of 340,285 babies, 199,877 achieved exclusive breastfeeding (59.97%), while for infants under 6 months old, only 44,546 babies received exclusive breastfeeding (50.35%) (Ministry of Health Republic of Indonesia, 2020). A survey in Indonesia reported that 38% of mothers stopped breastfeeding due to insufficient breast milk production. Difficulty with breast

milk flow causes mothers to feel anxious and avoid breastfeeding, which impacts the baby's suckling.

This affects the decrease in production and performance of oxytocin and prolactin hormones, leading to further decline in breast milk production, and even causing engorgement and milk stasis. As a result, mothers opt to stop breastfeeding and switch to formula milk. Breastfeeding can play a role in reducing child mortality (Kim et al., 2018).

Healthcare professionals, especially midwives, play a crucial role in accordance with Ministry of Health Decree No. 450/Menkes/SK/VI/2004 regarding exclusive breastfeeding. Healthcare professionals are to inform all new mothers to provide exclusive breastfeeding by referring to the 10 steps to successful breastfeeding (Ministry of Health Republic of Indonesia, 2020).

The role of midwives in supporting exclusive breastfeeding is significant, as shown by various studies. Midwives play an important role in the success of exclusive breastfeeding by providing education, information, and support to mothers from the start of breastfeeding until the baby is 6 months old. Various foods have been studied for their ability to increase breast milk production, one of which is Moringa Oleifera, also known as Kelor (Isnan & M, 2017). Kelor can be easily found in various regions of Indonesia.

This plant is called "The Miracle Tree" because it contains a number of nutrients and valuable active components (Olusanya et al., 2020). Kelor has ingredients that can increase breast milk production; almost all parts of the kelor plant, including the roots, bark, stem, fruit, seeds, leaves, and flowers, can be utilized. The part of kelor commonly used as a galactagogue is its leaves (Aderinola et al., 2018). Kelor leaves are known to contain more polyphenol components than other parts (Tshabalala et al., 2019).

Method

This methodology utilizes a **scoping review** technique. There are five steps in conducting a scoping review: identifying the review question, identifying relevant articles, selecting articles, charting data, and collating, summarizing, and reporting results (Arkshey and Malley, 2005).

Identifying the Research Question

This research used the Population, Intervention, Comparison, Outcomes (PICO) framework to formulate the research question and facilitate the literature search. This process identified key concepts for an effective search strategy. The question for this review is: "Is there an effect of giving boiled moringa leaves on increasing breast milk production?"

Table 1. PICO Framework

Population	Intervention	Comparison	Outcomes
Post partum wome* OR post partum mother*	Moringa oleifera OR Kelor	_	Breast milk production OR Breast milk

Identifying Relevant Studies

The search strategy aligns with the research question and objectives. The researchers determined inclusion and exclusion criteria, as presented in the following table:

Tabel.2 Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
- Articles discussing factors related to the effect of boiled moringa leaves on increasing breast milk production in lactating mothers. - Research published within the last 10 years (2015-2025). - Published in international and national journals. - Original research articles.	- Articles providing only abstracts. - Paywalled articles. - Book - Final assignments (Theses).

Article searching utilized several strategies: keywords, Medical Subject Headings (MeSH), truncation, Boolean operators (OR, AND, and NOT), and English language keywords. The search involved PubMed and Google Scholar databases, as well as supporting websites, to define the scope of this review. Meanwhile, gray literature was sourced from the World Health Organization (WHO). The keywords used in the article search were: "postpartum women" OR "Postpartum mother" OR "Ibu nifas" AND "Moringa oleifera" OR "Kelor" AND "produksi asi." Additionally, researchers applied a filter for the last ten years (2015-2025) and selected original research publications. The search results were then downloaded and saved for future use. The Joanna Briggs Institute (JBI) framework was used to conduct a critical appraisal after evidence collection. Pre-determined criteria were used for data selection.

Choosing Reasearch Results

The initial article search yielded 187 articles: 149 from PubMed and 38 from Google Scholar. These articles were then imported into Mendeley software, which identified 35 duplicate articles.After removing the duplicates, the researchers screened the titles and abstracts. A thorough scoping review was conducted by reading the full research publications to determine the relevance of each article. Ultimately, ten relevant articles were successfully retrieved.The entire article search process can be visualized in the following PRISMA flow diagram:

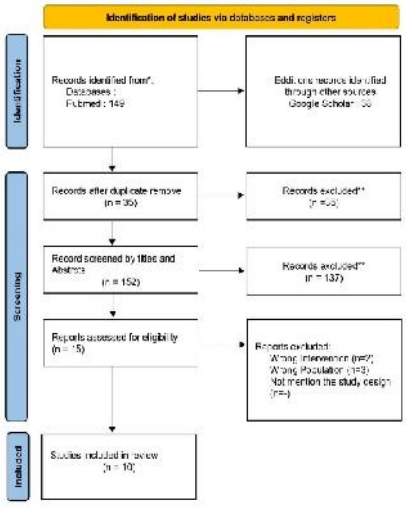

Figure. 1 Prisma Flow Chart

Table.3 Data Charting

No	Researcher/ Year	Research Title	Research country	Research Method	Research Result

1.	Fungtammasan & Phupong, 2021	The effect of *Moringa Oleifera* capsules on increasing breast milk volume in early postpartum patients.	Thailand	*Randomized Controlled Triall*	The results of this study will provide data on *Moringa Oleifera* as a herbal remedy for increasing breast milk volume.
2.	Safarringga & Putri, 2021	The effect of Moringa leaf extract on breast milk production in postpartum mothers.	Indonesia	Quantitative with a *design two group pretest postest*	The research results showed that the average breast milk production before consuming moringa leaf extract was 68.33 ml, and after consumption it increased to 105.00 ml. In the control group, the average production before consuming the placebo was 68.67 ml, and after consuming the placebo it increased to 80.00 ml.
3.	Johan *et al.*, 2020	The Potential of Moringa Leaf Drink in Increasing Breast Milk Production in Postpartum Mothers	Indonesia	Survei analitik	Based on the Friedman and Mann-Whitney tests, a p-value of < 0.05 was obtained, indicating a significant difference in the increase of breast milk production between the two groups. Therefore, it can be concluded that moringa leaves have the potential to enhance breast milk production in postpartum mothers
4.	Indriyani & Meliana, 2020	The Effect of Moringa Leaf Drink on Increasing Breast Milk Production in Postpartum Mothers in the Working Area of UPTD Kertajati Public Health Center, Majalengka Regency, 2020.	Indonesia	Kuantitatif with *design nonequeivalent control group design*	The research results showed that less than half (46.7%) of breast milk production before consuming moringa leaf drink was below normal, and a small proportion (13.3%) remained below normal afterward, while more than half (60%) showed improvement. There is an effect of moringa leaf drink on increasing breast milk production in postpartum mothers.
5.	Mundari *et al.*, 2023	The Effect of Moringa Leaf Extract on Increasing Breast Milk Production in Breastfeeding Mothers.	Indonesia	Quantitative with a *design pre and posttest group design*	he statistical analysis using the Dependent T-Test showed that the calculated t-value was 6.155, which was greater than the t-table value of 1.542 (6.155 > 1.542), thus H0 is rejected. This indicates that the administration of moringa leaf extract has a significant effect on increasing breast milk production in breastfeeding mothers.
6.	Purnanto *et al*., 2020	The Effect of Moringa Leaf Tea Consumption on Increasing Breast Milk Production	Indonesia	Quantitative with a quasi-experimental design using a one-group pretest-posttest design.	This study revealed that the average breast milk volume increased from 152.00 during the pre-test to 158.50 during the post-test. A significant difference in milk volume was found, indicated by a p-value of 0.002 and a correlation value of 0.934, showing a significant effect of moringa leaf tea consumption on breast milk production.

7.	Sinaga *et al.*, 2022	The Effect of Moringa Leaf Administration on the Smoothness of Breast Milk Production in Postpartum Mothers	Indonesia	Quantitative with a *quasy eksperimental rancangan one group pretest postest design*	Based on the research findings, the average smoothness of breast milk production before administering moringa leaf decoction was 4.00 with a standard deviation of 1.622. After the decoction was given, the average smoothness of breast milk production increased to 6.15 with a standard deviation of 1.137.
8.	Alindawati *et al*., 2021	The Effect of Moringa Leaf Extract Cookies on Breast Milk Production and Infant Weight in Postpartum Mothers in Bekasi Regency	Indonesia	Prospective observational study using a pretest-posttest control group design.	This study demonstrated that administering cookies containing moringa leaf extract for 14 days led to an increase in breast milk production of 112.5 mL in the treatment group, compared to only 45 mL in the control group ($p = 0.00$). These findings indicate that consuming moringa leaf extract cookies has an effect on increasing breast milk production and infant weight gain. Therefore, it can be concluded that moringa leaf extract cookies influence both breast milk production and infant weight.
9.	Dahliana & Maisura, 2021	The Effectiveness of Moringa Leaves on Breast Milk Production in Breastfeeding Mothers at Simpang Mamplam Health Center, Bireuen.	Indonesia	Quantitative with a *design quasi eksperimen one group pretest postest*	The statistical test revealed a significant difference in changes in breast milk production, as indicated by the increase in infant weight, between the group that received moringa leaves and the group that did not, with a p-value of 0.000 ($p < 0.05$).
10.	Mabsuthoh & Rohmah, 2021	The Effect of Moringa Leaf Extract on Breast Milk Production in Breastfeeding Mothers at Bahagia Health Center in 2021.	Indonesia	Quantitative with a design *Quasy Eksperimental one group prestest postest design*	The bivariate analysis indicated a relationship between moringa leaf extract and breast milk production, with a p-value of 0.000 ($p < 0.05$) and a COR value of 0.996. Based on these results, it can be concluded that moringa leaf extract has an effect on breast milk production.

Results and Discussion

After data charting, the quality of the articles was assessed through critical appraisal, evaluating the potential for methodological bias or systematic errors within the studies (Stanhope & Weinstein, 2023). Reviewers utilized JBI (Joanna Briggs Institute), a freely available critical appraisal instrument, to investigate the methodological limitations of the primary appraisal studies (Barker et al., 2023). Based on this critical appraisal, the selected items were deemed to be of good quality, comprising 5 articles with a Grade A and 5 articles with a Grade B.

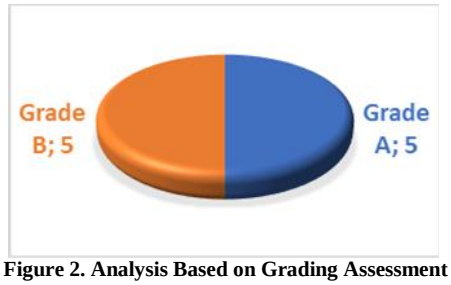

Figure 2. Analysis Based on Grading Assessment

This literature review discusses various relevant journals and research findings regarding the effect of consuming moringa (Moringa oleifera) leaves on breast milk production in postpartum mothers. The analysis was conducted by comparing findings from

various studies to gain a comprehensive understanding and deeper conclusions related to the effectiveness of moringa leaves as a galactagogue. Each source provided different contributions, whether in terms of the form of moringa leaf preparation used, the duration of administration, or the indicators of successful breast milk production.

1. Moringa Leaf Extract and Increased Breast Milk Production

Moringa leaves are highly nutritious, containing protein, iron, vitamins, and phytochemical compounds that have long been traditionally known to aid breast milk production. According to a study by Kurniasih (2013), moringa leaves can be processed into various forms such as capsules, tea, powder, and even processed foods like cakes and candies.

A study by Sulistiawati (2017) demonstrated that administering moringa leaf extract significantly increased prolactin levels, with an average level of 231.72 ng/mL in the intervention group compared to 152.75 ng/mL in the control group ($p = 0.002$). This finding is supported by another study showing a significant increase in breast milk volume on the fifth day after routine consumption of moringa extract for 10 days. Zakaria et al. (2016) also suggested that Moringa oleifera capsules administered as early as 6 hours postpartum could increase breast milk production on the third day, coinciding with the lactogenesis II phase. Mothers who consumed these capsules reported fuller breasts, higher satisfaction with breastfeeding, and continued exclusive breastfeeding until the age of 6 months.

2. Moringa Leaf Beverage and Breast Milk Production

Moringa leaves are also effective when consumed as a brewed beverage. According to Savitri (2016), the **phytosterol content** in moringa leaves acts as a natural stimulant in increasing breast milk production. A study by Indriyani and Meilani (2020) showed that postpartum mothers who regularly consumed **moringa leaf beverages** for one week experienced a significant increase in breast milk production. This is further supported by another study (Biancuzzu, 2003) that observed increased feeding frequency, infant weight gain, and frequency of urination and bowel movements as indirect indicators of increased breast milk volume.

3. Moringa Leaf Tea as a Galactagogue

One more practical form of consumption is moringa leaf tea. Research reviewed in article A6 showed that routine consumption of moringa leaf tea for 3 weeks significantly increased breast milk production ($p = 0.002$), with a very strong correlation ($r = 0.934$). The active compounds in moringa leaves, such as phytosterols, iron (Fe), sitosterol, and stigmasterol, function by stimulating the prolactin and oxytocin hormones, both of which play crucial roles in the lactation process (Nurcahyati, 2014; Luthfiyah, 2012).

4. Moringa Leaf Extract Cookies and Infant Weight

Innovations in other dosage forms, such as moringa leaf extract cookies, have also proven to influence breast milk production. Alindawati et al. (2021) stated that these cookies contain macronutrients and active compounds like flavonoids, polyphenols, and phytosterols, all of which act as galactagogues. According to Kuswanto et al. (2020), phytosterols play a role in the synthesis of steroid hormones such as estrogen and progesterone, which stimulate prolactin production. Article A8 showed that the consumption of

moringa leaf extract cookies had a significant effect on breast milk production and infant weight gain. The active compounds in the cookies work by stimulating alveolar epithelial cells and the anterior pituitary gland to increase breast milk secretion (Penagos Tabares et al., 2014)

5. Boiled Moringa Leaves and Smooth Breast Milk Production

In addition to tea and extracts, boiled moringa leaves have also proven effective. In article A7, administering boiled moringa leaves to postpartum mothers within a week resulted in a significant increase in breast milk production ($p < 0.05$). Although some respondents did not experience an increase due to irregular consumption, this finding is reinforced by Djajanti's (2013) research, which showed that a 40% decoction concentration was more effective than lower concentrations in increasing breast milk production.

6. Overall Effectiveness of Moringa Leaves on Breast Milk Production

An article (A9) concluded that consuming moringa leaves, in any form, significantly impacts the increase of breast milk production in lactating mothers. The average breast milk production in the group that consumed moringa leaves reached 4.40, indicating high effectiveness. Beyond the nutritional factors found in moringa leaves, correct breastfeeding techniques and the mother's psychological state also play important roles. Mothers who are relaxed and not stressed tend to produce an optimal amount of breast milk.

Conclusions

Research indicates that consuming moringa (Moringa oleifera) leaves, whether in the form of extract, tea, beverages, decoctions, cookies, or capsules, can significantly increase breast milk production in postpartum mothers. Moringa leaves contain various active compounds such as phytosterols, flavonoids, polyphenols, iron, sitosterol, and stigmasterol. These compounds have been shown to stimulate the production of prolactin and oxytocin hormones, which play crucial roles in the process of lactation or breast milk formation. This increase in breast milk production is evident not only from the volume of breast milk and hormone levels but also from indirect indicators such as increased infant weight, more frequent infant feeding, and increased frequency of infant urination and bowel movements. Regular and consistent consumption of moringa leaves is essential for its effectiveness as a galactagogue (a substance that increases breast milk production). Therefore, moringa leaves hold significant potential as a natural complementary therapy to support successful breastfeeding, especially in the postpartum period. However, it's important to remember that the effectiveness of moringa leaves is also highly dependent on other supporting factors, such as correct breastfeeding techniques and the mother's psychological state.

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