JPPIPA 10(12) (2024)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

The Effect of Complementary Therapy from Plant Extracts on Breast Milk Production

Lili Farlikhatun[1*], Fitri Ummu Rosyidah[1], Novia Karmilasari[1], Seftaliana[1], Masfupah[1], Sri Gustina[1], Rukmini[1]

[1] Sekolah Tinggi Ilmu Kesehatan Abdi Nusantara, Jakarta, Indonesia.

Received: August 13, 2024
Revised: October 14, 2024
Accepted: December 25, 2024
Published: December 31, 2024

Corresponding Author:
Lili Farlikhatun
lilifarlikhatun@gmail.com

DOI: 10.29303/jppipa.v10i12.8823

Abstract: Breastfeeding issues arise when mothers cannot produce enough milk to meet their babies' nutritional needs. This study aims to assess the effect of complementary therapies, such as consuming moringa leaves, katuk leaves, soy milk, spinach, young papaya, and using lavender aromatherapy, on increasing breast milk production. The quasi-experimental study involved postpartum mothers on day 4, using a pre-test and post-test design with six variables. Results showed that 83.9% of 56 mothers who consumed moringa leaves, 84.5% of 58 mothers who drank soy milk, 81.3% of 48 mothers who ate katuk leaves, 86.4% of 44 mothers who consumed spinach, 82.7% of 52 mothers who ate young papaya, and 83.3% of 30 mothers who used lavender aromatherapy experienced sufficient breast milk production. These findings demonstrate that all six therapies positively influence breast milk production. It is recommended that healthcare providers routinely offer these complementary therapies to postpartum mothers to support exclusive breastfeeding for their babies.

Keywords: Breast milk production; Complementary therapy; Plant extracts; Postpartum

Introduction

United Nations International Children's Emergency Fund (UNICEF) in 2022 reported that the average coverage of exclusive breastfeeding in the world for babies aged 0-6 months only reached 44%. Southeast Asia has a percentage value almost the same as the world percentage, namely 45%, meaning that the success of exclusive breastfeeding is still below 50% of the population (UNICEF, 2023). Central Statistics Agency (BPS) (2024) report shows that the percentage of babies under 6 months of age in Indonesia who receive exclusive breast milk (ASI) will reach 73.97% in 2023. The national percentage of exclusively breastfed babies in the country in 2023 will increase by 2.68 % compared to 2022, namely 72.04%. The same situation occurred in Central Java Province, showing that babies under 6 months of age who received exclusive breast milk (ASI) reached 80.2% in 2023. The percentage of exclusively breastfed babies in 2023 increased by 1.49% compared to 2022, namely 78.71% (Central Java Provincial Health Office, 2023).

Efforts to increase the production and provision of breast milk that have been widely carried out based on the results of the study are counseling, apart from that there is also family assistance and hypnolactation as well as using non-pharmacological therapies that can be found in everyday life. Midwifery care that is often applied to breastfeeding mothers to facilitate breast milk is by carrying out breast care, gently massaging the breasts, giving warm compresses to the breasts, reducing stress, and expressing or pumping breast milk at least every 3 hours to increase breast milk production (Husanah, 2020).

Therapeutic consumption of soy milk, soy milk is a drink made from soy bean juice as one of the local foods containing lagtagogum known as edamame (Glycine

How to Cite:
Farlikhatun, L., Rosyidah, F. U., Karmilasari, N., Seftaliana, Masfupah, Gustina, S., & Rukmini. (2024). The Effect of Complementary Therapy from Plant Extracts on Breast Milk Production. *Jurnal Penelitian Pendidikan IPA*, *10*(12), 9966–9974. https://doi.org/10.29303/jppipa.v10i12.8823

max L.Merill) which can stimulate the hormones oxytocin and prolactin such as alkaloids, polyphenols, steroids, flavonoids and other substances which are effective in increasing and facilitating breast milk production (Cahyanto, 2021). Niazi et al. (2019) and Nurdin et al. (2021) in their research in the form of giving 50 grams of soybean juice and 50 grams of melon juice given to breastfeeding mothers 2 times a day in the morning and evening for 7 days, to see an increase in breast milk production as measured by pumping breast milk which is calculated in 24 hours, as well as Other signs indicating that breast milk production has increased (interview results before and after the intervention, breast enlargement, leaking breast milk) showed an increase (Alves et al., 2021; Ikhlasiah et al., 2020; Sibeko et al., 2021; Sibeko & Johns, 2021).

Therapeutic consumption of Moringa leaves, Moringa leaves are a local food ingredient that has the potential to be developed in the culinary arts of nursing mothers because they contain phytosterol compounds which function to increase and facilitate breast milk production (lactogogum effect). Theoretically, compounds that have a lactogogum effect include sterols. Sterols are steroid class compounds, namely, alkaloids, saponins and flavonoids which function to increase and facilitate breast milk production (Aliyanto & Rosmadewi, 2019). In accordance with the research results of Gopalakrishnan et al. (2016), Kim et al. (2020), and Wu et al. (2016), Moringa leaves contain phytosterols which can increase breast milk production for women who are breastfeeding, where Moringa leaves contain Fe 5.49 mg/100 g and phytosterols, namely sitosterol 1.15%/100 g and stigmasterol. 1.52%/100 g which stimulates breast milk production.

Therapeutic consumption of young papaya, Papaya is one of the fruits that contains Lactogogue and several types of vitamins, such as vitamins A, C, E, and B complex, such as pantothenic acid and folic acid, minerals, such as magnesium and potassium, and dietary fiber (Foong et al., 2020; EL-Hak et al., 2025). Bae & Kratzsch (2018) and Zakarija-Grkovic & Stewart (2020), it was found that before giving young papaya fruit, the frequency of breastfeeding was an average of 5.7 times, after giving young papaya fruit, the frequency of breastfeeding was an average of 9.75 times, resulting in an increase in the frequency of breastfeeding of 4.05 times.

Eat spinach. Spinach is a source of minerals and vitamins as well as phytoestrogens which are believed to increase lactation. Some of the nutrients contained in spinach are vitamin B6, protein, thiamin, folic acid, calcium, potassium and vitamins (Karnesyia & Annisa, 2021). The results of previous research conducted by Patemah & Rufaindah (2022) showed that before treatment, most of the 83.3% of mothers were not fluent in breast milk production. After treatment, it was found that 80% of breast milk production was smooth. As well as therapy using lavender aromatherapy, pharmacological therapy such as using domperidone, metoclopramide and sulpiride according to a doctor's prescription. One of them is non-pharmacological therapy, namely Lavender aroma therapy (Dietz et al., 2016; Gunaratna et al., 2019; Tabeshpour et al., 2017). Lavender aromatherapy is something that can increase alpha waves in the brain, these waves can relax a person and provide a feeling of comfort, a sense of openness, reducing feelings of depression, stress, pain, unbalanced emotions, hysteria, frustration and panic. Lavender aromatherapy is an inhalation method that uses aromatherapy. The positive impact of lavender aromatherapy has a relaxing effect on the central nervous system in the hypothalamus which helps increase the production of the hormone oxytocin which has an impact on increasing breast milk production (Gallier et al., 2020; Lukasik & Zielenkiewicz, 2017). Based on the background above, the author is interested in taking the title "The Effect of Complementary Therapy of Moringa Leaves, Katuk Leaves, Young Papaya, Spinach, Soy Milk and Lavender Aromatherapy on Breast Milk Production in Indonesia in 2024" to see how each variable influences to increase breast milk production in mothers postpartum day 4.

Method

This study aims to determine the effect of Moringa leaves, katuk leaves, young papaya, spinach, soy milk, and lavender aromatherapy on the breast milk production of postpartum mothers on the fourth day after childbirth. The research design is quasi-experimental with a cross-sectional approach. The study consists of two variables: the independent variables and the dependent variable. The independent variables in this study include the administration of Moringa leaves, katuk leaves, young papaya, spinach, soy milk, and lavender aromatherapy, while the dependent variable is the breast milk production of postpartum mothers on the fourth day (Khannazer et al., 2015; Niazi et al., 2019).

Data collection was conducted through observation and direct measurement of breast milk production using objective methods such as weighing the milk produced. The study involved a sample of postpartum mothers on their fourth day after delivery, selected through purposive sampling based on specific inclusion criteria such as the mother's age, health condition, and parity (Alves et al., 2021; Sibeko et al., 2021). Data analysis was performed using univariate analysis to describe the characteristics of the variables, and bivariate analysis

using the T-test to determine the effect of the interventions on the independent variables on breast milk production as the dependent variable. The T-test was used to compare breast milk production between the intervention group and the control group to identify whether there was a significant difference.

Result and Discussion

Result

Univariate Analysis

Describe the Frequency Before and After Giving Complementary Therapy of Moringa Leaves, Katuk Leaves, Young Papaya, Spinach, Soy Milk and Lavender Aromatherapy on Smooth Breast Milk Production in Indonesia in 2024.

Table 1. Frequency distribution of smooth breast milk production

Variable	Pretest (n)	Pretest (%)	Posttest (n)	Posttest (%)
Moringa Leaves				
Lots	0	0	9	16.10
Enough	0	0	47	83.90
A little	56	100	0	0
Soy milk				
Lots	0	0	9	15.50
Enough	0	0	49	84.50
A little	58	100	0	0
Katuk leaves				
Lots	0	0	9	18.80
Enough	0	0	39	81.30
A little	58	100	0	0
Spinach vegetables				
Lots	0	0	6	13.60
Enough	0	0	38	86.40
A little	44	100	0	0
Young papaya				
Lots	0	0	9	17.30
Enough	0	0	43	82.70
A little	52	100	0	0
Aromatherapy lavender				
Lots	0	0	5	16.70
Enough	0	0	25	83.30
A little	30	100	0	0

Based on the results of previous research on the variable Moringa leaves, it was found that 56 of the 56 postpartum mothers had little breast milk production (100%). and the results of research after the variable Moringa leaves revealed that most of the 56 postpartum mothers had adequate breast milk production, 47 people (83.9%). Based on the results of previous research on the soy milk variable, it was known that 58 postpartum mothers had breast milk production before giving soy milk at the Gunung Megang Community Health Center, Kec. Mount Megang District. Muara Enim in total with a small breast milk production of 58 people (100%) and the results of research after the soy milk variable were known from 58 postpartum mothers.

Breast milk production after giving soy milk at the Gunung Megang Community Health Center, Kec. Mount Megang District. Muara Enim in 2024 will mostly have sufficient breast milk production of 49 people (84.5%). Based on the results of previous research on the katuk leaf variable, it was found that all 48 postpartum mothers had a little breast milk production, 48 people (100%) and the results of the research after the katuk leaf variable, it was known that most of the 48 postpartum mothers had sufficient breast milk production, 39 people (81.3%). Based on the results of previous research on the spinach variable, it is known that from 44 postpartum mothers, breast milk production before giving spinach at the Kelekar Community Health Center, Muara Enim Regency, South Sumatra Province in 2024, all of them had a little breast milk production of 44 people (100%) and the results of the research after the spinach variable. It is known that from 44 postpartum mothers breast milk production after giving spinach at the Kelekar Health Center, Muara Enim Regency, South Sumatra Province in 2024, the majority of them had sufficient breast milk production, 38 people (86.4%). Based on the results of previous research on the young papaya variable, it is known that from 52 postpartum mothers before giving young papaya at Pulau Panggung Community Health Center, Semende Darat Laut District, Muara Enim Regency in 2024, all 52 people had little breast milk production (100%) and the results of the research after the young papaya variable. It is known that from 52 postpartum mothers after giving young papaya at Pulau Panggung Community Health Center, Semende Darat Laut District, Muara Enim Regency in 2024, most of them had sufficient breast milk production, 43 people (82.7%). Based on the results of previous research on the lavender aromatherapy variable, it was known from 30 postpartum mothers that breast milk production before giving lavender aromatherapy was entirely with a small amount of breast milk production of 30 people (100%) and the results of research after the lavender aromatherapy variable were known from 30 postpartum mothers breast milk production after giving lavender aromatherapy. the majority with sufficient breast milk production were 25 people (83.3%).

Bivariate Analysis

Bivariate analysis to see the relationship between independent and dependent variables. The analysis results are shown in Table 2.

Table 2. The effect of complementary therapy moringa leaves, katuk leaves, young papaya, spinach, soy milk and lavender aromatherapy on breast milk production in Indonesia in 2024

Variable	Research result			
	Pretest	Posttest	Difference	P-Value
Moringa leaves	126.34	547.23	420.89	0.000
Soy milk	126.55	544.83	418.28	0.000
Katuk leaves	124.90	547.50	422.60	0.000
Spinach vegetables	127.95	546.14	718.19	0.000
Young papaya	126.54	546.54	420.00	0.000
Aromatherapy lavender	126.54	546.54	420.00	0.000

Discussion

Overview of Smooth Breast Milk Production

Based on the results of previous research on the variable Moringa leaves, it was found that 56 of the 56 postpartum mothers had little breast milk production (100%) and the results of research after the variable Moringa leaves revealed that most of the 56 postpartum mothers had adequate breast milk production, 47 people (83.9%). Based on the research results supported by theory and the results of previous research, the researchers assume that breast milk production is entirely in the small category, because the average daily production of breast milk is 126.34 ml. The lack of breast milk production is caused by a lack of breast milk consumed by babies which is caused by several factors, including a lack of food intake containing phytosterols which function to increase breast milk production. In order to increase breast milk production, mothers should consume lots of nutritious food, drink more water at least 8 glasses a day, eat more vegetables, nuts, fruit that contain lots of water and avoid stress and other negative thoughts. If necessary, take supplements to increase breast milk production. In this case, midwives have an important role in providing information in efforts to increase breast milk production, including the correct way to breastfeed babies and efforts to increase breast milk production by consuming green vegetables, one of which is katuk leaves, in order to increase breast milk production. Suggestions from researchers are that mothers can consume foods that can increase breast milk production, one of which is by consuming Moringa leaves.

In accordance with the results of Sibeko & Johns (2021) and Suroowan & Mahomoodally (2013), by administering Moringa leaf extract packaged in 200 mg capsules to breastfeeding mothers with a dose taken 2 times a day for 2 weeks regularly to see the adequacy of breast milk, it was found that before giving Moringa leaves, breast milk production was in the small category of 116. 8ml and after giving Moringa leaves, breast milk production was in the sufficient category at 567.83 ml. Likewise, the results of research by Pratiwi & Sumiarti (2020) by giving Moringa leaf pudding as much as 250 grams/day for seven days showed that before the intervention was given the breast milk production intervention was in the small category of 121.2 ml and after giving Moringa leaves breast milk production was in the sufficient category of 577 .54 ml. Onur et al. (2022) by administering Moringa extract 2 x 1 capsule a day for 15 days showed that the volume of breast milk in mothers given Moringa leaf extract increased rapidly. The volume of breast milk at the start of the intervention was not statistically significant. After the intervention, the breast milk volume of both groups increased, the intervention group increased from 117.5 to 660.5ml, an increase of 263.1 ± 40.8 ml (66.2%).

Based on the results of previous research on the soy milk variable, it was known that 58 postpartum mothers had breast milk production before giving soy milk at the Gunung Megang Community Health Center, Kec. Mount Megang District. Muara Enim in total with a small breast milk production of 58 people (100%) and the results of research after the soy milk variable were known from 58 postpartum mothers. Breast milk production after giving soy milk at the Gunung Megang Community Health Center, Kec. Mount Megang District. Muara Enim in 2024 will mostly have sufficient breast milk production of 49 people (84.5%). According to Prasetyono (2021) protein is very necessary to increase milk production. Nursing mothers need three servings of protein per day while breastfeeding. Bad changes in the mother's diet will affect breast milk protein levels. The mother will lose body protein and other nutritional reserves from her body to maintain the quality of breast milk. Jendras et al. (2020) explains that consuming soy milk is a drink made from soybean juice as one of the local foods that contains lagtagogum known as e*damame (Glycine max L. Merill)* Drinks made from soybean juice can stimulate the hormones oxytocin and prolactin such as alkaloids, polyphenols, steroids, flavonoids and other substances which are effective in increasing and facilitating breast milk production. Isoflavones contained in soy milk are amino acids which contain the vitamins and nutrients that soybeans form flavonoid. Isoflavon or hormones phytoestrogens is the estrogen hormone that is produced naturally by the body and can help the mammary glands of breastfeeding mothers to produce more breast milk.

In accordance with the results of research by Maries & Afriyani (2023), 35 people (77.5%) showed an increase in breast milk production after being given soy milk, with the category of very smooth breast milk and 5 people (12.5%) with good breast milk. Likewise with the results of Aulianova & Rahmanisa (2021) obtained viz post-test minimum value 75, maximum 90, mean 81.47. Astuti (2022) in their research, there was an increase in breast milk production after being given soy milk by 35 people (77.5%) with the category of very smooth breast milk and 5 people (12.5%) with smooth breast milk. Based on the results of previous research on the katuk leaf variable, it was known that all 48 postpartum mothers had little breast milk production, 48 people (100%) and the results of the research after the katuk leaf variable were known from 48 postpartum mothers, most of whom had sufficient breast milk production, 39 people (81, 3%). Pratiwi & Srimiati (2020) explained that katuk leaves are widely used as a fortifying ingredient in food products intended for breastfeeding mothers. Consumption of katuk vegetables by breastfeeding mothers can significantly lengthen the breastfeeding time for babies and for male babies only increases the frequency and duration of breastfeeding. The benefits of katuk leaves as increasing breast milk production are due to the content of katuk leaves which contain quite high levels of protein, vitamin C, phosphorus, calcium and iron. In 100 g fresh katuk leaves contain 79.8 g water, 7.6 g protein, 1.8 g fat, 6.9 g carbohydrates, and an energy value of 310 kJ.

The experimental group the average adequacy of breast milk (ASI) for breastfeeding mothers before treatment was 6.80 times breastfeeding and after treatment was 8.47 times breastfeeding, which means there is a difference of 1. 67 times breastfeeding. Likewise with Kitajima et al. (2017) showed that the average baby weight before intervention was 3429 grams and the average baby weight after intervention was 3752 grams with a difference in value mean amounting to 323 grams. The results of further research conducted by Triananinsi et al. (2020) showed that post-partum mothers' breast milk production before giving katuk leaf decoction was less breast milk production for 14 respondents (66.7%) and breast milk production after giving katuk leaf decoction was a lot of breast milk production for 21 respondents (100%).

Based on the results of previous research on the spinach variable, it is known that from 44 postpartum mothers, breast milk production before giving spinach at the Kelekar Community Health Center, Muara Enim Regency, South Sumatra Province in 2024, all of them had a little breast milk production of 44 people (100%) and the results of the research after the spinach variable. It is known that from 44 postpartum mothers breast milk production after giving spinach at the Kelekar Health Center, Muara Enim Regency, South Sumatra Province in 2024, the majority of them had sufficient breast milk production, 38 people (86.4%). The low coverage of exclusive breastfeeding can be caused by various factors, one of which is the factor that breast milk production is not optimal, so that many babies have less nutritional needs because mothers cannot provide maximum breast milk that suits the baby's nutritional needs (Purwanti, 2021). Breast milk production is a process of forming breast milk that involves the hormone prolactin and the hormone oxytocin. During birth, the hormones progesterone and estrogen will decrease and the hormone prolactin will be more dominant, resulting in breast milk secretion. There are many ways that can be done to facilitate breast milk, including through non-pharmacological measures such as consuming spinach (Hapsari, 2021). Midwives have a very important role in supporting breastfeeding and success in breastfeeding (Roesli, 2021). Spinach is a source of minerals and vitamins as well as phytoestrogens which are believed to increase lactation. Some of the nutrients contained in spinach are vitamin B6, protein, thiamin, folic acid, calcium, potassium and very high amounts of vitamins that are easily digested (Karnesyia & Annisa, 2021).

These results are in line with a literature study of 5 journals, so the results obtained before giving boiled spinach leaf water, breast milk production (ASI) were all in the deficient category. Likewise, research results from Sari & Marlian (2018) and Widiastuti et al. (2023) showed that 71.4% of breast milk production before giving spinach met the criteria for not being smooth. The results of research by Patemah & Rufaindah (2022) showed that before treatment there were 83.3% of mothers who were not producing breast milk smoothly.

Based on the results of previous research on the young papaya variable, it is known that from 52 postpartum mothers before giving young papaya at Pulau Panggung Community Health Center, Semende Darat Laut District, Muara Enim Regency in 2024, all 52 people had little breast milk production (100%) and the results of the research after the young papaya variable. It is known that from 52 postpartum mothers after giving young papaya at Pulau Panggung Community Health Center, Semende Darat Laut District, Muara Enim Regency in 2024, most of them had sufficient breast milk production, 43 people (82.70%). Young papaya fruit is a type of plant that contains laktagogum has the potential to stimulate hormones oxytocin and prolactin like alkolid, polifenol, steroid flavonoid and other substances are most effective in increasing and facilitating breast milk production. Reflex prolactin hormonally to produce breast milk, when the baby sucks the mother's nipple, stimulation occurs neorohormonal

on putting milk and areola mother This stimulus continues to pituitary through vagus nerves, then to anterior lobe. From lobe This will release hormones prolactin, enters the bloodstream and reaches the glands that make breast milk. These glands will stimulate the production of breast milk.

After being given papaya, breast milk production was in the sufficient category, which was 667.83 ml. After giving papaya, breast milk production was in the adequate category at 578.7 ml. Likewise breast milk production in breastfeeding mothers increased from 116.4 to 670.5ml. Based on the results of previous research on the lavender aromatherapy variable, it was known from 30 postpartum mothers that breast milk production before giving lavender aromatherapy was entirely with a small amount of breast milk production of 30 people (100%) and the results of research after the lavender aromatherapy variable were known from 30 postpartum mothers breast milk production after giving lavender aromatherapy. The majority with sufficient breast milk production were 25 people (83.3%).

Lavender aromatherapy is an inhalation method that uses aromatherapy. The positive impact of lavender aromatherapy has a relaxing effect on the central nervous system in the hypothalamus which helps increase the production of the hormone oxytocin which has an impact on increasing breast milk production (Ohorella et al., 2021). Linalool is the main active ingredient that plays a role in the anti-anxiety (relaxation) effects of lavender (Ohorella et al., 2021). Linalool (43.32%) and Linalyl Acetat (26.32%) are the largest components of lavender flower oil (Muchtaridi & Moelyono, 2022). The content of linalool and linalyl acetate is what stimulates the parasympathetic and has a narcotic effect and linalool acts as a sedative. The following is the chemical content in 100g of lavender (McLain, 2020).

In accordance with the results of Hayati et al. (2020) showed that after giving lavender aromatherapy, the mother's breast milk production was in the sufficient category at 68.9%. Likewise, with the results of research by William (2021), the breast milk production of postpartum mothers after being given lavender aromatherapy, the majority of postpartum mothers with breast milk production of 18.75 ml was 40%. The results of subsequent research conducted by Power (2020) and Price (2021) showed that after administering lavender aromatherapy, the mother's breast milk production was 78.70%.

Complementary Therapy That Can Facilitate Breast Milk Production

The research results show that the test results paired samples t-test It is known that the significance value before and after giving Moringa leaves is 0.000 < 0.05, so it can be concluded that Ho is accepted and Ha is rejected, thus it can be concluded that there is effectiveness of giving Moringa leaves to increase breast milk production in BPM Midwife M, Jayasakti Village, Muaragembong District, Bekasi Regency in 2024. This is because Moringa leaves contain phytosterol compounds which can facilitate breast milk production, phytosterols can directly stimulate the secretory cells of the mammary glands so that milk secretion increases. Moringa leaves are rich in nutrients including calcium, iron, protein, vitamin A, vitamin B, vitamin C and also contain phytosterols so they can increase breast milk production. Based on this statement, it can be seen that Moringa leaves can increase breast milk production.

The results show that soy milk gets a significance T test value before and after giving soy milk of 0.000 < 0.05, so it can be concluded that Ho is accepted and Ha is rejected, thus it can be concluded that there is effectiveness in giving soy milk at the Gunung Megang Community Health Center, Kec. Mount Megang District. Muara Enim in 2024. The effectiveness of soy milk on breast milk production is because soy milk contains protein which is used to stimulate breast milk during breastfeeding. Another substance is carbohydrates which can be used as a source of energy during breastfeeding. Mothers who consume soy milk do not encounter problems when consuming it because they both like this food, this makes the mother remain comfortable when consuming it so that breast milk production results in breast milk production. increase. Higher levels of isoflavones in babies were found in mothers who regularly consumed soybeans. *Isoflavones* or the phytoestrogen hormone is the estrogen hormone that is produced naturally by the body and can help the mammary glands of breastfeeding mothers to produce more breast milk.

The consumption of katuk leaves before and after was obtained from the T test results of 0.000 < 0.05, so it can be concluded that Ho was accepted and Ha was rejected, thus it can be concluded that there is effectiveness in giving katuk leaves in PMB N Pusakajaya Selatan Village, Cilebar District, Karawang Regency in 2024. Katuk leaves contain quite high levels of protein, vitamin C, phosphorus, calcium and iron. Apart from that, there are other ingredients such as polyphenols, amino acids, saponins and tannins and other compounds that can trigger breast milk production. Polyphenyls and steroids play a role in the prolactin reflex or stimulate the alveoli to produce breast milk, as well as stimulate the hormone oxytocin to stimulate the release and flow of breast milk. Sauropi folium in katuk leaves can increase the flow of nutrients

into the mammary glands and influence secretory cell activity which can affect breast milk production.

Research shows test results paired samples t-test It is known that the significance value before and after giving spinach is 0.000 < 0.05, so it can be concluded that Ho is accepted and Ha is rejected, thus it can be concluded that there is the effectiveness of spinach in increasing breast milk production at the Kelekar Community Health Center, Muara Enim Regency, South Sumatra Province in 2024. Because Spinach contains phytoestrogen compounds which can facilitate breast milk production, phytoestrogens can directly stimulate the secretory cells of the mammary glands so that milk secretion increases. Some of the nutrients contained in spinach are vitamin B6, protein, thiamin, folic acid, calcium, potassium and very high amounts of vitamins that are easily digested.

The research results also show that the test results paired samples t-test It is known that the significance value before and after giving young papaya is 0.000 < 0.05, so it can be concluded that Ho is accepted and Ha is rejected, thus it can be concluded that there is effectiveness of giving young papaya to increase breast milk production. Young papaya fruit is a type of plant that contains laktagogum has the potential to stimulate hormones oxytocin and prolactin like alkolid, polifenol, steroid flavonoid and other substances are most effective in increasing and facilitating breast milk production (Sardjono, 2021). Increased breast milk production is influenced by the presence of polyphenols and steroid which affects reflexes prolactin to stimulate alveolus who work actively in the formation of breast milk.

Furthermore, the results of research on the use of lavender aromatherapy show tests paired sample t-test known value p value equal to 0.000 < 0.05 before and after treatment using lavender aromatherapy, it can be concluded that Ho is accepted and Ha is rejected, thus it can be concluded that there is effectiveness of lavender aromatherapy in increasing breast milk production in Wates Village, Ngaliyan District, Semarang Regency in 2024. effectiveness of lavender aromatherapy to increase breast milk production, this is because lavender aromatherapy has a pleasant smell so it creates a feeling of calm and comfort during the breastfeeding process, in this way the mother will avoid stress which will greatly affect the mother's breast milk production.

Conclusion

This research identifies various complementary therapies that can affect breast milk production. This therapy includes giving moringa leaves, soy milk, katuk leaves, spinach, young papaya, lavender aromatherapy. Each of these therapies plays an important role in increasing the smooth production of breast milk. A deep understanding of this therapy is very important to increase the smooth production of breast milk.

Acknowledgments

We would like to express our deepest gratitude to our advisor who has guided us throughout the research process and to the respondents who have made significant contributions to the success of this study. Your support, guidance, and participation have been invaluable, and we greatly appreciate your effort and dedication. Thank you for your continuous encouragement and for making this research possible.

Author Contributions

L.F., F.U.S., N.K., S.M., and S.G. contributed to the conceptualization, data collection process, data processing, and article writing.

Funding

This research was funded by personal funds.

Conflicts of Interest

The authors declare no conflict of interest.

References

Aliyanto, W., & Rosmadewi, R. (2019). Efektifitas Sayur Pepaya Muda dan Sayur Daun Kelor terhadap Produksi ASI pada Ibu Post Partum Primipara. *Jurnal Kesehatan*, *10*(1), 84-91. https://doi.org/10.26630/jk.v10i1.1211

Alves, M. D. C., Pereira, D. E., Bidô, R. D. C. D. A., Freitas, J. C. R., Santos, C. P. R. D., & Soares, J. K. B. (2021). Effects of the Aqueous Extract of Phyllanthus niruri Linn During Pregnancy and Lactation on Neurobehavioral Parameters of Rats' Offspring. *Journal of Ethnopharmacology*, *270*, 113862. https://doi.org/10.1016/j.jep.2021.113862

Astuti, T. (2022). *The Effect of Giving Soy Milk to Postpartum Mothers on Increased Baby Weight in the Working Area of the Telaga Dewa Community Health Center, Bengkulu City* (Thesis). Kemenkes RI Poltekkes Bengkulu Applied Master's Program in Midwifery.

Aulianova, T., & Rahmanisa, S. (2021). Effectiveness of Alkaloid and Sterol Extraction of Katuk (Sauropus androgynus) Leaves on Breast Milk Production. *Jurnal Majority*, *5*(1), 117–121.

Bae, Y. J., & Kratzsch, J. (2018). Vitamin D and Calcium in the Human Breast Milk. *Best Practice and Research: Clinical Endocrinology and Metabolism*, *32*(1), 39–45. https://doi.org/10.1016/j.beem.2018.01.007

Central Statistics Agency (BPS). (2024). *Coverage for Babies Receiving Exclusive Breast Milk in 2023*. Jakarta: Republic of Indonesia Ministry of Health.

Cahyanto, B. A. (2021). *Vitamin A Intake, Health Care, Breast Milk Production (ASI) and Health Status of Postpartum Mothers*. Bogor: Department of Community Nutrition. Faculty of Human Ecology. Bogor Agricultural Institute.

Dietz, B. M., Hajirahimkhan, A., Dunlap, T. L., & Bolton, J. L. (2016). Botanicals and Their Bioactive Phytochemicals for Women's Health. *Pharmacological Reviews*, *68*(4), 1026–1073. https://doi.org/10.1124/pr.115.010843

EL-Hak, H. N. G., Mohallal, E. M. E., & Abomosallam, M. (2025). Reproductive and Developmental Safety Evaluation of Thymelaea hirsuta (L.) leaves Aqueous Extract in Wistar Albino Rats. *Journal of Ethnopharmacology*, *336*(July 2024), 118729. https://doi.org/10.1016/j.jep.2024.118729

Foong, S. C., Tan, M. L., Foong, W. C., Marasco, L. A., Ho, J. J., & Ong, J. H. (2020). Oral Galactagogues (Natural Therapies or Drugs) for Increasing Breast Milk Production in Mothers of Non-Hospitalised Term Infants. *Cochrane Database of Systematic Reviews*, *2020*(5). https://doi.org/10.1002/14651858.CD011505.pub2

Gallier, S., Abbeele, P. V. D., & Prosser, C. (2020). Comparison of the Bifidogenic Effects of Goat and Cow Milk-Based Infant Formulas to Human Breast Milk in an In Vitro Gut Model for 3-Month-Old Infants. *Frontiers in Nutrition*, *7*(December). https://doi.org/10.3389/fnut.2020.608495

Gopalakrishnan, L., Doriya, K., & Kumar, D. S. (2016). Moringa Oleifera: A Review on Nutritive Importance and Its Medicinal Application. *Food Science and Human Wellness*, *5*(2), 49–56. https://doi.org/10.1016/j.fshw.2016.04.001

Gunaratna, N. S., Moges, D., & Groote, H. D. (2019). Biofortified Maize Can Improve Quality Protein Intakes Among Young Children in Southern Ethiopia. *Nutrients*, *11*(1), 1–15. https://doi.org/10.3390/nu11010192

Hapsari, A. (2021). *Exclusive Breastfeeding Smart Book*. Jakarta: Salsabila Library Alkautsar Group.

Hayati, L., Hernandia D., Wahyuni, H. S. (2020). The Influence of Lavender Aromatherapy and Breastcare (Breast Care) on Postpartum Mothers' Breast Milk Production at RSI Sultan Agung Semarang. *Publication Manuscript*. Unissula Student Scientific Conference (KIMU).

Husanah, E. (2020). Midwifery Care for Mrs P with Breast Milk Production Problems Through Date Therapy, *Journal of Health Communication*, 11(1), 71-77.

Ikhlasiah, M., Winarni, L. M., Poddar, S., & Bhaumik, A. (2020). The Effects of Papaya Leaf Juice for Breastfeeding and Working Mothers on Increasing Prolactin Hormone Levels and Infant's Weight in Tangerang. *Enfermeria Clinica*, *30*(2019), 202–205. https://doi.org/10.1016/j.enfcli.2019.11.054

Jendras, G., Monizi, M., Neinhuis, C., & Lautenschläger, T. (2020). Plants, Food and Treatments Used by BaKongo Tribes in Uíge (northern Angola) to Affect the Quality and Quantity of Human Breast Milk. *International Breastfeeding Journal*, *15*(1), 1–12. https://doi.org/10.1186/s13006-020-00329-1

Khannazer, N., Paylakhi, S. H., Mirshafiey, A., Azizi, G., & Motamed, N. (2015). Silibinin, Up-Regulates Chemokine Receptor Expression in MDA-MB-231 Breast Cancer Cell Line. *Bangladesh Journal of Medical Science*, *14*(2), 190–195. https://doi.org/10.3329/bjms.v14i2.16740

Kim, C. C., Parkar, S. G., & Gopal, P. K. (2020). Developing Infant Gut Microflora and Complementary Nutrition. *Journal of the Royal Society of New Zealand*, *50*(3), 384–396. https://doi.org/10.1080/03036758.2020.1718716

Kitajima, Y., Ogawa, S., Egusa, S., & Ono, Y. (2017). Soymilk Improves Muscle Weakness in Young Ovariectomized Female Mice. *Nutrients*, *9*(8), 1–9. https://doi.org/10.3390/nu9080834

Karnesyia, K., & Annisa, A. (2021). *Various Benefits of Spinach as a Food to Supplement Breast Milk*. Jakarta: EGC.

Lukasik, A., & Zielenkiewicz, P. (2017). Plant MicroRNAs-Novel Players in Natural Medicine? *International Journal of Molecular Sciences*, *18*(1). https://doi.org/10.3390/ijms18010009

Maries, V. R., & Afriyani, L. (2023). Pengaruh Pemberian Susu Kedelai Terhadap Peningkatan Produksi ASI pada Ibu Nifas di RB Sri Amizar Kota Jambi. *Midwifery Health Journal*, *8*(2), 105-111. https://doi.org/10.52524/midwiferyhealthjournal.v8i2.231

McLain, D. E. (2020). *Chronic Health Effects Assessment of Spike Lavender Oil*. Walker Doney and Associates.

Muchtaridi, M., & Moelyono, M. (2022). *Aromatherapy Review of Aspects of Medicinal Chemistry*. Yogyakarta: Graha Ilmu.

Niazi, A., Yousefzadeh, S., Rakhshandeh, H., Esmaily, H., & Askari, V. R. (2019). Promising Effects of Purslane Cream on the Breast Fissure in Lactating Women: A Clinical Trial. *Complementary Therapies in Medicine*, *43*(February), 300–305. https://doi.org/10.1016/j.ctim.2019.02.002

Nurdin, M., Yulianty, R., Latief, S., Prihantono, P., Abu, J., & Usman, A. N. (2021). Effects of Centella asiatica (L.) Urban Extract in TNF-α Levels. *Gaceta Sanitaria*, *35*, S281–S283. https://doi.org/10.1016/j.gaceta.2021.10.034

Ohorella, F., Kamaruddin, M., Kandari, N., & Triananinsi, N. (2021). Efektifitas Aromatherapy Uap Lavender dan Pijat Oksitosin Terhadap Produksi ASI pada Ibu Nifas. *JKM (Jurnal Kebidanan Malahayati*), 7(2), 155-160. https://doi.org/10.33024/jkm.v7i2.3628

Onur, E., Gökmen, G. G., Nalbantsoy, A., & Kışla, D. (2022). Investigation of the Supportive Therapy Potential of Propolis Extract and Lactobacillus acidophilus LA-5 Milk Combination Against Breast Cancer in Mice. *Cytokine*, *149*(September 2021). https://doi.org/10.1016/j.cyto.2021.155743

Power, W. (2020). *Natural Antioxidants and Free Radicals*. Yogyakarta: Kanisius.

Prasetyono, D. S. (2021). *Buku Pintar Asi Eksklusif Pengenalan, Praktik, dan Kemanfaatannya*. Bantul: Diva Press.

Price, P. (2021). *The Effect of Aromatherapy on Your Life*. Yogyakarta: Grafindo Litera Media.

Patemah, P., & Rufaindah, E. (2022). Pengaruh Sayur Bayam Merah (Amaranthus tricolor l) Terhadap Produksi ASI Ibu Nifas di Kecamatan Poncokusumo Kabupaten Malang. *Media Ilmu Kesehatan*, *11*(3). https://doi.org/10.30989/mik.v11i3.805

Pratiwi, I., & Srimiati, M. (2020). The Effect of Giving Moringa Leaf Pudding (Moringa oleifera) on Breast Milk Production (ASI) to Breastfeeding Mothers in the Working Area of the Cawang Subdistrict Health Center, East Jakarta. *The Indonesian Journal of Health*), XI(1), 53-57. Retrieved from https://journal.stikeshb.ac.id/index.php/jurkessia/article/view/305

Purwanti, A. (2021) *Midwifery Care in the Period Postpartum*. Yogyakarta: Knowledge Horizon.

Roesli, U. (2021). *Guide to Early Breastfeeding Initiation Plus Exclusive Breastfeeding*. Jakarta: Mother's Library.

Sari, D. K., & Marlian, M. (2018). Efektifitas Pemberian antara Sayur Kelor dan Sayur Bayam Terhadap Kelancaran Produksi ASI pada Ibu Nifas di Kelurahan Sukorame Kota Kediri Tahun 2018. *Java Health Journal (JHJ)*, 1(2). Retrieved from https://www.fik-unik.ac.id/penelitian/download_file/f26f7f6208bed0571068e285300c7d5b.pdf

Sardjono, M. S. (2021). *Food Science*. Yogyakarta: UGM.

Sibeko, L., & Johns, T. (2021). Global Survey of Medicinal Plants During Lactation and Postpartum Recovery: Evolutionary Perspectives and Contemporary Health Implications. *Journal of Ethnopharmacology*, *270*(July 2020), 113812. https://doi.org/10.1016/j.jep.2021.113812

Sibeko, L., Johns, T., & Cordeiro, L. S. (2021). Traditional Plant Use During Lactation and Postpartum Recovery: Infant Development and Maternal Health Roles. *Journal of Ethnopharmacology*, *279*(February), 114377. https://doi.org/10.1016/j.jep.2021.114377

Suroowan, S., & Mahomoodally, F. (2013). Complementary and Alternative Medicine Use Among Mauritian Women. *Complementary Therapies in Clinical Practice*, *19*(1), 36–43. https://doi.org/10.1016/j.ctcp.2012.07.002

Triananinsi, N., Andryani, Z. Y., & Basri, F. (2020). The Relationship between Giving Katuk Leaf Vegetables to the Smoothness of Breastfeeding in Multiparous Mothers at the Caile Health Center. *Journal of Healthcare Technology and Medicine, Ubudiyah University, Indonesia*, *6*(1).

UNICEF. (2023). *The UNICEF UK Baby Friendly Initiative Orientation to Breastfeeding for General Practitioners. Orientation Handbook*. Oxford: Oxford University Press.

Central Java Provincial Health Office. (2023). *Central Java Province Health Profile in 2022*. Semarang: Provincial Health Office Central Java.

Widiastuti, R., Swamilaksita, P. D., Wahyuni, Y., Novianti, A., & Nuzrina, R. (2023). Program Inovasi Abang Mesi Meningkatkan Capaian Keberhasilan Pemberian ASI Eksklusif pada Ibu Menyusui di Wilayah UPTD Puskesmas Marga Jaya Kota Bekasi Tahun 2022. *Journal of Nutrition College*, *12*(4), 268-276. https://doi.org/10.14710/jnc.v12i4.38071

William, W. (2021). *Demperidone to Increase Breast Milk Production*. CDK-238/Vo, p. Retrieved from http://www.kalberned.com/portals

Tabeshpour, J., Sobhani, F., Sadjadi, S. A., Hosseinzadeh, H., Mohajeri, S. A., Rajabi, O., Taherzadeh, Z., & Eslami, S. (2017). A Double-Blind, Randomized, Placebo-Controlled Trial of Saffron Stigma (Crocus sativus L.) in Mothers Suffering from Mild-to-Moderate Postpartum Depression. *Phytomedicine*, *36*(October), 145–152. https://doi.org/10.1016/j.phymed.2017.10.005

Wu, J., Zeng, R., Huang, J., Li, X., Zhang, J., Ho, J. C. M., & Zheng, Y. (2016). Dietary Protein Sources and Incidence of Breast Cancer: A Dose-Response Meta-Analysis of Prospective Studies. *Nutrients*, *8*(11). https://doi.org/10.3390/nu8110730

Zakarija-Grkovic, I., & Stewart, F. (2020). Treatments for Breast Engorgement During Lactation. *Cochrane Database of Systematic Reviews*, *2020*(9). https://doi.org/10.1002/14651858.CD006946.pub4