

The Influence of Consuming *Sauropus Androgynus L. Merr*, *Moringa Oleifera Lam*, and *Vigna Cylindrica (L) Skeels* on Breastfeeding Mothers: Randomized Controlled Trial

Ajeng Galuh Wuryandari^{1*}, Indarmien Netty Ariasih¹, Julaecha²

¹Department of Midwifery, Health Polytechnic Jambi, Jambi, Indonesia

²Baiturrahim of College of Health Sciences, Jambi, Indonesia

Corresponding author: Ajeng Galuh Wuryandari, dr. Tazar Street, Buluran Kenali, Kec.

Telanaipura, Kota Jambi, Jambi 36361, Indonesia, Orcid :<https://orcid.org/0000-0002-7513-4666>,

[Phone: +62 812-7978-0909](tel:+6281279780909), [Email: wuryandariajenggaluh@gmail.com](mailto:wuryandariajenggaluh@gmail.com)

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Background: Much scientific evidence shows the benefits of *L. Merr*, *Moringa Oleifera* Lam, and *Vigna Cylindrica* (L) Skeels. The leaves of these plants can be easily found in almost all of Indonesia and are a local food ingredient for Indonesian people. This study analyses the effect of the consumption of *Sauropus Androgynus* L. Merr, *Moringa Oleifera* Lam, and *Vigna Cylindrica* (L) Skeels on increasing the production of breastmilk while breastfeeding.

Methods: The research design used in this study was one group pretest-posttest design. The sample was taken by purposive sampling with 37 breastfeeding mothers with children aged <40 days who met the inclusion criteria. The intervention was to provide products processed as daily dishes, namely "sayur bening" with a composition of 150 grams of each plants (*L. Merr*, *Moringa Oleifera* Lam, and *Vigna Cylindrica* (L) Skeels), then measure the milk production by looking at how much the amount of breast milk increases after consuming the product for five days in a row, with the same seasonings. Data analysis using Wilcoxon test.

Results: The number of respondents in the study was 37 people with an age range between 19-39 years, with a child age range of 4-40 days, and the number of children owned by the respondents between 1-5 people. Analysis using the Wilcoxon test, it was found that all respondents (100%) experienced an increase in breastfeeding with $p\text{-value} < 0.05$, the same result was also shown in the comparison of birth weight with children's body weight after being given the intervention.

Conclusion: Consumption of *Sauropus Androgynus* L. Merr, *Moringa Oleifera* Lam, and *Vigna Cylindrica* (L) Skeels was statistically proven to differ in the amount of breast milk expenditure significantly. Kathree processing is adapted to everyday cooking so that postpartum nursing mothers can easily accept the taste and appearance.

Keywords: *Sauropus Androgynus* L. Merr, *Moringa Oleifera* Lam, *Vigna Cylindrica* (L) Skeels, Breastfeeding, Mothers

Introduction

Breast milk makes the world healthier, smarter, and more equal [1–3]. The benefits of breastfeeding can reduce the incidence of infection, increase intelligence, possibly protect against overweight and diabetes, and prevent cancer for mothers [4,5]. The Lancet report on maternal and child nutrition states that 800,000 child deaths can be prevented through breastfeeding and calls for breastfeeding support, but says that almost worldwide report a decrease in the rate of exclusive breastfeeding, including Indonesia. The reasons why women avoid or stop breastfeeding range from medical, cultural, and psychological reasons to physical discomfort and discomfort [6,7]. These things are not trivial, and many mothers without support turn to bottle feeding of formula. Multiplying across populations and involving multinational commercial interests, this situation has catastrophic consequences at the level of breastfeeding and the next generation's health [8–10].

The mother's nutritional status during breastfeeding is an effect of the nutritional status of the mother before pregnancy and during pregnancy (weight gain during pregnancy). Maternal weight gain during pregnancy depends on the nutritional status of the mother before pregnancy [11,12]. One of the most common factors associated with the failure of exclusive breastfeeding is the factor of breastfeeding that has not come out in the first week after delivery and the mother's view that her milk production is not enough. Exclusive breastfeeding for six months is one of the global strategies to improve infants' growth, development, health, and survival. Although there are many benefits of exclusive breastfeeding for babies, mothers, families and communities, its coverage is still low in various countries, including Indonesia [13,14]. The Basic of Health Research 2010 data shows that the coverage of exclusive breastfeeding for infants up to six months is only 15.3% [10].

Hereditary habits that have become local cultural wisdom in the Danau Sipin District area are various vegetables that are believed to increase breast milk, including banana hearts, long bean leaves, katu leaves, moringa leaves and many more. While in 2019, Lake Sipin was chosen to be the winner of the National Clean and Healthy Behavior Competition, the vegetables above have

become regional local wisdom, with a variety of dishes derived from moringa, katu, long beans, kates. Danau Sipin District consists of 5 Kelurahan. There is 1 community health centre, namely the Putri Ayu Community Health Center. For January - September 2019, the target number of exclusive breastfeeding was 458 mothers, who gave exclusive breastfeeding 256 mothers, who did not give exclusive breastfeeding 49 for various reasons, while those who did not visit 153.

Various studies have been conducted to increase breast milk, including by giving oxytocin massage and the results are also significant. The culture of eating various vegetables such as katu leaves, Lembayung leaves (long beans) and banana flower, moringa and green beans related to their function as lactagogues is still focused on extracting and scientifically proving the function of long bean leaves and katu, moringa and kates leaves as lactagogue Traditionally processed form, namely as clear or boiled vegetables, stir-fry [5,15].

Danau Sipin sub-district in the work area of Putri Ayu Community Health Center which has a work area of 5 sub-districts. There is one coordinating midwife who is ready to participate in this research. Likewise, the head of the Driving the Empowerment of Family Welfare and his team and cadres. The leaves of long beans, katuk, and moringa are very potential to be developed both in terms of their benefits as lactagogues and the nature of these plants, which are very easy to grow with a short harvest life. Its use is still limited among Javanese and Malay tribesmen, with the processed form only as clear vegetables or boiled alone or mixed. However, not all villages have Moringa leaves, or Long bean leaves, all the time.

So far, breastfeeding mothers only consume L.Merr leaves which are used as laktagogums, whereas L.Merr leaves or also known as lavender leaves have greater benefits. Likewise, Moringa Oleifera Lam, and Vigna Cylindrica (L) Skeels leaves both contain laktagogums and saponins as well as polyphenols that can increase prolactin levels. Prolactin is a hormone that plays a major role in breast milk production [16-20]. Therefore, the development of functional supplementary food products for nursing mothers containing kathree leaves, namely Lembayung, katu, and moringa in

the form of ready-to-eat products.

This study aims to analyze the effect of consumption of Kathree (*Sauropus Androgynus* L. Merr, *Moringa Oleifera* Lam, and *Vigna Cylindrica* (L) Skeels) on increasing the production of breast milk in postpartum mothers.

Materials and Methods

Trial design

The Randomized Controlled Trial with design of this study was one group's pretest-posttest design, namely a research design that contained a pretest before being given treatment and a posttest after being given treatment.

Participants

The sample is mothers who have babies aged < 40 days in the working area of Putri Ayu Health Center. Sampling was done by purposive sampling with 37 mothers who breastfed children aged <40 days who met the inclusion criteria. The inclusion criteria for the sample were healthy mothers and babies, primigravida mothers, while the exclusion criteria were mothers suffering from depression. The sample of this study was randomly selected from 105 postpartum mothers who visited the community health center polyclinic.

The data used in this study is secondary data from the documentation of quarterly reports at the Putri Ayu Health Center and the Jambi City Health Service which was carried out in December 2019-September 2020. The dependent variable of the study was the production of breast milk, measured by criteria 1) Frequency of urination, newborns who get enough Breast milk then urinate for 24 hours at least 6-8 time. 2) Characteristics of urination, clear yellow urine color. 3) Frequency of bowel movements, bowel patterns 2-5 times per day. 4) Color and characteristics of bowel movements, in the first 24 hours the baby excretes bowel movements which is dark green, thick and

sticky, which is called meconium and beyond is golden yellow, not too runny and not too thick 5) The number of hours of sleep for babies who have enough breast milk for 2-4 hours. 6) Baby's weight. Signs of adequacy of breast milk in infants are: weight gain of more than 10% in the first week. As explained earlier that the questionnaire on breast milk production uses 6 question items, if the respondent answers yes, he will be given a score of 1 and if he answers no, he will be given a score of zero. Breast milk production questionnaire using the Guttman scale with a score range of 0-1. Breast milk production is said to be smooth if at least 4 of the 6 indicators observed in infants. If the value is less than 4 it is said no smoothly.

Intervention

Participants were given an intervention in the form of food consisting of 150 grams of each plant (L. Merr, *Moringa Oleifera* Lam, and *Vigna Cylindrica* (L) Skeels (Herbarium Medanense (Meda)). The dose of food (vegetables) was determined based on the daily requirement of vitamins and minerals for postpartum mothers, namely 150 grams of vegetables consumed. 3 times a day for 7 days, if toxic effects occur during consumption of vegetables, the mother and baby will be referred to the clinic. Input (Q1) is the production of breast milk, then the mother is given Kathree vegetables (X) as an intervention, after that comes the output (Q2) in this case changes in breast milk production.

Randomisation

Sample selection using a simple random method

Blinding

In this study, 3 enumerators were used to collect research data. The previous enumerators did not know the participants because they were students who had been trained by the researcher before

collecting data.

Statistical methods

Data were presented as numbers or percentages for categorical variables. Continuous data are expressed as the mean \pm standard deviation (SD), or median with Interquartile Range (IQR). The data obtained were analyzed by univariate and bivariate, from the normality test (Kolmogorov Smirnov) obtained abnormal data so that the analysis used the Wilcoxon test.

All tests with p-value (p)<0.05 were considered significant. Statistical analysis was performed using the SPSS version 16.0 application.

Ethical Consideration

Registered prospective respondents have signed an informed consent and there is no incentive to participate in the study and the anonymity of participants is guaranteed. Before carrying out data collection, the researcher first took care of ethical permission. The authors state that this study followed all ethical clearance processes and was approved by the health research ethics committee of Ministry of Health Polytechnic of Jambi, Indonesia, and registration number: LB.02.06/2/18/2019.

Results

The results of the univariate analysis, which aims to determine the frequency of each variable studied, can be seen in the table 1.

Table 1 shows that most respondents in group aged 20-30 years amounted to 14 people (37.8%).

Majority of respondents' education level is low education as much as 70.3%, the dominant occupation of respondents is housewives as much as 51.4%.

Characteristics	n	%
<i>Age</i>		
20-30 y.o	14	37.8
30-40 y.o	13	35.2
<i>Education Level</i>		
High (> High School)	11	29.7
Low (< High School)	26	70.3
<i>Occupation</i>		
Housewives	19	51.4
Civil servant	11	29.7
Entrepreneur	7	18.9

Table 1. *Frequency Distribution of Respondents' Characteristics*

The normality test results showed that the data on the measurement of the amount of breast milk expenditure before and after the intervention was abnormal data. The results showed that all respondents (100%) experienced an increase in breastfeeding with p -value < 0.05 . Statistically, there is a significant difference between before giving Kathree and after. The results can be clearer as in the table below.

Expenditures	Median (Q1- Q3)	Wilcoxon test
Before intervention	4 (2-4)	0.000
After intervention	5 (5-6)	

Table 2. *Wilcoxon Test Analysis Results about Breast Milk Production*

According to the Wilcoxon test, 37 respondents experienced an increase in the amount of milk expulsion. The results of this study prove that dietary factors such as *L. Merr*, *Moringa Oleifera* Lam, and *Vigna Cylindrica* (L) Skeels, with a p -value < 0.05 . Based on the results of this study, out of the five respondents, the baby's body weight increased by around 300 - 400 grams for 7 days of administration of purple leaf. Thus it can be stated that the provision of processed mauve leaves affects the increase in breast milk production for postpartum mothers.

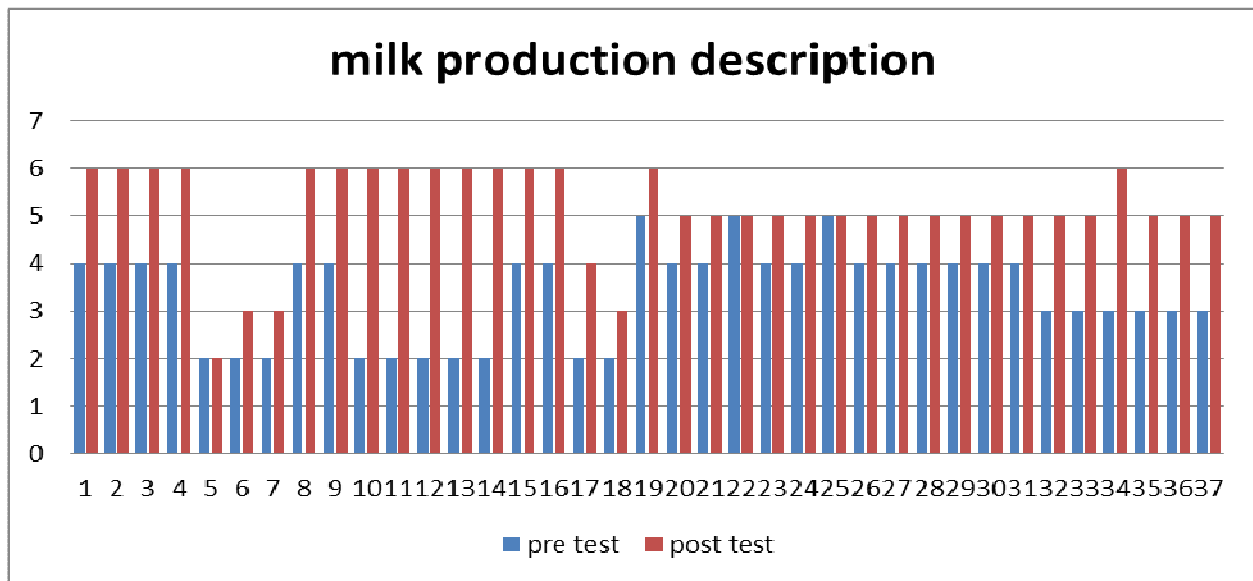


Figure 1. Description of milk production

Figure 1 shows the fluctuation of post partum breast milk production before giving Kathree and an increase in milk production after the intervention.

Discussion

This study proves that food factors have a significant effect on breast milk production in addition to psychological factors and baby's suction power. Kathree gift which consists of Moringa leaves, katuk leaves, and long bean leaves, also known as mauve leaves.

Moringa oleifera Lam (synonym: *Moringa pterygosperma* Gaertner), commonly known as Moringa, is the most popular Moringaceae clan species. *Moringa oleifera* grows in the form of tree and is long-lived (perennial) with a height of 7-12 meters. It also has sympodial branches that point upward or oblique and tend to grow in line and lengthwise. Can grow both in the lowlands and highlands to an altitude of ± 1000 m above sea level, often planted as a barrier or fence in the yard or field.

Moringa oleifera is a local food ingredient that can be developed in the culinary of breastfeeding

mothers because it contains phytosterol compounds that function to increase and accelerate milk production (lactagogum effect). Increased breast milk production, increased nutritional intake of infants, which is expected to impact the nutritional status of infants [21-22].

Moringa leaves contain high amounts of vitamin A, vitamin C, B vitamins, calcium, potassium, iron and protein which are easily consumed and assimilated by the human body. In addition, Moringa is also known to contain more than 40 anti-oxidants [23]. This content is needed by postpartum mothers who breastfeed. Breastfeeding mothers need more nutrients than during pregnancy. During breastfeeding, she needs extra energy to restore her health condition after giving birth, daily activities such as breast milk formation. In the first month after giving birth, milk production is generally abundant so that it comes out a lot and is sucked by the baby, so the mother is hungry and thirsty faster. In order for the number of calories to be balanced with the needs, adequate nutrition is needed because the energy will be reprocessed to form breast milk. During breastfeeding, the mother produces about 800-1000cc of breast milk [9,24,25].

Breast milk also contains protective compounds that can prevent babies from infectious diseases. Breastfeeding also has a tremendous emotional effect that can affect the inner relationship between mother and baby and affect the psychological development of the baby. Exclusive breastfeeding can optimize the baby's growth. Factors that influence breastfeeding are mothers who are well supported by their families and lactation education which can increase their knowledge, attitudes and behavior to provide exclusive breastfeeding for up to 6 months [24,26-28].

Previous research conducted by Zakaria [21] in Maros District on 70 breastfeeding mothers 6 weeks after giving birth showed that giving Moringa leaf extract and powder could increase breast milk volume, but the increase in the group that received the extract was higher than the group, get powder, but does not affect the quality of breast milk (iron, vitamin C and vitamin E).

Moringa oleifera is one of the alternative plants that are believed to have the potential to reduce malnutrition, hunger, prevent low birth weight, increase maternal hb levels, prevent DNA damage

due to stress and prevent anemia in pregnant women [25].

Research by Situmorang [29] by giving katuk leaf stew to nursing mothers as much as 3x1 with 150 cc of katuk leaf stew. Katuk leaves are useful for increasing breast milk, for fever, and many other things. Based on research, katuk leaf infusion can increase milk production in mice. Katuk leaf root infusion has a diuretic effect at a dose of 72 mg / 100 g BW. Katuk vegetable consumption for nursing mothers can prolong the time to breastfeed the baby. The process of boiling katuk leaves can eliminate anti-protozoa properties. Katuk leaf infusion levels of 20%, 40%, and 80% in mice did not cause congenital defects and did not cause reabsorption. Raw katuk leaf juice is used for natural body slimming in Taiwan. The protein content in katuk leaves is nutritious to stimulate the release of breast milk. While the steroid and polyphenol content in it can function to increase prolactin levels. Thus the production of breast milk can increase. The steroids together with vitamin A also promote the proliferation of new alveolar-alveolar epithelium. Thus, there will be an increase in the number of alveoli in the gland which will automatically increase milk production. One of the reasons women do not give breast milk to their babies is that there is not enough milk to not be satisfied with breastfeeding. This is one of the factors that exclusive breastfeeding fails so that the mother gives formula milk to her child [12].

From the research results of Rahmawati [24] conducted a study on giving katuk leaves on increasing the production of sheep's milk. From the results of these studies, it turns out that the 20% katuk leaf extract solution given in vitro can increase milk production > 20%. The milk composition did not change, there was an increase in glucose metabolism activity by > 50%.

Suyanti & Anggraeni, [30] also states that giving katuk leaf decoction which is drunk 3 times a day (150cc in 1x drink) for 7 days can increase milk production by 50-120 ml. The Man Whitney statistical test p value <0.05 showed a significant effect of katuk leaf decoction on breast milk production based on the baby's weight gain. Mothers with sufficient breast milk can be seen from the frequency of weight gain for babies on day 10 [27].

Long bean plant (*Vigna cylindrica* (L) Skeels) is one plant that people believe can enlarge breasts and increase milk production. This plant has a proliferative effect on breast cells because it contains phytoestrogens, which are natural estrogens found in plants. This compound can stimulate proliferation if it binds to estrogen receptors. Long bean leaves contain 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. In addition, the Long Bean Leaves also contain as much vitamin A as 5240 IU, vitamin B1 0.28 milligrams and vitamin C 29 milligrams [5,31].

In the future, the plants from this research can be used as an alternative therapy for pregnant women who lack milk production. In addition to the effects or side effects that have not been widely reported, these three plants are very easy to find and inexpensive.

Conclusion

Moringa leaves, katuk leaves and long bean leaves were statistically proven to have significant differences in the amount of breastfeeding. Kathree processing is adapted to the form of everyday cooking so that postpartum nursing mothers can easily accept the taste and appearance. Kathree can easily be found in almost all over Indonesia, and is the local wisdom of the Indonesian people.

Study limitations

In our research, it has limitations such as the number of participants being fewer, and in this study there were 3 types of plants used for the intervention and no data analysis was carried out on each type of plant so that the efficacy of each plant could not be known, so in the future it is necessary further research

Author contributions

AGW and J contributed on concepting and designing the research. AGW and INA searched

literature, analyze and interpret the data. AGW and J contributed to the paper's conceptualization, critical revision, and edited the overall improvement. All authors drafting manuscript, read and approved the final submitted paper.

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Conflict of interest

There is no conflict of interest to declare.

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