ORIGINAL ARTICLE

The Effect of Giving *Carica papaya Linn* on Breast Milk Volume in Breastfeeding Mothers: Pre-Experimental Study

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ABSTRACT

Introduction: A significant decline in breast milk production often has an impact on the rate of exclusive breastfeeding. Investigating preventative strategy to increase breast milk production is essential to address this problem. One such strategy is to include *Carica papaya Linn* in the diet of mothers. Therefore, this study aims to determine the effects of *Carica papaya Linn* administration on the volume of breast milk in breastfeeding mothers. **Materials and Methods:** Using a one-group pre-posttest design and the pre-experimental approach, this study was carried out from September 2022 to March 2023. A total of 16 breastfeeding mothers in the Kerinci Regency, Jambi Province, Indonesia, working area of Siulak Gedang Primary Health Center, aged 0–7 days, served as the participants. **Results:** The milk volume rate increased from 30.62 ml to 143.75 ml after consuming *Carica papaya Linn*, and the Wilcoxon test showed a p-value below <0.001 (<0.05), suggesting that the intervention had a significant impact. These findings showed that breastfeeding mothers who received the intervention produced more breast milk. **Conclusion:** The field of mother and newborn health is expected to gain several advantages from the results, including new knowledge on how natural nutrients increase breast milk production.

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INTRODUCTION

After childbirth, women often experience a natural phase known as postpartum that lasts for 6 weeks, leading to various physiological and psychological changes. The primary psychological changes are mood swings and adjusting to parenthood, while the physiological changes include uterine involution and lochia discharge. In addition, previous studies suggested that lactation played an essential role in these processes by producing breast milk from the mothers' bodies through complex mechanisms influenced by mechanical stimuli, nervous system responses, and hormonal interactions leading to milk letdown (1). Breastfeeding optimization has been shown to promote growth development as well as cognitive abilities for infants. However, exclusive breastfeeding requires support and attention from families, communities, healthcare providers, or directly affected mothers. A previous study showed that providing adequate nutrition for mothers had a direct influence on milk production levels (2).

According to previous studies, infants receive the ideal nourishment from breast milk during the first 6 months of life. (3). However, mothers often face challenges during exclusive breastfeeding due to various factors, such as inadequate breast milk production (4).

According to the 2020 Breastfeeding Advocacy Initiative report, the rate of exclusive breastfeeding varies globally, with rates being 25% in West and Central Africa, 30% in East Asia and the Pacific, 47% in South Asia, 32% in Central America and the Caribbean, 51% in Southeast Asia, 46% in developing countries, and 38% worldwide (5). In Southeast Asia, the rate varies among different countries, including 51.2%, 23.1%, and 50.2% in Myanmar, Thailand, and Timor-Leste 50.2%, respectively (6).

At present, Indonesia ranks third from the bottom among 51 countries worldwide in the assessment of the status of policies and programs for infant and young child feeding. This indicates that the provision of breast milk as the first food for infants is still insufficient. However, the early prevention of child malnutrition that causes undernutrition and stunting can be achieved through proper exclusive breastfeeding and complementary feeding practices (7). Consequently, mothers need additional nutrition to enhance breast milk production to fulfill the role effectively. Breastfeeding can also be aided by consuming galactagogues, such as mung bean, fennel juice, boiled papaya fruit water, and papaya leaf powder (8,9).

Native to Central America, papaya (Carica papaya Linn) is a plant in the Caricaceae family that grows in tropical and subtropical climates. The plant is widely known for its abundant nutrients and health-promoting ingredients. In addition, its galactagogues, such as alkaloids, polyphenols, steroids, and flavonoids, increase the production of breast milk by stimulating the release of the hormones prolactin and oxytocin (11). Due to these properties, it can be used as a non-pharmacological lactagogue, which can increase lactation rates (12). The latex of Carica papaya Linn has also been shown to have an action on the uterus akin to oxytocin, while the constituent saponins, minerals, vitamins, and enzymes enhance the number and diameter of mammary glands (9,13).

MATERIALS AND METHODS

Study design and sample

Using a quasi-experimental and one-group pre-posttest design, this study was carried out in 3 villages in Siulak Gedang District, Kerinci Regency, Jambi Province, Indonesia, with the lowest rates of exclusive breastfeeding. The sample population consisted of 16 breastfeeding mothers aged 0-7 days in Siulak Gedang Primary Health Center's working area in Kerinci Regency from September 2022 to March 2023.

Inclusion and exclusion criteria

The inclusion criteria for this study were willingness to participate as participants, being breastfeeding mothers of reproductive age (20–35 years) with infants aged 0-7 days, and those who preferred Carica Papaya Linn. The exclusion criteria were breastfeeding mothers with breast problems, those who were unwell, and mothers currently taking milk-suppressing medications.

Study variables

The dependent variable was the amount of milk produced from breast before and after the administration of Carica Papaya Linn Vegetable Broth. Meanwhile, the independent variable was the consumption of Carica Papaya Linn.

Study procedure and data collection

Informed consent was first obtained before conducting the intervention, which comprised distributing 1 bowl of Carica Papaya Linn vegetable with a composition of 100 mg of Carica Papaya Linn boiled in 250 cc water to participants. This served as approval for the engagement and ensured the confidentiality of the provided data. The implementation phase started with a reassessment of participants' condition on the first day. The study team explained the procedures by measuring and pumping the pre-test milk volume for 2 hours after breastfeeding in the morning. Subsequently, the intervention was carried out by providing Carica papaya Linn based on the pre-prepared Standard Operating Procedure to participants. The intervention was administered 7 times, from the 2nd day to the 8th day, indicating that it was given once daily over one week. Continuous monitoring of participants' responses was conducted during the procedure. On the 8th day, the post-test breast milk volume was measured by pumping breast milk 2 hours after breastfeeding in the morning.

Ethical clearance

This study was approved by the Research Ethics Committee, Faculty of Medicine Andalas University No. 205/UN.16.2/KEP-FK/2022.

Data analysis

Univariate analysis was conducted to examine the frequency and percentage. Meanwhile, bivariate analysis was carried out using statistical analysis with SPSS version 17.0, and significance was determined through the Wilcoxon test with a threshold of $P<0.05$.

RESULTS

Table I showed that the majority of participants were aged 21-34 years (81.2%), 43.8% had completed high school education, and 50% were homemakers.

Table I: Participants' characteristics

Variables	f	%
Age (years)		
≤ 20	3	18.8
21-34	13	81.2
Educational background		
Junior high school	3	18.8
Senior high school	7	43.8
University	6	37.5
Occupation		
Private officer	1	6.2
Enterpreneur	6	37.5
Farmer	1	6.2
Housewife	8	50

The results showed that the initial milk volume rate was 30.62±16.52 ml, which increased to 143.75±15.00 ml after the consumption of the intervention, as shown in Table II. The Wilcoxon test yielded a p-value of <0.001 (<0.05), indicating that Carica papaya Linn affected the volume of breast milk in breastfeeding mothers.

Table II: The effect of giving Carica papaya Linn on breast milk volume in breastfeeding mothers

Variable	Mean	SD	p-value
Pretest	30.62	16.52	<0.001
Posttest	143.75	15	

DISCUSSION

Based on the results, there was an effect of Carica papaya Linn on the volume of breast milk in breastfeeding mothers, which could be influenced by many factors. The main factors were hormonal, namely the hormones prolactin and oxytocin. When infants sucked on mothers' breast, it stimulated neurohormones in the nipple and areola. The vagus nerve transmitted stimulation to the hypophysis, which activated the anterior lobe, causing prolactin hormone release. As it entered the circulation and traveled toward the mammary glands, breast milk production was stimulated (7,8). When infants were brought close to their mother's breast, the rooting reflex was stimulated, which caused the secretion of the hormone oxytocin and the ejection of milk (9). Compounds found in Carica papaya Linn could increase the levels of lactogenic hormones, such as prolactin, which enhanced the volume of breast milk produced (14)

The nipple of mothers secreted the hormone prolactin, which initiated the production of breast milk. Neurohormonal mechanisms were responsible for this activation in the areola and nipple. Carica papaya Linn is a plant that is rich in lactagogues, which stimulate prolactin or increase the activity of secretory cells in the mammary glands to produce more milk. Other health benefits of eating the fruit have also been reported by scientific studies, including its potential to promote breastfeeding, have antimicrobial qualities, and serve as a laxative to regulate digestion (15). Galactagogues known to enhance volume production could help mothers who were unable to produce enough milk during exclusive breastfeeding (16).

The results of previous studies showed that ingestion of Carica papaya Linn affected the volume of breast milk produced by mothers. This resulted from the regular consumption of the plant Linn for 7 days. The plant contained alkaloids and saponins that were lactagogues and may have stimulated the production of prolactin and oxytocin, which were helpful in producing more breast milk. The administration of Carica papaya Linn to postpartum mothers on days 0-7, at this stage, when breasts were stimulated, prolactin hormone levels increase, and this increase in prolactin hormone stimulated the cells inside the alveoli to produce breast milk, increasing in breast milk volume. Other factors influencing breast milk production included age, parity, education, and family support. Age affected the hormonal production of breast milk, most breastfeeding mothers in this study were aged 20-35 years, when oxytocin and prolactin hormone production worked effectively (17).

The limitation of this study was measurements were only taken twice, before and after the intervention, as well as there was no control group. Consequently, there was less apparent comparison between the intervention and non-intervention groups as it minimized failure in the study and experienced limitations in time or in determining the sample.

The health center, through village midwives, was expected to provide information and advise breastfeeding mothers to consider implementing Carica papaya Linn as one of the alternative interventions to increase breast milk volume.

CONCLUSION

In conclusion, there was an effect of Carica papaya Linn on the volume of breast milk in breastfeeding mothers. This had implications for the maternal and infant health field as well as provided a new understanding of the potential of natural nutrients to improve the production of breast milk.

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REFERENCES

1. Pillay J, Davis TJ. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Oct 27, 2018. Physiology, Lactation. [PubMed: 29763156]
2. Dimitrovska-Ivanova M, Zisovska E. Impact of Breast Milk Secretory Immunoglobulin A on Infants Acute Gastroenteritis. Open Access Maced J Med Sci. 2020 Aug 30; 8(B):897-901. https://doi.org/10.3889/oamjms.2020.5259
3. Muhartono M, Graharti R, Gumandang HP. The effect of papaya (Carica papaya L.) towards breast milk production in breastfeeding mothers. Medula. 2018;8:39-43. https://doi.org/10.14710/jnc.v1i1.427 DOI: https://doi.org/10.14710/jnc.v1i1.427
4. Bravi F, Wiens F, Decarli A, Dal Pont A, Agostoni C, Ferraroni M. Impact of maternal nutrition on breast-milk composition: A systematic review. Am J Clin Nutr. 2016;104(3):646-62. http://doi.org/10.3945/ajcn.115.120881
5. Kurniati D, Mardiyanti S, Suprihatin DS. Differences in breastmilk production in the provision of processed papaya fruit to postpartum mothers at

BPM Maria Kota Bandar Lampung in 2018. J Ilmiah Kesehatan Kebidanan. 2018;7(2):1-8.19. https://doi.org/10.3889/oamjms.2021.5880
6. Istiqomah, S., Wulanadari, D. T., & Azizah, N. (2015). Pengaruh Buah Pepaya Terhadap Kelancaran Produksi ASI Pada Ibu Menyusui di Desa Wonokerto Wilayah Puskesmas Peterongan Jombang Tahun 2014. Edu Health, 5(2), 102–108. Retrieved from http://journal.unipdu.ac.id:8080/in dex.php/eduhealth/article/view/477
7. Kementerian Kesehatan RI, Profil Kesehatan Republik Indonesia Tahun 2017; 2018.
8. Kharisma Y, Ariyoga A, Sastramihardja HS. Effect of Unripe Papaya (Carica papaya L.) Aqueous Extract on Histological Feature of Mice Lactating Mammary Glands. MKB. 2011;43(4):160-5. https://doi.org/10.15395/mkb.v43n4.63
9. Prell C, Koletzko B. Breastfeeding and complementary feeding. Dtsch Arztebl Int. 2016;113(25):435-44. PMid:27397020. http://doi.org/10.3238/arztebl.2016.0435
10. Pinnamaneni R. Nutritional and medicinal value of papaya (Carica papaya Linn.). World J Pharm Pharm Sci. 2017;6(8):2559-78. https://doi.org/10.20959/wjpps20178-9947
11. Murtiana T. Buah Pepaya. Jakarta: Pustaka Cipta; 2011.
12. Nataria D, Oktiarini S. Increase in breast milk production by consuming papaya fruit. J Kesehatan Prima Nusantara Bukittinggi. 2018;9(1):7-10. DOI: https://doi.org/10.35730/jk.v9i1.340
13. Machmudah M, Khayati N, Widodo S, Hapsari ED, Haryanti F. Improvement of prolactin hormone levels on postpartum mothers taken by the Oketani massage and pressure in GB-21 point. Indones J Nurs Pract. 2020;4(1):1-6. https://doi.org/10.18196/ijnp.41101
14. Gusnedi G, Nindrea RD, Purnakarya I, Umar HB, Andrafikar, Syafrawati, et al. Risk factors associated with childhood stunting in Indonesia: A systematic review and meta-analysis. Asia Pac J Clin Nutr. 2023;32(2):184-195. http://doi.org/10.6133/apjcn.202306_32(2).0001
15. Herlinda LA. Description of the successful production of post pubily ASI by consuming pepaya fruit in BPM Bengkulu City. In: Proceeding the 4th International Conference On Health Science (ICH), Bengkulu; 2020. p. 99-104. https://doi.org/10.3889/oamjms.2021.5880
16. Syarief H, Damanik RM, Sinaga T, Doloksaribu TH. Utilizationand Product Development of Bangun-bangun Leaves as Supplement and Functional Food for Lactating Mother. J Ilmu Pertanian Indones. 2014;19(1):38-42.
17. Nindrea RD, Sari NP. How Does Family Planning Services Respond to the SARS-CoV-2 Pandemic in Indonesia? Asia Pac J Public Health. 2022;34(2-3):316-317. https://doi.org/10.1177/10105395211051254