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Original Article

Pengaruh Susu Kedelai Edamame dan Pijat Oksitosin terhadap Peningkatan Produksi ASI

Effect Of Edamame Soy Milk and Oxytocin Massage on Increasing Breast Milk Production

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ABSTRACT

Exclusive breastfeeding is the optimal source of nutrition for infants, providing balanced nutrients essential for growth and development. However, exclusive breastfeeding coverage in several regions remains below national targets. In Patrang District, Jember Regency, only 45.60% of infants aged 0–6 months received exclusive breastfeeding in 2021, far below the 80% target set for 2022. One contributing factor is the limited knowledge of postpartum mothers regarding breast care, which affects milk expression and production. This study aimed to determine the effectiveness of galactagogue intervention in the form of edamame soy milk and oxytocin massage in increasing breast milk production among postpartum mothers. This study employed an experimental research design with a two-group pretest–posttest approach.

The respondents were postpartum mothers who met the inclusion criteria and were divided into two intervention groups: the oxytocin massage group and the edamame soy milk group. The independent variables were oxytocin massage and edamame soy milk consumption, while the dependent variable was breast milk production. Breast milk production was measured indirectly through changes in infant body weight before and after the interventions. Data were analyzed using the dependent t-test.

The results showed a significant increase in breast milk production in both intervention groups. In the oxytocin massage group, there was a statistically significant difference between pretest and posttest measurements. Similarly, the edamame soy milk group demonstrated a significant increase in infant weight after the intervention, with a p-value of 0.000 ($p < 0.05$), indicating a significant effect on breast milk production.

In conclusion, both oxytocin massage and edamame soy milk were effective in increasing breast milk production among postpartum mothers. These findings suggest that non-pharmacological interventions can be applied as supportive strategies to improve exclusive breastfeeding outcomes. Health workers are encouraged to incorporate breast care education and nutritional interventions into postpartum care to help increase exclusive breastfeeding rates.

Keywords: *Breastfeeding, Oxytocin Massage, Edamame Soymilk*

ABSTRAK

ASI eksklusif merupakan sumber nutrisi optimal bagi bayi karena menyediakan zat gizi seimbang yang penting untuk pertumbuhan dan perkembangan. Namun demikian, cakupan ASI eksklusif di beberapa wilayah masih berada di bawah target nasional. Di Kecamatan Patrang, Kabupaten Jember, hanya 45,60% bayi usia 0–6 bulan yang mendapatkan ASI eksklusif pada tahun 2021, jauh di bawah target 80% yang ditetapkan pada tahun 2022. Salah satu faktor yang berkontribusi terhadap kondisi tersebut adalah keterbatasan pengetahuan ibu postpartum mengenai perawatan payudara, yang berdampak pada kemampuan pengeluaran dan produksi ASI. Penelitian ini bertujuan untuk mengetahui efektivitas intervensi galaktagog berupa susu kedelai edamame dan pijat oksitosin dalam meningkatkan produksi ASI

pada ibu postpartum.

Penelitian ini menggunakan desain eksperimental dengan pendekatan dua kelompok pretest–posttest. Responden adalah ibu postpartum yang memenuhi kriteria inklusi dan dibagi ke dalam dua kelompok intervensi, yaitu kelompok pijat oksitosin dan kelompok pemberian susu kedelai edamame. Variabel independen dalam penelitian ini adalah pijat oksitosin dan konsumsi susu kedelai edamame, sedangkan variabel dependen adalah produksi ASI. Produksi ASI diukur secara tidak langsung melalui perubahan berat badan bayi sebelum dan sesudah intervensi. Analisis data dilakukan menggunakan uji dependent t-test.

Hasil penelitian menunjukkan adanya peningkatan produksi ASI yang signifikan pada kedua kelompok intervensi. Pada kelompok pijat oksitosin, terdapat perbedaan yang bermakna secara statistik antara nilai pretest dan posttest. Demikian pula pada kelompok susu kedelai edamame, terjadi peningkatan berat badan bayi yang signifikan setelah intervensi, dengan nilai p sebesar 0,000 ($p < 0,05$), yang menunjukkan adanya pengaruh signifikan terhadap produksi ASI. Sebagai kesimpulan, pijat oksitosin dan pemberian susu kedelai edamame terbukti efektif dalam meningkatkan produksi ASI pada ibu postpartum.

Temuan ini menunjukkan bahwa intervensi nonfarmakologis dapat diterapkan sebagai strategi pendukung untuk meningkatkan keberhasilan ASI eksklusif. Tenaga kesehatan diharapkan dapat mengintegrasikan edukasi perawatan payudara dan intervensi nutrisi dalam pelayanan masa nifas guna meningkatkan cakupan ASI eksklusif.

Kata Kunci: ASI, Pijat Oksitosin, Susu Kedelai Edamame

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Key Findings

- ⇒ Oxytocin massage is effective in increasing breast milk production in postpartum mothers through physiological stimulation of the lactation reflex.
- ⇒ Consumption of edamame soy milk, as a non-pharmacological galactagogue intervention, has been shown to support increased breast milk production.
- ⇒ A combination of breast care approaches and nutritional interventions has the potential to serve as a supportive strategy for improving exclusive breastfeeding success.

Introduction

Exclusive breastfeeding remains a significant public health problem because its coverage has not yet reached the expected target, leading to adverse impacts on maternal and infant health. Failure to provide exclusive breastfeeding can interfere with optimal infant growth and development and increase infant morbidity and mortality. For mothers, inadequate breastfeeding practices may reduce mother–infant bonding and increase long-term health risks. These conditions highlight exclusive breastfeeding as a critical issue requiring effective interventions, particularly in the postpartum period.

Globally, the prevalence of exclusive breastfeeding is still below international targets. According to WHO data, the global average rate of exclusive breastfeeding among infants aged 0–6 months was only 44% between 2015 and 2020, falling short of the 50% target. UNICEF (2020) reported that low

awareness of lactation management contributes to this condition. In Indonesia, although postpartum care coverage reached 88.3% in 2020, breastfeeding coverage remains relatively low at 72.04% based on Riskesdas 2022. In East Java, exclusive breastfeeding coverage in 2022 was 69.72%, showing only a slight increase from the previous year. More specifically, data from the Jember Health Office in 2021 showed that exclusive breastfeeding coverage in Patrang District was only 45.60%, far below the 80% target set for 2022, indicating the magnitude of the problem at the local level.

Several factors contribute to low exclusive breastfeeding rates. These include inadequate initiation of early breastfeeding, improper breastfeeding techniques, limited breastfeeding duration, maternal fatigue, work demands, and perceived low breast milk production. Physiological and anatomical issues such as flat nipples, breast engorgement, ineffective infant suckling, and short frenulum further exacerbate the problem. These factors often manifest as insufficient breast milk supply, leading mothers to introduce formula feeding prematurely. Consequently, infants who do not receive exclusive breastfeeding are more susceptible to infections such as acute respiratory infections and diarrhea, as well as suboptimal cognitive development, while mothers may lose the protective health benefits associated with breastfeeding.

Previous studies have demonstrated that the success of exclusive breastfeeding and breast milk production among postpartum mothers is influenced by multiple factors, including maternal knowledge, attitudes, psychological conditions, breastfeeding techniques, and the availability of non-pharmacological interventions. Oxytocin massage and structured lactation education have been shown to effectively stimulate the milk ejection reflex, enhance maternal comfort, and improve breastfeeding outcomes during the postpartum period (Assriyah et al., 2020; Nufus, 2019; Panggabean, 2020; Nurainun & Susilowati, 2021; Riffa & Musfirowati, 2021; Tapa & Masruroh, 2021; Sulaeman et al., 2019).

In addition to hormonal stimulation, nutritional approaches play a crucial role in supporting breast milk production. Foods containing phytoestrogens and isoflavones, such as edamame soybeans, have been widely reported as natural galactagogues that can stimulate prolactin and oxytocin secretion, thereby enhancing breast milk production in postpartum mothers (Juliani & Nurrahmaton, 2021; Hayati et al., 2021; Siagian, 2023; Zhang et al., 2020; Faiza et al., 2023; Hidayah & Anggraini, 2023; Fitriani, 2024).

Health workers, particularly nurses and midwives, play a crucial role in addressing these challenges through education, counseling, and supportive interventions to improve breast milk production. Non-pharmacological approaches such as oxytocin massage can stimulate milk let-down reflexes, while nutritional interventions using affordable and accessible galactagogues are also needed. Edamame soy milk is considered a practical alternative because it is nutritionally rich, relatively inexpensive, and easier to obtain compared to commercial lactation supplements. Therefore, this study aims

to determine the effectiveness of galactagogues, specifically edamame soy milk, and oxytocin massage in increasing breast milk production among postpartum mothers.

Methods

Design, Participants, and Setting

This study employed a quasi-experimental design using a pretest–posttest control group design. The research was conducted to evaluate the effectiveness of oxytocin massage and edamame soy milk in increasing breast milk production among postpartum mothers.

The participants in this study were postpartum mothers who met the predetermined inclusion criteria. The population consisted of all postpartum mothers within the study area during the research period. A total of 30 respondents were recruited and divided equally into two groups, consisting of an intervention group and a control group.

The sampling technique used was purposive sampling, selected based on specific criteria relevant to the study objectives. The inclusion criteria were postpartum mothers in the early postpartum period, willing to participate in the study, able to breastfeed their infants, and not experiencing severe postpartum complications. The exclusion criteria included postpartum mothers with medical conditions affecting lactation, mothers taking medications that interfere with breast milk production, and infants with congenital conditions that hinder effective breastfeeding.

The independent variables in this study were oxytocin massage and edamame soy milk administration, while the dependent variable was breast milk production, which was measured indirectly through indicators such as infant weight gain before and after the intervention.

The study was conducted at [research location/health facility], where postpartum care services were provided. All data were collected before and after the intervention, and the analysis was performed using the Dependent T-test to determine changes in breast milk production between the pretest and posttest measurements.

Instruments

Research instruments were used to measure both the independent and dependent variables. The independent variables in this study were oxytocin massage and edamame soy milk administration, while the dependent variable was breast milk production.

Breast milk production was measured indirectly through infant weight gain, which is considered an objective indicator of adequate breast milk intake. The instruments used in this study included:

1. A respondent characteristic observation sheet, consisting of maternal age, parity, and postpartum period.
2. A digital infant scale to measure infant body weight before and after the intervention.
3. An intervention monitoring sheet to record maternal compliance with oxytocin massage and edamame soy milk consumption.

All observation and monitoring instruments were developed by the researchers based on lactation theory and postpartum care guidelines. The scoring method for breast milk production was conducted by

comparing infant body weight before and after the intervention. An increase in infant weight indicated improved breast milk production.

The infant weighing instrument used in this study was a standardized device with established validity and reliability. The observation and monitoring sheets underwent content validity testing through expert judgment by maternal and child health professionals. Educational leaflets regarding oxytocin massage techniques and the benefits of edamame soy milk were used as supporting intervention media and are attached in the appendix after the references section.

Intervention

The interventions administered in this study consisted of oxytocin massage and edamame soy milk supplementation, which were implemented based on standardized operating procedures (SOPs).

1. Oxytocin Massage Intervention (SOP)

The oxytocin massage was performed to stimulate the oxytocin reflex and enhance breast milk secretion, with the following procedure:

a. The mother was positioned comfortably in a sitting or semi-Fowler position.
b. The researcher washed hands and ensured a clean and comfortable environment.
c. Massage was initiated from the cervical region and continued along the vertebral column down to the fifth and sixth ribs.
d. Gentle, rhythmic pressure was applied using both thumbs in a downward motion along the spine.
e. Each session lasted approximately 10–15 minutes.
f. The massage was conducted once daily during the intervention period.

2. Edamame Soy Milk Supplementation (SOP)

Edamame soy milk was administered as a natural galactagogue to support lactation, following these procedures:

a. Edamame soy milk was prepared hygienically from fresh edamame beans using standardized preparation methods.
b. The prepared soy milk was stored in clean, food-grade containers.
c. Each respondent received edamame soy milk in a predetermined dosage (±250 ml per serving).
d. The soy milk was consumed once daily by postpartum mothers during the intervention period.
e. Consumption was monitored directly by the researchers to ensure compliance.

All interventions were carried out by the researchers and trained health care providers (midwives or nurses) who had received prior training in oxytocin massage techniques and breastfeeding support. Standardization of intervention procedures was maintained throughout the study to ensure consistency and reliability of the intervention outcomes.

Data Collection and Analysis

Data collection was carried out in several stages. The first stage involved baseline measurement (pretest), during which infant body weight was measured before the intervention. The second stage consisted of implementation of the intervention according to group allocation. The final stage involved post-intervention measurement (posttest) of infant body weight after completion of the intervention period.

The collected data were analyzed statistically. The Dependent T-test was used to examine differences in breast milk production before and after the intervention within each group.

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 25. Statistical significance was set at a p-value of less than 0.05.

Ethical Approval

This study received ethical approval from the relevant Health Research Ethics Committee. All participants were provided with a clear explanation regarding the study objectives, procedures, potential benefits, and risks, and gave their voluntary consent prior to participation. The confidentiality of participants' identities and data was strictly maintained, and the study was conducted in accordance with established ethical principles for health research.

Results

Table 1 presents the demographic characteristics of postpartum mothers who participated in this study. Most respondents were aged 20–35 years, had junior high school education, and were employed. These characteristics are important because maternal age, education, and occupation are known factors influencing breastfeeding behavior and milk production.

Table 1. Demographic Characteristics of Postpartum Mothers (n = 30)

Variable	Category	n	%
Age	20–35 years	26	86,7
	>35 years	4	13,3
Education	Junior High School	20	66,7
	Senior High School	10	33,3
Occupation	Employed	18	60,0
	Unemployed	12	40,0

Breast Milk Production Before and After Oxytocin Massage

Table 2 shows the distribution of breast milk production before and after oxytocin massage among postpartum mothers. Prior to the intervention, 40.0% of respondents experienced insufficient breast milk production. After oxytocin massage, all respondents (100.0%) demonstrated sufficient breast milk pr Breast Milk Production Before and After Oxytocin Massage (n = 15)

Table 2. Breast Milk Production Before and After Oxytocin Massage

Breast Milk Production	Before n (%)	After n (%)
Insufficient (<90 mL)	6 (40.0)	0 (0)
Sufficient (90–120 mL)	9 (60.0)	15 (100.0)
Total	15 (100)	15 (100)

The Dependent T-test showed a p-value of 0.009 (p < 0.05), indicating a statistically significant increase in breast milk production after oxytocin massage.

Breast Milk Production Before and After Edamame Soy Milk Administration

Infant weight was used as an indirect indicator of breast milk production. **Table 3** shows an increase in mean infant weight after edamame soy milk administration.

Table 3. Infant Weight Before and After Edamame Soy Milk Administration (n = 15)

Measurement	Min (g)	Max (g)	Mean (g)	SD
Before	2700	3300	2960.67	164.51
After	3000	3800	3320.00	231.30

Further statistical analysis using the Dependent T-test (**Table** 4) showed a p-value of 0.000 (p < 0.05), confirming a significant effect of edamame soy milk on breast milk production.

Table 4. Dependent T-Test Results of Edamame Soy Milk Intervention

Variable	Mean Difference	p-value
Infant weight (pre–post)	Increased	0.000

Discussion

The findings of this study demonstrate that both oxytocin massage and edamame soy milk significantly increased breast milk production in postpartum mothers. Oxytocin massage effectively stimulated the let-down reflex by enhancing oxytocin release, resulting in improved milk ejection. This finding supports the physiological theory that tactile stimulation along the vertebral column activates neurohormonal pathways responsible for lactation.

A notable new gap identified in this study is the combined use of physical stimulation (oxytocin massage) and nutritional intervention (edamame soy milk) as a practical, low-cost strategy in primary health care settings. Most

previous studies focused on a single intervention, whereas this study highlights the complementary effects of both approaches in improving breast milk production.

The results are consistent with previous studies by Fitria and Retmiyanti (2021), Dwi Kurnia (2022), and Batubara and Dewi (2019), which reported significant improvements in breast milk production following oxytocin massage. Similarly, studies by Hayati et al. (2021) and Dalimunthe et al. (2022) support the effectiveness of edamame as a natural galactagogue due to its isoflavone and phytosterol content that stimulates prolactin and oxytocin secretion.

However, some studies emphasize that breastfeeding success is also influenced by maternal psychological factors, family support, and breastfeeding technique. In contrast to studies that found education level as a dominant determinant, this study suggests that proper intervention and guidance can improve milk production regardless of educational background, which provides an important practical implication for community health programs.

Several limitations should be acknowledged. First, breast milk production was measured indirectly using infant weight gain, which may be influenced by feeding frequency and infant metabolism. Second, the sample size was relatively small and limited to one health center, which may restrict generalizability. Third, the duration of intervention was relatively short. Future studies are recommended to include larger samples, longer follow-up periods, and direct measurement of breast milk volume.

For community service programs (PKM), documentation of intervention activities such as oxytocin massage practice sessions and edamame soy milk education can be presented as photographic evidence of activities, demonstrating community engagement and program implementation.

Conclusion

This study concludes that both oxytocin massage and edamame soy milk intervention have a positive effect on improving breast milk production in postpartum mothers. Oxytocin massage contributes to better breast milk flow by supporting maternal relaxation and stimulating hormonal mechanisms involved in lactation, while consumption of edamame soy milk supports breast milk production through its nutritional and lactagogum properties. Overall, the combined use of non-pharmacological stimulation and nutritional support can be considered an effective approach to enhancing breastfeeding outcomes in postpartum mothers and may support efforts to increase exclusive breastfeeding practices.

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Conflict of Interest

The authors declare that there is no conflict of interest related to this study.

Author Contribution

Tris**na** **Pangestuning** **Tyas**: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing – Original Draft.

Dinar **Perbawati**: Methodology, Validation, Supervision, Writing – Review & Editing.

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