



Effect of lactation massage on increasing breast milk production in postpartum mothers

Siti Hasanah^{1*}, Adriana Palimbo¹, Siti Noor Hasanah², Novalia Widiya Ningrum¹, Raudhatul Jannah¹

¹Department of Midwifery, Faculty of Health, Sari Mulia University, Banjarmasin, Indonesia

²Department of Midwife Profession, Faculty of Health, Sari Mulia University, Banjarmasin, Indonesia

*Corresponding author: sitihasanah1017@gmail.com

ARTICLE INFO	ABSTRACT
Article history: Received 16 January 2026 Revised 28 Juli 2026 Accepted 03 Agustus 2026 Published 09 Agustus 2026 Keywords: Lactation massage Breast milk production Postpartum mothers Non-pharmacological intervention Midwifery	Background: Insufficient breast milk production is a major obstacle to exclusive breastfeeding. Lactation massage is a potential complementary intervention to increase milk production, but requires stronger scientific evidence. Objective: This study aimed to analyze the effect of lactation massage on increasing breast milk production in postpartum mothers. Method: The research design used a pre-experimental one-group pretest-posttest. Participants consisted of 20 postpartum mothers in an independent midwifery practice area in Banjarmasin. Standardized lactation massage intervention was performed for 15 minutes, twice daily, for three consecutive days. Milk production was measured in milliliters (ml) using a manual breast pump before (first postpartum day) and after the intervention (third day). Data analysis used the Wilcoxon Signed-Rank test. Results: There was a significant increase in breast milk production after the intervention ($p < 0.001$). The average milk volume increased from 188.5 ± 40.95 ml to 342.5 ± 69.04 ml. Before the intervention, 100% of respondents had insufficient milk production (<250 ml). After the intervention, the distribution changed to 65% sufficient (250-400 ml) and 25% more (>400 ml). Conclusion: Lactation massage significantly increases breast milk production in postpartum mothers, thus it can be considered as a supportive intervention in postpartum care.

This is an open-access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



1. Introduction

Breast milk (*Indonesian: Air Susu Ibu [ASI]*) is the best and most ideal nutrition for infant growth and development, particularly during the golden period of the first 1000 days of life. Exclusive breastfeeding for the first six months of life not only provides optimal health benefits for the infant, such as enhanced immune function, reduced risk of infection, and improved cognitive development, but also confers positive impacts for the mother, including faster postpartum recovery, reduced risk of hemorrhage, and return to pre-pregnancy body



weight (Araújo Maciel et al., 2024; Najahah, 2024; Oliveira et al., 2024; Senosy et al., 2020). The World Health Organization (WHO) recommends exclusive breastfeeding until infants are six months old, to be continued for two years or more alongside complementary feeding (Victora et al., 2016; WHO, 2017). However, in practice, many postpartum mothers face challenges in meeting this recommendation, with one of the main obstacles being the perception or reality of insufficient milk supply. This phenomenon is a primary cause of exclusive breastfeeding failure and early breastfeeding cessation in various parts of the world, including Indonesia (Cousins et al., 2023; Nurhayati & Fikawati, 2020).

Data from the Badan Pusat Statistik (BPS) indicates that exclusive breastfeeding coverage in Indonesia reached only around 72.13% in 2025, still below the national target of 80% (BPS, 2025). This low rate is often associated with various multifactorial factors related to the mother, the infant, and environmental support. On the maternal side, physiological factors such as suboptimal prolactin and oxytocin hormone levels, inadequate breastfeeding technique, psychological conditions (stress, anxiety, and low self-confidence), and anatomical factors like breast hypoplasia play significant roles (Ambekar et al., 2024; Fatimah et al., 2024; Imami et al., 2024; Manshanden et al., 2025; Muktamath et al., 2025; Uvnäs-Moberg et al., 2020). The perception of insufficient milk supply, although sometimes not supported by objective medical evidence, can create a vicious cycle where anxiety inhibits the oxytocin-controlled let-down reflex, thereby actually reducing milk production (Jayanti & Yulianti, 2022; Oliva-Pérez & Oliver-Roig, 2022; Rohma et al., 2023). Therefore, safe, effective, affordable, and culturally acceptable interventions to increase breast milk production are urgently needed to support the success of exclusive breastfeeding.

Complementary therapies such as lactation massage are gaining attention in the non-pharmacological management of breastfeeding. Lactation massage is a manual stimulation technique applied to the breast, chest, back, and specific acupressure points, aimed at enhancing blood circulation and lymphatic flow around breast tissue, relaxing tense muscles, and stimulating the release of prolactin and oxytocin hormones (Agustia & Camelia, 2025; XU et al., 2023). Prolactin is responsible for milk production in the alveoli, while oxytocin triggers the milk ejection reflex (let-down reflex). The underlying theory is that physical stimulation and relaxation from the massage can reduce maternal stress levels, which is a strong inhibitor of the oxytocin reflex. Additionally, massage is believed to help clear blocked milk ducts



(ductal blockage), reduce engorgement, and improve breast comfort, thereby making breastfeeding more effective (Crowley, 2015; Kraus et al., 2025).

Although theoretically promising as a supportive intervention, the efficacy claims of lactation massage still require stronger and more standardized scientific validation. Many postpartum mothers, healthcare providers, and lactation counselors may have applied or recommended specific massage techniques based on empirical experience, yet without standardized guidelines and measurable outcome evidence. This situation carries the potential for wide variations in practice and even risks if the techniques applied are incorrect. Therefore, it is important to objectively evaluate the effect of lactation massage by employing a more robust research design that measures primary outcomes in terms of quantitative increases in breast milk production, such as expressed milk volume in milliliters or adequacy scores. Based on this rationale, the aim of this study is to analyze the effect of lactation massage on increasing breast milk production in postpartum mothers. It is hoped that this research will provide empirical evidence that can serve as a basis for developing effective postpartum care protocols and standardized lactation massage intervention modules for healthcare workers, thereby supporting efforts to improve the coverage and success of exclusive breastfeeding in Indonesia.

2. Methods

Research design

This study employed a pre-experimental one-group pretest–posttest design without a control group. The design aimed to examine the effect of lactation massage on breast milk production among postpartum mothers by measuring outcomes before and after the intervention within a single group.

Participants

The study was conducted with 20 postpartum mothers in the working area of Rahmiyati Independent Midwife Practice, Banjarmasin, South Kalimantan, Indonesia. Participants were selected using total sampling from all postpartum mothers with estimated deliveries in June 2025 who met the inclusion criteria. Inclusion criteria included mothers who were willing to participate, had no contraindications to lactation massage, and were within the postpartum period. Exclusion criteria included mothers with breast cancer, recent breast surgery, heart disease, diabetes, or severe infections.



Data collection

Data were collected through direct observation using a structured observation sheet. Breast milk production was measured using a manual breast pump on the first day postpartum (pretest) and again on the third day after intervention (posttest). The intervention consisted of lactation massage performed for 15 minutes, twice daily (morning and evening), for three consecutive days, following a standardized operating procedure (SOP) adapted from validated sources.

Data analysis

Data were analyzed descriptively and inferentially using IBM SPSS Statistics version 26. Descriptive statistics (frequency, percentage, mean, standard deviation, minimum, and maximum) were used to describe participant characteristics and breast milk production. Based on the results of assumption tests:

1. The Shapiro-Wilk test indicated normal distribution of data ($p > 0.05$ for both measurements).
2. Levene's test showed violation of homogeneity of variance assumption ($p < 0.05$).

Therefore, despite normal distribution, the Wilcoxon signed-rank test was selected as the most appropriate test to compare pre-test and post-test breast milk production, as it does not require the assumption of homogeneity of variance. Statistical significance was set at $p < 0.05$ with a 95% confidence interval.

Ethical consideration

The study received ethical clearance from the Research Ethics Committee of Universitas Sari Mulia (313/KEP-UNISM/VI/2025). Written informed consent was obtained from all participants prior to inclusion. Confidentiality was maintained throughout the research process, and participants were assured of their right to withdraw at any time without penalty.

3. Result

The assessed characteristic was the respondents' age, considering that maternal age can influence physiological and psychological conditions related to breast milk production. The distribution of respondents' age is presented in Table 1, which groups age into risk (<20 years) and no-risk (20–35 years) categories. The analysis results show that the majority of respondents were in the no-risk age group, with a mean age of 26.05 years. This data provides important context before further discussing the relationship between lactation massage



intervention and breast milk production in this group.

Tabel 1. Age characteristics of respondents (n=20)

Category	Frequency	Percentage (%)
At risk (<20 years old)	2	10,0
Not at risk (20-35 years old)	18	90,0
Total	20	100

Minimum: 17; Maximum: 33; Mean: 26,05

Before the intervention was administered, breast milk production in all respondents was measured as baseline data (pre-test). These initial measurements provide an overview of the breast milk production condition among postpartum mothers in the study area prior to receiving lactation massage intervention. The data is presented in Table 2, which categorizes breast milk production into three levels: low, sufficient, and high. These baseline results are essential for comparison in assessing the changes that occurred after the intervention.

Table 2. Breast milk production before lactation massage

Category	Frequency	Percentage (%)
Low (<250 ml)	20	100
Sufficient (250-400 ml)	0	0.0
High (>400 ml)	0	0.0
Total	20	100

After the lactation massage intervention was carried out for three consecutive days, a reassessment was conducted to evaluate changes in breast milk production. The post-intervention measurement results (post-test) are presented in Table 3. This data illustrates the distribution of breast milk production categories after the respondents received lactation massage and will be used to compare the conditions before and after the intervention in order to assess the effect of the treatment provided.

Table 3. Breast milk production after lactation massage

Category	Frequency	Percentage (%)
Low (<250 ml)	2	10.0
Sufficient (250-400 ml)	13	65.0
High (>400 ml)	5	25.0
Total	20	100

The descriptive statistical comparison of breast milk production before and after the intervention shows an increase in average production from 188.5 ml to 342.5 ml. This primary finding indicates a positive change in breast milk volume following the administration of



lactation massage. The Wilcoxon signed-rank test confirms a significant difference in breast milk production as a result of lactation massage (see Table 4). The Wilcoxon signed-ranks test was used because Levene's test indicated that the data were not homogeneous ($\alpha < 0.05$).

Table 4. Test of breast milk production before and after lactation massage (n=20)

Intervention	Minimum	Maximum	Mean $\pm$ Standar Deviation	p-value
Before	100	240	188.5 $\pm$ 40.95	<0.001
After	200	430	69.04 $\pm$ 69.04	

Note: The Wilcoxon signed-ranks test was used because the data were not homogeneous.

4. Discussions

The findings of this study indicate a significant increase in breast milk production following a structured lactation massage intervention among postpartum mothers in an independent midwifery practice area. The average milk volume increased from 188.5 $\pm$ 40.95 ml to 342.5 $\pm$ 69.04 ml after three days of intervention, with the difference being statistically significant as confirmed by the Wilcoxon signed-rank test ($p < 0.001$). This substantial increase aligns with the physiological rationale underlying lactation massage, which posits that targeted manual stimulation can enhance hormonal regulation and local circulation. The massage protocol, focusing on the neck, shoulder, back, and breast tissue areas, is designed to stimulate the release of prolactin and oxytocin—key hormones responsible for milk synthesis and ejection. By reducing muscle tension and promoting relaxation, this intervention likely succeeded in diminishing psychological barriers such as stress and anxiety, which are known inhibitors of the let-down reflex. This mechanism is consistent with previous studies reporting that relaxation through massage facilitates hormone secretion and improves milk flow (Kartilah & Februanti, 2024; Setiani & Lutfiyanti, 2024; Yulianti et al., 2024). Furthermore, the mechanical action of the massage may help clear potential ductal blockages and enhance lymphatic drainage, thereby reducing breast engorgement and making breast tissue easier to empty (Cooper & Kowalsky, 2015). These results contribute to the growing body of evidence supporting non-pharmacological complementary therapies in postpartum care, especially in resource-limited settings where access to lactation consultants or advanced medical support may be restricted. The simplicity of the intervention, its low cost, and its cultural acceptability enhance its potential for integration into routine postpartum care protocols managed by midwives.



The age profile of the participants, which was dominated by mothers in the non-risk age group (20–35 years, 90%), provides relevant context for interpreting the results. Maternal age is a long-established factor influencing lactation physiology, where both adolescent and older mothers often face biological and psychosocial challenges that can hinder breast milk production (Gila-Díaz et al., 2020; Sadovnikova et al., 2020). In this study, the two respondents under 20 years of age remained in the "low" production category post-intervention, highlighting the potential role of age as a moderating variable. This observation reinforces existing literature suggesting that younger mothers may experience delayed lactogenesis or a lower prolactin response due to physiological immaturity and higher psychological stress levels (Ambekar et al., 2024; Nagel et al., 2022). The overall success in the older age group underscores the importance of tailored interventions, where younger mothers may require additional support such as more intensive education, psychological counseling, or more frequent monitoring. Furthermore, the baseline data revealed universally insufficient milk production (<250 ml) among all participants before the intervention. This uniform starting point strengthens the internal validity of the study, as the observed changes can more reliably be attributed to the massage intervention rather than to pre-existing variations. The post-intervention distribution—shifting to 65% sufficient (250–400 ml) and 25% high (>400 ml)—illustrates a clinically meaningful transition, which likely translates to improved breastfeeding outcomes, increased infant satiety, and reduced formula supplementation. Such a shift is crucial during the early postpartum period when maternal confidence and milk supply are being established.

The results of this study reinforce findings from several other studies that also reported a significant increase in breast milk volume following lactation massage (Agustia & Camelia, 2025; Rahmadani et al., 2025). However, the magnitude of the increase observed here is quite substantial, likely due to the standardized protocol administered over several days. Unlike single-session interventions, the repeated application over three consecutive days may have allowed for cumulative physiological and psychological benefits, including sustained hormonal stimulation and progressive maternal relaxation. This aligns with research by Romadhoni et al. (2023), which stated that optimal results are achieved with repeated sessions over consecutive days. Nevertheless, the absence of a control group limits the ability to conclusively attribute all the increase solely to the massage, as a natural physiological rise



in milk production typically occurs during the first postpartum week. Additionally, the use of a manual breast pump for measurement, while pragmatic, introduces potential variability due to differences in pump efficiency and maternal comfort with the device. Future research could complement volume metrics with infant weight gain or direct breastfeeding observation to capture breastfeeding effectiveness more holistically.

The implications of these findings extend to clinical practice, particularly in community-based midwifery care. Lactation massage is a low-risk, cost-effective intervention that can be easily integrated into postpartum visits. Midwives and community health workers can be trained to perform and teach this technique, empowering mothers to self-manage mild to moderate lactation challenges. This is highly relevant in Indonesia, where independent midwifery practices are a primary source of maternal care in many regions. Implementing such interventions could help bridge the gap between the national exclusive breastfeeding target and current coverage rates. Furthermore, the non-invasive nature of massage aligns with cultural preferences for traditional and complementary therapies, potentially increasing acceptance and adherence. From a public health perspective, improving breastfeeding rates through simple interventions like lactation massage can contribute to reducing child malnutrition, stunting, and infection rates, while also promoting maternal health through faster uterine involution and mother-child bonding (Asmin & Rahmat, 2025; Handajani et al., 2021; Lutter, 2013). However, successful integration requires the development of clear guidelines, training modules, and monitoring tools to ensure technique safety and consistency. It is also important to identify mothers who may have contraindications for massage, such as those with breast pathology, infection, or specific chronic conditions, as outlined in the SOP. A balanced approach combining massage with education on proper latch, frequent breastfeeding, and nutritional support is likely to yield the most sustainable improvements in breastfeeding outcomes.

This study has several limitations that need to be acknowledged. First, the pre-experimental single-group design without a control group limits the ability to definitively conclude causality, as temporal changes and the natural progression of lactation could be confounding factors. Second, the small sample size (n=20) and recruitment from a single midwifery practice restrict the generalizability of the findings to broader populations. Third, measuring breast milk production through expression may not fully represent the infant's



actual intake, due to variations in pump efficiency and the exclusion of direct breastfeeding dynamics. Additionally, the brief three-day monitoring period does not capture the sustainability of the effects beyond the immediate post-intervention phase. Other potential confounding variables, such as maternal nutritional status, parity, previous breastfeeding experience, and infant health status, were not controlled for, which may have influenced the results.

Future research should address these limitations through more rigorous designs. Randomized controlled trials (RCTs) with control groups receiving standard care or a placebo intervention would provide stronger evidence of efficacy. Studies should include larger and more diverse samples from multiple sites to enhance external validity. A longer follow-up period—up to 2–4 weeks postpartum—would help determine whether the increase in milk volume is sustained over time. Objective biomarkers, such as serial serum prolactin levels, could be integrated to more directly elucidate the physiological mechanisms. Furthermore, a mixed-methods approach combining quantitative measurements with qualitative insights into mothers' experiences, confidence, and perceived support would yield a more comprehensive understanding of the intervention's impact. Research could also explore the differential effectiveness of lactation massage among sub-populations, such as primiparous versus multiparous mothers, cesarean versus vaginal deliveries, and younger versus older mothers, to enable more personalized recommendations. Finally, cost-effectiveness analyses and implementation science studies are needed to guide the scalable integration of lactation massage into routine postpartum care protocols in resource-limited settings.

5. Conclusion

Lactation massage has a significant effect on increasing breast milk production in postpartum mothers within the working area of Rahmiyati Independent Midwifery Practice. This is evidenced by the increase in average milk volume from 188.5 ml to 342.5 ml after the intervention, along with a shift in production categories from 100% low to 65% sufficient and 25% high. These findings support the implementation of lactation massage as an effective complementary intervention for enhancing breast milk production in postpartum midwifery care, particularly for mothers of optimal reproductive age (20–35 years).

6. Conflict of interest

All authors declare no conflict of interest.



7. References

- Agustia, N., & Camelia, R. (2025). Effect of lactation massage and oxytocin massage on milk production in postpartum women: A quasi-experimental study. *Lentera Perawat*, 6(2), 355–361. <https://doi.org/10.52235/lp.v6i2.475>
- Ambekar, P., Havale, A., & Deshmukh, J. (2024). Effect of maternal psychological distress on lactation: A review of the literature. *International Journal of Indian Medicine*, 05(11), 19–30. <https://doi.org/10.55552/IJIM.2024.51104>
- Ambekar, P., Havale, A., & Deshmukh, J. (2024). Effect of maternal psychological distress on lactation: A review of the literature. *International Journal of Indian Medicine*, 05(11), 19–30. <https://doi.org/10.55552/IJIM.2024.51104>
- Araújo Maciel, G., Priscilla Araújo Maciel, D., Cristina Araújo Vieira, I., Dos Santos Silva, T., Mateus Alexandrino de Brito, S., Paula de Jesus Anunciação, L., Silva Soares, J., Claudia Espelho de Almeida, A., Domingos de Oliveira Junior, A., Caparroz Nogueira, M., Salomão Henrique Robles, E., & Carolina Beltrami, A. (2024). The benefits of breastfeeding for the health of the infant, the mother and the impact this has on public health in Brazil. *International Seven Journal of Multidisciplinary*, 3(2), 386–401. <https://doi.org/10.56238/isevmjv3n2-002>
- Asmin, R. Y., & Rahmat, R. A. (2025). Training families in oxytocin massage to increase breast milk production in breastfeeding mothers [in Indonesia]. *Sahabat Sosial: Jurnal Pengabdian Masyarakat*, 3(4), 529–536. <https://doi.org/10.59585/sosisabdimas.v3i4.740>
- BPS. (2025). *Percentage of Infants Aged Less Than 6 Months Receiving Exclusive Breastfeeding by Province (Percent), 2025 [in Indonesia]*. BPS. <https://www.bps.go.id/id/statistics-table/2/MTM0MCMY/persentase-bayi-usia-kurang-dari-6-bulan-yang-mendapatkan-asi-eksklusif-menurut-provinsi.html>
- Cooper, B. B., & Kowalsky, D. (2015). Physical therapy intervention for treatment of blocked milk ducts in lactating women. *Journal of Women's Health Physical Therapy*, 39(3), 115–126. <https://doi.org/10.1097/JWH.0000000000000037>
- Cousins, T., Ross, S., Demirci, J., Poston, S., & Gibbs, B. (2023). Breastfeeding experiences and barriers among mothers with perceived insufficient milk. *Journal of the Academy of Nutrition and Dietetics*, 123(9), A57. <https://doi.org/10.1016/j.jand.2023.06.190>



- Crowley, W. R. (2015). Neuroendocrine regulation of lactation and milk production. *Comprehensive Physiology*, 5(1), 255–291. <https://doi.org/10.1002/j.2040-4603.2015.tb00607.x>
- Oliveira, m. E. D., lima, a. C. S., da silva, a. L. B., silva, b. J. Q., de magalhães, c. C. R. G. N., bernardino, d. A., freire, e. V. S., da costa, f. E. S., da silva, m. E. F., & silva souza santos, v. (2024). Aleitamento materno exclusivo: pilar fundamental para a saúde e o desenvolvimento infantil. in *Estudos multidisciplinares sobre saúde da criança e do adolescente*. Editora academic. <https://doi.org/10.58871/conbrasca24.c06.ed05>
- Fatimah, S., Febriyana, N., & Dwilda, E. (2024). The relationship between stress levels in breastfeeding mothers and the smooth flow of breast milk production [*in Indonesia*]. *Malahayati Nursing Journal*, 6(10), 3989–3996. <https://doi.org/10.33024/mnj.v6i10.13835>
- Gila-Díaz, A., Herranz Carrillo, G., Cañas, S., Saenz de Pipaón, M., Martínez-Orgado, J. A., Rodríguez-Rodríguez, P., López de Pablo, Á. L., Martin-Cabrejas, M. A., Ramiro-Cortijo, D., & Arribas, S. M. (2020). Influence of maternal age and gestational age on breast milk antioxidants during the first month of lactation. *Nutrients*, 12(9), 2569. <https://doi.org/10.3390/nu12092569>
- Handajani, D. O., Suprpti, S., Rahayu, R. M., Mulyani, E., & Sulastri, S. (2021). Effect to loving touch baby massage in increasing the frequency of breastfeeding. *Journal Universitas Muhammadiyah Gresik Engineering, Social Science, and Health International Conference (UMGESHC)*, 1(1), 92. <https://doi.org/10.30587/umgeshic.v1i1.2477>
- Imami, D. A. N., Rahmawati, N. A., Prasetya, A., & Ronawati, D. D. (2024). Oxytocin massage education to improve smooth breast milk production among the breastfeeding mothers' community at Posyandu Mawar 5, Ketohan Hamlet, Dau District, Malang Regency [*in Indonesia*]. *Jurnal Pengabdian Masyarakat Bangsa*, 2(9), 3768–3773. <https://doi.org/10.59837/jpmba.v2i9.1531>
- Jayanti, C., & Yulianti, D. (2022). Effect of anxiety on the smooth production of breast milk in postpartum mother in COVID-19 pandemic. *International Journal of Chemical & Material Sciences*, 5(1), 5–9. <https://doi.org/10.21744/ijcms.v5n1.1863>
- Kartilah, T., & Februanti, S. (2024). Emotional freedom techniques and oxytocin stimulation massages that effectively reduce anxiety and increase smooth breast milk production of



- nursing mothers. *Malaysian Journal of Nursing*, 16(02), 46–53.
<https://doi.org/10.31674/mjn.2024.v16i02.005>
- Kraus, V., Čižmárová, B., & Birková, A. (2025). When your body tells you to not breastfeed—the connivance of oxytocin, prolactin, and dopamine. *International Journal of Molecular Sciences*, 26(12), 5909. <https://doi.org/10.3390/ijms26125909>
- Lutter, C. (2013). Breast feeding. In *Encyclopedia of human nutrition* (pp. 207–212). Elsevier.
<https://doi.org/10.1016/B978-0-12-375083-9.00031-3>
- Manshanden, T. M. N., Abelha, S. G., Velzel, J., McEachran, J. L., Geddes, D. T., & Perrella, S. L. (2025). Characteristics and experiences of lactating women with measured low milk production. *International Breastfeeding Journal*, 20(1), 64.
<https://doi.org/10.1186/s13006-025-00753-1>
- Nagel, E. M., Howland, M. A., Pando, C., Stang, J., Mason, S. M., Fields, D. A., & Demerath, E. W. (2022). Maternal psychological distress and lactation and breastfeeding outcomes: A narrative review. *Clinical Therapeutics*, 44(2), 215–227.
<https://doi.org/10.1016/j.clinthera.2021.11.007>
- Najahah, I. (2024). Exclusive breastfeeding. In *Infant nutrition and feeding*. IntechOpen.
<https://doi.org/10.5772/intechopen.110441>
- Nurhayati, E., & Fikawati, S. (2020). Counseling of exclusive breastfeeding during antenatal care (ANC) and perceptions of insufficient milk supply. *Jurnal Gizi Dan Dietetik Indonesia (Indonesian Journal of Nutrition and Dietetics)*, 7(2), 65.
[https://doi.org/10.21927/ijnd.2019.7\(2\).65-73](https://doi.org/10.21927/ijnd.2019.7(2).65-73)
- Oliva-Pérez, J., & Oliver-Roig, A. (2022). Relación del retraso de la lactogénesis II con la percepción materna de leche insuficiente: un estudio longitudinal. *Enfermería Clínica*, 32(6), 413–422. <https://doi.org/10.1016/j.enfcli.2022.07.005>
- Rahmadani, F. N., Rahayu, W. D., & Meylawati, L. E. (2025). Lactation massage to increase breast milk production in postpartum mothers: A case study at Dr. Esnawan Antariksa Air Force Hospital [in Indonesia]. *Jurnal Manajemen Kesehatan Dan Keperawatan*, 2(2), 84–90. <https://doi.org/10.35968/4v46hh10>
- Rohma, A. N., Utomo, M. T., Etika, R., & Ningtyas, W. S. (2023). Relationship between anxiety and breast milk expulsion in lactating mothers. *Journal of Maternal and Child Health*, 8(2), 169–175. <https://doi.org/10.26911/thejmch.2023.08.02.04>



- Romadhoni, A. B. C., Prastyoningsih, A., & Widyastuti, D. E. (2023). The effectiveness of lactation massage on the smooth flow of breast milk production in postpartum mothers [in Indonesia]. *Jurnal Kesehatan Kusuma Husada*, 67–72. <https://doi.org/10.34035/jk.v14i1.938>
- Sadovnikova, A., Wysolmerski, J. J., & Hovey, R. C. (2020). The onset and maintenance of human lactation and its endocrine regulation. In *Maternal-fetal and neonatal endocrinology* (pp. 189–205). Elsevier. <https://doi.org/10.1016/B978-0-12-814823-5.00014-3>
- Senosy, S. A., Saleh, L. H., & Alareed, H. R. (2020). Exclusive breastfeeding knowledge, practices and determinants among mothers in rural areas, Egypt. *International Journal Of Community Medicine And Public Health*, 7(7), 2443. <https://doi.org/10.18203/2394-6040.ijcmph20202963>
- Setiani, N., & Lutfiyanti, A. (2024). Lactation Massage and Hypnobreastfeeding Relaxation Techniques in Breastfeeding Mothers. *Jurnal Kesehatan Stikes Muhammadiyah Ciamis*, 11(2), 62–71. <https://doi.org/10.52221/jurkes.v11i2.707>
- Muktamath, V. U., Sunitha, N. H., Ravi, Y., Hegde, P. R., Biradar, S., Saptagiri, T. V., & Ilager, S. (2025). Understanding insufficient maternal milk production: clinical causes and remedies. In *Clinical guidance in breastfeeding - physiology, success, and challenges*. IntechOpen. <https://doi.org/10.5772/intechopen.1009947>
- UvnäsMoberg, K., Ekström-Bergström, A., Buckley, S., Massarotti, C., Pajalic, Z., Luegmair, K., Kotlowska, A., Lengler, L., Olza, I., Grylka-Baeschlin, S., Leahy-Warren, P., Hadjigeorgiu, E., Villarme, S., & Dencker, A. (2020). Maternal plasma levels of oxytocin during breastfeeding—A systematic review. *PLOS ONE*, 15(8), e0235806. <https://doi.org/10.1371/journal.pone.0235806>
- Victora, C. G., Bahl, R., Barros, A. J. D., França, G. V. A., Horton, S., Krasevec, J., Murch, S., Sankar, M. J., Walker, N., & Rollins, N. C. (2016). Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. *The Lancet*, 387(10017), 475–490. [https://doi.org/10.1016/S0140-6736\(15\)01024-7](https://doi.org/10.1016/S0140-6736(15)01024-7)
- WHO. (2017). *Guideline: Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services*. WHO. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK487814/>



- XU, J., CHEN, H., ZHANG, J., LI, J., LI, Y., & TANG, L. (2023). Operating procedures of traditional Chinese medicine breast massage. *Journal of Integrative Nursing*, 5(2), 151–154. https://doi.org/10.4103/jin.jin_27_23
- Yulianti, I., Yani, L. Y., & Arishinta, C. H. (2024). Literature review study of lactational massage on the flow of breast milk. *Journal of Scientific Research, Education, and Technology (JSRET)*, 3(1), 189–193. <https://doi.org/10.58526/jsret.v3i1.344>