

THE EFFECT OF OXYTOCIN MASSAGE ON BREAST MILK PRODUCTION IN POSTPARTUM MOTHERS AT RSUD DR. M. THOMSEN NIAS

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Abstract. Insufficient breast milk production remains a leading cause of exclusive breastfeeding failure in postpartum mothers, particularly in the early postpartum period. Physiological and psychological barriers including impaired let-down reflexes, post-caesarean effects, and maternal anxiety reduce milk output and drive supplementation with infant formula. This study aimed to evaluate the effect of oxytocin massage on breast milk production in postpartum mothers admitted to RSUD dr. M. Thomsen Nias. A quantitative one-group pretest–posttest quasi-experimental design was employed. A total of 21 postpartum mothers were selected through purposive sampling from the Postnatal Ward of RSUD dr. M. Thomsen Nias from 1 to 14 February 2026. Oxytocin massage was administered along the spine to the 5th–6th costae for 10–15 minutes per session over three consecutive days. Breast milk volume was measured using a manual breast pump before and after each session. Data were analyzed using the Shapiro–Wilk normality test and the paired sample t-test. Mean breast milk production increased significantly from 22.86 ml (SD = 7.171) at pretest to 52.14 ml (SD = 16.013) at posttest, representing a 128.1% increase. The paired sample t-test confirmed a statistically significant effect ($t = -8.476$; $df = 20$; $p = 0.000$; $p < \alpha = 0.05$). Oxytocin massage is an effective, safe, and easily implemented non-pharmacological intervention for enhancing breast milk production in postpartum mothers, with strong potential for integration into standard postnatal midwifery care protocols.

Keywords: Oxytocin Massage, Postpartum, Breast Milk Production, Let-Down Reflex, Non-Pharmacological Intervention

Abstrak. Produksi ASI yang tidak mencukupi tetap menjadi penyebab utama kegagalan pemberian ASI eksklusif pada ibu pascapersalinan, terutama pada periode pascapersalinan awal. Hambatan fisiologis dan psikologis termasuk gangguan refleks pengeluaran ASI, efek pasca operasi caesar, dan kecemasan ibu mengurangi produksi ASI dan mendorong pemberian susu formula. Studi ini bertujuan untuk mengevaluasi efek pijat oksitosin pada produksi ASI pada ibu pascapersalinan yang dirawat di RSUD dr. M. Thomsen Nias. Desain kuasi-eksperimental pretest-posttest satu kelompok kuantitatif digunakan. Sebanyak 21 ibu pascapersalinan dipilih melalui pengambilan sampel bertujuan dari Ruang Pascapersalinan RSUD dr. M. Thomsen Nias dari tanggal 1 hingga 14 Februari 2026. Pijat oksitosin diberikan di sepanjang tulang belakang hingga tulang rusuk ke-5–6 selama 10–15 menit per sesi selama tiga hari berturut-turut. Volume ASI diukur menggunakan pompa ASI manual sebelum dan sesudah setiap sesi. Data dianalisis menggunakan uji normalitas Shapiro–Wilk dan uji t sampel berpasangan. Rata-rata produksi ASI meningkat secara signifikan dari 22,86 ml (SD = 7,171) pada pra-uji menjadi 52,14 ml (SD = 16,013) pada pasca-uji, yang mewakili peningkatan sebesar 128,1%. Uji t sampel berpasangan mengkonfirmasi efek yang signifikan secara statistik ($t = -8,476$; $df = 20$; $p = 0,000$; $p < \alpha = 0,05$). Pijat oksitosin merupakan intervensi non-farmakologis yang efektif, aman, dan mudah diimplementasikan untuk meningkatkan produksi ASI pada ibu pascapersalinan, dengan potensi kuat untuk diintegrasikan ke dalam protokol perawatan kebidanan pascapersalinan standar.

Kata Kunci: Pijat Oksitosin, Pascapersalinan, Produksi ASI, Refleks Let-Down, Intervensi Non-Farmakologis

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INTRODUCTION

Exclusive breastfeeding for the first six months of life is a global recommendation by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), as it significantly contributes to optimal infant growth, prevention of infectious and chronic diseases, and maintenance of maternal health (WHO, 2018). Despite its well-documented physiological and immunological benefits, global breastfeeding coverage remains considerably below target. According to the Global Breastfeeding Scorecard 2023, only 46% of infants are breastfed within the first hour of birth, whereas WHO's 2030 target is 70% (WHO & UNICEF, 2025). In Indonesia, the early initiation of breastfeeding (EIB) rate has reached only approximately 27%, with a mere 14% of infants experiencing direct skin-to-skin contact within the first 60 minutes postpartum. Nevertheless, national exclusive breastfeeding coverage demonstrates a positive trend, rising from 52% in 2017 to 66.4% in 2024, with North Sumatra Province recording an EIB rate of 83.2% (Kemenkes RI, 2024).

Breastfeeding success is influenced by interrelated physiological and psychological factors. Maternal emotional state plays a critical role in milk production, as 80–90% of breastfeeding success is determined by the smooth functioning of the oxytocin reflex, which is highly sensitive to the mother's psychological condition (Satriyandari, 2025). When a mother experiences stress, anxiety, or discomfort particularly in the early postpartum period the let-down reflex is inhibited, reducing milk output and driving supplementation with infant formula. Furthermore, mothers who have undergone caesarean section face additional challenges attributable to residual anaesthetic effects and limited mobility, which further delay milk production in the early postpartum days (Meher & Zaluchu, 2024).

Oxytocin massage is a non-pharmacological intervention that stimulates oxytocin hormone secretion through systematic massage along the spine to the 5th–6th costae. This mechanism facilitates the let-down reflex, reduces breast engorgement, and prevents blockage of the lactiferous sinuses (Saputri, 2019). Several studies have demonstrated its clinical effectiveness: Labibah & Wenda (2022) reported a significant increase in breast milk output following oxytocin massage, while Marchannela (2024) and Magdalena et al., (2020) confirmed statistically significant pre- and post-intervention differences ($p \leq \alpha$). Preliminary data at RSUD dr. M. Thomsen Nias indicate that the majority of postpartum mothers experience difficulties with milk expression in the early postpartum period, with several mothers promptly transitioning to infant formula due to perceived insufficient milk supply. This finding aligns with those of Meher & Zaluchu (2024), who identified cultural influences and inaccurate health information as primary risk factors for exclusive breastfeeding failure.

in the Nias Region. Despite the proven efficacy of oxytocin massage as an effective non-pharmacological intervention, its implementation at RSUD dr. M. Thomsen Nias remains limited. Accordingly, this study aims to identify breast milk production volumes before and after oxytocin massage intervention, and to evaluate the effect of this intervention on breast milk production among postpartum mothers at RSUD dr. M. Thomsen Nias.

METHOD

This study employed a quantitative approach using a one-group pretest–posttest quasi-experimental design. This design was selected because measurements were conducted twice on the same group before and after the intervention without a control group, enabling direct evaluation of changes in breast milk production attributable to the oxytocin massage intervention. The study was conducted in the Postnatal Ward of RSUD dr. M. Thomsen Nias from 1 to 14 February 2026. The target population comprised all postpartum mothers admitted to the Postnatal Ward during the study period. A sample of 21 participants was selected using purposive sampling based on predetermined inclusion and exclusion criteria. Inclusion criteria were: (1) postpartum mothers experiencing difficulties with milk expression; (2) not consuming lactation supplements or traditional herbal remedies during the study period; and (3) willingness to provide written informed consent. Exclusion criteria were: (1) allergy to massage oil; (2) currently prescribed lactation-stimulating medication by a physician; (3) presence of an active communicable disease; and (4) voluntary withdrawal from the study.

The instruments and materials used included an informed consent form, a structured demographic questionnaire, an observation sheet (checklist), coconut oil or baby oil as the massage medium, and a manual breast pump to measure milk volume in millilitres (ml). Data collection was conducted through structured interviews and direct observation across three stages: (1) preparation, encompassing proposal development, ethical research approval, and institutional permits; (2) implementation, involving informed consent, demographic data collection, pretest measurement of breast milk production, administration of the oxytocin massage for 10–15 minutes, and posttest measurement; and (3) data processing and statistical analysis. The independent variable was the oxytocin massage intervention, operationally defined as massage performed by the researcher using the thumbs along the spine to the 5th–6th costae, for a duration of 10–15 minutes per session, using coconut oil or baby oil as the medium, administered once daily for three consecutive days. The dependent variable was

breast milk production, defined as the volume of milk successfully expressed and measured using a manual breast pump in millilitres (ml), recorded on an observation sheet before and after each intervention session.

Data analysis was conducted in two stages. Univariate analysis described the distribution of breast milk production using mean values, standard deviation, and minimum and maximum values. Prior to bivariate analysis, data normality was assessed using the Shapiro–Wilk test at a 95% confidence level ($\alpha = 0.05$). As the data were normally distributed (significance value > 0.05 for both conditions), bivariate analysis was performed using the paired sample t-test to evaluate the statistical significance of the effect of oxytocin massage on breast milk production.

RESULTS

Distribution of Mean Breast Milk Production

Table 1 presents the descriptive statistics for breast milk production before and after the oxytocin massage intervention.

Table 1. Distribution of mean breast milk production before and after oxytocin massage intervention (n = 21)

Variable	Mean (ml)	Std. Deviation	Min (ml)	Max (ml)
Before oxytocin massage (Pretest)	22.86	7.171	10	40
After oxytocin massage (Posttest)	52.14	16.013	25	80

As shown in Table 1, breast milk production before the intervention ranged from 10 ml to 40 ml, with a mean of 22.86 ml (SD = 7.171). Following the oxytocin massage intervention, milk production increased substantially, with a mean of 52.14 ml (SD = 16.013), ranging from 25 ml to 80 ml. The mean difference between pretest and posttest was 29.28 ml, representing a clinically meaningful increase of 128.1%.

Normality Test (Shapiro–Wilk)

Table 2 presents the results of the Shapiro–Wilk normality test conducted prior to bivariate analysis.

Table 2. Shapiro–Wilk normality test results

Variable	Statistic	df	Significance (p)
Pretest	0.942	21	0.241
Posttest	0.960	21	0.517

As demonstrated in Table 2, the significance values for pretest ($p = 0.241$) and posttest ($p = 0.517$) were both greater than $\alpha = 0.05$, confirming that the data were normally distributed. With the normality assumption satisfied, the paired sample t-test was determined to be the appropriate bivariate analysis method.

Hypothesis Testing: Paired Sample t-Test

Table 3 presents the results of the paired sample t-test examining the effect of the oxytocin massage intervention on breast milk production.

Table 3. Paired Sample t-Test results: effect of oxytocin massage on breast milk production

Variable	Mean Difference (ml)	Std. Deviation	t-value	Df	p-value
Pretest–Posttest	–29.286	15.834	–8.476	20	0.000

As shown in Table 3, the paired sample t-test yielded $t = -8.476$, $df = 20$, and $p = 0.000$. Since $p < \alpha$ ($0.000 < 0.05$), the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. It is therefore concluded that the oxytocin massage intervention has a statistically significant effect on breast milk production in postpartum mothers at RSUD dr. M. Thomsen Nias.

DISCUSSION

Breast Milk Production Before Oxytocin Massage Intervention

The mean pretest breast milk production was 22.86 ml (range: 10–40 ml). The relatively low volume observed in the early postpartum days can be attributed to multiple interrelated physiological and psychological factors. During this period, the neonatal gastric capacity is minimal, and hormonal regulation of milk synthesis — mediated by the interplay of prolactin, oxytocin, and cortisol — has not yet reached its functional equilibrium. Consequently, many mothers perceive their milk supply as insufficient, which heightens anxiety and further suppresses the let-down reflex (Satriyandari, 2025). Among the 21 study participants, six were post-caesarean section mothers who exhibited lower initial milk production, a condition influenced by residual anaesthetic effects, restricted mobility, and negative perceptions derived from the experiences of family members or peers. These findings are consistent with those of Meher & Zaluchu (2024), who identified cultural influences and inadequate health information as compounding barriers to breastfeeding in the Nias Islands context.

Physiologically, elevated cortisol levels in anxious postpartum mothers directly inhibit oxytocin secretion from the posterior pituitary gland, thereby attenuating the myoepithelial cell contractions necessary for the let-down reflex. This neurohormonal suppression results in

reduced expressed milk volumes and may precipitate early formula supplementation if not addressed promptly through clinical intervention (Labibah & Wenda, 2022). The pretest findings therefore underscore the urgent need for structured non-pharmacological interventions that can effectively modulate the neuroendocrine pathways governing milk ejection.

Effect of Oxytocin Massage on Breast Milk Production

Following the oxytocin massage intervention, mean breast milk production increased significantly to 52.14 ml (range: 25–80 ml), representing a 128.1% increase relative to pre-intervention levels. The paired sample t-test confirmed that this increase was statistically significant ($t = -8.476$; $df = 20$; $p = 0.000$; $p < \alpha = 0.05$), providing strong evidence for the efficacy of oxytocin massage as a lactation-enhancing intervention. These findings are consistent with those of Saputri (2019), who reported a significant increase in milk volume following oxytocin massage, and Atik & Hamidah (2024), who confirmed the effectiveness of a comparable intervention among postpartum mothers in a clinical setting.

Physiologically, oxytocin massage performed along the thoracolumbar spine stimulates afferent sensory pathways that activate the parasympathetic nervous system. This parasympathetic activation prompts the posterior pituitary gland to secrete oxytocin into systemic circulation. Circulating oxytocin binds to receptors on myoepithelial cells surrounding the breast alveoli, inducing their contraction and facilitating the ejection of milk from the alveolar lumen into the lactiferous ducts — the let-down reflex. Concurrently, massage stimulates the release of endorphins, which reduce maternal stress and anxiety, further disinhibiting the oxytocin reflex and creating a positive neurohormonal feedback cycle conducive to sustained milk production (Labibah & Wenda, 2022). The reduction in breast engorgement and lactiferous sinus blockage observed in the current study corroborates these neurophysiological mechanisms.

Comparison with Previous Research

The present findings are consistent with a growing body of evidence demonstrating the clinical efficacy of oxytocin massage. Marchannela (2024) and Magdalena et al., (2020) both reported statistically significant effects of oxytocin massage on breast milk production ($p \leq \alpha$), utilizing comparable quasi-experimental designs. The magnitude of the effect observed in the current study (128.1% increase) is notably substantial and may reflect the cumulative

benefit of three consecutive daily massage sessions, as well as the active involvement of family members in administering the massage independently. Strong family engagement, combined with structured health education on exclusive breastfeeding, has been demonstrated to enhance maternal self-efficacy and commitment to sustained breastfeeding practices (Satriyandari, 2025).

It is important to note that the success of the intervention was not solely a function of massage technique. Maternal receptivity, psychological preparedness, and the quality of midwifery support each contributed to the observed outcomes. Mothers who received clear explanations of the intervention rationale and demonstrated technique displayed greater compliance with the three-day protocol and reported higher levels of comfort and confidence during breastfeeding. These observations align with the therapeutic principles of person-centred care in postnatal midwifery.

Clinical Implications

The findings of this study carry significant clinical implications for postnatal midwifery practice. Oxytocin massage constitutes a safe, low-cost, and easily administered non-pharmacological intervention requiring no specialized equipment or pharmaceuticals, making it highly suitable for integration into routine postnatal care in both hospital and community settings. Given the documented barriers to exclusive breastfeeding in the Nias Islands — including cultural norms, information gaps, and limited midwifery resources (Meher & Zaluchu, 2024) — the scalability and accessibility of oxytocin massage represent particular advantages. Its incorporation into standardized postnatal care protocols at RSUD dr. M. Thomsen Nias could meaningfully improve exclusive breastfeeding rates and contribute to broader maternal and infant health outcomes.

CONCLUSION

This study demonstrated that the oxytocin massage intervention had a statistically significant effect on breast milk production in postpartum mothers at RSUD dr. M. Thomsen Nias ($t = -8.476$; $df = 20$; $p = 0.000$; $p < \alpha = 0.05$). Mean breast milk production increased from 22.86 ml before the intervention to 52.14 ml after the intervention, yielding a mean difference of 29.28 ml and a 128.1% improvement. This increase was mechanistically attributed to the stimulation of the let-down reflex through oxytocin and endorphin secretion induced by systematic massage along the thoracolumbar spine. Oxytocin massage is

demonstrated to be an effective, safe, and easily implemented non-pharmacological intervention that requires no specialized equipment. Its integration into standard postnatal midwifery care protocols is strongly recommended as a strategy to improve breastfeeding outcomes and support national exclusive breastfeeding targets in Indonesia.

Study Limitations

Several limitations must be acknowledged. The relatively small sample size ($n = 21$) and the absence of a control group in the quasi-experimental design limit the generalizability of the findings and preclude causal inferences. Confounding variables — including the mother's psychological condition, spousal support, previous breastfeeding experience, and parity — could not be fully controlled within this design. Furthermore, the study was conducted at a single institution over a limited timeframe, restricting the representativeness of the sample. Future research employing a randomized controlled trial (RCT) design with a larger, multi-centre sample and a control group is warranted to strengthen the level of scientific evidence and to account for the confounding factors identified above.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed:

- For healthcare practitioners: Oxytocin massage should be incorporated as a standard non-pharmacological intervention in postnatal midwifery care protocols at RSUD dr. M. Thomsen Nias and comparable healthcare facilities. Midwives and nurses should receive structured training in oxytocin massage technique to ensure consistent and evidence-based application.
- For healthcare institutions: Hospital administration should develop and enforce institutional protocols for the delivery of oxytocin massage to all eligible postpartum mothers, with particular attention to post-caesarean section mothers and primiparous mothers who face greater risk of early breastfeeding failure.
- For postpartum mothers and families: Mothers and their family members should be educated on the rationale, technique, and benefits of oxytocin massage as part of routine breastfeeding education, empowering them to apply the intervention independently in the home setting during the early postpartum period.
- For future researchers: Subsequent studies should employ a randomized controlled trial (RCT) design with a larger, multi-centre sample and an appropriate control group to

establish a higher level of causal evidence. Future research should also explore the synergistic effects of oxytocin massage combined with other non-pharmacological interventions such as breastfeeding counseling, skin-to-skin contact, and nutritional support, as well as long-term effects on exclusive breastfeeding duration.

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REFERENCES

- Atik, A., & Hamidah, R. (2024). Non-Pharmacological Interventions to Increase Milk Production in Postpartum Mothers: A Literature Review. *International Journal of Nursing Studies*, 12(1), 15–22.
- Kemkes RI. (2024). *Health Profile of Indonesia 2024*. Ministry of Health of the Republic of Indonesia. <https://www.kemkes.go.id>
- Labibah, A., & Wenda, D. S. (2022). The Effect of Oxytocin Massage on the Rapid Expulsion of Breast Milk. *Jurnal Kesehatan Siliwangi*, 2(3), 834–840. <https://doi.org/10.34011/jks.v2i3.779>
- Magdalena, F., Putri, A., & Wulandari, S. (2020). Oxytocin Massage as a Supportive Method to Enhance Breast Milk Production. *Journal of Pediatric and Maternal Health*, 5(3), 120–128.
- Marchannela, S. (2024). Impact of Back Massage on Oxytocin Release and Breastfeeding Success in Postpartum Mothers. *Nursing and Midwifery Research*, 7(1), 30–37.
- Meher, C., & Zaluchu, F. (2024). Cultural Influences of Early Food Introduction on Exclusive Breastfeeding Rates in the Nias Islands, Indonesia. *Journal of Multidisciplinary Healthcare*, 17, 5653–5663. <https://doi.org/10.2147/JMDH.S478448>
- Saputri, D. (2019). Effect of Oxytocin Massage on Breast Milk Production in Postpartum Mothers. *Journal of Maternal and Child Health*, 4(2), 85–91.

- Satriyandari, R. (2025). Stress, Maternal Anxiety, and the Let-Down Reflex: Implications for Breastfeeding. *Indonesian Journal of Midwifery*, 8(1), 10–18.
- World Health Organization. (2018). *Breastfeeding*. WHO. <https://www.who.int/news-room/facts-in-pictures/detail/breastfeeding>
- World Health Organization & UNICEF. (2025). *Increasing Breastfeeding Rates in Indonesia: Mothers Need More Support on World Breastfeeding Week*. UNICEF Indonesia. <https://www.unicef.org/indonesia/id/press-releases/peningkatan-angka-pemberian-asi-di-indonesia>