

Effect Of Oxytocin Massage on Breast Milk Production in Breastfeeding Mothers

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ABSTRACT

Introduction: In the postpartum period, there are many challenges that may arise during the process of breast milk production, such as irregular breast milk production or difficulty expressing breast milk. Because the possibility of disruption at the beginning of breastfeeding can cause failure in breast milk production, these problems can interfere with the breastfeeding process. This study aims to analyze the effect of oxytocin massage on increasing breast milk production. By massaging the patient's spine (vertebra) up to the fifth or sixth rib, which was conducted for 15 minutes twice daily over a period of 2 days, oxytocin massage can help increase breast milk production. **Methods:** This study used a quasi-experimental design characterized by a one-group pre-test-post-test layout and sampling approach based on purposive sampling followed by 19 breastfeeding mothers at the Ngadirojo Community Health Center. The Wilcoxon Signed Rank Test, which is not parametric, was used to analyze the data. **Results:** The analysis results showed the average value of breast milk scores before the intervention was 0.86 ± 0.87 , [median: 0.60 (IQR: 0.20-1.20)], while after the intervention increased to 10.51 ± 6.61 [Median: 9.50 (IQR:6.00-14.50)]. The Wilcoxon Signed Rank Test results obtained $p < 0.001$, indicating there was statistically significant difference between breast milk scores before and after the intervention. **Conclusion:** This study shows oxytocin massage affects breast milk production in breastfeeding mothers.

Keywords: oxytocin massage. Breast milk production, breastfeeding mothers.

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INTRODUCTION

Indonesia currently faces complex nutritional challenges. Overnutrition, stunting, and malnutrition coexist, as do non-communicable diseases triggered by malnutrition. According to the Indonesian Ministry of Health (2023), breastfeeding can help prevent certain nutritional disorders. Central Java has the highest exclusive breastfeeding rate at 75.6%, according to the 2023 Indonesian Health Survey. Results of the Indonesian Nutritional Status Survey in 2024: National Exclusive Breastfeeding Rate 66.4%, Central Java 74.7% (Indonesian Ministry of Health 2025). The exclusive breastfeeding rate in Wonogiri Regency in 2024 was 71.9% (Wonogiri Regency Health Office 2024), and the exclusive breastfeeding rate at Ngadirojo Community Health Center in 2024 was 84.27% (Ngadirojo 2024). The declining national

figures, coupled with the less-than-100% achievement of Wonogiri Regency and Ngadirojo Community Health Center, illustrate that many breastfeeding mothers experience various obstacles that can interfere with breastfeeding (Nency Agustia et al. 2025; Epti Yorita et al. 2023).

Globally, perceived insufficient milk supply is reported by 35% to 60% of mothers as the primary reason for early weaning. Furthermore, in Indonesia, studies indicate that approximately 38.5 % of postpartum mothers experience delayed milk ejection or inadequate milk production during the crucial first few days after delivery (Nagel et al., 2021).

In the postpartum period, common problems include inadequate breast milk production and delayed let-down (Suradi 2019; Sandriani et al. 2023). There early breastfeeding difficulties are highly prevalent, delayed onset



of lactation frequently occurs within the first 24 to 72 hours postpartum, significantly increasing the risk of breast engorgement and hindering the transition to mature milk (Ariyanti et al., 2025). On the first to third day postpartum, the first breast milk produced is colostrum. Colostrum is a yellowish fluid rich in protein, particularly immunoglobulins, which play a role in protecting babies from infection and preventing allergies in newborns. Furthermore, colostrum acts as a digestive tract cleanser by assisting in the expulsion of meconium, thus preparing the baby's intestines for further nutritional intake (E. Anbarasi et al. 2023). These breastfeeding disorders can potentially lead to failure in the breastfeeding process.

Achieving optimal lactation management is aided by physiotherapy. Oxytocin massage is one type of physiotherapy intervention. The spine, from the seventh cervical vertebra to the fifth or sixth rib (costae V-VI), is massaged in an oxytocin-induced manner (K. Hikmatun at al. 2024). This massage activates the parasympathetic nervous system. This stimulation plays a role in the release of the hormone oxytocin from the posterior pituitary gland, which activates the milk ejection reflex (let-down reflex). Furthermore, oxytocin massage helps increase muscle relaxation, improve blood circulation, and reduce emotional tension in breastfeeding postpartum mothers. This state of relaxation contributes to the mother's physical and psychological readiness for breastfeeding, thereby improving the smooth production and release of breast milk. Therefore, physiotherapy intervention through oxytocin massage not only plays a role in the physical aspects but also provides important psychological support for successful breastfeeding (Ani Minarni et al. 2013). Previous research by Nursanti (2020) showed that oxytocin massage is effective in increasing breast milk flow and increasing comfort and relaxation in breastfeeding mothers (Nur Pratiwi. 2025).

Efforts to increase breast milk production and smooth milk flow are crucial for supporting successful breastfeeding, especially for mothers in the early postpartum period. Oxytocin

massage, a non-pharmacological physiotherapy intervention, has the potential to be integrated into maternal health services because it is relatively safe, easy to implement, and provides physical and psychological benefits (Zara Faiza et al. 2023). Previous research has reported that oxytocin massage can address milk flow issues, relieve engorgement, and increase milk production (Doko, Aristiati, and Hadisaputro 2019). Ardhiyani Muslimah and team (2020) explained that a combination of oxytocin massage and breast care can significantly increase breast milk production in new mothers (Sri Wahyuningsih et al. 2022). This study aims to examine this more specifically in breastfeeding mothers during the early stages of breastfeeding.

METHODS

Type of Research

This study was quantitative with a quasi-experimental design, using a one-group pre-test-post-test design. The aim was to compare the pre-test and post-test results of the intervention group. This research was conducted at the Ngadirojo Community Health Center, Wonogiri Regency, during the research implementation period of 2025. In this study, the independent variable is oxytocin massage, while the dependent variable is breast milk production. The research instruments used were a questionnaire and an observation sheet.

Sampling Technique, Sample, Size, and Inclusion Criteria

The population in this study was all postpartum mothers breastfeeding on days 2-3 who visited the Ngadirojo Community Health Center. With 19 respondents meeting the inclusion and exclusion criteria, the sampling procedure used a purposive sampling technique. Inclusion criteria included postpartum mothers breastfeeding on day 2-3 with a history of normal delivery, full-term gestation, no chronic energy deficiency (CED), and no use of breast milk-stimulating medications. Exclusion criteria included postpartum mothers on day 1 and beyond day 3, breastfeeding mothers with a history of cesarean delivery, breastfeeding mothers taking breast milk-stimulating



medications, mothers who had given birth prematurely, breastfeeding

Intervention Procedure

The oxytocin massage intervention was carried out following a detailed and standardized clinical procedure. For patient positioning, the mother was instructed to sit comfortably leaning forward, with her arms folded and supported on a table or the back of a chair, allowing her breasts to hang loose and free from pressure. The massage area specifically target the back, applying circular thumb movements along both sides of the spine (vertebrae), starting from the neck and extending down to the level of the fifth or sixth rib. The massage was performed for a duration of 15 minutes per session, with a frequency of once a day. Each patient received a total of three sessions administered over three consecutive days. To ensure safety and clinical standardization, the intervention was exclusively provided by a qualified physiotherapist possessing the

Data Analysis

The data was analyzed using a normality test, the Shapiro–Wilk test, to determine the distribution of data for each variable. The results of the normality test indicated a non-normal distribution of data for both the pre-test and post-test variables. The analysis of differences in breastfeeding scores before and after the intervention was conducted using the non-parametric Wilcoxon Signed Rank Test.

Ethical Consideration

This research utilized Ethical Clearance issued by the Health Research Ethics Commission (KEPK) of the Faculty of Health Sciences, Muhammadiyah University of Surakarta, under No. 1/KEPK-FIK/XII/2025, issued on December 17, 2025.

RESULTS

Table 1. Characteristics of Age, Postpartum Day, Delivery Status, Gestational Age, Lila and Respondent Education

Variabel	N	Min	Max	Median	Mean ± SD
Age (years)	19	20	37	28,0	27,95 ± 4,77
Postpartum Day	19	2	3	2,0	2,11 ± 0,32
Delivery Status	19	1	3	2,0	1,63 ± 0,60
Gestational Age (weeks)	19	37	39	38,0	38,37 ± 0,60
LILA (cm)	19	24	30	26,0	26,84 ± 1,95
Last Education					
SMP	4	-	-	-	-
SMA	12	-	-	-	-
D3	1	-	-	-	-
S1	2	-	-	-	-
Work					
Work	9	-	-	-	-
Doesn't work	10	-	-	-	-

Respondents ranged in age from 20 to 37. The respondents' postpartum days ranged from the 2nd to the 3rd day. Most of the respondents' deliveries occurred between the 1st and 3rd days. Respondents' gestational age ranged from 37–39 weeks with an average value of 38.37 ± 0.60 weeks. Respondents' mid-upper arm circumference (MUAC) ranged from 24 to 30 cm.

All respondents are in the productive and mature age range for breastfeeding, respondents are in the Colostrum Breastfeeding period, All respondent babies were born at term, the respondents' nutritional status is good as described by all respondents having normal LILA size, and most respondents' last education level is high school, while in terms of employment status, the total number of respondents who do not work is slightly more compared to respondents who work.



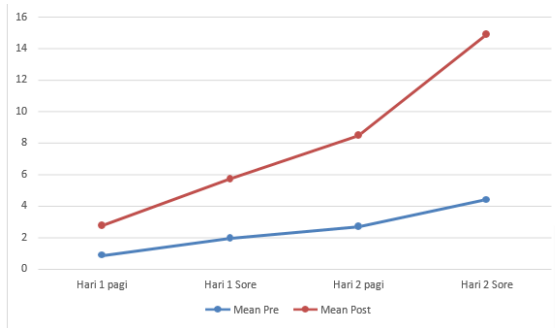


Figure 1. Changes in the amount of breast milk output. Measurements before the first intervention continued after each Intervention

Based on the data analysis (Table 1 and Figure 1), it can be seen that the average (mean) breast milk production volume (mL) increased after oxytocin massage at all measurement times. On the first morning, the mean breast milk production volume (mL.) increased from 0.86 mL before the intervention to 1.86 mL after the intervention. A similar increase was also seen on the first afternoon, from 1.94 mL to 3.76 mL.

On the second day, the increase in breast milk production (mL) was significantly greater than on the first day. Mean breast milk production volume (mL) in the morning measurements increased from 2.67 mL before the intervention to 5.78 mL after the intervention. Meanwhile, in the afternoon measurements, mean breast milk production increased from 4.38 mL to 10.51 mL after the oxytocin massage. This indicates a trend of increasing breast milk production volume from day to day after the intervention.

Table 2. Results of the Wilcoxon Test of Total Breast Milk Scores Before and After Intervention

Variable	Mean Pre ± SD	Mean Post ± SD	p-value
Score ASI (ml)	0,86 ± 0,87	10,51 ± 6,61	< 0,001

The results of the Wilcoxon test in Table 1 show that the average score of breast milk production volume (mL) before the intervention was 0.86 ± 0.87 , while after the intervention it increased to 10.51 ± 6.61 . The results of the Wilcoxon Signed Rank Test obtained $p < 0.001$, p value < 0.05 , H_0 was rejected, meaning that

oxytocin massage had an effect on the amount of breast milk production, indicating a statistically significant difference between the breast milk scores before and after the intervention.

DISCUSSION

This study demonstrates that oxytocin massage increases the amount of breast milk production volume (‘mL) by breastfeeding postpartum mothers. Of the 19 postpartum mothers who underwent oxytocin massage, the mean breast milk production (‘mL) score before the intervention was 0.86 ± 0.87 , while after the intervention, it increased to 10.51 ± 6.61 . The Wilcoxon Signed Rank Test showed a $p < 0.001$, indicating a statistically significant difference between breast milk production scores before and after the intervention. These data indicate that oxytocin massage, administered as early as possible, effectively increases breast milk production. However, it is important to critically note that this study employed a one group pre test post test design without a control group. Due to the absence of a control group, the observed increase in breast milk production volume cannot be fully and exclusively confirmed as a result of the intervention alone, as spontaneous physiological changes during the early postpartum period may also contribute to the result. Although breast milk production is influenced by several factors, oxytocin massage can trigger the release of the hormone oxytocin, which helps milk ejection, prevents blocked milk ducts, and provides a sense of comfort, thus increasing breast milk production in this study population.

Oxytocin massage works through a physiological mechanism by stimulating the parasympathetic nervous system, which plays a role in the process of breast milk production. Mechanical stimulation in the form of massage on the area along the spine, specifically from the cervical vertebrae to between the 8th and 9th thoracic vertebrae, activates nerve impulses that are transmitted to the hypothalamus and then to the posterior pituitary. This activity triggers the release of the hormone oxytocin into the blood. Oxytocin is important in the let-down reflex by



triggering contractions of the myoepithelial cells surrounding the lactiferous ducts in the mammary glands, allowing for more optimal milk release. Furthermore, oxytocin massage also has a relaxing effect on breastfeeding mothers and reduces stress hormones such as cortisol. This reduction in stress hormones contributes to increasing the effectiveness of prolactin and oxytocin, thus physiologically supporting increased milk production and release.

The mechanism for increasing breast milk production through oxytocin massage is not only related to the milk ejection reflex, but also involves complex neuroendocrine regulation between the central nervous system and the mammary glands. Mechanical stimulation of the paravertebral area during oxytocin massage activates mechanosensory receptors in the skin and muscle tissue, which then transmit afferent impulses to the spinal cord and the hypothalamus, which in turn stimulates the posterior pituitary gland to release the hormone oxytocin into the bloodstream.

Oxytocin plays a direct role in stimulating the myoepithelial cells surrounding the alveoli and lactiferous ducts to contract, thereby facilitating the let-down reflex and milk ejection. This mechanism physiologically explains how oxytocin massage can increase the volume of breast milk released after the intervention, as demonstrated in the results of this study and supported by the findings of Supardi (2022) and Doko, Aristiati, and Hadisaputro (2019).

In addition to neuroendocrine mechanisms, oxytocin massage also provides physiological effects through modulating the psychological responses of breastfeeding mothers. Stress, anxiety, and emotional tension are known to inhibit the release of oxytocin and prolactin by increasing cortisol levels. Oxytocin massage provides a sense of comfort and calm, thereby reducing cortisol levels and creating an optimal hormonal environment for lactation. This supports the function of prolactin in milk synthesis and increases breast tissue sensitivity to oxytocin. Oxytocin massage interventions are

physically and psychologically beneficial, and physiologically can increase the success of breast milk production and release in postpartum mothers (Hidayanti 2021; Muslimah 2020).

Beyond the intervention itself, other contributing factors must be considered in the interpretation of these findings. The natural physiological postpartum process, where milk production typically scales up in the first few days, may overlap with the intervention effects. Additionally, factors such as breastfeeding frequency, maternal nutritional intake, the mothers psychological condition, family support, and the correct application of breastfeeding techniques are significant variables that could influence the volume of milk produced.

Based on the results of this study, it can be concluded that oxytocin massage performed routinely every morning and evening for two days, with a massage duration of 15 minutes, has been proven to be more effective in increasing breast milk production. This finding aligns with research by Doko (2019), which states that the frequency of oxytocin massage influences breast milk production, where repeated stimulation optimizes the hormonal response of breastfeeding mothers. Physiologically, after oxytocin massage, the hormone oxytocin is released into the bloodstream within 1–5 minutes and triggers the let-down reflex, generally within 3–10 minutes, which is characterized by the release of breast milk due to contraction of myoepithelial cells in the breast alveoli (Uvnäs-Moberg et al., 2020).

Nevertheless, the limitations of this study, including the lack of a control group and the potential influence of confounding variables as mentioned above, suggest that future research should utilize a randomized controlled trial (RCT) design to more rigorously isolate the impact of oxytocin massage from other natural and environmental factors.

CONCLUSION

The conclusion of this study is to indicate that oxytocin massage is associated with increased breast milk production in



breastfeeding mothers. Oxytocin massage may be considered as a physiotherapy-based intervention to support successful breastfeeding and can be performed with the assistance of a spouse or family members. Further research with a larger sample size and a controlled experimental design is needed to confirm these findings.

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