

Oxytocin Versus Endorphin Massage for Breast Milk Flow in Mothers of Infants Aged 0–6 Months

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Abstract. Difficulty with breast milk flow may disrupt breastfeeding and is influenced by neuroendocrine and psychological factors. Oxytocin massage and endorphin massage are non-pharmacological approaches intended to promote relaxation and support the milk-ejection reflex. This study compared the effects of the two massage techniques on breast milk flow among mothers breastfeeding infants aged 0–6 months in Sinomwidodo Village, Pati Regency, Indonesia. A pre-experimental two-group pretest–posttest study was conducted in May–June 2021. Twenty mothers were recruited by purposive sampling and allocated to an oxytocin-massage group (n = 10) or an endorphin-massage group (n = 10). Each intervention was monitored for 12 treatment sessions. Breast milk flow was assessed using a 10-item questionnaire and classified as adequate (scores 9–10), moderately adequate (7–8), or inadequate (<7). Data normality was examined using the Shapiro–Wilk test, followed by the Mann–Whitney test for the post-intervention comparison. Before intervention, inadequate flow was reported by 7 mothers in the oxytocin group and 8 in the endorphin group. After intervention, adequate flow was reported by 8 and 7 mothers, respectively. The between-group difference was not statistically significant ($p = 0.429$). Both techniques were associated with favorable descriptive changes, but neither demonstrated superiority. The techniques may therefore be selected according to maternal preference, provider competence, and service feasibility.

Keywords: breastfeeding; breast milk flow; endorphin massage; oxytocin massage; postpartum care

INTRODUCTION

Exclusive breastfeeding during the first six months of life is an important strategy for supporting infant nutrition, immunity, growth, and survival. Nevertheless, mothers may discontinue or supplement breastfeeding when they perceive that breast milk is delayed, insufficient, or difficult to express. The research report noted that breastfeeding coverage in Pati Regency remained uneven across primary health-care areas and identified limited lactation knowledge, inadequate counselling, social and cultural factors, workplace constraints, and formula promotion as barriers to exclusive breastfeeding (Dinas Kesehatan Kabupaten Pati, 2018; Widayanti, 2014). These conditions indicate that practical, acceptable, and low-cost support for lactating mothers remains relevant in community maternal care.

The establishment and maintenance of lactation depend on coordinated endocrine, mechanical, and psychological processes. Prolactin supports milk synthesis, whereas oxytocin contracts the myoepithelial cells surrounding the alveoli and facilitates the milk-ejection or let-down reflex (Cunningham, 2014; Maryunani, 2015). Nipple stimulation and effective infant suckling are central triggers, but stress, pain, fatigue, anxiety, and discomfort may increase catecholamine activity and interfere with oxytocin release. Psychological adaptation during the postpartum period may therefore influence breastfeeding experiences, particularly when mothers are coping with role changes, sleep disruption, and concern about their ability to care for the infant (Anggraini, 2010; Hawari, 2011; Martalia, 2012).

Pharmacological galactagogues have been used in selected situations, but their indications and potential adverse effects require careful consideration (William & Carrey, 2016). Complementary approaches may provide a supportive option when they are used alongside correct breastfeeding technique, on-demand feeding, adequate nutrition, and assessment of maternal or infant problems. Massage and acupressure are among the complementary measures used in maternal care to promote comfort and relaxation (Hartono, 2012; Sumantri et al., 2016). Previous studies have reported improved lactation-related outcomes after oxytocin massage, Marmet techniques, Woolwich massage, endorphin

massage, or combined stimulation packages (Alyensi et al., 2017; Budiarti, 2010; Mardiyarningsih et al., 2011; Pamuji et al., 2014).

Oxytocin massage is applied along both sides of the vertebral column toward the fifth and sixth ribs. It is intended to reduce muscular tension, stimulate parasympathetic activity, and support oxytocin-mediated milk ejection (Sari, 2017). Repeated massage-like stimulation has also been associated with oxytocin-related neurophysiological responses (Lund et al., 2002). Endorphin massage uses very light, calming touch over the arms, neck, shoulders, and back, accompanied by relaxation and reassuring communication. The resulting comfort is expected to reduce stress and facilitate prolactin and oxytocin reflexes (Mongan, 2009). Studies in Indonesia have reported favorable lactation outcomes after endorphin and oxytocin massage, either separately or in combination (Hidayati & Hanifah, 2019; Wulandari et al., 2019).

Although both techniques have plausible mechanisms and have been studied independently, direct community-based comparisons remain limited. It is therefore important to determine whether one technique offers a clinically meaningful advantage or whether both can be considered comparable supportive options. This study aimed to describe breast milk flow before and after oxytocin and endorphin massage and to compare post-intervention outcomes among mothers breastfeeding infants aged 0–6 months in Sinomwidodo Village. The findings are expected to inform midwives and families when selecting feasible non-pharmacological lactation support.

METHODS

This study used a pre-experimental, non-randomized two-group pretest–posttest design. It was conducted in Sinomwidodo Village, Tambakromo District, Pati Regency, Central Java, Indonesia, from May to June 2021. The study population comprised 20 postpartum mothers who were breastfeeding infants aged 0–6 months, and all 20 eligible mothers were included by purposive sampling. Ten participants received oxytocin massage and ten received endorphin massage. The design and analytical procedures followed the research plan reported by the investigators and general guidance for health and midwifery research (Hidayat, 2014; Sugiyono, 2011).

Participants were eligible when they were breastfeeding an infant aged 0–6 months, agreed to breastfeed on demand, had no identified postpartum psychological disorder or major family-related social problem, had an infant without prematurity, low birth weight, jaundice, or another health problem, did not practice food restriction, and provided written informed consent. Participants were excluded when they missed more than two consecutive massage sessions or were taking medication considered capable of affecting breast milk flow.

In the oxytocin-massage group, the mother sat in a relaxed forward-leaning position with the upper back exposed. Massage oil was applied, and the provider massaged both sides of the spine using circular pressure from the neck and upper back toward the fifth to sixth ribs. The procedure was performed for approximately 2–3 minutes and repeated three times during a session. In the endorphin-massage group, the mother assumed a comfortable sitting or side-lying position, practiced slow deep breathing, and received very light stroking over the outer arms, neck, shoulders, and back. The back strokes formed a V-shaped movement from the neck toward the rib area while the provider used calming verbal reassurance. Each intervention was documented on an observation checklist, with a target of 12 treatment sessions.

The primary outcome was breast milk flow adequacy. It was measured using a 10-item questionnaire administered before and after the intervention period. The maximum score was 10. Scores of 9–10 were categorized as adequate flow, scores of 7–8 as moderately adequate flow, and scores below 7 as

inadequate flow. Primary data were collected through observation, interview, and completion of the study checklist and questionnaire.

Data management included editing, coding, scoring, and tabulation. Participant characteristics and outcome categories were summarized as frequencies and percentages. The Shapiro–Wilk test was used to assess normality. Because the pretest and posttest distributions were non-normal, the post-intervention scores of the two groups were compared using the Mann–Whitney test. Statistical significance was defined as $p < 0.05$. The analysis focused on the between-group comparison; the research report did not provide a separate inferential test of within-group change.

RESULTS AND DISCUSSION

All 20 enrolled participants completed the study and were included in the analysis. Nine participants (45%) were aged 21–24 years and 11 (55%) were aged 25–29 years (Table 1). Thus, the sample consisted entirely of mothers in early adulthood, with a small concentration in the 25–29-year age group.

Table 1. Age distribution of participants (N = 20)

Age (years)	Frequency	Percentage (%)
21–24	9	45
25–29	11	55
Total	20	100

Before intervention, only 1 of 10 mothers in the oxytocin-massage group had adequate breast milk flow, whereas 7 had inadequate flow. In the endorphin-massage group, none had adequate flow and 8 had inadequate flow. After the intervention period, 8 mothers in the oxytocin group and 7 in the endorphin group were categorized as having adequate flow. No participant remained in the inadequate category according to the principal posttest distribution reported in the study results (Table 2). These findings demonstrate a marked descriptive shift toward better breast milk flow in both groups.

Table 2. Breast milk flow adequacy before and after the interventions

Assessment	Intervention	Adequate n (%)	Moderately adequate n (%)	Inadequate n (%)	Total
Pretest	Oxytocin massage	1 (10)	2 (20)	7 (70)	10
Pretest	Endorphin massage	0 (0)	2 (20)	8 (80)	10
Posttest	Oxytocin massage	8 (80)	2 (20)	0 (0)	10
Posttest	Endorphin massage	7 (70)	3 (30)	0 (0)	10

The Shapiro–Wilk test indicated that both the combined pretest and posttest score distributions departed from normality ($p = 0.004$ and $p < 0.001$, respectively; Table 3). Consequently, the Mann–Whitney test was used for the post-intervention comparison. The result was not statistically significant ($p = 0.429$), indicating that the study did not identify evidence that oxytocin massage was superior to endorphin massage, or vice versa, in improving breast milk flow.

Table 3. Shapiro–Wilk normality test for breast milk flow scores

Assessment	Statistic	df	p-value
Pretest	0.844	20	0.004
Posttest	0.748	20	<0.001

The baseline findings show that most participants entered the study with inadequate perceived breast milk flow. This pattern is consistent with the complex transition into lactation, in which hormonal adaptation, infant attachment and suckling, maternal confidence, pain, fatigue, and anxiety can interact. Healthy maternal condition and adequate nutrition support milk production, while psychological distress may inhibit the let-down reflex (Poedianto, 2020). Age may also influence lactation capacity; the predominance of mothers aged 25–29 years in this study represented a generally favorable reproductive age, although the narrow age range and small sample did not permit meaningful examination of age as an effect modifier (Budiarti, 2010).

The descriptive improvement after oxytocin massage is biologically plausible. Stimulation along the vertebral area may facilitate relaxation and parasympathetic activity while supporting the neuroendocrine pathway that culminates in oxytocin release. Oxytocin contracts the myoepithelial cells and propels milk from the alveoli into the ductal system, thereby facilitating milk ejection (Cunningham, 2014). Previous studies have reported that oxytocin massage and related manual techniques can improve perceived milk flow or production, particularly when repeated and integrated with effective breastfeeding practices (Alyensi et al., 2017; Mardiyarningsih et al., 2011; Sari, 2017).

Endorphin massage showed a similarly favorable descriptive pattern. Gentle touch, controlled breathing, and reassuring communication may reduce discomfort and psychological tension. Endogenous endorphin release is associated with relaxation and reduced pain perception, while a calmer maternal state may reduce catecholamine-mediated inhibition of oxytocin. This pathway provides a reasonable explanation for the improvement observed after endorphin massage (Mongan, 2009). Comparable findings have been described in studies of endorphin and oxytocin massage among breastfeeding mothers, including studies using combined stimulation approaches (Hidayati & Hanifah, 2019; Pamuji et al., 2014; Widayanti, 2014).

The absence of a statistically significant between-group difference suggests that the techniques may work through overlapping pathways rather than fundamentally different mechanisms. Both include therapeutic touch, focused attention, relaxation, and stimulation of areas associated with comfort and autonomic regulation. Wulandari et al. (2019) likewise reported that oxytocin and endorphin massage were both useful for supporting breast milk production. The present study adds a direct head-to-head comparison in a village-based maternal population and indicates that neither intervention should automatically be regarded as the single preferred option.

From a service perspective, comparable outcomes can be advantageous. Midwives may select the technique according to the mother's comfort, cultural acceptance, clinical condition, available time, privacy, family involvement, and provider competence. Oxytocin massage may be preferred when focused back stimulation is acceptable, whereas endorphin massage may be useful when a mother responds better to very light touch and guided relaxation. Both techniques should be positioned as adjuncts rather than substitutes for assessment of breastfeeding attachment, feeding frequency, maternal nutrition, breast or nipple problems, infant illness, and warning signs that require referral. Complementary care is most beneficial when integrated into comprehensive postpartum and breastfeeding support (Anggraini, 2010; Maryunani, 2015; Sumantri et al., 2016).

This study has several limitations. The sample was small, selected purposively, and not randomized; consequently, baseline equivalence and generalizability cannot be assured. The study did not include a no-treatment control group and did not report a separate inferential analysis of within-group change. Breast milk flow was measured using a questionnaire rather than an objective indicator such as expressed milk volume, infant test weighing, or longitudinal infant growth. Potential confounders—including parity, postpartum day, breastfeeding technique, feeding frequency, nutritional intake, family support, and previous breastfeeding experience—were not presented in the results. The findings should therefore

be interpreted as preliminary comparative evidence. Future studies should use randomized allocation, larger samples, standardized intervention fidelity, objective lactation outcomes, and repeated follow-up.

CONCLUSION

Oxytocin massage and endorphin massage were both associated with favorable descriptive changes in breast milk flow among mothers breastfeeding infants aged 0–6 months in Sinomwidodo Village. Adequate flow after treatment was observed in 8 of 10 mothers receiving oxytocin massage and 7 of 10 receiving endorphin massage. The post-intervention difference between groups was not statistically significant ($p = 0.429$), so neither technique demonstrated superiority. Both may be considered supportive non-pharmacological options within comprehensive lactation care, selected according to maternal preference, provider competence, and service feasibility. Larger randomized studies using objective measures of milk transfer or production are needed to confirm effectiveness.

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