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Effectiveness of the Combination of Oxytocin Massage with Baby Massage towards Increasing Breast Milk Production

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ABSTRACT

Background: Postpartum mothers in Indonesia are encountering significant challenges with breastfeeding, resulting in a high rate of early discontinuation due to low milk production. However, the combined therapy of oxytocin massage for mothers and baby massage has demonstrated substantial effectiveness in increasing breast milk production. This innovative approach holds significant promise for preventing stunting in newborns and aligns with the government's efforts to reduce stunting rates. This study aims to combine therapy for mothers and babies, especially oxytocin massage stimulation, together with infant massage, to increase breast milk production. **Methods:** The study was designed as a quasi-experimental study and included two groups of participants: the experimental group and the control group. The study involved a total of 48 participants, with 24 in each group, and used *blocked randomization* as the sampling technique. The study measured the increase in breast milk production and conducted an analysis using the Independent sample t-test. **Results** showed that the experimental group given oxytocin massage with baby massage obtained significant results on increasing breast milk production compared to the control group, with an average difference of 9,917 cc. The independent t-test produced a p-value of 0.001; these results prove that there is a significant difference between the experimental group and the control group. Oxytocin is crucial for transferring breast milk from mother to baby, and baby massage increases the frequency of breastfeeding, stimulating the hormone prolactin to produce breast milk. This intervention can be recommended to postpartum mothers, families as a form of support or to health workers to improve the achievement of exclusive breastfeeding.

INTRODUCTION

Breastfeeding is a natural way to provide nutrition to babies, but many mothers face difficulties and concerns during the early postpartum period (Acar & Şahin, 2024).The World Health Organization (WHO) recommends exclusively breastfeeding babies for the first six months of their lives, and then continuing to do so until they are two years old or older, even after introducing other foods. The term "exclusive breastfeeding" refers to giving a newborn nothing but breast milk, not even water, as

nourishment or drink. This indicates that while the child's diet includes other fluids like water, water-based drinks, or fruit juices, the baby's main source of nutrients is breast milk (Babakazo et al., 2022). On the other hand, mothers who had a bad experience with nursing in the early going, such as complaining about it within the first week after giving birth or having excruciating pain during the first two weeks (Da Silva Tanganhito et al., 2020).

Endogenous prolactin and oxytocin play a pivotal role in inducing lactation. Breastfeeding serves as the primary physiological stimulus influencing prolactin secretion, which is essential for sustaining lactation. Prolactin levels reach their peak 30 minutes after the first lactation, and baseline prolactin levels are positively associated with both milk production per second and daily pumping frequency. However, successful breastfeeding involves numerous contributing factors, and insufficient milk production is one of the most common challenges encountered by mothers during the breastfeeding process. Inadequate milk production and slow milk release contribute to the insufficient breastmilk supply for their babies (Fang et al., 2024)

A study in Indonesia found that 38% of mothers stopped breastfeeding because of insufficient milk production. Uneven breast milk production causes concern for mothers and leads them to avoid breastfeeding, which can affect the baby's ability to receive milk. This, in turn, can impact the production and function of the hormones oxytocin and prolactin, leading to a decrease or even cessation of breast milk production (Doko et al., 2019)

The World Health Organization (WHO) has released data indicating that the global average for exclusive breastfeeding is only about 38%. In Indonesia, only 54.5% of children aged 0-6 months are exclusively breastfed, despite the target being 80%. Although breastfeeding is widely practiced in Indonesia, the prevalence of exclusive breastfeeding at six months is only 37.3% (Kementerian Kesehatan RI, 2019).WHO and UNICEF recommend that babies start breastfeeding within the first hour of life, receive exclusive breastfeeding for the first six months, and continue breastfeeding until they are two years old (Acar & Şahin, 2024)

Stimulation is a fundamental requirement for child development and plays a crucial role in their growth (Desi Handayani Lubis et al., 2022). A child's growth and development begin when they are in the womb, and several factors impact their nutritional status before and after birth (Tello et al., 2022). Breastfeeding is exceptionally imperative for ideal child development and improvement, both physically and mentally (Campos et al., 2021). A study by Sirajudin et al. (2020) concluded that breastfeeding practices are effective in preventing stunting in children. Stunting can lead to increased infant mortality, frequent infections, and limited opportunities for play and learning (Tello et al., 2022) (Resmana & Hadianti, 2019). According to the 2018 Basic Health Research report, the prevalence of stunting in children under five years of age in Indonesia is 30.8% (Kementerian Kesehatan RI, 2019b)

Oxytocin massage stimulates the hormone oxytocin, which is responsible for storing breast milk in the alveolar lumen and releasing it when needed (Ramadhini & Kurniati, 2022). Similarly, baby massage can stimulate babies to breastfeed. Breastfeeding triggers the release of oxytocin from the hypothalamus. Oxytocin then causes contractions of the myoepithelial cells surrounding the milk ducts and alveoli, which helps push the milk out of the nipple (Fang et al., 2024). To address the issue of postpartum mothers struggling to meet breast milk needs, it is important to undertake research that can promote exclusive breastfeeding and prevent stunting. This will support government policies aimed at reducing stunting rates in Indonesia. This study

aims to combine therapy for mothers and babies, especially oxytocin massage stimulation together with infant massage, to increase breast milk production.

METHODS

This study was designed as a quasi-experimental study and involved two groups of participants: an experimental group and a control group. The experimental group consisted of mothers who received oxytocin massage, and their babies who received the massage. The control group consisted of mothers and babies who did not receive a massage. The population in this study was all postpartum mothers on the first day who were treated at Kolooran Amurang Hospital. The number of respondents in this study was 48 participants who met the inclusion criteria, namely postpartum mothers who were willing to be respondents. The sampling technique was blocked randomization. The results of the blocked randomization sample calculation using Microsoft Excel involved placing subjects into two groups: the intervention group (I) with 24 participants and the control group (C) with 24 participants. After grouping, the treatment was randomly assigned to participants based on the serial number on the birth register.

Measurement of breast milk volume using a 5 mL Volumetric Pipette, which has been validated by re-measuring with a Graduated Beaker, ensuring accurate measurement results. The intervention measured the amount of breast milk produced before and after massage, and its effectiveness was assessed using a pipette. The amount of breast milk was measured in the morning on the first and third days. Oxytocin massage is done once a day for three days, with a massage duration of 15 minutes, while baby massage is also done once a day for 10 minutes. The experimental group consists of mothers who receive oxytocin massage before measuring milk volume, as well as babies who receive baby massage. On the other hand, the control group consists of mothers and babies who do not receive any massage before measuring breast milk volume. Additionally, the research received ethical clearance approval from the Research Ethics Commission of the Manado Ministry of Health Polytechnic with number KEPK.01/09/380/2024

RESULTS

Table 1. Descriptive Characteristics of Respondents

Characteristics	Experiment Group		Control Group	
	n	%	n	%
Mother's Age				
≤ 20	4	16.7	3	12.5
21-35	18	75	19	79.2
> 35	2	8.3	2	8.3
Parity				
Primigravida	10	41.7	9	37.5
Multigravida	14	58.3	15	62.5
Education				
Bachelor	5	20.8	4	16.7
High school	16	66.7	17	70.8
Junior School	3	12.5	3	12.5
Birth Method				
Spontaneity	17	70.8	19	79,2
IVF	7	29.2	5	20.8
Baby Gender				

Characteristics	Experiment Group		Control Group	
	n	%	n	%
Man	8	33.3	14	58.3
Woman	16	66.7	10	41.7

Table 1 shows data on the age characteristics of respondents, most of whom were in the 21 to 35 age range, namely 18 people (75%) in the experimental group and 19 people (79.2%) in the control group.The parity characteristics of the respondents show that most are multiparous, with 14 people (58.3%) in the experimental group and 15 people (62.5%) in the control group. Based on educational level, the majority of respondents were high school graduates, namely 16 people (66.7%) in the experimental group and 17 people (70.8%) in the control group. In terms of delivery method, most respondents gave birth spontaneously, with 17 people (70.8%) in the experimental group and 19 people (79.2%) in the control group.

The gender of newborns in the experimental group was dominated by females, namely 16 babies (66.7%), while in the control group there were more males, namely 14 babies (58.3%).

Table 2. Distribution Of The Average Amount Of Breast Milk In The Control Group

	N	Means	Standard Deviation	95% CI	t	*p -value*
First measurement	24	4.46	3.323	-3.386 – -1,697	-6,227	0,001
Second measurement	24	7.00	4.663			

The data in Table 2 shows that the average amount of breast milk before intervention was 5.46 cc. After intervention, the average breast milk production increased significantly to 17.92 cc with a p-value of 0.001, indicating the effectiveness of the combination of oxytocin massage for postpartum mothers and infant massage in increasing breast milk production.

Table 3. Distribution Of The Average Amount Of Breast Milk In The Experimental Group

	N	Means	Standard Deviation	95% CI	t	*p -value*
Pre-Intervention Breast Milk Amount	24	5.46	4.364	13.162 – 11.754	36.600	0,001
Post-Intervention Breast Milk Amount	24	17.92	4.986			

The study's results indicated a noticeable difference between the experimental group (n = 24) and the control group (n = 24), with the experimental group showing higher breast milk production.

Table 4. Comparison Of The Experimental Group With The Control Group

Group	Means	Mean Differences	95% CI	t	*p -value*
Experimental Control	12.46 2.54	9.917	8.847 – 10.986	18.659	0,001

The study included 48 respondents, all mothers with babies treated at Kolooran Hospital. The comes about appears that the exploratory group created more breast drainage than the control group, with a mean difference of 9.917 cc. The independent T-test created a p-value of 0.001, showing a significant contrast between the two groups. Based on these comes about, it can be concluded that there's a significant distinction in the outcomes of the test group that received oxytocin rub with child knead compared to the control group.

DISCUSSION

The results showed a significant difference between the two groups; the intervention group had a mean difference of 9.917 cc. While the control group only obtained a mean difference of 2.54. Based on these results, it can be concluded that there is a significant difference in the results of the experimental group that received oxytocin massage with infant massage compared to the control group. In this study, there are also confounding variables such as green beans and green beans can be considered because polyphenols and amino acids in green beans can affect the hormone prolactin, which stimulates breast milk production. In addition to green beans and vegetables, the mother's nutritional status also affects the hormone prolactin, which naturally stimulates breast milk production.

The results of this study showed that breast milk production in the intervention group increased from 5.46 mL to 17.92 mL. This result aligns with the theory of infant needs. On the first day after birth, colostrum production in 24 hours is approximately 50 ml. If a baby breastfeeds 8-12 times in 24 hours, each feeding produces approximately 6 ml of breast milk. As the days progress, breast milk production increases. In the first 2-3 days after birth, the breasts can produce 300-400 ml of breast milk, and starting on the fifth day, this can reach 500-800 ml in 24 hours. Therefore, if a baby breastfeeds at least 8 times a day, the amount of breast milk produced in the first 2-3 days after birth is approximately 50 ml per feeding (Sari, 2017).

The production of breast milk and lactation requires stimulation of the breast muscles to contract the mammary glands. A study has shown that oxytocin massage for postpartum mothers, combined with baby massage, can increase breast milk production. A study involving 18 respondents reported that oxytocin massage and breast care can increase breast milk production (Triansyah et al., 2021). The study revealed that 66.7% of mothers in the intervention group achieved high milk production, compared to only 16.7% in the control group, demonstrating the effectiveness of oxytocin massage in stimulating the spinal cord and triggering the release of oxytocin from the posterior pituitary gland (Aulya Kartika et al., 2025).

This hormone, in turn, stimulates the production of breast milk. Oxytocin can be administered directly or through massage to stimulate its release. When a baby suckles at the mother's breast, sensory receptors around the nipple are activated, leading to the indirect activation of oxytocin neurons and secretion of oxytocin. The hormone then acts on myoepithelial cells in the mammary glands, facilitating the pumping of milk into the collecting ducts. Subsequently, the baby can feed on the milk. Oxytocin massage not only stimulates the release of the hormone oxytocin but also helps the mother relax and feel comfortable, reduces fatigue after giving birth, and

prevents breast swelling and blockage of breast milk (Kilci Erciyas & Kavlak, 2024).

In addition, tactile stimulation can strengthen muscles, bones, and organ frameworks so that they can function ideally. Newborn massage is an effective intervention strategy to prevent severe hyperbilirubinemia by reducing intrahepatic bilirubin or suppressing its production. In a study, it was stated that there was a significant difference: the massaged group had lower transcutaneous bilirubin levels compared to the control group (Dalili et al., 2016; Sirajuddin et al., 2020).

Rubbing a newborn has a positive effect on the development and growth of the newborn because rubbing can increase weight. Weight gain is related to stimulation of weight receptors under the skin, increased vagus nerve movement, increased levels of IGF-1 and IGF-2, and increased gastric motility (Erçelik & Yılmaz, 2023). The benefits of infant knead include expanding weight and development, expanding continuance, expanding the baby's concentration, and helping the child rest soundly, building a bond of love between guardians and children (holding), and increasing breastmilk production. In addition to the benefits, infant knead moreover has impacts and complications if done inaccurately due to rubbing blunders such as injury or bruising on the skin and muscles, torment within the infant, so that the infant gets to be fastidious, muscle and bone wounds, swelling, and the child becomes more fussy. But as long as infant massage is done accurately and delicately, at that point, infant massage is safe to do, indeed, useful (Wei-Peng Lu,Wen-Hui Tsai,Ling-Yi Lin, 2019)

The advantages of exclusive breastfeeding are plentiful and benefit the mother, baby, and family. Exclusive breastfeeding promotes bonding between mother and child. Financially and psychologically, exclusive breastfeeding can be beneficial for families. One of the primary objectives of the global health program recommended by the World Health Organization (WHO) is exclusive breastfeeding for the first six months of life. The goal is to ensure that, by 2025, at least half of all newborns worldwide will be exclusively breastfed for the first six months. (Jama et al., 2020).

The best way to feed babies is to breastfeed them from birth to six months of age, and then continue until they are 24 months old. Babies should only be given nutritious, balanced, and safe breast milk until they are six months old, and breastfeeding should be continued until the age of two years. Exclusive breastfeeding is important for the baby's immunity and resistance to disease, as well as for strengthening the bond between mother and child (Nur et al., 2019).

Breast milk is well-known for boosting the baby's immune system and effectively preventing respiratory tract infections, diarrhea, allergies, and other health issues. Additionally, breastfeeding has psychological benefits, strengthening the bond and sense of security between mother and child, aiding in the psychological development of newborns, and reducing the likelihood of psychological problems such as autism. Therefore, breastfeeding plays a significant role in increasing the chances of child survival and reducing the burden of disease in children (Ouyang et al., 2024). The advantages of exclusive breastfeeding are abundant, benefiting the mother, baby, and the entire family. It fosters closeness between the mother and child and brings about financial and psychological advantages for the family. The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life as a crucial goal of global health programs. It is anticipated that by 2025, at least half of all newborns worldwide will be exclusively breastfed for the first six months (Jama et al., 2020).

The best way to feed babies is to breastfeed them from birth to six months of age and continue until they are 24 months old. Babies should receive nutritious, balanced, and safe breast milk exclusively for the first six months, and then breastfeeding should

continue until they are two years old. Exclusive breastfeeding is important for the baby's immunity and disease resistance, as well as for strengthening the bond between mother and child (Nur et al., 2019).

CONCLUSION

The study found that oxytocin massage combined with baby massage effectively increased breast milk production. The intervention group produced an average of 9,917 cc more breast milk compared to the control group, with a p-value of 0.001 according to the t-independent test. Oxytocin is crucial for transferring breast milk from mother to baby, and baby massage increases the frequency of breastfeeding, stimulating the hormone prolactin to produce breast milk. This intervention can be recommended to postpartum mothers to ensure sufficient breast milk production to meet their baby's needs.

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