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Effect of combining oketani and oxytocin massage towards breast milk production: a quasi-experimental study

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ABSTRACT

Challenges in achieving exclusive breastfeeding often emerge during the initial days when complete establishment of breast milk production may not occur. In this vulnerable period, infants might receive supplementary foods or drinks, creating barriers to exclusive breastfeeding. This study seeks to integrate oketani and oxytocin massage with a suggestive approach to evaluate their impact on breast milk production among mothers. Employing a quasi-experimental design with a pre-post-test control group, the research focuses on postpartum mothers at PKU Muhammadiyah Gombong Hospital, with a sample size of 60 respondents chosen through purposive sampling. Demographic data and observation sheets were utilized to document breast milk production before and after the intervention. Data analysis involved Mann-Whitney and Wilcoxon tests. The study revealed a significant difference between pre- and post-intervention phases within the intervention group (p-value <0.005), indicating noteworthy changes following the implementation of oketani and oxytocin massages. The interventions demonstrated potential in enhancing breast softness, nipple and areola elasticity, and overall milk production, offering valuable insights into non-pharmacological approaches for supporting breastfeeding.

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1. INTRODUCTION

According to the world health organization (WHO), the prevalence of exclusive breastfeeding among mothers varies in different regions, with rates of 25% in Central Africa, 32% in the Caribbean & Latin America, 30% in East Asia, 47% in South Asia, and 46% in emerging nations. At a global level, 40% of infants aged under six months are exclusively breastfed [1]. The practice of exclusive breastfeeding has the potential to prevent the deaths of more than 820,000 children under the age of five if all infants aged 0-6 months were exclusively breastfed. Inadequate breastfeeding practices can lead to a range of health problems, including malnutrition, infectious diseases, and developmental disorders, in children and toddlers. Furthermore, breastfeeding can contribute to reducing the overall healthcare costs associated with children in families [2].

In the Indonesian context, the national data for 2021 reveals that 56.9% of infants are exclusively breastfed, surpassing the targeted objective of 40% for the same year. In the province of Central Java, the statistics from the health department indicate that 79.7% of infants are initiated into breastfeeding at an early stage, with 66% of them continuing to receive breast milk until the age of six months. Additionally, in Kebumen Regency, the rate of exclusive breastfeeding stands at 69.2% [3], [4].

Exclusive breastfeeding challenges often arise in the initial days when breast milk production may not be fully established. During this vulnerable period, infants might be introduced to supplementary foods or drinks, posing obstacles to exclusive breastfeeding [5], [6]. Breast milk production becomes a challenge, with issues on the first postpartum day associated with reduced stimulation of the oxytocin hormone. Psychological factors play a crucial role, considering the physical and physiological changes experienced by postpartum mothers, which can impact lactation [7], [8].

The act of breastfeeding involves the baby's sucking, which stimulates both the nipple and breast tissue. This stimulation is conveyed to the hypothalamus through the medulla, leading to the inhibition of factors that suppress prolactin secretion. Conversely, it stimulates the release of factors that promote prolactin secretion [9]. These factors then prompt the anterior pituitary to release prolactin, subsequently activating alveoli cells responsible for milk production. Several factors influence the smooth production of milk, including diet, mental and emotional well-being, contraceptive usage, breast care, breast anatomy, physiological factors, rest patterns, the frequency of infant sucking or feeding, birth weight, gestational age at delivery, and the consumption of tobacco and alcohol. Inadequate milk production can result in various consequences such as pain, breast swelling, mastitis, and, in severe cases, abscess formation leading to infections. Infected breasts cannot be breastfed, resulting in potential issues like dehydration, malnutrition, jaundice, diarrhea, and a compromised immune system in infants [10].

Advancements in scientific knowledge have led to the development of diverse methods aimed at tackling challenges associated with breastfeeding. One such approach is the oxytocin massage, particularly effective in the postpartum period, as it triggers the production of the oxytocin hormone. Recognized as a viable solution, the oxytocin massage offers additional benefits, including reducing breast engorgement, resolving blocked milk ducts, and aiding in sustaining milk production during periods of maternal and infant illnesses [11]–[13].

Another widely utilized method is the Oketani massage, which is a gentle breast care technique designed to stimulate the pectoralis muscle, thereby enhancing milk production, and promoting softer, more elastic breasts. Originating from Japan and pioneered by Midwife Sotomi Oketani, this distinctive treatment has gained popularity and is practiced in various countries, such as Korea, Japan, and Bangladesh [14]. Oketani massage assists breastfeeding mothers by addressing challenges, offering comfort, relieving postpartum pain, and inducing relaxation. In contrast to traditional massages, Oketani massage results in softer breasts, more elastic areolas, and nipples, thus facilitating the breastfeeding process. The pressure applied during the massage contributes to a smoother milk flow by stimulating the alveoli [15], [16].

A mother's confidence in her ability to breastfeed is a crucial factor in successful breastfeeding. The subconscious mind plays a significant role in shaping one's experiences, and positive suggestions or affirmations can be effectively applied through mental relaxation. A relaxed and content state of mind contributes to the smooth flow of breast milk [17], [18]. To support postpartum mothers in achieving Exclusive Breastfeeding, considering the pivotal role of the initial days of milk production and production, and to endorse the Exclusive Breastfeeding program, the researcher is interested in developing and validating a study. Therefore, this study aimed to integrates oketani and oxytocin massage with a suggestive approach in order to assess their impact on breastmilk production among mothers'. This study was conducted at PKU Muhammadiyah Gombong Hospital. The outcomes of this research could have immediate and long-term implications for both maternal and child health, emphasizing the urgency of exploring interventions that can positively impact breastfeeding outcomes.

2. METHOD

2.1. Design and sampling setting

This research adopts a quantitative approach utilizing a quasi-experimental design with a control group or comparative group. The study was conducted at PKU Muhammadiyah Gombong Hospital during the period from September 2023 to November 2023. The population that is being examined is made up of mothers who have recently given birth at PKU Muhammadiyah Gombong Hospital. The determination of the sample size was achieved by employing the formula for assessing the disparity between two proportions [19]. Consequently, this led to the establishment of a minimum sample size of 60 individuals, with 30 participants allocated to both the treatment and control groups. This allocation was accomplished through the utilization of purposive sampling techniques. However, we acknowledge that the sample size in this study was relatively small, which we recognize as a limitation of this study. The criteria for inclusion in the study are as follows: mothers who are in the first 1-3 days after giving birth, mothers who are willing to participate, mothers who have healthy infants, and mothers who reside in Kebumen Regency. The criteria for exclusion from the study are mothers who have complications after giving birth and infants who have congenital abnormalities.

2.2. Instrument

Two instruments were utilized in this study. In the initial stage, the researchers formulated a demographic datasheet to outline the characteristics of participants, such as their age, level of education, occupational status, and parity status. Subsequently, an observation sheet was developed to document the amount of breast milk produced before and after the intervention. The breast milk production assessment tool implemented in this investigation is organized into three distinct categories: insufficient production (<250 ml), normal production (250-400 ml), and excessive production (>400 ml).

2.3. Intervention

In this particular study, an intervention encompassing the application of oketani and oxytocin massages, coupled with a suggestive approach, was implemented. The experimental group was subjected to the intervention, which entailed the administration of oxytocin and oketani massages, given 1 to 2 times daily for a span of three days, with each session lasting between 3 and 20 minutes. In contrast, the control group was provided with postpartum breast care in accordance with the hospital's standard care protocol. Due regard was given to privacy during the massages, with primipara women positioned in a sitting posture, their upper garments exposed, and leaning forward. Throughout the procedure, the women were instructed to rest their arms on a bolster in front of them and place their heads on their arms, thereby ensuring that both breasts were easily accessible.

2.3.1. Oxytocin massage

The oxytocin massage was administered by the researchers through the application of upward and downward strokes on the breasts and on the sides of the vertebrae located between the scapula bones. This was achieved by employing small circular friction movements. To execute the friction movements, the researchers employed a clenched fist technique with the thumb curved outward. The duration of the friction movements was upheld for a span of 3 minutes.

2.3.2. Oketani massage

The intervention involved the development of standard operational procedures (SOPs) by the researcher. These procedures were established by consulting relevant literature on breast care and Oketani massage, specifically "Breastfeeding and Human Lactation" [20] and "Oketani's Breast Massage Therapy" [21]. The massage technique consisted of eight manual steps performed on both the right and left breasts in a gentle and rhythmic manner. Steps one to seven focused on the treatment process, while step eight involved the milking or expressing of the breast. Each step had a duration of approximately one minute, and the entire series was repeated for a period of 15 to 20 minutes. The first three steps involved gentle and painless pushing and pulling motions to separate the hard section of the breast from the pectoralis fascia in primipara women. Steps four to six involved dragging the entire breast downwards and to the sides using two thumbs and two hands. In the fourth step, the entire breast was pushed downwards towards the umbilicus. Steps five to six aimed to disconnect the hard base parts of the breast. Furthermore, in the first seven steps, the breast was manipulated in a clockwise direction to expand its base. In the eighth step, expression was performed using four different techniques on both the right and left breasts, covering the outside surface, lower part, inside, and upper periphery.

2.4. Data analysis

The statistical package for the social sciences (SPSS) version 22 was utilized to analyze the data. Univariate analysis was employed to illustrate the frequency and percentage distribution of the variables being considered. To assess normality, the Kolmogorov-Smirnov test was performed, revealing non-normal distribution among continuous data in both the treatment and control groups. Consequently, non-parametric testing was conducted. Therefore, group comparisons were carried out using the Mann Whitney and Wilcoxon test, with a significance level of 95%.

2.5. Ethical consideration

Ethical approval for the research was obtained from the Health Research Ethics Commission of Muhammadiyah University Gombong. The reference number for ethical approval is 271.6/II.3.AU/F/KEPK/VIII/2023. This ensures that the research is conducted with due consideration for the rights and well-being of the participants.

3. RESULTS AND DISCUSSION

In this section, the research outcomes are presented through tables and detailed descriptions, complemented by comprehensive discussion. The results and discussion is organized into several sub-sections for a more structured presentation and analysis of the results.

3.1. Participants characteristics

The participant's demographic characteristics are presented in Table 1. It was discovered that the majority of mothers in both groups were between the ages of 20 and 35, with 21 participants (70.0%) in the intervention group and 19 participants (63.3%) in the control group falling within this age range. Additionally, most mothers in both groups had completed high school, with 17 participants (56.7%) in the intervention group and 15 participants (50.0%) in the control group. Similarly, the majority of mothers in both groups were unemployed, making up 19 participants (63.3%) in the intervention group and 16 participants (53.3%) in the control group. Moreover, the study also revealed that a significant number of mothers were multiparous, with 21 participants (70.0%) in the intervention group and 22 participants (73.3%) in the control group. The homogeneity test results indicated that the variance in respondent characteristics was similar in both groups ($p>0.05$), thus suggesting that the two caregiver groups were comparable.

The results presented in Table 2 reveal a noteworthy difference between the pre- and post-intervention phases within the intervention group, indicated by a p-value <0.005. This suggests a significant changes in the treatment group following the implementation of oketani and oxytocin massages, in contrast to the control group. Conversely, the control group's breast milk production exhibited a p-value >0.05, signifying an absence of substantial change following the intervention of Oketani and oxytocin massages. Based on the Table 3, the treatment group's breast milk production is 1.96 times smoother than the control group. Additionally, the treatment group's breast milk production is 1.17 times sufficient compared to the control group.

Table 1. Characteristics of participants and homogienity test (n=60)

Variable	Group				p-value
	Intervention		Control		
	n	%	n	%	
Age					
20-35	21	70.0	19	63.3	0.584
<20 or >35	9	30.0	11	36.7	
Education status					
Junior high school	10	33.3	11	36.7	0.854
Senior high school	17	56.7	15	50.0	
College	3	10.0	4	13.3	
Occupation status					
Working	11	36.7	14	46.7	0.432
Unemployed	19	63.3	16	53.3	
Parity status					
Multipara	21	70.0	22	73.3	0.774
Primipara	9	30.0	8	26.7	

Table 2. Comparison of breast milk production in the intervention group and control group before and after the intervention

Variable	Group	*Z*	p-value
Breastmilk production	Intervention	-2.915	0.036*
	Control	-2.328	0.199

Note: Wilcoxon test was performed, *Significant at p<0.05.

Table 3. Comparison of breast milk production in the intervention group and control group after the intervention

Group	Breastmilk production (post-test)						OR1 CI (95%)	OR2 CI (95%)
	Excessive		Normal		insufficient (R)			
	n	%	n	%	n	%		
Intervention	17	56.7	11	36.7	2	6.7	1.96	1.17
Control	13	43.3	14	46.7	3	10.0	0.19-26.22	0.11-16.36

Note: Mann-Whitney test was performed, CI=Confidence interval, R=reference

3.2. Discussion

In the present investigation, the objective was to combine the techniques of oketani and oxytocin massage with a suggestive approach in order to evaluate their influence on the production of breastmilk among mothers. The results exhibited a notable alteration in the treatment group subsequent to the implementation of oketani and oxytocin massage in comparison to the control group. Corresponding to the findings of the current study, a previous study discovered that mothers who received oxytocin massage from their husbands displayed reduced necessity for breastfeeding assistance, heightened rates of successful breastfeeding, and improved self-confidence in breastfeeding [22]. Another previous study showed oketani and oxytocin massage techniques have an impact on postpartum women who underwent cesarean sections' overall colostrum production and improved breastfeeding successfully [15], [23].

The findings from previous study showed that Oketani massage can positively influence a mother's success in breastfeeding, enhancing various aspects such as preparedness for feeding, rooting, fixation (latching on), and sucking [14]. This massage technique involves addressing all breast muscles and the areola, promoting improved blood and lymph circulation. By reducing milk stasis without adverse effects, Oketani massage alleviates breast congestion discomfort and enhances breastfeeding success through oxytocin/milk ejection reflex stimulation [24]. Moreover, the massage strengthens the pectoralis muscle, resulting in softer and more elastic breasts, facilitating easier suckling for infants at the breast [25].

One plausible interpretation of these findings is that Oketani massage contributes to breast softening and enhances the flexibility of nipples and areolas, making them more manageable for infants during breastfeeding, ultimately leading to increased breastfeeding success. This practice may reduce stress, lessen the need for breastfeeding support, boost the immune system, and promote overall health and relaxation among women. Additionally, massage has been shown to naturally increase oxytocin production. In summary, these results endorse Oketani massage as a valuable technique that could reduce the need for breastfeeding support while concurrently enhancing breastfeeding success and self-efficacy.

The Oketani massage, as documented in previous research [26], [27], is characterized as a painless procedure that offers overall relief and comfort to nursing mothers. It effectively enhances lactation regardless of breast and nipple size or shape, rectifies deformities such as inversion, flattening, or cracking of nipples, and prevents nipple injuries and mastitis. A related previous study [28] also demonstrated a significantly higher increase in neonatal weight in the group receiving the Oketani massage compared to the control group. Concerning postpartum mothers receiving oxytocin massage during the first seven days after delivery, a previous study describes the massage as being focused on the spinal area, starting from the 5-6th rib and extending to the scapula. The aim is to stimulate oxytocin release by accelerating parasympathetic nerve activity in the hindbrain [11]. This oxytocin massage produces a calming effect and facilitates the automatic release of breast milk [29]. The mechanism involves the stimulation of pressure receptors under the skin, which calms the nervous system, reduces cortisol levels, and subsequently increases oxytocin levels [30].

Moreover, the impact of oxytocin massage on breast milk adequacy for postpartum mothers is noteworthy. This non-pharmacological approach effectively stimulates the release of oxytocin and enhances milk production [31]. The massage, applied during lactation, has been shown to increase milk release by 11.5 times through stimulation of the spinal muscles and a 28% reduction in cortisol levels [32]. Neurotransmitters stimulate the medulla oblongata, sending signals to the hypothalamus to secrete oxytocin from the posterior pituitary. By reducing muscle tension, relieving stress, and triggering the milk let-down reflex, the massage helps enhance milk production [32], [33].

In comparison to standard care, the Oketani Massage is effective in reducing the severity of post-delivery breast engorgement [15], [16]. Additionally, Oketani breast massage significantly enhances the total solids, lipids, casein content, and gross energy of breast milk, resulting in an overall improvement in quality [14], [27]. The combination of Oketani massage triggers prolactin and oxytocin reflexes, which aim to stimulate nerves in the posterior pituitary gland, leading to the release of oxytocin. This release induces contractions in the myoepithelial cells surrounding the alveoli [24], facilitating the movement of milk into the ampulla [34]. While the release of oxytocin is influenced by the baby's sucking, receptors in the ducts also contribute to the release of oxytocin [31], [32].

While the present study sheds light on the potential benefits of Oketani massage and oxytocin intervention in improving breastfeeding outcomes, it is crucial to acknowledge certain limitations. Firstly, the study's duration was relatively short, conducted over three days, which might not capture long-term impacts or variations in breastfeeding success. Additionally, the sample size was modest, limiting the generalizability of findings to a broader population. The study focused on postpartum mothers in a specific hospital setting, and cultural or contextual variations may influence the applicability of the results in different regions.

Nevertheless, the implications of this study are noteworthy. The positive effects observed in breastfeeding success among mothers receiving Oketani massage and oxytocin intervention suggest the potential for integrating these techniques into postpartum care protocols. Health practitioners, especially those in maternity wards, may consider incorporating Oketani massage and oxytocin interventions to enhance

breastfeeding experiences for postpartum mothers. Further research with larger and diverse samples, considering cultural nuances, is recommended to validate and extend the findings. If replicated and validated, the study's outcomes could contribute to evidence-based practices, fostering improved breastfeeding support and maternal well-being in postpartum care settings. Moreover, an important constraint is our lack of ability to adequately manage extraneous variables, making it difficult to comprehensively control factors that influence observed associations; this constraint has the potential to affect the internal validity of the study, highlighting the necessity for careful interpretation of the results, thus, future research should utilize more sophisticated techniques to enhance control over confounding variables.

4. CONCLUSION

In conclusion, this study investigated the combined impact of oketani massage and oxytocin intervention on breastfeeding outcomes among postpartum mothers. The findings suggest positive effects, highlighting improvements in breastfeeding success, including readiness for feeding, root, fixation (latching on), and sucking. Oketani massage and oxytocin intervention demonstrated potential in enhancing breast softness, nipple and areola elasticity, and overall milk production, providing valuable insights into non-pharmacological approaches to support breastfeeding.

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