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1. Introduction

One of the reasons women choose to give formula milk to their infants is a lack of breast milk supply. Anxiety and feelings of insecurity prevent the hormone oxytocin from being released. This hormone affects the release of prolactin, a hormone that stimulates breast milk production (Noviyana et al., 2022). Feelings of worry in mothers will cause discomfort, emotional tension, and a lack of self-confidence. If a breastfeeding mother experiences stress or pain, there will be an inhibition of the let-down reflex, which will reduce breast milk production (Marifah & Suryantini, 2021). Breast milk or mother's milk is the best intake for newborn babies, because it contains nutrients and antibodies that are suitable for optimal growth and development of babies (Aryani & Alyensi, 2019).

WHO guidelines and Government Regulation No. 33 of 2012 address exclusive breastfeeding, which is the practice of giving infants breast milk exclusively for six months after birth without supplementing or substituting it with other foods or beverages (Manurung, 2020). Infants who are exclusively breastfed for the first six months of their lives will develop more favorably than those who are not. Exclusively breastfed babies will have the best possible brain development, which will impact their verbal, motor, and emotional skills (Amalina et al., 2022). Compared to babies given anything other than breast milk, breastfed babies had a 25-fold lower risk of dying within the first month of life. Mothers can also benefit from breast milk by avoiding breast cancer, anemia, and postpartum hemorrhage (Manurung, 2020). In practice, however, many infants still do not receive only breast milk, as mandated by government regulations or WHO recommendations. According to global data, only 44% of infants younger than six months were exclusively breastfed in 2020, compared to the WHO's global target of 70%. This percentage is considerably lower in Indonesia, where it was 52.5% in 2023, a 12% drop from 2019 (Anggraini et al., 2022).

Food, mental and spiritual well-being, contraceptive use, breast care, breast anatomy, physiological parameters, sleep habits, birth weight, gestational age at delivery, and alcohol and cigarette use are all factors that contribute to the production of breast milk. Postpartum mothers' physical and physiological changes, which can lead to psychological changes and affect lactation, are additional aspects to consider (Anggraini et al., 2022). Another issue with breast milk production is the influence of maternal variables. Reduced oxytocin hormone stimulation may result in issues with breast milk production on the first day following delivery. It is essential to consider psychological aspects. The mother's physical and physiological changes following childbirth lead to alterations in her mental state. This disorder may impact lactation (Sembiring, 2019). Parity is another aspect of moms that influences the production of breast milk. According to a study, parity can have an impact on breast milk supply, Aminah said. Compared to primiparous mothers, the percentage of breast milk production is higher in multiparous mothers, who have given birth more than once. This is because multiparous moms have prior breastfeeding expertise and confidence. If the mother is successful with breastfeeding the first kid, she will have greater success with breastfeeding the second. The hormone oxytocin can be released in response to this mother's confidence, facilitating the smooth flow of breast milk (Pani & Tempali, 2022).

Oxytocin and breast massage are two non-pharmacological therapies that can stimulate the production of breast milk. The vertebrae, specifically the pars thoracica, the area around the back, can be massaged to increase the production of breast milk. This will make the mother feel content, joyful, and confident because she can breastfeed her child. Thinking about her child with love and other positive emotions will also trigger the oxytocin reflex (Kholisotin et al., 2019). An oxytocin massage stimulates the spinal cord, and the neurotransmitter then communicates with the hypothalamus via the medulla oblongata. Therefore, the hormone oxytocin, which triggers the production of breast milk, is released by the posterior pituitary. Stimulation of the breast muscles to the mammary glands is necessary for the contractions required in the lactation process and for the generation of breast milk (Triansyah et al., 2021).

Oketani massage is another method to help boost breast milk production. Oketani massage is a skill in breast care that Sotomi Oketani from Japan first popularized, Oketani massage consists of 8 techniques for separating the milk glands and has been applied in several countries including Bangladesh, Korea and Japan, the benefits of Oketani massage are to smooth the channels and production of breast milk, make the breasts more elastic and soft on the neck of the nipple, the peak of the nipple, and around the areola, this massage also does not cause pain or discomfort (Hidayah et al., 2023). One of the painless breast care techniques is Oketani massage. The benefits of Oketani massage include creating a sense of comfort, increasing breast milk production, breasts becoming more elastic, smooth breast milk production channels, and the ability to prevent and treat mothers who experience breast swelling, sunken nipples, sore nipples, sunken nipples or flat nipples (Anggraini et al., 2022).

By strengthening the pectoralis muscles, Oketani massage can improve the production of breast milk and make the breasts softer and more elastic, which will facilitate the baby's suctioning experience. Oketani massage will also provide a sense of overall relief and comfort to the respondents, improve the quality of breast milk, prevent sore nipples and mastitis, and help reduce or alleviate lactation problems caused by flat or inverted nipples (Nurhikmah et al., 2021). Because the alveoli are under pressure, more milk is secreted, smoothing out the milk flow. The baby may suck more easily because the Oketani massage makes the breasts softer and more elastic. The sensory nerve endings around the breast will be stimulated by the baby's suction on the mother's nipple. The anterior pituitary gland produces the hormone prolactin in response to this

stimulation, which is transmitted to the brain. The alveolar cells are stimulated to make breast milk by the hormone prolactin. Therefore, the baby will produce more breast milk the more often they breastfeed. In addition to prolactin and the anterior pituitary, the posterior pituitary (neurohypophysis) receives stimulation from the baby's suction and releases oxytocin, which causes contractions. The produced milk will be squeezed out of the alveoli and into the duct system by the cell contractions, and it will subsequently enter the baby's mouth through the lactiferous ducts (Fatrin, 2021).

The Bangkinang City Health Center's work area examined the impact of Oketani massage on the amount of breast milk produced by nursing mothers. The average amount of breast milk produced before receiving Oketani massage was 82.40, and the average amount after receiving Oketani massage was 105.20. According to researchers, Oketani massage can make the breasts more flexible and soft, allowing the mammary glands to produce more breast milk. The effect of Oketani massage can be seen from the increasing volume of breast milk in mothers, many of whom breastfeed for a long time, and are calm when breastfeeding (Sari & Syahda, 2020). Oketani massage is more effective in influencing breastfeeding frequency and defecation frequency compared to Marmet massage. Before the intervention, the frequency of breastfeeding was 3 times a day, while after the intervention on the 7th day, it increased to 35 times a day. Before the intervention, nursing occurred four times per day in marmet massage; however, on the seventh day following the intervention, breastfeeding frequency rose to 28 times per day. In comparison to the delta values of breastfeeding frequency (13.5 > 13.1) and defecation frequency (5.75 > 3.00), the difference between the pre-test and post-test values of Oketani massage is more pronounced in altering breastfeeding frequency and defecation frequency. Meanwhile, with a delta value of urination frequency 9.25 <11.12, Marmet massage is more successful than Oketani massage at influencing the frequency of urination (Astari, 2019). This study aims to compare the effects of oxytocin massage and Okeltani massage methods on breast milk flow in postpartum mothers.

2. Materials and Methods

A quasi-experiment with a two-group post-test design was employed in this investigation. The study's population consisted of 20 postpartum moms who had regular deliveries and were enrolled in the Independent Practice Place of Midwife Hj. Ida in Karawang Regency between October and January. The study's sample consisted of 28 participants, divided into two groups: 14 received an Oketani massage, and 14 received an oxytocin massage. Total sampling was the method utilized for sampling. Mothers who were willing to participate in the study, those who were postpartum from the first to the seventh day, those who had a standard delivery, those who did not take lactation supplements, mothers who did not have STIs, mothers who had babies with labiopalatoschizis, mothers who did not have tuberculosis, and mothers who did not have herpes were the sample criteria. The oxytocin and oketani massages served as the study's independent variables. However, the production of breast milk was the study's dependent variable. A measuring cup or milk bottle and a breast milk production observation sheet were the study instruments used to gauge the amount of breast milk produced. The characteristics of the respondents were examined using univariate analysis.

The statistical test used to determine the difference in effectiveness between groups 1 and 2 was the Independent t-test, which was derived from the p-value of the two groups. Bivariate analysis was used to determine the difference in effectiveness between oxytocin massage and Oketani massage on breast milk production in postpartum mothers. A significant difference exists if the p value is less than 0.05, while no significant difference exists if the p value is greater than 0.05. The Mann-Whitney test must be used in place of the Independent t-test if the aforementioned criteria are not met. Measurement and monitoring of breast milk volume served as the primary method of data collection for the study. This study was carried out three times consecutively. The subjects got either an Oceletan massage or oxytocin massage therapy every day. Following the examination of the milk and breast milk, a breast milk glass or bottle was used to measure the individuals' breast milk volume.

3. Results

Table 1 Respondent Characteristics Based on Age

Ages	Frequency	Percentage
<20 years	3	10.7
21-35 Years	22	78.6
36-40 Years	3	10.7
Total	28	100.0

Based on Table 1, it can be seen that out of 28 respondents, three mothers were aged less than 20 years (10.7%). There were 22 mothers aged between 21 and 35 years (78.6%), and there were three mothers aged between 36 and 40 years (10.7%).

Table 2 Respondent Characteristics Based on Education

Education	Frequency	Percentage
Elementary school	5	17.9
Junior high school	16	57.1

Senior High School	6	21.4
College	1	3.6
Total	28	100.0

Based on Table 2, it can be seen that out of 28 respondents, five people (17.9%) have an elementary school education. Sixteen people (57.1%) have a junior high school education. Six people (21.4%) have a senior high school education, and one person (3.6%) has higher education.

Table 3 Respondent Characteristics Based on Occupation

Pekerjaan Ibu Bersalin	Frequency	Percentage
Housewife	26	92.9
Private	2	7.2
Self-employed	0	0
Total	28	100.0

Based on Table 3, it can be seen that out of 28 respondents, 26 are mothers who work as housewives (92.9%), and 2 are mothers who work in the private sector as factory workers (7.2%). Meanwhile, there are no mothers who work as entrepreneurs.

Table 4 Level of breast milk production volume before (Pre Test) and after (Post Test) Oketani massage in postpartum mothers at TPMB Midwife Hj. Ida Royani, Karawang Regency

Variable	Mean	Min	Max	Std. Deviasi	*P value*
Pre	19.76	1	90	18,259	0,000
Post	29.60	3	95	21.304	

Table 4 indicates that, before Oketani massage therapy, the average level of breast milk production among postpartum mothers was 19.79, with a range of 1 to 90, and a lowest value of 1 and a highest value of 90. After receiving Oketani massage therapy, the average level of breast milk production among postpartum mothers was 29.60; however, the range of values was 21.304, with the lowest value being three and the highest being 95. With a p-value of 0.000 < α (0.05), the Oketani massage group's changes in breast milk volume production before and after the massage were significantly different.

Table 5 Breast Milk Production Volume Before (Pre-test) and After (Post-test) Oxytocin Massage in Postpartum Mothers at TPMB Midwife Hj. Ida Royani, Karawang Regency

Variable	Mean	Min	Max	Std. Deviasi	*P Value*
Pre	12.10	1	60	10,961	0,000
Post	17.83	2	70	14,088	

Table 5 indicates that the mean amount of breast milk produced by postpartum mothers before oxytocin massage therapy was 12.10, with a range of 10,961, and the lowest and highest values being 1 and 60, respectively. Following oxytocin massage therapy, the average level of breast milk production among postpartum mothers was 17.83; the lowest value was 2, and the highest value was 70, with a range of 14.088. With a p-value of 0.000 < α (0.05), the oxytocin massage group's changes in breast milk volume production before and after the massage were significantly different.

Table 6 The Effect of Oketani Massage and Oxytocin on Breast Milk Production in Postpartum Mothers

Therapy		N	Mean Rank	Sum of Ranks	Mann-whitney
Post	Oketani	42	50.79	2133.00	0.002
	Oksitosin	42	34.21	1437.00	
	Total	84			

The Mann-Whitney U test results indicate that Okeltani massage is more effective than oxytocin massage, as shown in Table 6. This is evident from the Sum of Ranks column, which suggests that the value is 1437.00 following an oxytocin massage and 2133.00 following an Okeltani massage. A p-value of 0.002 < 0.05 is used. This indicates that the alternative hypothesis (H_a) is accepted and the null hypothesis (H_0) is rejected. Therefore, it can be said that Okeltani massage is more effective than oxytocin massage on the first day.

Table 7 Effectiveness of Oketani Massage and Oxytocin Massage for Postpartum Mothers at TPMB Midwife Hj. Ida, Karawang Regency in March-May 2024

Therapy		N	Mean Rank	Sum of Ranks
Difference	Oketani	42	29,56	1243
	Oksitosin	42	17,83	749
	Total	84		

According to Table 7, the Oketani massage group has the most significant difference in the Sum of Rank column between the average values of providing postpartum moms with an Oketani massage and an oxytocin massage.

4. Discussion

One of the breast massages created in Japan by Sotomi Oketani is the Oketani massage. According to Sotomi Oketani, nursing can strengthen the mother-child bond and improve the physical and emotional health of both the mother and the child. Oketani massage is also used to treat issues related to breastfeeding and the breasts, including partial breastfeeding, low milk production, inadequate milk, and breast engorgement. Oketani massage promotes the infant's mental and physical growth, which in turn enhances the quality of the milk and, consequently, the infant's mood and sleep patterns. Oketani massage can soften the entire breast, make the areola more flexible and pink, and make the lactiferous ducts and nipples rounder and more elastic. By strengthening the pectoralis muscles, Oketani massage can enhance the production of breast milk and increase the elasticity of the breasts, making it easier for the infant to nurse. Additionally, the breast as a whole becomes more flexible, resulting in high-quality breast milk (Akhiriyanti & Nisa, 2021; Astari, 2019).

Research conducted by Yanti et al (2019) revealed that there was a difference in the smoothness of breast milk and anxiety levels before and after Oketani massage was performed on postpartum mothers. During nursing, Oketani massage recipients experienced a sense of quiet, relaxation, comfort, and calmness, which increased oxytocin levels and produced smooth breast milk, in turn increasing breastfeeding frequency and duration. This is significant because, according to the law of supply and demand, more breast milk is produced the more frequently the infant breastfeeds. A study by Nurhikmah et al (2021) showed that mothers who received Oketani massage regularly were more effective in reducing breast milk stasis than those who received oxytocin massage. This demonstrates that Oketani massage helps avoid problems that may impede the lactation process, in addition to directly increasing the supply of breast milk.

One hormone that is crucial during breastfeeding is oxytocin, which stimulates the let-down reflex mechanism that causes milk to be released from the breasts. The way oxytocin massage functions is by inducing the posterior pituitary gland to release the hormone oxytocin. The myoepithelial cells around the breast alveoli contract when oxytocin is released, forcing breast milk out through the milk ducts. The steady rise in this study implies that frequent massage stimulation can boost oxytocin release, which in turn increases the flow and production of breast milk (Azizah, 2019).

According to Gemilang (2020), Age may have an impact on a postpartum mother's ability to produce breast milk. When it comes to pregnancy, childbirth, and breastfeeding, people under the Age of twenty are viewed as physically, mentally, and psychologically immature. The younger the mother, the less likely it is that the baby will receive exclusive breastfeeding due to social pressures, the mother's mental health, and other factors that may impact the production of breast milk. Over the Age of 35, a mother's ability to exclusively breastfeed is no longer optimal due to the weakening and suboptimal function of her reproductive organs, such as the breasts. In contrast, under the Age of 20, the reproductive organs, including the breasts, are still growing.

According to Ulfah and Nugroho (2020) , there is no relationship between maternal education and exclusive breastfeeding. However, according to Gemilang (2020), mothers with secondary education have a good ability to receive and process information and knowledge. The mother's comprehension of critical information necessary to enhance the health and well-being of mothers and their children is closely linked to her educational attainment. The mother's knowledge and understanding of the value of nursing and efficient lactation management may vary depending on her academic background. According to Sutama et al (2020), with a prevalence ratio of 2.475, exclusive breastfeeding behavior is significantly correlated with the Pekapuran Raya Banjarmasin Health Center work area. This indicates that exclusive breastfeeding is often provided by moms who do not work 2.475 times more frequently than by mothers who do. The timing and availability of breastfeeding can be influenced by the mother's employment, which has a direct effect on the supply of breast milk. Due to the limited time and location for breastfeeding at work, working mothers may find it challenging to find time for exclusive breastfeeding. Research shows that working mothers tend to have lower rates of exclusive breastfeeding compared to mothers who do not

work. According to Ampu (2021), this indicates that job and exclusive breastfeeding practices are significantly correlated. Compared to working mothers, mothers who are unable to work are more likely to breastfeed their children exclusively.

Research by Anggraini et al (2022) suggests that Oketani massage is more effective than oxytocin massage in promoting breast milk production in postpartum mothers from day 1 to day 3. The results of other studies are also from Fatrin (2021), where the p value p = 0.000 with a significance level of p <0.05 from the results of previous studies that have been discussed. It can be concluded that Oketani massage is more effective in increasing breast milk production when compared to Marmet massage and oxytocin massage. The results of other studies, as reported by Astari (2019), also show differences in breastfeeding frequency and urination frequency on the seventh day after receiving either the Oketani massage intervention or the Marmet technique intervention, with p-values of p = 0.000 (p < 0.05). The results of another study also conducted by Yanti et al (2019) stated that giving Oketani massage using jasmine oil has many benefits and can be given to postpartum mothers to facilitate breast milk flow, reduce anxiety and can prevent breast milk stasis and the use of jasmine oil can also be given to pregnant women to reduce their pain complaints.

5. Final considerations

At the Independent Practice of Midwife Hj Ida Royani in Karawang Regency, the administration of Oketani massage therapy and oxytocin massage has the same effect on boosting and facilitating the production of breast milk in postpartum mothers; however, Oketani massage is more effective than oxytocin massage in this regard.

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Ethical considerations

I confirm that I have obtained all the necessary consents required by applicable law to publish any personal details or images of patients, research subjects, or other individuals used in this study. I have retained a written copy of all such consents, and I agree to provide multidisciplinary reviews, along with copies of the consents or evidence that such consents have been obtained, if requested.

Conflict of interest

The authors declare that they have no conflicts of interest.

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