



Turmeric Topical Application: An effective solution for reducing breast milk secretion delays in new mothers

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ABSTRACT

Background: The problem of low coverage of exclusive breastfeeding is partly influenced by insufficient breast milk production. The percentage of exclusive breastfeeding in infants under six months of age in Central Kalimantan in 2020 was 52.98%. This percentage was among the lowest nationally. In 2021, the coverage of exclusive breastfeeding in infants under six months of age reached 56.8%, and in 2022 it did 60.5%. The figure in 2022 exceeded the set target, but several regencies/cities still had low coverage. Insufficient breast milk supply impacts on the nutritional status of the child. Low breast milk production also arises due to several other factors during breastfeeding, namely late initiation of breastfeeding, long breastfeeding time, sore nipples, breast pain and swelling, and inverted nipples.

Aims: The study sought to measure the level of success of turmeric topical application in shortening the time it takes to initiate breast milk secretion.

Methods: The study uses a true experimental posttest-only control group design. A subject of 50 mothers having full-term spontaneous deliveries and with normal breasts was used in the study. The sample was divided into two groups: control and intervention groups. The sample was selected using a matching process based on age, parity, and early initiation of breastfeeding. Subjects who met the inclusion criteria were offered whether they were willing to be given turmeric compresses after the delivery process. Subjects who were willing were included in the intervention group and those who were not willing were included in the control group. Age and parity in the intervention group were all taken, while the control group was selected to match the intervention group. The intervention group was given a treatment with a turmeric compress on the breasts for six hours. All participants were then observed for time of breast milk secretion initiation. In this experiment, we didn't perform blinding, but we managed it by having the midwife administer the turmeric compress just once during the delivery process before sending the client home. Following this, we recorded the results, specifically the initial breast milk release in both the intervention and the control group.

Results: The average time periods it took to initiate breast milk secretion in the intervention and control groups were 509.96 minutes (8.5 hours) and 1573.76 minutes (26.2 hours), respectively. There was a significant difference ($p = 0.023$) in the time of breast milk secretion initiation of 1063.8 minutes or 17.73 hours between both groups.

Conclusion: Applying a turmeric compress on the breasts of postpartum mothers may shorten the time it takes to initiate breast milk secretion.

Keywords: *Turmeric compress; Breast milk secretion; Postpartum mothers; Breastfeeding initiation.*

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1. Introduction

Breast milk is an ideal food for babies because it contains a number of ideal nutrients with a balanced composition that is beneficial for the growth and development of babies and the maintenance of their health. Breast milk provides babies with calories, vitamins, minerals, and other nutrients that they need (Utari & Desvira, 2021). The World Health Organization (WHO) and UNICEF recommend that every baby be exclusively breastfed for at least six months after birth and that breastfeeding should continue for two years (Maleki & Youseflu, 2022).

Breastfeeding can be one of the first steps for babies to have a healthy life. Breastfeeding is regarded as the most essential element in reducing newborn death rates, and it has many benefits for maternal health. However, despite these recommendations, only 37% of babies under six months of age are Exclusive breastfeeding in low- and middle-income countries (Haryanti *et al.*, 2024; Sharma & Khadka, 2019).

The government is expected to attain the exclusive breastfeeding coverage target in order to achieve the Sustainable Development Goals (SDGs), one of which is to ensure a healthy life and promote the welfare of all levels of society at all ages (Kementerian Perencanaan Pembangunan Nasional, 2020). However, insufficient breast milk production often poses complications to the targeted coverage of exclusive breastfeeding. Based on data from ePPGMN in 2023, the exclusive breastfeeding coverage rate in 2023 was 58%. This figure still fell short of the 75% coverage target set in the 2023 Health Strategy Plan, suggesting the need to increase the coverage rate to achieve optimal results.

The percentage of exclusive breastfeeding in infants under six months of age in Central Kalimantan in 2021 reached 56.8%, and in 2022, it was 60.5%. Although the coverage rate in 2022 exceeded the set target, several regencies/cities still had low coverage, including South Barito Murung Raya (2%), Palangka Raya (18%), North Barito (40%), Sukamara (45%), and South Barito (48%) (Kementerian Kesehatan RI, 2022).

Insufficient breast milk supply is a problem faced by some breastfeeding mothers due to low breast milk production, impacting on the nutritional status of the child (Djanah & Muslihatun, 2017). In addition to low breast milk production, this problem also arises due to several other factors during breastfeeding, namely late initiation of breastfeeding, long breastfeeding time, sore nipples, breast pain and swelling, inverted nipples, and redness (Babakazo *et al.*, 2022).

Breast milk production can be increased through both pharmacological and non-pharmacological therapies. Mothers primarily prefer non-pharmacological therapies using traditional techniques with herbs because they are considered safer and with minimal side effects. These include consuming katuk leaves and using turmeric either by oral administration or topical application on the breasts (Mayasari & Jayanti, 2022). These traditional methods have been passed down through generations and are believed to be effective in stimulating milk production. Katuk leaves, in particular, are known for their galactagogue properties that can help increase breast milk supply. Similarly, turmeric is believed to have anti-inflammatory properties that can help with any pain or swelling in the breasts. By incorporating these natural remedies into their routine, mothers can potentially improve their breastfeeding experience and ensure their baby is getting the nutrition they need (Beckskei *et al.*, 2020; Maru *et al.*, 2023).

From observations and interviews with Dayak mothers in Central Kalimantan, it was figured out that the local wisdom of the Dayak tribe holds that turmeric applied to the breasts is efficacious in facilitating breast milk production as well as accelerating the release of breast milk. Turmeric can be taken as herbal medicine drinks or applied topically.

Turmeric contains essential oils, curcuminoids, turmeone, galactagogue, and zingiberene, which have the potential to be anti-inflammatory, antibacterial, and antioxidant. The galactagogue compound can act as a stimulant to facilitate and increase breast milk production (Ariescha & Tryaningsih, 2019). The role of turmeric as a topical drug is thought to be closely related to its efficacy in facilitating blood circulation and inducing calmness, thus reducing the risk of stress during breastfeeding. The efficacy of turmeric in treating depression have long been known in Chinese medicine. This is thought to play a role in facilitating the release of breast milk (Ramaholimihaso *et al.*, 2020). More research is required to fully understand the possible advantages and mechanisms of turmeric for breastfeeding women.

2. Methods

The research used an experimental posttest-only control group design. The measurements include the duration of the first release of breast milk and the time interval after delivery until the first release of liquid breast milk, not thick colostrum. It was examined by squeezing the nipple and checking whether the breast milk that was expressed was thin or thick. Objective data were supported by subjective data on early signs of breast milk secretion, namely the breasts feeling full, tight, and painful. The research was carried out at the Pahandut Public Health Center. The sample size was calculated based on the results of research on the timing of breast milk expression with early initiation of breastfeeding (EIBF) treatment. Each of the intervention and control groups consisted of 25 people. The inclusion criteria were postpartum mothers delivering at term and spontaneously, having no problems with breasts (no history of surgery, infection, phototherapy, or nipple disorders), and showing willingness to be respondents. Postpartum mothers who were sick, receiving treatment from a doctor, and taking breast-milk-stimulating drugs were excluded. A drop-out was marked by failure to carry out the intervention according to the research provisions. The intervention and control groups were matched in terms of age, parity, and early initiation of breastfeeding.

Before being divided into control and intervention groups, subjects who met the inclusion criteria were offered whether they were willing to be given turmeric compresses after the delivery process. Subjects who were willing were included in the intervention group, and those who were not willing were included in the control group. Age and parity in the intervention group were all taken, while the control group was selected to match the intervention group. The intervention was carried out only once after the delivery process. It was carried out by a midwife at the health center in the position of the subject, who was still being hospitalized and not yet home, so that the implementation of the intervention could be ensured to be consistent.

The treatment was administered to the intervention group in the following steps:

1. Four hours after giving birth, mothers in the intervention group had their breasts compressed with crushed turmeric. The turmeric used is fresh turmeric weighing 50 g for each breast. The turmeric is first ground and then compressed onto the breast. The turmeric compress was applied on the entire surfaces of their breasts, except the nipples.
2. The turmeric compress was applied for six hours, during which time the mothers were allowed to wear a bra as usual.
3. After six hours, the breasts were cleaned thoroughly with a piece of wet wipe, followed with a piece of dry tissue.
4. An evaluation of the time of the first secretion of breast milk (thin as opposed to thick breast milk) was carried out, followed by additional assessments of early signs of breast milk production, such as the breasts feeling full, firm, and painful.
5. These assessments were also conducted on the control group.

The confounding variables controlled by analysis in this study were breast care and early breastfeeding initiation (IMD). The early initiation of breastfeeding variable was not analyzed because all samples, both the intervention and the control group, were given IMD, so they were matched. While breast care was analyzed with the results of the Chi-Square test with a p-value of 0.225 (> 0.05), this means that there is no statistically significant difference between breast care and the time of first breast milk release. Initially, data collection related to the nutritional status of the subjects was carried out by measuring the body mass index, but this was not continued because the bias with the increase in maternal weight during pregnancy is greatly influenced by the physiological process of increased fluid accumulation during the pregnancy process. Nutrition and stress levels of pregnant women were not measured in this study and are shortcomings of the study.

The bivariate analysis determined the relationship between topical application of turmeric as an independent variable and the time of breast milk secretion initiation as a dependent variable. External variables including the baby's weight, the baby's gender, and the mother's parity were also examined in their effects on the smoothness of breastfeeding as a dependent variable. The t-test was employed to determine the association between the independent and dependent variables. Meanwhile, the Chi-square test is used to assess the association between external variables and the dependent variable. In multivariate analysis, linear regression was utilized.

3. Results

The distribution of participants by age, parity, breast care, and early initiation of breastfeeding can be seen in Table 1. Five individuals (20%) were < 20 years of age, and 11 (44%) fell within the age range of 20 to 35 years. The participants comprised eight primipara (32%) and 17 multipara (68%). At the intervention group, there were 10 individuals did breast care, while 15 did not. In the control group, six individuals did breast care, while 19 did not. Breast care and early initiation of breastfeeding were controlled for the analysis. In both groups, 25 individuals initiated breastfeeding early. Based on Table 1, both intervention and control groups were the same because of the matching process carried out before intervention.

Table 1. Distribution of Research Participants

Variable		Turmeric Compress		No Turmeric Compress	
		N	%	N	%
Age (year)	<20	5	20	5	20
	20 – 35	11	44	11	44
	>35	9	36	9	36
	Total	25	100	25	100
Parity	Primipara	8	32	8	32
	Multipara	17	68	17	68
	Total	25	100	25	100
Breast Care	Yes	10	40	6	24
	No	15	60	19	76
	Total	25	100	25	100
Early Initiation of breastfeeding	Yes	25	100	25	100
	No	0	0	0	0
	Total	25	100	25	100

As shown in Table 2, this recent study showed that applying turmeric compresses to new mothers significantly sped up the time it took for their breast milk to start flowing. On average, mothers who used the turmeric compress began producing milk was 509.96 minutes (or in about 8.5 hours), while those who didn't had to wait much longer— with an average time of 1573.76 minutes (or around 26 hours). The difference between the two groups was significant (p value = 0.023), meaning that there was a significant difference in the duration of first breast milk secretion between individuals applying the turmeric compress on their breasts and those who did not apply the turmeric compress.

Table 2. Relationship between Turmeric Compress Application and the First Breast Milk Secretion Duration

Group	N	Mean (minute)	Standard Deviation	p value
Turmeric Compress	25	509.96	309.46	0.023
No Turmeric Compress	25	1573.76	1420.09	

Mann-Whitney test

The results of the Chi-square test for breast care and the time interval after delivery until the first release of liquid breast milk, not thick colostrum, can be seen in Table 3. The Chi-square test results show that the p -value was > 0.05. It indicates that there was no significant difference between breast care and the time of first breast milk secretion. In other words, breast care did not affect the timing of breast milk secretion. Because the bivariate test demonstrated that breast care had no effect on the time of first breast milk secretion, multivariate analysis was not conducted. This study's final outcome measured was the time of first breast milk release. The overall experience of breastfeeding or the success of exclusive breastfeeding up to 6 months has not been studied.

Table 3. Relationship between Breast Care and the Time of First Breast Milk Secretion

Breast Care	Group		p value
	Turmeric Compress	No Turmeric Compress	
Yes	10	6	0.225
No	15	19	
Total	25	25	

4. Discussion

The research participants were postpartum mothers who gave birth at the Pahandut Public Health Center, Palangka Raya City, Central Kalimantan, Indonesia. All of them were qualified to take part in the research until the end, and no one dropped out. Throughout the study, the participants were provided with regular check-ins and support to ensure their well-being. The high level of participation and commitment of the participants contributed to the success of the research and the validity of the results obtained. The findings were able to accurately reflect the experiences and perspectives of the participants. This level of dedication from the participants highlights the importance of their voices being heard in research studies. The consistent support provided to them also reflects the ethical considerations taken by the researchers to prioritize the well-being of the participants. Overall, the collaboration between the researchers and the postpartum mothers resulted in a successful study that truly captured the lived experiences and insights of this specific population.

The distribution of research participants by age, parity, breast care, and early initiation of breastfeeding is shown in Table 1. Several researches revealed no significant association between maternal age and nursing self-efficacy levels. For instance, Amini et al. (2019) discovered a weak link between the two.

The relationship between the number of children in a family and the mother's breastfeeding behavior is influenced by the family's perception on breastfeeding. New mothers who breastfeed their infants have much higher family attitudes or support than those who use mixed or artificial feeding. This suggests that family support and perceptions on breastfeeding play a crucial role in a mother's decision to breastfeed (Bengough et al., 2022). Breastfeeding duration is favorably associated to family size, birth order, maternal age, and the nutritional quality of the children (Arif et al., 2021). Mothers with larger families may have more experience and support from older children and other family members, leading to longer breastfeeding durations. Previous breastfeeding experience was found to be favorably connected with greater nursing self-efficacy scores. These factors can impact a mother's ability and readiness to breastfeed immediately after giving birth (Li et al., 2021).

Breast care treatment, including oxytocin massage, can positively impact breast milk production by stimulating the release of the oxytocin hormone, leading to increased milk production. A study revealed that postpartum mothers who received oxytocin massage produced more milk compared to those who did not receive it. Factors such as breast care treatment and oxytocin massage can contribute to higher breast milk production (Hendriyani et al., 2019). Some studies collected data on various factors that might affect the duration of breastfeeding, such as background data, antenatal and postnatal attitudes towards breastfeeding, breastfeeding intention, and postnatal support after discharge (Gavine et al., 2022; Naja et al., 2022).

Early breastfeeding shows a substantial favourable link with both exclusive breastfeeding and breastfeeding length, with the latter having the greatest benefit. Knowledge about breastfeeding, birth history, and midwife's support also play a role in exclusive breastfeeding. Mothers in urban regions are more likely to commence early breastfeeding and perform exclusive breastfeeding than those in rural areas (Permatasari & Syafruddin, 2016). Early breastfeeding initiation has been demonstrated to boost exclusive breastfeeding rates in big groups. During the first month of the intervention, the rates of exclusive breastfeeding were already high, and they remained steady throughout the program, with significant increases observed over time. Timely commencement and exclusive breastfeeding were key indicators in these programs, emphasizing the importance of establishing good infant feeding practices early on (Fosu-Brefo & Arthur, 2015; Patel et al., 2015).

This study focuses on assessing the time of first breast milk release, not on the entire breastfeeding process or the amount of breast milk produced during breastfeeding. So the preparation factors before the lactation process that are commonly carried out by pregnant women, such as breast care and IMD, are the main choices of researchers. Nutritional factors during breastfeeding and emotional factors of mothers, such as postpartum blues, experience many changes during breastfeeding (lactation), so they are not the main choices of researchers. However, it is better to still be used as a confounding variable, including family support. Because in this study it is not used as a confounding variable, it will be added to the statement in the discussion as a research deficiency.

The results revealed that there was a considerable difference in the time of first milk secretion between the group of mothers who applied a turmeric compress on the breasts and those who did not ($p < 0.05$). Mothers who had a turmeric compress applied on their breasts had their first breast milk come out faster than those who did not apply a turmeric compress. The average difference in breast milk release time was 1,063.8 minutes. It can be said that mothers who applied a turmeric compress for six hours after childbirth took less time to express breast milk for the first time (17.73 hours) compared to postpartum mothers without compresses. To ensure that the acceleration of breast milk production was indeed due to the influence of the turmeric compress, several variables that might acted as confounders were controlled. The age and parity variables were controlled through sample selection restrictions by matching. Because all the participants practiced early initiation of breastfeeding, this variable was already controlled. Lastly, the variable breast care was controlled through the Chi-square analysis process.

The results of the Chi-square test for breast care and the time of first breast milk secretion can be seen in Table 3. According to these results, there was no significant difference between breast care and the time to express breast milk ($p > 0.05$). In other words, breast care did not affect the timing of breast milk secretion. Because the bivariate test of breast care showed no effect on the time of breast milk secretion, multivariate analysis was not conducted.

This research used an intervention of a one-time six-hour turmeric compress, unlike people's custom in using turmeric compresses; typically turmeric compresses are applied all day long every two days to ensure the smooth release of breast milk. Nonetheless, a significant difference was detected between the group of postpartum moms using a turmeric compress on their breasts and those who did not. If the intervention was carried out for a longer time, the first breast milk secretion might have occurred even earlier.

Turmeric is a spice plant that is often used in various dishes. It contains chemical compounds that have medicinal properties. The curcuminoids contained in turmeric consists of curcumin, 10% desoxycurcumin, and 1–5% bisdesmethoxycurcumin. In addition, turmeric also contains essential oils, sesquiterpene ketones, 60% turmerontumeon, 45–55% vitamin C, 30% protein, 25% zingiberene, 8% starch, 3% carbohydrates, and 1–3% fat. Other contents include mineral salts, iron, phosphorus, and calcium (El-Saadony *et al.*, 2023; Megananda *et al.*, 2024).

Turmeric massage can help increase breast milk production by stimulating oxytocin production, leading to contraction of myoepithelial cells and increased prolactin, hence increased milk production. Turmeric can stimulate the anterior pituitary gland to release more prolactin, resulting in increased milk production. Some chemical components of turmeric, such as curcumin, have an estrogenic effect and may also boost milk production. Traditional birth attendants in the Sumba tribe use turmeric oil paste to reduce stiff and painful breasts, which can help with milk flow. This is especially beneficial for breastfeeding mothers who may be experiencing low milk supply (Martin *et al.*, 2023; Tarapandjang *et al.*, 2024).

Additionally, turmeric is known for its anti-inflammatory effect, which can help reduce any swelling or discomfort in the breast tissue (El-Saadony *et al.*, 2023). This natural remedy has been passed down through generations and has been proven effective in aiding breastfeeding mothers. Turmeric massage can be a beneficial and holistic approach to supporting breastfeeding and ensuring health (Tarapandjang *et al.*, 2024). The use of turmeric massage can promote relaxation and stress relief for breastfeeding mothers, which can further improve milk production (Nasution *et al.*, 2023). This traditional practice has been used for centuries in various cultures to support lactating women and promote overall health. Incorporating turmeric massage into a breastfeeding routine can not only enhance milk flow but also offer a sensation of comfort and well-being for both the mother and the baby (Modak *et al.*, 2023).

Early initiation of breastfeeding is crucial for newborns' health and is recommended within one hour of birth by the World Health Organization. Mode of delivery, maternal knowledge, region of residency, receipt of breastfeeding instructions, and maternal education level are all connected with early commencement of breastfeeding (Ahmed & Salih, 2019; Ahmed et al., 2019). These factors can impact a mother's ability and readiness to breastfeed immediately after giving birth. It is important for healthcare providers to address these influences and provide support to ensure that all newborns have the best possible start to life. By promoting early initiation of breastfeeding, we can improve the health outcomes for both the mother and the baby (Asimaki et al., 2022; Gavine et al., 2022).

With proper support and guidance from healthcare providers, mothers can successfully initiate breastfeeding within the recommended timeframe. Mothers who have received adequate education and information about breastfeeding are more likely to understand its importance and be motivated to start breastfeeding early. Ultimately, ensuring that mothers have access to resources and support can help increase the rates of early initiation of breastfeeding, leading to improved health outcomes for newborns.

The limitation of this study is that it has not included the variables of maternal nutrition, emotional factors, and family support. In the future, it is better to add these confounding variables. The suggestion for further research is not only to measure the time of the first breast milk release but also the amount of breast milk during lactation and the success of exclusive breastfeeding. Conclusions may differ in populations with maternal conditions with nutritional disorders and emotional and hormonal imbalances that are not variables measured in this study.

5. Conclusion

This study showed that in the group that compressed the breasts with turmeric, breast milk came out faster than the group that did not compress the breasts. Breast milk production was faster by 17.73 hours compared to those who did not compress the breasts with turmeric. There was a significant difference in the time of the first breast milk release between the group of postpartum mothers who compressed the breasts with turmeric and those who did not. Turmeric might be recommended as an alternative for increasing breast milk production. Turmeric has been demonstrated to relieve pain, reduce inflammation, lower blood pressure, and improve blood circulation in breastfeeding mothers. Turmeric can stimulate the anterior pituitary gland to produce more prolactin to increase breast milk production. Overall, using turmeric can be a natural and effective way to increase breast milk supply for breastfeeding mothers. Its ability to stimulate prolactin production and its estrogenic effects make it a valuable supplement for those looking to increase breast milk production. In addition, other health benefits of turmeric make it a safe and beneficial choice for breastfeeding mothers who want to improve their overall well-being. Further research should not only measure the time of the first breast milk release but also the amount of breast milk during lactation and the success of exclusive breastfeeding. In addition, it is advisable to add confounding variables such as maternal nutrition, emotional factors, and family support.

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Conflict of Interest

There is no conflict of interest. Nothing is to be disclosed.

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