

# The effect of topical aloe vera and breast milk on the recovery of cracked nipples

Fazdria<sup>1</sup>, Alchalidi<sup>2</sup>, Kasad<sup>3</sup>, T. Iskandar Faisal<sup>4</sup>

<sup>1,2</sup>Prodi Kebidanan Langsa, Poltekkes Kemenkes Aceh, Indonesia

<sup>3,4</sup>Prodi Keperawatan Langsa, Poltekkes Kemenkes Aceh, Indonesia

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## ABSTRACT

One of the common discomforts during the postpartum period is cracked nipples. If not properly managed, this condition may lead to mastitis. This study aimed to analyze the effect of topical application of aloe vera and breast milk on the healing of cracked nipples. This research employed a quasi-experimental design with a two-group pretest–posttest approach. The sample consisted of 34 postpartum mothers with cracked nipples at Birem Bayeun Community Health Center. Data were analyzed using the Wilcoxon test. The results showed a significant effect of aloe vera and breast milk application on the healing of cracked nipples ( $p = 0.000$ ). It can be concluded that the topical application of aloe vera and breast milk has a significant effect on the recovery of cracked nipples among postpartum mothers.

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### Corresponding Author:

Alchalidi,  
Prodi Kebidanan Langsa,  
Poltekkes Kemenkes Aceh,  
Jl. Islamik Center Desa Paya Bujuk Beuramo, Kecamatan Langsa Barat, Kota Langsa, 24416, indonesia  
Email: idoykeren933@gmail.com

## INTRODUCTION

Health problems during the breastfeeding period are commonly experienced by many mothers and can affect the success of exclusive breastfeeding. Some of the most common issues include nipple pain and injury, breast inflammation (mastitis), insufficient breast milk production, and breast engorgement. These conditions can cause discomfort for the mother and negatively impact the baby's breast milk intake (Astari et al., 2020; S. F. Fauziah & Musiin, 2022).

According to the 2022 Indonesia Demographic and Health Survey (IDHS), 17.3% of postpartum mothers breastfed their infants, 20.7% did not breastfeed at all, and 62% stopped breastfeeding. The highest proportion was found among postpartum mothers who discontinued breastfeeding before the end of the puerperal period. Among them, 79.3% experienced cracked nipples, 5.8% suffered from breast engorgement, 12.5% reported insufficient milk flow, and 2.4% experienced breast problems such as mastitis (Agustin, 2019).

Pain in the nipples and breasts often causes mothers to feel afraid of breastfeeding. However, the belief that breastfeeding itself causes cracked nipples is actually a myth. In fact, not all mothers experience nipple cracking during breastfeeding (N. Fauziah, 2022; Zakiah et al., 2024). In the first few days after childbirth, the nipples tend to be more sensitive, which may cause mild

discomfort at the beginning of breastfeeding. This discomfort usually lasts for less than half a minute, does not lead to nipple damage, and subsides on its own. Nipple sensitivity generally disappears within 3 to 7 days after delivery, as milk production increases and milk flow becomes smoother (Haibah et al., 2021; Pratiwi & I, n.d.).

If nipple wounds are not treated promptly, complications such as bacterial infections may develop, leading to mastitis or breast abscesses. When mastitis occurs, mothers often experience difficulty breastfeeding, preventing the baby from receiving optimal exclusive breastfeeding, which ultimately affects both maternal and infant health. Therefore, this condition can become a barrier for mothers to provide exclusive breastfeeding to their babies (Mujenah et al., 2023; Sulymbona et al., 2021).

The causes of cracked nipples in breastfeeding mothers include poor latch-on during breastfeeding, infant biting, improper use of breast pumps, allergic reactions to ointments, creams, or breast care lotions, fungal infections, and infant tongue-tie (Fatimah et al., 2022; Gusnidarsih & Widyaningsih, 2018). The main cause of cracked nipples is generally improper baby latch-on, which is often influenced by incorrect or uncomfortable breastfeeding positions. This condition can actually be prevented through proper breast care. Breast care can begin during the third trimester of pregnancy and continue during the first one to two days after childbirth. Such care includes breast massage, warm compresses, breast emptying, and nipple care. Proper management of cracked nipples is essential, as incorrect handling may lead to undesirable effects (Hondro et al., 2022; Soleha & Aini, 2021).

Efforts that mothers can take to prevent or reduce nipple wounds include wearing comfortable bras, avoiding the use of soap and creams on the breast area, ensuring proper breastfeeding position, applying breast milk to the nipple area, and manually expressing breast milk. In addition, treatment can also be carried out through breast care, such as using olive oil, breast milk, or natural-based creams, as well as applying compresses using tea leaves or betel leaves (S. Ananda et al., 2022).

Breast milk has many benefits for the nutritional needs and health of infants. In addition, it can also serve as an alternative remedy for managing breastfeeding-related problems. Breast milk acts as a non-pharmacological therapy for healing wounds or cracked nipples, providing natural antibacterial protection. Breast milk contains immunological factors such as lactoferrin, immunoglobulins, and antimicrobial enzymes that accelerate tissue regeneration while protecting the affected area from bacterial colonization. Its natural fat content and emollient properties help maintain moisture and prevent further friction on the nipple. An additional advantage is that breast milk is readily available, safe, and cost-free, making it practical for postpartum mothers without any risk of adverse effects (Astari et al., 2020; Ramadhan & Rahmawati, 2019).

Another non-pharmacological therapy that can support the healing of cracked nipples is aloe vera. This plant has anti-inflammatory properties and promotes wound healing, helping to relieve pain and inflammation. The compounds aloin and emodin contained in aloe vera act as natural analgesics that effectively reduce pain and inflammation in injured nipples. In addition, other components such as saponins and tannins function as antibacterial agents that prevent bacteria from adhering to epithelial cells. The gel-like structure of aloe vera also provides a soothing effect on the skin, helping to reduce irritation and dryness that may worsen nipple wounds, while its antimicrobial effects play a role in preventing infections in the affected area (N. O. Ananda et al., 2023; Maleki & Youseflu, 2022).

Compared to other non-pharmacological therapies such as warm compresses, lanolin, or essential oils, aloe vera and breast milk offer a higher safety profile, minimal risk of allergic reactions, and more substantial clinical evidence supporting their effectiveness in healing nipple injuries. The combination of anti-inflammatory, antimicrobial, and tissue-regenerating effects makes these two therapies a more rational, economical, and easily applicable choice for self-care among breastfeeding mothers (Arma et al., 2024; Astari et al., 2020).

Based on a preliminary survey conducted by the researcher at Birem Bayeun Community Health Center, the coverage of exclusive breastfeeding was found to be only 10.8%. Of the 461 infants aged 0–6 months, only 64 received exclusive breastfeeding. From interviews with 10 mothers, it was found that 5 mothers experienced cracked nipples, 2 mothers had inverted nipples, and 3 mothers experienced neither condition. The exact number of breastfeeding mothers with cracked nipples is unknown due to the absence of specific reporting on nipple-related conditions.

Based on a study conducted by Nuriah et al., the application of aloe vera gel was found to accelerate the healing process of cracked nipples in breastfeeding mothers more effectively than conventional wound-healing creams or ointments (Arma et al., 2024).

Based on the above discussion, cracked nipples in postpartum mothers represent an urgent issue that requires proper attention. This study is essential to enable postpartum mothers to apply non-pharmacological therapies, such as breast milk application and tea compresses, for the treatment of cracked nipples. Therefore, this research aims to determine the effect of topical application of aloe vera and breast milk on the healing of cracked nipples in postpartum mothers.

## RESEARCH METHOD

This study employed a quasi-experimental design with a two-group pretest–posttest approach, without a control group. Both groups received treatment through the topical application of aloe vera and breast milk. The population in this study consisted of 34 postpartum mothers with cracked nipples at Birem Bayeun Community Health Center. The sampling technique used was total population sampling, in which all members of the population were included as samples (Firdaus & Zamzam, 2018).

The research instrument used in this study was an observation sheet consisting of respondents' biodata and an observation table assessing nipple cracks. The research was conducted in three stages. The first stage (pretest) involved assessing or observing the nipple cracks of the respondents. The second stage involved providing interventions to both groups by applying aloe vera and breast milk for seven consecutive days. The third stage (posttest) involved reassessing the condition of the nipple wounds after the intervention. The collected data were then analyzed using the Wilcoxon test (Hidayat, 2014).

## RESULTS AND DISCUSSIONS

### Research Results

#### Univariate Analysis

**Table 1.** Frequency distribution of respondents' characteristics based on age and parity

Characteristics	Group Aloe Vera		Group Breast Milk	
	f	%	f	%
Age				
Early adulthood (25-35 years)	17	100	15	88.2
Late adulthood (36-45 years)	0	0	2	11.8
Parity				
Primiparous	8	47.1	9	52.9
Multiparous	9	52.9	8	47.1

Based on the table above, it was found that in the aloe vera group, all mothers were aged between 25–35 years (100%), while in the breast milk group, the majority of mothers were also aged between 25–35 years (88.2%). Regarding parity characteristics, most mothers in the aloe vera group were multiparous (52.9%), whereas in the breast milk group, the majority were primiparous (52.9%).

## Bivariate Analysis

**Table 2.** Effect of topical aloe vera on cracked nipple healing

		N	Mean Rank	Sum of Ranks	Sig.
Cracked nipples Pretest- Posttest	Negative ranks	14	7.50	105.00	0,000
	Positive ranks	0	0.00	0.00	
	Ties	3			
	total	17			

Based on the table above, there was a decrease in wound scores after the application of aloe vera, with 14 mothers showing improvement and an average score of 7.50. The statistical analysis showed a p-value of 0.000, indicating that there was a significant effect of aloe vera application on the healing of cracked nipples among postpartum mothers.

**Table 3.** Effect of topical breast milk on cracked nipple healing

		N	Mean Rank	Sum of Ranks	Sig.
Breast milk Pretest- Posttest	Negative ranks	13	7.00	91.00	0,000
	Positive ranks	0	0.00	0.00	
	Ties	4			
	total	17			

Based on the table above, there was a decrease in wound scores after the application of breast milk, with 13 mothers showing improvement and an average score of 7.00. The statistical analysis showed a p-value of 0.000, indicating that the application of breast milk had a significant effect on the healing of cracked nipples among postpartum mothers.

## Discussions

### Effect of Topical Aloe Vera on Cracked Nipple Healing

The results showed a decrease in wound scores after the application of aloe vera, with 14 mothers showing improvement and an average score of 7.50. Statistical analysis revealed a p-value of 0.000, indicating a significant effect of aloe vera application on the healing of cracked nipples among postpartum mothers. The application of aloe vera for seven consecutive days to postpartum mothers with nipple wounds demonstrated visible improvement, accelerating the healing process, reducing pain, and moisturizing the skin around the nipple area.

Aloe vera functions as an anti-inflammatory and herbal wound-healing agent that can reduce swelling and prevent edema by inhibiting the cyclooxygenase enzyme or the production of prostaglandin E2 (PGE2) from arachidonic acid. The aloe vera leaf contains two types of fluids; the first is a clear gel-like substance with antibacterial and antifungal properties, as well as salicylates that can stimulate fibroblasts—skin cells that play an essential role in wound healing. Topical application or compresses of aloe vera have been proven to reduce the degree of injury and pain, as well as to prevent and alleviate swelling (Prastita et al., 2024).

Davood, in his study, stated that the use of aloe vera as a complementary therapy can enhance wound healing. This is because aloe vera helps maintain skin moisture and integrity, prevents ulcer formation, and accelerates the wound-healing process (Hekmatpou et al., 2019).

The study conducted by Nuriah et al. found that the use of aloe vera gel with nanoparticles significantly accelerated the wound-healing process in breastfeeding mothers. The incorporation of nanoparticle technology in aloe vera gel formulations provides distinct advantages. Nanoparticles, with their extremely small size (ranging from 1–100 nm), enable deeper skin penetration, reaching the epidermal and dermal layers that are typically difficult to access with conventional formulations (Arma et al., 2024).

The results of this study are consistent with the findings of Rui-Hua Wang et al., which demonstrated that the healing time of nipple wounds after the application of aloe vera gel ranged from  $5.28 \pm 1.26$  days. This indicates that the use of aloe vera gel can significantly alleviate pain

caused by nipple trauma in breastfeeding mothers, accelerate the wound-healing process, and reduce the duration of nipple trauma (Wang et al., 2024).

### Effect of Topical Breast Milk on Cracked Nipple Healing

The results of the study showed a decrease in wound scores after the application of breast milk in 13 mothers, with an average value of 7.00. The statistical analysis yielded a p-value of 0.000, indicating that the application of breast milk had a significant effect on the healing of nipple fissures in postpartum mothers. The application of breast milk for seven consecutive days was found to reduce or heal nipple fissures in postpartum mothers. This is attributed to the antibacterial properties of breast milk, which help prevent infection and promote faster wound healing.

Breast milk (ASI) provides numerous benefits for the nutritional needs and health of infants; however, it can also serve as an alternative remedy for addressing breastfeeding-related problems (Yulianto et al., 2022). Breast milk functions as a non-pharmacological therapy for healing nipple fissures or wounds, offering antibacterial protection that helps prevent infection in the affected area (S. F. Fauziah & Musiin, 2022; Ramadhan & Rahmawati, 2019).

The study conducted by Evayanti showed that the average healing time of nipple fissures in postpartum mothers who were treated with breast milk was 8.3 days. This finding indicates that the application of breast milk can accelerate the healing of nipple wounds. However, there was a difference observed in the group treated with peppermint, which had a shorter average healing time of 6 days (Evayanti, 2019).

A case study conducted by Siska on the management of nipple fissures in breastfeeding mothers found that the application of topical breast milk led to complete healing within eight days. This suggests that the use of topical breast milk has a significant effect on the healing of nipple fissures in postpartum mothers.

## CONCLUSION

The results of this study conclude that the application of aloe vera gel and breast milk can accelerate the healing of nipple fissures in postpartum mothers. For healthcare providers, especially midwives, these two therapies can be incorporated as part of the standard interventions in the initial management of nipple injury in breastfeeding mothers. Education on the proper use of aloe vera gel and the correct technique for applying breast milk topically can be provided during routine lactation counseling sessions. The researchers hope that future studies can further investigate the standardization of aloe vera preparations (including gel concentration, extraction methods, and potential microbial contaminants), conduct allergy and irritation testing, and/or carry out controlled clinical trials on the use of aloe vera.

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