

Breast Pain Reduction Techniques Using Cabbage Leaves

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Abstract: Breast pain and engorgement are common problems experienced by postpartum mothers and may interfere with successful breastfeeding. One non-pharmacological method that has been widely used to relieve breast discomfort is the application of cabbage leaf compresses. This study aimed to analyze the differences in breast pain levels among breastfeeding mothers who received cabbage leaf compresses compared to those who did not. A quasi-experimental study was conducted at Jakenan Health Center, Indonesia, in May to September 2024. The study involved postpartum mothers on days 2–4 after delivery who were selected using a consecutive sampling technique. Breast pain levels were measured before and after the intervention. Data normality was assessed using the Shapiro–Wilk test, and differences between groups were analyzed using the Mann–Whitney test with a 95% confidence interval. The results showed a significant difference in breast pain levels between the intervention group and the control group. Mothers who received cabbage leaf compresses experienced a greater reduction in breast pain than those who did not receive the intervention ($p = 0.005$). In conclusion, cabbage leaf compresses are effective in reducing breast pain among postpartum mothers and may be considered a simple, safe, and affordable intervention to support breastfeeding.

Keywords: Breast Pain; Cabbage Leaf Compress; Postpartum

Introduction

According to the WHO, 81% of maternal mortality rates (MMRs) are due to complications during pregnancy and childbirth, and 25% occur during the postpartum period. Puerperal maternal deaths are usually caused by puerperal infections (10%), which occur due to a lack of care for wounds and bleeding (42%), caused by birth canal tears, placental residues and uterine atony. Other causes include eclampsia (13%) and puerperal complications (11%). Infection during the puerperium can also be caused by lactation problems. One such problem is breast milk dams (Saraung, Rompas, 2021).

The postpartum period (puerperium) is an important factor in reducing the Infant Mortality Rate (IMR) and the Maternal Mortality Rate (MMR) in Indonesia. In Indonesia, the incidence of breast milk

deficiency mostly affects working mothers, accounting for up to 16% of breastfeeding mothers (Kurniawati & Handayani, 2022). In 2019, the percentage of infants aged 0–6 months who were exclusively breastfed in Central Java was 69.46%, ranking 13th nationally. The target for the 2019 strategic plan was 50% (Ministry of Health, 2020), which is slightly higher than the percentage of exclusive breastfeeding in 2014 (60.7%) and an increase on the 2015 figure of 61.6% (Abihail & Mahmudiono, 2022).

The puerperium, or postpartum period, is the time during which women experience the recovery and adaptation of their reproductive systems to the conditions of pregnancy. This period lasts 6–8 weeks and involves physiological adaptations, one of which is the start of the breastfeeding or lactation process. One of the challenges that can occur during the postpartum period is breast engorgement, which is understood as an

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increase in venous and lymphatic flow in the breasts as part of the body's preparation for breastfeeding. This condition is caused by the overstretching of the milk ducts, leading to breast swelling, pain, and engorgement, often accompanied by a rise in body temperature (Darsini Suwarno et al., 2024). During this period, lactation is an important indicator of maternal and child health.

The lactation process is explained as the combined action of prolactin and oxytocin, the let-down reflex and stimulation through the baby's suction. Maintaining a balance in the production of oxytocin and prolactin will ensure a good lactation process, enabling the baby to receive milk exclusively. If oxytocin secretion is not smooth, it can inhibit milk production in mothers, aggravating breast engorgement and causing discomfort in postpartum mothers (Kasanah & Rofika, 2023).

Clinical manifestations of breast engorgement include swollen, hard, tense and hot breasts, as well as discomfort or pain, especially when touched or pressed (Kasanah & Rofika, 2023). Indrani's (2019) research showed that, out of a total sample of 90 breastfeeding mothers, 65–75% experienced breast engorgement (D, 2019).

Research carried out at Stanford University School of Medicine indicates that the high levels of glutamine found in cabbage can be beneficial in managing inflammation, such as that associated with breast inflammation (Hadriani et al., 2025). Cabbage can be used in swelling therapy because it contains the amino acid methionine, which has antibiotic properties, along with other components such as sinigrin (allylisothiocyanate), mustard oil, and magnesium oxylate sulphur heterosides. These substances help to widen the capillaries, which increases blood flow into and out of the affected area, allowing the body to reabsorb fluid that is trapped in the breast. Additionally, cabbage leaves release a cooling gel that absorbs heat, helping clients feel more relieved. The leaves tend to become wilted or mature after 30 minutes of application (Doloksaribu & Barus, 2023).

A preliminary data survey of three postpartum mothers, conducted in November 2023, found that all experienced breast pain on day three postpartum. Two of them felt that cabbage leaf compresses on the breast were comfortable, while one person did not find them comfortable. Elzehri et al (2023) obtained research results that there was no statistically significant difference between the two groups regarding breast swelling symptoms (namely the raw cabbage leaf compress group with hot compresses to relieve breast swelling. This means that there was a significant improvement in the scale of breast swelling and pain before and after the intervention ($p < 0.001$) in the two groups (Amin Elzehri et al., 2023).

Safitri et al. (2022) found that cabbage leaf compresses and breast care management were more effective in alleviating breast swelling in postpartum mothers than breast care management alone ($p = 0.001$) (Safitri et al., 2022). Similarly, in systematic review and meta-analysis, Our study showed that applying cold cabbage leaves helped in decreasing breast pain. Similarly Pramesthi and Rohmayanti (2024) that their literature review found that after applying cabbage leaf compresses, there was a decrease in breast swelling scale (SPES) (Dea Pramesthi & Rohmayanti, 2024). Khofiyah and Febriyanti (2021). The results of the statistical test of Khofiyah and Febriyanti's (2020) research showed that there was an effect of providing cabbage leaf compresses on reducing breast swelling in postpartum mothers with a p value = 0.000 (Khofiyah & Febriyanti, 2021).

Based on the above description, breast engorgement is the main cause of lactation problems, with a decrease in pain observed after cabbage leaf compresses were administered. Therefore, researchers are interested in analysing the effect of cabbage leaf compresses on breast pain in nursing mothers 2–4 days postpartum at the Jakenan Health Centre in the Pati district (Kasanah & Rofika, 2023).

Method

Study Desain and Setting

This study used a quasi-experimental research design involving a post-test control group to investigate differences in breast pain between the group that received cabbage leaf compresses and the control group. The study was conducted from May to September 2024.

Participants

The study population comprised postpartum mothers aged two to four days. A sample of 20 mothers was selected using consecutive sampling techniques. The criteria for inclusion in the study were that the mothers were postpartum, aged 2–4 days, willing to participate, cooperative, receiving good support from their families, without a history of frequent painkiller use, of the Javanese ethnic group, without pain trauma, and with a stable mood. The study was conducted at the Jakenan Health Centre in Pati Regency, Central Java, Indonesia, in 2024.

Data normality was assessed through the Shapiro-Wilk test, which is appropriate for sample sizes smaller than 50. The resulting p -value was 0.000, which is below the significance level of 0.05. This indicates that the data does not follow a normal distribution. As a result, the Mann-Whitney test was selected for conducting the analysis.

Intervention

In this study, the intervention involved providing cabbage leaf compresses for breastfeeding mothers to use on their breasts on days two to four after delivery. The compresses were carried out by the mothers or their families after receiving prior education. The compresses were applied on days 2, 3 and 4 for up to two 20-minute sessions per day. The control group did not receive cabbage leaf compresses, but breast pain was still measured on day 5. Researchers also monitored the implementation of the compresses via video call each day when the mother applied them. This was an effort by the researchers to ensure that the mothers were actually carrying out the intervention.

Data Collection

Breast pain data was collected through interviews using the Numeric Rating Scale (NRS), which asks respondents to rate their pain on a scale of 0-10. Respondents were asked to mark a number on the NRS line at the point where they felt the level of pain. The measurement results show the mother's pain score. The breast pain data were then processed using SPSS. The NRS used in this study has been tested for validity and reliability.

Statistical Analisis

The data were checked for completeness and analyzed using SPSS version 24.0. To determine if the data followed a normal distribution, the Shapiro-Wilk test was applied, as it is suitable for sample sizes less than 50. The test resulted in a significance value (p) of 0.000. Since this p-value is less than 0.05, it was concluded that the data does not follow a normal distribution. As a result, the Mann-Whitney test was selected for the analysis of the data.

Ethical Clearance

This research has been reviewed and approved by the Ethics Department of the School of Health Sciences at Ngudia Husada Madura, receiving approval on May 13th, 2024 under reference number 2126/KEPK/STIKES-NHM/EC/V/2024.

Result and Discussion

The participants in this study were split into two groups: an intervention group and a control group. The intervention group included breastfeeding mothers from Jakenan Village, Jakenan District, with a total of 10 participants. Initially, there were 11 respondents in this group, but one dropped out during the study. The control group comprised breastfeeding mothers in Tondomulyo Village, Jakenan District. There were 10 respondents in this group, none of whom dropped out.

Research result

1. Descriptive Statistics

Postpartum Maternal Breast Pain Scale in Two Groups. All respondents reported mild pain (1-3) in both the compress and uncompress groups.

Table 1. Breast Pain Scale of Both Groups

Item	Control (Pain Without Cabbage Leaves Compressed) (n=10)	Intervention (Pain with Cabbage Leaf Compressed) (n=10)
Mean	2.3	1.5
Median	2	1.5
Minimum	2	1
Maximum	3	2
Deviation Standard	0.483	0.527

Based on Table 1 above, it can be seen that, of the postpartum mothers without cabbage leaf compresses (n = 10), the average breast pain score on day 4 was 2.3, with a median of 2, a minimum of 2, and a maximum of 3.

For the group of mothers who used cabbage leaf compresses (n = 10), the average breast pain score on postpartum day 4 was 1.2, with a median of 1.5, a minimum of 1, and a maximum of 2.

2. Normality Test

Table 2 Normality Test Results

Group	Statistic	df	Sig. (p)
Control (Pain Without Cabbage Leaves Compressed)	0.594	10	0.000
Intervention (Pain with Cabbage Leaf Compressed)	0.655	10	0.000

Based on table 2 above, the results of the data normality test using the Shapiro-Wilk test (n < 50) show that the data are not normally distributed since both scores of the two groups shows <0,05 (p value 0,000). Therefore, the Mann-Whitney test method can be used for the data analysis.

Differences in Breast Pain Scale Scores Between Postpartum Mothers with and Without Cabbage Leaf Compresses

Table 3. Mann Whitney Test

Group	N	Mean Rank	Z score	p-value
Intervention (Pain with Cabbage Leaf Compressed)	10	7.25	-2.805	0.005
Control (Pain Without Cabbage Leaves Compressed)	10	13.75		
Total	20			

Based on Mann-Whitney's calculations, the p-value is 0.005 ($p < 0.05$), indicating a significant difference in breast pain between the cabbage leaf compress group and the control group.

Discussion

Interpretation of Key Findings. Based on the findings from the statistical analysis, it can be understood that:

1. Descriptive Evidence of Pain Reduction

The preliminary findings from Table 1 (Breast Pain Scale) show a clear descriptive trend: the group receiving the cabbage leaf compress had a substantially lower average pain score ($x = 1.5$) than the control group ($x = 2.3$). This difference in average score of 0.8 points indicates that the use of cabbage leaf compresses seems to shift the level of pain from the moderate category (2.3) to the mild category (1.5) in postpartum mothers. Lower minimum and maximum scores in the intervention group (1-2) compared to the control group (2-3) also reinforce the indication that cabbage leaf compresses help limit the intensity of pain felt.

2. Validity of Non-Parametric Statistical Methods

Table 2 (Normality Test) shows that the pain score data in both groups was not normally distributed ($p < 0.05$ value on the Shapiro-Wilk test). The decision to use the Mann-Whitney U Test was precise and essential. With a small sample count ($n = 10$ people per group) and abnormal data, this non-parametric test ensures that comparisons between groups are validly conducted without violating strict statistical assumptions, thereby improving the reliability of inferential conclusions.

3. Clinical and Statistical Significance

The key and most important findings come from table 3 (Mann-Whitney Test). The test results showed a value of $p = 0.005$. Since the p (0.005) value was much smaller than the established significance level ($\alpha = 0.05$), it was determined that there was a statistically significant difference in breast pain scores between the intervention group and the control group. This statistical significance confirms that the observed decrease in pain is not due to chance, but rather is a direct effect or at least closely related to the cabbage leaf compress intervention. With a substantially lower mean rank in the compressed group (7.25) than in the non-compressed group (13.75), this study provides strong evidence that cabbage leaf compresses are effective as a non-pharmacological technique to reduce breast pain in postpartum mothers with breast swelling (engorgement).

Based on the analysis of the data, it can be determined that the results of this study provide strong

empirical and statistical support for the use of cabbage leaf compress as a breast pain reduction technique. These findings are important because they offer a simple, low-cost, and accessible intervention to address common problems that can hinder successful breastfeeding in the postpartum period.

4. Comparison with Previous Studies

Breast engorgement is a common and uncomfortable condition that many new mothers go through, usually during the first two weeks after childbirth, typically in the first two weeks after giving birth. It is characterised by swollen and painful breasts, usually due to an overproduction of milk. This condition can complicate breastfeeding and is often a result of the body adjusting to the demands of nursing. It can be uncomfortable and may affect the mother's ability to breastfeed comfortably (Smita Richesh Robert, 2024). Primary breast engorgement happens when blood and lymphatic fluid build up in the tissue surrounding the alveoli, as the body gets ready to make milk. Secondary breast engorgement can start around day 5 after childbirth, or sometimes on days 9 or 10, if the mother isn't nursing often enough or the baby isn't getting enough milk from the breasts (Christena et al., 2024). If not treated, this condition can cause the baby to lose interest in breastfeeding. This can lead to a blockage of milk, which reduces milk supply and may result in mastitis or an infection of the mammary glands (Aprilina et al., 2021).

Breast engorgement is experienced by nearly 90% of women in the world after giving birth. (Alekshev et al., 2015). This happens because of hormonal changes, specifically the release of prolactin and oxytocin hormones. Around 24 hours after giving birth, colostrum starts to come out of the breasts. The breasts then become full and heavy between 72 to 96 hours after birth. Milk production increases during days 3 to 5 after giving birth, causing the breasts to fill with milk, making them feel tense, hard, and possibly sore (Napisah et al., 2021). It is important to receive proper and effective care to avoid serious breast issues like mastitis and breast abscesses. This care may involve the use of antibiotics, pain relief medications, adequate rest, and staying well-hydrated (Christena et al., 2024). If breast engorgement is left untreated, it may result in issues like a decrease in milk production, incomplete emptying of the breasts, and painful or injured nipples, which can have a negative effect on the baby. Midwives need to have a good understanding of how to treat breast engorgement and its related issues in order to help the mother's discomfort (Smita Richesh Robert, 2024) in a simple way that the mother can do easily and cheaply.

Treatment for breast swelling can involve both non-pharmacological and pharmacological approaches. A

non-pharmacological method includes applying a cabbage leaf compress, which involves placing cabbage leaves on the swollen breast (Aprilina et al., 2021). Cabbage leaves are believed to relieve breast pain in nursing mothers because they contain several substances that have anti-inflammatory properties and can help reduce swelling (Christena et al., 2024). Cabbage leaves contain sinigrin, a compound with antibiotic and anti-inflammatory properties. It helps dilate blood vessels, improving circulation and allowing fluids trapped in the breasts to be reabsorbed. This process can help reduce swelling and inflammation, promoting smoother milk flow (Smita Richesh Robert, 2024).

This study was conducted by measuring the breast pain scale of post partum mothers on day 4. On days 2, 3, and 4, mothers were given compresses using cabbage leaves on their breasts. While the control group did not do cabbage leaf compresses and measured the pain scale on day 4. The pain scale was measured using the NRS (Numerical Rating Scale) scale with a scale of 0-10.

The average breast pain scale of postpartum women without cabbage leaf compress (10 people) on day 4 was 2.3; median 2; minimum 2 and maximum 3. While in the cabbage leaf compress group (10 people); the average breast pain scale of postpartum women on day 4 was 1.2; median 1.5, minimum 1 and maximum 2.

The effectiveness of the use of cabbage leaf compresses (*Brassica oleracea*) found to be significant in this study is based on a unique combination of the physical (thermal) effects and biochemical (pharmacological) content of the leaves. In general, pain-inducing breast engorgement is caused by fluid buildup (edema) and inflammation of the breast tissue, and cabbage leaves work to address both of these problems.

The main mechanism of cabbage leaves is through its anti-inflammatory and edema-reducing effects. Physically, if cabbage leaves are used in a cold state (refrigerated), it provides a vasoconstricting effect (narrowing of blood vessels), which helps to reduce excessive blood flow and fluid buildup in inflamed areas (Zakarija-Grkovic & Stewart, 2020). The chill of the leaves also acts as a topical analgesic agent, inhibiting the pain signals received by the mother, which directly contributes to the decrease in pain scores observed in the results of the study.

Meanwhile, the biochemical role of cabbage leaves lies in its phytochemical content. Although the evidence regarding specific active substances being absorbed into the skin is still of low certainty, the literature suggests that cabbage contains sulfur and glucosinolates which have anti-inflammatory and anti-irritant properties (Saini & Saini, 2014). This content is believed to mediate inflammation, help the body reabsorb edema fluid trapped in the breast, and facilitate lymphatic drainage.

Some reports also mention that the curved and flexible shape of cabbage leaves allows for a comfortable and effective application to address breast swelling and hardness, as evidenced by the findings that cold cabbage leaf compresses are preferred and considered effective by many women over other interventions (Mangesi & Zakarija-Grkovic, 2016; Zakarija-Grkovic & Stewart, 2020). However, it should be noted that these benefits may be statistically limited to reducing breast pain and hardness, and not to improving overall breastfeeding duration (Mangesi & Zakarija-Grkovic, 2016).

The findings of this study are consistent with the results reported by Arora et al. (2008), who demonstrated that both hot/cold compresses and cabbage-leaf compresses effectively reduced breast swelling and pain ($P \leq 0.001$), although hot/cold compresses showed superior pain-relief effects compared with cold cabbage leaves ($P \leq 0.001$) (Arora et al., 2009). Supportive evidence is also provided by Ozkaya and Korukcu (2022), who found that the application of cold cabbage leaves significantly reduced breast pain, although it did not produce a significant decrease in breast engorgement. Their systematic review and meta-analysis concluded that cold cabbage leaves are effective for reducing breast pain, while additional experimental studies are necessary to clarify their effect on breast engorgement (Ozkaya & Korukcu, 2023). Consistent findings were also reported by Wong et al. (2017), who observed that both cold cabbage leaves and cold gel compresses alleviated pain and breast firmness in women with engorgement, with cold cabbage leaves demonstrating a greater therapeutic effect and therefore being recommended for postpartum breast-engorgement management (Wong et al., 2017). In contrast, Mangesi et al. (2016), in a study involving 39 participants comparing cabbage-leaf extract with a placebo, found no significant differences in breast pain (MD 0.40, 95% CI -0.67 to 1.47; low-quality evidence) or engorgement (MD 0.20, 95% CI -0.18 to 0.58; low-quality evidence), highlighting inconsistencies within the existing evidence base and underscoring the need for further high-quality research (Mangesi & Zakarija-Grkovic, 2016).

Overall, a topical compressed of cabbage leaves on days 2, 3 and 4 for up to two 20-minute sessions per day serve as an effective topical anti-edema agent, both due to its cooling effect and its anti-inflammatory content, resulting in a significant reduction in breast pain and also morbidity of the lactating mothers, as confirmed by the results of the Mann-Whitney Test in this study.

The findings of this study indicate that cabbage leaf compresses are effective in reducing breast pain among postpartum mothers, supporting the growing body of evidence regarding the benefits of non-pharmacological interventions for breast engorgement and lactation-

related discomfort. Breast engorgement is a common postpartum problem characterized by breast swelling, pain, and tissue tension resulting from increased vascularity, interstitial edema, and milk accumulation, which may negatively affect breastfeeding success if not managed appropriately (Douglas, 2022). Furthermore, breastfeeding-related breast and nipple discomfort has been identified as one of the major factors contributing to breastfeeding difficulties, maternal distress, and reduced sleep quality during the postpartum period (Yasar et al., 2023; Leah Laageide, Stephanie Radke Donna Santillan, Patrick Ten Eyck, 2021). Evidence from a systematic review by (Mangesi & Zakarija-Grkovic, 2016) suggests that although no single intervention has been established as the gold standard for breast engorgement management, non-pharmacological approaches remain widely recommended because of their safety and minimal side effects. Similarly, (Razmjouei et al., 2020) reported that herbal and non-pharmacological therapies, including cabbage leaves, effectively reduce breast engorgement symptoms and improve maternal comfort during lactation. The present findings are also supported by studies demonstrating the effectiveness of breast care interventions in preventing and reducing breast engorgement among postpartum women (Nuryana & Dewi, 2025). The therapeutic effect of cabbage leaves may be associated with their cooling properties and bioactive compounds, such as sinigrin and sulfur-containing substances, which help reduce inflammation, promote vasodilation, improve local circulation, and facilitate the reabsorption of accumulated fluids within breast tissue (Safitri et al., 2022). Comparable benefits have also been reported for other natural therapies, including Aloe vera compresses, which have shown effectiveness in reducing breast pain and swelling among postpartum mothers (Midwifery et al., 2023) ; (Usman et al., 2022). Therefore, cabbage leaf compresses may serve as a simple, affordable, safe, and evidence-based intervention that can be incorporated into routine postpartum breast care to support maternal comfort and successful breastfeeding.

5. *Implications for Public Health*

The implication of this study is the role of midwives or health workers to be involved in efforts to reduce or prevent maternal breast pain by compressing cabbage leaves. This is an effort to make the exclusive breastfeeding program a success as part of efforts to produce a quality next generation of the nation free from stunting.

6. *Limitations and Cautions*

This study has limitations in that it did not test retention to see how long the mother did not feel pain

after giving cabbage leaf compresses on the second to fourth day.

7. *Recommendations for Future Research*

It is anticipated that future studies will investigate how well reduced breast pain is maintained after using cabbage leaf compresses.

Conclusion

This study shows that there is a significant difference in the level of breast pain experienced by breastfeeding mothers between those in the treatment group and those in the control group. Midwives and health workers can provide education to postpartum and breastfeeding mothers to compress their breasts using cabbage leaves, both as a preventive measure and as a treatment. This study recommends that the Health Office as a policy maker can adopt the implementation of providing cabbage leaf compresses to postpartum and breastfeeding mothers through a policy and facilitate materials and training on providing cabbage leaf compresses for health cadres in each village. Midwives in the village are expected to provide assistance to health cadres and breastfeeding mothers regarding the cabbage leaf compress method through the WA group communication platform and other platforms such as Facebook, Twitter, or Instagram which are commonly used by midwives and health centers.

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Author Contributions

Uswatun Kasanah as a researcher conceptualized this research, collected data, and poured it into a manuscript. Ana Rofika, Irfana Tri Wijayanti, Iin Tri Marlinawati and Retno Wulan as fellow researchers helped in data collection, searching for articles and compiling the discussion. Eviyati Aini Muriana has a role for the critical data interpretation and analysis, and also was responsible for the development and synthesis of the discussion section.

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Conflicts of Interest

This research has no conflict of interest.

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