



**EFFECTIVENESS OF TRANSDERMAL PATCH COMPRESSED RED GINGER EKSTRAKT (ZINGIBER OFFICINALE VAR.RUBRUM) AS THERAPY ALTERNATIVE TO FLOWNESS BREAST MILK IN POSTPARTUM MOTHERS**

**Fiyola Ladyvia\*, Suharyo Hadisaputro, Ari Suwondo**

Politeknik Kesehatan Kemenkes Semarang, Jl. Tirto Agung, Pedalangan, Banyumanik, Semarang, Central Java 50268, Indonesia

\*[Fiyolaladyvia22@gmail.com](mailto:Fiyolaladyvia22@gmail.com)

**ABSTRACT**

Breast milk smoothness occurs because the blockage of venous and lymphatic flow increases, causing breast swelling, inhibiting milk flow, and pain in the breast and increasing body temperature, if not treated immediately there can be breast milk dams, mastitis and even breast infections. This causes pain, to reduce breast swelling non-pharmacologically can be done with the development of *transdermal patch compress red ginger extract*. The research purposes is a resulted in the development of a viable red ginger extract *transdermal patch* compress and proved its effectiveness as an alternative therapy for smooth breastfeeding in postpartum mothers. Produce and analyze its effectiveness as an alternative therapy for smooth breast milk in postpartum mothers. Method: This type of research is R&D, and *quasi-experimental Pre-Posttest With Control Group Design*. The sample amounted to 30 postpartum mothers divided into 2 intervention groups with the development of transdermal patches of red ginger extract and breastcare and a control group with breastcare. The variables measured were breast milk volume, decreased swelling and breast tenderness. Consecutive sampling technique. Data collection using questionnaires and observations. Data analysis using univariate and bivariate using Wilcoxon and Mann Whitney. The development of transdermal red ginger extract patches is validated and feasible to be applied as an alternative therapy to smooth breast milk of puerperal mothers. Test results of effectiveness of increasing breast milk volume from 2,47 to 71,07 ( $p = 0.000$ ), decreasing breast swelling from 3,45 to 1,32 ( $p = 0.000$ ), breast pain from 2,91 to 0,14 ( $p = 0.001$ ). The application of the development of Transdermal Extract Red Ginger Patch is feasible and effective as an alternative therapy against the smooth breastfeeding of puerperal mothers.

Keywords: breast tenderness; puerperal mother; smooth breastfeeding; swelling of the breast; transdermal red ginger extract patch

**First Received**

01 March 2024

**Revised**

16 March 2024

**Accepted**

27 March 2024

**Final Proof Received**

17 April 2024

**Published**

01 June 2024

**How to cite (in APA style)**

Ladyvia, F., Hadisaputro, S., & Suwondo, A. (2024). Effectiveness of Transdermal Patch Compressed Red Ginger Ekstrakt (Zingiber Officinale Var.Rubrum) as Therapy Alternative to Flowness Breast Milk in Postpartum Mothers. *Indonesian Journal of Global Health Research*, 6(3), 1461-1470. <https://doi.org/10.37287/ijghr.v6i3.3186>.

**INTRODUCTION**

*The World Health Organization (WHO)* and *the United Nations Children's Fund (UNICEF)* recommend starting breastfeeding babies within an hour of birth and breastfeeding exclusively for the first 6 months of life, which means not giving other foods or drinks including water. (*World Health Statistic*, 2022) The World Health Organization (WHO) actively promotes breastfeeding as the best source of nutrition for infants and young children, and seeks to increase the rate of exclusive breastfeeding during the first 6 months to at least 50% by 2025. (*World Health Statistic*, 2022)

Exclusive breastfeeding is providing breast milk as the only source of food for babies from birth to 6 months of age, except drugs and vitamins. Exclusive breastfeeding is breast milk given to babies since birth for six months, without adding or replacing with other foods or drinks (PP Number 33 of 2012 concerning Exclusive Breastfeeding). (Karo, 2021) Breast milk contains all the nutrients and energy that a baby needs in the first few months of life, and can meet half or even more of the baby's nutritional needs during the second half of the first year, as well as one-third of the baby's nutritional needs during the second half of the third year.

Exclusive breastfeeding is an indicator of a child's health. Exclusive breastfeeding in Indonesia increased from 69.62% in 2020 to 71.58% in 2021 and 72.04% in 2022. The latest data in Central Java the percentage of children aged 0-5 months who received exclusive breastfeeding in 2020 was 76.30%, in 2021 it was 78.93% and in 2022 it decreased to 78.71%. Low exclusive breastfeeding is caused by various problems that occur during breastfeeding, one of which is the absence of breast milk. (R. Sari et al., 2022). Exclusive breastfeeding is not optimal can cause various health risks in children. As many as 45% of neonatal deaths due to infection, 30% of deaths due to diarrhea in the world can occur due to lack of exclusive breastfeeding. Children who are not exclusively breastfed have a 14 times higher risk of dying from diarrhea and pneumonia compared to children who are exclusively breastfed (Novembriany, 2022).

Many factors influence exclusive breastfeeding in infants aged 0-6 months, including predisposing factors such as knowledge, socio-cultural, psychological, maternal physical, behavior/stimulation, health workers, and maternal experience is lacking. Another important factor that influences the failure of exclusive breastfeeding is that mothers are not facilitated with Early Initiation of Breastfeeding (IMD) (Novembriany, 2022). Low exclusive breastfeeding is caused by various problems that occur during breastfeeding, one of which is the breast milk dam. Poor management of breast care can result in early termination of breastfeeding. The main reason for early termination of breastfeeding is due to pain caused by swelling of the breasts leading to unsmooth milk. (Jamarrudin et al., 2022)

According to the *World Health Organization* (WHO), in 2019 the average percentage of women who experienced breast milk reached 87.05% or as many as 8242 postpartum mothers from 12,765 people. (Jamarrudin et al., 2022) Puerperal mothers are at high risk of breast dams. Breast milk does not smooth occur due to blockage or breast dam when venous and lymphatic flow increases, causing breast swelling, inhibiting milk flow, and causing pain in the breast and increasing body temperature, if not treated immediately breast milk dams, mastitis and even breast infections can occur (Sarwono, 2008).

Breast milk in postpartum mothers is smooth because it takes the first steps before breast care such as pumping milk regularly, giving milk to babies frequently, and breast care. Medical therapy is carried out if there has been an infection given where breast milk is not smooth and there is breast swelling pain accompanied by fever, drugs such as analgesics or non-steroidal anti-inflammatories to relieve pain and inflammation in the breast. Some medications that may be prescribed by a doctor include ibuprofen, paracetamol, or mefenamic acid (Jamarrudin et al., 2022).

The use of drugs to overcome breast milk dams in nursing mothers, some types of drugs such as analgesics and non-steroidal anti-inflammatories are generally considered safe for consumption by mothers and are not harmful to the baby. (Nurhayati, 2017) PThe use of these drugs can affect the quality of breast milk and can cause some unwanted side effects,

because it is necessary to provide safer, easier, and more effective treatment alternatives for smooth breast milk in nursing mothers (Jamarrudin et al., 2022).

Non-medical treatment that has been applied before, namely holistic breastfeeding consisting of *psychoeducation*, *oxytocin massage* and Qur'an murotal for 30 minutes given every day for 7 consecutive days, has an effect on the prolactin hormone of postpartum mothers increased by 67.56 (27%) compared to standard postpartum care alone (T. P. K. Sari, 2020). Breast care is one way to overcome breastfeeding problems, especially during the puerperium, so that the process of removing breast milk can run smoothly. Side effects arising from the use of drugs containing chemicals, therefore an easy and effective alternative treatment is needed. Health care emphasizes the importance of effective and quality care, which can be done independently (Nurhayati, 2017).

An easy therapy to do at home is breast compresses. Breast compresses are a simple and practical treatment that can be done by yourself. An alternative that combines warm compresses with some natural and herbal ingredients, such as ginger. Ginger is an herbal plant that has many benefits. Ginger has anti-inflammatory, anti-pain, anti-bacterial and anti-pyretic properties. In line with research states ginger compresses with a combination of warm water and also ginger spices that have been shredded so that heat effects will arise. (Nurhayati, 2017) The effect of heat The effect of red ginger can cause vasodilation of blood vessels resulting in increased blood circulation, causing a decrease in pain by reducing inflammatory products such as bradykinin, histamine and prostaglandins. The natural substance that red ginger has is an oleoresin substance consisting of *zingeron*, *gingerol* and *shogaol*. This natural ginger substance is able to relieve inflammation such as breast dams because ginger natural substances as anti-inflammatory and antioxidant. Natural ginger is fragrant, warm and definitely if mixed with warm water will cause blood vessels to dilate will smooth blood flow as opposed to anti-pain effects. (Novia & Noval, 2021)

Interventions that studied the effects of ginger compresses on the smoothness of breast milk, where the use of ginger herbal compresses showed significantly reduced average scores of right and left breast pain which decreased on average dam-related pain scores in the right and left breasts in the intervention group was significantly greater than in the control group (Novia & Noval, 2021). Red ginger is expected to be effective against the smooth flow of breast milk in postpartum mothers, but some postpartum mothers do not want to compress manually using a cloth because it is considered less flexible, so another alternative is needed, namely ginger compresses in a more practical dosage form in the form of *transdermal patch compres* with ginger extract designed to follow breast anatomy. No one has tried using *transdermal patch compres* preparations made from red ginger extract to help reduce pain in breast swelling, as for previous products that combined dayak onion extract extract with a combination of polymers polyvinyl pyrrolidone and ethyl cellulose (Monazzami et al., 2021).

Previous interventions have been carried out warm compresses of red ginger and breast care, compresses are carried out for 15 minutes for 3 days in the morning and evening, warm compresses of red ginger as much as 100 grams pounded then attached to the lower back of pregnant women for 20 minutes. Red ginger herbal compresses require more time and effort in preparation, with use can be more complicated, in addition, the concentration of active substances in the compress may vary (Sudirman & Modjo, 2021). *Patch compres* is a medical material designed to give a compress effect to a specific area. *Patch Compres* is usually made of materials that are not easily torn and can absorb liquids, such as cotton or other porous materials coated with adhesive materials. *Transdermal Patch compress* can be used on the layer of skin that has inflammation or pain, by attaching it to breast affected by the problem.

*Patch compres* has a cold or hot nature, depending on the type of *breastpressure* and health problems to be overcome, making it easier for postpartum mothers to do breast care with more practical compresses (Ulya et al., 2021).

The research purposes is a resulted in the development of a viable red ginger extract *transdermal patch* compress and proved its effectiveness as an alternative therapy for smooth breastfeeding in postpartum mothers. Based on the exposure of the problem on this background, an analysis is needed "Development of *Trandermal Patch Compres* Red Ginger Extract (*Zingiber Officinale var.rubrum*) to measure its effectiveness as an alternative therapy for the smoothness of breast milk in postpartum mothers."

**METHOD**

This research discusses the differences in the effectiveness of transdermal patch compress red ginger extract and breastcare in reducing pain and breast swelling in postpartum mothers. This type of research is Research and Development (R&D) and the type of research used after the product is finished is quasi experimental. With a Pretest Posttest With Control Group Design approach. Where an intervention was carried out by giving compressed patches of red ginger extract to facilitate breast milk in postpartum breastfeeding mothers compared to the control group. This research was conducted in December.

Researchers carried out random assignment of PMB in the Semarang City area. Randomization results were the population in this study were postpartum mothers at PMB Bdn. Eka Setyowati Str. Keb Semarang City. Research subjects were taken using consecutive sampling technique and a sample of 15 people were obtained for each intervention group and control group Semarang City as the research location.

The intervention group was given transdermal patch therapy with red ginger compress 2 times a day and breastcare for 3 days, while the control group was given breastcare 2 times a day for 3 days, then an assessment was carried out using the *numeric rating scale* (NRS) pain score and the *six point engagement scale* (SPES) breast swelling score). The research data used included respondent characteristics such as parity and age. Data collection using questionnaires and observations. Data analysis using univariate and bivariate using *Wilcoxon* and *Mann Whitney*. This research has received approval from the institution and the Semarang Ministry of Health Polytechnic and Health Polytechnic Ethics Commission with ethical certificate number: No.1287/EA/KEPK/2023.

**RESULTS**

Organoleptic tests showed that the shape, color, texture and aroma were different in the three formulations, so the researchers used 3 trained panelists to find the best formulation for the red ginger extract transdermal patch.

Table 1.  
Organoleptic Results of Trained Panelists on Shape, Color, Texture and Aroma of Red Ginger Extract Patches

Color	Percentage of Likes and Very Likes		
	F1	F2	F3
Overall (Shape, Color, Texture, and Aroma)	33,3%	66,7%	33,3%

Based on the organoleptic preference test which was carried out on 3 trained panelists, the results obtained were that formulation 2 (F2) was the most preferred, namely 66.7% totaling the percentage of shape, color, texture and aroma. So in this study researchers used

formulation 2 (F2) as a transdermal formulation for red ginger extract patches. This study was divided into 2 groups, namely the intervention group and the control group. The intervention group was given red ginger compress transdermal patch therapy 2 times a day and breastcare for 3 days, while the control group was given breastcare 2 times a day for 3 days.

Table 2.  
Frequency Distribution of Respondent Characteristics Based on Age, IMD, Formula Milk, Joint Care Children

Characteristics	Intervention (n=15)		Control (n=15)		P-Value
	f	%	f	%	
Age					
<20	2	13,3	0	0	
20-35	12	80,0	14	93,3	0,289
>35	1	6,7	1	6,7	
Early initiation of breastfeeding					
Yes	14	93,3	14	93,3	
No	1	6,7	1	6,7	1,000
Formula Milk					
Yes	4	26,7	2	13,3	
No	11	73,3	13	86,7	0,237
Child care join					
Yes	14	93,3	13	86,7	0,075
No	1	6,7	2	13,3	

\*Uji Levene Test

The results of the homogeneity of the two groups for the variables age, IMD, formula milk, and joint care children showed a  $p\text{-value} > 0.05$ , meaning there was no significant difference in the intervention group and the control group. So that the characteristics of respondents in both groups are homogeneous or will not influence the research results.

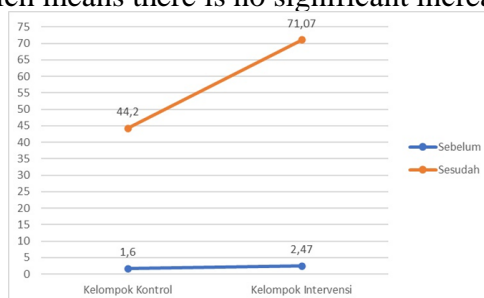
Table 3.  
Differences in Breast Milk Volume in Intervention and Control Groups Before and After Treatment

Group	Intervention	Control	P-Value
	Mean	Mean	
Pre	2,47±1,06	1,60±1,03	0,915**
Post	71,07±22,93	44,20±22,02	0,369**
P-Value	0,000*	0,011*	

\*Uji Wilcoxon

\*\*Uji Mann Whitney

In the intervention group, meaning there was a significant increase in breast milk volume with an average value from 2.47 to 71.07, while in the control group  $p = 0.011$  with an average value from 1.60 to 44.20. which means there is no significant increase in breast milk volume.



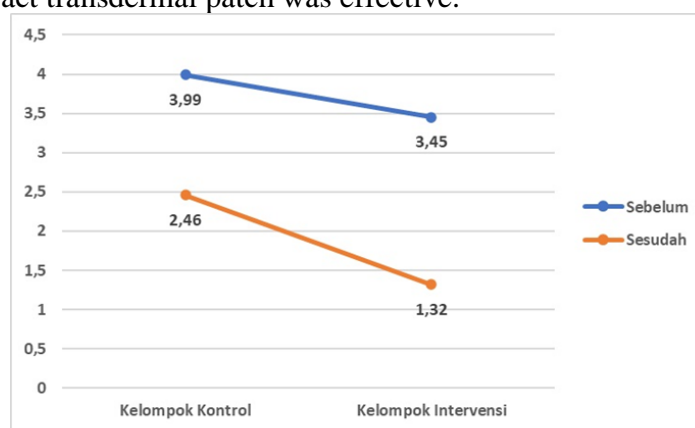
Picture 1. Changes in the average volume of breast milk in postpartum mothers

It can be concluded that administering a transdermal patch of red ginger extract is more effective than standard breast care for smooth breastfeeding in postpartum mothers.

Table 4.  
Average Measurement Score for Breast Swelling

Group	Intervension	Control	P-Value
	Mean	Mean	
Pre	3,45±4,55	3,99±4,81	0,226**
Post	1,32±1,88	2,46±3,28	0,000**
P-Value	0,000*	0,001*	

The average pre-post test breast swelling score in the intervention group before treatment was 3.45, while the average after treatment decreased to 1.32, which means that the administration of the red ginger extract transdermal patch was effective.



Picture 2. Changes in the average breast swelling score in breastfeeding mothers at prepost

Based on the graph in Image 2 above, it can be concluded that the average decrease in the breast swelling score of the intervention group after being given treatment decreased by 61.74%, while the control group experienced a decrease of 38.36% after being given treatment. It can be concluded that administering a transdermal patch of red ginger extract is effective in reducing the breast swelling score of postpartum mothers.

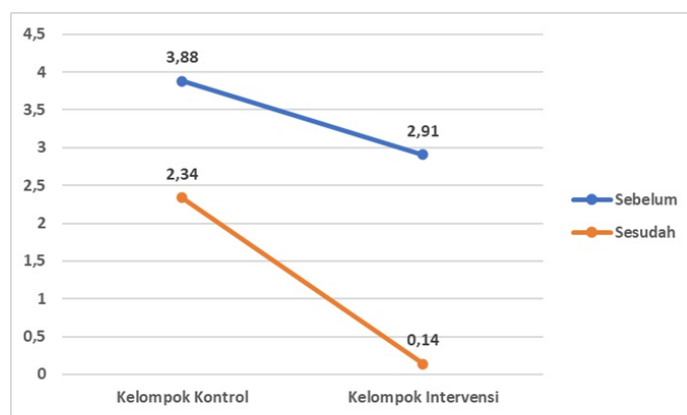
Table.5  
Differences in Breast Pain in the Intervention and Control Groups Before and After Treatment

Group	Intervension	Control	P-Value
	Mean	Mean	
Pre	2,91±4,29	3,88±5,05	0,056**
Post	0,14±1,06	2,34±3,12	0,000**
P-Value	0,001*	0,001*	

\*Uji Wilcoxon

\*\*Uji Mann Whitney

The average pre-post test breast pain score in the intervention group before treatment was 2.91, while the average after treatment decreased to 0.14, which means that the administration of the red ginger extract transdermal patch was effective.



Picture 3. Changes in the average breast pain score in breastfeeding mothers at prepost

Based on the graph in Image 3 above, it can be concluded that the average decrease in the breast pain score of the intervention group after being given treatment decreased by 95.19%, while the control group experienced a decrease of 39.69% after being given treatment. It can be concluded that administering a transdermal patch of red ginger extract is effective in reducing breast pain scores in postpartum mothers.



Picture 4. Red Ginger Extract Transdermal Patch Preparation

## DISCUSSION

One of the factors inhibiting adequate breastfeeding for babies is breast milk blockage caused by swelling and pain in the breasts. This condition can inhibit the flow of breast milk, reducing the mother's ability to provide adequate breast milk to the baby. Therefore, to overcome this problem, breastcare measures are carried out to reduce swelling and pain in the breasts. Breastcare can stimulate blood and lymphatic circulation, which helps reduce swelling by removing excess fluid and harmful substances from tissues. The use of compresses can theoretically reduce swelling by constricting blood vessels and reducing fluid flow to the affected area.

Even though breastcare is a useful step, sometimes providing breastcare alone is felt to be less effective. To increase its effectiveness, a more holistic approach is needed. One of the steps taken is to add red ginger extract patches to the breasts. Red ginger extract has been known to have anti-inflammatory properties and can help increase blood circulation in the affected area, thereby helping to reduce swelling and pain more effectively (Novia & Noval, 2021). Infections that cause swelling and pain in the breasts, such as mastitis, affect the physical condition but do not directly interfere with the physiological mechanisms of breast milk production. Even in these conditions, persistent stimulation of the nipple or regular emptying of the breast, although it may be uncomfortable, can trigger the release of prolactin and maintain milk production. Despite infections and pain, continuing to stimulate the breasts

with regular emptying can help prevent a buildup of breast milk which could potentially cause more serious problems such as a breast abscess.

Hormonal changes after giving birth, especially an increase in the hormone prolactin, can stimulate breast milk production and cause breast engorgement. Apart from that, changes in body fluid balance also cause breast swelling. This swelling can then cause breast milk blockage due to pressure on the milk ducts and lactiferous ducts which can inhibit milk flow. Breast engorgement can be treated with actions such as breastfeeding regularly, ensuring correct breastfeeding techniques to avoid breast milk blockage which can cause discomfort, pain and the risk of infection in the breast (mastitis). It is hoped that the combination of breastcare treatment and administering red ginger extract patches can provide a more comprehensive solution to overcome breast milk blockages. This approach not only relieves symptoms locally, but also has the potential to increase overall milk flow, support smooth breastfeeding of the baby, and ensure that the baby's nutritional needs and immune protection are properly met.

Providing sufficient breast milk also signals the mother's body to maintain a balance between milk production and demand. In other words, the more frequently and long enough a baby is breastfed, the more efficient the mother's body will be in providing breast milk according to the baby's needs. It can be concluded that administering a transdermal patch of red ginger extract is more effective than standard breast care for smooth breastfeeding in postpartum mothers. This research is also supported by the results of research on the effectiveness of aloe vera compresses in treating swelling pain in postpartum mothers, showing that breast care can reduce breast swelling on days 3-5 after treatment. Meanwhile, giving breastcare and red ginger extract transdermal patches simultaneously is effective in reducing breast swelling within 3 days.

The red ginger extract transdermal patch used contains the active compounds phenol, gingerol, shogaol, paradol, zingiberene and essential oils. These compounds have been shown to have anti-inflammatory properties that can reduce inflammation and hyperemia.(Novia & Noval, 2021) This research is also supported by the results of research on the effectiveness of aloe vera compresses in treating swelling pain in postpartum mothers, showing that breast care can reduce breast pain on days 3-5 after treatment.(Wardani & Saryanti, 2021) The results of content tests carried out at the Unwahas Pharmaceutical Biology Laboratory, Semarang City, showed the presence of flavonoids, phenolics, saponins and tannins in the ethanol extract of red ginger.

Supported by previous research, the data distribution shows the intensity of back pain in third trimester pregnant women before and after ginger compresses. Before the intervention, the majority of respondents (50%) reported experiencing moderate pain, while after the ginger compress, the majority of respondents (80%) reported experiencing mild pain. These results indicate a decrease in pain intensity after administering the ginger compress. Statistical analysis shows that the  $p\text{-value} = 0.005 < 0.05$ , meaning that the ginger compress intervention has a significant effect on reducing low back pain in pregnant women in the third trimester (Rosidah Nurhamidah & Andrieanto Nurrochman, 2022).

Adequate breastfeeding for babies plays an important role in the smooth production and delivery of breast milk. Breast milk is the main nutrient which is rich in nutrients and antibodies, supporting optimal growth and development of babies. Adequate breastfeeding consistently stimulates the production of the hormones prolactin and oxytocin in the mother,

which play a role in increasing the production and release of breast milk. Involving the baby in frequent and adequate breastfeeding sessions can provide the stimulus needed by the mammary glands to increase milk production.

## CONCLUSION

Based on the research results, the development of a red ginger extract *transdermal patch* has been successfully created. Research shows that the use of this patch is feasible and effective as an alternative therapy to increase the flow of breast milk in postpartum mothers. Apart from that, this patch is also effective in controlling treatment before and after the intervention. In testing, there was a significant increase in the volume of postpartum mothers' breast milk from 2.47 to 71.07, with a *p* value ( $p = 0.000$ ), indicating significant success. In addition, breast swelling was successfully reduced from 3.45 to 1.32, with a *p* value ( $p = 0.000$ ). Apart from that, the reduction in breast pain also appeared significant, from 2.91 to 0.14, with a *p* value of 0.001. These findings indicate that the development of a red ginger extract transdermal patch is not only effective in increasing the flow of breast milk, but can also control various symptoms associated with the breastfeeding process in postpartum mothers, especially breast swelling and pain.

## REFERENCES

- Athallah, Athallah, and Sinta Okta Lianda. (2021). "Formulation And Evaluation Of Stick Balm Preparations From Red Ginger Oleoresin (*Zingiber Officinale* Rosc) As A Muscle And Joint Pain Reliever." *Journal of Pharmaceutical And Sciences* 4(1):34–40. DOI: 10.36490/journal-jps.com.v4i1.62.
- Ginting Munthe, Novita Br, and DKK. (2022). *Postpartum Textbook S1 Midwifery Volume II*. edited by Team MCU Groups. Main Image Masterpiece.
- Jamarrudin, Raditha Nur Arsy, Ferawati Taherong, and Syatirah. 2022. "Journal of Midwifery." 4(2):32–41. DOI: 10.24252/jmw.v4i2.29549.
- Karo, Marni Br. 2021. *The Behavior Of Breastfeeding Mothers In Exclusive Breastfeeding*. NEM.
- Martini, Martini, Yetti Anggraini, and Ranny Septiani. (2022). "Effectiveness of Aloe Vera and Cabbage Leaf Compresses Against Breast Engorgement in Puerperal Mothers." *Journal of Health* 13(3):522. DOI: 10.26630/JK.V13I3.3556.
- Monazzami, Maryam, Sedigheh Yousefzadeh, Hasan Rakhshandeh, and Habibollah Esmaily. (2021). "Comparing the Effects of Hot Compress and Hot Ginger Compress on Pain Associated with Breast Engorgement." *Nursing and Midwifery Studies* 10(2):73–78. DOI: 10.4103/nms.nms\_24\_20.
- Novembriany, Yerika Elok. (2022). "Exclusive Breastfeeding At Tamban Health Center, Barito Regency, Kuala In 2022." 7(1):44–48.
- Novia, and Noval. (2021). "The Effect of Polyvinyl Pyrolidon and Ethyl Cellulose Polymer Combination on Characteristics and Penetration Test of Formulation Transdermal of Dayak Onion Extract Patch (*Eleutherine Palmifolia* (L.)." *Journal of Surya Medika* 7(1):173–84.
- Nurhayati, Nunuk. (2017). *Cortisol: breast milk dams and maternity blues*. 1st ed. Media Nusa Creative.

- Putri, Maulidia Annisa, and Nur Eva Aristina. (2023). "Breast Care in Postpartum Mothers with the Incidence of Breast Milk Dam." *Journal of Midwifery* 02(02):2963–1343.
- Rosidah Nurhamidah, and Andrieanto Nurrochman. (2022). "Characterization of natural polymers as adhesives of transdermal patch preparations by mixing method." *Journal of Pharmaceutical Research* 125–32. DOI: 10.29313/jrf.v2i2.1449.
- Sari, Ririn, Siswi Astuti, Mayang Sari, and Rizqi Syari'ati. (2022). *Maternal and Child Health Profile*. DOI: 4203002.
- Sari, Selvi Puspan, Titin Fatimah, and Rismawati. (2021). "The Effect of Kobis Leaf Compress on Breast Pain in Postpartum Mothers at Murniati Clinic." *Journal of Midwifery* XIII(01):139–48.
- Sari, Tatsa Princess Kumala. (2020). "Effectiveness Of Red Ginger Compresses On Prevention Of Breast Swelling, Reduction Of Breast Pain And Prostaglandin Hormone Levels In Puerperal Mothers."
- Sarwono, Prawirohardjo. (2008). *Midwifery Science*. 4th ed. edited by A. B. Saifuddin, G. H. Wiknjastro, and T. Rachimhadhi. Jakarta PT. Bina Pustaka 2008.
- Saryanti, Dwi, and Ita Mustika Putri Setyadi. (2022). "Optimization Of The Use Of HPMC And Na Cmc In Transdermal Patch Formula Of Eagle Flower Ethanol Extract (*Clitoria Ternatea* L.) With The Simplex Lattice Design Method." *Indonesian Journal of Pharmaceutical Research* 4(3):289–305. DOI: 10.33759/jrki.v4i3.224.
- Sudirman, Andi Akifa, and Dewi Modjo. (2021). "Effectiveness between warm compresses and fever compress plasters with a decrease in infant body temperature against measles immunization in the work area of the Telaga Health Center." *Olives (Journal of Health Sciences)* 8(1). DOI: 10.31314/zijk.v8i1.1162.
- Ulya, Ni'matul, Dewi Andariya Ningsih, Frisca Dewi Yunadi, and Misrina Retnowati. (2021). *Textbook of Postpartum and Nursing Midwifery Care*. 1st ed. edited by M. Nasrudin. PT Nasya Expanding Management.
- Wardani, Viki Kurnia, and Dwi Saryanti. (2021). "Transdermal Patch Formulation of Papaya Seed Ethanol Extract (*Carica Papaya* L.) on the basis of hydroxypropyl methylcellulose (HPMC)." *Smart Medical Journal* 4(1):38. DOI: 10.13057/smj.v4i1.43613.