

# The Effectiveness of Olive Oil to Prevent Sore Nipple on the Breastfeeding Mother

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**Abstract**—The coverage data of exclusive breastfeeding in the world was 39% and it was estimated to be 36% in poor and developing countries. Many women didn't give exclusive breastfeeding because of sore or blister on their nipples. The incidence of sore nipples was 11-96% of all breastfeeding mothers in the world. The aim of this study was to determine the effectiveness of olive oil to prevent the sore nipples on breastfeeding mother. This study used a quasi-experimental post-test only non-equivalent control group design to see the differences of the effectiveness of olive oil to prevent the sore nipples by smear on the intervention group nipple. The smear frequency was twice a day for 10 days. This study was conducted on June - September 2019 in Kudus. The population of this study was all breastfeeding mothers in Kudus. The intervention and control group consist of 15 respondent. The sampling technique use consecutive sampling. The data collection use observation sheets. The data analysis use the Mann Withney test. **Result:** 13.3% of 15 respondents on intervention group got sore nipple. On the control group, there were 53.3% of 15 respondents got sore nipple. The p value of Mann Whitney analysis result was 0.022. It is lower than alpha (0.05). It shows that the application of olive oil on the nipples of breastfeeding mothers was effective to prevent the sore nipple. **Conclusion:** olive oil can prevent the sore nipple on the breastfeeding mother.

**Keywords**—*Olive Oil, Nipple, Breastfeeding*

## I. INTRODUCTION

Midwifery care on postpartum period is the important thing to prevent the maternal death. About 60% incident of maternal death was happened on the postpartum period. They were caused by postpartum bleeding, eclampsia, infection and other. The incident of postpartum infection consists of reproductive organ infection (uterus, vagina, cervix, etc), breast infection and other). However, breast infection was not cause the mother death but it made the uncomfortable condition and bother the exclusive breastfeeding process.

Breast milk was a main foundation for the baby's growth, especially on the golden period (1000 first day of their life). But exclusive breastfeeding in Indonesia only 47%. There are three main causes of the low coverage of exclusive breastfeeding: 1) giving early meal (before 6 months of baby's age), 2) the low level of mother's knowledge about breastfeeding and 3) less of the family support system (especially from husband). A new breastfeeding

mother usually worry about their capability to breastfeed. They feel not competence to give direct breastfeeding. They feel their breast milk is not enough to fulfill the demand of their baby. On the four or five day after labor, most of the first mother have some problem related to breastfeeding process. They feel uncompetence to giving breast milk, they feel sore on their nipple because of the nipple blister, they feel tired because of labor process and take care their baby. Those problems can affect to their breast milk production so the volume is very low. Need to give attention ,support and information for the mothers so they don't be panic to face of breastfeeding period.

World Health Organization (WHO) recommends exclusive breastfeeding for babies in the first six months of their age. It means only breast milk for babies in their first six months life without other meal or drink. Exclusive breastfeeding can prevent the babies from respiratory disease, gastrointestinal disease, allergy and other disease. It is very effective to decrease mortality child in the poor and developing country. The coverage of exclusive breastfeeding in the world was still low (39%), and in the poor and developing country was 36%. [1][2]

Many problems cause the low coverage of exclusive breastfeeding such as the low level of mother knowledge about exclusive breastfeeding, busy, back to work, sore nipple, feel less production of breast milk.[3][4].

The early breastfeeding problem and make the high incidence of exclusive breastfeeding drop out is sore nipple/nipple wounds. The incidence of sore nipple was 34-96% from all breastfeeding mother. It was predicted that 80-90% breastfeeding mother has a little sore nipple on the early breastfeeding period. If it is not treated well, 26% will be worst (erythema, oedema)[5]

The wrong baby position and incorrect attachment of baby's mouth to the breast were the most cause of sore nipple. Another cause of sore nipple are using the bottle, engorgement, primipara, abnormally of nipple, using the breast pump, abnormally of tongue and baby's mouth. The incidence of sore nipple was 11-96%. Sore nipple was very difficult to be healed because it will be repeat as long as breastfeeding period.[6]

Incorrect attachment can be done if the areola doesn't good enter to the baby's mouth. The areola doesn't attach to the palatum so the baby's tongue can injure the nipple. On the engorgement case, breastmilk difficult to get out because breastmilk duct was blocked. It make the baby suck more hard so their tongue injure the nipple. Same condition on the case of abnormally of tongue and baby's mouth. The friction of the breast pump to the nipple can cause the nipple wound. If the nipple wound doesn't treat properly it can be infection on the nipple and breast.

Sore nipple can make uncomfortable condition and bother the psychological condition of the mother. It can disturb the sleeping time, mood, sleep quality and bonding attachment. However, the mothers should continue giving their breastmilk to their baby.[7]

Although sore nipple make the mother feel uncomfortable, but they usually delay to get treatment. They delay it until the wounds getting worst[8]

Lanolin and vitamin A ointment usually used to treat the sore nipple. Lanolin make the nipple skin moisture. Lanolin help the drug absorption. The using of vitamin B complex (Dexpanthenol) make the skin nipple moisture, keeping soft and skin elasticity. Peppermint increase the wounds nipple healing, skin tissue flexibility, prevent blisters.[5]

Olive oil is one of kind oil that cheap and easy to get. Olive oil began use in mediterranean a long time ago. Olive oil make the skin more moist and dry skin healing. It is caused by antioxidant and antimicroba content of olive oil.[9]

Olive oil consist of flavonoid, antioxidant, antibacterial, anti fungus. Olive oil is used to treat the skin infection such

as dermatitis, diaper rash, psoriasis and wound healing. Olive oil contain of Omega 3, it can be anti inflammatory and make the wound healing faster.[10]

Based on the utility and beneficial of olive oil, then we can use the olive oil to prevent the sore nipple. The using of olive oil to prevent the sore nipple has been done but the study about that still a little bit.

The aim of this study was to identify the effectiveness of olive oil to prevent the sore nipple on the breastfeeding mother.

**II. METHOD**

This study uses a quasi-post-test only non-equivalent control group design experiment. This study look the differences of the effectiveness olive oil use to prevent sore nipple between intervention and control group. All respondents were applied olive oil on their nipple twice a day as long as 10 days after labor. While, all respondents in the control group were not applied olive oil on their nipple. The inclusion criteria were breastfeeding mother, on the 10 days early period after labor, want to apply olive oil on their nipple, no history of olive oil allergy. The sampling technique uses consecutive sampling. The number of subjects of this study were 15 respondents in each group. This study held in the Kudus Regency on June - September 2019. Treatment to the intervention group were smearing olive oil on the nipple and areola 2x / day for 10 days at the early period after labor. Collecting data by using observation sheets. The data was analyzed by using Mann Withney test.

**III. RESULT AND DISCUSSION**

**TABLE I. THE INCIDENCE OF SORE NIPPLE ON BREASTFEEDING MOTHERS**

Variable	Group			
	Intervention		Control	
Sore nipple	2	13.3%	8	53.3%
normal	13	86.7%	7	46.7%
Total	15	100%	15	100%

Source: Primary Data, 2019

Based on Table I. In the Intervention group, there were 2 respondents (13.3%) had sore nipple and 13 respondents (86.7%) have not sore nipple. In the control group, there were 8 respondents (53.3%) had sore nipple and 7 respondents (46.7%) have not.

There were two factors that affect to the breastfeeding process. They were internal and external factor. The internal factors were mother's experience, attitudes and self confidence. The external factors were socio-economic conditions, traditions, attitudes of health workers, family support and maternal-infant health conditions. If one or many factors not support, they will affect the sensitivity of breastfeeding mothers who have sore nipples. Breastfeeding mothers who have sore nipple need more attention to increase their self confidence. If there were no attention for them, they will stop to give exclusive breastfeeding to their baby [11]

The breastfeeding method consists of correct attachment, positions and direct contact to the mother's body. The attachment of baby's mouth to the areola and nipple is the main role of the breastfeeding success. The right position of suckling, good attachment to the breast, effective

breastfeeding technique is the key to proper breastfeeding techniques.[12]

Incorrect of attachment and position of the baby's mouth to the breast were the main causes of sore nipple in the first ten days after labor. Sore nipples start on the third to seventh days after labor, the peak severity occurs on the third day after labor. Other researchers, said that besides the incorrect breastfeeding, the cause of sore nipple were using of nipple protectors, nipples less exposed by sunlight and air, less frequency and duration of breastfeeding. Sore nipple did not heal easily because the mother must continuously feed her baby. Sore nipple as the way of secondary bacterial and fungal infections that trigger breast infections[13]. It is estimated that friction of the nipple with the baby's tongue and the strength of the baby's suction are related to the occurrence of sore nipple[14]

Sore nipple or nipple wound was a sign of breast infection or inflammation (mastitis). The bacteria that causes mastitis are *Sthapylococcus aureus* and *Streptococcus agalactie*. The bacteria or fungi enter by the wound on the nipple. Most causes of sore nipple infections by fungi is caused by *Candida albicans* so it make nipple very painful. This condition getting

worst by dry skin on the nipple and shiny. This condition getting worst if the mother doesn't keep the personal hygiene well. Before breastfeeding, the mother should wash their hand first, but in the reality most of the mother forget that.

The dirty hand can transmit the bacteria or fungi cause the infection. The bacteria or fungi that enter through the wound will attack the mammary gland and become inflammation then infection.

TABLE II. THE EFFECTIVENESS OF OLIVE OIL TO PREVENT SORE NIPPLE

	N	Mean	p value
Intervention Group	15	12.50	0.022
Control Group	15	18.50	

Source: Primary Data, 2019

Based of Table II. Mann-Whitney test results obtained p-value of 0.022 with a significance level of  $p < 0.005$ . It means the application of olive oil on nipples and areola is effective to prevent sore nipples. Treatment of blasted nipples can be done pharmacologically and non-pharmacologically. Pharmacological treatment includes antibiotics, anti-fungi. While non-pharmacological treatment uses lanolin, peppermint, compresses (warm compresses, hydrogel compresses, tea compresses), the use of putting protection, photo therapy and the application of breast milk.[15]

Good lactation management such as the accuracy of attachment of baby's mouth, correct breastfeeding position were considered the most appropriate method to prevent sore nipples.

Blister of the nipples were caused by wrong attachment and positions and considered as a trigger for mastitis. Nipple damage usually occurs early in the breastfeeding period. Sores on the nipple were the entry points for several microorganisms that cause mastitis, including *Staphylococcus aureus*.

Treatment of sore nipple should be adjusted to the cause. If it is caused by bacteria, the treatment by antibiotics. If it is caused by fungus, it is treated by antifungals. If it is caused by dermatitis, it must avoid irritating factors and the use of corticosteroid creams and warm compresses may be needed for ease the pain[16]

An effective method to prevent sore nipple cannot be found with certainty. Olive oil is easy to get and cheap. Olive oil contents of antioxidant and anti-microbial. It was used to heal wounds. Olive oil is safe for newborns.[17]

Olive oil as we know it is the result of direct squeezing of olives, which is a fruit that is rich in oil content. Olive oil is the only oil that can be consumed immediately after the olives are pressed. Compared to other oils, olive oil is very rich in Monounsaturated Fatty Acids (MUFA) which are efficacious to reduce high cholesterol levels. Olive oil contains a number of diphenol compounds, such as hydroxytyrosol (HT) and oleuropein (OE) in high amounts, which is up to 800 mg per liter. Those compound is a strong antioxidant, and also can make olive oil is not easily oxidized and becomes rancid like other vegetable oils when stored for long periods of time.

Olive oil is obtained from olives which are processed into a paste. The paste is stirred slowly until the oil dots are fused into concentrate. Then, the oil is extracted by means of a press or by centrifugation techniques. This is where various types of olive oil are obtained, for example light olive oil, virgin, extra virgin and others. These different types of olive oil refer

to differences in the processing process. For example virgin and extra virgin olive oils are processed organically with a cold pressing system. There is also pure olive oil, also known as refined olive oil, which has gone through the process of adding chemicals. The types of olive oil that are widely available in the market: Extra Virgin Olive Oil. It is produced from the first extract or blackmail process through the cold press process. Meaning that the olives do not undergo a heating process such as being dipped in hot water, and without chemicals. The price of Extra Virgin oil is more expensive because it comes from olives with number one quality. The vitamin and mineral content is still natural and complete so that it can be consumed directly. The color of this oil is usually greenish, has a special aroma and flavor, with acidity levels of less than 0.8%. This oil is not good for sauteing or frying because the boiling point is very low. Extra virgin olive oil is better consumed by drinking or used as a mixture of foods such as salads or boiled vegetables. Pure extra virgin olive oil does not change physically even though it is placed in the refrigerator for days. There will be no visible layer of frozen oil on its surface. Many kinds of olive oil, such as: Virgin Olive Oil, Fino olive oil, Pure olive oil, Extract and Refined Olive Oil, Extra Light and Light Olive Oil, Pomace. Virgin olive oil is produced through a cold press process but from a second extract or juice. Higher acidity. This type of olive oil can be consumed directly or used as salad dressing. Fino Olive Oil is a mixture of Extra Virgin and Virgin. Pure Olive Oil is refined olive oil. The price is more economical and affordable compared to the price of extra virgin but the nutritional content is lower. Virgin olive oil is added to add and strengthen flavor. This type of oil is golden yellow and can be used for cooking, such as a mixture of cooking and sauteing. Extract and Refined Olive Oil. Although it is produced from the first juice, this type of olive oil is chemically processed to improve its poor quality. Chemicals are added to neutralize the strong taste and high acidity. To strengthen the taste of oil, virgin olive oil is added to it. Extra Light and Light Olive Oil is the result of refining olive oil extracts or juice from low quality. The color of this oil is clear yellow with the softest taste and aroma among others. Prices are priced for both types of oil is quite cheap. The quality of these two types of oils also varies, can be recognized based on differences in aroma, taste and color. Pomace is not thrown away but is able to be reprocessed. This type of olive oil is

chemically processed and virgin oil is added to strengthen the taste. Usually used as raw materials for cosmetics, shampoo, soap and others.

Basically, the use of olive oil for cooking is more beneficial than ordinary cooking oil. The content of omega 9 or oleic fatty acids reaches 80%. This figure is 10% more than palm oil. Unlike trans fats and saturated fats, oleic acid - including a type of unsaturated fat Mono Unsaturated Fatty Acid - can increase good cholesterol, thereby reducing the risk of coronary heart disease. Not only that, olive oil also contains linoleic acid (omega 6) - including Poly Unsaturated Fatty Acid (PUFA) - which can smooth skin and cell walls.

However, due to the high content of PUFA, olive oil tends to be less stable when heated. That is why olive oil is better used disposable, namely as edible oil, oil for food spread and sauteing, not frying. If used for frying or cooking at high temperatures, the ingredients can be damaged and can increase bad cholesterol in the body.

These antioxidant compounds also function in protecting the body from free radical attack if you consume olive oil. Not only that, for those who suffer from gastritis or gastritis, olive oil can help the activation process of bile and pancreatic hormones so as to eliminate the symptoms of the ulcer or gastritis.

Another advantage of olive oil is that olive oil can be heated to a temperature of 220 degrees Celsius before being converted into its trans form, while other oils have been overhauled at a temperature of 180-190 degrees Celsius.

The wound healing phase in a wound process is through 3 phases or 3 stages of wound healing, namely:

#### A. *Inflammatory Phase*

This inflammatory phase will last from the wound until about the fifth day. Disconnected blood vessels in the wound suffered will cause bleeding and the body in this case will try to stop it by vasoconstriction, contraction of the end of the broken vessel (retraction), and hemostasis reaction. Hemostasis occurs because platelets coming out of the blood vessels stick together, and together with the fibrin tissue that forms, clots the blood that comes out of the blood vessels. Meanwhile an inflammatory reaction occurs. Mast cells in connective tissue produce serotonin and histamine which increase capillary permeability resulting in fluid exudation, inflammation of inflammatory cells, accompanied by local vasodilation which causes edema and swelling. Clinical signs and symptoms of inflammation reaction become clear in the form of reddish color due to dilated capillaries (rubor), warm temperatures (heat), pain (dolor), and swelling (tumor).

Cellular activity that occurs is the movement of leukocytes through the walls of blood vessels (diapedesis) to the wound due to chemotactic power. Leukocytes secrete hydrolytic enzymes that help digest bacteria and wound impurities. Lymphocytes and monocytes which then appear participate destroy and eat wounded feces and bacteria (phagocytosis). This phase is also called the slow phase because the reaction of the formation of new collagen is small and the wound is only linked by very weak fibrin.

#### B. *Proliferation Phase*

The proliferation phase is also called the fibroplasia phase because what stands out is the fibroblast proliferation process. This phase lasts from the end of the inflammatory phase until about the end of the third week. Fibroblasts are derived from undifferentiated mesenchymal cells, producing mucopolysaccharides, aminoglycine asama, and proline which are the basic ingredients of collagen fibers that will link the wound edges.

In this phase the fibers are formed and destroyed again to adjust to the tension in the wound which tends to shrink. This property, together with the contractile nature of myofibroblasts, causes traction on the wound edges. At the end of this phase the strength of the injured strain reaches 25% of normal tissue. Later, in the process of ending the strength of collagen fibers increases due to intramolecular and intermolecular bonds. In this phase of fibroplasia, the wound is filled with inflammatory cells, fibroblasts, and collagen, forming a reddish-colored tissue with a smooth-surfaced surface called granulation tissue. The wound epithelium consisting of basal cells detaches from the base and moves to fill the wound surface. The place is then filled by new cells formed from the process of mitosis.

The migration process can only occur in a lower or flat direction, because the epithelium cannot migrate to a higher direction. This process only stops after the epithelium touches each other and closes the entire wound surface. With the wound surface closed, the process of fibroplasia by forming granulation tissue will also stop and the maturation process will begin in the interim phase.

#### C. *Remodeling Phase*

In this phase, the maturation process consists of re-absorption of excess tissue, shrinkage in accordance with gravity, and finally re-forming of newly formed tissue. This phase can last for months and is declared to be over when all signs of inflammation have disappeared. The body tries to normalize everything that has become abnormal due to the healing process. Odema and inflammation cells are absorbed, young cells mature, new capillaries close and are reabsorbed, excess collagen is absorbed and the rest shrinks according to the existing strain. During this process scar tissue is produced that is pale, thin, and limp and easy to move from the bottom. Maximum shrinkage is seen in the wound. At the end of this phase, the appearance of skin injury is able to withstand stretches of approximately 80% of normal skin ability. This is achieved approximately 3-6 months after healing.

Olive oil has four other important components namely peroxide, anisidin, iodine and aldehyde. These components carry antimicrobial properties in bacteria and fungus and have the ability to increase blood flow while accelerating the growth of skin tissue. In addition, olive oil can be used for prevention as well as for treating wounds. Olive oil contains polyphenol compounds. Polyphenols are phytochemical compounds that are naturally able to protect body cells from damage caused by free radicals and remove toxins from the body. Vitamin E contained in olive oil is very high. Vitamin E is useful for anti-inflammatory, anti-oxidant, helps to nourish, moisturize and soften the skin. So, the olive oil can help to heal the wound faster.

#### IV. CONCLUSION

Sore nipples make uncomfortable on the breastfeeding mother. The pain can disturb the continuity of exclusive breastfeeding. Olive oil contains several active substances that are able to moisturize, prevent dryness, treat wounds. The use of olive oil by smearing on nipples in the morning and evening on a regular basis is recommended to prevent sore nipple especially early in the breastfeeding period.

#### REFERENCES

- [1] S. Huml, "Sore nipples. A new look at an old problem through the eyes of a dermatologist.," *Pract. Midwife*, vol. 2, no. 2, pp. 28–31, Feb. 1999.
- [2] U. Indraccolo, M. Bracalente, R. Di Iorio, and S. R. Indraccolo, "Pain and breastfeeding: a prospective observational study.," *Clin. Exp. Obstet. Gynecol.*, vol. 39, no. 4, pp. 454–457, 2012.
- [3] N. A. Lavergne, "Does application of tea bags to sore nipples while breastfeeding provide effective relief?," *J. Obstet. Gynecol. neonatal Nurs. JOGNN*, vol. 26, no. 1, pp. 53–58, 1997.
- [4] M. Nakamura, Y. Asaka, T. Ogawara, and Y. Yorozu, "Nipple Skin Trauma in Breastfeeding Women During Postpartum Week One.," *Breastfeed. Med.*, vol. 13, no. 7, pp. 479–484, Sep. 2018.
- [5] M. Shanazi, A. Farshbaf Khalili, M. Kamalifard, M. Asghari Jafarabadi, K. Masoudin, and F. Esmaeli, "Comparison of the Effects of Lanolin, Peppermint, and Dexpanthenol Creams on Treatment of Traumatic Nipples in Breastfeeding Mothers.," *J. caring Sci.*, vol. 4, no. 4, pp. 297–307, Dec. 2015.
- [6] M. Sayyah Melli *et al.*, "Effect of peppermint water on prevention of nipple cracks in lactating primiparous women: a randomized controlled trial.," *Int. Breastfeed. J.*, vol. 2, p. 7, Apr. 2007.
- [7] H. McClellan, D. Geddes, J. Kent, C. Garbin, L. Mitoulas, and P. Hartmann, "Infants of mothers with persistent nipple pain exert strong sucking vacuums.," *Acta Paediatr.*, vol. 97, no. 9, pp. 1205–1209, Sep. 2008.
- [8] M. S. Melli *et al.*, "A randomized trial of peppermint gel, lanolin ointment, and placebo gel to prevent nipple crack in primiparous breastfeeding women.," *Med. Sci. Monit.*, vol. 13, no. 9, pp. CR406–411, Sep. 2007.
- [9] R. Lucas, Y. Zhang, S. J. Walsh, H. Evans, E. Young, and A. Starkweather, "Efficacy of a Breastfeeding Pain Self-Management Intervention: A Pilot Randomized Controlled Trial.," *Nurs. Res.*, vol. 68, no. 2, pp. E1–E10, 2019.
- [10] A. N. C. Gungor *et al.*, "Comparison of olive oil and lanolin in the prevention of sore nipples in nursing mothers.," *Breastfeeding Medicine: the official journal of the Academy of Breastfeeding Medicine*, vol. 8, no. 3, United States, pp. 334–335, Jun-2013.
- [11] T. M. Campos *et al.*, "Effect of LED therapy for the treatment nipple fissures: Study protocol for a randomized controlled trial.," *Medicine (Baltimore)*, vol. 97, no. 41, p. e12322, Oct. 2018.
- [12] F. Vieira, M. M. Bachion, D. D. C. F. Mota, and D. B. Munari, "A Systematic Review of the Interventions for Nipple Trauma in Breastfeeding Mothers.," *J. Nurs. Scholarsh.*, vol. 45, no. 2, pp. 116–125, Jun. 2013.
- [13] D. Scolnik and M. Glatstein, "Lanolin for Nipple Pain in Breastfeeding Mothers.," *American journal of therapeutics*, vol. 24, no. 4, United States, pp. e500–e501, 2017.
- [14] H. L. McClellan, J. C. Kent, A. R. Hepworth, P. E. Hartmann, and D. T. Geddes, "Persistent Nipple Pain in Breastfeeding Mothers Associated with Abnormal Infant Tongue Movement.," *Int. J. Environ. Res. Public Health*, vol. 12, no. 9, pp. 10833–10845, Sep. 2015.
- [15] C.-L. Dennis, N. Schottle, E. Hodnett, and K. McQueen, "An all-purpose nipple ointment versus lanolin in treating painful damaged nipples in breastfeeding women: a randomized controlled trial.," *Breastfeed. Med.*, vol. 7, no. 6, pp. 473–479, Dec. 2012.
- [16] G. Akkuzu and L. Taskin, "Impacts of breast-care techniques on prevention of possible postpartum nipple problems.," *Prof. Care Mother Child*, vol. 10, no. 2, pp. 38–41, 2000.
- [17] A. Mohammadzadeh, A. Farhat, and H. Esmaeily, "The effect of breast milk and lanolin on sore nipples.," *Saudi Med. J.*, vol. 26, no. 8, pp. 1231–1234, Aug. 2005.