

Effect of Breast Milk versus Lanolin on Healing of Sore Nipple among Postnatal Lactating Mothers

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Abstract

Nipple soreness is considered one of the most common short-term problems among mothers. Nipple soreness can usually be corrected in a matter of days which causes pain and discomfort for the mothers to continue breastfeeding. **Aim of the study:** To evaluate the effect of breast milk versus lanolin on healing of sore nipple among postnatal Lactating mothers. **Research design:** A quasi-experimental research design was used. **Settings:** The study was conducted in obstetrics departments at Qena General Hospital and South Valley university hospital. **Subjects:** A purposive sample of 120 postnatal lactating mothers with nipple soreness diagnosed in their first postpartum week were selected, the selected subjects were randomly divided into two equal study groups. **Tools of data collection:** Six tools were used to collect data namely: A structured interview questionnaire; Women's' knowledge related to breast feeding, breast feeding observation checklist; Visual analogue scale; nipple trauma scale and nipple soreness scale. **Results:** Findings demonstrated that the mean score of nipple pain and nipple soreness were significantly decreased among the breast milk group than lanolin group in the seventh and fourteenth day of intervention. There was a statistically significant difference between the two groups in favor of the breast milk in caring of nipple pain and nipple soreness in the seventh and fourteenth days of intervention. **Conclusion:** The study concluded that breast milk was more effective in healing of sore nipple than lanolin application among postnatal lactating mothers. **Recommendations:** Further studies are recommended to gain more insight into the effectiveness of breast milk in treating nipple soreness. Nurses and mothers must be educated about evidence-based practice in nipple soreness prevention and treatment.

Keywords: Sore nipple, breast milk application, lanolin, healing, postnatal lactating mothers

Introduction:

Breastfeeding can be challenging, especially in the early days. Many women who start out breastfeeding stop before the recommended minimum of exclusive breastfeeding for six months. Often women stop because common problems interfere with their ability to breastfeed (**Ministry of Health and Population, 2014**).

Breastfeeding is very important for the health and well-being of infants and mothers. It has been traditional way of feeding newborn and is one of the most natural and beneficial acts a mother can do for her child. Dramatic health benefits have been proven to pass from mother to child through breast milk. It is a common belief that breast feeding is a natural phenomenon and

proceeds smoothly and uneventfully (**World Health Organization, 2019**).

Breast feeding is a special gift from a mother to her baby. It not only provides a natural opportunity for bonding but also supports the growth and development of the new born. Many newborn lives are saved because breast milk provides important nutrients and protection against illness and infection. If every baby were exclusively breastfeed from birth, about 1.5 million lives would be saved each year (**Cesar et al., 2016**).

Several studies have shown that women with breast and nipple complications reported that it affects their success and continuation of breastfeeding. In a survey in New York City, 35% of nursing mothers stopped breastfeeding

after one week due to the pain of cracked nipples. Thirty percent stopped breastfeeding between weeks one and three. Another survey of breastfeeding mothers in Brazil reported that there was 25% higher risk of interruption of exclusive breastfeeding when the women had cracked nipples. Mothers with higher education levels were more likely to continue breastfeeding despite the pain of cracked nipples (**Juliana et al., 2016**).

A recent study conducted in Zagazig, reported that the majority of women were exposed to nipple soreness and breast engorgement and none of the women in the sample extend exclusive breastfeeding until the 6 months after delivery (**Abdallah et al., 2018**). A study highlighted that problems preventing mothers from adequate breastfeeding including insufficient milk production or perceived insufficiency, cracked or sore nipples, inverted nipples and breast engorgement (**Elwelely & Mansour, 2018**).

Normally, nipples are kept supple from the secretions of the Montgomery tubercles in the areola. They can become sore when they are excessively dry or wet, which makes them crack or fissure (**Coca et al., 2019**). Nipple pain can be classified as an acute pain because, usually, it occurs in the first week postpartum. The most commonly cause is inadequate positioning and attaching of the infant to the breast, which can lead to damage to the skin of the nipple and pose a major challenge for breastfeeding women, as they need to breastfeed around eight times a day in the early postpartum period. Frequent incorrect feeding hampers the tissue repair process and can lead to further damage (**Amir et al., 2018**).

Nipple soreness is one of the most common reasons new mothers give for discontinuing breastfeeding, often during the first week of nursing. This is quite unfortunate, for nipple soreness is almost always a short-term problem, and can usually be corrected in a matter of days. Breastfeeding is encouraged in current obstetrical practice which is not supposed to hurt, even though most of the mothers are experiencing some degree of soreness during the early stages of nursing. The degree of soreness varies greatly, with some mothers experiencing slight tenderness, and others bleeding and cracked nipples (**Abd-Elsalam et al., 2017**).

Healing soreness nipples in breastfeeding women is complicated due to repeated trauma from infant sucking and exposure to maternal skin and infant oral flora predisposing the nipple to secondary bacterial and fungal infection. Previous reports have suggested establishment of a good feeding position by the mother and baby, and correct attachment of the baby are important factors in successful breastfeeding, prevention and improvement of nipple trauma and nipple pain (**Degefa et al., 2019**).

A variety of interventions designed to reduce nipple pain in breastfeeding women have been reported. These include pharmacological topical treatments with antibacterial sprays, antifungal cream; non-pharmacological topical applications as peppermint oil/water, lanolin; dressings using warm compresses, hydrogel dressings, tea bags; breast shells and expressed breast milk (EBM). Other interventions that have been identified in the literature include time-restricted breast-feeding or exposure of the nipples to phototherapy and air-drying. Despite a lack of evidence-based studies on efficacy of expressed breast milk, it is widely used for the prevention and treatment of sore nipples (**Dennis et al., 2014**).

Expressed breast milk has immune globulin content and healing elements such as growth factors, anti-inflammatory and antimicrobial substances. (**Degefa et al., 2019**). Lanolin application is recommended to treat painful and/or damaged nipples. Aside from expressed breast milk, lanolin is the only intervention that has received continued endorsement by the La Leche League International, the most predominant global, community-based breastfeeding support network for women. Lanolin is also recommended by the International Board Certified Lactation Consultants (IBCLC) and is included in their core curriculum for lactation consultant practice (**Mannel et al. 2018**).

Lanolin is considered a pure and safe intervention (containing no preservatives, additives, water, chemicals or perfume), aimed at creating a moist healing environment for nipple trauma, and providing a semi-occlusive barrier that promotes retention of internal moisture and prevents dryness. Lanolin may provide a moist dermal environment to prevent scar formation,

promote epithelial regrowth and decrease nipple pain (Martin, 2016).

The most common causes of nipple trauma are; incorrect positioning and attachment of the baby to the breast, disorganized or dysfunctional suckling, incorrect use of breast pump, bacterial infection of nipple, candidacies of nipple/breast, tongue tie and vasospasm of nipple. Effective attachment of the baby to the breast is necessary to prevent nipple damage and pain, facilitate removal of milk from the breast, and maintain an adequate milk supply (Cesar et al. 2016).

The nurse should ensure mother is in a comfortable position with good back support, Support breast with one hand, bring baby to breast and tickle lower lip with nipple. Baby should open mouth wide, aim nipple at roof of mouth and allow him to draw it into his mouth. For breaking suction, the mother should gently insert her finger into baby's mouth beside nipple and allow baby to open mouth widely before removing nipple (Morland-Schultz K and Hill, 2016).

Significance of the study:

Nipple pain associated with breastfeeding are common, with incidence varying from 34 to 96%, and are cited as one of the main reasons for early cessation of breastfeeding in the early postpartum period within the first postpartum week, while later on; low milk supply is often seen as a reason to stop breastfeeding. Treating sore nipples quickly and effectively is very important factor to establish successful breastfeeding by maintaining a pleasurable breastfeeding relationship between mother and infant and preventing complications such as mastitis or breast abscesses (Juliana et al., 2016).

A variety of interventions have been used to either treat or prevent nipple pain and/or soreness associated with breastfeeding. However, there is little evidence from prospective trials regarding the use of topical agents as breast milk or lanolin. Despite a lack of evidence-based research on its efficacy, expressed breast milk (EBM) and lanolin continue to be widely recommended for the prevention and treatment of sore nipples that heal rapidly, often within a day or two. However, it is still easier to prevent rather than to treat them. Therefore, prevention and treatment of nipple trauma during the early postpartum period are

essential for successful and continued breastfeeding (Nakamura et al., 2018). Therefore, the current study was done to evaluate the effect of breast milk application versus lanolin on healing of sore nipple among postnatal lactating mothers.

Aims of the study:

To evaluate the effect of breast milk versus lanolin on healing of sore nipple among postnatal lactating mothers through;

1. Assess postnatal lactating mother's knowledge & practices related to breast feeding technique pre intervention.
2. Assess postnatal lactating mother's nipple pain, soreness & trauma score pre intervention.
3. Application of Breast Milk versus Lanolin with palliative measures on sore nipple among postnatal lactating mothers.
4. Evaluate postnatal lactating mother's knowledge & practices related to breast feeding technique post-intervention.
5. Compare postnatal lactating mother's nipple pain, soreness & trauma score between 2 groups post-intervention.

Study Hypothesis:

Postnatal lactating mothers with sore nipple who apply breast milk exhibit faster healing than who are use lanolin.

Subjects and Methods:

Research Design:

A quasi-experimental research design was utilized in the current research. Quasi-experimental research is a prospective or retrospective study in which patients self-select or are selected into one of some different treatment groups to compare the real effectiveness and safety of non-randomized treatments (Maciejewski, 2020).

Study setting:

This study was carried out in the obstetrics department at Qena General Hospital, which

provides charge-free inpatient and outpatient services. The work was done in the obstetrics department, located at the second floor of the hospital, with about 40 beds. Also, in the obstetrics department at South valley university hospital located at the fourth floor of the hospital

Study subjects:

Sample size:

The study included a purposive sample of 120 postnatal lactating mothers with nipple trauma. Epi -Info program was used to estimate the sample size using the following parameters: - Target population 267 per 3 months; - Expected frequency $p = 50\%$; - Acceptable error = 5% ; - Confidence coefficient = 95% ; - Sample size = 120.

The study subjects were selected from the previously mentioned settings according to the following inclusion criteria: Lactating mothers with sore nipple diagnosed by obstetrician in their first postpartum week, did not take any treatment for sore nipples, having a telephone for contact and willing to participate in the study. Lactating mothers who are suffering from severe anemia, chronic disease, ductal infections, infectious mastitis, and inverted nipple were excluded from the study.

The selected subjects were randomly divided into two equal study groups: Study group (1) included 60 mothers who were advised to put their breast milk on their sore nipples and air dries them after each feeding. Study group (2) included 60 mothers who were instructed to apply lanolin on their sore nipples after each feeding. All studied mothers in the two groups were instructed to continue these treatments for 14 day duration.

Sample technique:

The research study was conducted by non-probability purposive sampling technique.

Tools of data collection:

Six tools were used to collect the data.

Tool (I): A structured interview questionnaire: It was developed by the researchers and included information related to demographic data such as age, residence, level of education, phone number and occupation.

Tool (II): Women's' knowledge related to breast feeding: It was developed by the researchers after reviewing relevant and recent literature (Kent et al., 2015; Nayeri et al., 2019, Dias et al., 2017; and Abou-Dakn et al., 2011) to assess initiation of breast feeding, importance of breastfeeding, duration of breast feeding and number of breastfeeding per day. Women's' knowledge related to breast and nipple problems such as; breast infection, plugged duct, nipple soreness. It was consisted of 20 items. Each question was answered by the studied mothers through correct answer, incomplete answer, and incorrect answer. The scoring system was (0) if the answer is incorrect, (1) if the answer is incomplete, and (2) if the answer is correct with the total grade of 20. The level of knowledge was determined as satisfactory when was ($\geq 60\%$), and unsatisfactory level ($\leq 60\%$).

Tool (III): Breast feeding observation checklist: It was modified from WHO BREAST Feed observation form, which was developed by **World Health Organization & United Nations Children's Fund, 1993**. Breast feeding observation checklist used to assess the breastfeeding process. It included: mother's and newborn's positions as well as the newborn's attachment to the breast. It was developed to grade positioning (mother and newborn), and newborn's attachment during breastfeeding based on WHO criteria. Each item was assigned 1 point.

- Correct body position:

The mother should relax and comfortable, sit straight and well supported back, trunk facing forward and lap flat, baby neck should be straight or bent slightly back and body straight, baby body should turned toward mother, and baby body should be close to mother body and facing breast with the newborn's nose opposite her nipple and chin touching the breast, and baby whole body supported not just the neck and shoulders.

Correct baby's attachment:

The mouth should be wide and open, lower lip should be turned outwards, and baby's chin should be touched breast and more areola seen above baby mouth

A scoring system for correct body position: -

One criterion from mother's position and one criterion from infant's position or both from

mother's position take score 1-2 and considered "poor". - At least one criterion from mother's position and two or three criteria from newborn's position take score 3-4 and considered "average". - At least two criteria from mother's position and three or four criteria from infant's position take score 5-7 and considered "good".

A scoring system for correct baby's attachment:

Item one given score 1 and considered "poor", item two take score 2 and considered "average", item three and four given score 3-4 and considered "good".

Tool (IV): Visual analogue scale (VAS):

It was adapted from **Abou-Dakn, (2012)**, to assess nipple pain. The VAS is usually scored from 0 to 10 and the participants were asked to place a mark through the line at the point best describing the characteristic being assessed (pain). Measure, such as; 0 representing no pain and 10 representing pain as bad as it could possibly be. Rating scales were used to determine the level of pain as follows: no pain, mild (discomforting), moderate (distressing), and severe (excruciating).

Tool (V): Nipple soreness rating scale (NSRS)

It was developed by **Storr (1988)**. The scale was adopted and used to assess nipple status. It included six items that describe nipple soreness. The six items scored by Likert scale from Zero to five for each item, Zero given to no nipple discomfort as the score increase it means increase discomfort as follows: Normal nipple color, no tenderness (0), Nipple slightly red and/or tender for first 5-10 seconds of feeding (1), Nipple red and tender for longer than first 5-10 seconds of feeding (2), tender between feeding, makes mother grimace when baby starts feeding (3), Nipple beginning to crack, involuntary gasps of pain when baby starts feeding (4), Nipple cracked, feels sore "down to my toes" when baby starts feeding (5).

Tool (VI): Nipple Trauma Score (NTS):

It was adopted from **Abou-Dakn et al (2011)**, it is a valid and reliable as reported by Abou-Dakn et al, It was used to evaluate nipple trauma. The NTS score ranged between 0 and 5 and is based on wound depth and the extent of tissue damage. Description of nipple trauma as

follow: No microscopically visible skin changes scored 0, erythematic or edema or combination of both scored 1, superficial damage with or without scab formation of less than 25% of the nipple surface scored 2, superficial damage with or without scab formation of more than 25% of the nipple surface scored 3, partial thickness wound with or without scab formation of less than 25% of nipple surface scored 4, and partial thickness wound with or without scab formation of more than 25% of nipple surface scored 5. A nipple was considered to be healed if the corresponding trauma score rating was zero. A score of 1 to 5 indicated nipple trauma i.e. an absence of healing.

Field work:

Content Validity and Reliability:

- Tool I was developed by the researchers after reviewing relevant and recent literature. Content validity was assured by a panel of five experts in the field of Obstetrics and Gynecological Nursing to test its content validity. Modifications were done accordingly based on their judgment. Reliability of tool I was 0.713
- Tool II was modified after reviewing relevant literature, and checked for content validity by a jury of 5 experts in the field of Obstetrics and Gynecological Nursing. Reliability of tool II was 0.917.
- Tool III was checked for content validity by a jury of 5 experts in the field of Obstetrics and Gynecological Nursing. Its reliability was 0.887.
- Tool IV was checked for content validity by a jury of 5 experts in the field of Obstetrics and Gynecological Nursing. Its reliability was 0.785.
- Tool V (NSRs) was adopted from **Storr (1988)** was checked for content validity by a jury of 5 experts in the field of Obstetrics and Gynecological Nursing. Its reliability was 0.852.
- Tool VI (NTS) was checked for content validity by a jury of 5 experts in the field of Obstetrics and Gynecological Nursing. Its reliability was 0.88.

A pilot study:

It was conducted on 12 postnatal lactating mothers with nipple soreness to test the clarity, applicability of the study tools, identification of a suitable place for interviewing women, and to detect any possible modification that might face the researchers. Sample of pilot study were excluded from the actual study sample.

Data collection procedures:

The actual procedure was divided into three phases which included (assessment, Intervention, evaluation):

I - Assessment phase:

Data were collected from the beginning of January 2019 till the end of March 2019. The researchers were visited previous mentioned settings two days per week to collect data from 8 am to 1 pm. Each mother had nipple soreness was interviewed for 15-20 minutes during the first postpartum visit. Tool (I) was used to collect data from the two study groups through an interview schedule. Tool (II) was used by the researchers for the two groups to assess women's' knowledge regarding breast feeding. Tool (III) was used by the researchers for the two groups to observe the correctness of body position and correctness of attachment during breast feeding. The researchers asked the mother to breastfeed her baby and researchers observed the breastfeeding process for 5 minutes. Tools IV, V and VI were used to assess the nipple pain intensity, nipple soreness and trauma for the two study groups before the interventions as pre-test.

2- Intervention phase:

The studied mothers in the two study groups received face-to-face instructions about breastfeeding techniques, breast hygiene using a simple illustrative pamphlet. The pamphlet included simple pictures about the anatomy of the breast, correct breastfeeding position and infant's attachment. Then mothers were asked to keep their nipples dry and avoid using soap or other materials that could cause dryness of the nipple skin. Also they received education regarding breast feeding including nipple problems.

The breast milk group was instructed to take the expressed breast milk and put soaked cotton with breast milk on the nipples and areola after washing the nipples with water following every

breastfeed from day 1 to day 14 and wash before the next feed. The lanolin group was instructed to apply it on the sore nipple and areola after washing the nipples with water following every breastfeed from day 1 to day 14 and wash before the next feed. The researchers demonstrated for each mother how to apply breast milk and lanolin on the nipples and areola, and allowed the air-dry them, and it was followed by re-demonstrations by mother.

Evaluation and follow-up phase:

The follow-up of mother application of expressed breast milk and lanolin respectively in breast milk group and lanolin group was carried out daily by researcher through telephone interviews. All the studied mothers were asked about the frequency and duration of breastfeeding during 24 hours and were recorded.

A follow-up visit was arranged for both groups one week after the first intervention (day seven) and two weeks after the first intervention (day fourteen). A questionnaire was used to determine the presence and severity of sore nipple, trauma and pain. This follow up was carried out at homes. During the visits, the researchers ensured that the participants were performing interventions correctly and the nipples were examined for pain and nipple soreness healing using tools IV, V and VI. Breast feeding technique and breast feeding knowledge including nipple problems was also assessed in all the studied mothers by using Tool III and Tool II respectively. In addition to, each mother scored her own pain during breastfeeding during the fourteen days.

The nipple damage was defined on the basis of the width of the damage as follows: 1– 2 mm, mild; 3–9 mm, moderate; >10 mm, severe and/or a visible yellow color in the crack. Areola damage was also assessed according to the same criteria. The healing process and pain of the sore nipples were assessed and compared among the two study groups to find out the most effective method in dealing with nipples soreness.

Administrative and ethical consideration:

An official permission was obtained from the responsible authorities of the study settings to carry out the study after explaining the aim of the study. Before the research started, Approval of the Ethical Research Committee of Faculty of

Nursing was obtained before conducting the study. Written consent was obtained from the studied mothers to participate in the study after the aim of the study was explained to them. The researchers informed the studied mothers that, the study was voluntary and they had the right to withdraw from the study at any time, without giving any reason. Moreover, they were assured that their information would be confidential.

Statistical Analysis:

Statistical analysis was done after collection of data by using Statistical Package for Social Sciences (SPSS) version 20 program. A descriptive and analytical statistics were used such as percentages, means and standard deviations. Chi-square-test and One-Way ANOVA Repeated Measures- test at 0.05 levels to find out the statistical significance difference of the results were used.

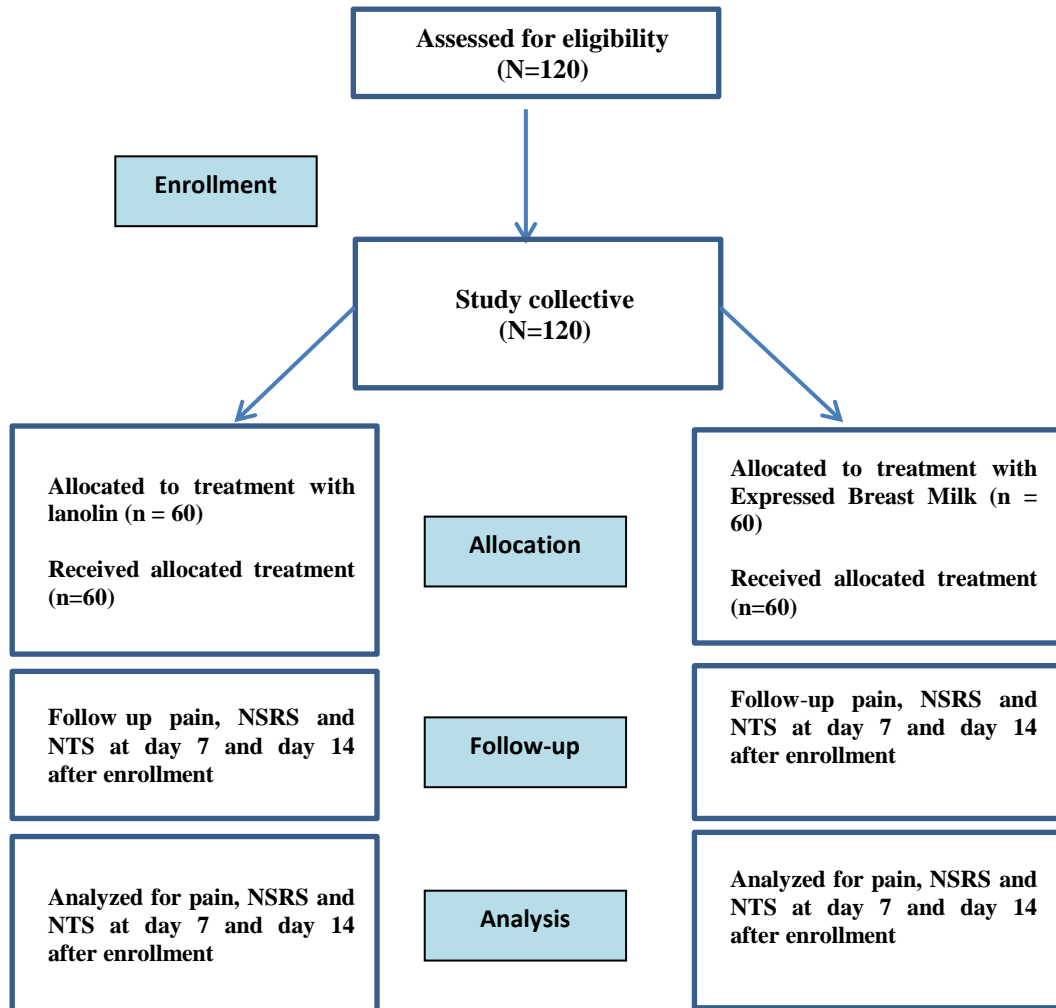


Figure 1: Flow chart of the study

Results:

Table 1: Showed that 58.5% and 50% of women in the breast milk and lanolin groups respectively were between 20-< 30 years of age

but with no statistical significant difference. Regarding residence, 50% and 58.5% of women in the breast milk and lanolin groups respectively was living in urban areas. As much as 48.0% of women in breast milk group

were had primary education compared to 50.0% in the lanolin group. Meanwhile, 65% of the women were housewives in breast milk group compared to 81% in the lanolin group

Table (2) illustrated that 55% and 45% of the breast milk and lanolin groups respectively had initiated breastfeeding during the first 2- 5 hours after childbirth. 65% and 60% of the two study groups mothers respectively were know the importance of breastfeeding. Regarding following right positions during breastfeeding, 67% and 62% of the studied mothers in two groups respectively were breastfeed their newborns in right position. It was observed that 65% and 47% of the studied mothers in breast milk group and lanolin were breastfeed their newborns more than 10 times daily. The duration of breastfeeding session was 10 minutes among 43.5% and 37% of the breast milk, and lanolin groups respectively.

Table 3 portrayed the number and percent distribution of the study subjects according to their knowledge about nipple problems. Similary proportion of the subjects in breast milk group and lanolin group were had incomplete and incorrect knowledge on the first day (17.0% or 83.0% vs. 15% or 83.0% respectively). However, on the 7th day, the studied mothers in breast milk group and in lanolin group showed slightly increase in correct knowledge (7% and 1.5% respectively). On the 14th day the studied mothers in breast milk group showed more correct knowledge than women in lanolin group (79.5% and 20.0% respectively).

It is evident from **table (4)** that there was no significant difference between the breast milk and lanolin groups in their total score of position (mother and newborn) and attachment grade pre intervention. 68% and 79% of the mothers in the two study groups respectively had poor body position (mother and newborn), compared to no one of them had good body position. In addition, 66.5% and 79.5% of the mothers in breast milk group and lanolin group respectively had poor attachment compared to no one of them had good attachment.

It is evident from **table (5)** that there was no significant difference between the breast milk and lanolin groups in their total score of position (mother and newborn) and attachment

grade 14 days post intervention. 63% and 53% of the mothers in in breast milk group and lanolin group respectively had good body position (mother and newborn). In addition to, 60% and 65% of the mothers in breast milk group and lanolin group respectively had good attachment.

Table 6 showed that 62% and 58% of women in breast milk group and lanolin group respectively felt no pain in their breasts or nipple at the 7th day. Meanwhile, severe pain was only felt by 10.0% of women in the breast milk group and 8% in lanolin group. Statistically significant differences were observed at ($p=0.003$). The same table pointed that 78% and 60% respectively of the studied mothers in breast milk group and lanolin group were felt no pain at the 14th day. Statistically significant differences were observed at ($p=0.004$).

Table 7 revealed that by the 7th day 12.0% and 25% respectively of women in breast milk group and lanolin group felt tender nipple for the first 5- 10 minutes after feeding, 4.0% and 5.0% respectively in breast milk group and lanolin group had tenderness more than 5 minutes this feeling has been improved by the 14th day and the majority (89.0%) of women in breast milk group felt normal with no feeling of tenderness or soreness compared to 72% in lanolin group.

Table (8) illustrated the mean score of nipple soreness in three time periods among the breast milk and lanolin groups. In the first day before intervention the mean score of nipple soreness was nearly equal 4.264 ± 0.82 & 4.223 ± 0.93 for the breast milk and lanolin groups respectively. No statistical significant difference was found between the two groups ($P=0.880$). On the other hand, in the 7th day of intervention there was a significant decreased in the mean score of nipple soreness 1.375 ± 0.87 & 1.636 ± 0.54 respectively for the breast milk and lanolin groups. A statistically significant difference was detected between the two groups in favor of the breast milk group where $P = 0.006$. Moreover, in the 14th day of intervention there was a significant decreased in the mean score of nipple soreness 0.38 ± 0.29 & 0.075 ± 0.25 for the breast milk and lanolin groups respectively. There was a statistically

significant difference between the two groups in favor of the breast milk group where $P = 0.003$.

Table (9) illustrated the mean score of nipple trauma in three time periods among the breast milk and lanolin groups. In the first day before intervention the mean score of nipple soreness was 4.34 ± 0.70 & 4.53 ± 0.54 for the breast milk and lanolin groups, respectively. No statistical significant difference was found between the two groups ($P=0.743$). On the other hand, in the 7th day of intervention there was a significant decreased in the mean score

of nipple trauma 1.27 ± 0.63 & 1.32 ± 0.74 respectively for the breast milk and lanolin groups. A statistically significant difference was detected between the two groups in favor of the breast milk group where $P = 0.001$. Moreover, in the 14th day of intervention there was a significant decreased in the mean score of nipple trauma 0.16 ± 0.37 & 0.076 ± 0.28 for the breast milk and lanolin groups respectively. There was a statistically significant difference between the two groups in favor of the breast milk group where $P = 0.001$.

Table (1): Distribution of the studied mothers according to their Demographic Characteristics

Items	Breast milk group (n=60)		lanolin group (n=60)		x ²	P
	No.	%	No.	%		
Age						
20-< 30	35	58.5	31	52	5.4	0.073
30- ≤ 35	25	41.5	29	48		
Residence						
Urban	31	52	35	58.5	1.037	1.642
Rural	29	48	25	41.5		
Educational level						
Illiterate	3	5%	6	10%	1.077	1.475
Primary school	29	48%	30	50%		
Secondary school	28	47%	24	40%		
Occupation						
Working	21	35%	11	19%	1.297	574
Housewife	39	65%	49	81%		

Table (2): Distribution of the studied mothers regarding their knowledge about breastfeeding

Knowledge about breastfeeding	Breast milk group (n=60)		lanolin group (n=60)		FET/X ² (P)
	No	%	No	%	
Initiation of breastfeeding after delivery:					
- Immediately after delivery (within 1 st hour)	3	5.0	9	15.0	0.712 (0.937)
- 2-5 hrs. after delivery	33	55.0	27	45.0	
- 6-24 hrs. after delivery	24	40.0	24	40.0	
Importance of breastfeeding to mothers and baby					
- Know	39	65%	36	60%	0.612 (0.747)
- Don't know	21	35%	24	40%	
Right position of breastfeeding					
- Yes	40	67%	37	62%	2.876 (0.573)
- No	20	33%	23	38%	
Number of breastfeeding times/day:					
- <5	9	15.0	14	22.5	4.18 (0.382)
- 5-10	12	20.0	18	30.0	
- >10	39	65.0	28	47.5	
Duration of breastfeeding					
- <10 minutes	19	31.5	21	35.0	2.978 (0.562)
- 10 minutes	26	43.5	22	37.0	
- > 10 minutes	15	25.0	17	28.0	

Table (3): Distribution of the studied mothers regarding their knowledge about nipple problems

Knowledge about nipple problems	Breast milk group (n=60)		lanolin group (n=60)		P
	No.	%	No.	%	
at 1st day					
Correct answer	0	0.0	1	2	0.699
Incomplete answer	10	17	9	15	
Incorrect answer	50	83	50	83	
At 7th day					
Correct answer	4	7	1	1.5	0.048*
Incomplete answer	21	35	8	14	
Incorrect answer	35	58	51	84.5	
At 14th day					
Correct answer	48	79.5	12	20	0.003*
Incomplete answer	11	19	21	35	
Incorrect answer	1	1.5	27	45	
X ² (P)	15.4 (0.001)*		2.2 (0.368)		

* P < 0.05 (significant)

Table (4): Number and percent distribution of the study subjects according to the quality of their total position (mother and newborn) and attachment (latch on) grade (practices)(pre intervention)

Total position and attachment grade	Breast milk group (n=60)		lanolin group (n=60)		x ² (P)
	No	%	No	%	
Body position:					2.886 (0.570)
- Poor	41	68.0	47	79.0	
- Average	19	32.0	13	21.0	
- good	0	00.0	0	00.0	
Attachment:					2.179 (0.723)
- Poor	40	66.5	48	79.5	
- Average	20	33.5	12	20.5	
- good	0	00.0	0	00.0	

Table (5): Number and percent distribution of the study subjects according to the quality of their total position(mother and newborn) and attachment (latch on) grade (practices) (14 days post intervention)

Total position and attachment grade	Breast milk group (n=60)		lanolin group (n=60)		x ² (P)
	No	%	No	%	
Body position:					1.984 (0.712)
- Poor	10	17	13	22	
- Average	12	20	15	25	
- good	38	63	32	53	
Attachment:					1.821 (0.810)
- Poor	6	10	5	8	
- Average	18	30	16	27	
- good	36	60	39	65	

Table (6): Distribution of the studied mothers according to Visual Analog Scale at 7th day and at 14th day

Breast Pain	Total Visual Analogue pain intensity scale scores							
	Breast milk group = 60				Lanolin group = 60			
	7 th day		14 th day		7 th day		14 th day	
	No	%	No	%	No	%	No	%
No pain (Score 0)	37	62	47	78	35	58	36	60
Mild pain (score14)	14	23	13	22	13	22	23	38
Moderate pain (score5-7)	3	5	0	0.0	7	12	0	0
Sever pain (score8-10)	6	10	0	0.0	5	8	1	2
P- value	0.003*				0.004*			

* Significant at $P \leq 0.05$ **Table (7):** Comparison between the grade of soreness at the 7th day and the 14th day among women in the breast milk group and lanolin group

Grade of nipple soreness	Breast milk group = 60				Lanolin group = 60			
	7 th day		14 th day		7 th day		14 th day	
	No	%	No	%	No	%	No	%
Normal	47	78	54	90	39	64	43	72
Tender for 1st 5-10 minutes after feeding	7	12	4	6	15	25	9	15
Tender more than 5-10 minutes after feeding	2	4	1	2	3	5	3	5
Tenderness between feeding	4	6	1	2	2	4	4	6
begin to crack	0	0.0	0	0.0	1	2	1	2

 $P < 0.05$ (significant)**Table (8):** Comparison of mean total score of nipple soreness in four time periods among the breast milk and lanolin groups

Total score of nipple soreness	Total nipple soreness rating scale scores		
	1 st day before Interventions	7 th day	14 th day
	Mean \pm SD	Mean \pm SD	Mean \pm SD
Breast milk group = 60	4.264 \pm 0.82	1.375 \pm 0.87	0.38 \pm 0.29
Lanolin group = 40	4.223 \pm 0.93	1.636 \pm 0.54	0.075 \pm 0.25
F	0.127	5.282	6.082
P	0.880	0.006 *	0.003 *

*: Significant at $P \leq 0.05$ **Table (9):** Comparison of mean total score of nipple trauma in three time periods among the breast milk and lanolin groups

Study groups	Total nipple trauma score			
	1 st day before interventions	7 th day	14 th day	F (p)
	Mean \pm SD	Mean \pm SD	Mean \pm SD	
Breast milk group = 60	4.34 \pm 0.70	1.27 \pm 0.63	0.16 \pm 0.37	103 (< 0.001) *
Lanolin group = 60	4.53 \pm 0.54	1.32 \pm 0.74	0.076 \pm 0.28	684 (< 0.001) *
F	0.743	3.734	7.342	
P	0.477	0.027	0.001 *	

* Significant at $P \leq 0.05$

Discussion:

Painful nipple soreness and trauma causes a problem for mothers and also, may cause severe pain and mastitis leading to low prevalence of breastfeeding. Nipple soreness confronts breastfeeding women 3-6 days postpartum and in some mothers, may persist to 6 weeks after delivery (Nayeri et al., 2019). Pain during breastfeeding is considered a sign of a problem and should not be neglected. Although sore or tender nipples are common during the first few days of breastfeeding, it should be improved (Dias et al., 2017). Normal soreness usually occurs for about a minute when the baby first latches on to the breast. If pain is severe and continuous, it reflected a sign of a problem and should be resolved and corrected (Saeidi et al., 2017).

Nipple damage often results from improper latch or positioning at the breast. To prevent nipple damage, soreness, and pain it is imperative to provide newly breastfeeding women with education regarding proper positioning and latch, but to also frequently observe breastfeeding in the early postpartum period, to provide hands-on assistance if needed. Therefore, the prevention and treatment of nipple pain and soreness is important (Firouzabadi et al., 2020).

The results of the current study revealed that there no statistical significant differences were detected between the breast milk and lanolin study groups regarding their demographic data; this is reflected similarity of the characteristics between the two groups.

The results of the current study indicated that more than half and less than half of the breast milk and lanolin groups respectively had initiated breastfeeding during the first 2- 5 hours after childbirth. These results were much less than those reported by Chaudhary et al., (2018) who studied " Knowledge and practice of mothers regarding breast feeding " and found that only 10% and 25% of mothers knew they had to start breastfeeding immediately after birth and knew the benefits of colostrum, and few women who knew how to cope with their breast or nipple problems. This difference could be explained by valuable effort of the

researcher who provides advice and support to mothers during the study period.

The results of the current study revealed that the subjects in breast milk group and lanolin group were either had incomplete or incorrect knowledge on the first day regarding breast feeding including nipple problems. From the researcher's point of view, this might be due to the fact that all the mothers were with no experience before, at a relatively young age and might not be exposed to similar educational program during their antenatal period or immediately during postnatal period mean while majority of them had correct answer on 14 days after intervention which reflected the effectiveness of intervention. The current study findings were supported by findings of the study conducted by Buck (2014) who stated that health education about breast feeding is essential fundamental in ensuring a positive breast-feeding experience.

The results of the current study revealed that more than two thirds and more than three quarters of the mothers in the two study groups had poor body position and poor attachment before intervention. From the researchers' point of view, this is good indication to show that antenatal education about women's positioning and attachment technique is very important to reduce nipple soreness and pain caused by breastfeeding mean while more than half of women had good body positioning and attachment after 14 days from the intervention which reflected the effectiveness of intervention. The current study findings were supported by findings of the study conducted by Kent et al. (2015) and ascertained that proper positioning and attachment in the first week after birth assisted in the prevention and treatment of nipple damage and subsequent infection.

The results of the current study indicated that more than three quarters of the studied mothers in breast milk group compared to less than two thirds in lanolin group were felt no pain at the 14th day. Statistically significant differences were observed ($p=0.004$). This is indicated the positive effect of the two methods in reliving nipple pain which is favor more in breast milk group.

These findings are in the line with a study conducted by **Abou-Dakn et al. (2011)** who studied "Positive effect of HPA lanolin versus expressed breast milk on painful and damaged nipples during lactation", and suggested that the use of lanolin and breast milk decrease nipple pain intensity scores within approximately seven to ten days postpartum. This is similar to results done by **Dennis et al. (2012)** in a trial evaluating an all-purpose nipple ointment and found participants in the lanolin group had low levels of pain and satisfaction with breastfeeding vs. those in the all-purpose nipple ointment group ($p < .01$)

The results of the current study revealed that in the 7th day of intervention there was a significant decrease in the mean score of nipple soreness for the breast milk and lanolin groups, also, in the 14th day of intervention with a statistically significant difference between the two groups in favor of the breast milk group. The effectiveness of breast milk may be related to the breast milk having healing elements such as antibodies, anti-inflammatory, anti-microbial substances and epidermal growth factor which may potentially promote the growth and repair of skin cells (**Marrazzu et al. (2015)**).

These results are in agreement with the study done by **Gharakhani et al., (2018)** about "A comparative study of the effects of mint tea bag, mint cream, and breast milk on the treatment of cracked nipple in the lactation period" in Iranian who found that breast milk was more effective than mint cream and mint tea in decreasing soreness of the nipple. The current study result is matched with the study performed by **Hables & Mahrous (2021)** titled with "Breast Milk on Nipple Soreness among Lactating Mothers" and detected that olive oil, coconut oil and breast milk in their order had positive effect on management of nipple soreness.

These results not similar with the study conducted by **Eshgizade et al., (2016)** about "Comparison of the effect of olive oil, aloe vera extract and breast milk on healing of breast fissure in lactating mothers" who reported that there was no significant difference between breast milk and olive oil groups. Also, the study with **Pezeshki et al., (2020)** about "

Comparison of the Effect of Aloe Vera Extract, Breast Milk, Calendula-E, Curcumin, Lanolin, Olive Oil, and Purslane on Healing of Breast Fissure in Lactating Mothers" who found that no significant difference was observed between the mother's breast milk group and olive oil and usage of these therapeutic methods is suggested to improve sore nipples given their low cost and limited side effects.

These results are supported with the study conducted by **Alamohoda et al., (2020)** who studied "Effects of both Aloe Vera gel and breast milk on the improvement of nipple soreness in lactating women" and reported that nipple soreness between the two groups before treatment and 10 days after delivery and before treatment and 14 days after delivery, indicated a significant difference ($P < 0.001$). Also, These findings confirmed by the result of the study conducted by **Ismail et al., (2019)** that studied the study titled with "Effect of Breast Milk, Peppermint Water and Breast Shell on Treatment of Traumatic Nipple in Puerperal Lactating Mothers" who stated that the mean score of nipple soreness and nipple trauma were significantly decreased among the breast milk group in the seventh and fourteenth day of intervention with a statistically significant differences between the two groups.

This current finding is similar to the finding of the study of **Mohammad et al., (2015)** who studied "The effect of breast milk and lanolin on sore nipples" and found that breast milk was more effective in managing nipple soreness than lanolin in relation to healing time. On the contrary, the result of the current study is not similar to the study conducted by **Neto et al., (2018)** about "Comparative Study of the Use of HPA Lanolin and Breast Milk for Treating Pain Associated with Nipple Trauma" and revealed that there was pain improvement from the second to the third assessment in the group that used lanolin, while the pain remained not changed between these two periods in the breast milk group.

The results of the current study revealed that a statistically significant difference was detected between the two groups in favor of the breast milk group where ($P = 0.001$) in the 7th day of intervention and in the 14th day of intervention where there was a significant

decreased in the mean score of nipple trauma. This indicates that the positive effect of breast milk was more effective in relieving nipple trauma than lanolin.

The result is in the same line with **Mohammad et al., (2015)** that studied "The effect of breast milk and lanolin in the treatment of sore nipples" and showed that breast milk has the advantage of being convenient, inexpensive, with no side effects and non-pharmacologic and must be recommended for the treatment of nipple trauma.

Similarly, the results of the present study, **Gharakhani et al,(2018)** who compared the effects of mint tea bag, mint cream, and breast milk on the treatment of cracked nipple in the lactation period, and they reported that the severity of nipple pain and trauma was significantly lower in breast milk group than the peppermint tea and peppermint cream groups. In addition, **Fadel & Khedr (2018)** who done a study titled with " Effect of Breast Milk on Nipple Pain among Early Puerperal Lactating Women" and also stated that expressed breast milk can be used as a lubricant on nipple to manage nipple trauma and pain among early lactating women.

The results of the current study were not similar to the results conducted by **Vieira et al, (2017)** studied the effects of anhydrous lanolin versus breast milk combined with a breast shell for the treatment of nipple trauma and pain during breastfeeding and reported that the healing of nipple trauma was faster in the group treated with breast milk, starting on the third day of intervention. And the intensity of pain was lower in the group treated with breast milk starting on the fifth day of treatment. They concluded that the intervention with breast milk was more effective than anhydrous lanolin for the treatment of nipple trauma and pain in breastfeeding women.

On the other hand, **Ahmed et al, (2015)** showed that lanolin, tea bag compresses and expressed breast milk had the same effect of relieving nipple trauma. Furthermore, **Abou-Dakn et al, (2011)** concluded that lanolin was more effective than expressed breast milk in reducing nipple pain and promoting healing of nipple trauma.

Conclusion:

Based on the finding of the present study, it can be concluded that more than half and less than half of the breast milk and lanolin groups had initiated breastfeeding during the first 2-5 hours after childbirth. Majority of women in the two study groups had good body position and good attachment practices after fourteen days of the intervention. Statistically significant differences were observed regarding the positive effect of the two methods in relieving nipple pain which is favor more in breast milk group. By the 14th day, the majority of women in breast milk group their feeling has been improved and felt normal with no feeling of tenderness or soreness compared to lanolin group. Breast milk is effective in the nipple trauma treatment compared to lanolin group fourteen days after intervention.

Recommendations:

Based on the results of the present study, the following recommendations can be suggested:

- Application of breast milk could be suggested as a treatment of nipples soreness.
- Postnatal lactating newly breastfeeding mothers should be educated about proper positioning and attachment of the baby to the breast for breastfeeding to prevent traumatic nipples incidence.
- Replication of the current research on a larger sample size and different settings is recommended to validate results.
- Further studies are recommended to gain more insight into the effectiveness of breast milk. Nurses and mothers must be educated about evidence-based practice in nipple soreness of breast milk.

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