

A randomized Controlled Study on the Effects of Extra Virgin Olive Oil Compared to Breast Milk on Painful and Damaged Nipples During Lactation

Naglaa Abdelmawgoud Ahmed⁽¹⁾, Amina Ibrahim Badawy Othman⁽²⁾, Amal Ahmed Kanona⁽²⁾, Hemat Mostafa Amer⁽¹⁾, Nagat Salah Shalaby⁽³⁾, and. Nadia Bassuoni Elsharkawy^(4,5)

(1) Family and Community Health Nursing, Faculty of Nursing, Menoufia University, Egypt.

(2) Medical Surgical Nursing, Faculty of nursing, Menoufia University, Egypt.

(3) Maternity, Gynecology and Obstetrics Nursing, Port-Said University, Egypt.

(4) Associate professor, Nursing Department, College of Applied Medical Sciences, Jouf University, Kingdom of Saudi Arabia.

(5) Maternal and Newborn Health Nursing Department, Faculty of Nursing, Cairo University, Cairo, Egypt.

Abstract

Painful and damaged nipples during lactation are common causes of premature breast feeding cessation. The applications of different non-pharmacological products to soothe and heal nipples are widely recommended. Aim: to evaluate the effects of extra virgin olive oil compared to breast milk on painful and damaged nipples during lactation. Design: Randomized controlled trial was utilized. Setting: The study was conducted at postpartum unit in Menoufia university Hospital Maternity, Maternal and Child Health Center, Menoufia, Egypt. Sample: A simple random sample of 120 postpartum women were recruited & randomly assigned into 2 groups 60 women for each. The First group subjects were requested to apply extra virgin olive oil to their nipples twice daily after breastfeeding & the second group subjects were asked to apply breast milk. Tools of data collection: I- Structured interview questionnaire to collect socio- demographic and medical data II- Visual Analogue Pain Scale to assess the subject's level of pain intensity during breastfeeding III- Nipple Trauma Score to assess the nipple trauma & evaluate healing rates of breasts. Results: There were statistically significant differences between extra virgin olive oil and breast milk groups with extra virgin olive oil group have significant lower nipple pain, lower nipple trauma, & better nipple trauma healing than breast milk group on the 3rd, 7th & 14th day (p Value <0.01). Conclusion: The application of extra virgin olive oil has better effect on painful and damaged nipples during lactation than breast milk. Recommendations: raising awareness of lactating mothers regarding the beneficial effect of extra virgin olive oil on nipple trauma and pain and how to apply it through a programmed postpartum care.

Keywords: Breast Milk, Extra Virgin Olive Oil, Lactation and Painful & Damaged Nipples.

Introduction

Nipple trauma has been identified as pain sensation associated with breastfeeding in frictional and suction lesions of nipple ranging from uncomfortable feeling to severe pain with physical trauma that is characterized by cracked, sore, bleeding, edematous, and blistered nipples that may have fissures present. It is a major problem among breastfeeding women and it is one of the main reasons that prevent mother from breastfeed her newborn and sometimes is the leading cause of breastfeeding cessation. Nipples pain and trauma can start immediately after delivery reaches its peak by third to seventh day postpartum (Thompson, 2016).

Nipples become painful and start to show small cracks that may bleed. The physical and psychological effects of nipple pain can cause high levels of emotional distress. The incorrect handling of the infant to the mother's breast, the inadequate positioning between mother and child has been identified as main risk factors of nipple trauma and pain (Janaina, Tatiana & Graciete, 2017, Shams, 2011).

The most effective measures of helping women is to establish soothing and painless breastfeeding in order to continue to breastfeed as long as they intend has yet to be established, and research is urgently needed in this area (Buck, Amir, Cullinane, & Donath, 2014). Buck, Amir, and Donath (2014) reported that the application of different preparations to soothe and heal nipples is widely

recommended. Many traditional remedies, such as onions, peppermint water, and olive oil, are used by lactating women. From that perspective the use of extra virgin olive oil (EVOO) has been proposed

Recent epidemiological & clinical evidence has provided the scientific basis for the health benefits of olive oil (Boskou, 2015). It has been used since ancient times as a cosmetic and to aid skin healing. The ancient Egyptians used it as an anti-wrinkle potion; the Romans used it as a moisturizer after bathing. To this day, olive oil is used widely in many countries to treat and prevent multiple skin conditions & an evaluation of its biologic value as a topical raw material in dermatology is reported. (Viola & Viola, 2009).

Extra virgin olive oil (EVOO) has immunological, anti-inflammatory, antioxidant, antibacterial, antifungal properties and used by researchers for prevention and treatment of nipple trauma as it is an easily attainable and relatively inexpensive substance and it had been used for sore nipples in the Mediterranean countries for many years (Gungor et al, 2013). Extra virgin olive oil (EVOO) and Olive oil is natural oil that contain flavonoids, antioxidant, antibacterial, antifungal properties and used by researchers for prevention and treatment of nipple trauma as it is an easily attainable and relatively inexpensive substance and it had been used for sore nipples in the Mediterranean countries for many years .. Also it has been tested for management of different skin problems as atopic dermatitis, and diaper rash. EVOO is a safe and may be beneficial choice for prevention and treatment of nipples problems including sore, cracked and traumatized nipples (Gungor et al, 2013).

Breast milk is a natural treatment that promotes wound healing, but over a long period of time. Milk contains bioactive factors that employ antimicrobial and anti-inflammatory mechanisms to stimulate and modulate the development of immune function and the growth and development of lactating tissues. These protective factors help to explain the action of breast milk in healing nipple trauma in breastfeeding women (Coca, Abr ao ACFV, 2008, Abou-Dakn et al., 2011, & Mohammad, Farhat, and Esmacily, 2005). So,

we plan to evaluate the effectiveness of the application of EVOO versus Breast Milk (BM) nipple trauma and pain among lactating women.

Significance of the Study

It is a dream for most women to have comfort postnatal period and breastfeed her baby, but nipple trauma is still a common problem, for pain or cracks, and soreness that frequently occur after breastfeeding. When the nipples are injured, breastfeeding is in danger. It is estimated that 34 to 96 % of breastfeeding women experience some nipple soreness and may resort to premature weaning (Brent, 2010). Moreover, up to one third of mothers who experience these complications may change to other methods of infant nutrition within the first six weeks postnatal (Abou-Dakn, et al., 2011).

Many traditional remedies, such as onions, peppermint water, and olive oil, are used by lactating women. However, to date, none of the products have been confirmed as a final solution to this problem. Extra virgin olive oil (EVOO) has immunological, anti-inflammatory, antioxidant, antibacterial, antifungal properties and used by researchers for prevention and treatment of nipple trauma as it is an easily attainable and relatively inexpensive substance and it had been used for sore nipples in the Mediterranean countries for many years (Gungor et al, 2013). From that perspective the use of extra virgin olive oil (EVOO) has been proposed.

Aim of the Study

The aim of the current study is to evaluate the effects of extra virgin olive oil compared to breast milk on painful and damaged nipples during lactation

Hypotheses

- H1.** The study group who will apply Extra Virgin Olive Oil (EVOO) will have significant lower nipple pain intensity than the control group who will have breast milk (BM).
- H2.** The study group who will apply Extra Virgin Olive Oil (EVOO) will have lower nipple trauma than the control group who will have breast milk (BM).

H3. There will be a difference between applying Extra Virgin Olive Oil (EVOO) study group and breast milk (BM) control group in nipple trauma healing.

Subjects and Methods

Research Design

Randomized controlled trial was utilized to accomplish this study's purpose.

Research Setting

The study was conducted at postpartum unit in Menoufia university Hospital Maternity, Maternal and Child Health Center (MCHc) in Shebin Eklom, Menoufia, Egypt and after taking the address of the entire participant, home visits were made on the third, seventh and fourteenth days.

Sample

A simple random sample of 120 postpartum women will be recruited based on the following inclusion criteria; Postpartum women who is willing to participate, having normal nipple skin and breastfeed her baby during first 12 hours after birth and not using any ointments, oils, and or medications to the nipples. Women, who have any medical contraindication for breastfeeding, are diagnosed by ultrasound to deliver a baby with cleft lip or cleft palate or other congenital anomalies interfere with normal suckling baby, women who have any psychological or mental disorder, and have an allergy to EVOO. Women were randomly assigned into 2 groups; group1 sixty women were applied few drops EVOO on the nipples after breastfeeding and Group 2 sixty women who were applied few drops of breast milk on the nipples after breastfeeding. Sample size will be calculated based on a power analysis of 0.95 ($\beta=1-0.95=0.5$) at alpha .05(one –sided) with large effect size (0.5) was used as the significance.

Tools of data collection

Structured interview questionnaire was developed by the researchers to collect socio-demographic and obstetrical data.

Visual Analogue Pain Scale (VAS) was adopted from (Duffy, Percival, Kershaw, 1997, & Buchko, et al., 1994) and used by the

researchers to assess the subject's level of pain intensity during breastfeeding on enrollment, 3rd, 7th, and 14thdays postpartum. VAS Rating Pain level from 0 to 10, Level (0) denoted no Pain, level from 1 to 3 denoted mild pain, a score from 4 to 6 denoted moderate pain and score from 7 to 10 indicated worst or severe pain. A high reliability was proved by a strong correlation with a coefficient of 0.976 ($p < 0.001$). A high internal consistency of the VAS score was shown by a Cronbach-alpha of 0.9117.

Nipple trauma score (NTS) was adopted from (Abou-Dakn, Fluhr, Gensch, & Wöckel, 2011) was adopted to assess the Nipple Trauma Score (NTS) and to evaluate healing rates of breasts. Description of Nipple Trauma score was as follows: 0 -No microscopically visible skin changes, 1-Erythema or edema or combination of both, 2- Superficial damage with or without scab formation of less than 25% of the nipple surface, 3- Superficial damage with or without scab formation of more than 25% of the nipple surface, 4-Partial-thickness wound with or without scab formation of less than 25% of the nipple surface, 5-Partial-thickness wound with or without scab formation of more than 25% of the nipple surface. Testing of NTS showed a high interobserver reliability of 0.88 (Goodman's gamma). A nipple was considered to be 'healed' if the corresponding trauma score rating was either 0 or 1, the important factor being that the nipple surface was intact.

Validity of Instruments

Instruments were developed by the researchers after reviewing the related literature and tested for its content validity. Validity indicated the degree to which the tool measures what it is expected to measure. It was determined by a panel of experts in the field of Maternal and Newborn Health Nursing and obstetrics, Community health nursing and Medical surgical Nursing to test the content validity and to clarify the sentences as well as, appropriateness of content.

Ethical Considerations

The primary official permission was obtained from the scientific research ethics Committee of the Faculty of Nursing Menoufia University to approve the tools. As well; an official permission was taken from the hospital and MCHc administrative personnel in the recommended setting to collect the data. Also each woman was informed about the purpose of the study and its importance. The researchers emphasized that participation in the study was voluntary, and that anonymity and confidentiality were assured through coding the data, women had the right to withdraw from the study at any time without giving any reason. A written informed consent was taken from women who are willing to participate in the study and met the inclusion criteria.

Pilot Study

A pilot study was conducted on 10% of the sample to assess the feasibility and clarity of the tools and to determine the needed time to complete the tools. The pilot study subjects were excluded.

Procedure

Eligible women in the postpartum unit and Maternal and Child Health Center (MCHc) were approached by the researchers, women were interviewed to obtain socio-demographic baseline data, preliminary assessment done immediately after enrollment for nipples pain using Visual Analogue Scale (VAS) as well as nipple trauma score (NTS). All women received breastfeeding technique instructions and the potential problems that could be experienced during the lactation period. Natural Extra Virgin Olive Oil (EVOO) was prepared with the cold press method and had 0.8% acidity that as no more than 0.8 grams of oleic acid per 100 grams of oil for classification as extra virgin olive oil. It was stored in the dark at room temperature until use. Women in group 1 (intervention group) had requested to apply few drops of (EVOO) to nipples after each baby feeding, day and night, as well as women in group 2 (control group) had requested to apply few drops from breast milk (BM) after baby's feeding, day and night. Clinical evaluation has done again using home visit to the participant by 3rd, 7th, and 14th day postpartum to evaluate pain using (VAS) and for nipple trauma score (NTS). If there are no

effects within 7 days, women had instructed to stop the applications, and the failure of the topical treatment was recorded. Women who had apply the treatment for 4 or more consecutive feedings or who used treatments other than those proposed in the trial, such as creams or oils, excluded from the study analysis.

Statistical Analysis

Upon the completion of data collection, data will be tabulated and analyzed, relevant statistical analysis will be used to test the obtained data using Statistical Package for Social Science (SPSS) program, version 23. Descriptive and inferential statistics will be carried out: (1) Descriptive statistics: On the basis of the raw data, the mean, and standard deviations will be calculated for each component of the dependent variables for all subjects, in addition to frequencies and percentages distributions. (2) Inferential statistics: (T-test & Chi-square) will be used to examine the differences and similarities between the study groups.

Results

Table (1): Distribution of studied mothers in the study and control groups according to socio-demographic characteristics (n= 120).

Demographic characteristics	EVOO group n=60		BM group n=60		Total n =120		χ^2	P-value
	No.	%	No.	%	No.	%		
Age							<i>t test</i>	
Mean \pm SD	31.08	\pm 2.52	32.77	\pm 3.71			-1.327-	.187
Residence								
Rural	39	65.0%	25	41.7%	64	53.3%	6.56	
Urban	21	35.0%	35	58.3%	56	46.7%		.010
Employment								
working	23	38.3%	20	33.3%	43	35.8%	.326	.568
not working	37	61.7%	40	66.7%	77	64.2%		
Education level								
didn't read and write	5	8.3%	9	15.0%	14	11.7%	3.881	.567
read and write	6	10.0%	8	13.3%	14	11.7%		
elementary education	7	11.7%	8	13.3%	15	12.5%		
Moderate education	19	31.7%	21	35.0%	40	33.3%		
High School	17	28.3%	11	18.3%	28	23.3%		
post graduate studies	6	10.0%	3	5.0%	9	7.5%		

Table 1 shows distribution of studied mothers in the study and control groups according to socio-demographic characteristics (n= 120). It clarifies that mean age of the studied mothers in EVOO group and BM group are 31.08 \pm 2.52 & 32.77 \pm 3.71. Regarding to Employment, 61.7% & 66.7% of the studied mothers in EVOO group and BM group aren't working. Regarding to Education level, 31.7% & 35.0% of the studied mothers in EVOO group and BM group have Moderate education.

Table (2): Distribution of studied mothers in the study and control groups according to pregnancy and labor history (n= 120).

Demographic characteristics	EVOO group n=60		BM group n=60		Total n =120		χ^2	P-value
	No.	%	No.	%	No.	%		
The number of previous pregnancies								
1-2	32	53.3%	26	43.3%	58	48.3%		
3 or more	28	46.7%	34	56.7%	62	51.7%	4.226	.517
The number of abortions								
No previous abortion	33	55.0%	30	50.0%	63	52.5%	.321	.956
More than one abortion	27	45.0%	30	50.0%	57	47.5%		
The number of childbirth								
Primigravida	27	45.0%	28	46.7%	55	45.8%	.034	.855
Para gravida	33	55.0%	32	53.3%	65	54.2%		
Number of antenatal visits								
less than 6 visits or equal	25	41.7%	20	33.3%	45	37.5%	.889	.346
equal or more than 7 visits	35	58.3%	40	66.7%	75	62.5%		
Type of the present delivery								
Normal delivery	26	43.3%	24	40.0%	50	41.7%	.137	.711
Caesarean section	34	56.7%	36	60.0%	70	58.3%		
The number of children you have, including the current birth								
1-2	27	45.0%	28	46.7%	55	45.8%	4.005	.135
3 or more	33	55.0%	32	53.3%	65	54.2%		
Nipple type								
prominent	9	15.0%	21	35.0%	30	25.0%	7.209	.066
semi-prominent	24	40.0%	18	30.0%	42	35.0%		
semi-inverted	20	33.3%	13	21.7%	33	27.5%		
flat	7	11.7%	8	13.3%	15	12.5%		
Types nipple problems								
nipple pain only	27	45.0%	21	35.0%	40	33.3%	1.343	.511
Nipple injury only	13	21.7%	14	23.3%	27	22.5%		
Pain and nipple injury	20	33.3%	25	41.7%	45	37.5%		

Table 2 shows Distribution of studied mothers in the study and control groups according to pregnancy and labor history (n= 120).about more than half of the studied sample in the EVOO and BM groups (56.7% & 60.0%) respectively have Caesarean section and (55.0% & 53.3%) of them have repeated childbirth. Regarding Nipple type, about one third (33.3%) in the EVOO group have semi-inverted nipple and in the BM group (35.0%) have prominent nipple. Regarding Types of nipple problems about one third (33.3%) in the EVOO have Pain and nipple injury. Meanwhile in the BM group (35.0%) has nipple pain only.

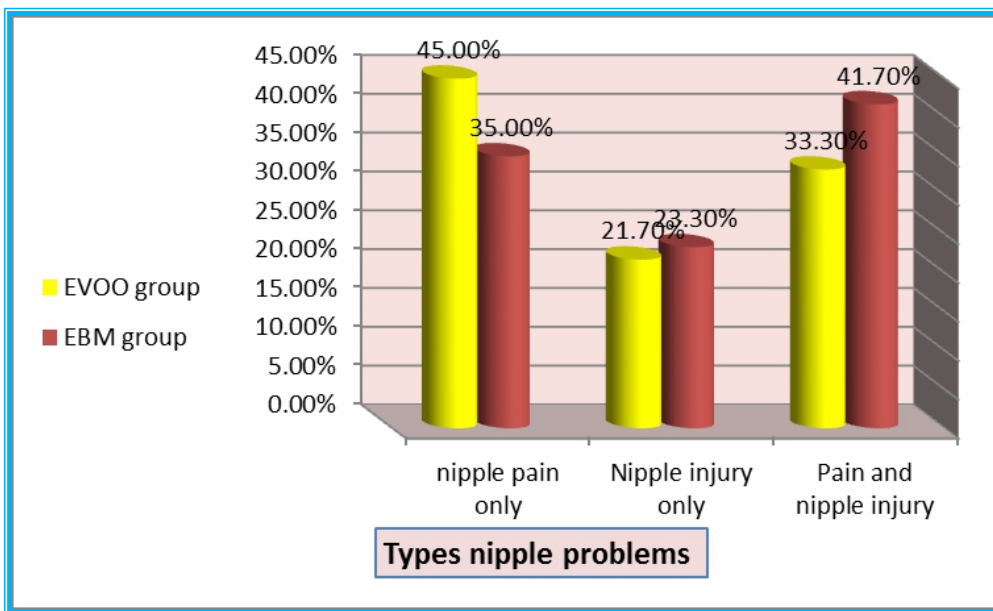


Figure (1): Types nipple problems. It illustrates that, about one third (33.3%) in the EVOO have Pain and nipple injury. Meanwhile in the BM group (35.0%) has nipple pain only.

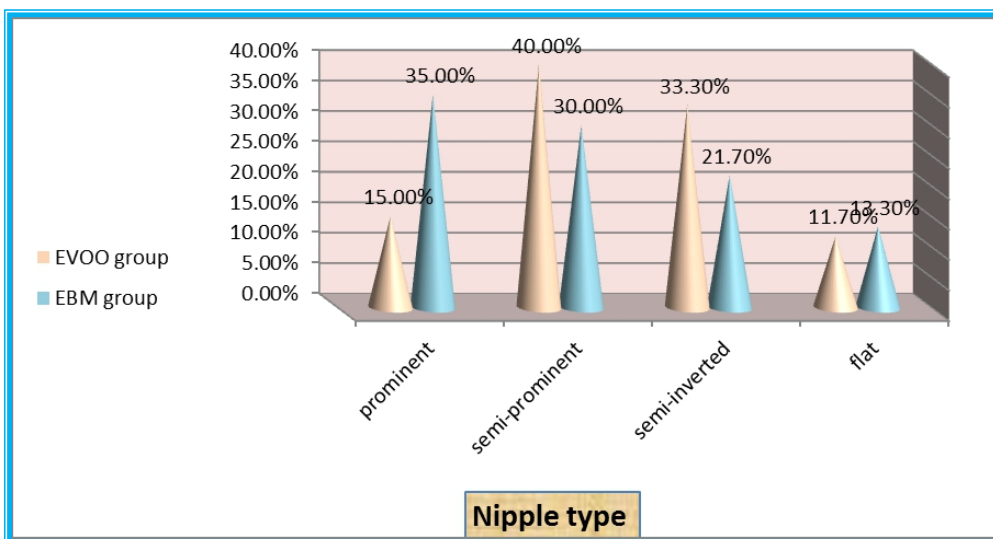


Figure (2): Nipple type. It clarifies that, about one third (33.3%) in the EVOO group have semi-inverted nipple and in the BM group (35.0%) have prominent nipple.

Table (3): Characteristics of the newborn of the studied mothers in the studied groups (n= 120).

Demographic characteristics	Group		EVOO group n=60		BM group n=60		Total n =120		Test of significance	P-value
The gender of the newborn	χ^2									
male	22	36.7%	26	43.3%	48	40.0%			.556	.456
female	38	63.3%	34	56.7%	72	60.0%				
gestational age during childbirth per weeks	<i>t test</i>									
Mean \pm SD	37.100 \pm 1.29		37.150 \pm 1.51						-.194-	.846
Weight of the newborn at birth per grams	<i>t test</i>									
Mean \pm SD	2687.50 \pm 17.7		2660.00 \pm 15.7						.872	.385

Table 3 clarifies Characteristics of the newborn of the studied mothers in the studied groups (n= 120). Regarding to gender of the newborn, more than half of the neonates for the studied mothers in EVOO and BM groups were female (63.3% & 56.7%) respectively. The means of gestational age during childbirth per weeks were 37.100 \pm 1.29 for the EVOO group and 37.150 \pm 1.51 for BM group. The means of Weight of the newborn at birth per grams were 2687.50 \pm 17.7 for the EVOO group and 2660.00 \pm 15.7 for BM group.

Table (4): Nipple Trauma Score for the studied mothers in the EVOO group and BM group on Enrollment, 3rd day, 7th day and 14th day

Group	Nipple Trauma Score	Enrollment		3 rd day		7 th day		14 th day	
		No.	%	No.	%	No.	%	No.	%
EVOO group	No visible skin changes	5	8.3%	7	11.7%	24	40.0%	39	65.0%
	Erythematic or edema or combination of both	17	28.3%	17	28.3%	6	10.0%	6	10.0%
	Superficial damage with or without scab formation of less than 25% of the nipple surface	14	23.3%	18	30.0%	26	43.3%	14	23.3%
	Superficial damage with or without scab formation of more than 25% of the nipple surface	15	25.0%	7	11.7%	0	.0%	0	.0%
	Partial thickness wound with or without scab formation of less than 25% of the nipple surface	1	1.7%	8	13.3%	3	5.0%	0	.0%
	Partial thickness wound with or without scab formation of more than 25% of the nipple surface	8	13.3%	3	5.0%	1	1.7%	1	1.7%
	χ^2	10.59		16.29		16.93		11.38	
P-value	.060		.006		.005		.023		
BM group	No visible skin changes	0	.0%	0	.0%	10	16.7%	33	55.0%
	Erythematic or edema or combination of both	18	30.0%	10	16.7%	8	13.3%	6	10.0%
	Superficial damage with or without scab formation of less than 25% of the nipple surface	8	13.3%	22	36.7%	24	40.0%	9	15.0%
	Superficial damage with or without scab formation of more than 25% of the nipple surface	15	25.0%	3	5.0%	8	13.3%	8	13.3%
	Partial thickness wound with or without scab formation of less than 25% of the nipple surface	4	6.7%	19	31.7%	6	10.0%	0	.0%
	Partial thickness wound with or without scab formation of more than 25% of the nipple surface	15	25.0%	6	10.0%	4	6.7%	4	6.7%
	χ^2	10.59		16.29		16.93		11.38	
P-value	.060		.006		.005		.023		

Table 4 shows Nipple Trauma Score for the studied mothers in the EVOO and BM groups on Enrollment, 3rd day, 7th day and 14th day. It clarifies that there is no statistical significance difference between EVOO and BM groups on the Enrollment. Meanwhile there are statistical significance differences between EVOO and BM groups on the 3rd day, 7th day and 14th day. This reveals that mothers who applied Extra Virgin Olive Oil (EVOO) have lower nipple trauma than who breast milk (BM).

Table (5): level of pain intensity during breastfeeding for the studied mothers in the EVOO group and BM group on Enrollment, 3rd day, 7th day and 14th day

Group	level of pain intensity during breastfeeding	Enrollment		3 rd day		7 th day		14 th day	
		No.	%	No.	%	No.	%	No.	%
EVOO group	NO PAIN	0	.0%	8	13.3%	19	31.7%	39	65.0%
	MILD	12	20.0%	19	31.7%	19	31.7%	20	33.3%
	MODERATE	19	31.7%	13	21.7%	13	21.7%	0	.0%
	SEVERE	29	48.3%	20	33.3%	9	15.0%	1	1.7%
BM group	NO PAIN	0	.0%	3	5.0%	4	6.7%	24	40.0%
	MILD	12	20.0%	10	16.7%	15	25.0%	20	33.3%
	MODERATE	18	30.0%	23	38.3%	28	46.7%	12	20.0%
	SEVERE	30	50.0%	24	40.0%	13	21.7%	4	6.7%
χ^2		.044		8.207		12.376		17.371	
P-value		.978		.042		.006		.001	

Table 5 clarifies level of pain intensity during breastfeeding for the studied mothers in the EVOO group and BM group on Enrollment, 3rd day, 7th day and 14th day. It reveals that, there is no statistical significance difference between EVOO and BM groups on the Enrollment. Meanwhile there are statistical significance differences between EVOO and BM groups on the 3rd day, 7th day and 14th day. This means that mothers who applied Extra Virgin Olive Oil (EVOO) have significant lower nipple pain intensity than who breast milk (BM).

Table (6): Effects on nipple trauma healing for the studied mothers in the EVOO group and BM group on Enrollment, 3rd day, 7th day and 14th day

Group	Effects on nipple trauma healing	Enrollment		3 rd day		7 th day		14 th day	
		No.	%	No.	%	No.	%	No.	%
EVOO group	a palpable sense of improvement	12	20.0%	0	.0%	43	71.7%	51	85.0%
	Simple feeling of improvement	7	11.7%	37	61.7%	8	13.3%	8	13.3%
	could not decide	30	50.0%	17	28.3%	0	.0%	0	.0%
	It still exists	11	18.3%	6	10.0%	8	13.3%	1	1.7%
	It got worse	0	.0%	0	.0%	1	1.7%	0	.0%
BM group	a palpable sense of improvement	14	23.3%	3	5.0%	29	48.3%	41	68.3%
	Simple feeling of improvement	4	6.7%	22	36.7%	9	15.0%	8	13.3%
	could not decide	29	48.3%	26	43.3%	1	1.7%	3	5.0%
	It still exists	13	21.7%	9	15.0%	15	25.0%	8	13.3%
	It got worse	0	.0%	0	.0%	6	10.0%	0	.0%
χ^2		5.237		9.297		10.312		16.80	
P-value		.155		.026		.035		.001	

Table 6 shows Effects on nipple trauma healing for the studied mothers in the EVOO group and BM group on Enrollment, 3rd day, 7th day and 14th day. It clarifies that there is no statistical significance difference between EVOO and BM groups on the Enrollment. Meanwhile there are

statistical significance differences between EVOO and BM groups on the 3rd day, 7th day and 14th day. This reveals that mothers who applied Extra Virgin Olive Oil (EVOO) have improvement in nipple trauma healing than who breast milk (BM).

Table (7): Mean scores of Nipple Trauma and Nipple trauma healing for the studied groups on Enrollment, 3rd day, 7th day and 14th day.

Items	Enrollment Mean ± SD	3 rd day Mean ± SD	7 th day Mean ± SD	14 th day Mean ± SD
Nipple Trauma Score				
EVOO group	2.23± 1.45	2.01± 1.43	1.25±1.22	0.65 ±1.02
BM group	2.53±1.52	2.81±1.32	2.07± 1.40	1.13± 1.52
<i>t test</i>	-.881-	-3.254-	-3.394-	-2.041-
<i>p-value</i>	.380	.001	.001	.044
Nipple trauma healing score				
EVOO group	1.28 ± 0.78	1.31±0.35	1.15±0.33	1.01±0.13
BM group	1.43± 0.81	1.51±0.50	1.53±0.35	1.18±0.39
<i>t test</i>	-1.031-	-2.250-	-2.145-	-3.141-
<i>p-value</i>	.305	.026	.034	.002

Table 7 shows Mean scores of Nipple Trauma and Nipple trauma healing for the studied groups on Enrollment, 3rd day, 7th day and 14th day. It reveals that, there is no statistical significance difference between EVOO and BM groups on the Enrollment regarding Nipple Trauma and Nipple trauma healing Score. Meanwhile there are statistical significance differences between EVOO and BM groups on the 3rd day, 7th day and 14th day. This reveals that mothers who applied Extra Virgin Olive Oil (EVOO) have improvement in Nipple Trauma and nipple trauma healing Score than who breast milk (BM).

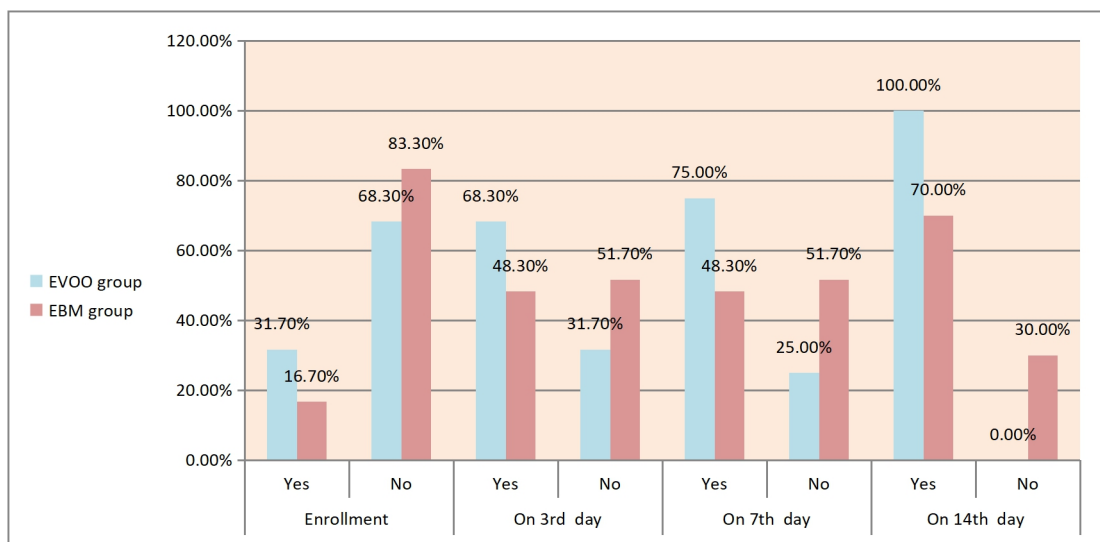


Figure (3): Effectiveness of intervention for the studied mothers in the EVOO group and BM group on Enrollment, 3rd day, 7th day and 14th day

Figure 3 illustrates effectiveness of intervention for the studied mothers in the EVOO group and BM group on Enrollment, 3rd day, 7th day and 14th day. It clarifies that more than two third (68.3%) and the majority (83.3%) of the studied mothers who apply Extra Virgin Olive Oil (EVOO) and have breast milk (BM) have no benefits on the Enrollment. So there is no statistical significance difference between EVOO and BM group. Meanwhile, more than two third (68.3%), three quarter (75.0%) and all of them (100.0%) of the studied mothers in the EVOO group have more beneficial on the 3rd day, 7th day and 14th day respectively than the studied mothers in the BM group. So there are statistical significance differences between EVOO and BM group.

Discussion

The present finding reveals that the appropriate use of EVOO results in a significant reduction of pain associated with breastfeeding and significantly no pain within 14 days of topical treatment. The finding showed that No pain as reported by the 39 lactating mothers (65.0%) of the EVOO used nipples compared with 24 patients (40.0%) of the BM used nipples .

Such finding agree with Oğuz et al., (2014), who conducted the study on 65 lactating mothers and focused on preventive properties of olive oil in sore nipples, reported that, no pain was reported by 66.1% of the olive oil used nipples and 46.4% of the lanolin used nipples.

Also, the present study finding go in the same line with Cordero, Villar, Barrilao, Corte's and Lo'pez, (2015) study who compared the application of EVOO versus breast milk on prevention of cracked nipple, they concluded that, EVOO had significantly manage the cracked nipple than the other group .

Regarding the effect Virgin Olive Oil (EVOO) on nipple trauma, the present study showed that, on the seventh day post interventions slightly less than half of EVOO group had normal skin without any skin change compared to one fifth of the breast milk group who had normal nipple skin. This may be due to the virgin olive oil, applied to the skin has analgesic and anti-inflammatory properties and protection against dryness of the skin .

This study finding come in accordance with Kirlek and AkdolunBalkaya, (2013) who conducted an experimental study aimed to compare the effects of olive oil and breast milk on prevention of cracked nipple in early puerperium period on 39 lactating mothers; 13 mothers each in breast milk, olive oil, or control groups. The findings showed that, there was statistically significant difference between study group who utilize olive oil and other groups in the occurrence of cracked nipple in their first week post intervention.

Additionally, the study finding conducted by Lin, Chen-xi, (2018) evaluate the effect of olive oil for nipple pain, nipple trauma, and

maternal satisfaction. a prospective, randomized study of 80 lactating women, admitted to Tri-Service General hospital postpartum unit. Eligible patients were randomized to olive oil group or breast milk group and they concluded that; nipple trauma and nipple score change from baseline nipple trauma and nipple pain at 10 days in olive group compared with the other group.

The present study reveals that, mothers who applied Extra Virgin Olive Oil (EVOO) have improvement in nipple trauma healing than mothers utilized expressed breast milk (EBM). This is due to the presence of oleic acid, which acts as a skin softener, and wealth of antioxidant substances, makes it particularly able to directly protect the skin (Publio &Marzia, 2009).

This study finding was in consistence with Nageeb, Fadel & , Fikry (2018) , they conducted the study to evaluate the effect of utilizing extra virgin olive oil on nipple trauma among lactating mothers. On 116 women were randomly allocated into two equal groups. First group was the study group who asked to rub nipples with extra virgin olive oil after each feeding and the second group was the control group who received pharmacological management for nipple trauma according to physician prescription. They concluded majority of lactating mothers who used extra virgin olive oil (EVOO) had faster recovery of nipple trauma on the seventh and fourteenth day post intervention more than lactating mothers in control group.

Conclusion

In conclusion, our data shows a significantly better outcome for lactating mothers who treated with EVOO as compared to BM. This benefit reached statistical significance for healing rates, nipple trauma and nipple pain. In our study topical treatment with EVOO is more effective than BM for faster healing of nipple trauma and reducing nipple pain.

Recommendations

Based on the study results of the current study the following recommendation can be suggested;

- Raising awareness of lactating mothers regarding the beneficial effect of extra virgin olive oil on nipple trauma and pain and how to apply it through a programmed postpartum care.
- Further studies are needed with a well-designed large sample size to gain more insight into the effectiveness of EVOO on prevention/reduction of nipple problems during lactation.

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