Application of Olive Oil on Nipple in Late Pregnancy Period to Prevent Nipple Trauma during Lactation

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Abstract

Back ground: Pain on breastfeeding is an important cause of weaning and, therefore, its prevention is essential. Application of olive oil on nipple decreases this pain as it contains nutrients that fight inflammation. **Aim of study**: Was to examine application of olive oil on nipple in late pregnancy period to prevent nipple trauma during lactation. **Design:** Aquasi-experimental design (pre-post design) was utilized to fulfill the aim of this study. **Setting:** This study was conducted at Obstetrics and Gynecology Outpatient Clinic in Benha University Hospital. **Sample:** A purposive sample of 120 primigravida who attended the above mentioned setting during six months was recruited for the study. **Tools of data collection**: Four tools were used to collect the necessary data. I: A structured interviewing questionnaire. II: Nipple trauma score. III: Nipple Soreness Rating Scale and IV: Follow up sheet. **Results**: There was a highly statistical significant differences between both study and control group in favor of study group regarding nipple trauma score and nipple soreness score. Also, there was a highly statistically significant relation between nipple trauma score as well as nipple soreness score and frequency of application of olive oil per day. Finally, there was a highly statistically significant relation between nipple trauma score as well as nipple soreness score and period of using olive oil on nipples. **Conclusion**: Application of olive oil on nipple in late pregnancy period had appositive effect to prevent nipple trauma during lactation. **Recommendations**: There is a need to provide counseling program during the third trimester for pregnant mothers & direct postpartum period about protection and treatment of the traumatic nipple.

Key words: Lactation, Late Pregnancy, Nipple Trauma, Olive oil.

Introduction

Breastfeeding is considered by the World Health Organization (WHO) as one of the primary reasons for decreasing child mortality rates related to common diseases in early childhood, like diarrhea and pneumonia. Breast milk provides all the nutrients needed for adequate nutrition and development of the infant until six months of age, so exclusive breastfeeding for six months has been recommended by WHO as the optimal way of feeding infants. Complementary food should be introduced gradually after this time, with mothers continuing breastfeeding for up to two years or more (**Cirico, et al., 2021).**

Nipple trauma is defined as a macroscopic cutaneous lesion in the nipple and areola area, or as vascular lesions that can cause a change in color, texture, and shape of the skin. Nipple trauma ranges from mild

inflammation, small blisters and grazes through to compression stripes, cracks and fissures. Other indications of nipple pathology include: Exudate or yellow crust, Plaques or flaky skin, Shiny skin, Pustules and Blanching (**Jiménez, et al., 2021).** The most common attributed cause of nipple trauma was incorrect positioning and attachment, followed by infection, palatal anomaly, flat or inverted nipples, mastitis and vasospasm, according to WHO 90% of nipple trauma caused by improper holding and positioning of baby during breastfeeding (**Wang, et al., 2021)**.

There are various methods had been used to either treat or prevent nipple trauma associated with breastfeeding such as exposure of the nipples to dry heat, or air-drying, teach the mother proper breastfeeding technique, application of ointments, tea bags, dressings, compresses and application of olive oil. Studies used olive oil for management of nipple trauma as it had been used for sore nipples in the Mediterranean countries for many years. Also it has been tested for various skin disorders, such as atopic dermatitis, diaper rash and skin care of premature babies and it is a safe and may be beneficial choice for preventing sore nipples. Additionally, olive oil applied to the skin, has healing and anti- inflammatory properties. **(Ahmad, et al., 2021)**.

Nurses have many opportunities to influence the care of the mother and/ or the baby and can assist in planning and providing services that will help in meeting the goals for improving women's health. Nurses must generally focus on health promotion rather than disease prevention as a key concept. The best intervention for alleviating nipple trauma in lactating mothers is education on proper positioning and attachment of the new born as well as anticipatory guidance regarding the high incidence of early postpartum nipple pain because helping the mother in establishing the best baby attachment will help in prevention and treatment of nipple trauma **(Ahmed, et al., 2018)**.

Significance of the study:

Nipple trauma is one of the most common reasons given by mothers for ceasing exclusive breastfeeding **(Dennis, et al., 2018**). Nipples trauma possess threats to mothers, infants and societies. The most common consequences of traumatic nipples include infants' deprivation of breast milk benefits and it may lead to maternal stress and mothers' dissatisfaction (**Bowman, 2017**).

Worldwide, it is estimated that 34 to 96% of breast feeding women experience some nipple soreness, with 26% progressing to cracks and extreme nipple pain. Furthermore, up to be one third of the mothers who experience these symptoms may change to alternate methods of infant nutrition within the first six postnatal weeks. Moreover, it is a painful condition that can also cause psychological distress and interfere with general activity, mood, sleep, and bonding between mother and infant **(Ahmed, et al., 2018).**

The study helps uncover a critical problem that leads to unsuccessful breastfeeding which is nipple trauma. Most of studies discuss the use of alternative methods to prevent nipple trauma during immediate postpartum period as application of breast milk, lanolin, peppermint oil and olive oil to the nipples to prevent nipple trauma during breastfeeding. However, this study applied during late pregnancy to investigate the effect of nipple preparation with olive oil application on prevention of nipple trauma.

Aim of the study:

The present study aimed to examine application of olive oil on nipple in late pregnancy period to prevent nipple trauma during lactation

Research Hypotheses

Studied women who would use olive oil on nipple in late pregnancy period would have less nipple trauma and soreness during lactation than those who don't.

Subjects and method:

Study design:

A quasi- experimental design (pre-post design) was utilized to fulfill the aim of this study.

Setting:

This study was conducted at Obstetrics and Gynecology Outpatient Clinic in Benha University Hospital

Sampling:

Sample Type : A purposive sample

Sample Size: 120 primigravida who attended the above mentioned setting during six months was recruited for the study. The studied sample was selected according to the following **inclusion criteria:** Primigravida who completed 38 weeks' gestation. Have normal nipple skin (free from nipple disorders as; flat, inverted or cracked nipple). Not using any medication, ointment or oils to the nipples.

Exclusion criteria:

Women who are diagnosed by U/S to deliver a baby with cleft lip or cleft palate or other congenital anomalies interfere with normal suckling of the baby. Presence of mental disability.Women with any medical problem that interfere breast feeding.

Tools of data collection:

Four tools were used to collect the necessary data:

Tool (I): A structured interviewing questionnaire:

It was designed by the researcher which included demographic characteristics such as (tele number, age, level of education, occupation, residence and income).

Tool (II): Nipple trauma score (NTS):

It was adopted from **(Vieira, et al., 2015)** to identify nipple trauma score . it included six items (no visible skin changes, erythematic or edema or combination of both, superficial damage with or without scab formation of less than 25% of nipple surface, superficial damage with or without scab formation of more than 25% of the nipple surface, partial thickness wound with or without scab formation of less than 25% of the nipple surface, partial thickness wound with or without scab formation of more than 25% of the nipple surface)

Scoring system:

This nipple trauma score related to 6 degree that describe nipple trauma and those items are, 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, 3: Superficial damage with or without scab formation of more than 25% of the nipple, 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. Those items scored by Likert scale from Zero to 5 for each item, zero refers to normal nipple skin as the score increase it refers to increase trauma and discomfort and pain.

Tool (III): Nipple Soreness Rating Scale (NSRS):

It was adopted from (**Niazi et al., 2013**) to assess nipple soreness.it included 6 items (nipple color is normal, no tenderness, nipple slightly red and/or tender for first 5-10 seconds of feeding, nipple red and tender for longer than first 5-10 seconds of feeding, tender between feeding, makes me grimace when baby starts feeding, nipple beginning to

crack, involuntary gasp of pain when baby starts feeding).

Scoring system:

This Scale related to six degree that describe nipple soreness and those items are ;0:nipple color is normal and no tenderness,1:nipple slightly red and /or tender for first 5-10 seconds of feeding ,2: nipple is red and tender for longer than first 5-10 second of feeding, 3:is tender between feeding, makes me grimace when baby starts feeding ,4:nipple beginning to crack and involuntary gasp of pain when baby starts feeding, 5:nipple cracked and feels sore down to my toes when baby starts feeding.

Those items scored by Likert from Zero to 5 for each item, Zero refers to no nipple pain or discomfort as the score increase it refers to increase discomfort and pain.

Tool (IV) : Follow up sheet :

It was designed by the researcher after reviewing the related literature.

The sheet included questions about (follow the health instructions shown in the brochure , frequency of application of olive oil on nipples per day and period of using olive oil on nipples before starting breast feeding).

Tools validity and reliability:

The validity of questionnaire was reviewed by 3 jury experts in the field of Obstetrics & Gynecology Health Nursing to ascertain clarity, relevance, comprehensiveness and applicability of tools. Modifications were done such as adding, rephrasing and omitting some questions. The reliability of the tool was performed to confirm it's consistency. The cronbach's alpha coefficient for the tool II (nipple trauma score) was 0.85, for tool III (nipple soreness rating scale) was 0.86% and for tool IV (follow up sheet) was 0.74.

Ethical consideration:

Ethical aspects should be considered before starting the study as the following: The research approval was obtain from scientific research ethical committee, faculty of nursing at benha university before starting the study.

An official permission from the selected study settings was obtained from the fulfillment of the study. The aim of the study was explained to each participant before applying the study. An oral consent was obtained from each participant after explanation the purpose of the study. The study was not having any physical, social or psychological risk on participants. Maintain confidentiality, self-esteem and dignity of participants. Freedom to with draw from participation in the study at any time.

Pilot study:

The pilot study conducted on 10 % of the total duration of data collection (3 weeks) to estimate the time required for completing the sheets and to check the simplicity, clarity, applicability and feasibility of the developed tools. No modifications were done. Thus, women involved in the pilot study were included in the study sample.

Field work:

To fulfill the aim of this study, the following phases adopted. Preparatory phase, interviewing and assessment phase, planning phase, implementation phase and evaluation phase. These phases covered six months. The researcher visited the previously mentioned setting two days/week, (Tuesdays, Tursdays), from 9.00 Am to 12.00 Pm from the beginning of May to the end of october until the six months was completed.

Phase1: Preparatory phase:

It was the first phase of the study and it included reviewing current and related literatures. Also, theoretical knowledge of various aspects of the study using books,

articles, periodicals, magazines and internet to develop tools for data collection.

Phase2: Interviewing and assessment phase:

This phase was encompassing interviewing each woman in the waiting room of the outpatient clinic. At the beginning of the interview the researcher greeted the woman, introduced herself to each woman included in the research, explain the purpose of the research, provide the woman with all information about the study and take oral consent to participate in the study. demographic data was collected by the researcher through administration of (tool I: A structured interviewing questionnaire). Average time for the completion of each woman interview was around (15-20 minutes).

Phase 3: planning phase:

A printed colored brochure regarding olive oil application on nipple during late pregnancy was prepared by the researcher. Objectives of the study were constructed.

Phase 4: Implementation phase:

In this phase, the researcher explained how to use olive oil by applying 3 drops to each nipple 3 times per day and let the nipples be exposed for few minutes until absorption of olive oil. The researcher asked the women to wash nipples before each breast feeding . The control group received the routine care **Echolls, T., (2017).**.

Phase 4: Evaluation phase:

It was done at one week after delivery by using the tool

Tool (II): Nipple trauma score (NTS), Tool (III): Nipple Soreness Rating Scale (NSRS) and Tool (IV) : Follow up sheet

Statistical analysis:

Data were verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 21.0) was used followed by data tabulation and analysis. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages).Test of significance(Chi-square test) was applied to test the study hypotheses. A significant level value was considered when $p \leq 0.05$. And a highly significant level value was considered when $p \leq 0.001$.While $p>0.05$ indicate non-significant results.

Study Limitations:

The waiting place of the obstetrics and gynecology outpatient clinic was crowded and noisy, which required more time and effort to conduct the study.

Results:

Table (1): Clarifies that more than three quarters (78.3% and 76.7%) of both control and study groups respectively in age group (<25 years) with a mean age of 22.85 + 4.07 years and 23.10 + 4.23 years respectively. Less than two third of the control group (63.3%) and more than two third of the study group (68.3%) were lived in rural area. Concerning level of education, it was clear that half of the control group (50%) and more than half of the study group (58.4%) had secondary education.

Table (2): Demonstrates that, less than two thirds (60.0%) of the study group and more than one tenth (13.3%) of the control group had no visible skin changes one week after delivery. As well as, the minority (3.3%) of the study group and more than one tenth (13.3%) of the control group had Partial thickness wound with or without scab formation of less than 25% of the nipple surface. There was a highly statistical significant differences between both study and control group in favor of study group ($P \leq 0.001$).

Table (3): Demonstrates that, less than two thirds (65.0%) of the study group

and less than one fifth (16.7%) of the control group had no tenderness on the nipples one week after delivery. As well as, (0.0%) of the study group and less than one tenth (6.6%) of the control group had nipple cracked, feels sore "down to my toes" when baby starts feeding. There was a highly statistical significant differences between both study and control group in favor of study group($P \leq 0.001$)

Figure (1): Shows that, more than two thirds (68.3%) of the study group follow the health instructions shown in the brochure on how to use olive oil

Figure (2): Shows that, less than three quarters (76.3%) of study group had used olive oil on nipples three times daily.

Figure (3): Displays that, less than half (45.0%) of study group had used olive oil on nipples before starting breast feeding four weeks or more.

Table (4): Clarifies that, there was a highly statistically significant relation between nipple trauma score and frequency of application of olive oil per day among study group (P=0.000). The more times that olive oil is used on the nipple daily, the better the condition of the nipple.

Table (5): Demonstrates that, there was a highly statistically significant relation between nipple trauma score and period of using olive oil on nipples before starting breast feeding among study group (P=0.000). The more weeks that olive oil is used on the nipple, the better the condition of the nipple.

Table (6): Displays that, there was a highly statistically significant relation between soreness score and period of using olive oil on nipples before starting breastfeeding among study group (P=0.000). The more weeks that olive oil is used on the nipple, the better the condition of the nipple.

Table (7): Displays that, there was a highly statistically significant relation between nipple soreness score and period of using olive oil on nipples before starting breast feeding among study group (P=0.000). The more weeks that olive oil is used on the nipple, the better the condition of the nipple.

Table (1): Distribution of the studied sample according to their demographic characteristics (n= 120)

Demographic characteristics	Control group n= 60		Study group n=60	
	No	%	No	%
Age (years)				
<25	47	78.3	46	76.7
25- 35	10	16.7	9	15.0
> 35	3	5.0	5	8.3
Mean ± SD	22.85± 4.07		23.10±4.23	
Residence				
Rural	38	63.3	41	68.3
Urban	22	36.7	19	31.7
Education				
Illiterate	1	1.7	2	3.3
Read and write	4	6.7	2	3.3
Basic education	8	13.3	6	10.0
Secondary education	30	50.0	35	58.4
University education	17	28.3	15	25.0
Occupation				
House wife	44	73.3	42	70.0
Working	16	26.7	18	30.0
Monthly income				
Enough	35	58.3	39	65.0
Not enough	25	41.7	21	35.0

Table (2): Distribution of studied sample according to their nipple trauma score (n=120)

Description of nipple trauma	One week after delivery					
	Control group		Study group		Chi square test	
	No.	%	No.	%	X2	P-value
No visible skin changes	8	13.3	36	60.0	29.3	0.000
Erythematic or edema or combination of both	17	28.4	9	15.0		
Superficial damage with or without scab formation of less than 25% of nipple surface.	13	21.7	5	8.3		
Superficial damage with or without scab formation of more than 25% of the nipple surface	11	18.3	7	11.7		
Partial thickness wound with or without scab formation of less than 25% of the nipple surface	8	13.3	2	3.3		
Partial thickness wound with or without scab formation of more than 25% of the nipple surface	3	5.0	1	1.7		

**** Highly Significant** (P≤0.001)

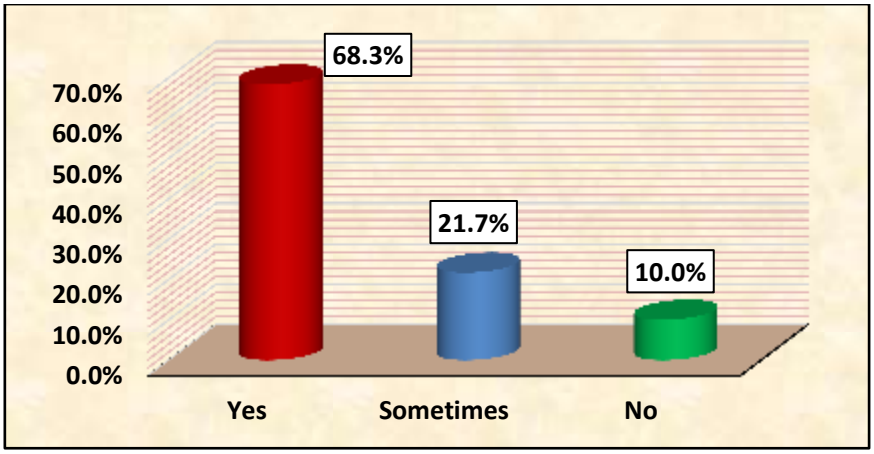

Figure (1): Percentage distribution of study group regarding their follow the health instructions shown in the brochure (n = 60)

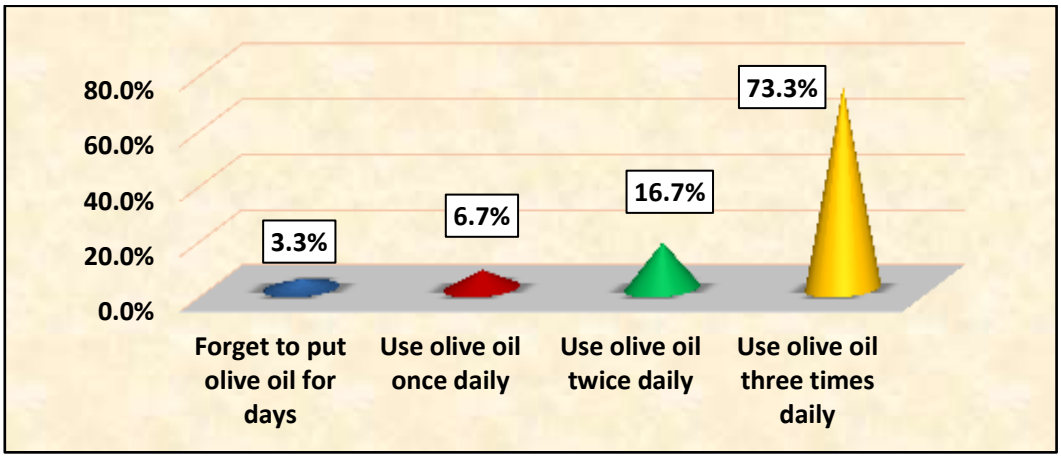

Figure (2): Percentage distribution of study group regarding frequency of application of olive oil on nipples per day (n = 60

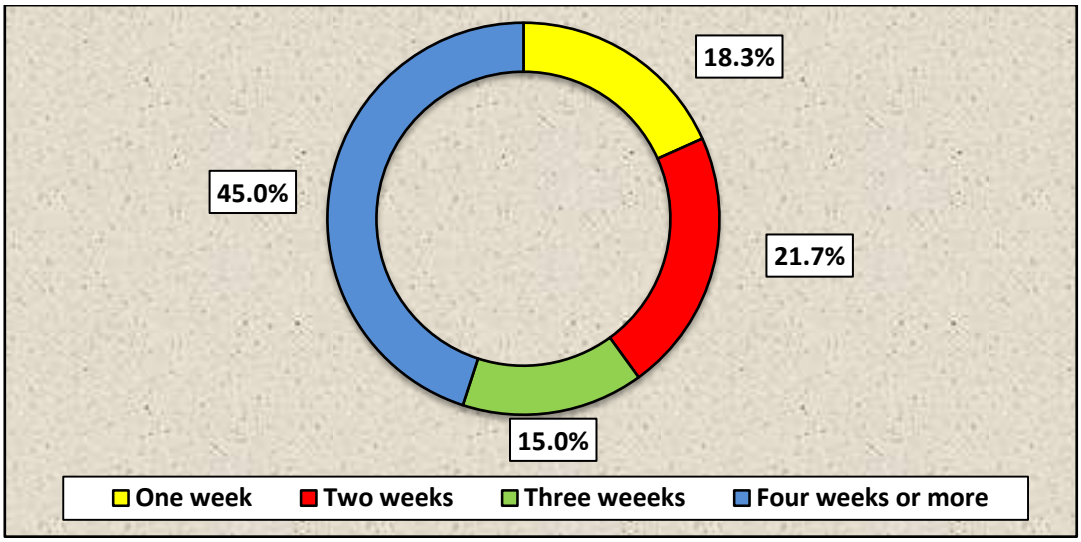

Figure (3): Percentage distribution of study group regarding period of using olive oil on nipples before starting breast feeding (n = 60)

Table (3): Distribution of studied sample according to their nipple soreness score (n=120)

Description of nipple soreness	One week after delivery					
	Control group		Study group		Chi square test	
	No.	%	No.	%	X2	P-Value
Nipple color, no tenderness	10	16.7	39	65.0	32.5	0.000
Nipple slightly red and/or tender for first 5-10 seconds of feeding	18	30.0	11	18.3		
Nipple red and tender for longer than first 5-10 seconds of feeding	12	20.0	6	10.0		
Tender between feeding, makes me grimace when baby starts feeding	9	15.0	3	5.0		
Nipple beginning to crack, involuntary gasp of pain when baby starts feeding	7	11.7	1	1.7		
Nipple cracked, feels sore "down to my toes" when baby starts feeding	4	6.6	0	0.0		

**** Highly Significant** (P≤0.001)

Table (4): Relation between nipple trauma score and frequency of application of olive oil per day among study group (n=60)

Description of nipple trauma	Forget for days (n=2)		1 time per day (n=4)		2 times per day (n=10)		3 times per day (n= 44)		X2	P-Value
	No	%	No	%	No	%	No	%		
No visible skin changes	0	0.0	0	0.0	0	0.0	36	81.8	114.9	0.000
Erythematic or edema or combination of both	0	0.0	0	0.0	1	10.0	8	18.2		
Superficial damage with or without scab formation of less than 25% of nipple surface.	0	0.0	0	0.0	5	50.0	0	0.0		
Superficial damage with or without scab formation of more than 25% of the nipple surface	0	0.0	3	0.75	4	40.0	0	0.0		
Partial thickness wound with or without scab formation of less than 25% of the nipple surface	1	50.0	1	0.25	0	0.0	0	0.0		
Partial thickness wound with or without scab formation of more than 25% of the nipple surface	1	50.0	0	0.0	0	0.0	0	0.0		

**** Highly Significant** (P≤0.001)

Table (5): Relation between nipple trauma score and period of using olive oil on nipples before starting breast feeding among study group (n=60)

Description of nipple trauma	1 Week (n=11)		2 Weeks (n=13)		3 Weeks (n=9)		4 Weeks or more (n= 27)		X2	P-Value
	No	%	No	%	No	%	No	%		
No visible skin changes	0	0.0	1	7.7	8	88.9	27	100.0	88.2	0.000
Erythematic or edema or combination of both	0	0.0	8	61.5	1	11.1	0	0.0		
Superficial damage with or without scab formation of less than 25% of nipple surface.	2	18.2	3	23.1	0	0.0	0	0.0		
Superficial damage with or without scab formation of more than 25% of the nipple surface	6	54.5	1	7.7	0	0.0	0	0.0		
Partial thickness wound with or without scab formation of less than 25% of the nipple surface	2	18.2	0	0.0	0	0.0	0	0.0		
Partial thickness wound with or without scab formation of more than 25% of the nipple surface	1	9.1	0	0.0	0	0.0	0	0.0		

***Highly Significant**

(P≤0.001

Table (6): Relationship between nipple trauma score and period of using olive oil on nipples before starting breast feeding among study group (n=60)

Description of nipple trauma	1 Week (n=11)		2 Weeks (n=13)		3 Weeks (n=9)		4 Weeks or more (n= 27)		X2	P-Value
	No	%	No	%	No	%	No	%		
No visible skin changes	0	0.0	1	7.7	8	88.9	27	100.0	88.2	0.000
Erythematic or edema or combination of both	0	0.0	8	61.5	1	11.1	0	0.0		
Superficial damage with or without scab formation of less than 25% of nipple surface.	2	18.2	3	23.1	0	0.0	0	0.0		
Superficial damage with or without scab formation of more than 25% of the nipple surface	6	54.5	1	7.7	0	0.0	0	0.0		
Partial thickness wound with or without scab formation of less than 25% of the nipple surface	2	18.2	0	0.0	0	0.0	0	0.0		
Partial thickness wound with or without scab formation of more than 25% of the nipple surface	1	9.1	0	0.0	0	0.0	0	0.0		

****Highly Significant** (P≤0.001)

Table (7): Relation between nipple soreness score and regarding period of using olive oil on nipples before starting breast feeding among study group (n=60).

Description of nipple soreness	1 Week (n=11)		2 Weeks (n=13)		3 Weeks (n=9)		4 Weeks or more (n= 27)		X2	P-Value
	No	%	No	%	No	%	No	%		
Nipple color, no tenderness	0	0.0	3	23.1	9	100.0	27	100.0	77.7	0.000
Nipple slightly red and/or tender for first 5-10 seconds of feeding	2	18.2	9	69.2	0	0.0	0	0.0		
Nipple red and tender for longer than first 5-10 seconds of feeding	5	45.5	1	7.7	0	0.0	0	0.0		
Tender between feeding, makes me grimace when baby starts feeding	3	27.2	0	0.0	0	0.0	0	0.0		
Nipple beginning to crack, involuntary gasp of pain when baby starts feeding	1	9.1	0	0.0	0	0.0	0	0.0		
Nipple cracked, feels sore "down to my toes" when baby starts feeding	0	0.0	0	0.0	0	0.0	0	0.0		

**** Highly Significant** ($P \leq 0.001$)

Discussion:

Despite the advantages of breastfeeding, many complications hinder the success of this practice; one of these complications is nipple trauma. Nipple trauma has been identified as pain sensation in friction and suction lesions of nipple ranging from uncomfortable feeling to severe pain with physical trauma. The most common attributed cause of nipple trauma was incorrect positioning and attachment, followed by infection, palatal anomaly, flat or inverted nipples, mastitis and vasospasm **(Dias, et al., 2017).**

The findings of this study were accepted the study hypotheses which were studied women who will use olive oil on nipples during late pregnancy will have less nipple trauma during lactation than those who don't and studied women who will use olive oil on nipples during late pregnancy will have less nipple soreness during lactation than those who don't

Regarding demographic characteristics of studied women, the result of the current study showed that, more than three quarters of both control and study groups were <25 years old with a mean age of 22.85 + 4.07 years old for the study group and 23.10 + 4.23 years old for control group. The possible explanation may be related to the nature of Egyptian people who marry and bringing children at early age. Also, this may be related to that nearly two thirds of studied women were from rural area which characterized by early marriage. The result of the current study is congruent with **Rashed,**

et al., (2019) who studied "Effect of Evidence Based Interventions on Traumatic Nipple among Primipara Breast Feeding Mothers" the findings revealed that the majority of study sample were < 25 years old. Conversely the study disagrees with **Ciftci, et al., (2018)** who assess "the effect of nipple care with honey on nipple cracking" and revealed that more than two thirds of their study sample were over 28 years old.

Regarding nipple trauma score, the result of the present study illustrated that, there were a highly statistically significant difference between study and control group regarding nipple trauma score one week after delivery, the study showed that about two thirds of the study group had no visible skin changes one week after delivery, whenever, more than one tenth of the control group had no visible skin changes one week after delivery. From my point of view this may be interpreted that the olive oil have anti-inflammatory properties which prevent cracked and sored nipple in lactating mothers. So that olive oil has an obvious effect on maintaining the skin and causing no visible changes in the study group. The results of the current study match with **Nageeb et al., (2019)** who revealed that, more than half of study group had healthy skin (no skin change) on the seventh day post intervention whenever, less than one third of control group had healthy skin (no skin change) on the seventh day post intervention, there were statistically significant differences between study and control group due to the effect of olive oil application. On the other hand, the results of the current study disagrees with **Eshgizade et al., (2016)** who conducted a study to compare of "the Effect of Olive Oil, Aloe Vera Extract and Breast Milk on Healing of Breast Fissure in Lactating Mothers" founded that, aloe vera extract is the most effective method for the management of breast fissure. The discrepancies between the current study findings and the latter group study may be due to the use of different type of olive oil.

The result of the present study also illustrated that, there were a highly statistically significant difference between study and control group regarding Partial thickness wound formation, the minority of the study group had partial thickness wound with or without scab formation of less than 25% of the nipple surface, and more than one tenth of the control group had partial thickness wound. From my point of view this may be interpreted that baby suckling in first days following delivery results in nipple cracking and may be infection either from the mother skin or the baby mouth. The inflammation and soreness decreased in the study group due to the application of olive oil which has effect in soothing skin and prevention of inflammatory process. oleocanthal compound which founded in olive oil is homologous with the non-steroidal anti-inflammatory drug leading to alleviate the inflammatory process, speed up wound healing recovery. The result of the current study agrees with **Ahmed, et al., (2018)** whose study entitled (Effect of Olive Oil Application to Nipples during late Pregnancy on Prevention of Postpartum Nipple Trauma), who revealed that, there were statistically significant difference between study and control group regarding partial wound formation, the minority of the control group had Partial thickness wound with or without scab formation of less than 25% of the nipple surface, and no one of their study group had Partial thickness wound following regular olive oil application for about 7 days. On the other hand, the study disagrees with **Ahmed., et al. (2019)** who studied "Evidence Based Guideline Using to Alleviate Traumatic Nipple among Nursing Mothers" the study

conducted on 150 nursing mothers in the postnatal Maternity Unit and outpatient family planning clinic at Ain Shams University Maternity Hospital. The finding concluded that, there was no statistically significant difference between groups who applied routine methods as olive oil for medical management of nipple trauma and partial thickness wound formation or who applied the most evidence alternative management either on seventh- or fourteenth-day post interventions.

According to nipple soreness score, the result of the present study illustrated that, there was a highly statistically significant differences between both study and control group in favor of study group. About two thirds of the study group compared to only less than one fifth of the control group had no tenderness on the nipples (normal nipple) one week after delivery. As well as, no one of the study group compared to less than one tenth of the control group had nipple cracked and felt sore "down to toes" when baby starts feeding. From my point of view this may be interpreted that the olive oil has good antioxidant properties and natural phenolic compounds also, it considered as a natural inhibitor that improves blood flow to the tissue, reduces inflammation and reduces cell damage. In contrast with findings of the current study **Ahmed et al.,(2018)** showed that according to nipple soreness rating scale, nearly two thirds(65%) of studied sample had normal nipple color no tenderness with in four days of starting breast feeding. Pertaining to the follow of the health instructions as shown in the brochure, the result of the current study illustrated that, more than two thirds of the study group follow the health instructions shown in the brochure on how to use olive oil. From my point of view this may be related to the good, simple, comprehensive and clear information that present in the brochure, and the desire of the women to avoid pain, nipple cracks and soreness that result from lactation. The result of the current study support by **Shimoda et al., (2016)**

who studied "Preventing nipple trauma in lactating women in the University Hospital of the University of Sao Paulo: a best practice implementation project" The findings revealed that, more than half of studied women follow project's instructions about prevention and management of nipple trauma.

Regarding frequency of application of olive oil on nipples per day, the result of the current study illustrated that, less than three quarters of study group had used olive oil on nipples three times daily, from my point of view this may be related to the effect of instructional guidelines that present in brochure, and the effect of adequate explanation from the researcher about the importance of application of olive oil for at least three times daily to get the desired outcomes. The finding of the current study is in congruent with the result of **Sağlık and Kısacık, (2021)** who revealed that, more than half of the study sample used olive oil for three times daily.

Pertaining to period of using olive oil on nipples before starting breast feeding, the result of the present study showed that less than half of study group used olive oil on nipples four weeks or more before starting breast feeding. From my point of view this may be interpreted that one month use before delivery is considered the best period for prevention of nipple trauma and inflammation during lactation.

The results of the current study is in consistent with **Eksioglu, et al.,(2017)** who evaluated "The Effects of Different Breastfeeding Training Techniques for

Primiparous Mothers Before Discharge on the Incidence of Cracked Nipples" The results showed that, more than one third of their study sample perform interventional guidelines such as application of extra virgin olive oil one month before delivery. Regarding relationship between nipple trauma score and frequency of application of olive oil per day among study group, the result of the present study illustrated that, there was a highly statistically significant relation between nipple trauma score and frequency of application of olive oil per day among study group, the more times that olive oil is used on the nipple daily, the better the condition of the nipple. From my point of view this may be related to that, olive oil has antioxidant and anti-inflammatory attributes, moreover; it contains significant amounts of squalene, the main component of skin surface polyunsaturated lipids which is easily absorbed deep into the skin helping to prevent cracking and damage, so that more application result in less trauma in the nipple.

The results of the current study is in the same line with **cordero ,et al., (2016**) who studied "the effect of application of extra virgin olive oil to prevent nipple cracking in lactating women" who concluded that, there was a highly statistically significant relation between nipple trauma score and frequency of application of olive oil , who reported that Extra Version Olive Oil (EVOO) helps prevent nipple cracking in lactating women by administering 3 drops on each nipple, it has been shown to have protective effects.

Concerning the relation between nipple trauma score and period of using olive oil on nipples before starting breast feeding among study group, the result of the present study illustrated that, there was a highly statistically significant relation between nipple trauma score and period of using olive oil on nipples before starting breast feeding among study group, the more weeks that olive oil is used on the nipple, the better the condition of the nipple. From my point of view this may be related to that, early application of olive oil during late antenatal period helped in preparation of the nipples for breastfeeding by increasing its elasticity, resistance to cracking by the antioxidant, anti-inflammatory and lubricant effect of olive oil and this decrease incidence of nipple trauma during breastfeeding. The result of the current study matches with **Ahmed, et al.,(2018)** who revealed that, the longest period that olive oil is used on the nipple, the better the less trauma score during early period of lactation.

Concerning to the relation between nipple soreness score and period of using olive oil on nipples before starting breast feeding among study group, the result of the present study illustrated that, there was a highly statistically significant relation between nipple soreness score and period of using olive oil on nipples before starting breast feeding among study group, the more weeks that olive oil is used on the nipple, the better the condition of the nipple. From my point of view this may be related to that when applying the olive oil for adequate period before breast feeding, this help reduce inflammation process, cracking, tenderness and soreness. The results of the current study agree with **Nageeb, et al., (2019)** who illustrated that, there were a highly statistically significant difference between the duration of olive oil use and nipple soreness score, they revealed that use of olive oil for more than three weeks results in better effect on reducing nipple cracks post-delivery.

Conclusion:

Application of olive oil on nipple during late pregnancy had a positive effect to prevent nipple trauma during lactation among study group. Also, there was a highly

statistically significant relation between nipple trauma score as well as nipple soreness score and the frequency of application of olive oil per day among study group. Moreover, there was a highly statistically significant relation between nipple trauma score as well as nipple soreness score and the period of using olive oil on nipples before starting breast feeding among study group Finally; the findings illustrated that study hypotheses were supported and aim was achieved.

Recommendations:

- There is a need to provide health education program during the third trimester for pregnant women and direct postpartum period about protection and treatment of the traumatic nipple.
- Application of olive oil to nipples during late pregnancy and during breast feeding should be recommended by medical team to all pregnant women.
- Health educations need to be given for the women in the third trimester, and to include a hint about proper breast-feeding position and nipple latch on.

Further studies:

- Replication of the study on large representative probability sample is highly recommended in different maternity hospitals to achieve more generalization of the results.
- Investigate effect of applying olive oil to prevent of nipple pain and management of nipple trauma.

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تطبيق زيت الزيتون علي الحلمة اثناء الفترة الأخيرة من الحمل لمنع إصابات الحلمة اثناء الرضاعة

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يعتبر الألم الناتج عن الرضاعة الطبيعية سببًا مهمًا للفطام ، وبالتالي فإن الوقاية منه ضرورية. فان وضع زيت الزيتون على الحلمة يقلل من هذا الألم والالتهابات لاحتوائه على العناصر الغذائية التي تحارب الالتهاب.**لذا هدفت هذه الدراسة** الي تقييم تاثير زيت الزيتون على الحلمة اثناء الفتره الاخيره من الحمل لمنع اصابات الحلمة أثناء الرضاعة. أجريت هذه الدراسة في العيادة الخارجية بمستشفي بنها الجامعي بقسم النسا والتوليد.تم تطبيق هذة الدراسة علي١٢٠ سيدة حامل لاول مرة حيث تم تقسيمهم الي مجموعتين متسوتين (مجموعة الدراسة ، مجموعة التحكم). حيث كشفت النتائج عن انة توجد فروق ذات دلالة احصائية عالية بين مجموعتين الدراسة والتحكم لصالح مجموعة الدراسة فيما يتعلق باصابة وتقرح الحلمة. كما توجد فروق ذات دلالة احصائية عالية بين درجة اصابة الحلمة وتكرار استخدام زيت الزيتون في اليوم بين مجموعة الدراسة .واخيرا هناك علاقة ذات دلالة احصائية عالية بين درجة تقرح الحلمة وفترة استخدام زيت الزيتون علي الحلمة. كما اوصت الدراسة بتنفيذ برنامج تثقيف صحي للسيدات الحوامل في الثلث الاخير من الحمل وفترة ما بعد الولادة