

Effect of Cabbage leaves, Olive Oil Massage and Warm Ginger on relief Breast Engorgement among Postpartum Women

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Abstract:

Background: The aim of this study was to compare the effect of a cabbage leaves, olive oil massage and warm ginger on relief breast engorgement among postpartum women. A quasi-experimental design was utilized in the current study. Setting: The study was conducted at the Maternity Outpatient Clinics and in Post-Natal Ward of Obstetrics and Gynecology Department Beni – Suef and Zagazig, University Hospital, Egypt,; during the period from July 2021 to June 2022. a convenience sample of 300 women with breast engorgement were enrolled in the study in the following groups (cabbage leaves, olive oil massage and warm ginger). Four instruments were used for data collection. The tool I: Structured interviewing questionnaire, Tool II: **Breast engorgement scale:** and Tool III: **Postpartum Women`s satisfaction.** Results:there was highly significant difference between mean score of a cabbage leaves, olive oil massage and warm ginger group at pre and post intervention with p value <0.01. **Conclusion:** According to these findings, the current study detected that a cabbage leaves, olive oil massage and warm ginger had positive effect on management of breast engorgement while a cabbage leaves had highest effect.

Keywords: Cabbage leaves, Olive Oil Massage , warm ginger, Breast Engorgement and Postpartum Women

Introduction

The postpartum, postnatal period or puerperium refers to the first 4-6 weeks following childbirth, when the mother's body returns to a non-pregnant state through physiological and anatomical changes. These changes are both retrogressive (involution of the uterus and vagina) and progressive (production of milk for lactation, restoration of the normal menstrual cycle, and beginning of a parenting role). Some of these changes may be simply bothersome for the new mother, although serious complications can also arise(**Shamekh et al.,2022**)

One of postpartum changes is milk production that occurs within the breast alveoli and is squeezed out into the milk ducts, which

carry the milk through the breast. Milk production is stimulated by dramatic reduction in progesterone, estrogen, and human placental lactogen levels after delivery of the placenta. When the baby suckles, the maternal brain releases prolactin hormone, which causes the alveoli to begin making milk and oxytocin hormone, which causes muscles around the alveoli to squeeze milk out through the milk ducts (**Alex et al., 2020**).

Breast engorgement is swelling of the breasts that the cause of painful tenderness and tenderness in the breasts. It's caused by increased blood flow and milk supply in the breast and it presents in the first days after child birth(**Mohamed, Shelil & Abd-Allah, 2022**). About the third postpartum day 65% - 75% of lactating women throughout the world and 82%

in Egypt experience some degree of primary breast engorgement, which is one of the most common minor discomforts, specially among primiparae (**Shamekh et al.,2022; Ghattas et al., 2022**)

Primary breast engorgement happens when the blood and lymph fluids fill the tissues surrounding the alveoli, in preparation for milk production. While, secondary breast engorgement may beginning on the 5 th postpartum day or in some cases on the 9th & 10th postpartum days, when the mother is not feeding frequently or the baby feed less milk from the breast. The woman's breast may be hard with tightly stretched skin that may look shiny; it may also go swollen, warm, tender and throbbing pain may be felt. Additionally, nipples may turn flat and taut, and areola may become full and hard, leading to hard latching. What is more, low grade fever and reduced breast milk may be experienced (**Hassan et al., 2020; Zolala et al., 2020**). Breast engorgement subsides within 24 to 48 hours or 3-5 days by baby suckling or by expressing milk. It may last for more than 2 weeks, consequently, interferes with the start and continuation of exclusive breastfeeding. Therefore, treatment may include antibiotics, analgesics, rest, and hydration. If breast engorgement is not treated promptly, it may lead to many complications (**Makwana & Tiwari, 2018**).

In fact, there is an array of pharmacological and non-pharmacological strategies for managing breast engorgement and its associated pain. Pharmacological strategies are considered to be beneficial, but its side effects sometimes outweigh their benefits (**Zagloul et al., 2020**). Therefore, non pharmacological strategies attracted considerable attention in recent years such as kangaroo care, fluid limitation, binding the breasts or wearing a tight brassiere, application of cabbage leaves,olive oil massage, hot and cold compresses alone or with herbal remedies (e.g., Fenugreek seeds and ginger) as well as local cactus or cold aloe vera gel applications (**Hassan et al., 2020; Mangesi & Zakarija-Grkovic, 2016**). There are numerous methods for managing breast engorgement as warm application before breastfeeding, cool

compresses, cabbage leaves, breast massage, acupuncture, warm ginger, and expressing milk. These methods can help in relieving engorgement symptoms and promote effective latch (**Mohamed, Shelil & Abd-Allah, 2022**). Several approaches for the treatment of breast engorgement include warm and cold compresses as well as cold cabbage leaves, breast massage, milk expression, Topical cabbage leaves, warm ginger and olive oil because of an easily accessible and relatively cheap substance was used by early Mediterranean cultures as a medicine to cure all diseases. Olive is among the oldest know, olive oil contains three major antioxidants substance which are: vitamin E,polyphenols, and phytosterols. Express a little milk or colostrum onto your nipples after nursing. In many cultures, human milk's antibacterial properties are used to treat skin irritations (**Sivarajah et al., 2020**). In addition to the benefits of ginger topical application, warm compresses on the breasts before feeding also was found to be effective; as hanging breasts and nipples in a pot of warm water and expressing milk before feeding can reduce pain, cause relaxation and increase blood flow to the area (**Kravchenko et al., 2019**). The physiological effect of heat includes vasodilatation; sedation; enhanced capillary permeability, cell metabolism, and blood flow rate to the affected area; as well as introduction of antibodies, leukocytes, oxygen and nutrients ;plus promotion of body part healing (**Hassan et al., 2020**). Sinigrin rapine, mustard oil, magnesium, oxalate and sulphurheterosidesare all known substances found in cabbage leaves. Cabbage leaves has both anti inflammatory and anti-irritant properties. Nurses contribute to the health and well-being of women, children, and families, by advancing skilled and specialized care in the clinical management of breastfeeding in their professional practice. Also, they should instruct and show and learn mothers how to express milk so they can use it when feeding their babies, and avoid breast engorgement (**Masoud, El-Kholy & Ramadan, 2018**).

Nurses have a vital role in recognize the need for mothers and their babies with breast feeding and breast engorgement through education because of their education is

an important but a complex issue. The nurse should focus on avoid of breast engorgement by providing guidance to the mother about starting breastfeeding as soon as possible after the birth, to give the baby time to learn to breastfeed before the breasts go full and firm, prevent early use of bottles. One time the milk comes in the mother should breastfeed at least eight times in 24 hours to avoid over completeness and use hand expression or a breast pump to move out the remaining milk. Besides, early postpartum care is essential to diagnose and treat complications.

Significance of the study

Breast engorgement is a major reason why women abandon breastfeeding. Past studies have discovered that Breast engorgement occurs in 82% of breastfeeding mothers in Egypt within the first postpartum week (Abdallah et al., 2018; Abd El-hady et al., 2021 & Ghattas et al., 2022). Breast engorgement causes pain and discomfort, sore nipples, mastitis, abscess formation, decreased milk secretion, introduction of breast milk substitutes, and premature cessation of breastfeeding which render it difficult for the mother to continue breastfeeding (Abd El-hady et al., 2021). Therefore, prevention and treatment of Breast engorgement during the early postpartum period are essential for successful breastfeeding. Therefore the current study done to compare the effect of a cabbage leaves, olive oil massage and warm ginger on relief breast engorgement among postpartum women

Purpose of the Study

Aim of the study The aim of this study was to compare the effect of a cabbage leaves, olive oil massage and warm ginger on relief breast engorgement among postpartum women

Research Hypothesis There is a difference between the a cabbage leaves, olive oil massage and warm ginger on relief breast engorgement among postpartum women

Method

Research Design: A quasi-experimental design (equivalent group design) was utilized in implementing this study.

Research Settings: This study was carried out at the Maternity Outpatient Clinics and in Post-Natal Ward of Obstetrics and Gynecology Department Beni – Suef and Zagazig, University Hospital, Egypt,

Sample Type: Convenient sample of 300 postpartum women with breast engorgement fulfilled the following criteria.

Inclusion criteria for the study sample:

- Free from medical diseases that interfere with breastfeeding.
- Initiation of breast feeding.
- Willing to participate in the study.
- Did not get any analgesics before breast engorgement treatments for at least 6 hours.

Sample Size : The average sample size was 100 per group. The sample size was calculated by the Epi-Info program at a 95% level of confidence, with an expected frequency = of 50%. Accepted error is = 5%. So, a convincing sample of 300 women was recruited in the study and indiscriminately assigned to 3 groups (G1, G2, and G3) G1: which comprised 100 women who will apply a cabbage leaves as breast engorgement relief G2: which comprised 100 women who will use olive oil massage as breast engorgement relive and G3: which comprised 100 women who will apply for warm ginger in the hospital as breast engorgement relief. Each of the 300 women was asked to select a piece of paper containing a number (1, 2, or 3), those who selected number 1 were assigned to G1, those who selected number 2 were allotted to G2, and those who chose number 3 were appointed to G3. This technique was used to avoid sample contamination and bias.

Tools for data collection: Throughout the course of the present study, data was collected using instruments that were developed by the researcher and revised by qualified

experts, and then tested for validity and reliability. Four instruments were developed and used by the researcher for data collection.

Three tools were utilized by the researchers as the following:

Tool one: Women's data structured interview questionnaire, which include the following parts:

Part (I): Women's demographic data: It includes women's age, education, occupation, current residence, family income/month.

Part (II): Women's Medical history including parity, mode of last delivery, obtained antenatal visits and sex of newborn

Part (III): Women's breastfeeding history such as rooming the baby and method, as well as rate of scheduled breastfeeds, number of breastfeeds/day, giving supplementing feeding and onset of breast engorgement after delivery.

Tool two: Breast engorgement scale: It included four chief parts that illustrate the breast's actual condition (redness, pain, edema, and pyrexia).

Part (I): Modified Reeda Scale (MRS), which was originally formed by Hill (1990). It was adopted by the researchers to assess the breast engorgement status after delivery in relation to redness and it was categorized into 4 categories: 0= No redness; 1= Mild redness (two-sided < 0.25 cm or one-sided < 0.5 cm) ;2= Moderate redness (0.5 cm two-sided or 1 cm one sided); 3= Severe redness (> 0.5 cm two-sided or > 1 cm one-sided). Alpha Cronbach test = 0.86.

Part (II): Visual Analog Scale (VAS), which was primitively developed by Woodforde & Merskey (1972) and adopted by the researcher for measuring intensity of breast pain. This scale is a self-report scale that consists of a flat line in centimeters from 0 to 10, stand for: 0 = No pain 1-3 = Mild pain 4-6 =

Moderate pain 7-10 = Severe pain. Alpha Cronbach test = 0.96.

Part (III): Newton's Scale (1951). It was adopted by the researchers to evaluate breast edema as follows: 0 = No edema (< 2.5 cm above basic). 1 =Mild edema (1.5 cm -< 2.5 cm above basic). 2 = Moderate edema (2.5 cm- 4 cm above basic). 3 =Severe edema (>4 cm above basic). Alpha Cronbach test = 0.98.

Part (IV): Pyrexia Chart, where the body temperature was assessed by using a thermometer and sorted as follows: 0 =No pyrexia (37- <37.5 °C). 1= Mild pyrexia (37.5- < 38 °C). 2= Moderate pyrexia (38-< 38.5 °C) 3= Severe pyrexia (≥ 38.5 °C). Alpha Cronbach test = 0.98.

The total score of breast engorgement was observed by summing up the scores of Part I (redness), Part II (pain), Part III (edema), and Part IV (pyrexia). Then, the degree of breast engorgement was estimated as follows: - No engorgement (0-< 3) - Mild engorgement (3-<6) - Moderate engorgement (6-< 9) - Severe breast engorgement (9-12)

Tool three Postpartum Women's satisfaction (Likert - Scale Rating): Adapted from Friedel et al. (2014) it was used to evaluate women's satisfaction levels regarding the intervention used for **breast engorgement** relief. This scale was formed of 5 variables:1, women were comforted by the utilization of the intervention; 2, it was a positive experience; 3, the intervention is not easy to use; 4, women would not like to use the intervention in the future. The Likert scale consists of 4 statements and was based on five points 1= Completely satisfied, 2= Satisfied, 3= Fair, 4= Dissatisfied, and 5= Completely dissatisfied. Alpha Cronbach test = 0.86.

Validity of Tools:

The validity of the tools was evaluated by five qualified experts (three experts from the Maternal and Newborn Health Nursing department at the Faculty of Nursing and two physicians from the Obstetrics and Gynecology department at the Faculty of Medicine). The

tools were reviewed for content accuracy and internal validity. Too, they were asked to judge the points for completeness and clarity (content validity). Suggestions were incorporated into the tools, and changes will be made.

Reliability of Tools:

The reliability of the tools was tested statistically by the researcher for testing the internal consistency of the instrument, using Cranach's Alpha test. This method took place through the administration of the same tools to the same studied groups under similar conditions on one or more occasions. Results from recurrent testing were compared.

Administrative approval:

On July 15, 2021, the Faculty of Nursing; Beni Suf University, and Zagazig University received approval from the hearing and ethics committee. An official letter was taken from the Faculty of Nursing, Beni Suf University, and Zagazig University Dean, and submitted to the directors of the Beni Suf University and Zagazig University Hospitals, chairperson of the obstetrics and gynecology departments of Beni Suf University Hospital and Zagazig University Hospital to carry out the study. Official permission was acquired from the directors of the above-mentioned settings to carry out the study. A complete explanation of the study aim was provided to the directors of the study settings.

Ethical Considerations

Approaches to assure the ethical issues were considered in the study regarding confidentiality and informed consent. The researchers introduced themselves to the women after the laparoscopic gynecological operation and explained the aim of the study and the nature of the study to acquire their acceptance to be recruited in the study as well as to gain their cooperation.

Confidentiality was achieved by locked sheets with the names of the studied women replaced by numbers. All studied samples were

informed that the information they provided during the study would be kept confidential and used only for research statistical purposes. After data collection, the results would be presented as group data with no personal participants' information remaining. The participating women were also informed that the results would be presented as a group of data with no personal participants' information remaining.

Subsequently explanations prior to enrollment in the study, informed consent was obtained from all participating women. Each woman was informed that involvement in the study was voluntary and that she could withdraw from the study whenever she decided to do so. Each woman was given the chance to freely refuse participation. They were free to request anything or have questions about the study details.

Pilot study:

A pilot study was carried out to test the applicability of the instruments, the feasibility of the study, and estimate the time needed for data collection. It was conducted on 10% of the total sample which is equal to 30 women. Based on the pilot study findings; the researchers rephrased some questions and sentences and then set the final fieldwork schedule as (factors that affect pain) The sample of the pilot study was excluded from the main sample size based on the changes done.

Study Field Work:

The data was collected in the obstetric ward over a 12-month period, starting from July 2021 to June 2022. Data were collected all over four days a week (Sunday, Monday,

Tuesday, and Wednesday) from 9 AM to 2 PM according to the availability of participants in both hospitals, Beni Suf and Zagazig University Hospitals.

One or two women were interviewed per day according to the availability of women who met the inclusion criteria. This protocol was followed till the needed number of participants was reached.

-The current study was conducted in consecutive phases (Interview and assessment phase, implementation, and evaluation phase).

Interview and assessment phase:

During the first link, which happens in the first hours after the operation in the ward, the researchers greeted the women, introduced

themselves, and explained the aim of the study in order to obtain their acceptance and recruit them to the study as well as to gain their cooperation. Later, for women who met the inclusion criteria their verbal and written informed consent was taken.

Each woman was interviewed to collect data related to their demographic characteristics (age, education, occupation, current residence, family income/month.), and their medical history and breastfeeding history such as (parity, mode of last delivery, obtained antenatal visits and sex of newborn)(rooming the baby, breastfeeding knowledge, and method, as well as frequency of scheduled breastfeeds, number of breastfeeds/day, giving supplements with breastfeeding and onset of breast engorgement after delivery).The interview took about 25 minutes for each woman; the women communicated in Arabic and documented their answers with the tools used.

Implementation Phase: (for G1 & G2& G3)

The researcher informed the women that **breast engorgement** is a major problem and has many complications. The researchers reassured all women, that all of them had the same. Ongoing from the 1st day of the study in which; each participant asked to wash nipples with clean water post breastfeeding then rub affected nipple with intervention methods according to which group allocated , then keep it exposure to air until dry and continue on this intervention until 14th day

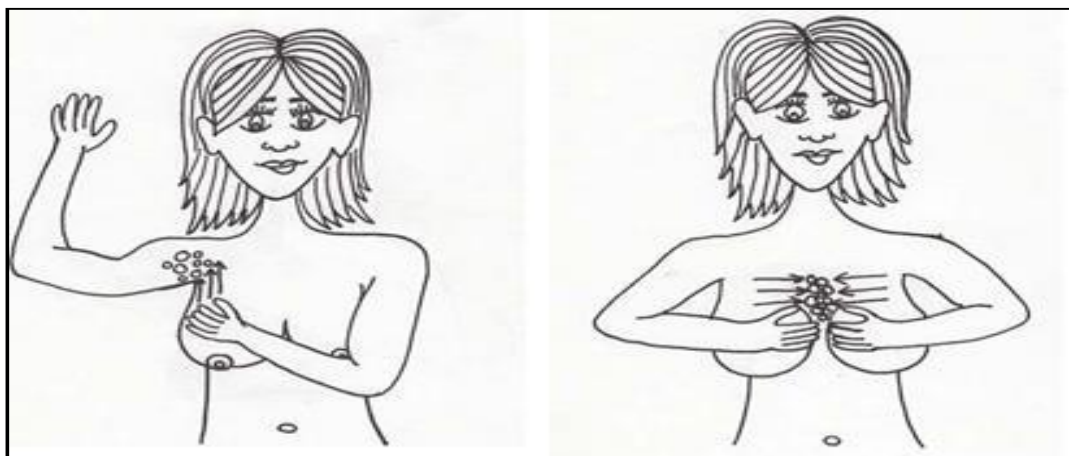
Nursing intervention for relieving breast engorgement : G1 (A cabbage leaves)

Study group were encouraged to administer cabbage leaves treatment for reducing breast engorgement. Cabbage leaves rinsed carefully before use. It was done by applying a small piece of cabbage leaf on the skin to test sensitivity you mean (patch test) before starting the treatment. Cabbage leaves were refrigerated in the freezer for approximately 20 minutes before application or cabbage may be applied warm in room temperature. Cabbage leaves applied directly to breasts, wearing them inside the bra. Cabbage leaves were placed inside the women bra for 15-20 minutes. Remove wilted leaves and reapply fresh leaves. The duration of each intervention was 20 minutes before each feeding. If the baby is unable to feed frequently enough, then fully drain the breasts once or twice daily with an effective breast pump until engorgement disappears.

Nursing intervention for relieving breast engorgement : (G2, olive oil massage)

- The study group was demonstrated by the researchers to do breast massage with olive oil through with massaging the outer sides of the breasts in long strokes up towards the lymph nodes in the axilla (armpit) and rub down the inner sides of the breasts toward the lymph nodes in the center of the chest

- The olive oil massage group was too learned to massage the breast 20 minutes before each feeding. They were also given an illustration materials and a single supply of olive oil as well as they were followed-up through a phone call.



Nursing intervention for relieving breast engorgement: (Group 3 Warm Ginger)

The women who were allotted to The warm ginger compresses group was asked to apply powder ginger in warm water on the affected breast for 20 minutes before each feeding, starting from the 3rd postpartum day.

At the end of the sessions, each woman was given a booklet with illustrations including (indications of cabbage leaves, olive oil massage and warm ginger intervention; benefits of cabbage leaves, olive oil massage and warm ginger, and how to apply it at home). the researcher evaluates breast engorgement after the intervention and measures women's redness, pain, edema, and pyrexia using tool two. each woman was given an instruction booklet and trained them on how to assess breast engorgement after the intervention.

At the end of the sessions, each woman was given a booklet with illustrations including (indications of cabbage leaf operation; benefits of cabbage leaf, and how to apply it at home). The researcher evaluates breast engorgement after the intervention and measures women's redness, pain, edema, and pyrexia using Tool two. Each woman was given an instruction booklet and trained them on how to assess breast engorgement after the intervention.

Evaluation phase:

- The degree of breast engorgement was assessed for three groups 30 minutes after 5th day breast massage through phone call or what's app.

- After completion of data collection, comparison between the three groups was done to compare the effect of a cabbage leaves, olive oil massage and warm ginger on relief breast engorgement among postpartum women

Statistical Analysis:

Data was entered and analyzed by utilizing the SPSS (Statistical Package for Social Science) statistical package version 26. The graphics were done using the Excel program.

Quantitative data were presented by mean (X) and standard deviation (SD). The

qualitative data were presented as frequency distribution tables, numbers, and percentages. It was analyzed by the chi-square (χ^2) test. However, if the expected value of any cell in the table was less than 5, the Fisher Exact test was used (if the table had 4 cells), or the Likelihood Ratio (LR) test (if the table had more than 4 cells). The level of significance was set as a P value <0.05 for all significant tests. massage the shoulder for 30 minutes.

Results

Table (1) shows that there are no significant differences between the three studied groups regarding all items of demographic characteristics (with $P > 0.05$ for each). While 50%, 40% and 44% of the women in the Olive Oil Massage, Cabbage leaves and Warm Ginger groups are more than 30- years old respectively. The mean age among the three groups is: $33.4 \pm 2.6Y$, 32.3 ± 2.4 years, and 31.6 ± 2.9 years, respectively. Regarding level of education, 54% and 40% of the Cabbage leaf and Olive Oil Massage groups were secondary education but 36% of Warm Ginger group was university education and 80%, 84% and 74% of the Olive Oil Massage, Cabbage leaves and Warm Ginger groups were not employee. According to residence, 60%, 80% and 70% Olive Oil Massage, Cabbage leaves and Warm Ginger groups from urban while family in not enough in 65%, 72% and 80% of studied groups respectively and the difference isn't significant statistically ($P = > 0.05$).

Table (2): revealed that there was no significant difference between three studied groups related parity, mode of last delivery, antenatal visit and sex of newborn at p value > 0.05 .

Table (3) shows statistically insignificant differences between the three studied groups regarding all items of **Breastfeeding history**

Table (4): Presents postpartum mothers' breast redness and Breast pain intensity using Cabbage leaves, Olive Oil Massage and Warm Ginger. The severe **Breast redness** decreased aggressively from 70% before and to 20% after intervention among the Cabbage leaves group,

while it diminished slightly from 83 % and 69% before intervention to 74% and 30% after intervention among the Warm Ginger and Olive Oil Massage groups. Regarding pain intensity, 66% of Cabbage leaves group were severe pain intensity and diminished to 20% severe pain intensity after intervention, but 60% and 59% the Warm Ginger and Olive Oil Massage groups severe pain intensity before intervention and reduced to 46% and 38% after intervention, a highly statistically significant difference was noted between them after intervention ($P < 0.001$),

Table (5): Presents postpartum women Breast edema and Level of pyrexia using Cabbage leaves, Olive Oil Massage and Warm Ginger, a highly statistically significant difference was noted between them after intervention ($P < 0.001$), where severe **Breast edema** reduced sharply from 30% and to 10% among the Cabbage leaves group, while it diminished slightly from 28 % and 31% to 24% and 28% after intervention among the Warm Ginger and Olive Oil Massage groups. Regarding Level of pyrexia, 30% of Cabbage leaves group

were moderate pyrexia were moderate pyrexia and diminished to 2% moderate pyrexia after intervention, but 25% the Warm Ginger and Olive Oil Massage groups were moderate pyrexia and reduced to 10% and 15% after intervention.

Table (6) shows the women's Total score of breast engorgement using Cabbage leaves, Olive Oil Massage and Warm Ginger intervention. shows line upon postpartum mothers' total score of **breast engorgement** using Cabbage leaves, Olive Oil Massage and Warm Ginger intervention.. No statistically significant difference was detected between the studied groups before intervention. However, a highly statistically significant difference was noticed between them after intervention ($P = 0.000$).

Table 6 showed that 50%, 70% and 30% of studied groups were completely satisfied, While 5% of Olive Oil Massage group was dissatisfied. There is a statistically significant difference between all groups (with p -value < 0.001).

Table (1): Demographic characteristics of the mothers in the three studied groups (N =300)

Demographic characteristics	Warm Ginger Massage Group (No=100)		Cabbage leaves group (No=100)		Olive Oil Massage group (No=100)		P value
	N0.	%	N0.	%	N0.	%	
Age (Years):							
20-		20.0	24	24.0	16	16.0	>0.05
30-	20	50.0	40	40.0	44	44.0	
40-50	50	30.0	36	36.0	40	40.0	
	30						
Mean ± SD	33.4 ± 2.6 Y		32.3 ± 2.4 Y		31.6 ± 2.9 Y		
Educational Level							
Illiterate/Read & Write	30	30.0	20	20.0	25	25.0	>0.05
Secondary school	34	34.0	54	54.0	40	40.0	
University	36	36.0	26	26.0	35	35.0	
Occupation: Employee							
Not employee	26	26.0	16	16.0	20	20.0	>0.05
	74	74.0	84	84.0	80	80.0	
Residence:							
Rural	70	70.0	80	80.0	60	60.0	>0.05
Urban	30	30.0	20	20.0	40	40.0	
Family income/month:							
- Just enough	20	20.0	28	28.0	35	35.0	>0.05
- Not enough	80	80.0	72	72.0	65	65.0	

statistically insignificant at p -value > 0.05 *statistically significant at p -value < 0.05

* highly statistically significant at p -value < 0.001

Table (2): Distribution of the Studied women according to the basal characteristics of Cabbage leaves, Olive Oil Massage and Warm Ginger Groups to relief Breast Engorgement among Postpartum Women (n=300).

Items	Warm Ginger Massage Group (No=100)		Cabbage leaves group (No=100)		Olive Oil Massage group (No=100)		P value
	N0.	%	N0.	%	N0.	%	
Parity:							
Primipara	80	80.0	84	84.0	86	86.0	>0.05
Multipara	20	20.0	16	16.0	14	14.0	
Mode of last delivery:							>0.05
Vaginal	70	70.0	84	84.0	86	86.0	
C. S	30	30.0	16	16.0	14	14.0	
Obtained Antenatal visits:							>0.05
Yes	75	75.0	68	68.0	80	80.0	
No	25	25.0	32	32.0	20	20.0	
Sex of newborn:							>0.05
Male	35	35.0	58	58.0	51	51.0	
Female	65	65.0	42	42.0	49	49.0	

statistically insignificant at p-value>0.05, *statistically significant at p-value<0.05

highly statistically significant at p-value<0.001

Table (3): Breastfeeding history among women in the three groups (N=300)

Breastfeeding history	Warm Ginger Massage Group (No=100)		Cabbage leaves group (No=100)		Olive Oil Massage group (No=100)		P value
	N0.	%	N0.	%	N0.	%	
Rooming the baby:	100	100.0					>0.05
- Rooming-in	0	00.0	98	98.0	99	99.0	
- Rooming-out			2	2.0	1	1.0	
Having knowledge about breastfeeding:		25.0		30.0			>0.05
- Yes	25	75.0	30	70.0	65	65.0	
- No	75		70		35	35.0	
Method of breastfeeding:	9	22.5	4	10.0			>0.05
- Schedule	31	77.5	36	90.0	20	40.0	
- On-demand					30	60.0	
Number of breastfeeds/day:		10.0	0	00.0			>0.05
6 times	10	20.0	80	80.0	5	5.0	
7-9 times	20	70.0	20	20.0	90	90.0	
10-15 times	70				5	5.0	
Giving supplements with breastfeeding:		42.0	35				>0.05
- Yes	42	58.0	65	35.0	58	58.0	
- No	58			65.0	42	42.0	
Onset of breast engorgement after delivery (days):	4-12		4-11		4-11		>0.05
- Min-max	7.68 ± 2.544		7.22 ± 1.912		7.57 ± 1.966		
- Mean ± SD							

statistically insignificant at p-value>0.05

statistically significant at p-value<0.05

highly statistically significant at p-value<0.001

Table (4): Distribution of women under the study concerning Breast redness and Breast pain intensity between the three groups (N =300)

Items	Warm Ginger Massage Group (No=100)		Cabbage leaves group (No=100)		Olive Oil Massage group (No=100)		P value ANOV A test
	N0.	%	N0.	%	N0.	%	
Breast redness :							<0.001
Before intervention:							2.656
- Mild	0	00.0	3	3.0	1	1.0	
- Moderate	17	17.0	27	27.0	30	30.0	
- Severe	83	83.0	70	70.0	69	69.0	
After intervention:							
- Mild	1	1.0	10	10.0	2	2.0	
- Moderate	25	25.0	70	70.0	69	69.0	
- Severe	74	74	20	20.0	30	30.0	
Breast pain intensity							<0.001
Before intervention							1.966
- Mild	2	2.0	4	4.0	1	1.0	
- Moderate	38	38.0	30	30.0	40	40.0	
- Severe	60	60.0	66	66.0	59	59.0	
After intervention:							
- Mild	4	4.0	20	20.0	2	2.0	
- Moderate	50	80.0	60	60.0	60	60.0	
- Severe	46	46.0	20	20.0	38	38.0	

statistically insignificant at p-value>0.05 - statistically significant at p-value<0.05

highly statistically significant at p-value<0.001

Table (5): Distribution of women under the study concerning Breast edema and Level of pyrexia for the three groups (N =300)

Items	Warm Ginger Massage Group (No=100)		Cabbage leaves group (No=100)		Olive Oil Massage group (No=100)		P value ANOV A test
	N0.	%	N0.	%	N0.	%	
Breast edema :							<0.001
Before intervention:							2.834
- No	5	5.0	2	2.0	3	3.0	
- Mild	23	23.0	20	20.0	22	22.0	
- Moderate	44	44.0	48	48.0	44	44.0	
- Severe	28	28.0	30	30.0	31	31.0	
After intervention:							
- No	8	8.0	20	20.0	4	4.0	
- Mild	24	24.0	40	40.0	25	25.0	
- Moderate	44	44.0	30	30.0	43	43.0	
- Severe	24	24.0	10	10.0	28	28.0	
Level of pyrexia :							<0.001
Before intervention:							2.931
- No	55	55.0	50	50.0	45	30.0	
- Mild	20	20.0	20	20.0	30	25.0	
- Moderate	25	25.0	30	30.0	25	60.0	
After intervention:							
- No	70	70.0	75	75.0	60	25.0	
- Mild	20	20.0	23	23.0	25	15.0	
- Moderate	10	10.0	2	2.0	15		

statistically insignificant at p-value>0.05 - statistically significant at p-value<0.05

highly statistically significant at p-value<0.001

Table (6): Distribution of women under the study concerning Total score of breast engorgement at different time of intervention (N = 300)

Total score of breast engorgement	Warm Ginger Massage Group (No=100)		Cabbage leaves group (No=100)		Olive Oil Massage group (No=100)		P value ANOV A test
	N0.	%	N0.	%	N0.	%	
Before intervention:							>0.05
- Mild (3-<6)	5	5.0	25	25.0	6	6.0	0.673
- Moderate (6-< 9)	77	77.0	60	60.0	75	75.0	
- Severe (9-12)	18	18.0	15	15.0	19	19.0	
After intervention:							<0.001
- Mild (3-<6)	20	20.0	44	44.0	15	15.0	4.641
- Moderate (6-< 9)	68	68.0	56	56.0	66	66.0	
- Severe (9-12)	12	12.0	0	0.0	19	19.0	

statistically insignificant at p-value>0.05 - statistically significant at p-value<0.05

highly statistically significant at p-value<0.001

Table 7: Frequency distribution of the studied groups satisfaction among the three groups (Cabbage leaves, Olive Oil Massage and Warm Ginger) regarding breast engorgement (n=300)

Variables	Warm Ginger Massage Group (No=100)		Cabbage leaves group (No=100)		Olive Oil Massage group (No=100)		P value ANOV A test
	N	%	N	%	N	%	
	Mothers' satisfaction						<0.001
Completely satisfied	50	50.0	70	70.0	30	30.0	6.082
Satisfied	30	30.0	20	20.0	34	34.0	
Fair	20	20.0	10	10.0	26	26.0	
Dissatisfied	0	0.0	0	0.0	5	5.0	
Completely dissatisfied	0	0.0	0	0.0	0	0.0	

statistically insignificant at p-value>0.05- statistically significant at p-value<0.05

highly statistically significant at p-value<0.001

Discussion

Breast engorgement is considered the most common health issue that affects a large number of postpartum women. It is a painful, unpleasant, and especially distressing condition for them as well as it may inhibit successful breastfeeding, leading to premature stop of breastfeeding, reduced milk production. Breast engorgement can likewise lead to cracked nipples, mastitis, and breast abscess. Therefore, the effective management of breast engorgement may provide an approach for health care providers to ameliorate postpartum care, including breastfeeding (Gresh et al., 2019). Different forms of breast engorgement interventions have been studied (i.e., cold cabbage leaves, cold gel packs, warm and cold

compresses, breast massage, and milk expression), but, limited consistent evidence has been found on effective interventions. Thus, more evidence-based investigation of non-pharmacologic remedies for the management of breast engorgement is needed because these tend to be popular (Berens et al., 2016; Zakarija-Grkovic & Stewart, 2020). Therefore, this study was performed to compare the effect of a cabbage leaves, olive oil massage and warm ginger on relief breast engorgement among postpartum women.

On investigating breast redness using MRS, At this study, after analyzing the collected data accepted the research hypothesis. The current study detected that a cabbage leaves, olive oil massage and warm ginger in their order had positive effect on management of

breast engorgement its associated symptoms (redness, pain, edema, pyrexia) and , olive oil massage had least effect while a cabbage leaves had highest effect (more than half of studied group had no and mild edema and pyrexia after intervention when compared with other groups (olive oil massage and warm ginger) . This might be attributed to the anti-inflammatory and anti-irritant properties of a cabbage leaves, which is rich in Sinigrin rapine, mustard oil, magnesium, oxalate and sulphurheterosides that reduce breast inflammation, moisturize breast skin, and keep it hydrated (Masoud, El-Kholy & Ramadan, 2018). The current finding is relatively similar to (Roberts KL et al., 2013) mention that when compared the efficiency of cabbage leaf extract with the treatment of breast engorgement in lactating women; they concluded that both the groups received equal relief from the discomfort and the hardness in breast tissue decreased substantially. These results disagreement with the study conducted by (Tablel and Mahrous, 2021). detected that olive oil, coconut oil and breast milk in their order had positive effect on management of nipple soreness, breast milk had least effect while olive oil had highest effect.

When breast pain was assessed using MRS and VAS, the results of the present study also revealed that and there was improvement and highly significantly sharp reduction among the a cabbage leaves group after intervention (more than three quarter of studied group had mild and moderate redness, pain), as opposed to the other group(olive oil massage and warm ginger) . This may reflect the fact that a cabbage leaves has anti-inflammatory and analgesic properties as sulfur content which can reduce breast swelling and inflammation. contains the amino acid methionine which functions as an antibiotic and other ingredients such as sinigrin (Allylisothiocyanate), mustard oil, magnesium, sulfur oxylate heterosides which can help widen capillary blood vessels, thereby increasing blood flow in and out of the area and allowing the body to reabsorb fluids blocked in the breast so that it can reduce breast swelling (Pratiwi, Handayani & Ariendh , 2019). Warm ginger massage also reduces pain by provocation of nerve endings that due to hanging breasts and nipples in a pot of warm water and expressing

milk before feeding can reduce pain, cause relaxation and increase blood flow to the area. These results agreed with (Shamekh et al., 2022) concluded that warm ginger compresses were more effective in relieving breast engorgement and its associated symptoms (redness, pain, edema, pyrexia) among postnatal lactating mothers than cold aloe vera gel compresses, although the relationship was not statistically significant. Furthermore, the result of present study showed that olive oil massage had more effective in relieving breast engorgement and its associated symptoms (redness, pain, edema, pyrexia). This may be attributed to the anti-inflammatory properties of olive oil, which is rich in polyphenols, the plant-based substances that decrease breast inflammation, moisturize breast skin, and keep it hydrated (Lin et al., 2017 & Cherney 2018).

The current result is relatively similar to (Ghattas et al., 2022) stated that olive oil breast massage significantly relieved breast engorgement and enhanced successful breastfeeding. Moreover, this findings supported by Chaudhary et al., (2019) who examined "The Effectiveness of Olive Oil Massage in Reducing Breast Engorgement and Pain among Postnatal Mothers with LSCS Admitted in Selected Hospital at Meerut" and illustrated that breast massage with olive oil is tacit in relieving breast pain among postpartum women with lower Cesarean section. The current study is fairly conformable with the three studies carried out in Menoufia and Behena governorates, Egypt, where it was detected that a cabbage leaves and olive oil application on breast nipples has greater effect on erythema associated with nipples' trauma , soreness and Breast Engorgement during lactation (Masoud, El-Kholy & Ramadan, 2018; Ahmed et al., 2020; Hables & Mahrous, 2021).

In general, the degree of breast engorgement was ascertained in the current study by summing up the previously discussed parameters (breast redness, pain, edema & pyrexia). It was discovered that severe breast engorgement highly significantly fell sharply among the studied group after intervention, as opposed to before intervention. As mentioned before; a cabbage leaves, which is rich in

Sinigrin rapine, mustard oil, magnesium, oxalate and sulphurheterosides that reduce breast inflammation, moisturize breast skin, and keep it hydrated.in the same line olive oil contains oleic acid and antioxidants, which can help fight inflammation. On the other hand, warm ginger breast massage may help prevent blockage of milk ducts, stimulate lymphatic system, increase blood flow to breast tissue and improve the flow of milk. It also decreases pain by nerve ending stimulation, stretching the soft tissue and removing of metabolic wastes (**Eske, 2020**);).

The current study results, There was a highly significant difference between all groups regarding total score of **breast engorgement after intervention** (P=0.000) **while** no statistically significant difference was detected between all groups before intervention. The current finding is relatively similar to(**Ghattas et al., 2022**), **found that there** was highly significantly increased sharply among the study group after intervention. Therefore, a cabbage leaves helps in softening the breast tissue and ensuring much easier latch on as well as making nursing easier and more effective. Cabbage leaves have both anti-irritant and antibiotic properties, which help in dilating local blood capillaries, promoting the blood supply to the breast tissues, improving milk ejection, and alleviating engorgement symptoms (**Rajaveni, 2019**).

The present study findings answered the study hypotheses. Regarding women who use a cabbage leaves, olive oil massage and warm ginger to relief breast engorgement, women who use a cabbage leaves will have less breast engorgement and its associated symptoms (redness, pain, edema, pyrexia) than those who use warm ginger. Also, women who use a cabbage leaves will have less breast engorgement and its associated symptoms (redness, pain, edema, pyrexia) than women who use olive oil massage.

There was a highly significant difference between all groups regarding women's satisfaction with the p-value = < 0.001. The present study revealed that a cabbage leaves and warm ginger had more satisfaction than women

in the olive oil massage group. While in the a cabbage leaves group more than half of the women in the group reported that they were completely satisfied when compared with other groups. The researchers explain these results as a cabbage leaves more effective, save, inexpensive, easy, and reduces breast engorgement and its associated symptoms (redness, pain, edema, pyrexia) in a safe way this due to anti inflammatory properties that work to damage, destroy, reduce, or localize (sekuster) both damaged agents and damaged tissues and minimal pain score and complications, with less cost to hospitals (**Usman et al., 2022**).

Conclusion

To conclude, According to these results, the current study detected that a cabbage leaves, olive oil massage and warm ginger had positive effect on management of nipple soreness, olive oil massage and warm ginger had least effect while a cabbage leaves had more effect than olive oil massage and warm ginger .

Recommendations:

- Further explore a cabbage leaves, olive oil massage and warm ginger` s possible positive effects on the prevention of breast engorgement
- Raising awareness of breastfeeding mother regarding the beneficial effect of a cabbage leaves, olive oil massage and warm ginger on breast engorgement

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