

Comparing between the Effect of Breast Massage versus Cabbage Leaves Compress on Reduction of Breast Engorgement among Postpartum Women

Rehab Sabry Fawzy Mohamed¹, and Mervat ELshahat I. Shelil² and Inas Mohamed Abd-Allah³

(1) Assistant lecturer of Obstetrics and Gynecological Nursing, Faculty of Nursing - Suez Canal University, Ismailia, Egypt.

(2) Assist. Professor of Community Health Nursing, Faculty of Nursing - Suez Canal University, Ismailia, Egypt.

(3) Professor of Obstetrics and Gynecological Nursing, Faculty of Nursing - Suez Canal University, Ismailia, Egypt.

Abstract

Background: Breast engorgement is painful congestion of the breasts with milk that can make it difficult for the baby to latch the mother breast properly. **Aim of this study:** evaluate the effect of breast massage and cabbage leaves on reduction of breast engorgement among postpartum women. **Design:** quasi experimental design was utilized in this study. **Study sample:** Purposive sample of 100 women with engorged breast. **Setting:** Suez Canal University Hospital and General Hospital at Ismailia City. **Tools of data collection: I:** Structured interviewing questionnaire **II:** Six-point engorgement scale **III:** visual analogue rating scale **IV:** Breast milk power of hydrogen record **V:** Suckling speed record of neonate and **VI:** Latch Score record. **Results:** All of the women in each group had swelling and warmth (100.0%), 32.0% of massage group had moderate engorgement and 35.0% of cabbage leaves group had severe engorgement. About three quarter of studied women had severe pain (73.0%). After 5 days of intervention, 80% of massage group and 32% of cabbage leaves group had normal breast, 48.0% had no pain, 99.0% had alkaline milk power of hydrogen and 87.0% had good breast feeding score. There were a statistical significant differences between studied groups regarding level of engorgement, intensity of pain, suckling speed and total latch score ($p < .05^*$) **Conclusion:** Application of breast massage and cabbage leaves compress was effective in relieving breast engorgement. Breast massage was more effective than cabbage leaves. **Recommendation:** Planning and developing prenatal classes for newly breast feeding mothers on prevention and management of breast engorgement. Nurses should be trained to use breast massage and the cabbage leaves compresses as the nursing approach for managing breast engorgement. **Keywords:** - Breast engorgement, breast massage, cabbage leaves, postpartum women.

1. Introduction

Breast engorgement is painful congestion of the breasts with milk that can make it difficult for the baby to latch the mother breast properly (McS& Ilksen, 2018). It occur when milk first come in breast and at other times and can be painful and uncomfortable for the mother. It is

characterized by the swelling of the breasts with the abrupt increase in milk volume, vascular congestion, and edema during the first two weeks after birth which may lead to decreased milk supply, mastitis, or inflammation of the breast and association with serious illness as breast infection (Nguyen et al., 2021). There are many factors that precipitate breast engorgement as

poor latch, decreased duration of breastfeeding, ineffective breastfeeds, **(Westerfield et al., 2018)**, missing baby early feeding cues, giving formula supplements to the baby, using a breast pump without a medical indication, as a result breast engorgement can hinder the development of successful breastfeeding, lead to early breastfeeding cessation **(Douglas, 2019)**.

The main sign of the engorgement is the firm, swollen and painful breasts. In more severe cases, the affected breast becomes very swollen, hard, shiny, and slightly lumpy when touched. When the breast is seriously engorged, the nipple is likely to draw in into the areola **(Amir et al., 2021)**.

The prevalence of breast problems during the postpartum period is very high. Several studies regarding breast engorgement have reported that the incidence rate throughout the world is 2%-3% for mastitis, and 65%-75% for breast engorgement with plugged ducts but in Egypt it was 82% **(Abd El-hady et al., 2021& Ranawaka et al., 2021)**.

Management of breast engorgement can be medical and non-medical methods. Medical management includes proteolytic enzymes such as protease, serrapeptase, and

subcutaneous oxytocin. Pain medications as ibuprofen can help relief pain and discomfort and is safe during breastfeeding. Non-medical methods are numerous as warm compresses before breastfeeding, cold compress, cabbage leaves and breast massage,. These methods can help in alleviating engorgement symptoms and promote successful latch **(Zakarija & Stewart, 2020)**.

Significance of the study:

Breast massage and cabbage leaves compress help in relieving engorgement and related symptoms as it reduces the breast pain as well as blood congestion in the mother's breast **(Eittah & Ashour, 2019)**. Also it increases the sweetness in mother's milk, improves circulation, increases good quality of mother's milk with increased pH and increases sucking response in the infant. **(Zagloul et al., 2020)**. So this study was done to evaluate the effect of breast massage and cabbage leaves compress on reduction of breast engorgement among postpartum women.

The aim of the study: The current study aims to evaluate the effect of breast massage and cabbage leaves on reduction of breast engorgement among postpartum women.

Research hypothesis: There will be an improvement of breast engorgement among postpartum women after using of breast massage and cabbage leaves with statistical significant difference between two groups.

2. Subjects and Methods

Study design: Quasi-experimental (pre – post test) research design was used in this study.

Target Population:

The target populations of this study were mothers have engorged breast.

Inclusion Criteria:

1. Breast engorged postnatal mothers with their babies during early postnatal days stayed from 3- 5days.
2. Primi gravida woman who delivered by cesarean section.
3. Gestational age at delivery was between 37 and 42 full weeks
4. Body temperature of < 38°C.
5. Who were willing to participate in the study.

Exclusion Criteria:

- 1- Mothers who had breast abscess, mastitis, infection in the breast, had low birth weight and low Apgar score babies.
- 2- History of breast surgery
- 3- Increased general temperature to over 38°C after the onset of the intervention.
- 4- Use of or need to use anti-inflammatory drugs during the intervention.

The sample of the study: Sample of 100 women with engorged breast were Purposively selected to participate in the study. Sample size was calculated using this formula (**Wassertheil-Smoller 2004**):

$$n = (Z_{\alpha/2} + Z_{\beta})^2 * 2 * \sigma^2 / d^2$$

n=sample size,

$Z_{\alpha/2}$ is the critical value of the normal distribution at $\alpha/2$ (e.g. for a confidence level of 95%,

α is 0.05 and the critical value is 1.96),

Z_{β} is the critical value of the normal distribution at β (e.g. for a power of 80%, β is 0.2 and the critical value is 0.84),

σ^2 is the population variance (=100),

d is the difference would like to detect (=4).

Study setting: The current study was carried out at Suez Canal University Hospital and General Hospital in Ismailia, Egypt.

Tools of data collection:

Tool (1): A structured interview:

involved three parts as part I included 4 questions and covered personal data as age, level of education, occupation, part II included 14 questions and covered obstetrical and gynecologic history as number of abortion, and part III included 7 questions and covered signs and symptoms of breast engorgement as swelling, redness, warmth, fatigue, nipple fissure and inverted nipple (Masoud., 2018).

Tool (2): Six-point engorgement scale:

Six-point engorgement scale is developed by (Thomas et al., 2017) in English language and it is a standardized tool that included one question and was used to assess the degree of breast engorgement with scoring ranges from 1 to 6. The women respond to the question as following: (1) for soft and no changes in breast, score (2) for slight changes in the breast, score (3) for firm and no tender breast, score (4) for firm, and

beginning tenderness in breast, score (5) for firm and tender of the breast, and score (6) for very firm and very tender.

Tool (3): Visual analogue rating scale:

It is a numeric rating scale of the intensity of the pain rating from (0-3). It included one question with the score zero (0) indicates no pain and the top score (3) indicates the worst possible pain.

Tool (4): Breast milk pH record:

It referred to mother's milk acidity and alkalinity checked with the help of digital pH meter. It was collected by the investigator in the clean & sterile plastic container, marked with mother's name, date and time of sample collected & stored in an ice box which will be brought to lab for checking pH with digital pH meter within two hours of collection. It included only one question and based on the result of checking milk pH. The response can be acidic or alkaline.

Tool (5): Suckling speed of neonate record:

Suckling speed was checked at the start of breastfeed during 1 min and checking it

for another 1 min and then taking the mean of the two measurements within 5 minutes of beginning of breastfeeding as assessed by structured checklist on suckling speed.

Tool (6): Latch Score record:

It is a standardized and documentation tool developed by (Jenson et al., 1994) to check for proper breastfeeding process. The LATCH include 5 questions noted an area of proper breastfeeding assessment were “L” stands for how infant will attach onto the breast, “A” stands for the audible swallowing amount, “T” stands for type of nipple of the mother, “C” stands for mother’s comfort level, “H” stands for how much help mother needs to hold infant to the breast. The investigator uses it to assess both mother and infant variables.

Scoring system:

Scoring system of engorgement :

- Score 1: Normal
- Score 2 and 3: Mild engorgement
- Score 4 and 5: Moderate engorgement
- Score 6: Severe engorgement.

Scoring system of pain:

No pain = (0) score

Mild pain score = (1) score

Moderate pain score = (2) score

Sever pain = (3) score.

Scoring system for latch:

Score 1-3 : poor breast feeding.

Score 4-6: fair breast feeding.

Score 7-10: good breast feeding.

Reliability of the Tool:

Reliability was done using cronbach’s alpha test, the reliability of tool (1) which assessed the level of engorgement was 0.948, (Thomas et al., 2017), the reliability of tool (3) which assessed level of pain was 0.864 and reliability of tool (6) which assessed for proper breast feeding process was 0.801 indicating high reliability of the study tools. (Jenson et al., 1994)

Pilot study

A pilot study was conducted on 10% of the study sample (10 women) to examine the clarity and effectiveness of the study tools. It was carried out for one month and covered 10 women. Data obtained from the pilot study were analyzed. Based on its results, modifications of the study tools were done. The subjects used for the pilot study was excluded from the study sample.

Field work:

Data collection was carried out through three phases: Interviewing and

assessment phase, implementation phase, and evaluation phase.

Interviewing and assessment phase :

In the postnatal ward of the hospitals of the study the investigator introduced herself to postnatal mother, and then determined if she could be included in the study based on pre-mentioned inclusion and exclusion criteria. Written consent was taken, and data were collected using the pre constructed tools. All the variables like breast engorgement, breast pain, breast milk pH and the suckling speed of neonates were checked and recorded in the recording sheet for both groups before intervention and it took about 10-15 minute for each tool. This interview and assessment phase took about 40-50 minutes for each mother; the postnatal women were asked in a simple Arabic language and document her answer in the tools utilized. It took about 10 months for data collection from December 2020 to September 2021.

Implementation phase:

During this phase the investigator established rapport with the mothers. They were assured that no physical or emotional harm would be done during the course of the study. The investigator instructed mothers about the benefits of breast massage or cabbage leaves compress to the mother.

Breast massage intervention was done by the investigator for breast massage group for duration of 10 to 15 minutes to women in the massage group. This intervention was repeated with the interval of 2 hours, in the morning from 10am-12am for 2 consecutive days before breast feeding .

Cabbage leaves intervention was done by the investigator for duration of 10 to 15 minutes to women in the cabbage leaves group. This intervention was repeated with the interval of 2 hours, in the morning from 10am-12am for 2 consecutive days before breast feeding.

Evaluation phase :

For both groups all the variables like breast engorgement, breast pain, breast milk pH and the suckling speed of neonates was evaluated for different two times: after three days of intervention and after five days of intervention using the same tools.

Administrative design:

An official permission for data collection was obtained from Suez canal university Hospital and general hospital in Ismailia city from the vice dean of faculty of nursing at Suez Canal University. Ethical approval was obtained from the research ethics committee of the faculty of nursing – Suez Canal University.

Ethical considerations:

All ethical considerations were considered for privacy and confidentiality. Written consents was obtained from the women participated in the study. Before starting the study a brief explanation of the study aim and reassurance that the information obtained will be confidential and used only for the study purpose with their right to withdraw at any time without any consequence. The topic of this study would not touch religious, ethical, moral and culture issues among women. This study was approved by the Research Ethics Committee of faculty of nursing at Suez canal university.

Statistical design:

The collected data was coded, organized, categorized, tabulated, computerized and analyzed using statistical package of the social sciences (SPSS) software program version 20.

3. Results

Table (1): Shows that the mean age of the studied sample was 23.86 ± 4.41 years for massage group and 25.18 ± 4.02 for cabbage leaves group. More than half of the studied sample (62%) was living in rural, 40% of massage group had secondary education compared to 14% of cabbage group. There was only statistical significant difference

between groups in the area of education ($P < 0.05$).

Table (2): shows that before intervention all of the studied sample (100.0%) had signs of swelling and warmness, (64.0%) of massage group had moderate engorgement and (68.0%) of cabbage leaves group had severe engorgement, about three quarter of the studied sample (83.0%, 73.0) had acidic milk PH and severe pain respectively and more than three quarter (85.0%) had poor breast feeding. There was statistical significant difference between groups in the area of level of engorgement, intensity of pain and suckling speed

Table (3): Shows that majority of the studied sample (88.0%) had swelling, more than half (53.0%) had moderate level of engorgement, 64.0% had moderate pain, about three quarter (76.0%) had alkaline milk PH and more than three quarter (87.0%) had fair breast feeding score. There were statistical significant differences between groups in some variables.

Table (4): shows that all of the studied sample (100.%) don't have redness and inverted nipple, more than half (56.0%) had normal breast, 48.0% had no pain, 99.0% had alkaline milk PH and 87.0% had good breast feeding

score. There was statistical significant differences between groups in some variables where 26.0% in massage group had nipple fissure comparing to 58.0% in cabbage group and 80.0% had normal breast comparing to 32.0% in cabbage group.

4. Discussion

Breast engorgement is the development of hard, swollen, and painful breasts caused by too much breast milk that can make it difficult for the baby to latch the mother breast properly. This condition frequently occurs when breast milk first comes in, as well as at other times, and can be quite uncomfortable (Wong et al., 2017). Several studies regarding breast engorgement have reported that the incidence rate throughout the world is 2%-3% for mastitis, and 65%-75% for breast engorgement with plugged ducts but in Egypt it was 82% (El-hady et al., 2021).

There are several approaches for the treatment of breast engorgement in breastfeeding women include: warm compresses before breastfeeding, cold therapy, cabbage leaves compress, breast massage, milk expression, and anti-inflammatory oral medications (Wong et al., 2017). Massage controls the blood circulation and tissue fluid circulation. Cabbage has both anti-inflammatory and

anti-irritant properties. So this study was done to evaluate the effect of breast massage and cabbage leaves compress on reduction of breast engorgement among postpartum women.

The current study clearly showed that all of the women in both massage and cabbage leaves group had signs of swelling and warmth, majority of them had redness, fatigue, headache and nipple fissure and one third had inverted nipple. This was in same side with (McS, 2018), who assessed the traditional practices resorted by mothers in the east of Turkey to treat breast engorgement, reported that majority of the mothers who had problems stated that they had fullness/swelling/fever in their breasts, pain and fissures on nipples and inverted nipple problem.

Also (Masoud, 2018), who assessed the effect of cabbage leaves on relieving breast engorgement among postnatal women at Benha University Hospital, showed that majority of cabbage leaves and control group had redness and swelling before intervention..

This study showed that level of breast engorgement before intervention was moderate in more than half of massage group and severe for about two third of cabbage

leaves group with no statistical significant difference. This agree with (Mcs et al., (2018), who stated that three fifth of postnatal women had moderate to severe breast engorgement during postnatal period.

This was in contrast with (Masoud, 2018), revealed that about one third of both cabbage leaves and control groups had pretest moderate level of engorgement.

Moreover, (Thomas et al., 2017), who assessed the level of breast engorgement among postnatal mothers at Hakeem Abdul Hameed Centenary Hospital, Jamia Hamdard, New Delhi, found that more than half of postnatal mothers had pretest mild engorgement level. From the researcher point of view these differences in level of breast engorgement may be attributed to different study groups and differences in demographic data. Also, frequency of feeding in our study was according self-demand and as known the newborn is too sleepy during first days of life and wouldn't have more frequent feeding that result in increased level of engorgement.

The present study revealed that there was statistical significant difference between two groups regarding level of breast engorgement and pain before and after

intervention. This agree with (Masoud, 2018), found that there was a statistically significant difference between the control and cabbage leaves groups regarding pre and posttest levels of breast engorgement and pain score.

The current study found that level of breast engorgement was mild in more than half of massage group after 3 days of intervention and it was normal for majority of the group after five days of intervention. This was in line with (Dehghani et al., 2018), who studied effect of breast oketani-massage on the severity of breast engorgement among lactating women at the obstetrics clinic and gynecology department of Imam Reza Hospital, reported that the engorgement severity after intervention in right and left breast was decreased to half in oketani massage group and control group.

The current study found that level of breast engorgement after 3 days of intervention was moderate in more than half of cabbage leaves group and after five days, it was mild for majority of the group. This was in agreement with (Masoud, 2018), who assessed the effect of cabbage leaves on relieving breast engorgement among postnatal women at Benha University Hospital, reported that engorgement level reduced to half after

three days of application of cabbage leaves compresses than at the beginning of the study in both cabbage leaves and control group and disappear at fifth day with statistical significant difference.

This study showed that more than half of massage group and more than three quarters of cabbage leaves group suffer from severe pain before intervention with statistical significant difference between two groups. This was in same line with **(Masoud, 2018)**, found that about three quarters of cabbage leaves and control groups had severe pain before intervention with no statistical significant difference between two groups. From the researcher perspective this may be due to our study sample was primi- para with delayed initiation of breast feeding

In the present study , pain level range from moderate to mild in majority of massage group after 3 days of intervention and disappear in half of this group after 5 days of intervention. This agree with **(Cho et al., 2012)**, found that after application of Oketani breast massage treatment, breast pain was reduced in both massage and control group.

This study revealed that pain level range from moderate to mild in majority of

cabbage leaves group after 3 days of intervention and disappear in half of this group after 5 days of intervention. This agree with **(Masoud, 2018)**, reported that pain score reduced to half after 3 days of cabbage leaves compress and disappear in majority of both cabbage leaves and control groups after 5 days.

Regarding milk PH, that majority of both groups had acidic milk PH before intervention with no difference between groups. This was in line with **(Krishnaveni, 2014)** found that milk PH was acidic for both massage and control group before application of breast massage with no statistical significant difference.

The present study showed that milk PH was alkaline in about three quarters of both groups after 3 days of intervention and was alkaline in all women in both groups after 5 days with no statistical significant difference. This was supported by **(Thomas et al., 2017)**, revealed that posttest milk PH was greater than pretest milk PH in all of studied sample which reveal the effectiveness of breast massage.

Concerning total latch score of breast feeding, this study showed that more than three quarter of both groups had poor

breast feeding before intervention. This disagree with (El-hady et al., 2021), stated that nearly two thirds of women had fair level of breastfeeding. This may stem from the enrolled postnatal women in this study were primipara with lack of experience.

The current study found that the methods of nursing care (massage and cabbage leaves compresses) for the management of breast engorgement was effective. Breast massage was more effective than cabbage leaves compress in relieving engorgement symptoms. This was in agreement with (Chaudhary et al., 2019) who assessed the effectiveness of olive oil massage in reducing breast engorgement and pain among postnatal mothers with LSCS admitted in selected hospital at Meerut, revealed that application of olive oil massage is found effective in reducing breast engorgement and breast pain among postnatal mothers with LSCS.

Also, (Witt et al., 2016), who found that the therapeutic breast message during the lactation period was useful in reducing breast engorgement among postnatal mothers. In addition, (Masoud, 2018), said that cabbage leaves compresses for the management of breast engorgement was

effective. Furthermore, (Wong et al., 2017), concluded that cabbage leaf application reduced pain associated with breast engorgement.

The previous result disagree with (Hill & Humenick., 2014) who reported that the use of cabbage leaves for engorgement is not effective. From the researcher point of view the differences in the type and effect of therapeutic methods may be due to different study groups, time of studies and severity of symptoms.

5. Conclusion

Application of breast massage and cabbage leaves was effective in relieving breast engorgement, breast pain, increasing milk PH, suckling speed and total latch score. Breast massage was more effective than cabbage leaves compress, where there was a statistical significant decrease in level of engorgement and intensity of pain with increase in suckling speed and total latch score for massage group compared to cabbage compress group.

6. Recommendations

Based upon the results of this study, the following recommendations can be suggested:-

1. Planning and developing prenatal classes for newly breast feeding mothers to improve their knowledge and develop their self-care practices regarding management of breast engorgement by using massage and cabbage.
2. Nurses should be trained to use breast massage and the cabbage leaves

compresses as the nursing approach for managing breast engorgement in their discharge teaching plan.

Table (1): Distribution of the studied sample according to their personal characteristics (n=100)

| Personal data | Massage group N=50 | | Cabbage leaves group N=50 | | Total N=(100) | | χ^2 | P value |
|------------------------------|-----------------------|------|------------------------------|------|------------------|------|--------------|---------------------------|
| | No | % | No | % | No | % | | |
| Age | | | | | | | 3.327 | 0.189 |
| 18-< 24 | 16 | 32.0 | 13 | 26.0 | 29 | 29.0 | | |
| 24- <29 | 25 | 50.0 | 20 | 40.0 | 45 | 45.0 | | |
| 29-35 | 9 | 18.0 | 17 | 34.0 | 26 | 26.0 | | |
| Mean \pm SD | 23.86 \pm 4.41 | | 25.18 \pm 4.02 | | 24.48 \pm 4.26 | | | |
| Residence | | | | | | | 2.716 | 0.099 |
| -Rural | 35 | 70.0 | 27 | 54.0 | 62 | 62.0 | | |
| -Urban | 15 | 30.0 | 23 | 46.0 | 38 | 38.0 | | |
| Educational level | | | | | | | 15.968 | P value 0.007* |
| -Can't read and write | 7 | 14.0 | 5 | 10.0 | 12 | 12.0 | | |
| -Read & write | 4 | 8.0 | 1 | 2.0 | 5 | 5.0 | | |
| -Primary education | 6 | 12.0 | 8 | 16.0 | 14 | 14.0 | | |
| -Preparatory education | 7 | 14.0 | 10 | 20.0 | 17 | 17.0 | | |
| -Secondary education | 20 | 40.0 | 7 | 14.0 | 27 | 27.0 | | |
| -university education & more | 6 | 12.0 | 19 | 38.0 | 25 | 25.0 | | |
| Occupation | | | | | | | 4.800 | 0.091 |
| -House wife | 44 | 88.0 | 36 | 72.0 | 80 | 80.0 | | |
| -Employee | 2 | 4.0 | 8 | 16.0 | 10 | 10.0 | | |
| -Worker, trades/business | 4 | 8.0 | 6 | 12.0 | 10 | 10.0 | | |

**statistically significant at P < .005*

Table(2) Distribution of the studied groups according to breast engorgement related variables before intervention. (n=100):

| Variables | Massage group N=50 | | Cabbage leaves group N=50 | | Total N= (100) | | χ^2 | P value |
|---|-----------------------|-------|---------------------------------|-------|-------------------|-------|----------|----------------|
| | No | % | No | % | No | % | | |
| Signs and symptoms of breast engorgement | | | | | | | | P value |
| - Swelling | 50 | 100.0 | 50 | 100.0 | 100 | 100.0 | ----- | ----- |
| - Redness | 32 | 64.0 | 38 | 76.0 | 70 | 70.0 | 1.714 | 0.190 |
| - Warmness | 50 | 100.0 | 50 | 100.0 | 100 | 100.0 | ----- | ----- |
| - Fatigue | 46 | 92.0 | 48 | 96.0 | 94 | 94.0 | 0.709 | 0.400 |
| - Headache | 45 | 90.0 | 39 | 78.0 | 84 | 84.0 | 2.679 | 0.102 |
| - Nipple fissure | 43 | 86.0 | 47 | 94.0 | 90 | 90.0 | 1.778 | 0.182 |
| - Inverted nipple | 15 | 30.0 | 18 | 36.0 | 33 | 33.0 | 0.407 | 0.523 |
| Level of breast engorgement | | | | | | | | P value |
| - Normal | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 10.265 | 0.001* |
| -Mild engorgement | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| -Moderate engorgement | 32 | 64.0 | 16 | 32.0 | 48 | 48.0 | | |
| - Severe engorgement | 18 | 36.0 | 34 | 68.0 | 52 | 52.0 | | |
| Intensity of pain | | | | | | | | P value |
| - No pain | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 6.139 | 0.003* |
| - Mild pain | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| - Moderate pain | 19 | 38.0 | 8 | 16.0 | 27 | 27.0 | | |
| - Severe pain | 31 | 62.0 | 42 | 84.0 | 73 | 73.0 | | |
| Mean \pm SD | 3.62 \pm 0.49 | | 2.92 \pm 2.23 | | 6.54 \pm 2.62 | | | |
| Milk PH | | | | | | | | P value |
| - Alkaline | 10 | 20.0 | 7 | 14.0 | 17 | 17.0 | 0.638 | 0.424 |
| - Acidic | 40 | 80.0 | 43 | 86.0 | 83 | 83.0 | | |
| Sulking speed | | | | | | | | P value |
| Mean \pm SD | 29.24 \pm 5.18 | | 20.64 \pm 5.72 | | 49.88 \pm 10.90 | | 63.219 | 0.001* |
| Latch score | | | | | | | | P value |
| - Poor breast feeding | 41 | 82.0 | 44 | 88.0 | 85 | 85.0 | 0.706 | 0.401 |
| - Fair breast feeding | 9 | 18.0 | 6 | 12.0 | 15 | 15.0 | | |
| - Good breast feeding | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |

**statistically significant at P < .005*

Table(3) Distribution of the studied groups according to breast engorgement related variables after 3 days of intervention. (n=100):

| Variables | Massage group N=50 | | Cabbage leaves group N=50 | | Total N= (100) | | χ^2 | P value |
|---|-----------------------|------|---------------------------------|-------|----------------------|------|----------|----------------|
| | No | % | No | % | No | % | | |
| Signs and symptoms of breast engorgement | | | | | | | | P value |
| - Swelling | 38 | 76.0 | 50 | 100.0 | 88 | 88.0 | 13.636 | 0.000* |
| - Redness | 5 | 10.0 | 8 | 16.0 | 13 | 13.0 | 0.796 | 0.372 |
| - Warmness | 31 | 62.0 | 40 | 80.0 | 71 | 71.0 | 3.934 | 0.047 |
| - Fatigue | 33 | 66.0 | 37 | 74.0 | 70 | 70.0 | 0.762 | 0.383 |
| - Headache | 22 | 44.0 | 28 | 56.0 | 50 | 50.0 | 1.440 | 0.230 |
| - Nipple fissure | 34 | 68.0 | 41 | 82.0 | 75 | 75.0 | 2.613 | 0.106 |
| - Inverted nipple | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | ----- | ----- |
| Level of breast engorgement | | | | | | | | P value |
| - Normal | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| - Mild engorgement | 33 | 66.0 | 14 | 28.0 | 47 | 47.0 | 14.492 | 0.000* |
| - Moderate engorgement | 17 | 34.0 | 36 | 72.0 | 53 | 53.0 | | |
| - Severe engorgement | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| Intensity of pain | | | | | | | | P value |
| - No pain | 4 | 4.0 | 0 | 0.0 | 4 | 4.0 | | |
| - Mild pain | 21 | 42.0 | 11 | 22.0 | 32 | 32.0 | 10.188 | |
| - Moderate pain | 25 | 50.0 | 39 | 78.0 | 64 | 64.0 | | 0.006* |
| - Severe pain | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| Mean \pm SD | 2.42 \pm 0.64 | | 2.78 \pm 0.41 | | 5.2 \pm 1.06 | | | |
| Milk PH | | | | | | | | P value |
| - Alkaline | 37 | 74.0 | 39 | 78.0 | 76 | 76.0 | 0.219 | 0.640 |
| - Acidic | 13 | 26.0 | 11 | 22.0 | 24 | 24.0 | | |
| Sulking speed | | | | | | | | P value |
| Mean \pm SD | 32.4400 \pm 4.94112 | | 24.1100 \pm 6.04683 | | 56.55 \pm 10.98795 | | 52.919 | 0.004* |
| Latch score | | | | | | | | P value |
| - Poor breast feeding | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| - Fair breast feeding | 41 | 82.0 | 46 | 92.0 | 87 | 87.0 | 2.210 | 0.137 |
| - Good breast feeding | 9 | 18.0 | 4 | 8.0 | 13 | 13.0 | | |

**statistically significant at P < .005*

Table(4) Distribution of the studied groups according to breast engorgement related variables after 5 days of intervention. (n=100):

| Variables | Massage group N=50 | | Cabbage leaves group N=50 | | Total N= (100) | | χ^2 | P value |
|---|-----------------------|-------|---------------------------------|------|----------------|------|----------|----------------|
| | No | % | No | % | No | % | | |
| Signs and symptoms of breast engorgement | | | | | | | | P value |
| - Swelling | 0 | 0.0 | 10 | 20.0 | 10 | 10.0 | 11.111 | 0.001* |
| - Redness | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | ----- | ----- |
| - Warmness | 1 | 2.0 | 8 | 16.0 | 9 | 9.0 | 5.983 | 0.014 |
| - Fatigue | 11 | 22.0 | 16 | 32.0 | 27 | 27.0 | 1.268 | 0.260 |
| - Headache | 11 | 22.0 | 18 | 36.0 | 29 | 29.0 | 2.380 | 0.123 |
| - Nipple fissure | 13 | 26.0 | 29 | 58.0 | 42 | 42.0 | 10.509 | 0.001* |
| - Inverted nipple | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | ----- | ----- |
| Level of breast engorgement | | | | | | | | P value |
| - Normal | 40 | 80.0 | 16 | 32.0 | 56 | 56.0 | 23.377 | 0.000* |
| - Mild engorgement | 10 | 20.0 | 34 | 68.0 | 44 | 44.0 | | |
| - Moderate engorgement | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| - Severe engorgement | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| Intensity of pain | | | | | | | | P value |
| - No pain | 38 | 76.0 | 10 | 20.0 | 48 | 48.0 | 33.729 | 0.000* |
| - Mild pain | 12 | 24.0 | 31 | 62.0 | 43 | 43.0 | | |
| - Moderate pain | 0 | 0.0 | 9 | 18.0 | 9 | 9.0 | | |
| - Severe pain | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| Mean ± SD | 1.24± 0.43 | | 1.38±0.49 | | 2.06±0.92 | | | |
| Milk PH | | | | | | | | P value |
| - Alkaline | 50 | 100.0 | 49 | 98.0 | 99 | 99.0 | 1.010 | 0.315 |
| - Acidic | 0 | 0.0 | 1 | 2.0 | 1 | 1.0 | | |
| Sulking speed | | | | | | | | P value |
| Mean ± SD | 38.70±14.84 | | 27.98±6.15 | | 66.68±21.60 | | 69.378 | 0.000* |
| Latch score | | | | | | | | P value |
| - Poor breast feeding | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 14.943 | 0.000* |
| - Fair breast feeding | 0 | 0.0 | 13 | 26.0 | 13 | 13.0 | | |
| - Good breast feeding | 50 | 100.0 | 37 | 74.0 | 87 | 87.0 | | |

**statistically significant at P < .05*

7. References

- Abbas, I. M., & Hasan, R. T. (2015).** Assessment of LATCH tool regarding initiation of breastfeeding among women after childbirth. *Assessment*, 5(05).
- Amir, L. H., Baeza, C., Charlamb, J. R., & Jones, W. J. b. (2021).** Identifying the cause of breast and nipple pain during lactation. *bmj*, 374.
- Chaudhary, P., Banu, T., & Farswal, A. (2019).** A Study to Assess the Effectiveness of Olive Oil Massage in Reducing Breast Engorgement and Pain among Postnatal Mothers with LSCS Admitted in Selected Hospital at Meerut. *International Journal of Nursing & Midwifery Research* (E-ISSN: 2455-9318), 6(4), 13-21.
- Cho, J., Ahn, H. Y., Ahn, S., Lee, M. S., & Hur, M. H. (2012).** Effects of oketani breast massage on breast pain, the breast milk pH of mothers, and the sucking speed of neonates. *Korean Journal of Women Health Nursing*, 18(2), 149-158.
- Dehghani, M., Babazadeh, R., Khadivzadeh, T., Pourhoseini, S. A., & Esmaili, H. (2018).** Effect of breast oketani-massage on neonatal weight gain: a randomized controlled clinical trial. *Evidence Based Care*, 8(3), 57-63.
- Eittah, H., & Ashour, E. (2019).** Comparing warm compresses application vs. chilled cabbage leaves for relieving breast engorgement among post-natal mothers. *Clinical Nursing Studies*, 7(3), 58.
- El-hady, A., Shehata, E. A. E. H., El-Refaey, A. M., & Ahmed Gaheen, M. A. A. S. (2021).** Self-Care Practices of Primipara Women Regarding Breast Engorgement. *Tanta Scientific Nursing Journal*, 20(1), 161-194.
- Hill PD & Humenick S., (2014):** The use of cabbage leaves for engorgement is not effective 91(4), P: 280.
- Jensen, D., Wallace, S., & Kelsay, P. (1994).** LATCH: a breastfeeding charting system and documentation tool. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 23(1), 27-32.
- Kahl, C., & Cleland, J. A. (2005).** Visual analogue scale, numeric pain rating scale and the McGill Pain Questionnaire: an overview of psychometric properties. *Physical therapy reviews*, 10(2), 123-128.

Krishnaveni, P. (2014). Effectiveness of breast massage on reduction of breast engorgement among mothers undergone caesarean section admitted in selected hospital at Tirunelveli (*Doctoral dissertation, Sri. K. Ramachandran Naidu College of Nursing, Sankarankovil*).

Masoud, A. (2018). The effect of Cabbage leaves on relief Breast Engorgement among Postpartum Women. Benha University, master thesis.

McS, I. (2018). Traditional practices of turkish mothers at breast engorgment during postpartum period. *International Journal of Caring Sciences*, 11(3), 1954-1961.

Ngestiningrum, A. H., Nuryani, N., & Setiyani, A. (2022). Effectivity of the Oketani Massage and the Back Massage Combination towards Breastmilk Production and to Prevent Breast Engorgement of Postpartum Mothers. *Health Notions*, 6(01).

Nguyen, N. T., Do, H. T., & Van Pham, N. T. (2021). Barriers to exclusive breastfeeding: A cross-sectional study among mothers in Ho Chi Minh City, Vietnam. *Belitung Nursing Journal*, 7(3), 171-178.

Pustotina, O. (2016). Management of mastitis and breast engorgement in breastfeeding women. *The Journal of Maternal-Fetal & Neonatal Medicine*, 29(19), 3121-3125.

Ranawaka, R. R., Madarasinghe, N. P., Kannangara, A. P., & de Silva, K. (2021). Cutaneous disorders of the breast. In *Atlas of Dermatology, Dermatopathology and Venereology: Inflammatory Dermatoses* (pp. 991-1038). *Cham: Springer International Publishing*.

Thomas, T., Devi, E. S., & George, L. S. (2017). Efficacy of Evidence Based Practice (EBP) Guideline to Prevent and Treat Breast Engorgement among Post Caesarean Mothers in Selected Hospital in Mangalore. *Journal of Health and Allied Sciences NU*, 7(01), 021-024.

Wassertheil-Smoller, S. (2004). *Biostatistics and epidemiology*. Springer New York.

Westerfield, K. L., Koenig, K., & Oh, R. (2018). Breastfeeding: common questions and answers. *American family physician*, 98(6), 368-373.

Witt, A. M., Bolman, M., Kredit, S., & Vanic, A. (2016). Therapeutic breast massage in lactation for the management of engorgement, plugged ducts, and mastitis. *Journal of Human Lactation*, 32(1), 123-131.

Wong, B. B., Chan, Y. H., Leow, M., Chong, Y. S., Koh, S., & He, H. (2017). Application of cabbage leaves compared to gel packs for mothers with breast engorgement: Randomised controlled trial. *International journal of nursing studies*, 76, 92-99.

Zagloul, M. C., Naser, E. G., & Hassan, H. E. (2020). Influence of hot compresses versus cabbage leaves on engorged breast in early puerperium. *International Journal of Studies in Nursing*, 5(2), 7.

Zakarija-Grkovic, I., & Stewart, F. (2020). Treatments for breast engorgement during lactation. *Cochrane Database of Systematic Reviews*, (9). 231-236