

# Effect of Educational Program on Mothers' Using for Non-pharmacological Therapies to Alleviate Breast Engorgement after Cesarean Section

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**Abstract:** Breast engorgement is a physiological condition characterized by painful swelling of the breast because of increase in milk volume, application of educational program as warm compresses and reverse pressure softening is crucial either for alleviating breast engorgement or preventing nipple trauma. This study aimed to evaluate the effect of educational program on mothers' using for non-pharmacological therapies to alleviate breast engorgement after cesarean section. A research design was quasi experimental study conducted in patient postnatal units at Ain Shams Maternity University Hospital and postpartum women homes. A purposive sample technique was used to recruit two hundred seventeen postnatal mothers in the study. Four tools of data collection were used first was structure interviewing questionnaire, second tool was Visual Analogue Scale (VAS), third tool was six-point breast engorgement scale, and fourth tool was LATCH scale. The result of the study shows that there is no statistical significant difference between control, cabbage leaves with reverse pressure softening, and warm compresses with reverse pressure softening groups as regard degree of pain, breast engorgement, and latching scale before implementation of educational program. While, there is a highly statistical significant reduction on degree of pain & breast engorgement with highly statistical significant improvement on latching scale between groups especially for warm compresses with reverse pressure softening group. Conclusion and recommendations: the study concluded that educational program had positive effect on reducing degree of pain and breast engorgement after cesarean section adding to improve baby latch. Accordingly, the following recommendation is proposed: application of educational program for cesarean section mothers at immediate postpartum period regarding warm compresses with reverse pressure softening as an effective method for alleviating breast engorgement.

**Keywords:** Educational program, Non-pharmacological Therapies, Breast engorgement, Cesarean Section.

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## 1. INTRODUCTION

Womens confronts challenges in the first few weeks after cesarean section delivery of their first babies. As they need to efficiently establish breastfeeding to confirm long term success but they may encounter problems related to breast and nipple that can challenge this process (*Lim et al, 2015*). Breast engorgement and nipple trauma represent most common breastfeeding problems that affect postpartum women. Breast engorgement is a painful and distressing condition affecting several women in the early postpartum period at time when mothers are coping with the requirements of a new baby. Breast engorgement may impede the development of successful breastfeeding (*Suresh et al, 2014*).

Breast engorgement refers as painful swelling of breasts that result from excessive milk production, outflow obstruction, or poor suckling of milk by baby. Moreover, breast engorgement consequence lead to difficult for the baby to latch on

mother breast properly (*Lawrence and Lawrence, 2015*). Moreover, breast engorgement is associated with various degree of pain over the breast and nipple. That consequently results in nipple damage, breast infections, and sometimes this can be the reason where the women stop breastfeeding. Often breast engorgement brings a lot of struggle for an infant to achieve a deep latch and feed without causing nipple damage (*Thabet et al, 2013*).

Several factors increase risk for breast engorgement as delay initiation of breastfeeding, infrequent and short feedings, using supplements, newborn's weak sucking, and sudden increase in milk production, nipple lacerations which result from wrong positioning of the baby on the breast (*Sulochana & Shantakumari, 2012*). In addition to, establish specific hours in the day to breastfeed, controlling the duration of breastfeeding, wearing a tight bra, using bottles, not emptying the breast after nursing the baby, and a sleepy or premature newborn (*Horta, et al, 2013*).

Breast engorgement occurs in 72% to 82% of lactating women. Engorgement usually starts on the third day when colostrum is changed to mature milk then gradually subsides with time. However, it may persist to end of second week of postpartum period as a result of delayed, irregular or disrupted removal of milk from the breast (*Priyanka et al, 2016*).

Various signs and symptoms associated with breast engorgement that include very hard and painful breast. The skin on the breast surface becomes red, the temperature increases, the areola becomes tense and hard, and the nipple is sometimes flattened out. The baby encounters serious nursing difficulties and in most cases refuses the breast. As a result, intense pain caused by engorgement forces some women to give up breastfeeding and switch to an easier way of feeding the baby (*Alekseev, Vladimir, and Nadezhda, 2015*). Moreover, engorgement may lead to mastitis as untreated engorgement increase pressure on the milk ducts causing a plugged duct. If it continues unchecked, the plugged duct can become a breast infection (*Murray, 2015*).

Breast engorgement can be prevented by immediate, successful, and frequent breastfeeding. Studies have shown that mother's awareness regarding breast engorgement, symptoms, factors contributing to breast engorgement, prevention and management is low especially among primipara mothers (*Cho and Ahn, 2014*). Therefore, mother should be advised about correct breastfeeding technique to ensure successful breastfeeding. Consequently, health education for primipara mother regarding correct breast feeding technique and correct baby latch-on to the breast during feeding may contribute to prevention of breast engorgement. Conversely, limited advice and support from health professionals concerning prevention and management of breast engorgement may make the engorgement worse (*Mangesi, and Dowswell, 2014*).

Appropriate management of breast engorgement is important for successful long-term lactation. As failure of resolve prolonged symptomatic engorgement may additionally have a negative impact on continued adequate milk supply. Various strategies have been used to relieve breast engorgement symptoms that can interrupt a woman's breastfeeding intentions. Both pharmacologic and non-pharmacologic therapies have been touted as beneficial for the treatment of engorgement (*Alekseev and Talalaeva, 2017*). However, nowadays most of the postnatal mothers prefer the non-pharmacological methods. These include cold cabbage compresses, cold gel pads, hot compresses and warm showers, which are used to activate the milk ejection reflex. Further treatment methods which have been suggested include the use of therapeutic ultrasound, breast binding, breast massage, herbal remedies, manual/electrical pump, Gua-Sha (massage) therapy as a form of treatment (*Pustotina, 2016*).

Green cabbage leaves used for management of breast engorgement. Cabbage is known to contain certain substances that have both antibiotic and anti-irritant action. It helps to decrease breast tissue congestion by opening small blood vessels, which improves the blood flow in and out of the area, allowing the body to reabsorb the fluid stuck in the breasts. Cabbage leaves may be used chilled or at room temperature. Nurse educates mother to use it for twenty minutes not more than three times per day and stop it when engorgement reduce as it can decrease milk supply (*Saini and Saini , 2014*).

Warm compresses application (a hand towel or cotton cloth dampened with warm water) on the breast for duration of 15-20 minutes just before feeding reduces pain and causes relaxation of blood vessels by opening vessels and increasing blood flow to the area. Nurse educates mother temperature of water ranged between 43 °C - 46°C, warm compresses should be replaced after 1-2 minutes and use it for twenty minutes three times per day (*Manna, Podder, and Devi, 2016*).

Reverse pressure softening (RPS) is a simple intervention that has proven very helpful in the first postpartum days. RPS uses gentle positive pressure to soften a 1-2 inch area of the areola surrounding the base of the nipple, temporarily moving some swelling slightly backward and upward into the breast. Once the areola is softened, the baby can latch and nurse.

Symptom relief begins in 15 to 30 minutes. RPS may be applied by the health care provider, and/or taught to the mother/significant others, if necessary. Moreover, RPS has several benefits as steady stimulation of nerves under the areola automatically triggers the milk ejection reflex, pushing milk forward in the breast nearly always within 1-2 minutes or less. Move excess interstitial fluid in the direction of natural lymphatic drainage. In addition to, reducing latch discomfort and facilitating milk transfer (*Bolman et al, 2013*).

Nurses contribute to the health and wellbeing of women, children, and family through enhancing practical skills and specialized care for preventing and managing breast feeding problems especially breast engorgement. As, multi-dispensary roles conducted by midwife, lactation consultant or community nurse contribute on prevention of this problem through comprehensive breastfeeding assessment, counseling, educating and guidance of mother both prenatal and postnatal to facilitate intervention and the development of successful breastfeeding plan (*Pereira et al, 2015*).

Moreover, nursing practice after cesarean section provide mother assistance to initiate breast feeding early, through using breast feeding positions that are more comfort for mother. Also, instructs mother about frequency of breast feeding at least 8 to 12 times each 24 hours to promote evacuation of breast milk and prevent engorgement. Additionally, nurse document infant positioning, latch, milk transfer, baby's daily weight, and all problems raised by the mother before hospital discharge such as nipple pain, perception of an inadequate breast milk supply, breast engorgement then applying evidence based nursing practice while caring with mother suffering from breast engorgement as warm compresses, cabbage leaves, breast massage, reverse pressure softening, and manual expression of milk (*Eapen and Fernandes, 2013*).

#### **Justification of the Study:**

Cesarean section is the birth of the baby through surgical incision made in both the wall of the mother's abdomen and uterus this surgical procedure require either general or regional anesthesia. Cesarean section is strongly linked with delayed lactogenesis, poorer infant sucking, delayed in early breastfeeding, decrease in success of breastfeeding, more supplementation, and shorter duration of breastfeeding (*Lin et al, 2011*). Moreover, incidence of cesarean section in Egypt was remarkably doubling from 26.7 percent to 51.8 percent between 2008 and 2014 according to Egyptian Demographic Health Survey (EDHS) (*Betrán et al, 2016*).

Primiparous women who experience cesarean births may neglect breast care and delay initiation of breast feeding due to the pain after the surgery. Therefore, nurses should assist mothers in coping with and solving the problems that they may encounter in successful breastfeeding through support postpartum mother to initiate breast-feeding within 30 minutes after delivery, provide guidance educational program regarding correct breast feeding technique prior to the development of breast engorgement by using non-pharmacologic therapies (*Lim et al, 2015*). Therefore, researchers suggested this study to evaluate the effect of non-pharmacologic therapies on alleviating breast engorgement after cesarean section.

#### **Aim of the Study:**

To evaluate the effect of educational program on mothers' using for non-pharmacological therapies to alleviate breast engorgement after cesarean section through:

1. Assessing degree of breast engorgement, pain, and Latch on before implementation of educational program.
2. Assessing women knowledge about non-pharmacologic therapies to alleviate breast engorgement after cesarean section.
3. Developing and implementing educational program for primipara mothers to alleviate breast engorgement after cesarean section according to their needs.
4. Evaluating the effect of educational program on degree of breast engorgement, pain, and Latch on after implementation of the program.

#### **Hypotheses:**

Educational program for non-pharmacologic therapies has positive effect on alleviating breast engorgement after cesarean section than cesarean section mothers who receive routine care.

**Operational Definitions:**

**Warm compresses:** refers to application of warm cotton cloth over the engorged breast that replaced after 1-2 minutes for duration of 15-20 minutes. The temperature of water ranged between 43 °C - 46°C.

**Cold cabbage leaves:** refers to apply of cold cabbage leaved that refrigerated for 20 -30 minutes into mother's engorged breasts inside brassiere for 15-20 minutes.

**Reverse pressure softening:** applying pressure to the areola at the base of nipple to move some of the fluid away from the nipple into the breast thus softening the areola enough to allow deep latch.

**2. SUBJECT AND METHODS**

**Study design:** A quasi experimental study.

**Setting:** The study conducted at postnatal units at Ain Shams Maternity University Hospital and postpartum women homes.

**Sample:** According to formula statistics  $n = Z^2 p (1-p) / d^2$  to calculate sample size.

- Z: statistic for a level of confidence. (For the level of confidence of 95%, which is conventional, Z value is 1.96).
- P: expected prevalence or proportion. (P is considered 0.5)
- d: precision. (d is considered 0.05 to produce good precision and smaller error of estimate)

A purposive sample consisting of (246) primipara mothers were recruited on the study under the following inclusion criteria; primipara mothers who had cesarean section delivery with breast engorgement at postnatal period and mothers deliver single full term fetus free from any complication affect breast feeding as cleft lip, cleft ballet. After excluding twenty four primipara mothers who included on pilot study the rest of mothers (222) were randomly divided into three equal groups; control group (74 primipara mothers receive routine care), intervention group I (GI; 74 primipara mothers receive cold cabbage leaves with reverse pressure softening) and intervention group II (GII; 74 primipara mothers receive warm compress with reverse pressure softening). This sample size reached two hundred seventeen (217) primipara mothers as five primipara mothers were lost at time of follow up.

**Tools of data collection:**

Four tools of data collection were used.

**I. Interviewing questionnaire sheet** that developed by the researchers based on literature review, and written in simple clear Arabic language named “**Educational program regarding non-pharmacological therapies to alleviate breast engorgement after cesarean section**”. It was consisted of

**Part 1:** Designed to collect data about the demographic characteristics of primipara mothers. It included data age, educational level, and residence.

**Part 2:** Consisted with breast feeding history "time of initiation of breast feeding, frequency of feeding, duration of feeding, and position of breast feeding".

**Part 3:** was designed to assess women's knowledge about breast engorgement as "time of breast engorgement, causes of breast engorgement, signs and symptoms, methods of treatment, and complications of breast engorgement.

**Knowledge scoring system was calculated as follow;** incorrect answer scored as one degree, and correct answer scored as two degree. So total Knowledge scores ranged from zero to 10. Score from 1 to 5 were evaluated as incorrect knowledge, and score from 6 to 10 were evaluated as correct knowledge. Finally mean score for each level was calculated. Overall test-retest reliability coefficients were cronbach's alpha values of 0.92.

**II. Visual Analogue Scale (VAS)** adopted from *Berens; (2015)*. It was used to assess degree of breast pain among primipara mothers. It consisted of a 10-cm line anchored at each end with words such as “no pain” was scored as 0, (mild pain) was scored from 1-3, (moderate pain) was scored from 4-7, and (severe / worst pain) was scored 8-10. Cronbach’s alpha revealed an internal reliability of 0.94.

**III. Six-point breast engorgement scale** adopted from *Hill (2008)* it was used to assess the degree of breast engorgement. It consists of scoring ranges from 1 to 6. Each scoring indicates the following description; Soft, no changes in breast scored as (1), Slight changes in the breast scored as (2), Firm, no tender breast scored as (3), Firm, beginning tenderness in breast scored as (4), Firm, tender scored as (5), and Very firm, very tender scored as (6). Cronbach's alpha revealed an internal reliability of 0.92.

**IV. LATCH is a breastfeeding charting system** that provides a systematic method for gathering information about breastfeeding adopted from *Altuntas et al; (2014)*. The system assigns a numerical score of 0, 1, or 2, to five key components of breastfeeding. Each letter of the acronym LATCH denotes an area of assessment. "L" is for how well the infant latches onto the breast. "A" is for the amount of audible swallowing noted. "T" is for the mother's nipple type. "C" is for the mother's level of comfort. "H" is for the amount of help the mother needs to hold her infant to the breast. The system is visually represented in the same form of the Apgar scoring grid, and the numbers are handled in the same way. The total score ranged between 0-10 the higher score indicated proper breastfeeding technique. Overall test-retest reliability coefficients were cronbach's alpha values of 0.92.

**Validity:** tools were reviewed by a panel of 5 experts in obstetric and gynecological and & community health nursing to test the face. Each of experts was asked to examine tools for content coverage, clarity, wording, length, format and overall appearance. Modifications were done according to the comments "rephrasing and cancelling for four questions".

#### **Ethical Considerations:**

An official approval was obtained from Scientific Research Ethical committee in Faculty of Nursing, Ain Shams University before starting the study. Researchers introduced themselves to mothers who met the inclusion criteria and informed them about the purpose of this study in order to obtain their acceptance to share in this study. Researchers ensured that, the study posed no risk or hazards on their health and their infants. Researchers ensured that mothers' participation in the study is voluntary. Mothers who were willing to participate in the study and met the inclusion criteria were approached by researchers and asked for verbal consent to confirm their acceptance. Each participant had right to withdrawal from the study at any time and all data that obtained were considered confidential.

**Pilot study** after the development of tools a pilot study was carried out on 10% of the predicted total sample size (24 primipara mothers). The purposes of the pilot study were to ascertain the relevance and content validity of tools, estimating the exact time needed for data collection and detect any problem that might face the researchers and interfere with data collection.

#### **Field work:**

- An official written approval letter clarifying the purpose of the study was obtained from the Dean of Faculty of Nursing of Ain Shams University & director of Ain Shams Maternity University Hospital as an approval for data collection to conduct this study.

The actual field work was carried out over a period of 7 months from beginning of September 2017 up to the end of March 2018. The researchers were available in the study setting 3 days/week from 8.00 a.m. to 1.00 p.m.

Tools of data collection took 15-20 minutes to be completed. After conducting the pilot study, the necessary changes were performed; some questions were rephrased, others cancelled, the tools were reconstructed and made ready for use. These primipara mothers were excluded from the study sample.

#### **Program construction: it consisted of 3 phases:**

**Phase I (interviewing and assessment):** at the beginning of interview the researchers explained to mothers the purpose of the study then oral consent was obtained. Researchers conducted individual interview with mothers who developed breast engorgement at postnatal units before their discharge. The time of interview ranged between 20-30 minutes that required for filling four tools of data collection.

#### **Phase II (implementation):**

Researchers were started implementation with *control group* to prevent contamination of the study. This group received hospital routine care only.



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*Study groups I & II* mothers who participated on this group received instructional session regarding program for alleviating breast engorgement that include (benefits of breast feeding, causes of engorgement, non-pharmacological therapies to alleviate breast engorgement, in addition to action, dose and route of selected non-pharmacological method in time ranging from 10-15 minutes then designed educational program was distributed for mothers.

In addition mothers on both study groups were instructed about;

- ✓ Correct breast feeding positions that suitable for cesarean section.
- ✓ Frequent breastfeeding especially whenever the baby feels hungry.
- ✓ Correct baby latching and suckling.
- ✓ Finish nursing on one breast before switching to other. This will typically take between 10 to 20 minutes.

*Study groups I (cold cabbage leaves with reverse pressure softening)* mothers on this group were instructed to apply cold cabbage leaves which are refrigerated in the freezer for 20-30 minutes before application on the engorged breast, leaving the nipple exposed. Then mother wear bra on the top of leaves to keep them in place and keep cotton pads between leaves and bra to soak up the leaking milk. Place the chilled cabbage leaf in the bra for 15-30 minutes 3-4 times per day or until the breasts begin to soften. This intervention was used for three consecutive days by mothers.

*Study groups II (warm compresses application with reverse pressure softening)* mothers on this group were instructed to apply warm compress using the water with temperature 43-46 degree Celsius. The warm moist cotton cloth is applied to engorged breast and the clothes were replaced frequently after 1-2 minutes, the process continued for 20 – 30 minute and repeated twice a day for three consecutive days.

As regard **reverse pressure softening (RPS)** mother instructed to perform one of three technique of RPS that was suitable for her before starting feeding the baby as follow;

### ✓ **Basic principles for applying RPS**

1. Clean hands and fingernails.
2. To avoid pain the pressure should be exert steady, gentle, but firm positive.
3. Pressure should be done on 1-2cm area of the whole central areola, right at its junction with the base of the nipple.
4. Pressure done in an inward direction perpendicular to the mother's chest wall, for a period of 1 -3 minutes.
5. Repeating pressure once (or more), depending on severity of swelling.
6. Perform RPS until engorgement has resolved well enough for easy latching.

### ✓ **Techniques for applying RPS**

#### **First technique:**

- Instruct the mother to position 3 – 4 curved fingertips of both hands to closely circle the base of the nipple, nails touching the shank.
- Press inward for 1-3 minutes, firmly enough to form 6-8 pits at the base of the nipple.
- Even if mother has no visible edema the central areola still often becomes much more soft, allowing deeper, more comfortable extension of the nipple areola into baby mouth.

#### **Second technique:**

- Straighten the first 1or2 fingers of each hand and point them sideways in opposite directions, with the first projections in contact with the upper and lower base of the nipple.
- After several minutes of inward pressure, reposition the first projections, touching the sides of the nipple at its base, pointing fingertips toward the floor, overlapping part of the depths just formed.

**Third technique:**

- Use the flats of two thumbs or the first several fingers on each hand lengthwise above and below the nipple, creating a 1-2 inch long depression.
- Continue to alternate in opposite quadrants, with repeated 2 minute periods of pressure, partially overlapping the first set of pits, to keep edema displaced from the entire area at the base of the nipple.
- After RPS, additional fingertip expression to further soften the areola is much easier, more comfortable and more productive. Creating a special niche for the chin often permits deeper latching.

**Phase III (follow-up & evaluation):** at this phase researchers follow up mothers on three groups through phone and at home to assess effect of educational program on alleviating breast engorgement then final evaluation done on fourth day after application of each method for three consecutive days to investigate study hypothesis.

**Statistical analysis:**

The collected data were organized, categorized, tabulated and statistically analyzed using the Statistical Package for Social Science (SPSS 20.0). The statistical analysis includes; percentage (%), mean, standard deviation (SD), Paired T test, and ANOVA were employed to compare quantitative variables within and between the groups, respectively. Also, Alpha Cronbach test was used to test reliability of tools. Statistical significance was considered at P-value < 0.05 and high significant differences obtained at P-value ≥ 0.001.

**3. RESULT**

**Table (1): Distributions of the studied mothers according to their socio-demographic data**

Items	Group I Control (N=72)		Group II Cabbage leaves with RPS (N=72)		Group III Worm compresses with RPS (N=73)	
	No.	%	No.	%	No.	%
<b>Age (years)</b>						
<20	4	5.6	5	6.9	5	6.8
20-<30	35	48.6	37	51.4	38	52.1
30-	33	45.8	30	41.7	30	41.1
<b>X ± SD</b>	29.6 ± 1.9		29.3 ± 2.03		29.8 ± 2.01	
<b>Educational Level</b>						
Read and write	10	13.9	9	12.5	8	10.9
Preparatory Education	14	19.4	19	26.3	13	17.8
Secondary Education	34	47.3	22	30.6	31	42.5
University education	14	19.4	22	30.6	21	28.8
<b>Place of Resident</b>						
Urban	70	97.2	70	97.2	72	98.6
Rural	2	2.8	2	2.8	1	1.4
<b>Family Income</b>						
Cover family need	52	72.2	50	69.4	53	72.6
Not cover family needs	20	27.8	22	30.0	20	27.4

**RPS (reverse pressure softening)**

Table (1) shows that 48.6%, 51.4%, and 52.1% of mothers in control group, cabbage leaves with RPS, and warm compresses with RPS groups their age between 20 to less than 30 years respectively. Regarding level of education 47.3 % 30.6 % and 42.5% of mothers in three groups had secondary education. Concerning place of residence 97.2%, 97.2%, and 98.6% of mothers in three groups were from urban area. As regard family income 72.2%, 69.4%, and 72.6% of mothers in three groups had family income that cover their needs.

Table (2): Distribution of the studied mother according to their current postpartum history

Items	Group I Control (N=72)		Group II Cabbage leaves with RPS (N=72)		Group III Warm compresses with RPS (N=73)	
	No.	%	No.	%	No.	%
<b>Time of initiation of breast feeding after delivery</b>						
After 1/2 hour	0	0.0	0	0.0	0	0.0
After 1hour	2	2.8	3	4.2	2	2.7
After one & 1/2 hour	5	6.9	6	8.3	6	8.2
After 2 hours	18	25.0	17	23.6	18	24.7
After more than 2 hour	47	65.3	46	63.9	47	64.4
<b>Time of breast engorgement</b>						
≤ 2 day	6	8.3	8	11.1	7	9.6
3-4 day	48	66.7	47	65.3	48	65.8
5 day	18	25.0	17	23.6	18	24.7

Table (2) points out that 65.3%, 63.9%, and 64.4% of mothers on control, cabbage leaves with RPS, and warm application with RPS groups initiated their breast feeding more than two hours after cesarean section. Concerning time of breast engorgement 66.7%, 65.3%, and 65.8% of mothers on control, cabbage leaves with RPS, and warm application with RPS groups developed breast engorgement between 3 : 4 day of postpartum period.

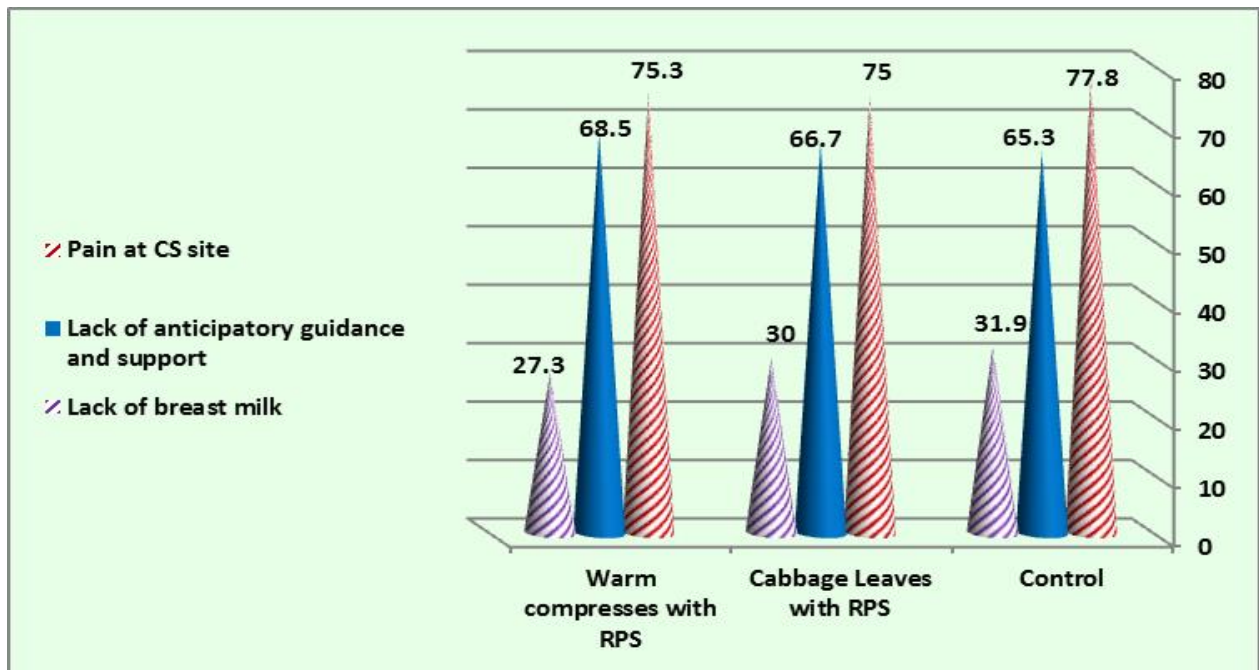


Figure (1): Distribution of the studied mother on control, cabbage leaves with RPS, and warm compresses with RPS according to causes of delay initiation of breast feeding

Figure (1): reveals that main cause for delay initiation of breast feeding is pain at CS site that represent 77.8%, 75.0%, and 75.3% among the studied mothers on control, cabbage leaves with RPS, and warm compresses with RPS groups respectively.



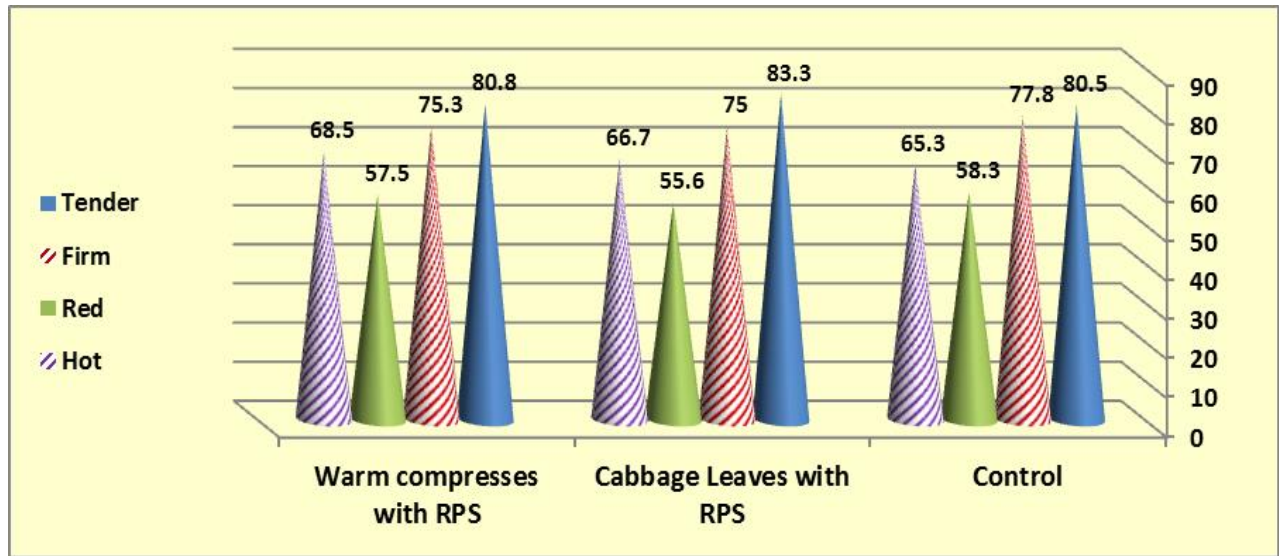


Figure (2): Distribution of the studied mother on control, cabbage leaves with RPS, and warm compresses with RPS according to signs and symptoms of breast engorgement

Figure (2): shows that most common signs and symptoms of breast engorgement are tender and firm breast that represent 80.5% and 77.8% among the studied mothers on control, 83.3% and 75.0% among the studied mothers on cabbage leaves with RPS, and 80.8% and 75.3% among the studied mothers on warm compresses with RPS groups respectively.

Table (3): Distribution of the studied mothers according to frequency of breast feeding

Items	Group I Control (N=72)		Group II Cabbage leaves with RPS (N=72)		Group III Warm compresses with RPS (N=73)	
	No.	%	No.	%	No.	%
<b>Frequency of feeding 1<sup>st</sup> day</b>						
4 times	62	86.1	64	88.9	63	86.3
5- 6 times	10	13.9	8	11.1	10	13.7
<b>Frequency of feeding 2<sup>nd</sup> day</b>						
4 -5 times	57	79.2	52	72.2	55	75.4
6-7 times	15	20.8	20	27.8	18	24.6
<b>Frequency of feeding 3<sup>rd</sup> day</b>						
4 -5 times	40	55.6	38	52.8	40	54.8
6-7 times	32	44.4	34	47.2	33	45.2
<b>Frequency of feeding 4<sup>th</sup> day</b>						
4 -5 times	35	48.6	17	23.6	19	26.0
6-7 times	17	23.6	33	45.8	20	27.3
≥ 8 times	20	27.8	22	30.6	34	46.7
<b>Frequency of feeding 5<sup>th</sup> day</b>						
≥ 6-8 times	38	52.8	7	9.7	8	11.0
9-11 times	24	33.3	38	52.8	35	47.9
≥ 12 times	10	13.9	27	37.5	30	41.1
<b>Frequency of feeding 6<sup>th</sup> day</b>						
≥ 6-8 times	35	48.6	5	6.9	6	8.2
9-11 times	23	31.9	37	51.4	36	49.3
≥ 12 times	14	19.5	30	41.7	31	42.5
<b>Frequency of feeding 7<sup>th</sup> day</b>						
≥ 6-8 times	36	50.0	3	4.2	4	5.5
9-11 times	20	27.8	39	54.1	37	50.7
≥ 12 times	16	22.2	30	41.7	32	43.8

Table (3): displays that (86.1%,88.9% and 86.3%) of the studied mothers in control, cabbage leaves with RPS, and warm compresses with RPS groups breast feed their babies 4 times in first day respectively. While, in the third day (44.4%, 47.2% and 45.2%) of the studied mothers in control, cabbage leaves with RPS, and warm compresses with RPS groups breast feed their babies 6-7 times per day respectively. Meanwhile, in fifth day after delivery (33.3 % , 52.8%, and 47.9%) of the studied mothers in control, cabbage leaves with RPS, and warm compresses with RPS group breast feed their babies 9-11 times per day respectively. As regard seven day (22.2%, 41.7%, and 43.8%) of the studied mothers in control, cabbage leaves with RPS, and warm compresses with RPS groups' breast feed their babies  $\geq 12$  times per day respectively.

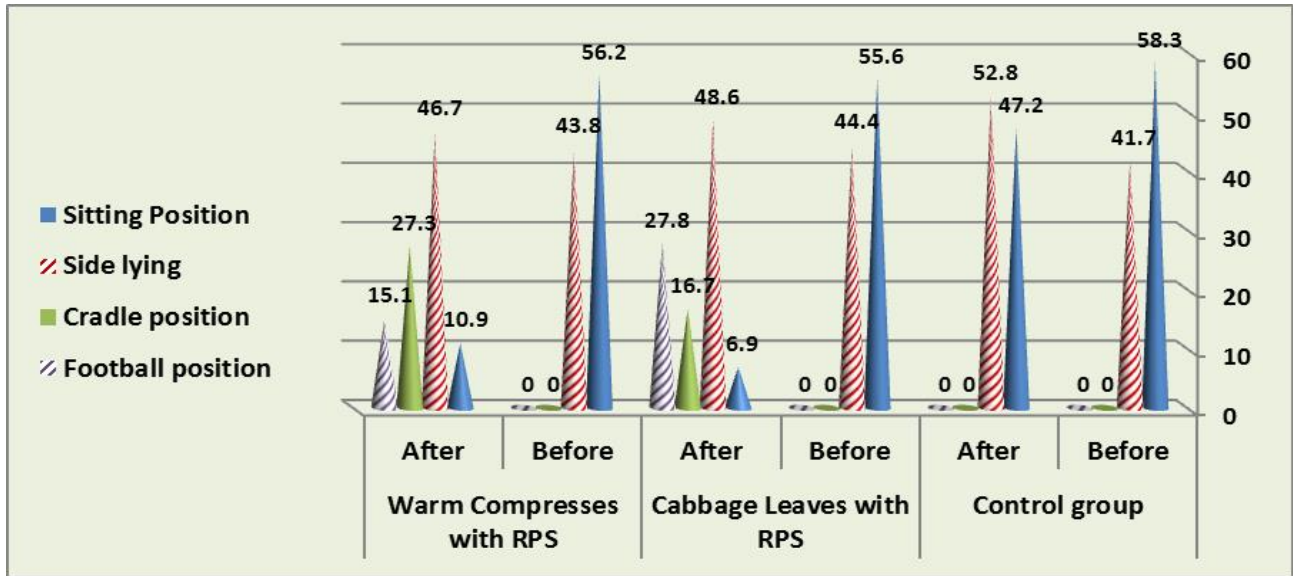


Figure (3): Distribution of the studied mother on control, cabbage leaves, and warm compresses with RPS according to their breast feeding position before and after implementation of educational program

Figure (3): indicates that most common breast feeding position used by mothers before implementation of educational program is sitting that represent 58.3%, 55.6% and 56.2% among the studied mothers on control, cabbage leaves with RPS, and warm compresses with RPS groups respectively.

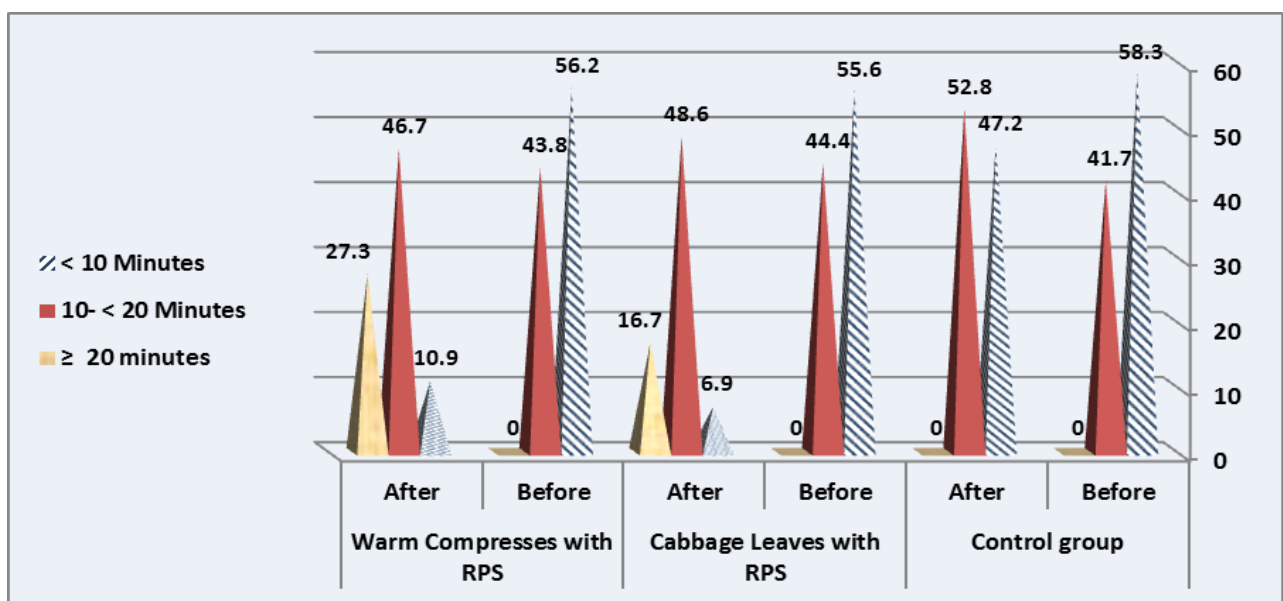


Figure (4): Distribution of the studied mother on control, cabbage leaves with RPS, and warm compresses with RPS according to their duration of breast feeding before and after implementation of educational program

Figure (4): displays that 58.3%, 55.6%, and 56.2% of the studied mothers on control, cabbage leaves with RPS, and warm compresses with RPS groups breast feed their babies for less than 10 minutes before implementation of educational program. While, after implementation of educational program 16.7% and 27.3% of the studied mothers on cabbage leaves with RPS, and warm compresses with RPS group breast feed their babies for more than 20 minutes.

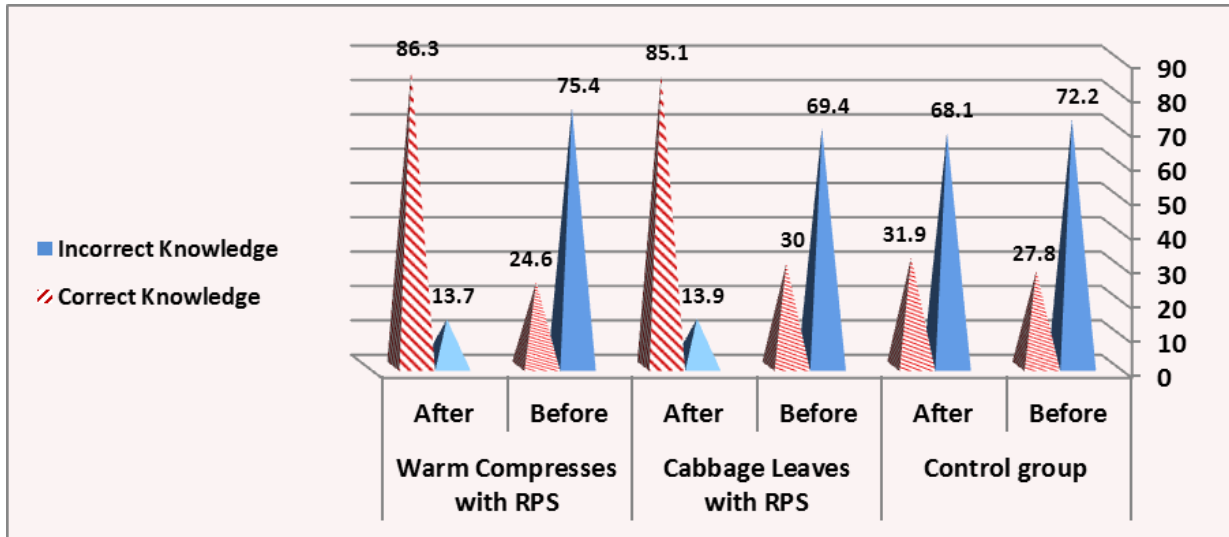


Figure (5): Distribution of the studied mother on control, cabbage leaves with RPS, and warm compresses with RPS according to their knowledge of breast engorgement before and after implementation of educational program

Figure (5): points out that 72.2%, 69.4%, and 75.4% of the studied mothers on control, cabbage leaves with RPS, and warm compresses with RPS groups have incorrect knowledge regarding breast engorgement before implementation of educational program. While, after implementation of educational program 85.1% and 86.3% of the studied mothers on cabbage leaves with RPS, and warm compresses with RPS group have correct knowledge regarding breast engorgement.

Table (4): Comparison within groups according to Visual Analogue Scale (VAS), Breast engorgement scale, LATCH scale total score before and after implementation of educational program

Groups	Before Implementation	After Implementation	T -test	P value
	Mean ± SD	Mean ± SD		
<b>Control group</b>				
Visual Analogue Scale (VAS)	7.29± 0.63	6.87± 1.42	3.31	0.24
Breast engorgement Scale	4.09± 0.35	3.93± 0.83	3.74	0.33
LATCH Scale	6.19± 0.01	6.40± 0.12	3.88	0.37
<b>Cabbage leaves with RPS group</b>				
Visual Analogue Scale (VAS)	7.45 ± 0.61	3.29 ± 0.01	7.68	0.001**
Breast engorgement Scale	4.02 ± 0.37	1.21 ± 0.05	8.01	0.001**
LATCH Scale	6.12 ± 0.03	8.53 ± 1.24	7.99	0.001**
<b>Warm compresses with RPS group</b>				
Visual Analogue Scale (VAS)	7.76±0.88	2.11±0.3	12.54	0.002**
Breast engorgement Scale	4.06±0.38	1.03±0.02	14.32	0.003**
LATCH Scale	6.09±0.08	10.21±1.41	16.62	0.004**

Table (4): points out that there is no statistical significant reduction on degree of pain and breast engorgement on control group with no statistical significant improvement on latching scale. While, there is a highly statistical significant reduction on degree of pain and breast engorgement on cabbage leaves with RPS and warm compresses with RPS groups with highly statistical significant improvement on latching scale.

**Table (5): Comparison between groups according to Visual Analogue Scale (VAS), Breast engorgement scale, LATCH scale total score before and after implementation of educational program**

Scales	Group I Control Mean ± SD	Group II Cabbage Leaves with RPS Mean ± SD	Group III Warm compresses with RPS Mean ± SD	F	P value
<b>Visual Analogue Scale (VAS)</b>					
Before intervention	7.29± 0.63	7.45 ± 0.61	7.76±0.88	3.01	0.062
After intervention	6.87± 1.42	3.29 ± 0.01	2.11±0.3	10.051	0.001**
<b>Breast engorgement Scale</b>					
Before intervention	4.09± 0.35	4.02 ± 0.37	4.06±0.38	2.63	0.075
After intervention	3.93± 0.83	1.21 ± 0.05	1.03±0.02	11.12	0.001**
<b>LATCH Scale</b>					
Before intervention	6.19± 0.01	6.12 ± 0.03	6.09±0.08	3.14	0.064
After intervention	6.40± 0.12	8.53 ± 1.24	10.21±1.41	12.32	0.001**

Table (5): shows that there is no statistical significant difference between control, cabbage leaves with RPS, and warm compresses with RPS groups as regard degree of pain, breast engorgement, and latching scale before implementation of educational program. While, there is a highly statistical significant reduction on degree of pain & breast engorgement with highly statistical significant improvement on latching scale between groups especially for warm compresses with RPS group.

#### 4. DISCUSSION

At the beginning of lactation women encounter difficulties with breastfeeding, breast engorgement is one of the most common problems that affect post natal mothers especially primipara and mothers who delivered through cesarean section. The engorgement process is caused by increased lactogenesis and prolactin concentrations in postpartum women. In the clinical setting various strategies were utilized for treatment of this problem such as warm compression, cold compression, and application of cabbage leaves, fluid limitation, binding the breasts or wearing a tight brassiere. The present study was conducted to evaluate the effect of educational program on mothers' using for non-pharmacological therapies to alleviate breast engorgement after cesarean section.

There is evidence that initiating and establishing early breastfeeding following a caesarean birth is more difficult, compared to a vaginal birth. A meta-analysis study concluded that elective but not emergency caesarean section had a significant adverse association with early breastfeeding (*Prior et al, 2012*). The result of the present study pointed out that nearly two third of mothers on three groups initiated their breast feeding more than two hours after cesarean section. This finding was in the same line with *Shrooti, Prativa, and Devkumari; (2016)* who carried out a descriptive cross-section study to assess knowledge and practice regarding breast feeding among 30 mothers who delivered through cesarean section at BPKIHS, Dharan, Nepal. They mentioned that only 17% of mothers initiated breast feeding after one hour meanwhile majority of mothers (70%) initiated after two hours. Regarding reasons for delayed breastfeeding after cesarean delivery were late shifting from recovery, pain and discomfort after cesarean section, and decreased milk secretion that represented 56%, 20%, and 12% respectively.

The result of the present study displayed that more than three quarters of the studied mothers on three groups had pain at incision sit, lack of anticipatory guidance and support, and lack of milk. This finding was consistence with *Smith; (2015)* who stated that maternal and infant stress during delivery adversely affect the onset of milk production as it affect release of oxytocin and thus inhibit milk ejection reflex, while infant stress result on weak suckling ability or decrease demand. Furthermore, lack of previous experience in breast feeding, and lack of family support (*Hsien et al, 2011*). This could be justified by cesarean section delivery was a significant barrier for initiating breastfeeding as mothers who had cesarean section delivery need more postoperative pain relief drugs this pain medication that received during and after delivery can suppress breast feeding, and decrease breast milk. In addition fatigue and stress lead to decrease breast milk.

In relation to signs and symptoms of breast engorgement reported by studied mothers on three groups the result of the present study revealed that more than three quarter of mothers on three groups complained from tender and firm breast

while, nearly two third complained from hotness and redness of breast. This finding was in agreement with *El Saily and Aboushady; (2016)* who conducted a quasi-experimental at El-Manial Maternity hospital to reduce the level of breast engorgement among the ninety postnatal mothers and to compare the effect of warm compresses versus cold cabbage leaves on breast engorgement. They mentioned that the most reported symptoms of breast engorgement were breast pain, redness, fatigue, warmth during touch, headache and fever that represented 88.9%, 70.0%, 70.0%, 45.6%, and 36.7% respectively.

Concerning duration of breast feeding the result of the present study showed that more than half of mothers on three groups were feeding their baby for less than 10 minutes before implementation of educational program. This finding was supported by *Mathew (2013)* who carried out a quasi-experimental to assess the effectiveness of cold cabbage leaves versus hot application on breast engorgement among 100 postnatal mothers in a selected Hospital, Mangalore, India he founded that 53.3% of the studied samples on both groups were feeding baby less than 5 minutes while, 46.7% of them feeding baby from 5 up to 10 minute. This could be explained by effect of mode of delivery as mother recovery from childbirth process require more time for cesarean section than normal vaginal delivery in addition primipara mothers were not adapted to their new role and need support to adapt with and practice mother role effectively.

In relation to breast feeding positions among the studied mothers on three groups the result of the present study pointed out that mothers on three groups were using only two positions setting and side lying position before implementation of educational program. While, after implementation of educational program nearly half of mothers on intervention groups (cabbage leaves with RPS, and warm compresses with RPS groups) were using cradle and football positions. This study finding was in agreement with *Padmasree, Varghese, and Krishnan; (2017)* who carried out quasi experimental, quantitative study in AIMS, Kochi among sixty mothers to evaluate the prevention, recognition and management of breast engorgement. They mentioned that comparing the breastfeeding practices regarding positioning in both groups, showed a significant difference at the level of 0.001. This finding indicated that prenatal teaching was effective in improving the health of mothers as well as practices of breastfeeding. As implementation of educational program was effective on women acquisition of new breast feeding position that was more comfort for mothers and more favor for successful latch on this reflected upon increase both frequency and duration of breast feeding among intervention groups.

As regard knowledge of the studied mothers on three groups regarding breast engorgement the result of the present study demonstrated that nearly three quarters of the studied mothers on three groups had incorrect knowledge before implementation of guideline. This study finding was in agreement with *Padmasree, Varghese, and Krishnan; (2017)* they reported that the mean pre-test knowledge level of control group was 9.83 and post-test knowledge was 10.03. In the Experimental group, the mean pre-test level was 10.20 and post-test level is 20.76. The T test value of control group was 0.71 and that of Experimental group was 12.83 which were highly significant at 0.001 level. Meanwhile, the result of the present study was on contrary with *Shrooti, Prativa, and Devkumari; (2016)* who mentioned that 50% of the respondent had knowledge about breastfeeding above median score (IQR) [7.5(6-9)]. This difference could be justified by variation between socio-demographic characteristics of sample as present study include primipara mothers only while, Shrooti study included different parity and higher educational level that impact on mothers knowledge.

Concerning comparison within groups the result of the present study revealed that there is no statistical significant reduction on degree of pain and breast engorgement on control group. This finding was in accordance with *Poonguzhali; (2016)* who conducted quasi-experimental study to examine effect of mechanical extraction of milk on the management of postpartum breast engorgement. It is study result indicated that minimal engorgement was experienced by 46% of the subjects. A control group (n=33) who experienced breast engorgement & followed standard management practice was compared to an experimental group (n=34) who used a hand operated pump to relieve engorgement symptoms. They suggested that mechanical removal of milk is an effective way to increase the comfort & decrease the symptoms of engorgement.

Regarding comparison between groups the result of the present study pointed out that there is no statistical significant difference between control, cabbage leaves with RPS, and warm compresses with RPS groups as regard degree of pain, breast engorgement, and latching scale before implementation of educational program. This finding was supported by *Kaur et al; (2015)* who performed a comparative intervention study to examine the effectiveness of hot and cold compresses versus cabbage leaves on breast engorgement and pain among 60 postnatal mothers at Ludhiana, Punjab.



They mentioned that there is no statistical significant difference between two intervention group (experimental group I hot and cold compresses and experimental group II cabbage leaves) pre-intervention  $p=0.38$ .

As regard comparison between groups regarding breast engorgement the result of the present study showed that there is a highly statistical significant reduction on breast engorgement score among study groups (cabbage leaves with RPS and warm compresses with RPS groups). This finding was in agreement with *Nanthini and Bhuvanawari; (2015)* who conducted a quasi-experimental study to assess and compare the efficacy of hot water application and cold cabbage leaves compresses in the treatment of breast engorgement among 60 postnatal mothers. They reported that the overall paired T test value was significant at the level of  $p < 0.001$ . This shows that there was significant improvement in breast engorgement score in both cabbage leaf application and hot water application.

Concerning comparison between groups regarding degree of pain the result of the present study displayed that there is a highly statistical significant reduction on degree of pain among cabbage leaves with RPS and warm compresses with RPS groups as ( $P=0.001$  &  $P= 0.002$ ) respectively. This study finding was in accordance with *Disha et al; (2015)* who carried out a quasi-experimental study to know the effect of chilled cabbage leaves vs. hot compression on breast engorgement among 64 post natal mothers admitted in post natal wards of Nehru Hospital, PGIMER, Chandigarh. They reported that the difference in pre and post intervention intensity of pain in the breast as indicated by pain score in both study groups was statistically significant as indicated by paired t test ( $p<0.05$ ). This indicated that both interventions (application of chilled cabbage leaves and application of hot compress) were effective in reducing the pain in the engorged breast.

As regard comparison between groups regarding latch on scale the result of the present study revealed that there is a highly statistical significant improvement on latch on scale among intervention groups (cabbage leaves with RPS and warm compresses with RPS groups). This finding was in concurrence with *Cotterman; (2004)* who conducted a study on “reverse pressure softening: a simple tool to prepare areola for easier latching during engorgement” at Dayton, Ohio on 84 women at immediate postpartum period with breast engorgement. Its result concluded that reverse pressure softening before latching significantly reduces resistance of sub areolar tissue, temporarily freeing it to interact more efficiently with the baby’s mouth & triggers the milk ejection reflex promptly.

## 5. CONCLUSION

The result and research hypothesis of the study proves that educational program regarding non-pharmacological therapies has positive effect on alleviating breast engorgement after cesarean section. This pointed out by; improving of mothers' knowledge regarding breast engorgement after using educational program. In addition to reduce degree of pain and breast engorgement and improve baby latch among cabbage leaves and warm compresses with reverse pressure softening groups. As there is a highly statistical significant reduction on degree of pain & breast engorgement with highly statistical significant improvement on latching scale between groups especially for warm compresses with RPS group.

## 6. RECOMMENDATIONS

In the light of the study findings, researchers recommend that:

- Application of educational program for cesarean section mothers at immediate postpartum period regarding prevention and management of breast engorgement.
- Further researches still needed to evaluate effect of educational program regarding pharmacological and non-pharmacological therapies on mothers' knowledge and practice regarding prevention of breast engorgement.

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