

Original Paper

Breast Engorgement among Women with Caesarean Section: Impact of Nursing Intervention

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Abstract

Background: Breast engorgement is defined as enlarged & filling of breast with milk. It is one of the most significant problems confronting nursing women, especially primiparous, in the first week of motherhood. **The aim of the study** was to investigate the impact of nursing intervention on relieve of breast engorgement among women with caesarean section. **Design and setting** an interventional study was conducted in postnatal unit of Beni-Suef University hospital. **Sample** was simple random sample comprised a total of 90 Primiparae's cesarean section mothers; 45 in the interventional group & 45 in the control group. **Tools of Data Collection** were interview questionnaire sheet, knowledge assessment sheet and observational & Engorgement assessment scale. **The study revealed** that, the nursing intervention was more effective and contributed rapid recovery from breast engorgement especially among the older, educated, housewives, high social class's women and those who were rural dwellers. **The study recommended that** Prevention is a key element in reducing breast engorgement potentially among nursing mothers. So, primiparous mothers should learn about preventive measures for breast engorgement. Teaching mother how to express both breasts simultaneously to yield the most volume and to decrease time spend pumping each consecutively is the responsibility of health care providers.

Keywords

breast engorgement, primiparous, caesarian section, nursing intervention

1. Introduction

The postpartum period “Puerperium”, as states by Susan A. and Wong H., is the interval between the birth of the newborn and the return of the reproductive organs to their normal no pregnant state. This period sometimes referred to 4th trimester of pregnancy. Although the Puerperium has traditionally been considered to last 6weeks, this time frame varies among women (WHO, 2001; WHO & UNICEF, 1991). It is divided into immediate (*the 1st 24 hours*), early (*up to 7 days*) and remote (*up to 6 weeks*). The birth of infant signals the beginning of a new chapter in the life of the mother & her significant others (Bashir, 2008; WHO, 2002).

Puerperium is a normal process that result in a series of unwelcome both physiological & psychological changes in women (*especially for primiparae*) as their bodies recover from pregnancy & labor (WHO, 1995; WHO, 2001). The major physiological event of the puerperium is lactation. When the milk comes in, the breasts suddenly become larger, firmer and tenderer. New mothers experience a varying degree of discomfort at this time. Breast engorgement is considered among the most significant problems encountered in the 1st week of motherhood. The medical dictionary defines engorgement as local congestion, excessive fullness of any organ, vessel, or tissue due to an accumulation of fluid (Blick et al., 2007). Breast engorgement is stated by Litteton L. and Engerbeston J. in 2005 as enlarged and filling of the breasts with milk. Lactation literature refers to engorgement as the physiologic condition characterized by the painful swelling of the breasts associated with sudden increase in milk volume, lymphatic and vascular congestion, and interstitial edema during the first two weeks following birth. Engorgement is a normal physiologic process with a progression of events, not a result of trauma or injury to tissues (Walker, 2010; Hassan, 2011).

A distinction exists between breast fullness and engorgement. Engorgement is a common response of the breast to the sudden change in hormones and the presence of an increased volume of milk. It usually occurs in 3rd to 5th day postpartum when the milk comes in and lasts about 24 hours (Wilson & Lowdermilk, 2006; Hassan et al., 2020a). When milk production increases rapidly, the volume of milk in the breast can exceed the capacity of the alveoli to store it. If the milk is not removed, over distention of the alveoli can cause the milk-secreting cells to become flattened & drawn out, even to rupture. The distention can partly or completely occlude the capillary blood circulation surround the alveolar cells, further decreasing cellular activity. Congested blood vessels leak fluid into the surround tissue space contributing to edema. Pressure and congestion obstruct lymphatic drainage of the breasts, stagnate the system that rid the breast of toxins, bacteria, and cast-off cell parts, thereby predisposing the breast to mastitis (both inflammation & infection) (Walker, 2010; Buckley & Kulb, 2003).

Breast engorgement is one of the most common minor discomforts confronting nursing women after delivery, especially primiparous. As a result of increased blood supply to the breast, it causes swelling of the tissue surrounding the milk ducts. The duct may be pinched shut so that the milk does not flow (Wilson & Lowdermilk, 2006; Riordan & Hoover, 2005). The breasts are firm, tender, swollen and hot

and they are throbbing. The skin is taut, shiny, or transparent and low-grade fever. The tenderness and swelling may extend into the axilla. The areola is firm and the nipple may flatten, and the areola is too hard to grasp, making it difficult for a newborn to latch on (Wilson & Lowdermilk, 2006; Mohrbacher, IBCLC, & Stock, 1997; Hassan, 2011).

Engorgement can be classified as involving only the areola, only the body of the breast, or both. It may occur in one or both breasts. Areolar engorgement involves clinical observations of a swollen areola with tight, shiny skin, probably involving over-full lactiferous sinuses. A puffy areola is thought to be tissue edema caused by large amounts of intravenous fluids received by some mothers during labor (Walker, 2010; Riordan, 2009).

Some degree of breast engorgement is normal. Minimal or no engorgement in the first week postpartum has been associated with insufficient milk, early supplementation, and a higher percentage of breastfeeding decline in the early weeks. Women with mild to moderate hypoplastic breasts with a wide intramammary space (>1 inch) and a tubular shape are at particular risk for producing less than 50 % of the milk necessary for the first week (Newton & Newton, 1951, Neifert et al., 1990; Huggins et al., 2000).

Moderate to severe engorgement is of more concern. Rates of engorgement between 20% and 85% have been reported in the literature based on numerous definitions and are usually limited to the first few days postpartum. Such reports described engorgement as peaking between day 3 and day 6 and declining thereafter. However, data from two unpublished masters theses suggest that mothers experience more than one peak of engorgement and that engorgement may continue for as long as ten days or more (Riedel, 1991; Csar, 1991).

Four patterns of engorgement have been described: a single experience of the firm, tender breasts followed by a resolution of symptoms; multiple peaks of engorgement followed by resolution; intense and painful engorgement lasting up to fourteen days; and minimal breast changes. These patterns demonstrate that the experience of engorgement is not the same for all mothers (Riedel, 1991; Csar, 1991).

An individual mother's risk for and course of engorgement are; (1) Failure to prevent or resolve milk stasis is resulting from infrequent or inadequate drainage of the breasts. The higher the cumulative number of minutes of sucking during the early days postpartum, the less pain from engorgement mothers describes (Moon & Humenick, 1989), (2) Small breast size (other than hypoplastic and tubular). Mothers with small breasts may need to experience a greater number of breastfeedings over 24 hours than women with a larger milk storage capacity (Day & Hartmann, 1995), (3) Previous breastfeeding experience, but not parity, influences engorgement. Second-time breastfeeding mothers experience greater levels of engorgement sooner with faster resolution than first-time breastfeeding mothers. Breast engorgement for multiparous mothers' breastfeeding for the first time was similar to primiparous breastfeeding mothers. Robson (1990) found that mothers in a non-engorged group were

more likely to have never experienced engorgement following previous births than mothers in the engorged group (Mc Lachlan et al., 1993; Robson, 1990). (4) Mothers with high rates of milk synthesis (hyper lactation) or large amounts of milk such as mothers of multiples may see milk stasis magnified if infants consume less milk, if less milk is pumped, or whenever milk volume significantly exceeds milk removal (Livingstone, 1996), (5) Limited mother/infant contact in the early days; Shiau (1997) demonstrated significantly less engorgement on day three in mothers who participated in skin-to-skin care of their full-term babies rather than standard nursery care.

If breast engorgement is not promptly treated, it may lead to some complications such as; (1) feeding problems or slow weight gain if the baby is unable to latch on the engorged breast (Davidson et al., 2008), (2) Sore and cracked nipple due to the baby fumbling on/off as he tries to grasp hold of a too firm breast. (Morland Schultz & Hill, 2005), (3) Deep breast (Fraser et al., 2004), (4) Thrush: is a fungal infection can be formed on the nipple or within the breast (especially cracked nipple or congested breast), as they live on milk (Agamy, 2011), (5) Plugged ducts results from accumulation of milk or dead cells that have not been expelled from the breast. (Orshan, 2008), (6) Mastitis; Also, neglected engorgement may be a forerunner and predisposes to more serious breast problems such as Mastitis (acute intramammary) (Riordan, 2005a; WHO, 2000).

Prevention is still the best medicine for engorged breast and other breast-feeding's problems. Numerous preventive strategies have been seen over the years including restricting fluids, prenatal expression of colostrum, prenatal breast massage, and postnatal breast massage, binding the breasts, or wearing a tight bra. Mothers experience less severe forms of engorgement with early frequent feedings, self-demand feedings, unlimited sucking times, and with babies who demonstrate correct suckling techniques (Cable & Davis, 1997; Nikodem, 2006; Salhan, 2007; Davidson et al., 2008; Wilson & Lowdermilk, 2006).

When breast engorgement is evident, it could be relieved by several pharmacological and nursing measures. The main pharmacological measures are regular analgesia for 24 to 48 hours to reduce pain. The mother can take acetaminophen (Tylenol) for breast discomfort (Fraser et al., 2004). Use of an anti-inflammatory agent (Danzen) significantly improved symptoms Ibuprofen may help reduce pain and swelling associated with engorgement (LITTLETON & ENGBRETSON, 2005). The use of an oxytocin nasal spray prescribed just before infant feeding to relieve breast engorgement or to promote to flow of milk at the beginning of the period of nursing (Snowden et al., 2001).

For nursing measures; a plethora of treatment modalities for engorgement have been put forward, both anecdotally and in the literature, such as hot compresses, hot showers, soaking the breasts in a bowl of hot water, cold compresses after feedings, cold packs before feedings, ice packs, frozen bags of vegetables, both hot and cold therapy, binding the breasts, manual expression, mechanical expression, lymphatic breast massage, frequent feedings, alternate massage, chilled cabbage leaves, room temperature cabbage leaves, and cabbage leaf extract (Zagloul et al., 2020; Jacob, 2005; Benson &

Pernall, 2002).

1.1 Significant of the Study

Breast engorgement is considered among the most significant problems encountered in the first week of motherhood. Moderate to severe engorgement is of more concern. Rates of engorgement between 20% and 85% have been reported in the literature based on numerous definitions. It is one of the most common minor discomforts confronting nursing women 2-4 days after delivery, especially primiparae. Women may report red, swollen, warm, firm, tender, uncomfortable, overall heaviness, and full and throbbing pain in the breasts that may extend to the axilla, on examination; there may be pyrexia and tachycardia. The main importance lies in the fact that the engorged breast can prevent nursing, leading to decrease in the milk production. In addition, engorgement may be forerunner of acute-non infective mastitis (acute intra mammary) and breast abscess. Mastitis is an actual inflammation of breast tissue; if mastitis is not treated properly and promptly it may lead to breast abscess (Hanretty et al., 2003).

One of the most important aspects of midwifery care is providing accurate and consistent advice on how to prevent breast engorgement and, if problem occurs, how to overcome it, in order to reduce early cessation of breast feeding. Therefore, this study was undertaken to: Assess women knowledge and practiced regarding breast feeding. Assess the prevalence and severity of breast engorgement among a group of breastfeeding women delivered caesarian section. Apply and find out the effect of some nursing measures that may relief breast engorgement among a group of breastfeeding women with caesarean section.

1.2 Aim of the Study

Investigate the impact of nursing intervention on relieve of breast engorgement among women with caesarean section. *The aims of this study achieved through:*

- Apply deferent measures of nursing intervention for women to relieve the engorgement of the breast; these measures are:
 - 1) Appling of warm compresses for affected breast for 20 minutes before each feeding.
 - 2) Administered cold cabbage leaves which were refrigerated in the freezer for approximately 20-30 minutes.
 - 3) Massaging the breast and emptying the breast by manual (or pump) expression of milk.
- Evaluate the effect of nursing measures on the relief of breast engorgement comparing with routine hospital care.

1.3 Research Hypothesis

Breast engorgement among puerperal women delivered caesarian section will be relieved after application of nursing intervention.

2. Method

2.1 Technical Design:

2.1.1 Study design: This study is an interventional study.

2.1.2 Setting: The study was conducted in postnatal unit of Beni-Suef University hospital.

2.1.3 Subjects:

2.1.3.1 Samples size:

Total study subjects of 90 women who suffer from breast engorgement for a period of 6 months were included in the study from the previous mentioned setting *with the following criteria:*

- Primiparous women.
- Women with caesarean section delivery.
- Free from medical disease which interfere with breastfeeding (infectious disease as active pulmonary tuberculosis).
- Initiate breast feeding.
- Her baby is normal.

2.1.3.2 Sample type:

Primiparous women who delivered by caesarean section randomly selected. They were equally allocated into two groups an intervention and a control group:

A- study (intervention) group:

This group comprised half of the mothers (45 women) who suffer from breast engorgement. They were trained to apply three nursing measures to relief engorgement.

B- Control group:

This group were comprised the other half the mothers (45 women) who suffer from breast engorgement and they were left for the routine postnatal hospital care.

2.1.4 Tools of Data Collection:

Two tools were used to collect the necessary data about the study subjects as the following:

Tool (1): A specialized designed structured interview schedule was developed based on the review of currently related literature and used by the researcher to collect the necessary data about the study subjects. It included the general characteristics of the study subjects such as: name, age, residence, address, phone number, educational level, type of family, family income, occupation.

Tool (2): Engorgement assessment scale: This tool was especially designed to provide the baseline data of the subjects regarding their signs and symptoms of engorged breast. It was implemented by using an observational check list which illustrated the breast current condition (redness, swollen or edema of the skin and pain) as well as pyrexia. In addition, follow up-checklist to assess the effectiveness of the nursing interventions compared to routine hospital practices used to relieve the breast engorgement among the two groups to identify degree of improvement after applying the three suggested methods of treatment for breast engorgement (warm compresses, frozen cabbage leaves

compress and breast milk expression). This tool comprised four main parts:

Part (A): Modified Reeda Scale (RS) (Note 1)

The modified Reeda Scale (RS, 1989) was used to provide the most objective means for evaluating the condition of the engorged breast after delivery in relation to redness (R). Mild redness was characterized by presence less than 0.25 cm of redness in the bilateral breasts or less than 0.5 cm of redness in the unilateral breast. Moderate redness was characterized by an increase of redness to 0.5 cm in the bilateral breasts or 1 cm in only one breast. Severe redness was characterized by an increase of redness to more than 0.5 cm in each breast or more than 1 cm in only one breast.

Redness was determined through four levels:

- a- 0 = no redness.
- b- 1 = < 0.25 cm bilateral or < 0.5 cm unilateral (mild redness).
- c- 2 = 0.5 cm bilateral or = 1 cm unilateral (moderate redness).
- d- 3 = > 0.5cm bilateral or > 1 cm unilateral (severe redness).

Part (B): Visual Analog Scale (VAS)

It is a subjective self-reported scale for description mother self-rating of pain. The scale was used to identify the three pain levels according to La Foy and Geden (1989) as the following:

Mild pain was characterized by pinking and/or aching, Moderate pain was characterized by pressing, sharp cramping, and burning, while sever pain was characterized by no tolerance to pain.

Pain was determined through four levels:

- a- 0 = no pain.
- b- 1 = mild pain.
- c- 2 = moderate pain.
- d- 3 = severe pain.

Part (C): Newton's Scale (1951)

This scale entails measuring the chest circumference just above the nipple in the semi-recumbent position during the first 12 hours after delivery (Jacob, 2005; Snowden et al., 2005). This measurement is considered to baseline measurement to assess breast edema as the following:

No edema was characterized by an increase of chest circumference of less than 1.5 cm. Mild edema was characterized by an increase of chest circumference of 1.5 cm to less than 2.5 cm. Moderate edema was characterized by an increase of chest circumference of 2.5 cm to less than 4 cm. Sever edema was characterized by an increase of chest circumference of more than 4 cm.

Breast edema was determined through four levels:

- a- 0 = no edema.
- b- 1 = mild edema.
- c- 2 = moderate edema.
- d- 3 = severe edema.

Part (D): Pyrexia Chart

Thermometer is used to measure body temperature (to determine pyrexia).

Pyrexia was assessed through four levels:

- | | | | |
|----|-----------|----------------|---------------------|
| a- | 0 = 37- | ⁰ c | (no pyrexia). |
| b- | 1 = 37.5- | ⁰ c | (mild pyrexia). |
| c- | 2 = 38- | ⁰ c | (moderate pyrexia). |
| d- | 3 = 38.5- | ⁰ c | (severe pyrexia). |

Breast Engorgement Total Scale

The occurrence of breast engorgement was determined according to collection of the total scores in Tool (3):

Total (T) = redness + pain + edema + pyrexia.

The degree of breast engorgement was estimated according to the following:

- ❖ $T < 4$ considered as no breast engorgement.
 - ❖ $T \geq 4 \ \& \ < 8$ considered as mild breast engorgement.
 - ❖ $T \geq 8 \ \& \ < 12$ considered as moderate breast engorgement.
 - ❖ $T \geq 12$ considered as sever breast engorgement.
- | | |
|----|---------------------------|
| a. | 0 = no engorgement. |
| b. | 1 = mild engorgement. |
| c. | 2 = moderate engorgement. |
| d. | 3 = severe engorgement. |

2.2 Operational Design

The study to be completed was passed through different phases as follows: Preparatory phase then the pilot study and the field work.

2.2.1 Preparatory Phase

Tools development:-The tools of data collection were developed by the researcher after extensive review of recent and related literature.

2.2.2 Ethical Considerations:

- The researcher took consent from women included to participate in the study.
- The researcher tools didn't embarrass of modesty and didn't cause any harm or pain for the participant women.
- The researcher tools didn't cause any physical, psychological and social risk.
- The participant has right to withdraw at any time.

2.2.3 Pilot Study

A pilot study was carried out on 10% of women (9 cases) who were excluded from the sample to ascertain their clarity, estimated time, efficiency and applicability and the necessary changes were

undertaken.

2.2.4 Field Work (Procedure):

The researcher selects lactating caesarean women who fulfilled the criteria. The researcher explained the purpose of the study to every woman, and then her consent to participate in the study was obtained. Each interview was conducted individually and in total privacy to assure that information to be obtained will be confidential and will be used only for research purpose.

Six days per week specified for data collection until the study sample completed over a period of 6 months starting from the beginning of January till June 2010. Women attended to the postnatal ward were interview. The average number of interviewee was 1-3 per day and the time taken for each sheet to complete was 60-75 minutes, depending upon the response of interviewee.

The study proceeds as the following:

A. The whole primiparous caesarean women were interviewed by the researcher during the first 12 hours after delivery to find out general characteristics of the sample and assess their knowledge about breastfeeding and breast engorgement. In addition, the condition of their breasts was assessed during the initial interview according to the pre-designed check list which is used on the Newton's Scale. This assessment was considered as the base-line measurement of chest circumference.

B. The percent of sample who had breast engorgement among all primiparous women delivered by caesarian section were 55.9% all over the period of the study (6 months).

C. The whole sample (90 lactating women) that was actually suffered from breast engorgement. They were interviewed by the researcher in the 3rd postnatal day to identify their current signs, symptoms and complain (base-line data of the participants).

Group (1): Study group

This group were comprised half of the women who suffered from breast engorgement and different nursing measures were instituted & instructions' booklet was given for them. The methods of intervention were:

- 1) Applying of warm compresses for affected breast for 20 minutes before each feeding. Heat application is used in form of hot compresses, hot shower, or hot soaks. The temperature of hot compresses ranged between 43°C & 46°C.
- 2) Administered cold cabbage leaves which were refrigerated in the freezer for approximately 20-30 minutes prior to the procedure. Cold leaves were placed inside the women's brassier for 30 minutes.
- 3) Massaging the breast and emptying the breast by manual (or pump) expression of milk after each feeding was demonstrated at first by the researcher on one breast and re-demonstrated by the mother on the other breast.

Group (2): Control group

This group were comprised the other half of the women who suffered from breast engorgement and were left to the routine postnatal hospital care.

2.2.5 Follow up:

Reassessment of women's breast condition; using the same tools which were used in the 1st visit; was done for two groups at 3rd, 4th, and 5th day post-partum, and they instructed to come to outpatient clinic for follow-up visits at 7th, and 9th day post-partum. The breast was observed for (redness, edema, and pain) and the mother observed for pyrexia. A comparison was then done between the 1st and successive measurements which were done in the 3rd day and in the 4th, 5th, 7th, and 9th day after delivery.

2.3 Administrative Design

Official permission to conduct the study was obtained from responsible authorities after explanation of the purpose of the study.

2.4 Statistical Design

The data collected were computerized, revised, categorized, tabulated, analyzed, and presented in descriptive and associated statistical form using the statistical software SPSS. The necessary tables were then prepared and statistical formulas were used. The following statistical measures were used:

- A. Descriptive measures included percentages, arithmetic mean (\bar{x}), and Standard Deviation (SD).
- B. Statistical tests included:
 - 1) Chi square (χ^2) test for analysis of qualitative variables.
 - 2) T test for analysis of quantitative variables.
 - 3) r test for analysis of correlation association.
- C. Graphical presentation included Column-chart diagrams.
- D. The level of significance selected for this study was P equal to or less than 0.05.

3. Result

Table 1 illustrates the distribution of the study subjects according to their general characteristics. It was found that, the mean age was 23.9 ± 6.6 and the mean age of marriage was 22.2 ± 6.4 for the study group and 22.6 ± 4.9 and 21.04 ± 6.1 , respectively, for the control group. Concerning their level of education, it was clear that those who had secondary or equivalent secondary education constituted 48.9% of the study group and 31.1% of the control group. The majority of both the study & control groups (71.1% & 80%) were housewives. The same table shows that (51.1% & 53.4%) of both study & control group, respectively, were from rural areas. Considering the type of family, it was observed that similar proportion (51.1%) of both study & control subjects had extended family. In relation to family income, it was observed from the same table that (64.4%) of the study group and (51.1%) of the control group didn't have enough family income. While a minority of both groups (8.9%) were had more than enough for their need. No significant differences found between two groups which indicated homogeneity of the two groups.

Figure 1 presents distribution of the samples according to severity degree of breast engorgement before application of nursing measures. It was observed that moderate engorgement scored the highest

percentage (48.9% & 42.3%) for the study and control group, respectively.

Figure 2 portrays distribution of the samples according to severity degree of signs & symptoms breast engorgement before application of nursing measures.

Table 2 shows that, in the 3rd day (before intervention), 51.1% of the study compared to 6.7% of the control group had severe redness. After intervention, it was found that, the percentage of severe redness declined to 4.4% in the 4th day and completely absents by the 5th day in the study group. While increased to 26.7% in the 4th day and 31.1% by the 5th day in the control group. Concerning the complete recovery from redness, the table shows that, it was achieved among the whole study group (100%) by the 7th day, while in control group; only 24.4% of the sample was completely recovered by the 9th day.

Regarding to severe pain, the table shows that, in the postpartum 3rd day (before intervention), there is 46.6% of the study sample compared to 4.4% of the control group suffer from severe pain, while, in the 4th day this percentage declined to 0.0% in the study group. While increased to 31.1% in the 5th day and completely absents by the 9th day in the control group. When the complete recovery from pain was considered, the entire study group (100%) was recovered by the 7th day postpartum, while only 20% in the control group were recovered completely until the 9th day postpartum.

It is observed that, in the 3rd day (before intervention), 40% of the study sample compared to 6.7% of the control group had severe edema. After intervention, it was found that, the percentage of severe edema declined to 2.2% in the 4th day and completely absents by the 5th day in the study group. While increased to 28.9% in the 5th day and completely absents by the 9th day in the control group. concerning the complete recovery from edema , the table shows that , it was achieved among the whole study group (100%) by the 7th day ,while in control group, (55.6%) of the sample were completely recovered by the 9th day postpartum.

Regarding to severe pyrexia, the table shows that, in the postpartum 3rd day (before intervention), 51.1% of the study sample compared to 4.4% of the control group suffer from severe pyrexia, while, In the 4th day it was found that, complete absence of severe pyrexia in the study group, while remaining the same percentage until the 5th day in the control group. When the complete recovery from pyrexia was considered, the entire study group (100%) was recovered by the 5th day postpartum, while 93.3% of the control group was recovered completely by the 9th day postpartum.

Figure 3 shows comparison between study and control group regarding their complete recovery from breast engorgement throughout follow up visits. It was observed that all of study group completely recovered (100%) in the fifth day compared to only 40% of the control group.

Table 3 reveals that the complete recovery from (redness, pain & edema) for the study group throughout follow up visits was at the postpartum seventh day, while for the control group it extended after the ninth day postpartum. However, the complete recovery from pyrexia for the study group was at the postpartum fifth day compared to later than ninth day postpartum for the control group.

Table 4 illustrates a strong significant negative correlation association was found between the degree of breast engorgement and the age & age of marriage for both the study and control sample. The percent of illiterate women in both groups (3.0 ± 0.0 & 1.8 ± 0.8) had got high level of engorgement as compared to university educated women (1.4 ± 0.5 & 1.7 ± 0.5) in both groups. The same table illustrates that, level of breast engorgement increased in urban areas (2.3 ± 0.6 & 2.28 ± 0.8) compared to rural ones (1.8 ± 0.6 & 1.83 ± 0.7). It was observed a strong significant negative correlation association between the degree of breast engorgement and family income for both the study and control sample, respectively, $r = -0.86, -0.88$.

It was observed in **Table 5** that, in the control group, 90.6% of women who aged less than 25 years were relieved from breast engorgement on the ninth day. While all of, participated women in, the study group were relieved from breast engorgement on the fifth day. The same table illustrates that the majority of the illiterate, read & writing women in the control group (85.7%) relieved from breast engorgement on the ninth day. The table shows that only 8.3% from housewives among the control group were recovered from breast engorgement on the fourth day and 91.7% of them were relieved on ninth day as compared with (90.6%) from housewives of the study group who were recovered on the fourth day and all of them were relieved on fifth day. The table also shows that (88.9%) of the study group who married ≥ 20 years old was relieved on the fourth day. In comparison, none of the women in the control group recovered on the same day. The table shows that only 12.5% of the rural women among the control group were relieved from breast engorgement on the fourth day and 50% from them were relieved on the fifth day as compared with (87%) of the same dwellers of the study group who were relieved on the fourth day and all of them relieved on the fifth day.

Table 1. Distribution of the Samples according to their General Characteristics

Variables	Sample groups				T & X2 Test
	Study Group (n = 45)		Control Group (n = 45)		
	N	%	N	%	
Age(in years)					
<20	14	31.1	12	26.7	T= 1. 08
20-	14	31.1	20	44.4	
25-	8	17.8	10	22.2	
30-40	9	20	3	6.7	
Mean	X- \pm SD		23.9 \pm 6.6		22.6. \pm 4.9
Education:					
Illiteracy	4	8.9	7	15.6	X2 =3.3
Read & write + Basic education	10	22.2	14	31.1	

Secondary equivalent education	22	48.9	14	31.1	
University education	9	20	10	22.2	
Occupation:					
Working	13	28.9	9	20	X ² = 1.0
Housewife	32	71.1	36	80	
Age of Marriage:					
< 20years	27	60	31	68.9	T = 0.89
≥ 20 years	18	40	14	31.1	
Mean	X- ± SD	22.2 ± 6.4		21.04 ± 6.1	
Duration of Marriage:					
≤5 years	18	40	14	31.1	X ² = 0.8
>5 years	27	60	31	68.9	
Mean	X- ± SD	5.8 ± 2.8		2.3 ± 3.3	
Residence:					
Urban	22	48.9	21	46.6	0.04
Rural	23	51.1	24	53.4	
Types of Family:					
Extended Family	23	51.1	23	51.1	identical
Nuclear Family	22	48.9	22	48.9	
Family Size:					
3- 5	21	46.7	23	51.1	0.18
> 5	24	53.3	22	48.9	
Mean	X- ± SD	6.1 ± 2.01		5.95 ± 2.02	
Family Income:					
Unsatisfied (not enough)	29	64.4	23	51.1	2.0
Just enough(enough for living only)	12	26.7	18	40	
Satisfy (enough & can save from it)	4	8.9	4	8.9	

*Significant, $P < 0.05$

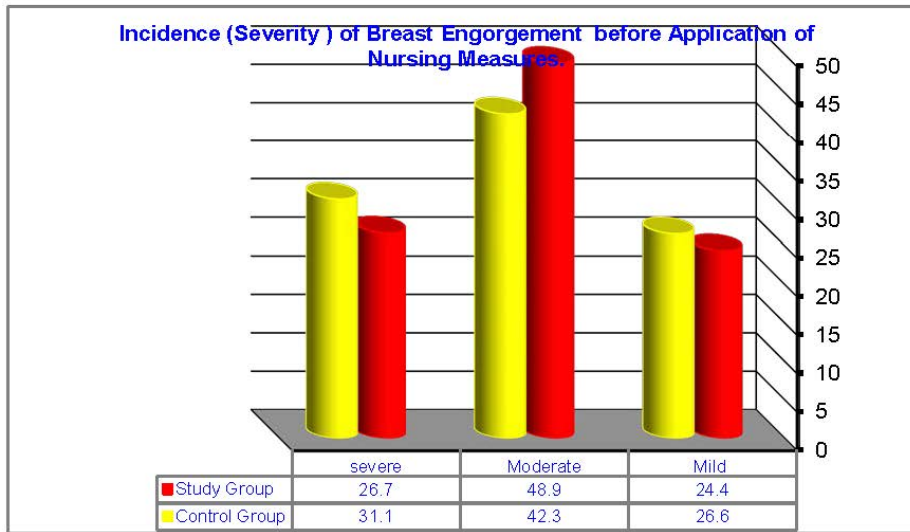


Figure 1. Distribution of Subjects according to Degree of Breast Engorgement and Its Signs & Symptoms throughout Follow up Visits

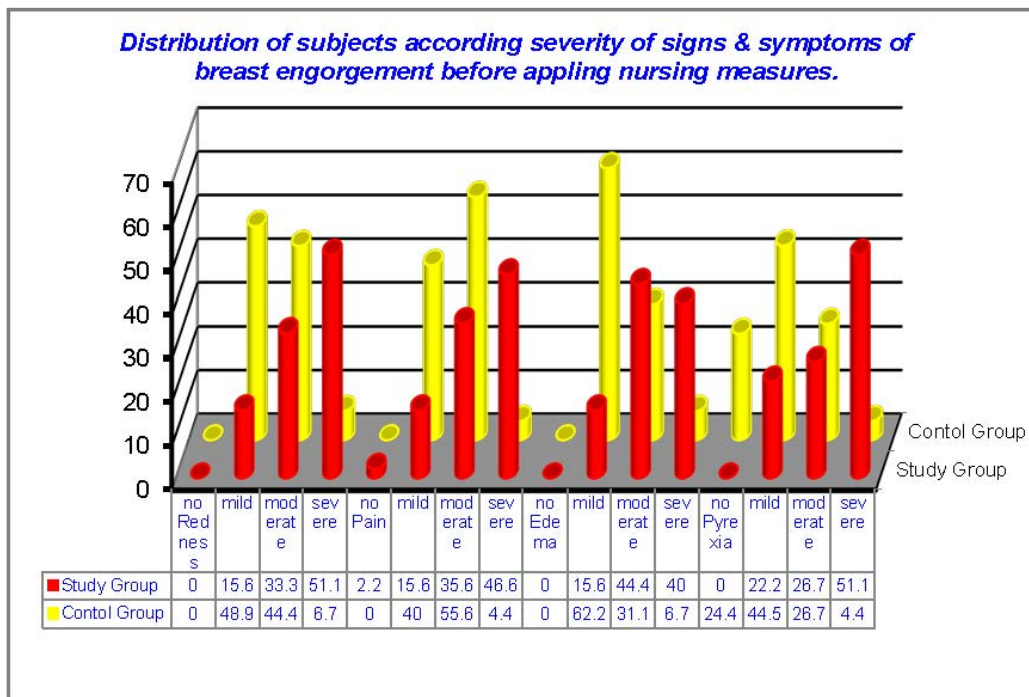


Figure 2. Distributions of the Samples according to Severity Degree of Signs & Symptoms Breast Engorgement before Application of Nursing Measures

Table 2. Distribution of the Sample according to Scoring of Signs & Symptoms (Redness, Pain, Pyrexia, and Edema) in the Breast Engorgement throughout Follow up Visits (By Using Reeda Scale)

Variable	Breast Engorgement throughout Follow up Visits	Scoring				X- ± SD	T Test
		Non %	Mild %	Moderate %	Sever %		
Scoring of Redness	3rd day						
	Study Group	0.0	15.6	33.3	51.1	2.4 ± 0.7	5.7*
	Control Group	0.0	48.9	44.4	6.7	1.6 ± 0.6	
	4th day						
	Study Group	35.5	48.9	11.2	4.4	0.8 ± 0.8	7.1*
	Control Group	2.2	20	51.1	26.7	2.0 ± 0.8	
	5th day						
	Study Group	95.6	4.4	0.0	0.0	0.04 ± 0.2	12.9*
	Control Group	13.3	35.6	20	31.1	1.8 ± 0.9	
	7th day						
	Study Group	100	0.0	0.0	0.0	0.0	5.0 *
	Control Group	33.3	28.9	22.2	15.6	1.2 ± 1.1	
9th day							
Study Group	100	0.0	0.0	0.0	0.0	13.3*	
Control Group	24.4	75.6	0.0	0.0	0.8 ± 0.4		
Scoring of Pain	3rd day						
	Study Group	2.2	15.6	35.6	46.6	2.3 ± 0.7	5.5*
	Control Group	0.0	40.0	55.6	4.4	1.6 ± 0.6	
	4th day						
	Study Group	53.3	40.0	6.7	0.0	0.7 ± 0.8	6.9*
	Control Group	2.2	24.4	49.0	24.4	2.0 ± 0.8	
	5th day						
	Study Group	97.8	2.2	0.0	0.0	1.6 ± 0.8	2.4*
	Control Group	13.3	40.0	15.6	31.1	2.0 ± 0.8	
	7th day						
	Study Group	100	0.0	0.0	0.0	0.0 ± 0.0	20.0*

	Control Group	31.1	33.3	17.8	17.8	1.2 ± 1.1	
	9th day						
	Study Group	100	0.0	0.0	0.0	0.0 ± 0.0	13.3*
	Control Group	20.0	80.0	0.0	0.0	0.8 ± 0.4	
Scoring of Pyrexia	3rd day						
	Study Group	0.0	22.2	26.7	51.1	2.3 ± 0.8	1.02
	Control Group	24.4	44.4	26.7	4.4	1.1 ± 0.8	
	4th day						
	Study Group	80.0	15.6	4.4	0.0	1.3 ± 0.5	2.2*
	Control Group	0.0	51.1	44.5	4.4	1.5 ± 0.6	
	5th day						
	Study Group	100	0.0	0.0	0.0	0.0 ± 0.0	9.2*
	Control Group	26.7	28.9	40	4.4	1.2 ± 0.9	
	7th day						
	Study Group	100	0.0	0.0	0.0	0.0 ± 0.0	9.0*
	Control Group	33.3	15.6	51.1	0.0	1.17 ± 0.9	
	9th day						
	Study Group	100	0.0	0.0	0.0	0.0 ± 0.0	1.8
	Control Group	93.3	6.7	0.0	0.0	0.07 ± 0.3	
	Scoring of Edema	3rd day					
Study Group		0.0	15.6	44.4	40.0	2.2 ± 0.7	
Control Group		0.0	62.2	31.1	6.7	1.4 ± 0.6	
4th day							
Study Group		62.2	28.9	6.7	2.2	0.5 ± 0.7	0.9
Control Group		4.4	31.1	51.1	13.3	1.7 ± 0.7	
5th day							
Study Group		71.1	28.9	0.0	0.0	0.3 ± 0.5	6.3*
Control Group		20.0	33.3	17.8	28.9	1.5 ± 1.1	
7th day							
Study Group	100	0.0	0.0	0.0	0.0 ± 0.0	7.5*	
Control Group	28.9	57.8	8.9	4.4	0.9 ± 0.8		

9th day						
Study Group	100	0.0	0.0	0.0	0.0 ± 0.0	5.6*
Control Group	55.6	42.2	2.2	0.0	0.5 ± 0.6	

*Significant, $P < 0.05$

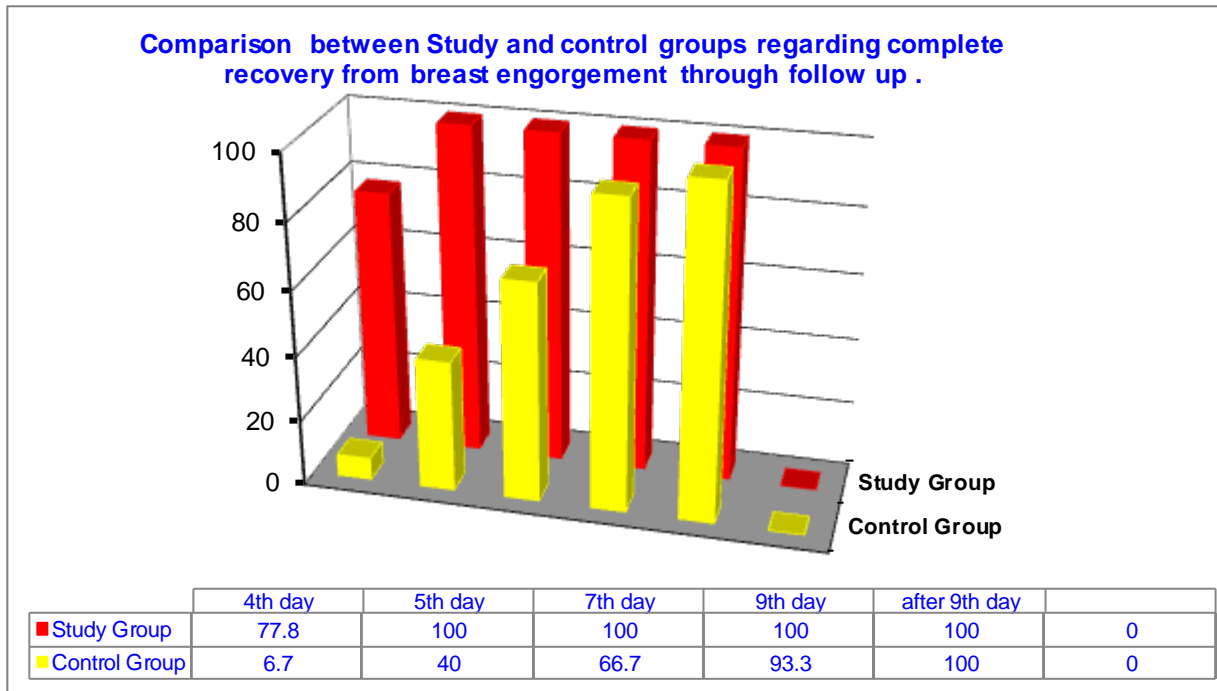


Figure 3. Complete Recovery from Breast Engorgement and Its Signs & Symptoms throughout Follow up Visits

Table 3. Comparison between Study Group and Control Group Regarding Complete Recovery from Signs & Symptoms of Breast Engorgement throughout Follow up Visits

S & S	Sample Group	Complete Recovery From Signs & Symptoms Of Breast Engorgement Throughout Follow Up Visits.										X2 Test
		3rd day		4th day		5th day		7th day		9th day		
		N	%	N	%	N	%	N	%	N	%	
Redness	Study Group	0	0	16	35.5	43	95.6	45	100	45	100	64.2*
	Control Group	0	0	1	2.2	6	13.3	15	33.3	11	24.4	
Pain	Study Group	1	2.2	24	53.3	44	97.8	45	100	45	100	60.8*
	Control Group	0	0	1	2.2	6	13.3	14	31.1	9	20	
Edema	Study Group	0	0	28	62.2	32	71.1	45	100	45	100	57.2*
	Control Group	0	0	2	4.4	9	20	13	28.9	25	55.6	
Pyrexia	Study Group	0	0	36	80	45	100	45	100	45	100	29.8*
	Control Group	11	24.4	0	0	12	26.7	15	33.3	42	93.3	

*Significant, P < 0.05

Table 4. Relationship between Degree of Breast Engorgement of the Studied Women in the Two Groups and Their General Characteristics

Variables	Study Group		Control Group	
	Mean	X- ± SD	Mean	X- ± SD
Age / Year				
<20	2.4	± 0.6	2.3	± 0.8
20-	2.3	± 0.6	2.2	± 0.7
25-	1.9	± 0.6	1.7	± 0.7
30-40	1.2	± 0.3	0.5	± 0.0
r Test	- 0.8*		- 0.7*	
Education				
Illiteracy	3.0	± 0.0	1.8	± 0.8
Read & write + Basic education	2.6	± 0.5	2.4	± 0.8
Secondary equivalent education	1.8	± 0.6	1.9	± 0.7
University education	1.4	± 0.5	1.7	± 0.5
r Test	- 0.95*		- 0.6*	

Occupation		
Working	2.4 ± 0.7	2.2 ± 0.8
Housewife	1.9 ± 0.7	2.0 ± 0.8
r Test	+ 0.81*	+ 0.74*
Age of Marriage		
<20years	2.4 ± 0.7	2.0 ± 0.7
≥ 20 years	1.8 ± 0.6	1.9 ± 0.8
r Test	- 0.8*	- 0.7*
Residence		
Urban	2.3 ± 0.6	2.28 ± 0.8
Rural	1.8 ± 0.6	1.83 ± 0.7
r Test	Identical	
Family Income		
Unsatisfied (not enough)	2.5 ± 0.6	2.7 ± 0.6
Just enough (enough for living only)	1.7 ± 0.8	1.9 ± 0.8
Satisfy (enough & can save from it)	1.2 ± 0.5	1.0 ± 0.5
r Test	- 0.86*	- 0.88*

* Significant Association

+ Positive Association

- Negative Association

Table 5. Relationship between Recovery Level of Breast Engorgement of the Studied Women in the Two Groups throughout Follow up Visits and Their General Characteristics

Variable	General Characteristics	Group	Follow up visits				
			4h day	5th day	7th day	9th day	>9th day
Age / Year	< 25 -	Study Group (n = 45)	78.6	100.0	-	-	-
		Control Group (n = 45)	0.0	25.0	53.1	90.6	100.0
	25 -	Study Group (n=45)	75.0	100.0	-	-	-
		Study Group (n = 45)	30.0	80.0	100.0	-	-
	30-40	Control Group (n = 45)	77.8	100.0	-	-	-
		Study Group (n = 45)	0.0	66.7	100.0	-	-
	r Test	Study Group	+ 0.93 *				
		Control Group	+ 0.81 *				
Educatio n	Illiteracy, Read & write	Study Group (n = 45)	42.9	100.0	-	-	-
		Control Group (n = 45)	0.0	9.5	28.6	85.7	100.0

	Secondary equivalent education	Study Group (n = 45)	90.9	100.0	-	-	-
		Control Group (n = 45)	14.3	64.3	100.0	-	-
	University education	Study Group (n = 45)	100.0	-	-	-	-
		Control Group (n = 45)	11.1	77.8	100.0	-	-
	r Test	Study Group	+ 0.87 *				
		Control Group	+ 0.75 *				
Occupation	Working	Study Group (n = 45)	38.5	100.0	-	-	-
		Control Group (n = 45)	0.0	33.3	66.7	100.0	-
	Housewives	Study Group (n = 45)	90.6	100.0	-	-	-
		Control Group (n = 45)	8.3	41.7	66.7	91.7	100.0
	r Test	Study Group	+ 0.93 *				
		Control Group	+ 0.69 *				
Age of marriage	< 20 years	Study Group (n = 45)	70.4	100.0	-	-	-
		Control Group (n = 45)	9.7	41.9	64.5	90.3	100.0
	≥ 20 years	Study Group (n = 45)	88.9	100.0	-	-	-
		Control Group (n = 45)	0.0	35.7	71.4	100.0	-
	r Test	Study Group	+ 0.97 *				
		Control Group	+ 0.76 *				
Residence	Urban	Study Group (n = 45)	77.2	100.0	-	-	-
		Control Group (n = 45)	0.0	28.6	52.4	85.7	100.0
	Rural	Study Group (n = 45)	87.0	100.0	-	-	-
		Control Group (n = 45)	12.5	50.0	79.2	100.0	-
	r Test	Study Group	+ 0.99 *				
		Control Group	+ 0.74 *				

* Significant Association

+ Positive Association

-Negative Association

4. Discussion

Breast engorgement during the early puerperium is one of the most common causes of morbidity affecting functions and experience of early motherhood (Hassan et al., 2020b; Jelovesk, 2006). Breast engorgement is a physiological condition that is characterized by painful swelling of the breasts as a result of a sudden increase in milk volume, lymphatic and vascular congestion, and interstitial edema

during the first two weeks following childbirth. This condition is caused by insufficient breastfeeding and/or obstruction in the milk ducts. Breast pain during breastfeeding is a common problem. The occurrence of such condition faced by the mother adds to her apprehension and anxiety may lead to other severe breastfeeding problems for mother with consequent discontinuation of breastfeeding or addition of supplements of animal milk/commercial infant formula. Also, negligence of breast engorgement may lead to certain serious complication such as mastitis and breast abscess (Fraser et al., 2004; Hanretty et al., 2003).

Intervention toward the goal of alleviating or relieving patient pain and other discomforts related to engorgement and its causes are primarily nursing functions. Concerning postpartum pain, some women choose not to use medications at all or to use it infrequently for various reasons, therefore, alternative methods to relieve these discomforts need to be available to such women (pediatric advisor, 2009, Hendrson et al., 2004; Benson & Pernall, 2002).

The best treatment for engorged breast is prevention; prevention is still the best medicine for any breastfeeding problem. Over the years, numerous strategies for the treatment of this problem have been employed such as kangaroo care, fluid limitation, binding the breasts or wearing a tight brassiere, hot and cold compresses, and application of cabbage leaves (Cable & Davis, 1997).

The present study was conducted to investigate the effect of nursing intervention on relief of breast engorgement among women with cesarean section. The study highlights the need for strengthening mother training as well as pointing out to what extent their knowledge and practices toward breastfeeding. This leads to safe breastfeeding and prevents engorgement.

The results of the study reveal that the socio-demographic and general characteristics of the subjects correlate, as expected, with the middle class of the Egyptian society. Where the mean age of the study and control participants was 23.3 years, and the mean age of marriage was 21.6 years old, the majority were, housewives and more than one half of them were rural dwellers and nearly similar proportion live within extended families as usual for rural communities. Considering the relatively high mean age of marriage of the subjects (in Upper Egypt) may reflect that the age of marriage has been raised in response to our national policy to limit family size. However, the prevalence of housewives, rural and unsatisfied family income among a sizable proportion of the study subjects may explain their reluctance to seek health services within their communities. In other words, working, urban women who have enough income are usually more likely to have better access to community health services which provide proper preparation, education, and care during antenatal and postnatal periods.

The present study clearly illustrates that all women suffer signs and symptoms (redness, pain, edema, and pyrexia) of breast engorgement. The results of the present study illustrate the degrees of breast engorgement. Studies have shown that 20-85% of breastfeeding women experienced moderate and severe breast engorgement. The degree of engorgement usually lessens with each child. First-time mothers often suffer more from engorgement than women who are nursing their second or third child,

because the time it takes for the mature milk to "come in" seems to shorten with each child (Aniansson, 2009).

When the relationship between certain characteristics of puerperal women and the degree of breast engorgement was investigated, it was revealed that older women were less likely to develop high degree breast engorgement than younger ones. Furthermore, a strongly negative correlation was observed between women's degree of breast engorgement and their age. This may be because older primiparae are more likely to be concerned about their babies, thus they followed instructions more accurately and breastfed their babies appropriately. Lactational failure, however, leads to the absence of suckling and failure of ejection which may lead to engorgement and stasis of milk (Moon & Humenick, 1989).

It was also evident from the results that better-educated women had less breast engorgement degree, while women with limited educational background had more breast engorgement degree. A strongly negative correlation was observed between women's degree of breast engorgement and their education. This was expected since educated women are more likely to have better access to the community health care services and source of information that help in early detection and proper management of minor discomforts during puerperium. These results were in line with Hassan (2000). It was also mentioned that women who had been educated were open-minded to new ideas (Biennial report, 1996). Also, this finding went hand with El-Sherbeni (1988), Sheha et al., (2018), and Hassanine et al., (2017); all of them emphasized on the importance of education in the prevention and control of maternity health problems. Moreover, education should be a mean that enables women to gain access to knowledge. The more educated women received a better contribution to their empowerment. Education of women could also improve the health of the entire family. Women with more education should also be able to control many events in their lives. Thereby, access to education had to be a fundamental human right and a prerequisite to social, cultural and economic well-being (Rowley, 1992; Hassan et al., 2019; Sheha et al., 2020).

The results of the present study also revealed a strong positive correlation women's degree of breast engorgement and their occupation. It was no wonder to find housewives and rural women are less likely to develop a higher degree of breast engorgement. This was expected since housewives and rural citizens accept their role as lactating mothers and practice it accurately as they are guided. This is opposite to urban working ones who prepare themselves in the wrong way for employment. Salhan S. et al. (2007), reported that, to help the mothers to maintain breastfeeding while working, the nurse should emphasized to the mother that she must establish a good milk supply, plan how and where she will pump the breast at work as well as planning baby feeding during the mother's working time.

Regarding age at marriage of the studied subjects, the results of the present study presented that three-fifths of the study group and more than two-thirds of the control group married at age less than 20 years. Furthermore, a strongly negative correlation was noticed between women's age at marriage and

women's degree of breast engorgement. It was not surprising to find that younger women tend to have a higher degree of breast engorgement than older ones. This might be because day by day life enhances women's experience and improves their knowledge. This result was considered by Ghulam (1979) who stated that early marriage could harm the mother's education, and also her understanding of how to relieve the minor discomforts during pregnancy. This result was supported by the other researches which indicated the fact that early marriage and pregnancy had hindered women to finish their education and to get a good job and had become financially dependent on their family. Therefore, teen mothers were more likely to live in poverty than women who were in delayed childbearing age (PBWRC, 2000; Smith & Maurer, 2000). Moreover delaying age at marriage was a key to improving women's status and maybe a way of increasing their leverages in the decision-making the process (Ibrahim, Mensch, & El Gibaly, 1998).

The results of the present study had also revealed a strongly negative correlation between women's degree of breast engorgement and their family income. Degree of breast engorgement was more prevalent among poor women as most women were likely lived in large and extended families. This increased family size might reduce the per capita income and amount of care the mother gained especially during her puerperium. This would affect badly on the mother's health and her health practices. This was in accordance with Abrams and Gordon (1961) and William (1967). Moreover, poverty, type, and size of the family might increase the burden on women caring for many persons and striving hard for a living (WHO, 1995). These results were supported by the fourth world conference (1995) which denoted that statistics about women and poverty were all too familiar, where women were the majority of 1.3 billion people living in extreme poverty. Those poor women were more likely to live in crowded houses.

It was observed from the results of the present study that, the degree of breast engorgement was higher among women who did not know than those who had correct but incomplete knowledge. A strongly positive correlation was found between the degree of breast engorgement and women's knowledge regarding breast engorgement. This may be since most women's knowledge was about the definition, causes and rarely about complications, prevention, and treatment of breast engorgement. This agrees with the fact that women need complete knowledge to perform correctively breast care and breastfeeding which consequently would prevent breast engorgement (Auvenshine & Enriquez, 1990).

Breast engorgement is a very frequent problem among postpartum mothers. If the mother gets breast engorgement, she should believe that it will soon heal. The mother should continue breastfeeding. Podgurski (1995) indicated that most breastfeeding problems can be solved if it is continued and without the use of expensive medical advice. If the mother stops feeding, the problem may get worse. However, several similar problems common to breastfeeding can be prevented or eased through simple techniques or addressed with common, simple treatment options. The use of comfort measures to relieve breastfeeding discomfort is seen as an area of nursing responsibility. In general, many local

comfort measures are being applied to relieve discomforts during breastfeeding (Guest, 2005).

Robson (1990) reported that heat application in the form of hot compresses, hot showers, or hot soaks is poorly researched and has usually been more of a comfort measure to activate the milk ejection reflex, rather than a treatment for edema. Some mothers complain that heat exacerbates the engorgement, causes throbbing and an increased feeling of fullness (Wilson & Lowdermilk, 2006). The application of heat is an effective way to increase circulation to breast, provide comfort and reduce edema (Mattson & Smith, 2000; Montle, Haslon, & Barton, 2004). A warm shower just before feeding may help to relieve engorgement. Mother can also cover her breasts with a warm washcloth and plastic dipper to keep the heat in (pediatric advisor, 2009).

Moreover, a cold compress may apply to the breast to prevent edema and numbness. The cool promotes pain relief by decreasing the excitability of the nerve ending, decreasing nerve conduction local vasoconstriction with reduces edema, decrease muscle irritability and spasm. In her book, *“Breastfeeding-A Guide for the Medical Profession”*, Dr. Ruth Lawrence (1999) recommends applying cold packs to the breasts after feeding to help reducing swelling, warmth, and pain. Robson discusses that application of cold for 20 minute would have a minimal vasoconstriction effect in the deeper breast tissue and that venous and lymphatic drainage would be enhanced in the deeper tissue due to the accelerated circulation to and from the superficial tissues.

Along with frequent nursing or pumping, many breastfeeding advocates suggest using cabbage leaves to reduce swelling when a mother experiences moderate to severe engorgement. Actual research data is spared, but the published studies and anecdotal reports from mothers, who have used it, seem to support its value in reducing breast engorgement (SU, 2010).

In addition, some breastfeeding experts recommended using cool cabbage leaves to treat uncomfortable breast engorgement. Many women who have tried cabbage leaves claim the treatment brings relief from discomfort and improve milk flow. (Cabbage has been used for centuries as a folk remedy for a wide variety of ailments) (Pediatric advisor, 2009; Wilson & Lowdermilk, 2006). It's not entirely clear why cabbage leaves would reduce breast engorgement, but the green cabbage plant contains a high concentration of sulfur, which is known to reduce swelling and inflammation in all tissues (Andrews, 2010). Cabbage is known to contain sinigrin (allylisothiocyanate) rapine, mustard oil, magnesium, oxalates, and sulfur heterosides. Herbalists believe that cabbage has both antibiotic and anti-irritant properties (Lawrence, 2010). It is theorized, that this natural mixture of ingredients from Mother Nature's Kitchen, helps decrease tissue congestion by dilating (opening) local capillaries (small blood vessels), which improves the blood flow in and out of the area, allowing the body to reabsorb the fluid which is trapped in the breasts. Cabbage may also have a type of drawing or wicking action that helps to move trapping fluid. In many cases, science is finding cures from Mother Nature's Kitchen can't be duplicated in the laboratory. This may be the reason why a gel made from cabbage leaf extract was not effective in treating engorgement as mentioned by Ayers (2000), Caplan (1999), Shifer (1995), and

Roberts (1995).

Rosier (1998) and Fraser D and Cooper M. (2009) anecdotally describes the use of chilled cabbage leaves applied to engorged breasts and changed every two hours in a small sample of women as having a rapid effect on reducing edema and increasing flow. Nikodem et al. (1993) showed a non-significant trend in reduced engorgement in mothers using cabbage leaves. Roberts (1995) compared chilled cabbage leaves and gel packs and found a similar significant reduction in pain with both methods. With two-thirds of the mothers preferred the cabbage due to a stronger, more immediate effect. Roberts et al. (1998). Studied the use of cabbage extract cream applied to the breasts which had no more effect than the placebo cream.

This study is supported by the finding of Snowden HM et al. (2001) who reviewed research studies to determine the effect of several interventions to relieve symptoms of breast engorgement among breastfeeding women and found that cabbage leaves were effective in the treatment of this painful condition. Cabbage leaves were preferred by mothers. The advantage of using cabbage leaves is its low cost and convenience as compared to other medical regimens. The present study also supported by the finding of Arora, Vatsa, and Dadhwal V. (2008) who reported that cold cabbage leaves as well as alternate hot and cold compresses both can be used in the treatment of breast engorgement.

When breasts are severely engorged, the baby often cannot latch on properly. Pumping or manually expressing some breast milk can help to reduce engorgement, allowing the baby to suckle, which will help to alleviate the swelling and prevent future episodes. Massaging the breasts as the babies' nurses can help to get out as much milk as possible. Many women are afraid to pump or express milk while they are engorged because they think it will cause them to make even more milk. However, engorgement is a problem of poor milk flow, rather too much milk. If the breasts are so full that it's hard for the baby to latch on correctly, it may want to pump or hand express some milk before the feeding. Express enough to soften the nipple and areola so the baby can better grasp the breast. If the breast is still uncomfortably full after feeding the baby, pump for a few minutes until the breasts are softer and the milk flowing better, reduce the firmness enough to relieve discomfort and reduce obvious softening (pediatric advisor, 2009).

Fraser and Cooper (2004) reported that the occurrence of problems (such as engorgement) would require artificial removal of milk. WHO/UNICEF (1993) stresses the importance of teaching all mothers how to express their milk in the first or second day after delivery. Breast pumping for a new mother should commence 6 to 24 hours after birth (Spicer, 2001). Milk removal commence by the third postpartum day to promote the likelihood of successful lactation (Labbok, 2001b). Expressing milk decreases the mechanical stress on the alveoli, preventing the cell death process, prevents blood circulation damages, alleviates the impedance to lymph and fluid drainage; decrease the risk of mastitis and compromised milk production, and gives relief to the mother (Walker, 2000). Hand expression and the electronic pump may be most helpful, as this drain the milk ducts better (Riordan, 2009; Johnson,

2010).

In the present study, the nursing measures (study group) were used as a method of treatment for breast engorgement. Checking the findings of this study reveals that, symptoms and signs improved significantly by time until complete recovery occurred. Maximum recovery from pyrexia was achieved among women in the fourth postpartum day, while maximum recovery from pain, redness, and edema was achieved among the same group by the fifth postpartum day. In Egypt among the currently available agents for the treatment such measures as cold, warmth, breast expression or pumping and cool cabbage which are used to alleviate signs & symptoms of Breast engorgement (redness, pain, edema, and pyrexia).

According to the results yielded by the present study, nursing measures seemed to be very useful in achieving a complete recovery of engorgement earlier and faster than routine hospital care. This coincides with Gamal El-deen (1993). Similar results reported by Ziemer and Pigeon (1995) who revealed a significant difference between women's follow up visits and complete or maximum relief of signs and symptoms among the control group (routine hospital care). Maximum relief from edema and pyrexia were achieved by ninth postpartum day, while Maximum relief from redness and pain were accomplished among women of the same group later than ninth postpartum day.

The relationship between women's general characteristics and relief of their breast engorgement was also investigated. The results of the present study revealed that nursing intervention was effective in its relief in a shorter time than routine hospital care.

As regards age, it was observed that complete recovery from breast engorgement was earlier among older women than younger ones. Furthermore, a positive correlation was observed between the recovery level of breast engorgement and their age. This may be explained by lack of experience of younger women, in addition, that those women are less likely to breastfeed than older ones; consequently, they were less liable to be relieved from breast engorgement. A similar finding was reported by Gamal EL-deen (1993). Other studies carried out in this field revealed that young mothers who were given a bucket of glucose water from the hospital were still giving water supplements after every feeding at the second postpartum week, despite full, dripping breasts. The mother and father stated that these feedings were against their better judgment but they had continued because they thought that it was what they were supposed to do. On the other hand, giving the infant a supplement can cause what is termed nipple confusion. The baby discovers that it is easier to suck on a rubber nipple and refuse the breasts. Consequently, breast engorgement may be developed and also difficult to be relieved (Hill, 1991).

From the present study, it was not surprising to find that the recovery level of breast engorgement was better in highly educated women. A highly significant positive correlation was noticed between women's education and their recovery level from breast engorgement. This result is in accordance with Gamal EL-deen (1993) who reported that the relief of breast engorgement is faster in highly educated

and middle social class women. This may be explained by the fact that educated and higher social class women were more likely to breastfeed their infant more frequently and longer than others. This is in line with the report of Applebaum (1975), Hill (1991) and Akin et al. (1981) who stated that the frequency of breastfeeding increased across all educational and income levels. Also, women of higher social status breastfeed longer than women of lower status. Also, many authors reported that in developing countries, the U.S.A. and Sweden, breastfeeding is now more common among highly educated women. All these are reflecting the relief of breast engorgement, but when the women receive both support and information, such support and this information had a positive effect on successful breastfeeding and consequently prevent breast complications (Applebaum, 1975).

Dealing with occupation and residence, the results of the present study revealed that, recovery level of breast engorgement was better among rural dwellers and housewives. Furthermore, a significant strong positive correlation was observed between the recovery level of breast engorgement and occupation and residence. This is not amazing as rural dwellers and housewives accept their role as lactating mothers and practice it accurately as they are guided as mentioned before.

Again, the relief of breast engorgement was faster in women whose age of marriage more than 20 years old. A significant strong positive correlation was observed between the recovery level of breast engorgement and mother's age of marriage. This may be explained by the fact that older women were more able to grasp and implement the instructions than younger ones. However, this might be due to the fact that day by day life enhances women's experience and improves their knowledge. Also, early marriage could hurt the mother's education as mentioned before (WHO, 1979).

Finally, the results of the present study reveal that the three methods used for the treatment of breast engorgement namely (cabbage, hot compresses, and milk expression) have eventually led to their recovery and relief of their signs and symptoms. Furthermore, the study suggests that cabbage with its properties may be a superiorly effective agent in treating the engorged breast. Also, milk expression gives an important role in decreasing the occurrence of subsequent breastfeeding problems such as engorgement, mastitis, and abscess. This is due to the fact that women with low economic status tend to neglect themselves and deal with engorgement is a serious problem. This may consequently lead to other risk breastfeeding problems. Such mothers never ask for medical advice because they find it financially costly. One of the most important properties of all mentioned measures as a treatment of engorgement is being economically financial and easy to use. So, the nurse can play an important role in the prevention and resolve of breast problems through proper counseling and education.

5. Conclusion

Based on the findings revealed by the present study, it can be concluded:

The degrees of severity of breast engorgement was higher with younger, less educated, working, urban, lower social classes women. The study also accepts the research hypotheses as, the nursing intervention

was more effective and contributed rapid recovery from breast engorgement especially among the older, educated, housewives, high social classes women and those who from rural areas than others.

6. Recommendations

In light of the results of the present study, the following recommendations are suggested:

- Prevention is a key element in reducing breast engorgement potentially among nursing mothers. So, mothers should learn about preventive measures for breast engorgement.
- Teaching mother how to express both breasts simultaneously to yield the most volume and to decrease time spend pumping each consecutively is the responsibility of health care providers. Additional, local WIC programs may provide a breast pump to engorged breast mothers and/or babies born preterm.

☛ *Further studies should be done in this area as follows:*

- Further researches are needed to clarify the magnitude of the breast engorgement problem in Egypt as a whole and compare between rural and urban areas to find out the suitable solution for it.
- Factors affecting the usage of traditional practices should be studied in depth by the health team for better management of these factors. This will affect positively the outcome of pregnancy & women health.
- Research should be encouraged to find the relation between the use of traditional practices and various socio-demographic and obstetrical factors on a larger sample size.

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Note

Note 1. The Reeda Scale is a tool used to provide the most effective means for evaluating the condition of the skin in relation to 5 factors (redness, edema, ecchymosis and healing). "To assess the effect of comfort measures on the healing process by Hill (1989)".