

ORIGINAL ARTICLE

Pre-Experimental Study to Evaluate the Effectiveness of Lukewarm Water on Breast Engorgement Among C-Section Postnatal Mothers (20-30 Years) in Nursing Home, New Delhi

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Neeta Singh Rohit Pandey. Pre-Experimental Study to Evaluate the Effectiveness of Lukewarm Water on Breast Engorgement Among C-Section Postnatal Mothers (20-30 Years) in Nursing Home, New Delhi. Int J Pediatr Nurs. 2025; 11(1): 23–32.

ABSTRACT

Background of the Study: Breast engorgement is a common and distressing condition experienced by postnatal mothers, particularly during the early stages of breastfeeding. It often leads to pain, discomfort, and breastfeeding challenges. Post-cesarean section mothers face additional barriers, such as physical discomfort and delayed breastfeeding initiation, which increase their risk of engorgement. Lukewarm water therapy, a simple, cost-effective intervention, is hypothesized to relieve breast engorgement by improving circulation and promoting milk flow.

Aim: The study aims to evaluate the effectiveness of lukewarm water therapy in reducing breast engorgement among postnatal mothers aged 20–30 years who have undergone cesarean sections in a nursing home in New Delhi.

Methods: A pre-experimental one-group pretest-posttest design was adopted. Thirty postnatal mothers experiencing breast engorgement were selected using purposive sampling. Participants received lukewarm water therapy twice daily for three consecutive days. Breast engorgement levels were measured using a standardized Breast Engorgement Scale before and after the intervention. Data were analyzed using descriptive and inferential statistics, with a paired t-test to compare pretest and posttest scores.

Results: The results indicated a significant reduction in breast engorgement levels following the intervention ($p < 0.05$). Mothers reported relief from pain and discomfort, and there was a noticeable improvement in breastfeeding outcomes.

Conclusion: Lukewarm water therapy is an effective, non-invasive method to manage breast engorgement among post-cesarean section mothers. It is recommended as a feasible intervention for improving maternal comfort and

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➤ Received: 06-03-2025 ➤ Accepted: 04-04-2025



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promoting successful breastfeeding. Further studies with larger sample sizes and control groups are suggested to validate these findings.

KEYWORDS

• Lukewarm water compress • Breast engorgement • Primigravida postnatal mothers • Effectiveness • Knowledge improvement

INTRODUCTION

Breastfeeding is widely recognized as the cornerstone of infant nutrition and maternal well-being, offering numerous health benefits for both mother and baby. However, the breastfeeding journey is often accompanied by challenges, one of the most common being breast engorgement.¹ This condition, characterized by painful swelling and firmness of the breasts, frequently occurs during the early postpartum period.

Cesarean section (C-section) deliveries add a layer of complexity to breastfeeding initiation and maintenance, as mothers often experience delayed breastfeeding due to physical discomfort and post-surgical recovery.² This delay can exacerbate milk stasis, increasing the risk of breast engorgement and its associated complications, such as mastitis or reduced milk supply.³

Lukewarm water therapy, a simple and non-invasive intervention, has been proposed as an effective method to alleviate breast engorgement.³ by improving blood circulation, relaxing breast tissue, and promoting milk flow, lukewarm water therapy holds promise as a feasible solution for mothers recovering from C-sections. This study seeks to explore its effectiveness in a focused population to provide evidence-based recommendations for postnatal care.⁴

Approximately 40% of newborns aged 0–6 months are exclusively breastfed, according to the World Health Organization. If all children aged 0–23 months were adequately breastfed, about 8,20,000 children's lives may be spared annually among those under the age of five. Breastfeeding raises IQ, increases attendance at school, and is linked to greater adult earnings. Breastfeeding improves infant growth and lowers health care expenses, which benefits both individual families and the country as a whole.

WHO and UNICEF advise:

- Breastfeeding should begin within an hour of birth.

- Breastfeed exclusively for the first six months of life; and
- At six months, nutritionally adequate and safe complementary (solid) foods should be introduced, along with continued breastfeeding for at least two years. But a lot of babies and kids don't get the best nutrition possible. For instance, between 2007 and 2014, only over 36% of infants ages 0 to 6 months were exclusively breastfed globally.

The guidelines have been updated to take into account the requirements of babies born to mothers living with HIV. With a far lower risk of HIV transmission, antiretroviral medications now enable young children to breastfeed exclusively until they are 6 months old and to continue doing so until they are at least 12 months old 1. of 2007-2014.¹

Under nutrition is estimated to be associated with 2.7 million child deaths annually or 45% of all child deaths. Infant and young child feeding is a key area to improve child survival and promote healthy growth and development. The first 2 years of a child's life are particularly important, as optimal nutrition during this period lowers morbidity and mortality, reduces the risk of chronic disease, and fosters better development overall.

Background of the Study

Breast engorgement is a prevalent condition that arises when milk production exceeds its expression, leading to distended milk ducts, increased vascularization, and inflammation. Left untreated, it can result in pain, difficulty breastfeeding, and potential infections. For mothers recovering from cesarean sections, restricted mobility, delayed breastfeeding, and post-operative stress make them particularly vulnerable to breast engorgement.^{4,5}

Traditional remedies for breast engorgement include cold compresses, massage, and pharmacological interventions. However, these methods may not be suitable or preferred by all mothers, especially those recovering

from surgery. Lukewarm water therapy has emerged as a simple, cost-effective alternative that aligns with the principles of non-invasive and holistic care.⁶

Despite anecdotal evidence supporting its effectiveness, there is a paucity of scientific research on the subject, particularly in Indian settings.⁶ This study aims to address this gap by evaluating the impact of lukewarm water therapy on breast engorgement among C-section mothers aged 20–30 years in a nursing home in New Delhi, thereby contributing to the existing body of knowledge in maternal and child health.^{6,7}

Around 40% of newborns aged 0–6 months are exclusively breastfed, according to the World Health Organization. If all children aged 0–23 months were adequately breastfed, almost 8, 20,000 children's lives may be spared annually among those under the age of five. Breastfeeding raises IQ, increases attendance at school, and is linked to greater adult earnings. Breastfeeding improves infant development and lowers health care expenses, which benefits both individual families and the country as a whole.⁸

An estimated 2.7 million child fatalities each year, or 45% of all child mortality, are thought to be related to under nutrition. One of the most important ways to increase child survival and encourage healthy growth and development is through infant and young child nutrition. A child's first two years of life are especially crucial since during this time, proper nutrition lowers morbidity and mortality, lowers the risk of chronic disease, and promotes better development in general. But a lot of babies and kids don't get the best nutrition possible.⁹ For instance, between 2007 and 2014, only over 36% of infants ages 0 to 6 months were exclusively breastfed globally. The guidelines have been updated to take into account the requirements of babies born to mothers living with HIV. With a far lower risk of HIV transmission, young children can now exclusively breastfeed until they are 6 months old and continue to do so until they are at least 12 months old thanks to antiretroviral medications.¹⁰

Aims

The primary aim of this study is to evaluate the effectiveness of lukewarm water therapy in reducing breast engorgement among postnatal

mothers aged 20–30 years who have undergone cesarean sections in a nursing home in New Delhi.

OBJECTIVES OF THE STUDY

- To assess the level of knowledge regarding breast engorgement among C-section postnatal mothers.
- To evaluate the effectiveness of lukewarm water compress on breast engorgement.
- To find the association between the scores of primigravida postnatal mothers regarding application of lukewarm water compression on breast engorgement with their selected demographic variables.

HYPOTHESIS

Null Hypothesis (H_0): There is no significant difference in the level of breast engorgement among postnatal mothers aged 20–30 years who have undergone cesarean sections before and after receiving lukewarm water therapy in a nursing home in New Delhi.

Alternative Hypothesis (H_1): There is a significant reduction in the level of breast engorgement among postnatal mothers aged 20–30 years who have undergone cesarean sections after receiving lukewarm water therapy in a nursing home in New Delhi.

RESEARCH APPROACH

In the present study an evaluative approach was considered an appropriate research approach for the present study.

Pre-experimental one group pretest- posttest design was adopted for this study.

Table 1: Representation of Research design

Pre-test Knowledge	Structured Teaching Programme	Post-test Knowledge
1 st Day	Same Day	7 th Day
X_1	O	X_2

Pre-test- X_1 , Treatment-O, Post-test- X_2

Here, X_1 is measurement of knowledge before administering Luke warm water.

X_2 is measurement of engorgement after administering Luke warm water.

O is structured teaching Programme

Variables under the study

Independent Variables: Any variable thought to have an impact on the dependent variable is an independent variable. As the researcher, you will adjust this variable to determine if it affects the dependent variable. Luke's warm water is an independent variable in this study.

Dependent Variables: The variable of interest to a researcher is known as the dependent variable. The researcher uses all of their methods to try and measure changes in the dependent variable. The effectiveness of a lukewarm water compress on breast engorgement in primigravida moms is the dependent variable in this study.

MATERIALS AND METHODS

Study Design

This study employed a pre-experimental one-group pretest-posttest design to evaluate the effectiveness of lukewarm water therapy.

Study Setting

The research was conducted in a nursing home in New Delhi that provides postnatal care to mothers who have undergone cesarean sections.

Sample and Sampling Technique

- **Population:** Postnatal mothers aged 20–30 years who have undergone cesarean sections and are experiencing breast engorgement.
- **Sample Size:** 30 participants.
- **Sampling Technique:** Purposive sampling was used to select participants who met the inclusion criteria.

Inclusion Criteria

1. Mothers aged 20–30 years.
2. Postnatal mothers who underwent cesarean delivery.
3. Mothers experiencing moderate to severe breast engorgement.
4. Mothers who were breastfeeding and willing to participate in the study.

Exclusion Criteria

1. Mothers with pre-existing breast conditions (e.g., mastitis or abscess).

2. Those unwilling to provide informed consent.
3. Mothers with contra indications to lukewarm water therapy.

Intervention

- Participants received lukewarm water therapy twice daily for three consecutive days.
- The therapy involved applying warm compresses (37–40°C) to the breasts for 15–20 minutes.

Data Collection Tools

1. **Demographic Questionnaire:** To collect participant details, including age, parity, and breastfeeding history.
2. **Breast Engorgement Scale:** A validated scale was used to assess the severity of breast engorgement before and after the intervention.

Procedure

1. **Pretest:** The level of breast engorgement was assessed using the Breast Engorgement Scale before starting the therapy.
2. **Intervention:** Lukewarm water compresses were applied under supervision.
3. **Post-test:** After three days of therapy, breast engorgement levels were reassessed using the same scale.

Data Analysis

- Descriptive statistics were used to summarize participant demographics.
- Paired t-tests were employed to compare pretest and posttest scores, with a significance level of $p < 0.05$.

Data collection tools / instruments

The purpose of this study was to evaluate how well lukewarm water works for breast engorgement. Thus, the effectiveness of lukewarm water among c-section primigravida postnatal moms was evaluated using a structured knowledge questionnaire and a six-point engorgement scale that were designed and employed for data collection.

1. Selection of the Tool:

- **Validated Breast Engorgement Assessment Scale:** Use an established tool like the **Bristol Breastfeeding**

Assessment Tool (BBAT) or Six-Point Engorgement Scale to assess breast engorgement severity before and after the intervention.

- **Pain Measurement Scale:** Consider using a **Visual Analog Scale (VAS)** or **Numeric Pain Rating Scale (NPRS)** to measure pain levels associated with breast engorgement.
- **Maternal Comfort Scale:** Include a self-reported questionnaire to assess overall comfort and relief after the application of lukewarm water.
- **Demographic and Clinical Data Sheet:** Collect relevant information such as age, parity, type of delivery, lactation status, and breastfeeding practices.

2. Development of the Tool:

- **Ensure Validity and Reliability:** Perform content validation with experts (nurses, lactation consultants, obstetricians) and pilot testing to check the reliability of the tool.
- **Pilot Testing:** Conduct a small-scale trial before full implementation to refine the tool and ensure clarity.
- **Scoring System:** Develop a clear scoring method to quantify breast engorgement severity and effectiveness of the intervention.

Table 1: Frequency and Percentage Distribution of Subjects According to Socio-Demographic Variables (n = 60)

	Frequency	Percent %
Age		
23-25 years	14	23.3
26-28 years	13	21.7
29-30 years	7	11.7
Education		
Primary school	18	30.0
High School	13	21.7
Higher secondary school	18	30.0
Graduate	11	18.3
Religion		
Hindu	29	48.3
Muslim	17	28.3
Sikh	14	23.3

Occupation		
Government	4	6.7
Business	17	28.3
Labourer	20	33.3
House Wife	19	31.7
Locality of House		
Rural Area	21	35.0
Urban Area	39	65.0
Source of Information		
Health Personnel	8	13.3
TV or Radio	12	20.0
News Paper and Magazine	34	56.7
Family Members	6	10.0
Type of Family		
Nuclear Family	22	36.7
Joint Family	11	18.3
Extended Family	27	45.0
Type of Diet		
Vegetarian	19	31.7
Mixed	30	50.0
Eggetarian	11	18.3
Economic Status		
₹ <2000 per month	23	38.3
₹ 2000 to 6000 per month	19	31.7
₹ 6001 top 12000 per month	12	20.0
₹ >12000 per month	6	10.0

Table 2 shows the frequency and percentage distribution of subjects according to selected socio-demographic variables

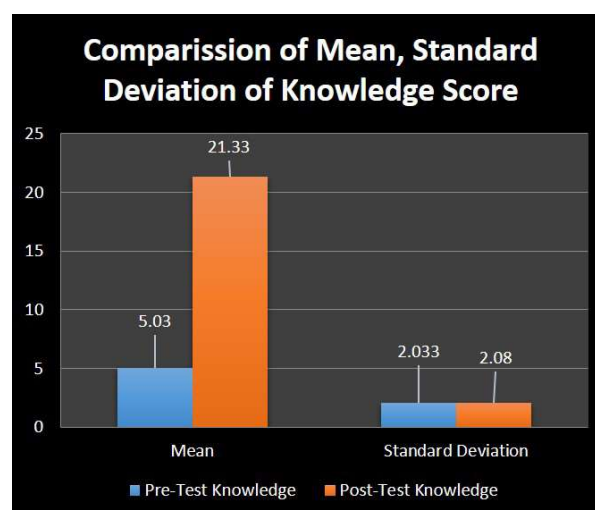


Figure 1: Comparison of Mean, Standard Deviation of Knowledge Score

Table 2: Mean, Mean Difference, Standard Deviation, paired 't' test value of Subjects Related to Knowledge

(n = 60)

Knowledge	Mean	Mean Difference	Standard Deviation	Paired 't' test value	'P' value	Result
Pre-test	5.03	16.3	2.033	42.182 (df = 59)	0.000	Significant
Post-test	21..33		2.080			

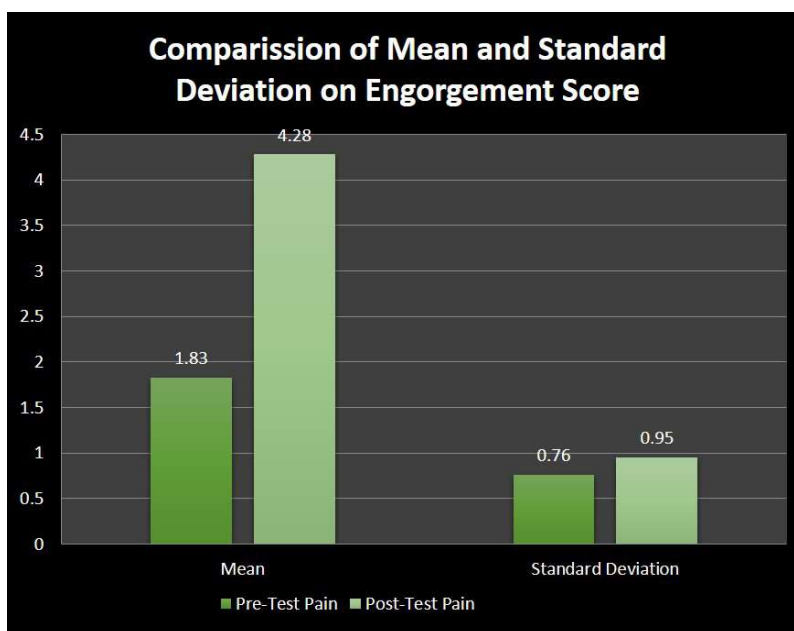
Level of significance at 'P' value < than 0.05

Table 3: Mean, Mean Difference, Standard Deviation, paired 't' test value of Subjects Related to level of engorgement

(n = 60)

Level of Engorgement	Mean	Mean Difference	Standard Deviation	Paired 't' test value	'P' value	Result
Pre-test	4.28	2.45	0.95	16.416 (df = 59)	0.000	Significant
Post-test	1.83		0.76			

Level of significance at 'P' value < than

**Figure 2:** Comparison of Mean, Standard Deviation of Engorgement Score**Table 4:** Level of Association between Post-test Knowledge and selected socio-demographic variables

(n = 60)

Demographic Variables	Options	Post-test Level of Knowledge		Chi-Square Value	'P' Value	Results
		Average	Good			
Age	20-22 years	1	25	1.512 (df = 3)	0.680	Not Significant
		3.8%	96.2%			
	23-25 years	0	14			
		0.0%	100.0%			
	26-28 years	1	12			
		7.7%	92.3%			
	29-30 years	0	7			
		0.0%	100.0%			

Demographic Variables	Options	Post-test Level of Knowledge		Chi-Square Value	'P' Value	Results
		Average	Good			
Education	Primary school	1	17	2.476 (df = 3)	0.480	Not Significant
		5.6%	94.4%			
	High School	0	13			
		0.0%	100.0%			
	Higher secondary school	0	18			
		0.0%	100.0%			
Occupation	Graduate	1	10	4.465 (df = 3)	0.215	Not Significant
		9.1%	90.9%			
	Government	0	4			
		0.0%	100.0%			
	Business	0	17			
		0.0%	100.0%			
Locality of House	Labourer	0	20	0.205 (df = 1)	0.651	Not Significant
		0.0%	100.0%			
	House Wife	2	17			
		10.5%	89.5%			
	Rural Area	1	20			
		4.8%	95.2%			
Source of Information	Urban Area	1	38	2.733 (df = 3)	0.436	Not Significant
		2.6%	97.4%			
	Health Personnel	1	7			
		12.5%	87.5%			
	TV or Radio	0	12			
		0.0%	100.0%			
Religion	News Paper and Magazine	1	33	1.218 (df = 2)	0.544	Not Significant
		2.9%	97.1%			
	Family Members	0	6			
		0.0%	100.0%			
	Hindu	1	28			
		3.4%	96.6%			
Type of Family	Muslim	0	17	2.163 (df = 2)	0.339	Not Significant
		0.0%	100.0%			
	Sikh	1	13			
		7.1%	92.9%			
	Nuclear Family	1	21			
		4.5%	95.5%			
Type of Diet	Joint Family	1	10	4.465 (df = 3)	0.107	Not Significant
		9.1%	90.9%			
	Extended Family	0	27			
		0.0%	100.0%			
	Vegetarian	2	17			
		10.5%	89.5%			
Mixed	0	30	4.465 (df = 3)	0.107	Not Significant	
	0.0%	100.0%				
	Eggetarian	0				11
		0.0%				100.0%

Demographic Variables	Options	Post-Test Level of Knowledge		Chi-Square Value	'P' Value	Results
		Average	Good			
<i>Economic Status</i>	₹ < 2000 per month	0	23	4.737 (df = 3)	0.192	Not Significant
		0.0%	100.0%			
	₹ 20000 to 6000 per month	1	18			
		5.3%	94.7%			
	₹ 6001 top 12000 per month	0	12			
		0.0%	100.0%			
	₹ > 12000 per month	1	5			
		16.7%	83.3%			

Level of significance at 'P' value < than 0.05

Table 5: Level of Association between Post-Test engorgement scores and Socio-Demographic Variables

(n = 60)									
Demographic Variable	Options	Post-Test engorgement scores					Chi-square	'P' Value	Result
		Slight changes in the breast	Firm, no tender breast	Firm, beginning tenderness in breast	Firm, tender	Very firm, very tender			
<i>Age</i>	20-22 years	11	10	3	2	0	13.047 (df = 12)	0.366	Not significant
		42.3%	38.5%	11.5%	7.7%	0.0%			
	23-25 years	5	6	2	1	0			
		35.7%	42.9%	14.3%	7.1%	0.0%			
	26-28 years	8	4	1	0	0			
		61.5%	30.8%	7.7%	0.0%	0.0%			
<i>Education</i>	29-30 years	3	1	2	0	1	12.057 (df = 12)	0.441	Not significant
		42.9%	14.3%	28.6%	0.0%	14.3%			
	Primary school	7	8	2	1	0			
		38.9%	44.4%	11.1%	5.6%	0.0%			
	High School	4	4	3	2	0			
		30.8%	30.8%	23.1%	15.4%	0.0%			
	Higher secondary school	10	6	2	0	0			
		55.6%	33.3%	11.1%	0.0%	0.0%			
	Graduate	6	3	1	0	1			
		54.5%	27.3%	9.1%	0.0%	9.1%			
<i>Occupation</i>	Government	0	2	1	0	1	21.256 (df = 12)	0.047	Significant
		0.0%	50.0%	25.0%	0.0%	25.0%			
	Business	9	3	4	1	0			
		52.9%	17.6%	23.5%	5.9%	0.0%			
	Labourer	9	8	2	1	0			
		45.0%	40.0%	10.0%	5.0%	0.0%			
<i>Locality of House</i>	House Wife	9	8	1	1	0	8.314 (df = 4)	0.081	Not significant
		47.4%	42.1%	5.3%	5.3%	0.0%			
	Rural Area	5	9	5	2	0			
		23.8%	42.9%	23.8%	9.5%	0.0%			
	Urban Area	22	12	3	1	1			
		56.4%	30.8%	7.7%	2.6%	2.6%			

Demographic Variable	Options	Post-Test engorgement scores					Chi-square	'P' Value	Result
		Slight changes in the breast	Firm, no tender breast	Firm, beginning tenderness in breast	Firm, tender	Very firm, very tender			
Source of Information	Health Personnel	2	6	0	0	0	22.277 (df = 12)	0.035	Significant
		25.0%	75.0%	0.0%	0.0%	0.0%			
	TV or Radio	8	2	1	1	0			
		66.7%	16.7%	8.3%	8.3%	0.0%			
Religion	News Paper and Magazine	14	13	5	2	0	6.217 (df = 8)	0.623	Not significant
		41.2%	38.2%	14.7%	5.9%	0.0%			
	Family Members	3	0	2	0	1			
		50.0%	0.0%	33.3%	0.0%	16.7%			
	Hindu	11	12	5	1	0			
		37.9%	41.4%	17.2%	3.4%	0.0%			
	Muslim	8	6	2	1	0			
		47.1%	35.3%	11.8%	5.9%	0.0%			
Type of Family	Sikh	8	3	1	1	1	2.660 (df = 8)	0.954	Not significant
		57.1%	21.4%	7.1%	7.1%	7.1%			
	Nuclear Family	10	8	3	1	0			
		45.5%	36.4%	13.6%	4.5%	0.0%			
	Joint Family	6	4	1	0	0			
		54.5%	36.4%	9.1%	0.0%	0.0%			
Type of Diet	Extended Family	11	9	4	2	1	4.767 (df = 8)	0.782	Not significant
		40.7%	33.3%	14.8%	7.4%	3.7%			
	Vegetarian	8	7	2	2	0			
		42.1%	36.8%	10.5%	10.5%	0.0%			
	Mixed	15	10	4	0	1			
		50.0%	33.3%	13.3%	0.0%	3.3%			
Economic Status	Eggetarian	4	4	2	1	0	21.836 (df = 12)	0.039	Significant
		36.4%	36.4%	18.2%	9.1%	0.0%			
	₹ < 2000 per month	15	4	3	1	0			
		65.2%	17.4%	13.0%	4.3%	0.0%			
	₹ 2000 to 6000 per month	8	6	4	1	0			
		42.1%	31.6%	21.1%	5.3%	0.0%			
	₹ 6001 top 12000 per month	2	8	1	1	0			
		16.7%	66.7%	8.3%	8.3%	0.0%			
	₹ > 12000 per month	2	3	0	0	1			
		33.3%	50.0%	0.0%	0.0%	16.7%			

Level of Significance at 'P' value less than 0.05

RESULTS

The study's findings showed that lukewarm water treatment for breast engorgement was beneficial for postpartum women who had c-sections.

DISCUSSION

1. Compared to the pre-test, the mean post-test knowledge score is higher. The calculated "t" value of 42.1 (p<0.001) indicated that the mean knowledge score before and after the exam differed in a highly significant way.

2. The mean engorgement score after the test is lower than the score before the test. The calculated "t" value of 16.41 ($p < 0.001$) indicated that the mean engorgement score before and after the test differed in a highly significant way. This suggests that for primigravida postpartum moms, the Luke warm water compress is beneficial for breast engorgement.
3. The results of the chi-square test, which was used to determine if the post-test knowledge score and a few chosen demographic characteristics were related, indicated that, at the 0.05 level of significance, there was no significant relationship. The results also demonstrated a substantial correlation between the post-test degree of engorgement score and specific demographic factors, such as economic position and information source.

CONCLUSION

According to the results of the study, postpartum women who had c-sections experienced less breast engorgement when lukewarm water was applied.

Conflict of interest:

There is no conflict of interest

Ethical Clearance: ethical clearance has been taken from hospital ethical committee.

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