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A Comparative Study To Assess The Effectiveness Of Hot Application Vs Reverse Pressure Softening Technique On Breast Engorgement And Latching Among Postpartum Mothers At Selected Hospitals Of Surat District

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Abstract:

Background of the study: Pregnancy and motherhood are very precious gifts for women by God. It is inexpressible experience that women come across during her life time. Puerperium is a period of approximately 6 weeks which commences following completion of 3rd stage of labour. Breast problems can begin immediately after childbirth or at any moment during lactation. Breast engorgement is the painful breast swelling brought on by an abrupt increase in milk volume, which makes it challenging for the baby to latch on to the mother's breast. Breast engorgement may occur if a mother's milk production rate exceeds her milk outflow rate and the mother experiences trouble to satisfy her baby's hunger.

Aim: To assess the effectiveness of Hot application and Reverse pressure softening technique on breast engorgement and latching among postpartum mothers at selected hospitals of Surat district.

Methods: A Pre-experimental two group pre-test post-test research design was used. A total sample of 60 Postpartum mothers were selected using a non-probability sampling technique from selected hospitals of Surat district. From which 30 in experimental group-1 and 30 in experimental group-2. The data were collected using a socio-demographic tool, 6-point breast engorgement scale and latch assessment tool. A Pre-test was conducted to assess the Breast engorgement and latching, followed by an intervention given for two times a day for 2 consecutive days. The post-test was conducted 2 days after 4th intervention to evaluate changes in breast engorgement and latching. Descriptive and inferential statistics, including mean, standard deviation, paired t-test, independent t-test and chi-square test were used to analyse the data.

Result: The mean breast engorgement scores in the hot application group reduced by 1 point on both sides, while in the RPS group the mean reduction was 1.66 on the left and 1.73 on the right breast with $p = 0.000$. For latching, the mean score increased from 1.85 to 6.04 in the hot application group ($t = 28.25$, $p = 0.000$) and from 1.90 to 7.95 in the RPS group ($t = 15.10$, $p = 0.000$). These findings indicate that RPS was more effective in reducing engorgement, whereas hot application produced greater improvement in latching.

Conclusion: The study concluded that the Reverse pressure softening technique was more effective in reducing breast engorgement and latching.

Keywords - Effectiveness, Hot Application, Reverse Pressure Softening Technique, Breast Engorgement, Latching, Postpartum mothers.

INTRODUCTION AND NEED OF THE STUDY

Breastfeeding is universally recognized as the optimal source of nutrition for infants, providing essential nutrients, antibodies and immunological protection that cannot be substituted by artificial feeding. Despite its benefits, postpartum mothers often face challenges that hinder effective breastfeeding.[1] Among these, breast engorgement—a painful swelling of the breasts due to milk stasis—is one of the most common and distressing conditions, affecting approximately 72–85% of primiparous women. Engorgement leads to discomfort, ineffective latching, poor milk transfer and an increased risk of early cessation of breastfeeding.[2]

The data shows that, **Global rate** of breast engorgement is reported as 1:8000 of women found in previous study done in September-October 2020. In **India**, breast engorgement is reported as 1:6500 of women.[3] In **Gujarat State**, breast engorgement is reported as 72-85% of women found in previous study done in September 2024[4]. In **Surat District**, 100% mother had tenderness, 100% had heaviness in breast, 100% had insufficient milk supply, 86.66% had hard mass, 70% mothers had pain in breast, 70% had breast discomfort, 56.67% had excessive hotness, 33.34% had swelling, 20% had redness, 20% had itching on breast, 19.99% had rashes on breast, 9.99% had inverted nipple, 6.66% had burning sensation and 6.66% had over stretching of breast reported in November-December 2021. [5]

Various non-pharmacological methods have been introduced to relieve breast engorgement. Hot application (warm compress) works by promoting vasodilation, enhancing circulation, reducing pain and facilitating milk let-down. In contrast, Reverse Pressure Softening (RPS) is a manual technique that displaces interstitial fluid from the areola, making it easier for the infant to latch effectively. While both methods have shown benefits, there is limited comparative evidence regarding their relative effectiveness. This gap necessitated the present study to provide evidence-based recommendations for clinical practice, particularly in resource-limited settings like Surat district.

THE OBJECTIVES:

1. To assess the level of breast engorgement and latching among the postpartum mothers before and after intervention.
2. To compare the effectiveness of hot application and reverse pressure softening technique on breast engorgement and latching.
3. To find the association between the mean post-test scores of hot application with their selected socio-demographic variables of postpartum mothers.
4. To find the association between the mean post-test scores of reverse pressure softening technique with their selected socio-demographic variables of postpartum mothers.

MATERIALS AND METHODS

A Pre-experimental two-group pre-test post-test research design and quantitative research approach was used, research setting were selected hospitals of surat district. The total sample size of the study was 60 postpartum mothers from which 30 in experimental group-1 and 30 in experimental group-2, which is estimated by power analysis. Purposive sampling technique was used in the study for data collection. Permission and ethical consideration was obtained before data collection. Postpartum mothers who were willing to participate in this study with their consent were included in this study and Postnatal mothers who are suffering from Mastitis, Breast Abscess were excluded from the study.

The tool used for data collection consist of 3 tools. Tool 1 included the socio-demographic data of mother, obstetrical data and lactation related data. Tool 2 included 6-point breast engorgement scale and Tool 3 included latch assessment tool. Based on the inclusion criteria, researcher selected 60 samples for main study among then 30 samples are provided hot application and another 30 samples are provided Reverse pressure softening technique for two times a day for 2 consecutive days. Post test were conducted after 4th intervention on 2nd day for both groups by using the 6-point breast engorgement scale and latch assessment tool.

RESULTS:

Socio-demographic variables of postpartum mother

With regard to age distribution in Group 1, the majority 21(70.0%) of sample belonged to the age group of 18-23 years. In Group 2, 14(46.7%) were in both 18-23 and 24-29 years age group. In terms of religion, in

Group 1, most of the mothers 20(66.7%) were Hindu. In Group 2, 21(70.0%) were Hindu. With regard to area of residence, both groups had the same distribution with 19(63.3%) residing in urban areas. In terms of educational status, in Group 1, majority 18(60.0%) of mothers had primary education. Similarly, in Group 2, 16(53.3%) had primary education. With regard to type of family, in Group 1, the majority 18(60.0%) belonged to joint families. In Group 2, 20(66.7%) were from joint families.

Obstetrical data of postpartum mother

With regard to number of parity, in both groups, the majority of mothers were primigravida 23(76.7%). In terms of mode of delivery, in Group 1, majority 21(70.0%) had undergone LSCS. Similarly, in Group 2, 18(60.0%) had LSCS. With regard to gestational age at the time of delivery, in both groups, the majority 25(83.3%) had term deliveries. In terms of postnatal day, in Group 1, most mothers 21(70.0%) were on their 2nd postnatal day. In Group 2, 15(50.0%) were on the 2nd day. With regard the presence of baby with mother, in Group 1, 30(100.0%) of mothers had their baby with them, whereas in Group 2, 29(96.7%) had their baby with them and only 1(3.3%) did not.

Table:1 Distribution of Postpartum Mothers Based on Their Lactation Data in Experimental Group 1 (Hot Application) Before and After Intervention.

Data related to lactation	Category	Experimental Group-1(Hot application)			
		Pretest		Posttest	
		F	%	F	%
Presence of breast milk secretion (n=30)	Yes	21	70.0%	30	100%
	No	9	30.0%	0	0%
If yes…					
Initiation of breastfeeding (n=21)	Yes	19	90.5%	30	100%
	No	2	9.5%	0	0%
If yes…					
Frequency of feeding (n=19)	As per demand	4	21.1%	0	0%
	Every 2 hours	0	0%	26	86.7%
	Every 4 hours	12	63.1%	4	13.3%
	Every 6 hours	3	15.8%	0	0%
Duration of feeding (n=19)	5 minute	3	15.8%	0	0%
	10 minute	9	47.4%	1	3.3%
	15 minute	7	36.8%	0	0%
	Till baby stop	0	0%	29	96.7%
Position adopted during feed (n=19)	Side lying	17	89.5%	4	13.3%
	Sitting	2	10.5%	26	86.7%
Pattern of breastfeeding at each time (n=19)	Feeding one side breast	13	68.4%	0	0%
	Feeding on both side breast	6	31.6%	30	100%
If No…					
	Yes	0	0%	0	0%

Expression of breast milk (n=2)	No	2	100%	30	100%

Table 2: Distribution of Postpartum Mothers Based on Their Lactation Data in Experimental Group 2 (Reverse Pressure Softening technique) Before and After intervention.

Data related to lactation	Category	Experimental Group-2(Reverse pressure softening technique)			
		Pretest		Posttest	
		F	%	F	%
Presence of breast milk secretion (n=30)	Yes	20	66.7%	30	100%
	No	10	33.3%	0	0%
If yes…					
Initiation of breastfeeding (n=20)	Yes	20	100%	30	100%
	No	0	0%	0	0%
If yes…					
Frequency of feeding (n=20)	As per demand	9	45.0%	0	0%
	Every 2 hours	1	5.0%	30	100%
	Every 4 hours	3	15.0%	0	0%
	Every 6 hours	7	35.0%	0	0%
Duration of feeding (n=20)	5 minute	1	5.0%	0	0%
	10 minute	11	55.0%	0	0%
	15 minute	8	40.0%	0	0%
	Till baby stop	0	0%	30	100%
Position adopted during feed (n=20)	Side lying	17	85.0%	1	3.3%
	Sitting	3	15.0%	29	96.7%
Pattern of breastfeeding at each time (n=20)	Feeding one side breast	0	0%	2	6.7%
	Feeding on both side breast	20	100%	28	93.3%
If No…					
Expression of breast milk	Yes	0	0%	0	0%
	No	10	100%	30	100%

Table 3: Level of Breast Engorgement in Experimental Group 1 (Hot Application) and Experimental Group 2 (Reverse Pressure Softening Technique) Before and After Intervention.

Level of Breast Engorgement in Pretest and Posttest		Hot Application				Reverse Pressure Softening Technique			
		Pretest		Posttest		Pretest		Posttest	
		F	%	F	%	F	%	F	%
Breast Engorgement Left Breast	No breast engorgement	0	0%	0	0%	0	0%	16	53.3%
	Mild breast engorgement	23	76.7%	25	83.3%	21	70.0%	14	46.7%
	Moderate breast engorgement	7	23.3%	5	16.7%	9	30.0%	0	0%
Breast Engorgement Right Breast	No breast engorgement	0	0%	0	0%	0	0%	18	60.0%
	Mild breast engorgement	22	73.3%	29	96.7%	22	73.3%	12	40.0%
	Moderate breast engorgement	8	26.7%	1	3.3%	8	26.7%	0	0%

It can be interpreted that the **Reverse Pressure Softening technique** was more effective in reducing breast engorgement completely (more mothers achieved "no engorgement" status), compared to Hot Application where none achieved complete relief post-intervention.

Table 4: Distribution of Postpartum mothers according to the Level of Breast Latching in Experimental Group 1 (Hot Application) and Experimental Group 2 (Reverse Pressure Softening Technique) Before and After Intervention

Latching Level in Pretest and Posttest	Hot Application				Reverse Pressure Softening Technique			
	Pretest		Posttest		Pretest		Posttest	
	F	%	F	%	F	%	F	%
Poor Latching	20	95.2%	0	0%	20	100%	0	0%
Moderate Latching	1	4.8%	1	3.3%	0	0%	12	40%
Good Latching	0	0%	29	96.7%	0	0%	18	60%
Total	**21**	**100%**	**30**	**100%**	**20**	**100%**	**30**	**100%**

These results highlight that while both interventions were effective in improving latching, the hot application method demonstrated a greater impact, with almost all mothers achieving good latching compared to the reverse pressure softening technique.

Table 5: Mean, median, mode, SD, range of breast engorgement score of group-1.

Pretest and posttest Breast Engorgement	Experimental Group-1 (Hot Application)				
	Mean	SD	Median	Mode	Range
Pretest Breast Engorgement Left Side	3.07	0.640	3	3	2-4
Pretest Breast Engorgement Right Side	3.23	0.504	2	2	1-3
Posttest Breast Engorgement Left Side	2.07	0.640	3	3	2-4
Posttest Breast Engorgement Right Side	2.23	0.504	2	2	1-3
Pretest Latching (n_1= 21)	1.85	1.15	2	2	0-4
Posttest Latching	6.04	0.804	6	6	5-8

It is evident from data that there was a significant reduction in breast engorgement and improvement in latching in group 1.

Table 6: Mean, median, mode, SD, range of breast engorgement score of group-2.

Pretest and posttest Breast Engorgement	Experimental Group-2 (Reverse Pressure Softening Technique)				
	Mean	SD	Median	Mode	Range
Pretest Breast Engorgement Left Side	3.13	0.681	3	3	2-4
Pretest Breast Engorgement Right Side	1.47	0.507	1	1	1-2
Posttest Breast Engorgement Left Side	3.13	0.629	3	3	2-4
Posttest Breast Engorgement Right Side	1.40	0.498	1	1	1-2
Pretest Latching	1.90	0.96	2	2	0-3
Posttest Latching	7.95	1.46	8	8	5-10

It is evident from data that there was a significant reduction in breast engorgement and improvement in latching in group 2.

Table 7: Significance of mean scores of breast engorgement and latching in Group-1. (n_1 = 30, n_2 = 30)

Paired t test Hot Application	Pretest		Posttest		Mean Difference	Paired t test	Sig. Value	Df	Table Value
	Mean	Std. Deviation	Mean	Std. Deviation					
Breast Engorgement Left Side	3.06	.639	2.06	.639	01	Nill	Nill	29	Nil
Breast Engorgement Right Side	3.23	.504	2.23	.504	01	Nill	Nill	29	Nil
Latching	1.85	1.15	6.04	.804	**4.19**	**28.25**	**0.000 S**	20	2.086

df= 29, P value= <0.05 at 0.05 level of significance

In the experimental group 1 increased from 1.85 at pre-test to 6.04 at post-test, with a mean difference of 4.19. The calculated t value was 28.25 at 20 degree of freedom, which is greater than the table value of 2.08 at 0.05 level of significance. Hence, the null hypotheses is rejected and the research hypotheses was accepted. The p-

value was 0.000 less then 0.05, indicating that the difference between pre-test and post-test score was highly effective in improving the latching score in experimental group 1. This means that hot application was highly effective in improving the latching score in experimental garoup-1.

Table 8: Significance of mean scores of breast engorgement and latching in group-2. (n_1 = 30, n_2 = 30)

Paired t test	Pretest		Posttest		Mean Difference	Paired t test	Sig. Value	df	Table Value
	Mean	Std. Deviation	Mean	Std. Deviation					
Breast Engorgement Left Side	3.13	0.681	1.46	0.507	1.66	**19.09**	0.000 **S**	29	2.045
Breast Engorgement Right Side	3.13	0.681	1.40	0.498	1.73	**21.10**	0.000 **S**	29	2.045
Latching	1.90	0.96	7.95	1.46	6.05	**15.10**	0.000 **S**	19	2.093

df= 29, P value= <0.05 at 0.05 level of significance

Interpretation: The findings from Table indicate that the **Reverse Pressure Softening technique was highly effective in significantly reducing breast engorgement and improving latching among Postpartum mothers.** All p-values were less than 0.05, proving that the results are statistically significant.

Table 9: Significance of comparing mean scores of breast engorgement and latching between the two experimental groups before and after interventions. (n_1 = 30, n_2 = 30)

Independent Samples Test	Independent Samples t-test for Equality of Means									
	Group	Mean	SD	Mean Difference	t-test	df	Table Value	Sig value	Confidence Interval	
									Lower	Upper
Pretest Breast Engorgement Left Side	Group-1	3.07	0.64	.067	.391	58	2.000	.697 NS	.408	.2749
	Group-2	3.13	0.68							
Pretest Breast Engorgement Right Side	Group-1	3.23	0.50	.100	.680	58	2.000	.499 NS	.194	.3945
	Group-2	3.13	0.63							
Posttest Breast Engorgement Left Side	Group-1	2.07	0.64	.600	**4.025**	**58**	**2.000**	**.000 S**	.301	.8984
	Group-2	1.47	0.51							
Posttest Breast Engorgement Right Side	Group-1	2.23	0.50	.833	**6.440**	**58**	**2.000**	**.000 S**	.574	1.092
	Group-2	1.40	0.50							

Pretest Latching	Group-1	1.86	1.15	0.042	0.12	39	2.000	0.898NS	.7169	.6312
	Group-2	1.90	0.97							
Posttest Latching	Group-1	6.05	0.80	**1.90**	**5.17**	**39**	**2.000**	**0.000** **S**	2.645	1.159
	Group-2	7.95	1.47							

df= 58, df= 39, P value= <0.05 at 0.05 level of significance

Interpretation: The **Reverse Pressure Softening technique (Experimental Group 2)** showed **greater improvement** in **reducing breast engorgement** and **enhancing latching** among Postpartum mothers compared to the **Hot Application (Group 1)**.

- **Association between hot application post-test score of breast engorgement of Postpartum mothers with their selected socio-demographic variables.**

There was a significant association between No. of parity ($\chi^2 = 4.509$, p=0.034) with post-test hot application scores. However there was no any significant association found with other variables.

- **Association between hot application post-test score of Breast Latching of Postpartum mothers with their selected socio-demographic variables.**

There was a significant association between age of mother ($\chi^2 = 14.483$, p=0.001) with post-test latching scores. However there was no any significant association found with other variables.

- **Association between Reverse Pressure Softening technique post-test score of breast engorgement and Breast Latching of Postpartum mothers with their selected socio-demographic variables.**

There was no significant association between the reverse pressure softening technique post-test scores of participants regarding breast engorgement, latching and selected socio-demographic variable.

DISCUSSION

Group-1: The mean pre-test left side breast engorgement score is 3.06 (SD= 0.639) which is reduced to 2.06 (SD=0.639) in the post test left side breast engorgement score with mean difference of 01 and on right side breast engorgement score is 3.23 (SD= 0.504) which is reduced to 2.23 (SD=0.504) in the post test right side breast engorgement score with mean a mean difference of 01.

The mean pre-test latching score is 1.85 (SD= 1.15) which is improved to 6.04 (SD=0.804) in the post test left side breast engorgement score with mean difference of 4.19 and calculated t value 28.25 (df=20, p=0.000), indicating a statistically significant improvement in latching. This indicate that hot application was highly effective in improving latching.

The present study finding is supported by a study conducted by **Patel V, et. al. (2023)** on a study to assess the effectiveness of warm compression on breast engorgement among post natal mothers. The findings of the study revealed that, in pretest mean breast engorgement score 4.13 (SD=1.32) and in post test mean breast engorgement score 2.0 (SD = 0.90), mean difference 2.13. The calculated t value is 4.156 with 22 degree of freedom and the p- value was 0.001. Since the p-value is less than 0.05, the result is statistically significant.[6]

Group-2: The mean left side and on right side breast engorgement score before the reverse pressure softening technique was 3.13 (SD=0.681). After the intervention, the mean left side breast engorgement score increased to 1.46 (SD= 0.507) and on right side breast engorgement score increased to 1.40 (SD=0.498). The mean difference (reduction) score is 1.66 in left side breast engorgement with calculated t value is 19.09 with 29 degree of freedom and the p- value was 0.000 and 1.73 in right side breast engorgement with calculated t

value is 21.10 with 29 degree of freedom and the p- value was 0.000. Since the p-value is less than 0.05, the result is statistically significant.

The mean latching score before the reverse pressure softening technique was 1.90 (SD=0.96). after the intervention, the mean latching score increased to 7.95(SD= 1.46). The mean difference (improvement) score is 6.05. The calculated t value is 15.10 with 19 degree of freedom and the p- value was 0.000. Since the p-value is less than 0.05, the result is statistically significant. This indicate that the reverse pressure softening technique was highly effective in reducing breast engorgement and improving the latching.

The present study finding is supported by a study conducted by **Pradnya Vhasale, et. al. (2025)** on Effectiveness of Reverse Pressure Softening Technique on Breast Engorgement and Breast Feeding Among Post-Natal Mothers. The findings of the study revealed that, the pretest mean score breast engorgement was 3 (SD= 1.06) and the post-test mean score was 2.34 (SD= 0.89). The mean difference score was 0.66. The calculated paired 't' test value of t = 3.347 and p value was 0.0057, which was found to be statistically significant at $p<0.05$ and pretest mean score of breastfeeding 11.96 (SD= 1.06) and the posttest mean score 25.1 (SD= 0.61). The mean difference score was 13.14. The calculated paired 't' test value of t = 28.204 and p value was 0.001, which was found to be statistically significant at $p<0.05$.[7]

CONCLUSION

Both interventions, hot application and reverse pressure softening, were found to be effective in managing breast engorgement and improving latching. RPS demonstrated greater effectiveness in reducing engorgement, whereas hot application provided superior improvement in latching. These interventions are easy to administer, cost-effective, and suitable for routine postnatal nursing care.

LIMITATION

- Small sample size may not fully represent the wider population of postpartum mothers.
- It was conducted only among the postpartum mother with breast engorgement in SMIMER hospital Surat, so the result may not apply to other settings.
- The study also relied on self-reported measures of data, which may have some bias.
- The hot application was limited to 10 minutes and reverse pressure softening technique was limited to 6 minutes for 2 times in a day for 2 days.
- Some mothers could not be assessed for latching in pretest due to absence of milk secretion.

RECOMMENDATION:

- On the basis of finding from the study that has been conducted certain recommendation have been made for future studies.
- Conduct similar studies with larger sample sizes and in different geographic regions for wider generalization.
- A comparative study can be conducted in different hospitals and community settings.
- A study can be conducted focusing on mother's knowledge, attitude and practices regarding self-management of breast engorgement and latching.
- A similar study can be repeated with inclusion of counselling and health education sessions to assess combined effectiveness.
- Reverse pressure softening technique can be incorporate into routine postnatal care.
- It is recommended that teach nursing staff and use the reverse pressure softening technique regularly, as it helps mothers relive engorgement quickly and supports successful latching.

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