



# **Effectiveness of Chilled Cabbage Leaves Versus Hot Application on Breast Engorgement among Postnatal Mothers in Selected Hospitals of Vadodara, Gujarat, India**

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

**Background of the study:** Breast feeding is important imperious in the mother's life. Breast milk may be complete healthy and salubrious supplement for the baby to help of the conjointly growth and development [1]. Breast engorgement causes discomfort and tenderness and pain that affect breastfeeding mothers early in the postpartum. The breast engorgement is one of the main factors contributing to early interruption of breastfeeding. Very few researches have been proven to monitor the effect of cabbage leaves application on breast engorgement [2].

**Methodology:** A quasi-experimental design two group pretest posttest design was used. A conceptual framework of Imogene king goal attainment model (1981) used for the conceptualization of the study. Total samples of 40 postnatal mothers were selected for the study using non probability purposive sampling technique. The samples divided in two experimental groups i.e. 20 in chilled cabbage leaves and 20 in hot application (temperature 43-46 degree Celsius - and tool used sociodemographic, pain scale & breast engorgement checklist and post test data collected after the intervention on 3<sup>rd</sup> day.

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**Results:** Both the intervention, chilled cabbage leaves and hot application were effective and reduced pain in postnatal mothers ( $p=0.001^*$ ) at  $p<0.05$  level. In chilled cabbage leaves & hot application are equally effective in reduced breast engorgement in postnatal mothers ( $p=0.001^*$ ) at  $p<0.05$  level.

**Conclusion:** Findings of chilled cabbage leaves and hot application were effective and reduced pain and breast engorgement among postnatal mothers.

*Keywords: Chilled cabbage; hot application; breast engorgement; postnatal mothers.*

## 1. INTRODUCTION

The Breast engorgement is causes discomfort and tenderness and pain that have an effect on breastfeeding mothers early within the postnatal period. Engorgement is one of the most serious causal problems for the first interruption of breastfeeding, only a few researches are evidenced to watch the result of cabbage leaves application on breast engorgement [2]. According to the world bank female, population in India 48.0 % 2020 [3]. As per the estimated population of female in Gujrat 2021 is 36.714,10 [4]. According to the world bank health organization 2017 MMR 145 by 2021 [5]. According to international institute for population sciences engorgement happens in 72 to 78 shares of postpartum mothers among each 6 to 10 woman suffer with breast engorgement [6].

### 1.1 Objectives of the Study

- 1) Assess the level of breast engorgement among postnatal mothers.
- 2) Assess the effectiveness of chilled cabbage group on breast engorgement among postnatal mothers as measured by pain scale and breast engorgement checklist.
- 3) Assess the effectiveness of hot application group on breast engorgement among postnatal mothers as measured by pain scale and breast engorgement checklist.
- 4) Compare the effect of chilled cabbage leaves group versus hot application group on breast engorgement.
- 5) Find out the association between pre-intervention levels of breast engorgement of postnatal mothers of both chilled cabbage leaves group hot application group with sociodemographic variables of postnatal women.

### 1.2 Hypotheses

**H<sub>1</sub>.** There will be significant difference between mean pretest and posttest breast engorgement

score after chilled cabbage leaves group among postnatal mothers.

**H<sub>2</sub>.** There will be significant difference between mean pretest and posttest breast engorgement score after hot application group among postnatal mothers.

**H<sub>3</sub>.** There will be significant difference between in mean post-test breast engorgement score after chilled cabbage leaves group versus hot application group among postnatal mothers.

**H<sub>4</sub>.** There will be significant relationship between pre intervention breast engorgement score in chilled cabbage leaves group and hot application group with the selected sociodemographic variables among postnatal mothers.

## 2. METHODOLOGY

### 2.1 Research Approach

Quantitative research approach

### 2.2 Research Design

Quasi-experimental two group pretest posttest design. Investigator administration the chilled cabbage leaves which were breezed 20-30 minute before applying in a day 3 times for 3 days and hot application compress using the warm moist sponge cloth in a day 3 times and continues for 3 days.

#### 2.2.1 Variable under study

**Independent variable:** chilled cabbage leaves & hot application

**Dependent variable:** breast engorgement

**Demographic variables:** Age, education, occupation, religion, residency, type of family, Food habits, Mode of delivery, Number of pregnancies (including present pregnancy), Time of initiation of breast feeding

**Research Setting:** Study was conducted in Parul Sevashram hospital Waghodia Vadodara.

**population:** Postnatal mothers

**Sample and Sampling Technique:** the sample was selected using non probability purposive sampling technique. In this study sample size consisted of forty (40) mothers. The sample was divided in to two groups. About 20 postnatal mothers were assigned in chilled cabbage leaves group and 20 mothers in hot application group.

### 2.2.2 Selection criteria for sample

**Inclusion criteria:** Postnatal women

Who have had a full term delivery, who have delivered within five days period, having breast engorgement, who are willing to participate in study and who breast feed their baby.

**Exclusion criteria:** diagnosed to have breast complication such as cracked nipple, mastitis, Breast abscess, diagnosed to have allergy to cabbage leaves, taking pharmacology & nonpharmacological treatment of breast engorgement.

### 2.2.3 Data collection tool/ technique

Self-administration questioner

**Part 1:** The investigator constructed this tool to collect the background data of the study subjects and to identify the influence of sample characteristics with the development of breast engorgement. Demographic proforma consist of 10 items includes Age, Education status, occupation status, religion, residency, type of family, food habits, mode of delivery, number of pregnancies, frequency of feeding.

**Part- 2 Breast engorgement check list.** Breast engorgement checklist consist of 5 items includes redness, warmth, hardness, swelling, lactation.

### Part-3 Numerical pain rating scale:

It is standardized numerical pain rating scale to assess the level of pain in breast engorgement.

## 4. RESULTS AND DISCUSSION

### 4.1 Section I:

Table 1 depicts the frequency and percentage distribution of the demographic variables of

postnatal mothers. According to their age in chilled cabbage leaves group majority 8(40%) were in 26-30 years of age. In hot application group majority 7(35%) were in 26-30 years of age.

Data on educational status of postnatal mothers revealed that in chilled cabbage leaves group maximum 7(35%) were had up to primary education, in hot application group maximum 6(30%) were had up to primary education.

As per occupational status of postnatal mothers in chilled cabbage leaves group majority 9(45%) were home worker. In hot application group majority 7(35%) were home worker, 7(35%) were private employed.

With regard to religion of postnatal mothers in chilled cabbage leaves group maximum 15(75%) belongs to Hindu. In hot application group maximum 12(60%) belongs to Hindu.

Data on residency of postnatal mothers showed that in chilled cabbage leaves group majority 11(55%) were living in rural area. In hot application group majority 12(60%) were living in urban area.

According to type of family of postnatal mothers in chilled cabbage leaves group majority 14(70%) were living in nuclear family. In hot application group majority 12(60%) were living in joint family.

As per food habits of postnatal mothers in chilled cabbage leaves group maximum 10 (50%) were vegetarian. In hot application group maximum 9(45%) were vegetarian.

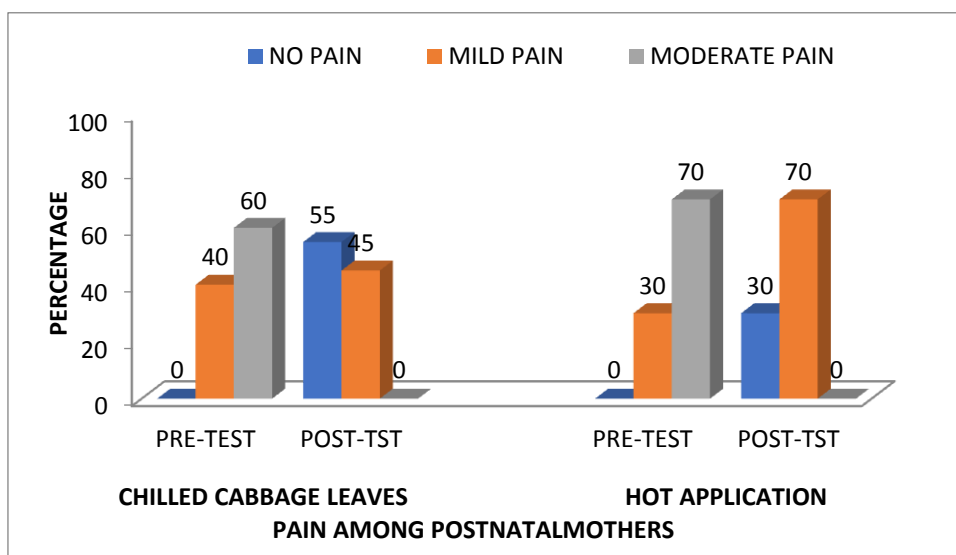
With regard to mode of delivery of postnatal mothers in chilled cabbage leaves group majority 10(50%) had lower segment caesarean section. In hot application group majority 9(45%) had lower segment caesarean section, 9(45%) had normal vaginal delivery.

According to number of pregnancies of postnatal mothers in chilled cabbage leaves group maximum 10(50%) had two pregnancies. In hot application group 10(50%) had two pregnancies.

With regard to time of initiation of breast feeding of postnatal mothers in chilled cabbage leaves group majority 9(45%) had initiated breast feeding within one hour of delivery. In hot application group majority 13(65%) had initiated breast feeding within one hour of delivery.

**Table 1. Frequency and percentage distribution of socio-demographic in postnatal mothers n=40**

Demographic Variables	Chilled cabbage leaves group n=20		Hot application group n=20	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
<b>1. Age in years</b>				
a.18-20 years	2	10	2	10
b.21-25 years	6	30	5	25
c.26-30 years	8	40	7	35
d.31-35 years	4	20	6	30
<b>2. Education status</b>				
a.no formal education	1	5	1	5
b. primary education	7	35	6	30
c. secondary education	6	30	5	25
d. higher secondary	3	15	4	20
e. Graduation	3	15	4	20
<b>3. Occupation status</b>				
a. home worker	9	45	7	35
b. government employed	2	10	2	10
c. Self-employed	6	30	4	20
d. private employed	3	15	7	35
<b>4. Religion</b>				
a. Hindu	15	75	12	60
b. Christian	2	10	3	15
c. Muslim	3	15	5	25
<b>5. Residency</b>				
a. Urban	9	45	12	60
b. Rural	11	55	8	40
<b>6. Type of family</b>				
a. Nuclear	14	70	8	40
b. Joint	6	30	12	60
<b>7. Food habits</b>				
a. Vegetarian	10	50	9	45
b. non-vegetarian	4	20	3	15
c. Mixed	6	30	8	40
<b>8. Mode of delivery</b>				
a. Normal vaginal delivery	9	45	9	45
b. Lower segment caesarean section	10	50	9	45
c. Forceps delivery	0	0	1	5
d. Ventouse delivery	1	5	1	5
<b>9. Number of pregnancies (including present pregnancy)</b>				
a. One	6	30	6	30
b. Two	10	50	10	50
c. 3 or more	4	20	4	20
<b>10. Time of initiation of breast feeding</b>				
a. Within half an hour of delivery	3	15	2	10
b. Within one hour of delivery	9	45	13	65
c. Within two hours of delivery	7	35	5	25
d. After 2 hours	1	5	0	0

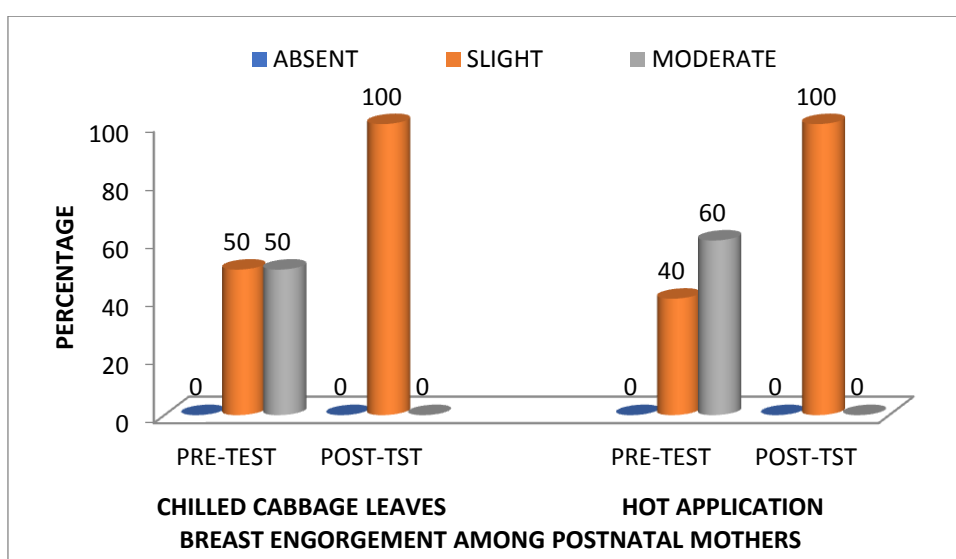


**Fig. 1. Distribution of pre-test and post-test level of pain among postnatal mothers in chilled cabbage leaves group and hot application group**

**4.2 Section II:**

Fig 1. Results showed that in chilled cabbage leaves group pre-test majority 12(60%) had moderate pain and 8(40%) had mild pain while in post-test majority 11(55%) had no pain and 9(45%) had mild pain. In hot application group maximum 14(70%) had moderate pain and 6(30%) had mild pain while in post-test majority 14(70%) had mild pain and 6(30%) had no pain.

Fig. 2. Results showed that in chilled cabbage leaves group pre-test majority 10(50%) had slight breast engorgement and 10(50%) had moderate breast engorgement while in post-test all the postnatal mothers 20(100%) had slight breast engorgement. In hot application group maximum 12(60%) had moderate breast engorgement and 8(40%) had slight breast engorgement while in post-test majority all the postnatal mothers 20(100%) had slight breast engorgement



**Fig. 2. Distribution of pre-test and post-test level of breast engorgement among postnatal mothers in chilled cabbage leaves group and hot application group**

### 4.3 Section III

Fig. 3. Illustrates to evaluate the effect of chilled cabbage leaves group and hot application group on pain among postnatal mothers. In chilled cabbage leaves group pre-test mean pain score was  $4.60 \pm 1.142$  and post-test mean pain score was  $0.55 \pm 0.686$  with mean difference of 4.05. The mean pre-test and post-test pain score was tested by using paired t test with obtained ( $t=15.80$ ,  $df=19$ ,  $p=0.001$ ) was statistically

significant at  $p < 0.05$  level. In hot application group pre-test mean pain score was  $4.95 \pm 0.999$  and post-test mean pain score was  $0.80 \pm 0.616$  with mean difference of 4.15. The mean pre-test and post-test pain score was tested by using paired t test with obtained ( $t=21.20$ ,  $df=19$ ,  $p=0.001^*$ ) was statistically significant at  $p < 0.05$  level. A hence posttest mean lower than pretest mean.  $H_1$ ,  $H_2$  Hence research hypotheses accepted.

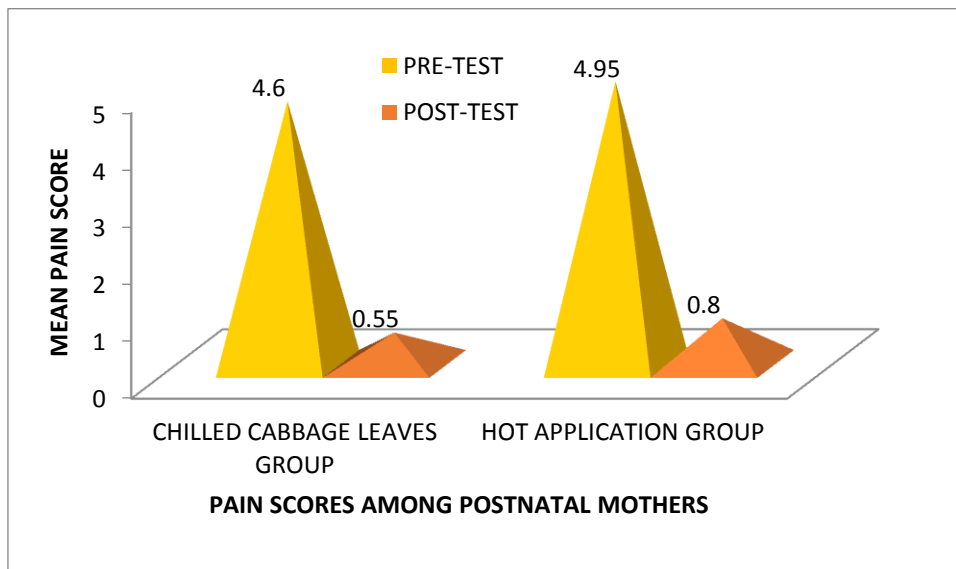


Fig. 3. Distribution of mean and SD of pain score of postnatal mothers in chilled cabbage leaves group and hot application group

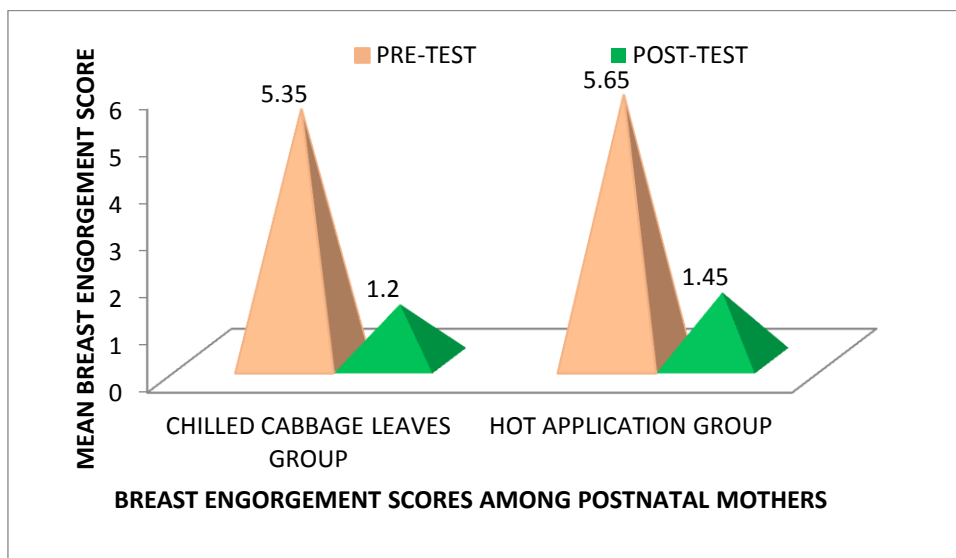


Fig. 4. Distribution of mean and SD of breast engorgement score of postnatal mothers in chilled cabbage leaves and hot application

Fig. 4. Illustrates to evaluate the effect of chilled cabbage leaves group and hot application group on breast engorgement among postnatal mothers. In chilled cabbage leaves group pre-test mean breast engorgement score was  $5.35 \pm 1.137$  and post-test mean breast engorgement score was  $1.20 \pm 0.410$  with mean difference of 4.15. The mean pre-test and post-test breast engorgement score was tested by using paired t test with obtained ( $t=15.70$ ,  $df=19$ ,  $p=0.001$ ) was statistically significant at  $p<0.05$  level. In hot application group pre-test mean breast engorgement score was  $5.65 \pm 1.089$  and post-test mean breast engorgement score was  $1.45 \pm 0.510$  with mean difference of 4.20. The mean pre-test and post-test breast engorgement score was tested by using paired t test with obtained ( $t=19.74$ ,  $df=19$ ,  $p=0.001$ ) was statistically significant at  $p<0.05$  level. A hence posttest mean lower than pretest mean. Hence are research hypotheses  $H_1$ ,  $H_2$  accepted.

**4.4 Section: IV**

Table 2 depicts the comparison of effect of chilled cabbage leaves group and hot application group on pain and breast engorgement among postnatal mothers. In chilled cabbage leaves group mean post-test pain score was  $0.55 \pm 0.686$  and in hot application group mean post-test pain score was  $0.80 \pm 0.616$  with mean difference of 0.25. The mean post-test pain score between chilled cabbage leaves application and hot application group was tested by using unpaired t test with obtained ( $t=1.213$ ,  $df=38$ ,  $p=0.233$ ) was statistically non-significant at  $p<0.05$  level. In chilled cabbage leaves group mean post-test breast engorgement score was  $1.20 \pm 0.410$  and in hot application group mean post-test breast engorgement score was  $1.45 \pm 0.510$  with mean difference of 0.25. The mean post-test breast engorgement score between chilled cabbage

leaves group and hot application group was tested by using unpaired t test with obtained ( $t=1.707$ ,  $df=38$ ,  $p= 0.096$ ) was statistically significant at  $p<0.05$  level [7,8].

**4.5 Section V:**

Association between pre-test levels of pain of postnatal mothers in chilled cabbage leaves group and hot application with their selected demographic variables which was tested by using chi-square test. The chi square values showed that age  $X^2 = 5.938$  &  $X^2=3.107$  , educational status  $X^2 = 5.714$  &  $X^2=0.442$  , occupational status  $X^2 = 2.407$  &  $X^2=4.508$  , religion  $X^2= 1.667$  &  $X^2=0.397$  , residency  $X^2= 0.135$  &  $X^2= 0.357$ , type of family  $X^2= 0.357$  &  $X^2= 3.220$ , food habits  $X^2= 2.569$  &  $X^2= 2.615$ , mode of delivery  $X^2= 0.741$ &  $X^2= 3.669$ , number of pregnancy  $X^2= 0.625$  &  $X^2= 1.270$  and time of initiating breast feeding  $X^2= 2.011$  &  $X^2= 1.099$  of postnatal mothers were statistically found non-significant association at  $p<0.05$  level with pre-test level of pain.

The association between pre-test level of breast engorgement of postnatal mothers in chilled cabbage leaves and hot application group with their selected demographic variables was tested by using chi-square test. The chi square values showed that age  $X^2= 3.001$  &  $X^2= 4.514$ , educational status  $X^2= 7.905$  &  $X^2= 7.153$ , occupational status  $X^2= 2.005$  &  $X^2= 0.506$ , religion  $X^2= 2.400$  &  $X^2= 0.069$ , residency  $X^2= 0.202$  &  $X^2= 1.035$ , type of family  $X^2= NA$  &  $X^2= 1.746$ , food habits  $X^2= 1.667$  &  $X^2= 2.011$  , mode of delivery  $X^2= 1.111$  &  $X^2= 4.259$ , number of pregnancy  $X^2= NA$  &  $X^2= 0.278$  and time of initiating breast feeding  $X^2= 1.587$  &  $X^2= 2.179$  of postnatal mothers were statistically found non-significant association at  $p<0.05$  level with pre-test level of breast engorgement.

**Table 2. Compare the effect of chilled cabbage leaves group and hot application group on pain and breast engorgement among postnatal mothers n=40**

Post-test Comparison		Mean	SD	Mean D	t value	df	p value
Pain	Cabbage leaves group	0.55	0.686	0.25	1.213	38	0.233 <sup>NS</sup>
	Hot application group	0.80	0.616				
Breast engorge ment	Cabbage leaves group	1.20	0.410	0.25	1.707	38	0.096
	Hot application group	1.45	0.510				

## 4.6 Discussion

The first objective of the study was to assess the level of pain and breast engorgement among postnatal mothers.

Results on pain showed that in chilled cabbage leaves group pre-test majority 12(60%) had moderate pain and 8(40%) had mild pain while in post-test majority 11(55%) had no pain and 9(45%) had mild pain. In hot application group maximum 14(70%) and 6(30%), 14(70%) ,and 6(30%).

Results on breast engorgement showed that in chilled cabbage leaves group pre-test majority 10(50%) had slight breast engorgement and 10(50%) had moderate breast engorgement while in post-test all the postnatal mothers 20(100%) had slight breast engorgement. In hot application group maximum 12(60%) 8(40%), 20(100%).

Similar study was carried out by Rajni Sharma conducted a study to assess the effectiveness of chilled cabbage leaf application and Hot application on pain and breast engorgement among post-partum women. Results on pain showed that in chilled cabbage leaf group pre-test majority 85.9% had pain and in post-test only 13% had pain where as in hot application group pre-test majority 87% had pain and in post-test 15% had pain. Results on breast engorgement revealed that in chilled cabbage leaf group majority 80% had breast engorgement and in post-test 10% had breast engorgement, while in hot application group maximum 78% had breast engorgement and in post-test 12% had breast engorgement [9].

The second objective of the study was to evaluate the effect of chilled cabbage leaves Versus hot application on pain and breast engorgement among postnatal mothers.

In chilled cabbage leaves group pre-test mean pain score was  $4.60 \pm 1.142$  and post-test mean pain score was  $0.55 \pm 0.686$  with mean difference of 4.05. The mean pre-test and post-test pain score was tested by using paired t test with obtained ( $t=15.80$ ,  $df=19$ ,  $p=0.001$ ) was statistically significant at  $p<0.05$  level. In hot application,  $4.95 \pm 0.999$  and  $0.80 \pm 0.616$  with 4.15 ( $t=21.20$ ,  $df=19$ ,  $p=0.001$ ) was statistically significant at  $p<0.05$  level.

Boi B, Koh S, Gail D (2012) conducted a study to assess the effectiveness of cabbage leaf

application on pain and hardness in breast engorgement among post-partum women. Results showed that experimental group receiving cabbage leaf treatment improved from a mean score of 5.17 (70%) to 3.02 (20%) significant at ( $p = <0.001$ ). Statistically significant reduction in pain scores from 1.8 points (30%) with cabbage leaf and 2.2 points (39%) with gel packs at ( $p=0.0001$ ) [10].

In chilled cabbage leaves group pre-test mean breast engorgement score was  $5.35 \pm 1.137$  and post-test mean breast engorgement score was  $1.20 \pm 0.410$  with mean difference of 4.15. The mean pre-test and post-test breast engorgement score was tested by using paired ( $t=15.70$ ,  $df=19$ ,  $p=0.001$ ) was statistically significant at  $p<0.05$  level. In hot application,  $.65 \pm 1.089$  and  $1.45 \pm 0.510$  with mean difference of 4.20. The ( $t=19.74$ ,  $df=19$ ,  $p=0.001$ ) was statistically significant at  $p<0.05$  level.

Study findings were supported by Arora S, Vasta M, Dadhwal V conducted a study to compare cabbage leaves and hot application on pain and breast engorgement among postnatal mothers. Results on pain showed that in experimental group mean score was  $6.14 \pm 1.2$  and in post-test was  $3.45 \pm 0.40$  was significant at  $p<0.001$ . Regarding breast engorgement in pre-test mean was  $5.17 \pm 0.70$  and post-test was  $3.02 \pm 0.20$  found significant at  $p<0.05$ . Comparison between experimental and control group revealed that mean score in experimental group was  $3.74 \pm 0.21$  and control group was  $4.26 \pm 0.17$  with mean difference of 0.52 was significant at  $p<0.03$ . Study concluded that cabbage leaves was effective in reduction of pain and breast engorgement among postnatal mothers [11].

The third objective of the study was to compare the effect of chilled cabbage leaves versus hot application on pain and breast engorgement among postnatal mothers.

In chilled cabbage leaves group mean post-test pain score was  $0.55 \pm 0.686$  and in hot application group mean post-test pain score was  $0.80 \pm 0.616$  with mean difference of 0.25. The mean post-test pain score between chilled cabbage leaves application and hot application group was tested by using unpaired t test with obtained ( $t=1.213$ ,  $df=38$ ,  $p=0.233$ ) was statistically non-significant at  $p<0.05$  level.

In chilled cabbage leaves group mean post-test breast engorgement score was  $1.20 \pm 0.410$  and



in hot application group mean post-test breast engorgement score was  $1.45 \pm 0.510$  with mean difference of 0.25. The mean post-test breast engorgement score between chilled cabbage leaves application and hot application group was tested by using unpaired t test with obtained ( $t=1.707$ ,  $df=38$ ,  $p=0.233$ ) was statistically non-significant at  $p<0.05$  level.

Thakur S, Gomathi, Bala K conducted a study to assess the effectiveness of hot application on breast engorgement among the postnatal mothers. Findings showed that in experimental group mean breast engorgement score and SD was  $1.60 \pm 0.563$  and  $5.93 \pm 0.254$  in control group was statistically significant at  $p<0.05$  level. Findings concluded that hot application was effective in reducing breast engorgement in experimental group than in control group to the control group [12].

Find out the association between pre-intervention level of pain and breast engorgement of postnatal mothers of both chilled cabbage leaves group and hot application group with socio-demographic variables of postnatal women.

Findings showed that demographic variables such as age, educational status, occupational status, religion, residency, type of family, food habits, mode of delivery, number of pregnancy and time of initiating breast feeding of postnatal mothers were statistically found non-significant association with pre-test level of pain and breast engorgement in chilled cabbage leaves group and hot application group.

Wong B et al. conducted a study to examine the effectiveness of cold cabbage leaves and cold gel packs application on pain, hardness due to breast engorgement among mothers. Findings revealed that no significant association was found between demographic variables of mothers with pain and breast engorgement in experimental and control group [13].

## 5. CONCLUSION

The study findings showed that chilled cabbage leaves and hot application were found to be effective in reducing pain and breast engorgement among postnatal mothers, but no significant difference was found between chilled cabbage leaves and hot application. The study concluded that chilled cabbage leaves and hot application can be promoted and recommended as an institutional policy and implemented as a

routine care for all postnatal mothers having breast engorgement for reducing pain. The study suggests that hot application can be used as a cost-effective nursing intervention in reducing pain and breast engorgement and among postnatal mothers, until and unless they have allergy to cabbage leaves.

## CONSENT AND ETHICAL APPROVAL

Ethical clearance was obtained from the ethical committee of Parul University Approval Number: PUIECHR/PIMSR/00/081734/3509. Individual consent was taken from the sample before data collection. Participants were also assured for the confidentiality of the information provided. Prior to data collection, formal permission was obtained from the Medical Superintendent of selected hospital, Vadodara. Participants were informed about the nature and purpose of the study and informed consent was obtained.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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