ORIGINAL RESEARCH

Submitted: 21.06.2022; Accepted: 14.07.2022; Published online: 20.08.2022

Effectiveness of Cold Pack Application on Reduction of Pain Perception during Active Phase of Labour among Parturient Mothers

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Abstract

Pregnancy is the period of gestation from the fertilization of an egg, through development of a fetus, and ending at birth of the baby. A woman's desire for, and cold pack of, pain relief during labour are influenced by many factors, including her expectations, the complexity of her labour and the severity of her pain. Objectives: To assess the pre-test and post-test level of pain perception during active phase of labour among parturient mothers both in experimental and control group, effectiveness of cold pack on reduction of pain perception during active phase of labour among parturient mothers in the experimental group, association between the level of pain perception during active phase of labour among parturient mothers with their selected demographic variables. Methods: An experimental research design was adopted for the study with 60 samples who met the inclusion criteria were selected by purposive sampling technique. Semi structured interview method was used to collect the demographical and obstetrical data, Wong Baker Scale tool was used to measure the level of pain. Result: The study shows that there is a significant difference between the posttest levels of pain perception during active phase of labour among parturient mothers in the experimental group than in the control group. Conclusion: There was a significant association in the post test level of pain perception among parturient mother in the experimental group than in the control group at $p<0.01$ and $p<0.001$ level. Thus the cold pack application is an effective non-pharmacological method which can be used to manage the level of pain perception during labour.

Keywords

Parturient Mothers, Cold pack application, Labour pain, Pain perception and childbirth

Imprint

Sahaya Mary, S. KalaBarathi. Effectiveness of Cold Pack Application on Reduction of Pain Perception during Active Phase of Labour among Parturient Mothers. Cardiometry; Issue 23; August 2022; p. 161-166; DOI: 10.18137/cardiometry.2022.23.161166; Available from: http://www.cardiometry.net/issues/no23-august-2022/effectiveness-cold-pack-application

INTRODUCTION

Pain is an unavoidable part of labour. The intensity of pain perception is mentioned to be mild, moderate, severe and worst in 15, 35, 30 and 20% of patients, respectively [1]. The intensity of pain is a reflection of different stimuli influenced by emotional, cognitive, motivational, social and cultural factors; thus, it is difficult to evaluate the severity of pain. Nevertheless, talking about childbirth pain causes an imagination of severe pain in the mind [2-4]. This results in preference of caesarean section, despite all dangers and side effects, even in patients without history of labour [5, 6].

The nature of labour pain differs from other pains as it results from uterus contractions–which are painful in contrast to muscular physiological spasms–not from real trauma, tissue damage or abnormal procedure. Various aetiologies are considered to be responsible for painful myometrium contraction including hypoxemia, pressure on neuronal ganglions of cervix and lower parts of uterus, distension of cervix and peritoneum covering fundus, in addition to stretching of vagina and perineum and pressure on pelvic floor muscles during the second phase of labour [7-9].

It has been shown that application of severe cold–ice–exerts strong and transient analgesic effect; consequently, its serial application can be beneficial [10]. Local application of cold is a non pharmacological sensory intervention applied in a wide range–superficial cold to ice massage–on back, anus and perineum for attenuating delivery pain. Different instruments are used for this purpose such as ice-filled glove, rolling pin and ice water– dampened towel [11-14].

In a study in 210 delivery units in Britain, it was demonstrated that ice packs were applied in 44 (21%) centres for pain control during the second phase of la-

bour [15]. In 9 maternity centres in USA, only 2_2% of parturient women received local cold or heat; however, the most probability of natural vaginal birth was seen in this group; the adjusted probability of natural birth according to parity was 1_05 with CI 95%: 0_97–1_13 [16]. In a study performed on 46 women, 41 (91_1%) were trained to use cold/heat, but only 13 (28%) had applied the method [17].

The mechanisms of pain relieve with ice pack application including inhibition of nociceptors, a reduction in muscle spasm and/or via the analgesic descending pathway of the central nervous system such as endorphins. Other relevant literatures pointed to the significant role of the ice pack application reduce pain through excretion of endorphin, inhibit of harmful materials and reducing pain receptors sensitivity. In addition, this method increases pain threshold and reduces the sensory and motor nerves conduction velocity. Moreover, cold signals are transferred to the spinal cord through A Delta fibers instead of C fibers. Impulses transmitted through thick fibers (A-Delta fibers), close the pain gate and thus decrease pain. When thick fibers' impulses are stimulated synthetically by ice, the gate closes further (i.e. the gate control theory of pain). Consequently, ice application may help to manage labour pain [18] .

Although cryotherapy is being used as a conventional method for peripartum women, to our knowledge, there is no randomised controlled trial evaluating effect of cold in decreasing labour pain. Most studies in this field have evaluated the effect of cold on reducing perineal pain or stimulating acupuncture points [19-22]. In the present study, we aimed to determine the effect of cold pack application on reduction of pain perception during active phase of labour among parturient mother. Although literature had hinted to the effect of ice application on pain intensity during labor, yet evidence-based research are still inadequate in this respect. The objective included to evaluate effect of cold pack application on reduction of pain perception during active phase of labor, in order to help in updating as well as enhancing the body of knowledge for the nursing field and improve nursing practices, which will ultimately contribute to the optimal women and infant's health and safety.

MATERIALS AND METHODS

This quasi-experimental study is conducted in Saveetha Medical College and Hospital, labour room. Total 60 participants participated in the study calculated using purposive sampling. The inclusion criteria included all the parturient mothers who are between 38-42 weeks of gestation in both primigravida and multigravida, At active phase of first stage labour with cervical dilatation of 3 – 7cm. Free from high risk factor. Exclusion criteria included all the parturient mothers who are:Diagnosed as high risk group. (Elderly primi, adolescent pregnancy, PIH, GDM, Systemic illness, multiple pregnancy, grand multipara, APH, Multiple gestation, Malpresentations, malposition), Planned for surgical intervention for delivery(-caesarean both elective and planned), Mentally ill.

After recruiting each study participant, the investigator maintained a good rapport and explained in detail about the importance of the study, their purpose and benefits by providing with a patient information sheet in their own regional language and after clarifying their doubts a written informed consent was obtained from each one of them. The ethical principles were followed and adhered to protect the rights of the participants, the safety and aseptic precaution has been taken into consideration till the completion of the intervention and confidentiality was maintained throughout the study. The demographic and obstetrical data were collected and duration of 10 minutes of time was given for its completion. Before the initiation of intervention, the study participants were assessed for general condition and the level of pain perception was monitored during the active phase of labour by using visual analog pain scale designed by Wong Bakers. Followed by that, privacy was provided and the mother placed comfortably and cold pack was applied on sacral area and lower abdomen was implemented by the investigator for duration of 10 minutes for every half an hour till the completion of active labour phase. Investigator simultaneously monitored the level of pain perception by using the same visual analog pain scale and documenting the level of pain perception for each cervical dilatation (3cm-7cm) in both experimental and control group. Once the entire intervention is completed, the mother was made comfortable and observed for any signs of discomfort.

ETHICAL STATEMENT

Ethical approval in this study was obtained from the Institutional research unit committee at the Saveetha College of Nursing, Saveetha institute of medical and technical science (SIMATS) with approval number of

.:055/04/2021/IRB-HS/SIMATS, Prior to the study, each participant has signed the informed consent. The investigators explained the nature of the study objectives and a clear explanation of data collection was given. Confidentiality was also ensured by explaining to the participants that all information was used only for research purposes and their identities were in the form of numbers, not names. In addition, the data collected could only be accessed by the investigators only. All participants also had the right to withdraw from the study at any time without penalty.

RESULTS

The current study, titled "Effectiveness of cold pack application on reduction of pain perception during active phase of labour among parturient mother", included 60 parturient mothers. The calculated independent \'t' test value of t = 2.928 between 6 cm and 7 cm and t=6.030 between pre-test and 7 cm cervical dilation was found to be statistically significant at p<0.01 and p<0.001 level which clearly shows that there was significant difference in the level of pain between the post-test which and the cervical dilation administered to the parturient mothers in the experimental group was found to be effective in reducing the level of pain in the post-test than the parturient mothers in the control group.

Statistical analysis

SPSS program version 20 was used for statistical analysis. The variables are presented in the form of frequency and percentages, standard deviation, and mean. The Chi square test was used to compete for categorical variables and test a significant difference between the study groups' outcome criteria. *P*-value was set at <0.05 for statistically significant criteria. All data collected for this purpose was entered into an excel sheet, tabulated, and statistically analyzed. Several statistical measures were used, including mean, standard deviation of mean, standard error mean, and data from the subject's demographic details from the student's unpaired t test.

Section A: Sample characteristics

Among 60 samples, 30 samples belongs to experimental group, most of the parturient mothers, 17(56.7%) were aged between 26–30, 10(33.3%) were post graduates, 23(76.7%) were unemployed, 29(96.7%) were sedentary workers, 23(76.7%) were Hindus, 12(40%) had a monthly income of Rs.15,001 – 20,000 and above Rs.20,000 respectively, 22(73.3%) belonged to nuclear family and 14(46.6%) were residing in sub urban area, 26(86.7%) had registered their pregnancy, 21(70%) made >4 antenatal visits, 11(36.7%) had a gestational age of 39–40 weeks, 19(63.3%) were primi gravida mothers and 18(60%) were primi parity whereas in the control Group, most of the parturient mothers, 14(46.7%) were aged between 21–35 years and 26–30 respectively, 14(46.6%) were post graduates, 22(73.3%) were unemployed, 29(96.7%) were sedentary workers, 23(76.7%) were Hindus, 12(40%) had a monthly income of Rs.15,001 – 20,000 and above Rs.20,000 respectively, 22(73.3%) belonged to nuclear family and 14(46.7%) were residing in sub urban area, 19(63.3%) had registered their pregnancy, 24(80%) made >4 antenatal visits, 16(53.3%) had a gestational age of 39–40 weeks, 26(86.7%) were primi gravida mothers and 12(40%) were primi parity.

Section B: Effectiveness of cold pack on reduction of pain perception during active phase of labour among parturient mothers in the experimental group

The Table 1 depicts the effectiveness of cold pack application of pain perception during phase of labour among parturient mothers in the experimental group. The pre-test mean score of pain was 4.60±1.10, the post mean pain score after 3 cm cervical dilatation was 4.53±1.04, after 4 cm was 5.20±1.13, after 5 cm was 5.77±0.86, after 6 cm was 6.07±0.91 and after 7 cm was 6.23±0.94.

Table 1

Effectiveness of Cold Pack Application of Pain Perception during Phase of Labour among Parturient Mothers in the Experimental Group N = 30

Pain Perception	Mean	S.D	Repeated Measures ANOVA – F Value
Pre-test	4.60	1.10	F = 32.588 P=0.0001 S***
Post Test			
3 cm	4.53	1.04	
4 cm	5.20	1.13	
5 cm	5.77	0.86	
6 cm	6.07	0.91	
7 cm	6.23	0.94	

***p<0.001, S – Significant

The calculated Repeated Measures ANOVA "F" value was F = 32.588 was found to be statistically significant at p<0.001 level. This clearly infers that there was significant difference between pre-test and post-

test level of pain among parturient mothers in the experimental group. Table 2 shows the Effectiveness of cold pack on reduction of pain perception during active phase of labour among parturient mothers both in experimental and control group.

Table 2

Effectiveness of cold pack on reduction of pain perception during active phase of labour among parturient mothers both in experimental and control group N = 60(30+30)

Pain Perception	Experimental Group		Control Group		Mean Difference	Student Independent 't' test Value
	Mean	S.D	Mean	S.D		
Pre-test	4.60	1.10	4.37	0.85	0.23	t = 0.918 p=0.362, N.S
3 cm	4.53	1.04	4.90	0.88	0.37	t = 1.469 p=0.147, N.S
4 cm	5.20	1/13	5.43	0.86	0.23	t = 0.902 p=0.371, N.S
5 cm	5.77	0.86	6.10	0.80	0.33	t = 1.553 p=0.126, N.S
6 cm	6.07	0.91	6.67	0.66	0.60	t = 2.928 p=0.005, S**
7 cm	6.23	0.94	7.40	0.49	1.17	t = 6.030 p=0.0001, S***

***p<0.001, **p<0.01, S – Significant, N.S – Not Significant

Section C

In this study, the calculated independent \'t' test value of t = 2.928 between 6 cm and 7 cm and t=6.030 between pre-test and 7 cm cervical dilation was found to be statistically significant at p<0.01 and p<0.001 level which clearly shows that there was significant difference in the level of pain between the post-test which and the cervical dilation administered to the parturient mothers in the experimental group was found to be effective in reducing the level of pain in the post test than the parturient mothers in the control group.

DISCUSSION

It is a prior concern for each pregnant woman since failure to relieve it may have an effect on psychological aspect. Severe labour pain also has been implicated in contributing to long term emotional stress with potential adverse consequences on maternal psychological health and family bonding.

Our study aimed to determine the effectiveness of cold pack on reduction of pain perception during active phase of labour among parturient mothers in the experimental group the impact of using a cold pack on parturient women' perceptions of pain throughout the birthing phase in the experimental group. The pre-test mean score of pain was 4.60±1.10, the post mean pain score after 3 cm cervical dilatation was 4.53±1.04, after 4 cm was 5.20±1.13, after 5 cm was 5.77±0.86, after 6 cm was 6.07±0.91 and after 7 cm was 6.23±0.94.The calculated Repeated Measures ANOVA "F" value was F = 32.588 was found to be statistically significant at p<0.001 level. This clearly infers that there was significant difference between pre-test and post-test level of pain among parturient mothers in the experimental group.The finding of the study is supported by Waters, B. Let al (2003) investigated the use of cold massage of the acupressure energy to reduce labour pain during contractions and noted a pain reduction and suggested that ice massage is a safe, non invasive, non-pharmacological method of reducing labour pain.

Our study aimed to assess the post -test level of pain perception during active phase of labour among parturient mothers both in experimental and control group.The calculated paired 't' test value of t = 5.757 between pre-test and 3cm, t=5.757 between 3 cm and 4 cm cervical dilation, t = 7.616 between 4 cm and 5 cm cervical dilation, t = 5.461 between 5 cm and 6 cm dilatation, t=8.930 between 6 cm and 7 cm dilatation and t=23.127 between pre-test and post-test after 7 cm dilatation was found to be statistically significant at p≤0.001 which clearly shows that there was significant difference in the level of pain between the post-test which and cold pack application to the parturient mothers in the experimental group was found to be effective in reducing the level of pain in the post test.

The calculated independent \'t' test value of t = 2.928 between 6 cm and 7 cm and t=6.030 between pre-test and 7 cm cervical dilation was found to be statistically significant at p<0.01 and p<0.001 level which clearly shows that there was significant difference in the level of pain between the post-test which and the cervical dilation administered to the parturient mothers in the experimental group was found to be effective in reducing the level of pain in the post-test than the parturient mothers in the control group. This findings was supported by SiratiNir M et al (2010) found

that the two groups, one receiving cold massage and another group placebo showed a significant difference and reduction in the labour pain perception.

The severe pain of the experimental group got reduced to 73.3% of Moderate level of pain perception in the experimental group than the control group primi gravid mothers that which pain perception remained among 80%, therefore showing a significant difference between experimental and control group after administering ice pack massage. Thus the hypothesis H1 which states "There will be significant difference in post-test level of labour pain perception during first stage of labour among parturient mothers in experimental and control group." is accepted.

CONCLUSION

This study concluded that the cold pack application during the active phase of labor has better effects on reduction of pain perception. Therefore, the practice of applying cold pack application during the active phase of labor is highly acceptable by mothers and midwives or nurses in helping to reduce the pain perception of labour in active phase. This indicates that the cold pack application is an effective non-pharmacological method and had no side effects which can be used to manage the level of pain perception during labour. In the initial stage of labour, local cold application to the back, belly, and lower region of the abdomen, as well as to the perineum in the second stage, significantly lessens labour discomfort. Additionally, based on the findings, it is likely to have a positive impact on the various stages of labour without having a negative impact on the mother or the foetus. It is advised to conduct more research on blind placebo groups. For the reasons listed above, cold treatment is thought to increase maternal satisfaction.

LIMITATION

- It is limited to a period of one month.
- Most participants showed satisfaction regarding cold pack application, but the satisfaction variable was not included in this study.

Author's Contribution

All authors contributed equally to the manuscript.

Conflict of Interest

The authors declare no conflict of interest.

Funding Source

The research has not received any external funding.

Acknowledgement

We thank the parturient mothers who participated and contributed to the study.

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