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Original Article

Effectiveness of Warm Compression on Lumbo-Sacral Region in Terms of Labour Pain Intensity and Labour Outcomes among Nulliparous: an Interventional Study

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ABSTRACT

Introduction: Childbirth is a distinctive and joyous moment in every mother's life. Giving birth is one of the powerful and vital event. This study aimed to assess and evaluate the effectiveness of warm compression (moist heat) on lumbo-sacral region in terms of labor pain intensity and labor outcomes

Methods: An experimental research design was carried out on 88 nulliparous mothers with normal singleton term pregnancy (44 participants in each group) who were admitted in the labor room. Mothers who had high-risk pregnancy were excluded. Warm compression was given to nulliparous mothers of the experimental group with hydrochollator pack at 70^0C temperature for 20 minutes for 3 times with one-hour interval on lumbo sacral region starting from 4-5 cm of cervical dilatation. Labor pain intensity score, fetal heart rate, frequency and duration of uterine contractions were assessed before and immediately of warm compression and again after 30 minutes only labor pain was assessed.

Results: Study results revealed that immediately after first, second and third time of warm compression labor pain intensity score in experimental group was lower than control group respectively (t= 3.20; P< 0.001; t =4.45; P< 0.001; t= 6.18; P< 0.001). But no significant difference found in fetal heart rate and labor outcomes in terms of duration of labor, type of delivery, baby born alive/ not and cried immediately after birth.

Conclusion: Warm compression was useful method to decrease the labour pain among nulliparous mothers in the first stage of labour and mothers reported satisfaction with intervention.

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Introduction

The physiological transition from being a pregnant woman to become a mother means huge change both mentally and physically.[1]

Labour pain can be described as a conflicting experience, one that is unbearable and still considered worthwhile because of the joy of having a baby.[2] there are series of factors which affect mother's insight including previous labor pain experience, women's capability to tolerate pain, mental and emotional condition regarding labour which all together forms a distinctive experience for every mother.[3]

Labour pain perception differs from women to women. It is an irregular phase, where the pain occurs in a cyclic form, firstly it peaks and then decreases. The intensity and the frequency of the pain aggravates as the labour progress.[4] Pain at the time of first stage of labour is because of the many factors such as pain due to the contracting uterus, cervical dilatation, stretching of the ligaments, and perineum during the birth of the baby. Women rank labour pain as highest ranked pain as compared to other pain.[5]

Natural childbirth is a beautiful experience. A mother who is in labour needs emotional and psychological support to cope up with the most stressful and painful stage of life that is giving birth to a baby.[6] What she needs at that crucial stage is all about therapeutic touch that can be provided to her by using non-pharmacological techniques such as heat therapy.[7] There are various heating modalities to provide heat such as ultrasound, hydrochollator pack, dry heat packs. Dry heat pack is less efficient in heat transmission as compared to hydrochollator pack, because hydrochollator pack composed of moist heat particles. It is placed on the skin for 15 to 20 minutes by wrapping within four to eight layers of towel. Studies also revealed that moist heat is more effective as compared to the dry heat.[8] Heat is generally administered on back, lower part of abdomen, groin, and perineum during labour.[9] It helps the mother to get relief from pain up to some extent by releasing of heat receptors of the skin and deep tissues which ceasing the pain signal transmission to the brain by closing the pain control gate.[10] Heat also helps in vasodilation and thus increasing the flow of blood.[11]

Warm compression is very simple to apply with no undesirable effect on mother and fetus[12] as well as help the mother by decreasing labour pain[12] and improve maternal satisfaction,[9] hence investigator used new method that is hydrochollator pack which consist silicon crystals to give warm compression (moist heat) as a non-pharmacological and non-invasive method for three times at the interval of one hour to get relief from labour

pain as well as to assess the effect of moist heat for longer duration. The study was conducted with the aim of investigation the effect of moist heat therapy on lumbo–sacral region on pain of labour, duration of three stages and fetal outcomes in nulliparous mothers.

Materials and methods

This experimental study approved by Institutional Ethical committee of (IEC No. 1176) Maharishi Markandeshwar (Deemed to be University) Mullana was conducted from August 2018 to February 2019 at the district hospital of Ambala. The sample size was calculated with power analysis by Cohen's d formula. The calculated effect size was found at 0.50 at the power of 0.8.[10] The calculated sample size was 128.

Out of that 16 subjects were excluded who were not meeting inclusion criteria. The 88 nulliparous mothers were selected conveniently and allocated to an experimental and control group randomly by a randomized computer generated table (Figure 1).

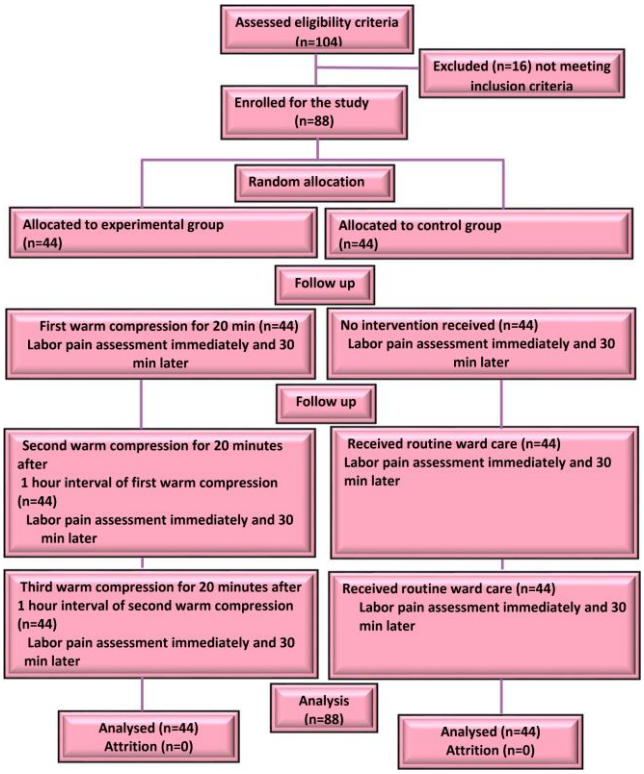

Figure 1. Flowchart of the study

The nulliparous mothers from 4-5 cm of cervical dilatation, having age in between 18 to 35 years, singleton term pregnancy, and spontaneous onset of labour pain and interested to participate were included in the study.

Those having high-risk pregnancy, premature rupture of membranes, fetal distress, abnormal location of the placenta, cord prolapsed, complication in progress of labour, using analgesics to reduce labour pain, lack of tendency to continue heat therapy were excluded.

Numeric pain intensity scale (κ=1) used to check labour pain and to record other parameters partograph (κ=0.8) was filled for each mother. Maternal outcome performa was used to note the type of delivery, time taken for progress of first, second and third stage of labour and fetal outcome performa to record the condition of the baby at birth like a baby born alive, asphyxiated and cried immediately after birth or not in both groups.

Mother satisfaction rating scale (Five point rating scale) (r=0.7) used to check the satisfaction among nulliparous mothers regarding warm compression in the experimental group under the criterion measure as, highly satisfied (81-100%), satisfied (61-80%), not satisfied (<60%).

The researcher gave information about study and took informed consent from nulliparous mothers to take participate. Labour pain intensity score, fetal heart rate, frequency and duration of uterine contractions were assessed before, immediately of warm compression. The researcher applied warm compression (moist heat) on lumbo sacral region among nulliparous mothers who were in 4-5 cm of cervical dilatation in the experimental group with hydrochollator pack at 70^0 C temperature by wrapping it in four layers of towel to maintain the heat effect. In between temperature of hydrochollator unit was assessed with the help of lotion thermometer. Warm compression was applied three times at the interval of one hour during the first stage of labour. Each warm compression was given for 20 minutes. Then immediately after each warm compression labour pain intensity score, fetal heart rate, frequency, and duration of uterine contractions were recorded on the record sheet. After 30 minutes of each warm compression, only the labour pain intensity score was recorded to check the long term effect of warm compression. Labour outcomes in terms of duration of labour, type of delivery and fetal outcomes in terms of the condition of newborn at birth was observed.

Mother's satisfaction level regarding warm compression was recorded in the fourth stage of labour. Only routine ward care was given to control group but labour pain intensity was assessed by maintain same time interval as in experimental group. Fetal heart rate, frequency and duration of uterine contractions, type of delivery, and condition of newborn at birth were also assessed with the same manner as in the experimental group.

Results

Data were entered into Microsoft Excel 2007 and using SPSS (Armonk, NY: IBM Corp) version 20 for analysis. More than half 52.3% of nulliparous mothers were in the age group of 24-26 years. All 100% of nulliparous mothers in the experimental group and control group had a history of antenatal screening. Majority 86.4% of nulliparous mothers in the experimental group and 97.7% of nulliparous mothers in the control group had no history of abortion. Majority 75% in the experimental group and 81.8% of nulliparous mothers in the control

group had been in labour from 3-5 hours. All 100% of nulliparous mothers in the experimental and control group, presence of show and bag of membranes were intact at the time of enrollment in the study. Nulliparous mothers were matched on these parameters before allocation. There was no significant difference in labour pain intensity score in both groups before three interventions (t = 0.15 P= 0.87; t = 0.19 P = 0.84; t = 0.69 P = 0.48) (Table 1).

Table 1. Labour pain intensity score before warm compression (n=88)

Time & group	Mean (SD)	t-test	P
First time		0.15[a]	0.87
Experimental	4.52 (1.43)		
Control	4.48(1.32)		
Second time		0.19[b]	0.84
Experimental	5.95 (1.12)		
Control	6.00 (1.12)		
Third time		0.69[c]	0.48
Experimental	7.55(0.87)		
Control	7.68(0.97)		

Comparison of ([a]: first time, [b]: second time, [c]: third time)

The paired t-test shows that labour pain reduced immediately after first (t = 14.5, P<0.001), second (t =13.6, P< 0.001) and third (t = 10.1, P<0.001) time of warm compression in experimental group. Whereas in control group pain level kept increasing with progress of labour (Table 2).

Table 2. Comparison of Labour Pain Intensity Score before and immediately after the first time, the second time and third time warm compression (moist heat)

Time & group	Before warm compression Mean (SD)	Immediately after warm compression Mean (SD)	t-test	P
First time				
Experimental	4.52(1.43)	3.20 (1.34)	14.5[a]	<0.001*
Control	4.48(1.32)	4.50(1.33)	0.57	0.57
Second time				
Experimental	5.95(1.12)	4.45(1.17)	13.6[b]	<0.001*
Control	6.00(1.12)	6.50(1.21)	4.35	<0.001
Third time				
Experimental	7.55(0.87)	6.18(1.24)	10.1[c]	<0.001*
Control	7.68(0.95)	8.52(0.90)	8.20	<0.001

Comparison of ([a]: first time, [b]: second time, [c]: third time), *statistically significant

Further (Table 3) independent t-test shows significant difference in labour pain intensity immediately after first, second and third time warm compression in experimental and control group (t = 4.53 P<0.001; t= 8.05 P< 0.001; t = 10.10 P< 0.001).

Figure 2 shows that after 30 minutes of first time warm compression mean labour pain intensity score was 4.91 and 5.25 in experimental and control group respectively. But after 30 minutes of second and third time warm compression mean labour pain intensity score (6.34, 8.30) was lower in the experimental group as compared to the control group (7.20, 8.89) which was found to be statistically significant at 0.05 level of significance. These results signify that warm compression was effective to reduce the labour pain. Further, both groups did not differ in terms of duration of first stage of labour (P=0.51)

Table 3. Comparison of Labour Pain Intensity Score immediately after warm compression (moist heat) in the experimental group and control group

Time & group	Mean (SD)	t -test	P
First time		4.53[a]	<0.001*
Experimental	3.20(1.34)		
Control	4.50(1.33)		
Second time		8.05[b]	<0.001*
Experimental	4.45(1.17)		
Control	6.50(1.21)		
Third time		10.10[c]	<0.001*
Experimental	6.18(1.24)		
Control	8.52(0.90)		

Comparison of ([a]: first time, [b]: second time, [c]: third time), *statistically significant

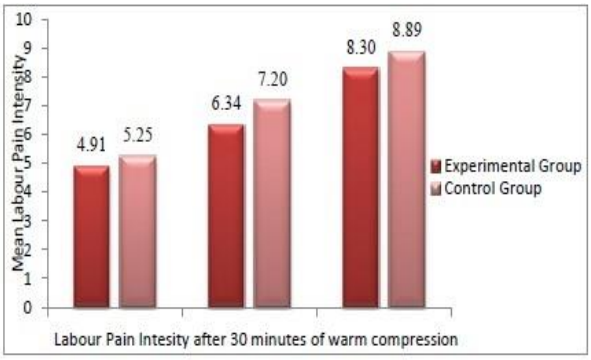

Figure 2. Comparison in labour pain intensity score after 30 minutes in experimental and control group

second stage of labour (P=0.86) third stage of labour (P=0.70) and type of delivery. Most 88.9% of nulliparous mothers had a normal vaginal delivery with episiotomy, only three mothers in the experimental group had Lower Segment Caesarean Section (LSCS). One mother had LSCS due to prolonged labour and two mothers went for LSCS due to fetal distress. No significant difference was found in terms of fetal outcomes including fetal heart rate, condition of newborn at birth. In this study, all 100% of nulliparous mothers had moderate satisfaction regarding the warm compression.

Discussion

In this study, all 100% nulliparous mothers in warm compression group and control group had a history of antenatal screening. This could be because of government initiatives in terms of Janani Suraksha Yojana, which promotes institutional delivery as well as free of cost antenatal and intranatal services to reduce maternal mortality and infant mortality rate.

Results of this study revealed that labour pain in experimental group immediately after warm compression was lower as compared to control group. These findings of current study were similar with the study done by Fahami et al.,[10] and by the Taavoni et al.,[9] where labour pain decreased due to application of heat therapy. These results are because heat enhance the release of heat receptors and ceases the pain signal transmitting to the brain by closing the pain control gate.[10]

Further, this study demonstrated that duration of labour was not reduced in experimental group. Similarly, Akbarzadeh et al.,[12] reported that there was no significant difference in the duration of the first stage in the experimental and control group. These findings were contradictory to the study done by Behmanesh et al.,[7] where duration of the first stage (P<0.001) and the third stage of labour (P<0.001) was reduced in experimental group. But no difference was found in the second stage of labour.

Although in current study 39 nulliparous mothers in experimental and 42 nulliparous mothers in control group had a normal vaginal delivery with episiotomy. The study result shows there was no significant difference in the type of delivery. Ganji et al.,[3] reported that majority 99% of mothers had a normal vaginal delivery with episiotomy after using intermittent heat and cold therapy. This indicates that warm compression had no effect on the type of delivery.

Additionally, in the current study, all 100% mothers were satisfied with the warm compression (moist heat) in the experimental group because warm compression helps to reduce the labour pain. Ganjiet al.,[3] also found that 43.8% were highly satisfied and 12.5% mothers had very high satisfaction by intermittent heat and cold therapy.

One limitation of current study was due to time constraints of data collection time period which researcher could assess only 104 samples. This could affect wide generalization of the findings.

Conclusion

The findings showed that warm compression was helpful technique to decrease pain of child birth immediately after warm compression among nulliparous mothers in the first stage of labour. Warm compression not causes deleterious effects on labour and fetal outcomes so it leads to more satisfaction among nulliparous mothers. This study suggests that various alternative and complementary methods should be used to reduce labour pain intensity as well as assess the perception of gynecological nurses and midwives regarding complementary and alternatives approaches. Warm compression can be included safely in the clinical area. Those nurses and midwives working in the antenatal ward and labour room, as well as patient's attendants, need to include in practice to administration the warm compression to get relieved from labour pain up to some extent.

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Ethical issues

None to be declared.

Conflict of interest

The authors declare no conflict of interest in this study.

Research Highlights

What is the current knowledge?

Warm compression (moist heat) is effective to reduce the labour pain intensity.

What is new here?

Hydrochollator pack was used to provide moist heat.

Author's contributions

All author were in the conception and design, acquisition of data, analysis and interpretation of data, drafting the article, review of article and find approval.

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