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Comparing the effects of ice massage and acupressure on labor pain reduction☆

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A B S T R A C T

Background: Childbirth is arguably one of the most painful experiences women undergo during their lives. This study aimed to compare the effects of ice massage, acupressure and placebo in reducing the intensity of labor pain in pregnant women from selected hospitals in Tehran, Iran.
Methods: A quasi-experimental study was conducted on 90 pregnant women referred from selected hospitals in Tehran. Mean age of the participants was 27.82 ± 6.20 years. Subjects were randomly divided into three groups ($n = 30$) to receive ice massage, acupressure or placebo. The intervention was applied at the Hegu point and pain intensity assessed using a visual analogue scale (VAS) before the intervention, immediately 30 min and 1 h after the intervention.
Results: Comparing pain intensity immediately, 30 min and 1 h post-intervention across the three groups showed a significant difference between the groups. At 30 min post-intervention ($p < 0.05$). A Tukey test showed this difference was related to ice massage.
Conclusion: Ice massage and acupressure techniques reduced pain during labor. However, ice massage provided more persistent pain relief. Due to high levels of pain intensity and increased pain experienced by the women during the active phase of labor, it is suggested that repeating these techniques during the first stage of labor could be an effective, accessible, cost-effective and non-invasive technique to help reduce the intensity of labor pain.

1. Introduction

A major priority of therapeutic- healthcare systems is to care for two vulnerable groups, mothers and children. Therefore optimal pain relief care for mothers during labor has been of central concern.[1]

Although pain is perceived as an inevitable part of childbirth, despite modern developments in medicine it has yet to be appropriately managed. Pain management continues to pose a problem for women during childbirth.[2] Labor pain can be very diverse in terms of the intensity felt by an individual and mean labor pain intensity is still regarded amongst one of the most severe pains human beings experience.[3,4]

Although severe continuous low-back pain is commonly experienced by approximately 30% of women during labor, there are still few options available to alleviate this pain, particularly in developing countries and remote area.[5] Continued pain and the fear it causes have numerous adverse effects on the physiological status of the mother and fetus. This may also increase the need for midwifery interventions including assistive devices and cesarean section.[6] Indeed, labor pain can increase elective cesarean section rates by 22%.[7] Primiparous women tend to undergo more labor pain than multiparous women, thus the provision of pain relief in obstetrics and gynecology is of considerable significance.[8,9]

Currently, many pharmacological and non-pharmacological methods are used to relieve labor pain. However, palliative drugs have many harmful side effects for both mother and fetus[10] including fatal debilitation of the central nervous system, a reduction in maternal cardiac output, bladder distension and prolongation of the second stage of labor.[11] Thus, non-pharmacological pain relief methods such as muscle relaxation, breathing techniques, acupressure, aqua therapy, music therapy, touch therapy and massage therapy are preferred over pharmacological methods. These methods are non-invasive, minimize complications for mother orfetus, provide support and enhance the cooperation among mothers and their therapists.[12,13]

A number of studies have evaluated the effects of non-pharmacological methods such as acupressure and/or ice massage to reduce labor pain. Some studies have suggested that ice message on the Hegu point on the hand can reduce labor pain.[14–17] In addition, the use of transcutaneous electrical nerve stimulation

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(TENS) on acupuncture pressure points has also claimed to be to be effective in reducing labor pain.[18,19] A number of other studies have reported upon the effect of massage on labor pain reduction[13,20–23] Acupuncture has also been shown to be helpful in labor pain relief, however, are view study Cho et al. (2010) emphasized the necessity of further studies in this regard.[24]

The use of massage to reduce the mean pain intensity during labor stages has indicated a reduced need for analgesic drug consumption.[25] According to traditional Chinese medicine, stimulating the LI4 & SP6points will reduce labor pain and strengthen uterine contractions.[18,24] Williams et al. even gone so far as to suggest that the process of labor could turn into a pleasant and enjoyable event through using modern and supportive pain reduction techniques such as massage.[26] However there may well be a need for further research here.

Although previous studies have investigated individual non-invasive pain relief approaches, to date no study has compared several non-pharmacological methods simultaneously. A review study by Cho et al, investigating findings of other studies on effective non-pharmacological methods for labor pain alleviation emphasized the need for further investigation in this field.[24] Thus, the present study mainly sought to compare the effects of ice massage and acupressure with a placebo to compare levels labor pain intensity.

2. Methods

This was a quasi-experimental study performed on 90 pregnant women referred to four hospitals in Tehran.

Women were included in the study if they were 18–40 years of age, had a singleton and term pregnancy, naturally started labor with normal fetal heart rate (FHR), had a natural pattern of uterine contractions, and a dilatation of 3–4 cm. They also had to score 3 or more in the visual analogue scale (VAS). Subjects were excluded if they had any underlying renal or cardiovascular disease, gestational diabetes, pre eclampsia, mental disorders, visual impairments, or a history of acupressure. In addition, any complications during the labor, which led to analgesic drugs use or midwifery interventions to accelerate the labor, caused the patients to be excluded. Data was collected using a standard VAS. The assumption in this scale was an 11 point, 0–10. This scale has been repeatedly used in different studies and its reliability and validity have been confirmed by the researchers.[16–18,27–29]

All included participants were randomly allocated into three groups of ice massage, acupressure and placebo. In previous studies it was noted that massage was performed between 7 and 20 min.[14,30] However in the active phase of labor, contraction interval times gradually decrease,[31] and patients may experience at least one painful contraction in every 10 min. Therefore in the present study, after identifying the Hegu point on the hand, ice massage was performed with the researcher placing ice balls (2 cm in diameter) inside a wet thin Gauze into the hand and massaging rotationally for 10 min (2 min pressure and 15 min break). In the acupressure group, the same massage procedure was performed using a glass marble (glass ball) In the placebo group ice balls were used at the same point but without pressure or massage.

In order to monitor the effects upon pain and pain relief, the intervention times were based on Lee & et al. and Chao & Cool ages, studies, in which the pain relieving effects of ice massage and acupuncture were measured immediately, 30 min and 60 min after the intervention.[18,27] Pain intensity was evaluated using the same VAS scale immediately, half an hour and 1 h after the intervention the obtained data were analyzed in $SPSS_{15}$ using one-way ANOVA and Tukey test for comparison between the groups. Repeated measure ANOVA was used to evaluate trends in the groups and chi-square test used for comparison of demographic variables.

Table 1
Demographic characteristics of the three groups.

Group→ Variable↓	Ice massage	Acupressure	Placebo	χ^2	df	*P*
Participants with high school diploma or higher	87.3%	90%	81%	2.52	6	0.86
No. of Pregnancy (Less 3)	80%	73.40%	76.60%	5.67	3	0.68
Planned pregnancy	56.7%	63.3%	63.3%	0.374	2	0.82
Awareness of fetal gender	73.30%	83.30%	73.30%	1.25	2	0.53

There were no significant differences between the groups based Chi-square test ($p > 0.05$).

Due to ethical considerations, pregnant women who required pharmacological intervention such palliative drugs, labor acceleration, or those who were unwilling to continue at any stage were excluded from the study. Therefore, one limitation of this study was the exclusion of 30% of participants due to unpredictable factors, including midwifery interventions, during the labor process.

3. Results

There were no significant differences between the three groups in terms of mean age, educational level, type of pregnancy (planned or unplanned), number of pregnancies and awareness of the sex of the fetus (Table 1).

Comparisons of mean pain intensity pre-intervention with post-intervention in the ice massage group showed a significant difference ($p < 0.001$) A significant difference was also observed in the acupressure group ($p < 0.001$) between pain intensity pre-intervention and immediately and half an hour post-intervention. However, the difference was not significant after 1 h. In the placebo group, the only statistically significant difference was seen between pain intensity before the intervention and immediately after it ($p < 0.001$) (Table 2).

A comparison of mean pain intensity using ANOVA showed the three groups to significantly differ in mean pain intensity half an hour post-intervention. A Tukey test showed this difference to be associated with the ice massage group ($p < 0.05$). Repeated measure AVOVA showed statistically significant differences in pain intensity before and after the interventions in the three groups. Indeed pain reduction was observed at all three stages following ice massage, immediately and 30 min after acupressure but only immediately after placebo. Half an hour following the intervention in the placebo group pain intensity was equal to the value before the intervention and 1 h after the intervention, pain significantly increased ($p < 0.05$) (Table 2).

When comparing the three groups in the study, ice massage had more persistent effects on pain reduction than the other two groups (Fig. 1).

4. Discussion

The results of this study showed that ice massage on acupressure points significantly reduced labor pain intensity immediately,

Table 2
Mean pain intensity before intervention immediately post-intervention 30 min and 1 h post-interventions.

Stage↓ Group→	Ice massage	Acupressure	Placebo	df	*F*
Before	7.47 ± 1.94	7.73 ± 1.41	7.17 ± 1.66	2	0.84
Immediately after **	5.73 ± 1.74	6.70 ± 1.44	6.33 ± 1.72	2	2.64
30 min after*	5.90 ± 1.84	6.87 ± 1.45	7.10 ± 1.64	2	4.42
One hour after	6.77 ± 1.97	7.73 ± 1.50	7.60 ± 1.56	2	2.88

There were significant differences between the groups based one-way ANOVA test.
*$P < 0.05$.

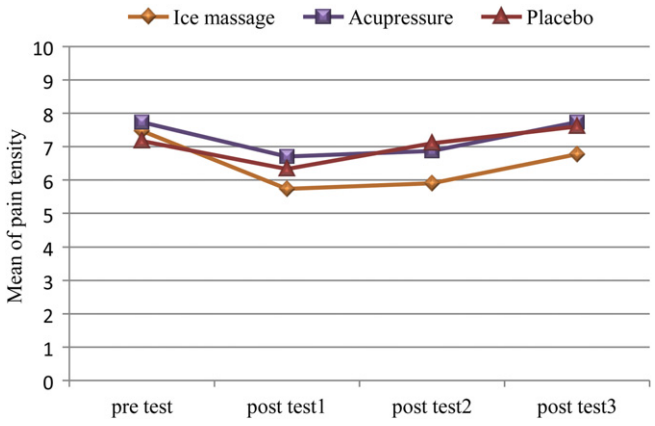

Fig. 1. Comparison between pain reduction effects of the three methods. There were significant differences between the groups based Repeated measure ANOVA test $^{*}P < 0.001$.

at 30 min and 1 h following the intervention. This finding was in accordance with previous studies which recommended ice massage as a valuable, effective, non-invasive and cost-effective technique in labor pain relief.[14–17] Some studies have also reported upon the effectiveness of massage for pain reduction during the first phase of the labor[18,20,21,27,29]

Based on our results, although pain intensity significantly decreased immediately and 30 min after acupressure, there was no significant difference between mean pain intensity before intervention and 1 h after it. This contrast might be caused by the duration of acupressure massage and acupressure point. Some studies continued the massage for a longer time, for instance Heidari et al. implemented massage for 30 min, assessing pain intensity 30 min and 1 h after the massage and then every 1 h for 8 h. They found a significant difference only after 2 h.[32]

In the present study, massage time was limited to 10 min. Therefore, it may be possible that more prolonged massage might result in prolonged pain relief. Previous studies applied pressure on VI (SP6) point, LI4 and SP6 points.[18,22,27,32] In contrast, acupressure was applied at the Hegu point in the present study. Considering these findings, it would appear that although acupressure seems to be acceptable as an effective labor pain reduction method, its efficiency depends on the duration of massaging and the selected acupressure points. It can also be concluded that repetition of acupressure during the first stage of labor will result in a more pleasant experience for women.

The main objective of this study was to compare mean labor pain intensity before and after two interventional methods compared with a placebo group. The results indicate that the three groups were well matched in terms of mean pain intensity. As we expected, physiological changes made progress in labor associated with increased pain. Cunningham et al. indicated that when a pregnant woman enters the real phase, the intensity and duration of contractions increase over time and pain relief interval are shorter. Increased intensity of uterus contractions causes pain to be felt more severly.[31] In the three groups of this study, pain intensity significantly decreased immediately after the intervention. However, at half and 1 h after the intervention, although pain increased in all groups the intensity of pain occurred more slowly in both the ice massage and acupressure groups. One hour after the intervention, mean pain intensity in the ice massage group had still not reached the levels recorded pre-intervention. However, in the acupressure group, pain levels were equal to the pre-intervention VAS measurements and in the placebo group, pain intensity had actually increased when comparison to measurements pre-intervention.

Although no reports comparing the effects of acupressure and ice massage on labor pain reduction are available, a number of studies have compared acupressure, touch therapy[19] or acupressure at different acupressure points.[18,22] All have highlighted the effectiveness of acupressure on labor pain reduction. In addition, Ownby,[30] compared the effects of ice massage and touch massage on pain reduction among AIDS patients and found both methods to be useful. However, no significant difference was reported between the two methods, which may be due to the difference in study population. Further studies in this field, particularly on reducing labor pain, are recommended.

Attrition rates during the study were due to emergency obstetric intervention during delivery and/or the need for drug therapy or emergency delivery and these are acknowledged as a problem associated with this study. It is also noted that the relatively small sample size does not allow us to generalize upon the findings reported here and further studies in this area are recommended It would be also be to monitor pain relief over a longer period and the impact of this intervention in reducing and maintaining pain reduction during labor, the actual childbirth and possible effect on the neonate by recording Apgar status. Finally, it would be interesting to undertake comparative cultural studies in the management and effectiveness of these pain relief measures during labor and childbirth.

5. Conclusion

Our findings suggest that although ice massage and acupressure methods reduced labor pain, due to the physiological increase in pain intensity in the active phase of the labor, the interventions should be repeated every 30 min. Ice massage was more effective than acupressure in pain reduction, and should be considered as a simple, inexpensive, available, tool for helping to minimize labor pain. Ice massage has the advantage of no side effects, requires no advanced training and can be performed in remote regions where limited access to medical methods and professionals is available.

Conflict of interest statement

None.

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