

Comparing the impact of acupuncture and pethidine on reducing labor pain

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Abstract

Background: Generally 50 to 70 percent of women suffer from a severe and unbearable pain during their childbirth. Abnormal fetal heart patterns, an increase of caesarian delivery rate, prolonged labor and low APGAR score in newborn are some of adverse effects of labor pain. Disagreement between different studies regarding the efficiency and effectiveness of acupuncture on labor pain led us to do this study.

Materials and Methods: This is a clinical trial study. Sampling was done randomly in Esfahan, Shahid Beheshti Hospital, based on the subjects' characteristics. Patients were classified into three groups of control, Pethidine and acupuncture (27–30 women in each group). All women with a first and second pregnancy. VAS pain ruler was used as data collection tool. Data were analyzed in SPSS software, and using ANOVA and kruskal–Wallis tests.

Results: The average pain score in control group 30 min after intervention was 7.80, while in Pethidine and acupuncture groups respectively were 6.87 and 5.77. Kruskal–Walis test showed that three groups in pain severity had significant difference at this time. The average length of the active phase of labor in Pethidine and acupuncture groups was 175 min while this time in control group was 243 min that ANOVA test showed a significant difference ($P = 0.000$).

Conclusion: Results showed that acupuncture can significantly reduce labor pain in 30 min after intervention, while it had no effect on labor pain at full dilatation. However, both in Pethidine and acupuncture groups, the length of the active phase has been considerably shortened.

Key Words: Acupuncture, labor pain, pethidine

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INTRODUCTION

There is an inverse correlation between parturient woman's socio-economic status, age and education with

the amount of labor pain. Also, the mother's weight and physical characteristics as well as the situation of the fetus directly influence labor pain. Especially, the normal ratio of weight to height has a significant impact on labor pain in primiparous women. It means that, in terms of her height, the heavier mother, the more painful her childbirth.^[1] Fear, anxiety and stress can exacerbate pain perception and behavior. For example, one of the most prevalent causes of anxiety is ignorance or misinformation about the phenomenon of childbirth. An ignorant parturient, especially when she is primiparous, because of fear of unknown, death, pain and probable problems may develop confusion

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and tension. Therefore, a parturient woman with unintended and unplanned pregnancy who shows a negative and obscure reaction to her pregnancy will have more pain severity and pain behavior.^[2] Different studies have shown that anxiety and labor pain may increase abnormal fetal heart patterns and decrease the first and fifth minute APGAR score.^[3] Studies show that reducing labor pain not only decreases emotional reactions and suffering but also eliminates or mitigates the maternal and fetal complications.^[4]

In fact, the more prolonged the delivery the more the risk of newborn's death. For example, if childbirth takes 24 h, the newborn mortality will be increased to six-fold.^[5] Also, when labor prolongs too much, the risk of maternal and fetal complications including postpartum hemorrhage, puerperal infection, impairment of the reproductive system, the mother's mood swings due to increased anxiety, pain, insomnia and fatigue, and neonatal complications such as infection, asphyxia, low APGAR and nerve injuries caused by obstetric intervention will be increased.^[6]

Nesheim *et al.*, study showed that using acupuncture during labor reduces the need of other painkillers such as meperidine, and their randomized, controlled study made the patients more satisfied.^[7]

In a study, it has been mentioned that acupuncture, homeopathy NO donors, breast stimulation or sexual intercourse are ineffective methods in all conditions or assessment is insufficient to conclude with evidence based medicine.^[8]

On the other hand, some studies showed wrist-ankle acupuncture, during the postpartum period, is effective for perineal pain relief after mediolateral episiotomy.^[9]

Acupressure seems to reduce pain during the active phase of labor in nulliparous women giving birth in a context in which social support and epidural analgesia are not available. However, the treatment effect is small which suggests that acupressure may be most effective during the initial phase of labor.^[10]

MATERIALS AND METHODS

This research is a clinical trial study in which sampling was done randomly by using random numbers in Esfahan Shahid Beheshti Hospital and based on the subjects' characteristics. This study has been registered in www.irct.ir with the code of IRCT201311157513N9. Patients were classified into three groups: Control, Pethidine and acupuncture. All women with a first and second pregnancy, who were

admitted in Shahid Beheshti Hospital for delivery in the time period between April and September 2010, were enrolled. The sample size, with the help of statistical consultant and based on data obtained from previous similar studies, was calculated to be 27–30 women in each group.

First or second term pregnancy, having no abortion, EP and Hydatidiform Mole, 18–35 age group, no history of chronic or acute illness, no history of infertility, term pregnancy (37–42 weeks), no CPD, have not received any painkiller until 4 h before intervention, active phase of labor (4–5 cm dilatation) were included to the study.

Fetal distress, severe maternal hemorrhage and thick meconium, internal medical diseases in pregnant women were excluded.

Data were collected using 10 cm McGill pain ruler, interview and questionnaire.

After random sampling and the subjects' voluntary and written consent to participate in the study a brief explanation on how to use pain ruler to measure pain severity was rendered. Women in control group (n = 27) underwent the hospital's routine cares in the form of oral communication and no painkiller was prescribed for them. The Pethidine group (n = 30), after entering into the active phase of labor, received 50 mg intramuscular Pethidine but the injection was no longer repeated [Figure 1]. In acupuncture group (n = 28) at first an explanation was given about how and where the needles will be inserted into the body and the patients were asked to report any probable burning or tingling they felt. When entering into the active phase of labor was proved, two needles were inserted in LI 4 point (Hegu point) in two hands and in ST-36 point (Zu san li point) in two legs that were disinfected by alcohol. The anatomic location of LI 4 point is on the dorsum of the hand and behind the abductor muscle of thumb and ST-36 point is located on the lateral side of the leg. The needles are left in the points for 20 to 30 min. Before intervention, by using VAS pain ruler, pain severity was measured in three groups and between the contractions. Then 30 min after intervention, pain severity was again assessed, and once more it was measured at the end of the first phase at full dilatation.

VAS pain ruler was used as data collection tool that due to its frequent usage and applicability in different studies is considered to be valid. The questionnaire also was designed based on library studies and was judged and approved by the university professors. Collected data were analyzed in SPSS software, and using ANOVA and KWH (kruskal Wallis) tests.

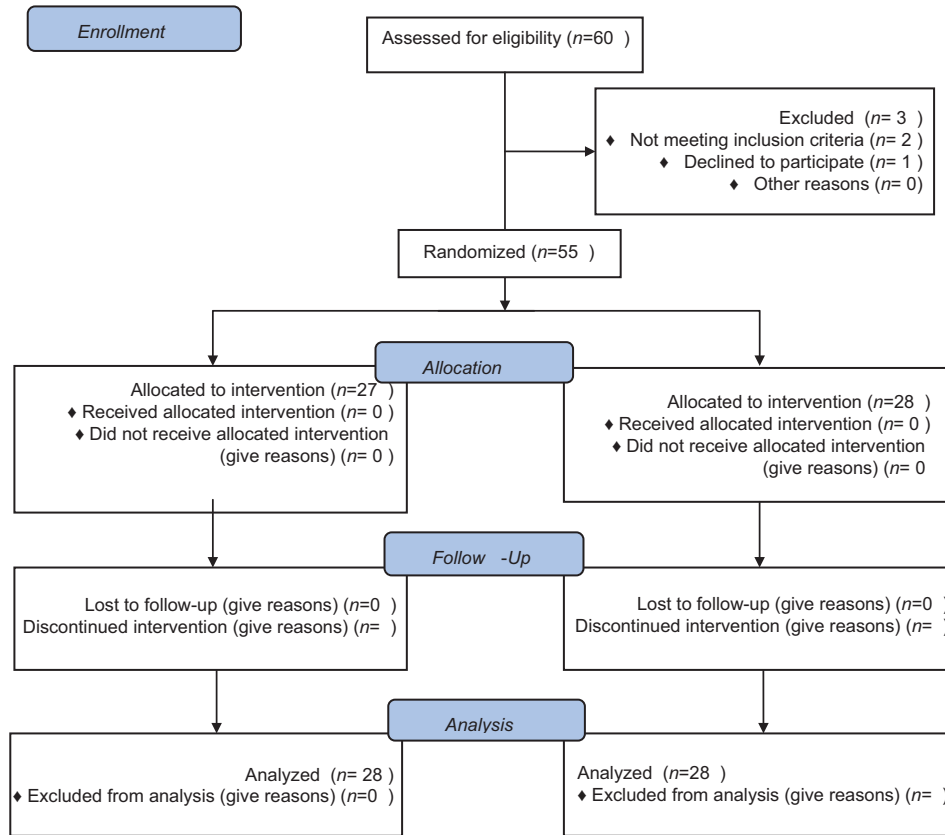


Figure 1: Study flowchart

RESULTS

Comparing the age of subjects in groups it was shown that the mean age of the cases in three groups was 25, ranging from 18 to 35. The mean age of the three groups determined by ANOVA test showed no significant difference between the groups ($P = 0.938$). Most of the subjects (39%) are between 25 to 29 years and only one percent of the subjects are in age 33 to 35. Evaluating the frequency of gestational age showed that the most frequency (26%) belongs to the group with gestational age of 39–40 weeks, and the least frequency (19%) to the group with gestational age of 37–38 weeks.

In evaluating the frequency distribution of parity, no significant difference was observed between the first and second pregnancies. A total of 49 percent of the cases were experiencing their first pregnancy and for 51 percent of the rest was their second pregnancy ($P = 837\%$). However, in terms of parity, no significant difference was observed between the subjects in the three groups ($P = 0.834$) [Table 1].

The highest mean for pain severity in three groups before intervention was 6 (20%) and the lowest mean was 3 (1%) and no significant difference was observed between the groups ($P = 0.259$). Comparing

Table 1: Frequency distribution of parity in three groups

Groups	First pregnancies (%)	Second pregnancies (%)	P
Control	10 (40)	15 (60)	0.834
Acupuncture	6 (46.2)	7 (53.8)	
Pethidine	6 (50)	6 (50)	

the subjects’ mean score of pain severity 30 min after intervention: In the acupuncture group the mean of pain severity was determined to be 5.77 with the minimum of 3 and maximum of 9; in Pethidine group the mean was 6.87 with the minimum of 4 and maximum of 10, and in control group the mean of pain severity was measured as 7.8. ANOVA test showed a significant difference between the three groups (P value = 0.0001). Comparing the mean of pain severity in subjects at full dilatation suggests that the mean of pain score for the subjects is more than 8. In comparing the subjects’ mean scores of pain severity in three groups at full dilatation no significant difference was observed ($P = 0.133$) [Table 2, Figure 2].

In Figure 2, pain severity in three groups before and 30 min after intervention also at the end of the first phase are compared with each other. As mentioned, in the first and third columns (that is before intervention

Table 2: Comparing the mean scores of 1and 5-minute APGAR in the subjects of three groups

Groups	The mean of APGAR1	The mean of APGAR5	P
Control	8.5	9.97	0.080
Acupuncture	8.57	9.90	
Pethidine	8.13	9.77	

APGAR: Appearance, pulse, grimace, activity, respiration

and at full dilatation) no significant difference was observed between the groups; while, in the second column which shows the pain severity in the control, the difference between acupuncture and Pethidine groups, in pain severity, is statistically significant and the mean of pain severity is lower in the acupuncture group.

The APGAR mean in the Pethidine group was lower than two other groups but this difference was not significant ($P = 0.08$). Min APGAR score in three groups was 7 and the maximum score was 10 [Table 2].

Comparing the duration of the active phase of labor in the subjects shows that the average of this time in acupuncture group has been 175.8 min with a min of 45 min and maximum of 300 min. The average of this duration in Pethidine group has been 175.13 min with a min of 60 and maximum of 300 min. But in control group the mean is 243.77 [Figure 3].

In terms of postpartum hemorrhage, it was observed that the subjects in all three groups had mild hemorrhage. Only two subjects of control group and one subject of acupuncture group had a severe bleeding and therefore no significant difference was observed between the groups ($P = 0.537$) [Figure 4].

Finally, three cases in each group of Pethidine and acupuncture and two cases in the control group because of thick meconium or fetal distress after abruption or CPD (cephalo pelvic disproportion) led to caesarian, that this difference statistically is not significant.

DISCUSSION

Labor pain is considered to be among the most severe pain syndromes. Even its severity is 8 to 10 scores higher than the pain of cancer, amputation and herpetic neuralgia. Labor pain has some known complications for the mother, fetus and the process of childbirth and this issue, in spite of new developments in medicine is considered to be one of the problems in the field of medical science. Hence, in the management of labor pain some safe and secure methods should be employed that are effective both for mother and fetus and do not interfere with delivery process and mother’s alertness and physiological actions.

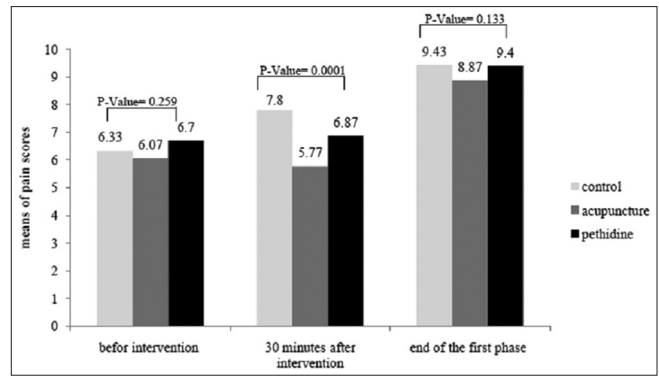


Figure 2: Comparing the means of pain scores in three groups and 3 phases

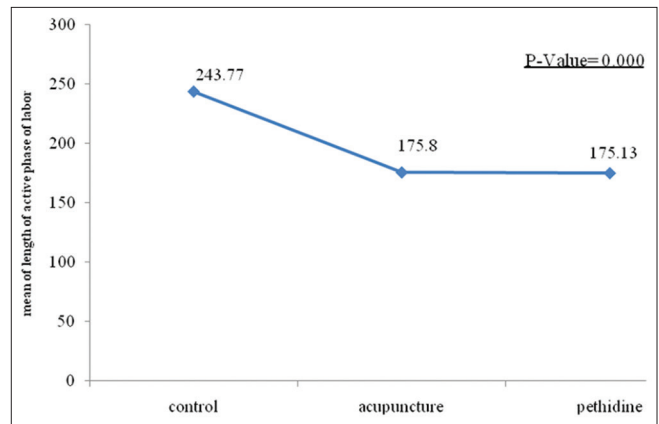


Figure 3: Comparing the length of active phase of labor in the subjects of three groups in terms of minute

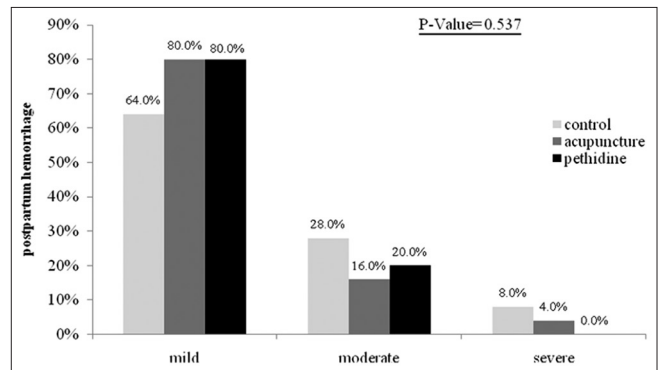


Figure 4: Comparison of postpartum hemorrhage in the subjects of three groups

Acupuncture is one of the non-pharmacologic approaches to pain management and control that have been traditionally used since 3,000 years ago. It is believed that inserting the needles in certain parts of the skin will balance the life energy which is flowing in the body channels and passes through the main organs.^[11] Applying acupuncture could markedly shorten the active phase of the first stage of labor and lower the VAS score of uterine contractive pain.^[12-15]

The negative correlation between the age and expression of pain in women in the active phase of labor was obtained by Melzack, as women who were younger than 20 expressed more pain.^[1] For this reason, the three groups were homogenized and, therefore, in terms of age, there is no significant difference between the groups.

Many believe that gestational age and the expression of pain severity are negatively correlated and especially in premature labor the pain is more severe. Therefore, the three groups were homogenized in terms of gestational age and no significant difference was observed between the groups.^[16]

Three groups do not differ in terms of parity. Melzack in assessing the severity of labor pain in parturient women, observed that pain severity in primiparous is more than multiparous women. This variable also was homogenized in the three groups.^[1]

The remarkable point is that most women in the active phase had 4–5 cm cervical dilatation and a pain score of 6 to 8 that descriptively is considered to be a severe pain. It means that more than half of the women experience a very severe labor pain from the beginning of the active phase. Only 2 percent of women had mild pain and six women (5%) complained about severe and intolerable pain. Melzack and Wall, who have conducted extensive studies on labor pain, believe that 70 percent of primiparous women and 50 percent of multiparous women suffer from severe pain at the first stage of labor. They also found out that the large amount of the pain in this first stage is essentially emotional and associated with the parturient woman's stress, anxiety and lack of awareness.^[4]

In the pre-intervention stage the severity of labor pain is not significantly different in the three groups and most women of three groups complain about severe pain. A comparison of labor pain severity in three groups 30 min after the intervention showed that the severity of labor pain in the acupuncture and Pethidine groups is significantly different from the control group, that means, acupuncture and Pethidine have been able to reduce the severity of pain significantly ($P = 0.0001$). Williams considers Pethidine as one of the most effective medications in controlling labor pain,^[17] and the point is that acupuncture like Pethidine and even more effectively is able to reduce labor pain.

Similar results also were obtained in studies conducted by Temfer *et al.*^[18] In studying 40 women who were undergoing acupuncture, they observed that compared to control group, labor duration, using Oxytocin and especially the severity of labor pain in these women have been significantly reduced.

Ramnero has also suggested that acupuncture provides the mother with calmness and relaxation, and therefore increases the mother's control in coping with labor pain and reduces the pain expression in those who receive it.^[19]

Loudermilk concluded that this reduction in perceived pain severity achieved by non-pharmacological methods of pain control is possible in terms of the gate control theory of pain. He continues that acupuncture, through reducing pain transmission capacity and even by blocking pain signals at cerebral-spinal level, can decrease the severity and perception of labor pain.^[20]

Similarly, Eappen *et al.* has conducted extensive studies on non-pharmacological methods of labor pain control, suggests that by inserting the needles in specific points, that organ's blocked energy will be flowed. The flow of energy (Qi) in organs of the body will improve the pain and illness.^[21]

Despite the mentioned good effects of acupuncture on the management of pain, this method has not been well-used to control labor pain. Also, no major side-effects have been reported, save few mild ones such as bruises, vasovagal stimulation and tingling sensation in the areas where the needles are inserted. On the other hand, Lyrans in their studies used acupuncture but could not reduce the severity of labor pain significantly and markedly.^[22]

In the study conducted by Nesheim, the group who received Pethidine during their labor reported an excellent pain relief for a short time, however, when the time of labor prolonged the efficiency of Pethidine was decreased.^[7] Likewise, in Scott's studies, using Pethidine especially in the first stage of labor is considered to be a factor in reducing pain.^[23] A comparison between the severities of labor pain at full dilatation of the cervix and the end of the first stage of labor showed that at this stage, in terms of pain severity, there is no significant difference between three groups; 75 percent of the subjects suffer from a severe and unbearable pain and rest of them complaint about severe pain.

In fact, in our study, acupuncture has not been able to continue its effectiveness in reducing labor pain at this stage. Thus, our study is not in line with other studies^[18] which have been able to reduce pain until the last stage of the labor and it is probably due to the non-repetition of acupuncture in our study, since in other studies if mother requested or the labor prolonged, acupuncture would have been repeated several other times and every time for 20 min. Likewise, in other studies the 4-point and 6-point methods have been used, while in our study

the needles only once were inserted in four points and remain there for 20 to 30 min.

Comparing the first and fifth minute APGAR scores of the newborn infants showed no significant difference in three groups. The APGAR score of 85% of the newborns was 8–10 and, while the fifth minute APGAR score in all newborn infants was 8–10. Williams believes that the first minute APGAR score of 8–10 for newborns shows that they are in a very good condition. Our study also suggests that interventions such as acupuncture and injection of Pethidine have no side-effects on newborns. And it is in spite of the fact that Williams believes that using Pethidine can cause neonatal respiratory depression.

The average length of the active phase of labor in the cases of three groups was significant $P = 0.0001$. That is in two groups acupuncture and pethidine the average length of labor is 68 min less than the control group. Ramnero and Nesheim, in their studies compared the acupuncture and control groups and found out a significant and considerable decrease in the length of labor in the acupuncture group.^[7,19]

Loudermilk says that the hormones such as catecholamine, cortisol and epinephrine which are produced by mother's response to stress when coping with the pain of labor can give disorder in contractions of the smooth muscle of the myometrium and impair dilatation and thus increase the length of labor, obstetric interventions and maternal-fetal complications.^[20] In this regard, Ramnero in his studies observed that acupuncture can increase mother's calmness and relaxation, maternal control and coping with the mechanism of labor which in turn can improve the progress of dilatation and shorten the length of the active phase of labor.^[19]

Comparing the subjects of three groups, in terms of postpartum hemorrhage, showed no significant difference in the three groups. Several studies have shown that acupuncture and Pethidine do not increase postpartum hemorrhage. Likewise, the cases lead to Caesarean delivery were not significantly different in the three groups, that is, in comparison with the control group, using Pethidine and acupuncture, in order to reduce labor pain, did not change the number of cases lead to Caesarean delivery. Also in Ramnero's study,^[19] using acupuncture during the labor had no side-effect on the procedure of delivery and on mother-newborn outcomes.

CONCLUSION

At the end it is worth mentioning that disagreement

about acupuncture and its effect on the process of labor is probably due to the differences in the methods, the length of time it is used and genetic differences between individuals.

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