



Effect of Acupressure Point (LI4) on Anxiety Levels of Pregnant Women during Labor: A Systematic Review and Meta-Analysis

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Abstract

Background: Using medication to reduce pain has adverse effects. It is, therefore, better to use non-pharmacological methods for pain relief. One of these methods is acupressure. The present study aimed to investigate the effect of acupressure point (LI4) on the anxiety levels of pregnant women during labor.

Materials and Methods: In this systematic review and meta-analyses, online databases, including Medline, Cochrane Library, EMBASE, and Scopus were searched up to November 2020 using keywords such as (Anxiety) AND (Acupressure). The final version of the Jadad scale, which comprises three important items, was used for evaluating the quality of trials.

Results: Results showed that the patients in the acupressure with ice group were not different from patients in touch group [SMD= -1.26; 95% CI: -2.86 to 0.614; p=0.205; heterogeneity; I²: 96.58%; p<0.001; 2 trials]. Women in the group of acupressure without ice [SMD= -0.83; 95% CI: -1.147 to -0.520; p<0.001; heterogeneity; I²:0%; 2 trials] reported significantly lower anxiety than those in the control group. Also, the meta-analysis showed that acupressure without ice was more effective than acupressure with ice in decreasing anxiety levels [SMD=-0.86; 95% CI: -1.18 to -0.55; p<0.001; heterogeneity; I²:64.47%; p=0.09; 2 trials].

Conclusion: Based on the results, acupressure point (LI4) with ice was not different from touch, but acupressure without ice resulted in significantly lower anxiety than the control group. However, these findings should be interpreted with caution due to the small sample size and the low number of studies.

Key Words: Anxiety, Acupressure, Hegu point, Labor, LI4.

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1- INTRODUCTION

Pregnancy and labor are considered evolutionary stages in a woman's life (1). Since not all women are emotionally balanced, they may respond differently to pregnancy and labor (2). One of the most important events in the life of every woman is childbirth and motherhood. Childbirth is one of the most sacred moments of creation and, at the same time, one of the most painful and distressing experiences in mothers' lives. Labor is a potentially stressful situation for the mother, and 70% of primiparous women experience anxiety during pregnancy and labor. Studies have shown that anxiety during pregnancy can lead to consequences such as low birth weight, reduced Apgar score, preterm delivery, limited intrauterine growth and fetal asphyxia, abortion, cleft palate, and pyloric stenosis in the fetus (3, 4).

Anxiety is the most common emotional response of women during labor and can have adverse effects on the fetus and the mother. During labor and delivery, the mother feels entangled in a chain of anxiety, fear, and pain (5). The causes of anxiety during labor include unfamiliar environment, complex medical equipment, continuous monitoring of fetal heart rate, and painful medical interventions (3). Increased pain and anxiety by stimulating the sympathetic nervous system leads to an increase in catecholamines, which reduces effective uterine contractions and slows down the delivery process (6).

Acupressure is a therapeutic method in traditional Chinese medicine that involves stimulating points, especially the fingertips, to treat and reduce pain (7). Acupressure is one of the new methods to reduce anxiety. Although no precise information is available on the main mechanisms of acupuncture and acupressure, they seem to act by releasing neurotransmitters in the central nervous system, including serotonin, thus

producing a sense of calmness and improving anxiety disorder in individuals (8). Acupressure is a branch of acupuncture in which the hand or the finger pressure is used instead of a needle. Acupressure is used as an effective technique not only to facilitate but also to manage labor pain in traditional Chinese medicine. In this study, a point called Hugo is selected. Hugo point is one of the most important points of the colon energy channel. This point is located on the back of the hand, between the first and second bones of the palm, next to the base of the second metacarpal bone. Stimulation of this point can reduce pain anywhere in the body (9, 10). Chao et al. (2017) found that the Hugo point stimulation can be used as an effective and safe method to reduce labor pain (11).

Skilnand et al. (2002) found that acupuncture on certain points, including Hugo point, reduces labor pain and no pain relief medications are needed (12). Although acupressure is a supportive, inexpensive, and practical intervention and its use as a low-risk method is increasing, there is little to support the positive effect of acupressure on the level of anxiety of pregnant women during labor. The aim of this study was to assess the effect of Acupressure Point (L14) on the anxiety levels of pregnant women during labor.

2- MATERIALS AND METHODS

Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) checklist was used as a template for this systematic review and meta-analysis (13).

2-1. Eligibility criteria

Participants, interventions, comparators, and outcome (PICO) was used to formulate the review objective and inclusion criteria.

2-1-1. Participants: Pregnant women.

2-1-2. Interventions: Any type of oral appliance as the primary treatment, use of oral appliance in conjunction with other treatment modalities, comparison between different types of oral appliances, comparison between oral appliances and other treatment modalities.

2-1-3. Comparators: Treatment vs. control group, treatment vs. different type of treatment, before vs. after treatment.

2-1-4. Outcomes: Primary outcome: reduction of anxiety levels, secondary outcomes: significant changes in anxiety levels.

2-2. Included studies: All clinical trials which assessed the effect of acupressure with or without ice in point LI-4 on anxiety during labor were included. Pilot, preliminary, and case report studies were not included due to limited sample size and a higher risk of bias. Included studies were published in English and Persian up to January 2020.

2-3. Information sources

A systemic search of electronic databases Medline (via PubMed), Web of Science, Cochrane, EMBASE- Ovid, and Scopus was conducted. The following keywords were searched: (Anxiety) AND (Acupressure OR Acupress OR Acupoint OR Acupoints OR Acupoint OR Hegu OR Pregnant OR Women).

2-4. Data extraction

A table was designed to extract data by the research team and two researchers reviewed each article. The following data were extracted and displayed in **Table.1:** Sample size, Duration of intervention, Assessment tool, and Results.

2-5. Study selection

A database search was conducted for possible studies. Abstracts of the studies were screened for identification of eligible studies, full-text articles were obtained and assessed, and a final list of included studies was made. This process was done independently and in duplication by two reviewers and any disagreement was resolved by a third reviewer.

Table-1: General characteristics of included studies.

Authors, Country, Year	Number of subjects in intervention /control	Type of intervention	Control group	Duration	Assessment tool	Results
Kaviani et al., 2012, Iran, (15)	55/ 55/ 55	Acupressure, Group II: ice massage	Group III: control	Intervention period lasted for 30 minutes	Spielberger State-Trait Anxiety Inventory	Anxiety levels were significantly reduced in comparison with the control group.
Mirzaee et al., 2020, Iran, (17)	30/ 30/ 30	Acupressure without ice	Touch	Intervention period lasted for 30 minutes	Spielberger State-Trait Anxiety Inventory	Women in the group of acupressure without ice reported less anxiety in comparison with acupressure with ice (p=0.04). The difference in pain severity before and after treatment with acupressure with (RCI $\frac{1}{4}$ 2.86) or without ice (RCI $\frac{1}{4}$ 5.54) was clinically significant. The intervention was not clinically meaningful in terms of anxiety.

2.6. Risk of bias in individual studies

The final version of the Jadad scale, which comprises three important items, was used for evaluating the quality of trials. The Jaded scale ranges from 0 to 5 points (14). These items included randomization (if randomization was conducted and if it was done appropriately), blinding (if the trial was blinded and if it was done appropriately), and reporting withdrawals and dropouts (if rate and reasons for withdrawals and dropouts were reported) (Table.2). A total of 175 articles were deleted after searching three databases, and 171 articles were deleted after reading the

titles and abstracts. Finally, the full texts of four articles were assessed in detail (Figure.1). The assessment was done by two reviewers independently and in duplication and any discrepancies were resolved by a third reviewer.

2-7. Statistical analysis

All statistical analyses were performed using the Comprehensive Meta-Analysis Version 2 (Biostat, Englewood, NJ, USA). For the heterogeneity assessment, the Cochran Q test ($p < 0.05$ as statistically significant) and I^2 index were used.

Table-2: Assessment of risk of bias through eligible studies.

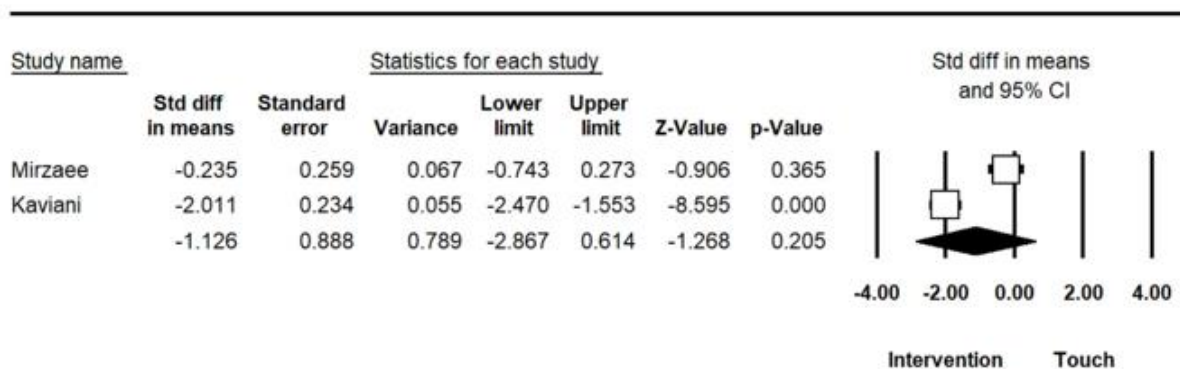
Name of authors, Reference	Randomization			Blinding			Report of dropping out
	Mention randomization	Appropriate method	Inappropriate method	Mention blinding	Appropriate method	Inappropriate	Withdrawals and dropouts
Kaviani et al., (15)							
Mirzaee et al., (17)							

: Low risk of bias. : High risk of bias.

3- RESULTS

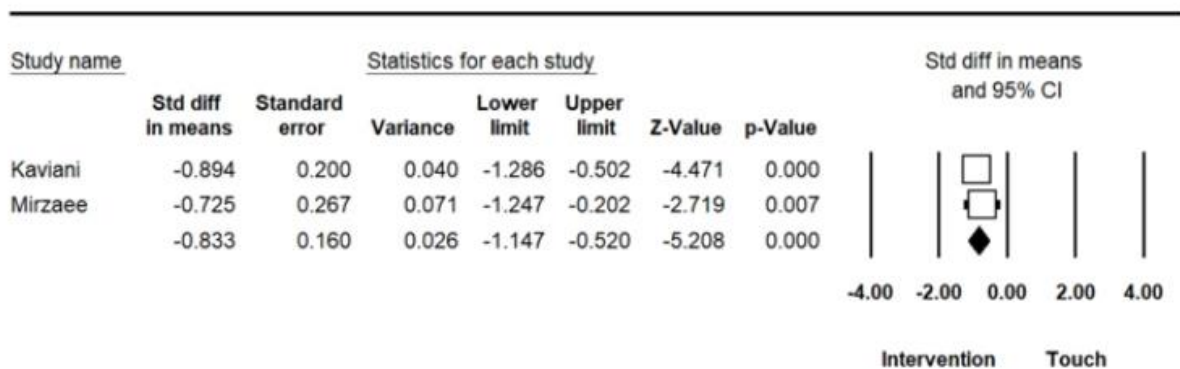
Two studies were included in the meta-analysis (15, 16). It showed that the acupressure with ice group was not different from the touch group [standardized median difference [SMD= -1.26;] 95% Confidence Interval [CI];-2.86 to 0.614; $p=0.205$; heterogeneity; I^2 : 96.58%; $p<0.001$; 2 trials; Figure.1]. Women in the group of acupressure

without ice [SMD= -0.83; 95% CI: -1.147 to -0.520; $p<0.001$; heterogeneity; I^2 : 0%; 2 trials; Figure.2] reported significantly lower anxiety than those in the control group. The meta-analysis showed that acupressure without ice was more effective than acupressure with ice in improving anxiety level [SMD=-0.86; 95% CI: -1.18 to -0.55; $p<0.001$; heterogeneity; I^2 :64.47%; $p=0.09$; 2 trials; Figure.3].



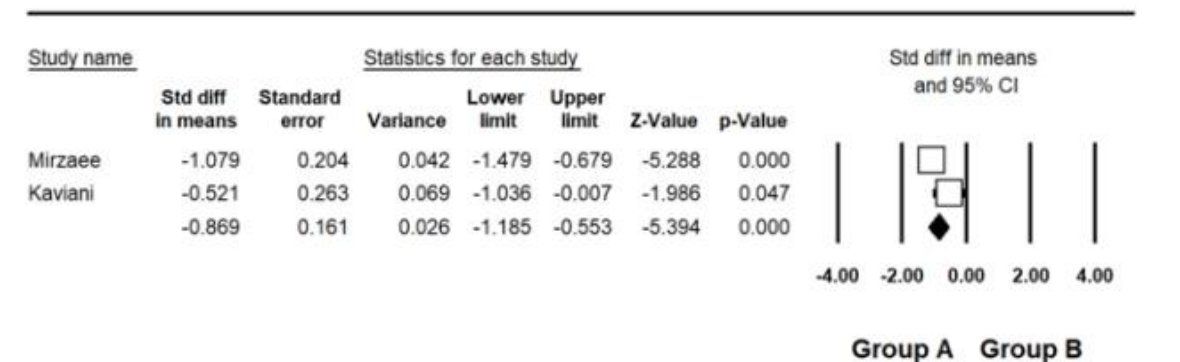
Meta Analysis

Fig.1: Comparison of the effect of acupressure on anxiety in ice group with touch group. The horizontal lines denote the 95% CI; ■ Point estimate (size of the square corresponds to its weight); ♦, Combined overall effect.



Meta Analysis

Fig.2: Acupressure without ice group on anxiety. The horizontal lines denote the 95% CI; ■ Point estimate (size of the square corresponds to its weight); ♦, Combined overall effect.



Meta Analysis

Fig.3: Comparison of acupressure without ice and with acupressure with ice. The horizontal lines denote the 95% CI; ■ Point estimate (size of the square corresponds to its weight); ♦, Combined overall effect.

4- DISCUSSION

According to control theory, a relationship exists between pain and psychological issues such as anxiety. The women with less anxiety experience less pain during labor. As a matter of fact, severe spasm of the pelvic and perineal muscles due to anxiety increases the severity of labor pain and can affect the progress of labor. Anxiety during labor increases the abnormal progression of labor by increasing the blood concentration of epinephrine and light epinephrine (18), so reducing anxiety during labor is very important. Using acupuncture, the levels of serotonin, endomorphins, beta-endorphins, and enkephalins in brain tissue and serum increase which finally leads to pain relief, relaxation, and improved motor function.

Due to these beneficial effects, acupuncture is used today for the treatment of various diseases including pain syndromes such as migraines and psychological disorders such as depression and anxiety. Acupuncture relaxation is achieved by inhibiting pain in the spinal cord and activating the central points of pain regulation by the secretion of opioids and other peptides that have been proven by neurological imaging techniques. Acupressure also improves circulation and energy in the body, the balance between the yin-yang symbols, the secretion of neurotransmitters, the activation of the opioid system, and the removal of lactic acid and carbon monoxide accumulated in the body as a result of muscles contraction. Therefore, it maintains the normal function of the body and relaxation and reduces anxiety in patients. Acupressure increases the satisfaction of patients and reduces the cost of treatment. It does not leave any adverse side effects even if it is done incompletely and it is very easy to learn and perform (19). A study on acupressure investigated several points on anxiety in the delivery room. Ranjkesh et al.

conducted a randomized clinical trial study on 130 mothers admitted to the Labor ward of Razi Hospital, Qazvin in 2018. The participants were randomly assigned to intervention and control groups. In the intervention group, Points SP6 and NEIMA in dilatation of 4 cm were simulated, which continued for 0.5 h, and then in dilatation of 8 cm, Points H7 and LI4 were simulated until the end of labor by TENS. The control group received routine midwifery care. Acupressure had a significant effect on the mean score of manifest anxiety in the intervention group compared to the control group ($p=0.001$). The difference between the mean scores of latent anxiety in the intervention group compared to the control group was also statistically significant ($p = 0.048$). It was concluded that stimulation of Points SP6, LI4, H7, and NEIMA is effective in reducing the latent and manifest anxiety of primiparous women and it is suggested as a treatment method for anxiety in pregnancy and labor. Stimulation of Points led to releasing endorphins and stimulating the three major areas of the brain, including the spinal cord, midbrain, and pituitary gland. The low-frequency pulses stimulate the small nerves in the muscles, including the efferent nerves, and endorphin reached the highest level 30 min after the onset of stimulation and remained high for up to 10 min. Also, intense stimulation and frequency of H7 and LI4, in addition to releasing endorphins, increased the level of serotonin in the pons located in the medulla oblongata and went from the pons of the efferent fibers to the spinal cord, releasing dynorphins in the spinal cord (20). In a study, Mirzaee et al. performed an interventional study on 70 primiparous pregnant women ($n=35$ in the control group, $n=35$ in the experimental group) who were referred to the pain room. The subjects were 37 weeks or longer pregnant and their cervical dilatation was 3-4 cm. The experimental group underwent reflexology for 20 min. In the

control group, another point (their legs) was massaged for 20 min. Before the intervention, the level of anxiety was the same in both groups ($P = 0.85$); however, after the intervention, the level of anxiety in the experimental group significantly decreased compared to the control group ($P < 0.001$). Nevertheless, no statistically significant difference was observed between the two groups in terms of the pulse ($P=0.44$), and blood pressure ($P=0.59$) (21).

In a study, Akbarzadeh et al. performed a clinical trial with a sample size of $n=150$ (50 people in each group) by convenience sampling method at Hafez Teaching Hospital in Shiraz, Iran in 2013. Balloon therapy was applied for 15-20 min four times a week and acupressure was applied for 20 min according to the rotational model. The results showed that the severity of postpartum anxiety was reduced in both balloon therapy and acupressure intervention groups. However, in the balloon therapy intervention group, a significant reduction was reported, so it can be used as an effective treatment to reduce postpartum anxiety (22).

The results of a study showed that acupressure at Point P6 is effective in reducing anxiety and depression in patients. Therefore, it is suggested as a simple, inexpensive, and practical method for the patient. As a result, acupressure, its contraindications, and other necessary training are recommended to patients (23). The results of another study on the positive effects of acupressure in reducing anxiety and improving the quality of life of patients with diabetes showed that the necessary training should be provided to medical personnel, including nurses, on acupressure and its effectiveness (24). The results of a study showed a significant reduction in anxiety of patients in an experimental group, demonstrating that acupressure is a suitable method to reduce the anxiety of patients undergoing

coronary angiography (24). However, there are few studies on anxiety during labor. According to the study results, acupressure at Points GB21, SP6, LI4, and BL23 significantly reduces anxiety during labor (20).

5- CONCLUSION

The study results showed that acupressure with ice group was not different from the touch group, but the acupressure without ice group reported significantly lower anxiety than those in the control group. However, these findings should be interpreted with caution due to the small sample size and the low number of studies.

6- AUTHORS' CONTRIBUTIONS

Study conception or design: FF, SM, and ND; Data analyzing and draft manuscript preparation: SM, and RA, Critical revision of the paper: FF and ND, Supervision of the research: FF, and ND; Final approval of the version to be published: FF, SM, RA, and ND.

7- CONFLICT OF INTEREST: None.

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