

An Evaluation of Acupressure on the Sanyinjiao (SP6) and Hugo (LI4) Points on the Pain Severity and Length of Labor: A Systematic Review and Meta-analysis Study

Abstract

Background: In this study, the effects of SP6 and LI4 acupressure on the pain severity and length of labor are examined. **Materials and Methods:** This systematic review and meta-analysis study was performed on articles published in 2004–2015. The articles, published in the English and Farsi languages, related to the effects of acupressure on the SP6 and LI4 points on the length and pain severity of labor. Data were collected by searching medical databases, including PubMed, ISI, MagIran, Google Scholar, Iran Medex, SID, Irandoc, and EMBASE, for relevant material. **Results:** Women who received SP6 acupressure experienced less pain immediately after the intervention [-0.56 , 95% confidence interval (CI): -0.77 , -0.36] than women in the touch group and exhibited decrease in the length of labor (-0.99 , 95% CI: -1.39 , -0.39), the active phase (0.95 , 95% CI: -1.30 , -0.61), and the second stage of labor (-0.39 , 95% CI: -0.74 , -0.03). Women who received LI4 acupressure experienced less pain immediately after the intervention (-0.94 , 95% CI: -1.36 , -0.53) than women in the touch group and exhibited shorter active phase (-0.91 , 95% CI: -1.18 , -0.63) and second stage of labor (-0.55 , 95% CI: -0.95 , -0.15) lengths. **Conclusions:** The use of SP6 and LI4 acupressure shows promise as a method for managing the length and pain severity of labor, but further study is required to establish its effectiveness along with other pharmacological and nonpharmacological methods.

Keywords: Hugo, Iran, labor, meta-analysis, Sanyinjiao

Introduction

Vaginal delivery is simultaneously one of the most special and most painful experiences in a woman's lifetime. Most women undergo elective anesthesia or cesarean delivery, which has the potential to lead to adverse effects on the mother and child.^[1] The optimal care of the mother during delivery is the most important goal of the healthcare system; this includes relieving her pain, which may be accomplished using various pharmacological and nonpharmacological methods.^[2] Nonpharmacological techniques, such as exercise, aromatherapy, and acupressure,^[2] are preferred due to their low cost, simple implementation, and noninvasive nature.

Recent studies have focused on using complementary and alternative medicine (CAM) as a strategy to reduce the length and pain severity of delivery. Acupressure is a subgroup of CAM^[3] in which pressure is applied to specific points

on the body to relieve muscle tension, improve blood circulation, and restore the body's vital energy. It is believed that the stimulation of these points triggers uterine contractions, resulting in faster deliveries.^[4,5] Various points are used in acupressure to induce and manage delivery, including the Sanyinjiao (SP6), Taichong (LV3), Ciliao (BL32), Weishu (BL21), Huantiao (GB30), Shangliao (BL31), and Hugo (LI4)^[6,7] points. The SP6 point is located four fingers above the medial malleolus behind the posterior edge of the tibia at the junction of the spleen, liver, and kidney channels.^[8] The LI4 point, considered an important part of the large intestine meridian, is located on the back of the hand beside the second metacarpal base between the first and second metacarpal bones.^[9] Past studies have shown that applying pressure to the SP6 point can be used as anesthesia during pelvic, to promote painless childbirth, and in the treatment of urinary and reproductive

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Fateme Najafi¹,
Molouk Jaafarpour¹,
Kourosh
Sayehmiri²,
Javaher
Khajavikhan³

¹Department of Nursing,
Faculty of Nursing and
Midwifery, Ilam University of

Medical Sciences, Ilam, Iran,

²Psychosocial Injuries Research
Center, Ilam University of
Medical Sciences, Ilam, Iran,

³Imam Khomeini Hospital, Ilam
University of Medical Sciences,
Ilam, Iran

Address for correspondence:

Dr. Kourosh Sayehmiri,
Associate Professor of
Biostatistics, Psychosocial
Injuries Research Center, Ilam
University of Medical Sciences,
Ilam, Iran.

E-mail: sayehmiri@razi.tums.
ac.ir

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disorders. Acupressure on the LI4 point can improve blood flow, reduce pain and spasms, and help to get the fetus out of the uterus. Numerous studies have examined the effects of the application of pressure to any of the aforementioned points (including SP6 and LI4) in isolation during labor.^[10-18] Additionally, many studies have explored how acupressure on the SP6 and LI4 points is used to induce labor and influence the duration and intensity of delivery. However, no meta-analysis has been conducted on this subject. In this study, the effects of SP6 and LI4 acupressure on the length of labor are examined. A comprehensive summary and analysis of these studies is important to achieve reductions to the pain and duration of delivery and to determine the best methods by which to accomplish this.

Materials and Methods

This is a systematic review and meta-analysis of the articles published about the effects of acupressure on the SP6 and LI4 points on the length and pain severity of labor in English and Farsi-language publications. This article was written according to PRISMA guidelines.^[19] The McGill Pain Questionnaire (MPQ) and the Visual Analog Scale (VAS) were used.

The data for this study were collected by searching medical databases, including PubMed, ISI, MagIran, Google Scholar, Iran Medex, SID, Irandoc, and EMBASE, for all articles that included the keywords “Sanyinjiao,” “Hugo,” “delivery,” “labor,” “severity of pain,” “SP6,” “LI4,” or “acupressure” in their abstracts. These were entered into an initial list. Two researchers simultaneously conducted a literature search and independently examined the quality of the articles. The final checklist was evaluated by researchers. The studies that were deemed irrelevant to the subject were excluded, as were those whose full text was unavailable. Ten relevant studies of the SP6 point and six studies of the LI4 point were selected for inclusion.

The following information about the studies included in the analysis was gathered and evaluated: the type of study conducted; the year of publication; the authors; the number of women in the acupressure, touch, and standard care groups; the total length of the birth; the length of the active phase of labor; the length of the first and second stages of labor in the acupressure, touch, and standard care groups; and the severity of pain before and immediately after the intervention, as well as 30, 60, 120, and 180 min later, in the acupressure, touch, and standard care groups. To meet the inclusion criteria for the meta-analysis, studies had to have evaluated the effects of acupressure on the total length of childbirth in addition to the lengths of the active phase of labor and of the first and second stages of labor in women with one or more children. Studies evaluating the severity of pain according to the VAS in dilatation 3–4 were also analyzed. In addition to evaluating the effects of SP6 and LI4 acupressure on the length and pain severity of labor separately, this study was also intended to investigate

the effects of simultaneous acupressure; however, only two full-text studies in Farsi were available, and meta-analysis could not be performed on them due to lack of common data.^[20,21]

Exclusion criteria included: the use of acupressure on the LI4 or SP6 points on only one hand or foot, respectively; the use of acupressure with electrical stimuli on the skin; the use of acupressure with ice massage on the LI4 and SP6 points; the lack of a touch or standard care group to function as a control group; and a lack of data presented as mean \pm standard deviation. The reported results of the information were entered into IBM SPSS Statistics 20.0 for analysis.

The studies were combined based on their sample sizes, means, and standard deviations. Because of the low number of studies used and because these studies had been published in prestigious journals, quality criteria were not included in the analysis. The average variance was calculated using the formula of two integrated variances. The mean difference was calculated using the formula $\delta = \frac{\mu_t - \mu_c}{\sigma}$, where μ_t is the case mean, μ_c is the control mean, σ^2 is the pooled variance calculated using the equation $\sigma^2 = (n_1\sigma_1^2 + n_2\sigma_2^2) / (n_1 + n_2 - 2)$, where σ_1^2 and σ_2^2 are the variances of the case group and control group, respectively, and n_1 and n_2 represent the number of participants in each group. The heterogeneity of the studies was evaluated using Cochran's Q test and the I² index. Owing to significant heterogeneity in the studies, a model with random effects was used. In order to examine publication bias, a Begg plot and the regressions method were used. A *p* value of <5%^[22] was considered a significant heterogeneity test. Sensitivity analyses were prespecified. Statistical analyses were performed using STATA 12.

Results

In this study, the effects of SP6 and LI4 acupressure on the lengths of labor, the active phase of labor, and the first and second stages of labor as well as the severity of labor pain were evaluated by a systematic review and meta-analysis. The effects of SP6 acupressure on the length and pain severity of labor were evaluated in 10 studies in the period 2004–2015. The same effects were analyzed for LI4 acupressure in six studies in 2010–2013. The general characteristics of the studies included in the meta-analysis are shown in Table 1. At the beginning of the research, 160 articles were selected and evaluated that remained after the removal of duplicates among which 35 articles were selected. Eight of these articles were excluded because they failed to comply with the standards of our meta-analysis. Seven of the remaining 27 articles lacked sufficient information and were disqualified. Finally, 16 articles were selected for inclusion in the meta-analysis [Figure 1].

Table 1: General characteristics of the studies included in the meta-analysis

Acupressure Point	Author	Year	Country	Total number	Mean (SD) of active phase length in case group	Mean (SD) of active phase length in Touch group	Mean (SD) of severity of pain before intervention in case group	Mean (SD) of severity of pain before intervention in Touch group	Mean (SD) of severity of pain immediately after intervention in case group	Mean (SD) of severity of pain immediately after intervention in Touch group
SP6	Kordi	2010	Iran	102	—	—	3.10 (2.28)	4.14 (2.26)	4.03 (2.50)	4.45 (2.36)
	Kashanian	2009	Iran	120	252.37 (108.50)	44.38 (155.88)	5.87 (1.77)	6.79 (1.52)	5.87 (1.77)	6.79 (1.52)
	Heidari	2008	Iran	128	—	—	3.10 (2.20)	3.40 (2.10)	4.30 (2.40)	4.10 (2.50)
	Lee	2004	Korea	75	108.30 (52.10)	146.30 (60.70)	5.80 (1.80)	6.30 (2.30)	6.40 (1.80)	7.60 (1.90)
	Hamid	2013	Egypt	100	—	—	4.64 (0.96)	4.48 (0.97)	—	—
	Akbarzadeh	2013	Iran	100	183.60 (61.20)	216.60 (0.67)	6.28 (1.18)	6.24 (1.70)	4.95 (1.65)	6.18 (1.91)
	Salehian	2011	Iran	60	174 (74)	225 (20)	3.03 (1.60)	3.50 (1.50)	2.20 (1.41)	—
	Mafetoni	2015	Brazil	156	—	—	—	—	—	—
	Samadi	2010	Iran	131	—	—	3.50 (0.9)	3.50 (1.10)	3.20 (0.6)	3.50 (1.05)
	Heidari	2008	Iran	128	—	—	—	—	—	—
LI4	Dabiri	2013	Iran	149	—	—	6.48 (2.23)	6.23 (2.24)	—	—
	Salehian	2011	Iran	60	185 (44)	225 (20)	3.20 (1.40)	3.50 (1.50)	2.60 (0.95)	4 (1.25)
	Salehian	2010	Iran	60	21.66 (54.86)	265.63 (68.30)	7.40 (1.10)	7.20 (1.40)	5.30 (1.20)	6.80 (1.70)
Point	Hamidzadeh	2012	Iran	100	—	—	6.36 (1.29)	6.02 (1.30)	5.38 (0.81)	6.68 (1.35)
	Hamidzadeh	2010	Iran	100	144 (48)	186 (60)	—	—	—	—
	Kordi	2011	Iran	83	—	—	2.14 (1.33)	2.38 (1.53)	2.86 (1.38)	3.35 (1.87)

The differences in the mean scores of the various factors related to delivery in pressure points SP6 and LI4 in the touch and control groups are presented in Table 2.

In total, the studies relating to SP6 examined 1,100 subjects, and the studies on LI4 looked at 552 subjects. In ten of the studies on SP6, a second “usual care” control group was used in addition to the touch group; two studies on LI4 used a second control group.

Three of the 10 studies on SP6 compared the lengths of labor for subjects receiving acupressure to those receiving usual care and those in the touch group. They found decreased labor lengths in the acupressure group compared to the usual care and touch groups: -0.72 (95% CI, $-1.11, -0.32$) and -0.99 (95% CI, $-1.60, -0.39$), respectively. The length of the active phase of labor was investigated in four of the studies on SP6. They found the acupressure group to experience decreased lengths of active labor relative to the control groups: -0.95 (95% CI, $-1.30, -0.61$). Two studies observed a decreased length in the first stage of labor in the acupressure group, and five studies found a similar reduction to the length of the second stage of labor: -1.02 (95% CI, $-2.36, 0.22$) and -0.39 (95% CI, $-0.74, -0.03$), respectively. The severity of pain in 6 of the 10 studies on SP6 was measured using the VAS. They found no significant difference between the pain experienced by the acupressure and control groups before delivery: -0.15 (95% CI, $-0.38, 0.08$). Four of the 10 studies documented a pain reduction in the acupressure group relative to the control groups immediately after the

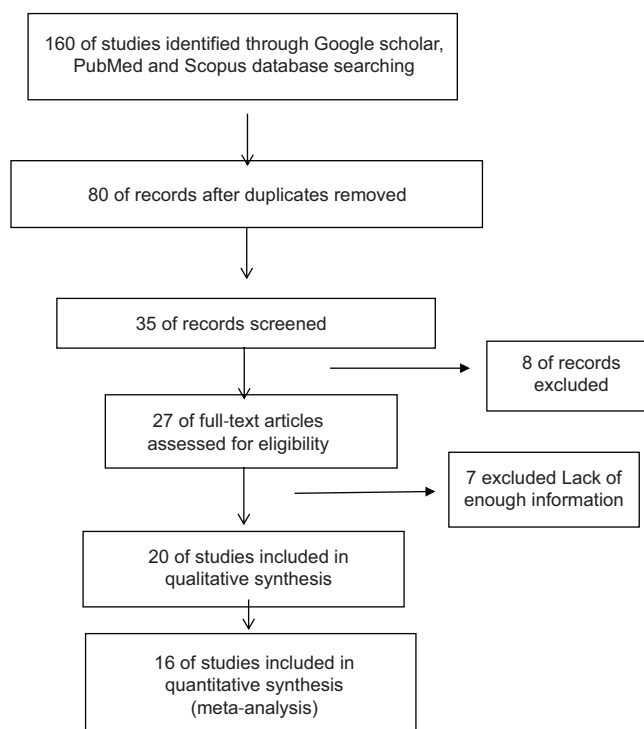


Figure 1: Study flowchart

Table 2: Characteristics studies evaluating the effects of acupressure on points SP6 or LI4 on factors related to labor and delivery

	Factors related to labor and delivery	Mean differences	95% CI	Study number
SP6	Total length of delivery in case-touch group	-0.99	-1.60, -0.39	3
Point	Total length of delivery in case-control group	-0.72	-1.11, -0.32	1
	The length of the active phase of labor	-0.95	-1.30, -0.61	4
	The length of the first stage of labor	-1.02	-2.36, 0.22	2
	The length of the second stage of labor	-0.39	-0.74, -0.03	5
	The severity of pain before intervention	-0.15	-0.38, 0.08	6
	The severity of pain immediately after intervention	-0.56	-0.77, -0.36	4
LI4 Point	The severity of pain 30 min after intervention	-0.45	-1.15, 0.25	3
	Length of the active phase of labor	-0.91	-1.18, -0.63	3
	The length of the second stage of labor	-0.55	-0.95, -0.15	4
	The severity of pain before intervention in case-touch group	0.07	-0.14, 0.27	5
	The severity of pain before intervention in case-control group	-0.19	-0.57, 0.19	2
	The severity of pain immediately after intervention	-0.94	-1.36, -0.53	4
	The severity of pain 30 min after intervention in case-touch group	-0.39	-0.93, 0.15	2
	The severity of pain 30 min after intervention in case-control group	-0.89	-2.02, 0.24	2
	The severity of pain 60 min after intervention in case-touch group	-0.51	-1.08, 0.07	3
	The severity of pain 60 min after intervention in case-control group	-0.69	-1.60, 0.23	2
	the severity of pain 120 min after intervention	-0.75	-3.44, 1.90	2

CI: Confidence interval

intervention: -0.56 (95% CI, -0.77 , -0.36). However, three studies observed no significant difference in pain levels between the acupressure and touch groups 30 min after the intervention: -0.45 (95% CI, -1.15 , 0.25). Three studies examined the length of labor in the touch group, observing that the length of labor in women who received SP6 acupressure was shorter than in those who were only touched on this point [Diagram 1].

The length of the active phase of labor was evaluated in three of the studies on the LI4 point, and a decreased length in the group that received acupressure relative to the touch group was observed: -0.91 (95% CI, -1.18 , -0.63). Four of the six studies compared the length of the second stage of labor between the acupressure and touch groups, documenting a reduced length in the acupressure group: -0.55 (95% CI, -0.95 , -0.15). No significant difference in the severity of pain before the intervention was observed between either the touch or control groups and the acupressure group: 0.07 (95% CI, -0.14 , 0.27) and -0.19 (95% CI, -0.57 , 0.19), respectively. However, the severity of pain immediately after the procedure was lower in the participants who received LI4 acupressure than in the touch group in four of the studies: -0.94 (95% CI, -1.36 , -0.53). Pain severity 30 min after the intervention was investigated in two of the studies. There was no difference between either the touch or control groups and the acupressure group: -0.39 (95% CI, -0.93 , 0.15) and -0.89 (95% CI, -2.02 , 0.24). Three studies documented pain severity 60 min after the intervention. No significant difference between

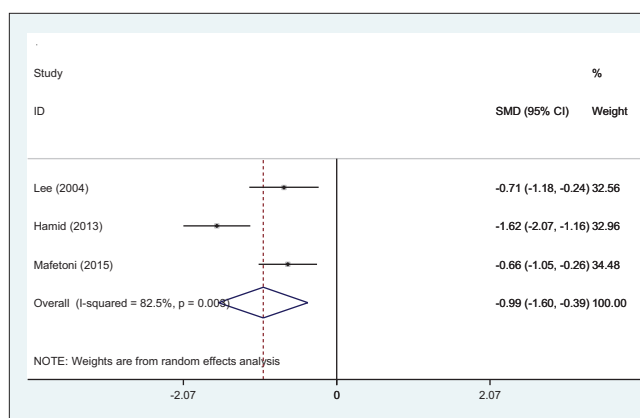


Diagram 1: The effects of SP6 point acupressure on the length of labor with 95% confidence interval: the midpoint of each segment is an estimate of the effect of pressure on SP6 point in the pressure group compared with the touch group as the first control group, according to random effects model. Diamond sign show overall estimate for total studies

either the touch or control groups and the acupressure group were detected: -0.51 (95% CI, -1.08 , 0.07) and -0.69 (95% CI, -1.60 , 0.23). Pain severity 120 min after the intervention was investigated in two of the six studies, and no significant difference was noted between the acupressure and touch groups: -0.75 (95% CI, -3.44 , 1.90). Three studies measured the length of the active phase of labor between the acupressure and touch groups, implying that the length of the active phase in the LI4 acupressure group was compared to touch at this point [Diagram 2].

No publication bias in the meta-analysis was detected using a Begg plot [Diagram 3].

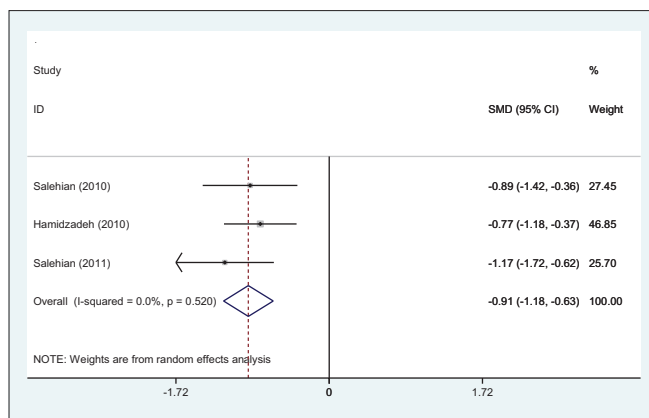


Diagram 2: The effects of LI4 point acupressure on the length of labor with 95% confidence interval: the midpoint of each segment is an estimate of the effect of pressure on LI4 point in the pressure group compared with the touch group as the first control group, according to random effects model. Diamond sign show overall estimate for total studies

Discussion

In this meta-analysis, the effects of SP6 and LI4 acupressure on the length and pain severity of labor were investigated. Ten studies were used to analyze the effects of SP6 acupressure on pain severity before and after the intervention as well as the lengths of labor, the active phase of labor, and the first and second stages of labor. Six studies examined the effects of LI4 acupressure on these factors.

In the studies that investigated the effects of SP6 acupressure, the total length of labor was shorter for women in the acupressure group than for those in the touch group. These results are in line with Lee,^[23] *et al.* who demonstrated a significant reduction in the length of labor in women who received SP6 acupressure. These results are also consistent with Mafetoni and Shimo *et al.*^[24] Acupressure may reduce the length of labor by increasing the intensity of uterine contractions without affecting the length of uterine contractions or of the intervals between them.^[11]

The length of the active phase was reduced in women who received SP6 acupressure compared to women in the touch group. This confirms the findings of Kashanian *et al.* that the mean length of the active phase in the acupressure group was significantly decreased compared to controls.^[17]

Our study found that the length of the first stage of labor was unaffected by SP6 acupressure. This disagrees with the observations of Heidari *et al.*^[13] that SP6 acupressure caused a significant reduction to the length of the first stage of labor. These results were also inconsistent with Zeisler *et al.*^[25] who found that use of CAM caused a reduction in the length of the first stage of labor.

However, our study found that the length of the second stage of labor was shorter in the acupressure group than

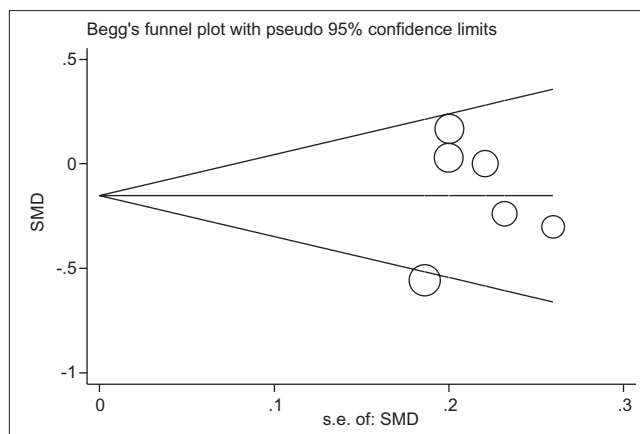


Diagram 3: Begg's funnel plot for publication bias

in the control group. This is inconsistent with Salehian's observations but agrees with Lee^[10] and Heidari *et al.*^[13] The main benefit of SP6 acupressure is on the cervix: It reduces the length of labor by helping cervical dilatation.^[4]

Our meta-analysis found that the severity of pain before the intervention did not differ between the SP6 acupressure and touch groups and that the baseline pain was almost the same; however, the severity of pain after the intervention was lower in the acupressure group than in the touch group. This agrees with Salehian *et al.*,^[15] who found that SP6 acupressure can reduce labor pain. These results were also consistent with Lee^[23] and Kashanian and co-worker^[17]; however, they were inconsistent with Heidari *et al.*,^[13] who observed no effect on labor pain.

Pain severity was measured 30 min after the intervention in the SP6 acupressure and touch groups. No significant difference was detected.

Owing to limited data, the total length of labor and the length of the first stage of labor were not analyzed in our meta-analysis for the studies on the LI4 point. However, we did find that the length of the active phase of labor was shorter in the LI4 acupressure group than in the touch group. While this confirms Hamidzadeh *et al.*^[16] and Salehian *et al.*,^[15] it is inconsistent with Chao *et al.*^[26] who found that the length of the active phase of labor was similar in women who received CAM and those in the control group.

The length of the second stage of labor was shorter in the LI4 acupressure group than in the touch group. This is consistent with Salehian *et al.*^[15]

The severity of pain before the intervention was similar in the acupressure and touch groups, but pain severity was lower in the acupressure group after the intervention. This agrees with results by Dabiri and Shahi *et al.*^[27] and Salehian *et al.*^[15] This effect may be due to the stimulation of energy channels and the creation of a balance between forces and energy flows. It may also reduce pain by

preventing the transmission of pain stimuli and increasing the production of endorphins.^[10]

Our study found no difference between the pain severity experienced by women in the LI4 acupressure and touch groups at 30, 60, or 120 min after the intervention. This is inconsistent with Kordi *et al.*,^[28] who observed a reduction to the pain severity experienced by women in the acupressure group 30 min after the intervention. Enjezab *et al.*^[29] and Waters *et al.*^[30] demonstrated that ice massages on the LI4 point 30 min after the intervention decreased pain in the acupressure group.

Our meta-analysis study has limitations. The number of studies that we examined was small, and all of the factors that we investigated were not present in every study. However, there was no bias in the studies included in this meta-analysis.

Conclusion

The use of SP6 and LI4 acupressure is an effective method to manage the length of labor and the active phase of labor. As the acupressure only affects the severity of pain directly after the intervention, the effect of using this method along with other pharmacological and nonpharmacological interventions should be further investigated. This systematic review found the data to be limited on the ideal acupressure intervention and corresponding controls, the best timing of outcome measurements, and additional staff and essential teaching. We have no complete data on the charges associated with providing acupressure during labor, and adverse reactions were often not monitored. Future studies should be planned to address these problems.

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Conflicts of interest

There are no conflicts of interest.

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