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Comparison of the Effect of Acupressure at SP6 and SP8 Points on Pain Intensity and Duration of the First Stage of Labor

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Abstract

Background: Labor pain is one of the most severe pains that women experience. Acupressure is a non-pharmacological method of pain relief without complications.

Aim: This study aimed to compare the effect of acupressure at SP6 and SP8 points on pain intensity and duration of the first stage of labor.

Method: This clinical trial was performed on 150 women admitted to a hospital in Tehran, Iran, during 2020. They were randomly divided into control, SP6, and SP8 groups. In the control group, a neutral point was selected. In dilatations of 3-4, 5-7, and 8-10 cm of the cervix, the pressure was applied to each group for 20 min. Pain intensity was measured before the intervention and then 15 and 30 min after intervention in three groups, and the duration of the first stage of labor was recorded. The data were collected using demographic and obstetrics characteristics form, observation checklist, and Visual Analogue Scale. The data were analyzed using SPSS software (version 19).

Results: The results showed that the mean pain intensity in the three stages of the intervention groups and the mean duration of the first stage of labor was significantly different from those in the control group ($P<0.001$). The Tukey post hoc test revealed that pain intensity and duration of the first stage of labor were significantly lower in the SP8 group ($P<0.001$).

Implications for Practice: It is recommended that acupressure be used as a non-pharmacological method to reduce pain and duration of labor.

Keywords: Acupressure, Complementary medicine, Labor pain, SP6 point, SP8 point

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Introduction

Labor pain is one of the most severe pains that women experience and is affected by many factors. Labor pain can lead to the loss of maternal psychological control leading to labor injuries (1, 2). The management of pain during childbirth is a fundamental challenge for health care workers who want women to have a comfortable, safe, enjoyable, and healthy delivery (3). On the other hand, prolongation of the first stage of labor is also associated with maternal and neonatal problems, perinatal death, and fetal complications, including head trauma, hypoxia, low Apgar score, and ultimately fetal death. The mother is also prone to postpartum hemorrhage and infection caused by anxiety, insomnia, and fatigue (4).

Safe and effective methods for mother and fetus should be used to reduce the severity of labor pain that does not disrupt the delivery process, maternal consciousness, force reflex, and maternal physiological functions. These side effects are more or less present following the medication methods used for this purpose (5). Nowadays, pharmacological methods (injection, inhalation, and nerve blockers, as well as anesthesia and opioids, such as pethidine) and non-pharmacological methods (hypnosis, labor in water, massage therapy, and acupressure) are used to reduce labor pain (6). Side effects with medications for mother and fetus include decreased cardiac output in the mother, risk of acidosis, injury to nerves, and prolonged labor (5).

Traditional pain relief and complementary medicine methods to control labor pain have developed highly in the last decade (7). Common forms of complementary medicine for pain relief include reflexology, acupuncture, acupressure, massage, and aromatherapy. Acupressure is a non-invasive method to reduce pain based on the principles of Traditional Chinese Medicine (8-10). Acupressure is a healthy way to promote health and improve physical function and has few side effects, and even if not done correctly, it does not cause any side effects. Moreover, it is less expensive, more acceptable for mothers than aromatherapy, hypnosis, reflexology, and has no side effects; in addition, the training of the midwives is cheaper and more accessible (5).

In this way, constant and firm pressure with the fingertips is used to stimulate the acupuncture points. In recent decades, many clinical studies have been conducted investigating the effect of acupressure on the treatment of gynecological and obstetric disorders and diseases, such as nausea, vomiting, and anxiety in pregnancy, induction of labor, reduction of labor pain, as well as reduction of cesarean section request and instrumental delivery (3, 11).

According to Traditional Chinese Medicine, there are two opposing and complementary forces in nature called Yin and Yang. These two forces interact to regulate the flow of "chi" energy. Acupressure is the use of the touch technique to balance the energy flow of the body or the "chi" of the human being (12). Diseases and injuries are caused by blocking or stopping "chi" energy in the body. There are several points as exit or entry doors for energy channels to body tissues and organs along energy channels.

In acupressure, particular points on the body's surface are applied using fingers, elbows, feet, nails, palms, thumbs, or other devices to balance the hypothetical lines of the body, which are the meridians. These points conduct electricity on the surface of the body and have a very high transmission power. The action of pressure on different parts of the body causes other sensations in the diseased organs (13). There are several points of pressure for the progression of labor and reduction of pain in the body, and it is believed that the stimulation of these points, on the one hand, stimulates uterine contractions, and therefore, progresses labor and reduces the duration of labor, and on the other hand, balances energy and reduces labor pain (4).

According to available scientific sources, acupressure can reduce labor pain with a pain gate control mechanism. Accordingly, the acupressure activates the large nerve fibers and closes the pain transmission gates. On the other hand, it may release endorphins, and thus, reduce pain (14). Pressure points (LI4, SP6, GB21, and BL32) are mostly used in labor and delivery. These points are usually suggested for increased uterine contractions, long and hard labor, and pain relief (3, 14).

A study on women who received acupuncture in these areas as part of prenatal care showed a 35% reduction in the use of induction of labor, a 31% reduction in the use of epidural analgesia, and a 9% increase in the use of epidural analgesia success rate. Natural childbirth, as well as labor duration, were shorter in this regard (14).

The Sanyinjiao (SP6) point of pressure is located 3 inches directly above the tip of the medial malleolus on the posterior border of the medial aspect of the tibia (15). The SP6 point is the most

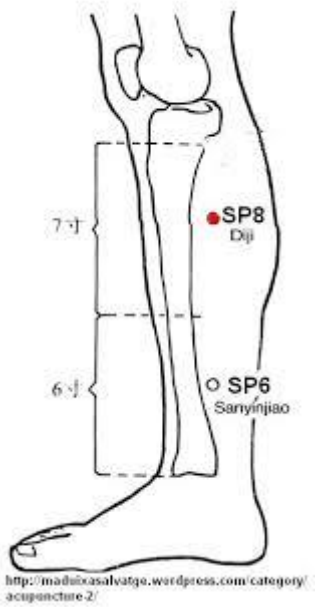

Figure 1. SP-6 and SP-8 acupuncture points(20)

common point in women's health. Research has shown that pressure at the SP6 point positively affects primary and secondary dysmenorrhea (16). A Korean study found that women who received acupressure at point SP6 experienced less labor pain, compared to women who received only touch at this point (17). Acupressure at SP6 is effective in reducing labor pain and the length of labor (15). Other clinical trials showed that labor pain and labor duration were lower in participants receiving SP6 acupressure than those in controls (17, 18).

Pressure Diji (SP8) point of pressure is located on the line that connects the tarsus to point SP6 on the leg's medial line below the tibia's inferior margin (Figure 1). The SP8 point is used to reduce pain, especially abdominal pain, bloating, diarrhea, heartburn, dysmenorrhea, and irregular menstruation (19, 20). The SP8 is the most important and commonly used point for the treatment of dysmenorrhea and is suitable for acute pain (21). The severity of dysmenorrhea is significantly reduced to about 2 hours after acupressure treatment at SP6 and SP8. In addition, after acupressure in these areas, the severity of systemic symptoms associated with dysmenorrhea decreased, except for nausea and vomiting (20).

Another study in China found that menstrual pain decreased in women who received acupressure at SP8 (22). In the review of the literature, no report was found investigating the effect of pressure on point SP8 on labor pain and duration of labor. The effect of point SP6 on labor pain has been proven so far. It seems that no study has been conducted on the effect of point SP8 on pain intensity and duration of labor; therefore, this study aimed to compare the effect of pressure at point SP8 with pressure at point SP6 on pain intensity and duration of the first stage of labor in women who admitted to Shahid Akbarabadi Hospital, Tehran, Iran, in 2020.

Methods

This study was a three-group randomized clinical trial conducted on 150 pregnant women referred to Shahid Akbarabadi Hospital, Tehran, Iran, in 2020 for delivery. This hospital was selected due to a large number of clients and the high number of deliveries. The clients are almost similar in terms of economic and social conditions. The sample size was calculated based on comparing the means of the groups using the table of variance (23) considering α=0.01 and 95% power, and the three groups in this study. The quantity of Δ/σ should be clear so that σ signifies the standard deviation and Δ is equal to the difference between the maximum and minimum mean scores of pain intensity in three groups, which was considered equivalent to 1.

According to a study conducted by Ozgoli et al. (2016) (24), 43 cases were calculated in each group; however, with a probability of sample loss of 15% of the sample size, 50 people were considered in each group. The participants who had the inclusion criteria were selected using the available sampling

method and were divided randomly into A (SP6), B (SP8), and C (control) groups using the random number function in Excel.

Inclusion criteria were: 1) being Iranian with first or second pregnancies (37 to 42 weeks), 2) age of 18 to 35 years, 3) being literate, 4) absence of family problems in the last six months and severe mental crises, such as death of loved ones, immigration, separation from spouse, and no chronic diseases (heart disease, lung disease, hypertension and diabetes), 5) no high-risk pregnancies (gestational hypertension, gestational diabetes, placenta previa, and placenta abruption), 6) no skin disorders, such as dermatitis and superficial skin infections, which are among the limitations of acupressure, 7) onset of spontaneous delivery and the tendency to have a normal delivery, 8) cervical dilatation at the time of hospitalization 3-4 cm, 9) single pregnancy with a live and healthy fetus, 10) cephalic presentation, and 11) absence of high-risk fetal criteria (abnormal fetal heart rate, fetal motility, intrauterine growth restriction, polyhydramnios, and oligohydramnios known by ultrasound and no amniotic sac rupture for more than 12 hours). On the other hand, those who were unwilling to continue participation in the study, and those who tended to have a cesarean section were excluded from the study.

The data were collected using demographic and obstetrics characteristics form, Visual Analogue Scale (VAS), a watch to measure labor duration, and an observation checklist. Content validity was used to determine the validity of the observation checklist. The VAS is a worldwide standard tool the validity and reliability of which have been determined in many studies (25-27). A Seiko watch was also used to measure the duration of labor. This watch is from a reputable factory and was compared with the standard watch of the country for its reliability.

The sampling was performed after obtaining the approval of the plan and receiving the code of ethics and registration in the Iranian Registry of Clinical Trials (IRCT). The objectives of the study were explained to the participants, and written consent was received from all of them. Participants were followed from dilatation of 3-4 cm to dilatation of 10 cm. All participants received routine care. Acupressure was performed in a position where the pregnant woman was comfortable and had access to the desired points. The approximate average time for the rotation of the meridian energy flow cycle in the body is 20 minutes (20). This time was considered for applying pressure in each group. All interventions and completion of questionnaires and checklists were performed by a midwife who was a member of the research team and had received the necessary training under the supervision of an acupressure specialist.

Before the intervention, pain intensity in 3-4 cm cervical dilatation was measured in all three groups using VAS. With the onset of contraction in dilatation of 3-4 cm of the cervix, the pressure was applied. In the intervention group (SP6), the pressure was applied by the thumb of the right hand to the SP6 point on the left foot and by the thumb of the left hand to the SP6 point on the right foot. The same operation was performed for the SP8 point. After 60 seconds of pressure, 60 seconds of rest time was considered while the thumb was still in contact with the pressure point. In the same way, this operation was performed for up to 20 minutes. In the control group, the point of which was selected 2 cm lower and 1 cm behind the SP8 point (neutral point), the pressure was applied as in the above two groups. The same pressure was applied to each group in dilatations of 5-7 cm and 8-10 cm. Finally, the mean intensity of pain was recorded immediately, as well as 15 and 30 minutes after intervention in dilatation 3-4 cm, 5-7 cm, and 8-10 cm in the three groups and were compared with each other.

The length of the active phase of labor (from dilatation 3-4 to 10 cm) was also measured in three groups using a valid clock by the researcher. Out of 150 women who entered the study, three, six, and one women were excluded due to receiving epidural analgesia, emergency cesarean section, and unwillingness to continue participating in the study, respectively (Figure 2).

The data obtained in this study were analyzed in SPSS software (version 19) using statistical tests, including the Chi-square, Kruskal-Wallis, one-way analysis of variance, and Fisher's exact test. The Kolmogorov-Smirnov test was used for normality, followed by the Mauchly test of sphericity. It is worth mentioning that all of these were valid ($P>0.05$). One-way analysis of variance was also employed to compare the mean pain score and length of the first stage of labor between groups (before intervention). Furthermore, repeated measures analysis of variance was utilized for intragroup comparison (before and after intervention). A p-value less than 0.05 was considered statistically significant.

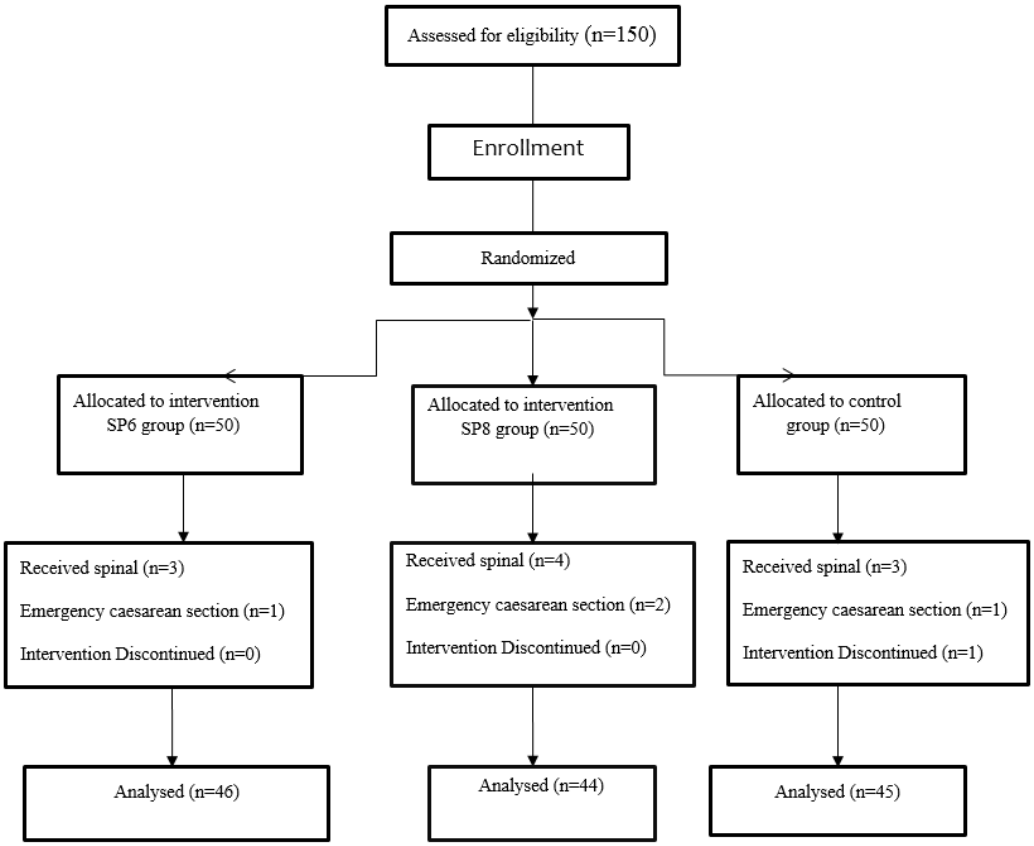

Figure 2. Consort Flow Diagram

Results

The results showed that most participants experienced a second pregnancy and were housewives. The three groups showed no significant difference regarding age, level of education, and occupation status. Other demographic and obstetrics characteristics are shown in Table 1. Furthermore, no difference was observed among the three groups in terms of pain intensity before the intervention.

Table 1. Distribution of socio-demographic and obstetric characteristics in SP6, SP8, and Control groups

Variable		Groups SP6 (N=46) n(%)	SP8 (N=44) n(%)	Control (N=45) n(%)	P-value
Age (years)	18-23 23-29 30-35 Mean(SD)	23(50) 11(23.9) 12(6.1) 25.23(5.15)	15(34.1) 17(38.6) 12(27.3) 26.27(5.35	21(46.7) 11(24.4) 13(28.9) 25.73(5.36)	0.65* F=0.42
Mother's education level	Primary High school Diploma College	5(10.9) 16(34.8) 20(43.5) 5(10.9)	2(4.5) 19(43.2) 18(40.9) 5(11.4)	6(13.3) 16(35.6) 21(46.7) 2(4.4)	0.71**
Mother's Occupation status	Housewife Freelancer Employee	37(80.4) 3(6.5) 6(13)	37(84.1) 1(2.3) 6(13.6)	41(91.1) 3(6.7) 1(2.2)	0.21***
Number of gestations	1 2	21(45.7) 25(54.3)	18(40.9) 26(59.1)	18(40) 27(60)	0.84**

Table 1. Continued

Gestational age (Weeks)	37 38 39 40 41	4(8.7) 13(28.3) 17(37) 12(26.1) 0(0)	2(4.5) 12(27.3) 19(43.2) 11(25) 0(0)	4(8.9) 10(22.2) 15(33.3) 13(28.9) 3(6.7)	0.55* F=0.60
Frequency of prenatal care	8≤ >8	11(23.9) 35(76.1)	17(38.6) 27(61.4)	15(33.3) 30(66.7)	0.31****
Participation in childbirth preparation classes	Yes No	8(17.4) 38(82.6)	5(11.4) 39(88.6)	7(15.6) 38(84.4)	0.75***
Body mass index	<18.5 18.5- 24.99 25- 29.99 30- 35	0(0) 27(58.7) 17(37) 2(4.3)	0(0) 32(72.7) 11(25) 1(2.3)	1(2.2) 29(64.4) 13(28.9) 2(4.4)	0.81* F=0.20
Severity of contractions before intervention	Mild Moderate Severe	15(32.6) 29(63) 2(4.3)	15(34.1) 25(56.8) 4(9.1)	15(33.3) 28(62.2) 2(4.4)	0.97**
Amniotic sac condition	Intact Rupture	39(86.7) 6(13.3)	33(75) 11(25)	37(82.2) 8(17.8)	0.36****
Bishop score before intervention mean(SD)		4.95(1.21)	4.75(1.44)	4.93(1.23)	0.71* F=0.34
Oxytocin	Used Did not use	25(54.3) 21(45.7)	18(40.9) 26(59.1)	20(44.4) 25(55.6)	0.41****

***** One-way analysis of variance ** KRUSKAL_WALLIS *** FISHER'S EXACT TEST **** Chi-square

However, there was a significant difference among the groups regarding the mean pain intensity in dilatations of 3-4 cm, 5-7 cm, and 8-10 cm, immediately, 15 and 30 minutes after the intervention (P<0.001) (Table 2). The Tukey post hoc test showed that the mean pain intensity in 3-4 cm dilatation in the SP8 group was 1.08 less than that in the SP6 group and 2.01 less than that in the control group. In addition, the mean pain intensity scores in dilatation of 5-7 cm and 8-10 in the SP8 group were 1.15 and 0.71 less than those in the SP6 group, respectively (P<0.001). The duration of the first stage of labor in group SP8 was less than that in the SP6 and the control groups. In addition, this time was shorter in group SP6, compared to that in the control group, which was significant (P<0.001) (Table 3).

Table 2. Comparison of labor pain intensity in the various dilatation and duration of the first stage of labor in SP6, SP8, and Control groups

Pain Intensity		Groups SP6 N=46 Mean(SD)	SP8 N=44 Mean(SD)	Control N=45 Mean(SD)	P-value	P-Value Group*Time
Before intervention		5.65 (0.99)	5.56 (0.99)	5.55 (0.89)	0.87* F=0.13	
Dilatation 3-4cm	Immediately after intervention	5.02 (1.08)	4.06 (0.87)	5.95 (1.06)	<0.001*** F=50.12	0.32*** F=1.17
	15 minutes after intervention	5.43 (1.14)	4.31 (0.90)	6.42 (1.01)		
	30 minutes after intervention	6.10 (1.10)	4.93 (0.97)	6.97 (0.89)		
	P-value**	<0.001	<0.001	<0.001		

Table 2. Continued

Dilatation 5-7cm	Immediately after intervention	6.28 (0.88)	5.15 (0.74)	7.48 (0.84)	<0.001*** F=125.98	0.76*** F=0.46
	15 minutes after intervention	6.86 (0.65)	5.68 (0.73)	7.91 (0.76)		
	30 minutes after intervention	7.56 (0.77)	6.40 (0.84)	8.62 (0.64)		
	P-value**	<0.001	<0.001	<0.001		
Dilatation 8-10cm	Immediately after intervention	8.82 (0.90)	7.77 (0.56)	9.40 (0.78)	<0.001*** F=51.56	<0.001*** F=17.82
	15 minutes after intervention	9.34 (0.64)	8.63 (0.61)	9.68 (0.55)		
	30 minutes after intervention	9.71 (0.45)	9.34 (0.52)	9.84 (0.36)		
	P-value**	<0.001	<0.001	<0.001		
Duration of first stage of labor (minutes) Mean (SD)		247.32 (37.42)	214.43 (35.81)	269.35 (45.57)	<0.001* F=21.38	

* One-way analysis of variance **One-way repeated measure ANOVA *** Two-way repeated measure ANOVA

Table 3. Pairwise comparison of the labor pain intensity and duration of the first stage of labor in SP6, SP8, and Control groups

Dilatation	Groups	Mean difference	Std.Error	P-value*
3-4 cm	SP8 vs. SP6	-1.08	0.20	<0/001
	SP6 vs. Control	-0.93	0.19	<0.001
	Sp8 vs. Control	-2.01	0.20	<0.001
5-7cm	SP8 vs. SP6	-1.15	0.14	0.001<
	SP6 vs. Control	-1.10	0.14	0.001<
	Sp8 vs. Control	-2.25	0.14	0.001<
8-10 cm	SP8 vs. SP6	-0.71	0.10	<0.001
	SP6 vs. Control	-0.34	0.10	0.001<
	Sp8 vs. Control	-1.06	0.10	0.001<
Duration of first stage of labor	SP8 vs. SP6	-32.89	8.40	<0.001
	SP6 vs. Control	-22.02	8.35	0.02
	Sp8 vs. Control	-54.92	8.44	<0.001

*Obtained from the post-hoc Tukey test

Discussion

The results showed that pressure at points SP6 and SP8 reduced labor pain and duration of the first stage of labor; however, pressure at SP8 point had a more significant effect. There have been several studies on the effect of pressure at SP6 point on labor pain (15, 17, 18). No research has been conducted in this regard so far, and in a review of the literature, no studies have been found showing the effect of pressure at point SP8 on pain intensity and duration of labor.

The SP6 point is the most common point in labor, and its stimulation reduces the pain intensity and duration of labor (5). Türkmen and Çeber Turfan (2020) reported that pressure at SP6 point reduced labor pain and the mean duration of the first stage of labor, compared to the control group (28). Asadi et al. (2015) reported a significant reduction in the duration of labor in the group that used acupressure at point SP6 (11). In the same line, Mafetoni et al. (2016) showed that labor pain decreased after one hour of applying pressure to point SP6, compared to the control group, which was consistent with the results of the present study (29). The results of a study carried out by Heidari et al. (2008) revealed no

decrease in the severity of labor pain after 30 minutes of pressure at SP6 point, compared to the control group, which was different from the results of our study.

In this study, the pressure was applied in 3-cm dilatation, while in our study, it was performed in three different dilatations. It seems that acupressure can be effective in different dilatations (30). It is believed that the stimulation of pressure points stimulates uterine contractions, and therefore, the progress of labor and energy balance, thereby reducing labor pain (31). The results of a study conducted by Yesil Cicek Calik and Komurcu (2014), as well as Sehhatie-Shafaie (2013) also showed the effect of pressure on the point of reducing pain and duration of the first stage of labor (4, 15).

According to Traditional Chinese Medicine, applying pressure to SP6 point releases lower limb energy and reduces pain (19). No studies have been found to evaluate the effect of the SP8 pressure point on labor pain and duration of labor, and studies have examined its effect on dysmenorrhea (21). Gharlaghi et al. (2012) performed a study to compare the effect of pressure at points SP6 and SP8 on the severity of dysmenorrhea, and they found that pressure at both points caused a significant reduction in the severity of dysmenorrhea; however, there was no difference between the two groups (20). The effect of pressure at points SP6 and SP8 on dysmenorrhea was compared by Abd El-Azeem et al. (2020), and they were found that pressure at both points was effective in reducing dysmenorrhea; nonetheless, the effect of point SP6 was more (32). The theories of Gate Pain Control and Biochemical Control have been proposed regarding the mechanism of action of acupressure (5).

According to Gate Pain Control Theory, skin stimulation can activate myelin nerves in muscles stimulating large fibers and transmitting impulses to higher nerve centers, including the spinal cord, hypothalamus, and pituitary gland. If this stimulation is persistent, it can keep the pain gates closed and reduce pain (33). Acupressure reduces pain by blocking pain transmission and endorphin, cortisol, and serotonin secretion (32).

The present study showed that pressures at SP6 and SP8 points in different dilations reduced the length of the first stage of labor, and this reduction was greater in the SP8 group. Makvandi et al. (2016) in a meta-analysis study showed that that the use of acupressure reduced the duration of the first stage of labor by more than an hour (34). In the same vein, Alimoradi et al. (2020) indicated the positive effect of several pressure points in reducing the duration of labor (35). In a study carried out by Mafetoni et al. (2015), acupressure was used at SP6 for 20 minutes during contraction, and the results showed that the duration of labor was reduced by about 180 minutes, compared to the control group (36). Najafi et al. (2018) in a meta-analysis study showed that pressure at SP6 point during labor could reduce the duration of the first and second stages of labor (37). Labor pain causes anxiety and fatigue in the mother and has a negative effect on the progress of labor. Acupressure plays an important role in reducing patients' fatigue by improving the body's energy and increasing opioids, such as endorphins and encephalin (5). Stimulation of pressure points can create a balanced delivery by improving and regulating uterine contractions, which shortens the duration of labor (38).

One of the strengths of this study was the investigation of the effect of the SP8 pressure point on the labor pain intensity and the duration of the first stage of labor for the first time. There have been several studies on the effect of pressure at SP6 point on pain intensity and duration of labor pain, and the effect of acupressure at this point is proven. The present study attempted to compare the effect of SP6 and SP8 pressure points on labor pain that had not been conducted before. On the other hand, pressure application in different cervical dilatations has been less performed in other studies, compared to the present study.

The limitation of the present study was the expression of pain based on the self-report. Pain thresholds also vary from person to person and cannot be controlled. Moreover, the study was conducted on a limited number, and more studies with more precipitants are needed to generalize the results to the community.

Implications for Practice

According to the study results, the pressure at point SP8 had a greater effect on reducing pain and duration of the first stage of labor, compared to the pressure at point SP6, which is a proven point. It is suggested that this method be used as a complementary method in labor and also recommended that midwives be trained to use these techniques that are completely practical, safe, non-pharmacological, cost-benefit, and acceptable to women during labor.

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Conflicts of Interest
The authors declare that there is no conflict of interest regarding the publication of this study.

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