

# Effects of Massage and Acupressure on Relieving Labor Pain, Reducing Labor Time, and Increasing Delivery Satisfaction

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## ABSTRACT

**Background:** Several recent studies have documented the effects of massage and acupressure in reducing labor pain and labor time and in satisfaction with the delivery. However, few studies have investigated the comparative effects of these two therapies.

**Purpose:** The aim of this study was to compare the effects of massage and acupressure on labor-related pain management, duration, and satisfaction with delivery.

**Methods:** This randomized controlled trial ( $n = 120$ ) included three intervention groups (massage only, acupressure only, and massage + acupressure) and one control group, in which patients received no massage or acupressure treatment. A personal information form, Pregnant Watch Form, and Visual Analog Scale (VAS) were used to collect data. Frequency and percentage calculations, chi-square test, Student's  $t$  test, Tukey's honestly significant difference test, and one-way variance analysis were used for data analysis.

**Results:** In the latent phase of labor, the mean VAS scores of the massage-only group and massage + acupressure group were lower ( $4.56 \pm 1.36$  and  $4.63 \pm 1.52$ , respectively) than that of the control group ( $6.16 \pm 1.46$ ;  $p < .01$ ). In the active and transition phases, the mean VAS scores of the massage-only group, acupressure-only group, and massage + acupressure group were significantly lower than that of the control group ( $p < .01$  and  $p < .001$ , respectively). During postpartum, the mean VAS score of the massage + acupressure group was lower ( $2.30 \pm 0.70$ ) than that of the control group ( $2.96 \pm 0.72$ ;  $p = .003$ ). Cervical dilatation completion time and 1- and 5-minute Apgar scores were similar among all of the groups ( $p > .05$ ). The three intervention groups reported relatively more positive feelings than the control group, and all three of the interventions were found to be effective in improving satisfaction.

**Conclusions/Implications for Practice:** The results of this study indicate that the dual application of massage and acupressure is relatively more effective than either therapy applied alone and that massage is more effective than acupressure.

## KEY WORDS:

labor pain, massage, acupressure, labor time, mother's satisfaction.

conditions that women typically experience in life, the stress related to uncontrolled labor pain also has a negative impact on the mother, the fetus, and the newborn (Perry, Hockenberry, Lowdermilk, & Wilson, 2014). Therefore, pain relief during labor is an essential aspect of obstetrical care. Labor pain relief methods are categorized into pharmacological (inhalation anesthesia, regional anesthesia, opioids such as pethidine) and nonpharmacological (hypnosis, laboring in water, acupuncture, massage) methods (Jones et al., 2012). Nonpharmacological applications may be performed by a midwife and a nurse independently in cooperation with the pregnant woman. Using nonpharmacologic pain-relief measures such as touch, massage, aromatherapy, and acupressure are important because assessing labor pain and applying appropriate nonpharmacologic interventions make midwives and nurses responsible for managing the labor process.

Massage, one of the oldest nonpharmacological methods of controlling labor pain, creates physiological and psychological effects on organisms through systematic manipulations that stimulate soft tissues mechanically (Brosseau et al., 2012). Massage induces relaxation during labor, reduces the severity of pain, relaxes muscle spasms, increases physical activity, channels the attention of the mother, and contributes to overall relaxation (Mortazavi, Khaki, Moradi, Heidari, & Vasegh Rahimparvar, 2012). By contrast, acupressure, the application of pressure to acupuncture points, is grounded in the meridian theory, which holds that acupressure incites the meridians that compose the network of energy routes throughout the body, augmenting the flow of qi (bioenergy) and thus changing the symptom experience. Fingers, towels, acupressure bands, and tennis balls are commonly used to apply acupressure (Simkin & O'hara, 2002). Acupressure has four basic effects on the body: analgesic, homeostatic, immunity enhancement, and sedative/psychological. The pain relief effect of acupressure has been explained using gate control, nociceptive afferent, and

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## Introduction

Labor is a special experience for a mother and her family. However, not only is labor pain one of the most painful

endorphin theories. Gate control theory holds that applying pressure to acupuncture points stimulates thick C fibers without myelin, which are touch and pressure receptors, thus preventing pain stimuli from reaching the cortex. Nociceptive afferent theory holds that acupressure inhibits the transmission of pain to the brain by stimulating mechanoreceptors. Endorphin theory holds that acupressure stimulates endorphin secretions, a natural analgesic (Dung, Clogston, & Dunn, 2004; Ma, Ma, & Cho, 2005; Sandifer, 1997).

The most commonly used acupressure points during the birth process are Sanyinjiao (SP6), He Gu (LI4), Zhi Yin (BL67), and Ci Liao (BL32). In this study, Acupoint SP6 was selected as it is the acupoint typically preferred in gynecology (Chen & Chen, 2004). Yu et al. (2015) indicated that Sanyinjiao (SP6) is one of the most commonly used acupressure points and may have better therapeutic effects than lesser used or unused acupuncture points. A meta-analysis found that labor pain severity after an SP6 intervention was lower in the acupressure-only group than in the touch group (Najafi, Jaafarpour, Sayehmiri, & Khajavikhan, 2018). Sanyinjiao is strongly related to the uterus. Pressing or needling SP6 promotes the flow of qi and blood to the uterus, improving nourishment and relieving pain in this organ (Yu et al., 2015). Sanyinjiao is easy for women to locate and for practitioners to apply pressure to without medical assistance. The application of acupressure to SP6 increases the pain threshold and blood flow and stimulates the release of endorphins. Studies have shown that pressure applied to the SP6 point decreases perceived pain and shortens delivery duration in pregnant women (Lee, Chang, & Kang, 2004; Makvandi, Mirzaiinajmabadi, Sadeghi, Mahdavian, & Karimi, 2016).

When administered to pregnant women, massage and acupressure have both been shown to reduce perceived pain (Jones et al., 2012; Smith, Levett, Collins, & Jones, 2012), anxiety, drug administration during labor (Chaillet et al., 2014; Levett, Smith, Bensoussan, & Dahlen, 2016), and the rate of cesarean section (Chaillet et al., 2014; Kashanian & Shahali, 2009) as well as shorten delivery duration and length of time spent in the hospital (Lee et al., 2004). These benefits help reduce hospital costs and the healthcare burden on the economy.

Systematic reviews support massage as a potentially effective approach to pain relief as well as a practical approach to pain management, providing increased satisfaction and reducing medication use. Nevertheless, the literature on this subject recommends further research (Smith, Collins, Crowther, & Levett, 2011; Smith et al., 2012).

Massage and acupressure are effective, nonpharmacological methods that may be applied during the labor process (Deepak & Chopra, 2013; Lee et al., 2004; Pilevarzadeh, Salari, & Shafiei, 2002; Simkin & O'hara, 2002). The beneficial effects of these methods may increase when used concurrently. Pressure may be administered to acupressure points during massage sessions. Although some studies have investigated these methods separately, no studies investigating the concurrent application of these two methods during pregnancy and

birth were found in the literature. Furthermore, only a few published studies examined the comparative efficacy of massage and acupressure (Hajiamini, Masaoud, Ebadi, Mahboubh, & Matin, 2012).

## Objective and Hypothesis

This study was designed to assess the effects of massage and acupressure on labor pain management during the first stage of delivery, duration of labor, and satisfaction with delivery in a sample of pregnant women.

This study formulated the following hypotheses:

H<sub>1</sub>: Perceived labor pain will differ among the four groups.

H<sub>2</sub>: Duration of labor will differ among the four groups.

H<sub>3</sub>: Satisfaction with delivery will differ among the four groups.

## Methods

### Participants

This randomized controlled trial was carried out in a women's health, education, and research hospital between August 8, 2012, and March 8, 2013.

The participant groups were formed using 2<sup>2</sup> factorial trial levels, and four groups were used in the study. The sample size was estimated using G\*Power 3.1.3 software (Heinrich Heine Universität, Dusseldorf, Germany). The 120 (4 × 30) participants were sufficient to identify differences among the groups with a 5% margin of error and 100% power.

The inclusion criteria were as follows: having an indication for vaginal birth, being primiparous, between 20 and 30 years old, having less than 4-cm cervical dilatation, being at 38–42 weeks of gestation, having a single and healthy fetus in the vertex position, lack of complications that may cause dystocia during labor, and no analgesia or anesthesia used during the first phase of labor.

### Procedures

This research was designed as a clinical trial. The participants were assigned randomly to the three intervention groups and one control group. Those in the control group continued to receive routine care from the hospital. The simple full randomization method was used for group assignments. To determine the order of application, the names of the study groups were written on a piece of paper 30 times by the researcher and the groups were selected randomly by drawing lots. The massage and acupuncture interventions were conducted by a single researcher to ensure uniformity.

### Massage-only group

A 30-minute massage session was administered to participants in the massage-only group during the latent (cervical dilatation of 3–4 cm), active (cervical dilatation of 6–7 cm), and transition (cervical dilatation of 8–9 cm) phases. The head, neck, shoulder, back, arms, hands, legs, and feet were massaged during each session in the same manner and duration.

### ***Acupressure group***

A 30-minute acupressure session using acupressure bands on the Sanyinjiao (SP6) acupressure points was administered to participants in the acupressure-only group during the latent, active, and transition phases. The SP6 points are located 3 kun (approximately 4 cm) above the inner malleolus. Researchers located the SP6 points using an acupoint device and marked them with a pencil. The acupoint device emits a green light when the correct site is touched. The acupressure bands used in this study (MedicMate Alternative Medicine Products, Colorado, USA) are a commercially available model featuring an elastic band with a small plastic button used for applying pressure. The band is adjustable to the size of the body area targeted for pressure application. This protruding plastic button is located on the SP6 point. One band was used for each individual.

### ***Massage + acupressure group***

Massage and acupressure were simultaneously administered to the participants in the massage + acupressure group during the latent, active, and transition phases. As noted above, an acupoint device was used to locate the SP6 points, a pencil was used to mark them, and an acupressure band was attached. The massage session began as soon as the acupressure band was attached.

All of the participants gave informed consent before participation. Contraction and fetal heart rate were monitored using electronic fetal monitoring before the intervention. The duration, severity, and frequency of uterine contractions were monitored continuously during the interventions using a tocodynamometer. Furthermore, the participants were monitored continuously for labor progress, vital signs, and general well-being until their transfer to a postpartum care room. A one-on-one interview with each participant was conducted within 8 hours of delivery to elicit participants' feelings, opinions, and perceptions about the intervention and the birth experience. Thirteen of the participants were delivered by cesarean section, seven received meperidine, and two received epidural anesthesia. Thus, 22 of the 142 participants were excluded from data collection, leaving data on 120 participants available for analysis.

### **Measures**

Data for this study were collected using a personal information form, Pregnant Watch Form, Questionnaire Related to Applied Methods, and Visual Analog Scale (VAS). The personal information form, Pregnant Watch Form, and Questionnaire Related to Applied Methods were all developed by the researchers in line with the literature (Chaillat et al., 2014; Chang, Wang, & Chen, 2002; Hajiamini et al., 2012; Janssen, Shroff, & Jaspar, 2012; Kashanian & Shahali, 2009; Lee et al., 2004; Simkin & O'hara, 2002; Smith et al., 2012) and adjusted to reflect the recommendations of three experts. The personal information form collected sociodemographic information (12 questions), pregnancy status information

(13 questions), and labor-related experience and coping methods information (five questions). The Pregnant Watch Form collected data on the intervention application. The Questionnaire Related to Applied Methods gathered data on massage and acupressure (e.g., satisfaction level, reuse status) as used to reduce labor pain. The VAS, first developed by Price, McGrath, Rafii, and Buckingham (1983), is used to self-evaluate perceived pain on a 10-cm ruler scale, with the analgesia indicator at one end and the most severe pain indicator at the other end (Tulunay & Tulunay, 2000). The VAS was administered immediately before and immediately after the interventions at 3–4, 6–7, and 8–9 cm of cervical dilation and during the postpartum period. Each participant was asked to mark her current level of perceived pain along the scale, with the number corresponding to the marked point recorded as the pain score.

A preliminary study was conducted with 10 of the participants, whose data were excluded from the study; their comments and results were used to revise the final version of the forms. On the basis of input from the preliminary study, the question "How many times did you go to control?" was replaced by the question "Did you take a regular antenatal follow-up?" Because the participants were unable to provide a response upon the onset of pain, the question was removed from the questionnaire.

### **Ethical Consideration**

Written permission was obtained from the ethics board of Ankara University and from the institution where the research was conducted (date: July 23, 2012; Resolution No. 12-390-12). Written informed consent was also obtained from the participants.

### **Statistical Analyses**

Analyses were performed using IBM SPSS Statistics Version 22.0 (IBM Inc., Armonk, NY, USA). All analyses of the research were made based on a 95% confidence level and 5% Type I error. Frequency and percentage calculations, chi-square test, Tukey's honestly significant difference (HSD) test, and one-way variance analysis were used to analyze the data.

### **Results**

The participants had a mean age of 23.4 years and a mean marriage duration of 20.8 months. More than three quarters (79.2%) had not reached the 40th gestational week of pregnancy, and 96.7% of the pregnancies were planned. Almost all reported not attending any antenatal preparatory training (98.3%) or receiving education about how to deal with labor (95%). Three quarters (76.7%) reported being afraid of labor, 74.5% reported being afraid of severe pain, 54.3% reported being afraid that their baby's health would deteriorate, and 24.5% reported being afraid of the delivery room. Although most participants stated a fear of labor pain, 91.7% did not have a coping plan. Oxytocin was used in 32.5% of the participants in this study.

**TABLE 1.**  
**Distribution of Sociodemographic and Obstetric Characteristics**

Characteristic	Massage (M) Group		Acupressure (A) Group		M + A Group		Control Group		Total		p
	M	SD	M	SD	M	SD	M	SD	M	SD	
Age	23.4	3.2	24.1	3.4	23.7	2.9	22.4	3.0	23.4	3.2	.169
Duration of marriage (months)	20.6	9.9	23.1	13.3	19.2	9.1	20.3	8.5	20.8	10.2	.487
Gestational week	39.3	0.9	39.3	1.0	39.4	1.0	39.3	1.1	39.3	1.0	.925
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>p</i>
Pregnancy											—
Planned	29	96.7	28	93.3	29	96.7	30	100.0	116	96.7	
Unplanned	1	3.3	2	6.7	1	3.3	0	0.0	4	3.3	
Follow-up examinations											—
Yes	28	93.3	30	100.0	29	96.7	29	96.7	116	96.7	
No	2	6.7	0	0.0	1	3.3	1	3.3	4	3.3	
Experiencing fear of birth											.619
Yes	23	76.7	25	83.3	21	70.0	23	76.7	92	76.7	
No	7	23.3	5	16.7	9	30.0	7	23.3	28	23.3	
No plan to proactively cope with labor pain											—
Yes	3	10.0	3	10.0	2	6.7	2	6.7	10	8.3	
No	27	90.0	27	90.0	28	93.3	28	93.3	110	91.7	
Oxytocin											.134
Used	6	20.0	11	36.7	8	26.7	14	46.7	39	32.5	
Did not use	24	80.0	19	63.3	22	73.3	16	53.3	81	67.5	

The groups were similar in terms of age, duration of marriage, gestational week, state of pregnancy planning, pregnancy follow-up examinations, fear of birth experience, and use of oxytocin (Table 1).

No statistical difference in VAS score was identified among the groups at pretest ( $p > .05$ ; Table 2). In the latent phase, the massage-only and massage + acupressure groups reported lower postintervention mean VAS scores than the control group ( $p < .01$ ; Table 3). In the active and transition

phases, all of the intervention groups reported significantly lower preintervention and postintervention mean labor pain scores than the control group ( $p < .01$  and  $p < .001$ , respectively; Table 3). In the postpartum period, the lowest VAS score (2.30) was recorded for the massage + acupressure group, whereas the highest VAS score (2.96) was recorded for the control group. The difference among the groups in terms of mean VAS scores was statistically significant ( $p < .01$ ; Table 3).

**TABLE 2.**  
**Distribution of VAS Scores by Study Group**

Group	<i>n</i>	VAS Score in Latent Phase				<i>t</i>	<i>p</i>	VAS Score in Active Phase			
		Preintervention		Postintervention				Preintervention		Postintervention	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Massage-only group	30	6.36	1.10	4.56	1.36	8.523	< .010	8.10	0.96	7.23	1.33
Acupressure-only group	30	5.87	1.63	5.43	1.85	1.531	.141	7.97	1.40	7.53	1.50
Massage + acupressure group	30	5.83	1.49	4.63	1.52	5.410	< .001	8.10	1.03	6.93	1.23
Control group	30	5.80	1.40	6.16	1.46	-3.612	< .001	9.20	0.89	9.40	0.77
<i>F</i>		1.100		7.042				8.408		24.131	
<i>p</i>		.352		.001				.001		.001	

Note. VAS = Visual Analog Scale.

The massage-only group had the shortest cervical dilation completion time (245 minutes), and the control group had the longest (350 minutes), although the differences among the groups were not significant ( $p > .05$ ; Figure 1). The massage-only group had the highest 1- and 5-minute APGAR scores (7.03 and 9.03, respectively), and the control group had the lowest (6.97 and 8.97, respectively), although the differences among the groups were not significant ( $p > .05$ , data not shown).

The percentage of participants receiving oxygen treatment in the control group was higher than that in the other groups (Table 1).

In terms of satisfaction with their intervention, 96.8% in the massage-only group, 93.3% in the acupressure-only group, and 100% of the massage + acupressure group expressed satisfaction with their intervention and intent to use in their next delivery. Furthermore, nearly all intervention group participants stated that they would recommend these applications to the other pregnant women. In the massage-only group, 89.3% reported decreased pain, 53.6% reported experiencing relaxation with positive feelings, and 14.3% reported that the intervention shortened delivery duration. In the acupressure-only group, 82.5% reported decreased pain, 25% reported accelerated delivery with frequent birth pangs, and 17.9% reported experiencing relaxation with positive feelings. In the massage + acupressure group, 96.7% reported decreased pain, 46.7% reported experiencing relaxation with positive feelings, and 13.3% reported a facilitated birth experience accompanied by a sense of confidence.

All of the massage-only group, 90% of the acupressure-only group, and 93.3% of the massage + acupressure group reported no experience of difficulties during the interventions. Mild pain because of the intervention was reported by two participants from the acupressure-only group and one participant from the massage + acupressure group, whereas one participant each from the acupressure-only and massage + acupressure groups reported itching because of the acupressure band.

## Discussion

Level of pain perceived varied during the latent, active, and transition phases of the first stage of delivery (Perry et al., 2014). Thus, this study applied different interventions and evaluated the levels of perceived pain across these phases. The massage-only group earned the lowest postintervention mean VAS score in the latent phase, whereas the score for the massage + acupressure group was only slightly higher. To the authors' knowledge, no study in the literature assesses the comparative effectiveness of massage and SP6-point acupressure in reducing labor pain. A study on the comparative effects on labor pain of ice massage and acupressure interventions applied to the same point at 3–4 cm of cervical dilation found a lower VAS score in the massage group after 30 minutes of application (Hajiamini et al., 2012). Similar to this study, a previous investigation of the effectiveness of massage treatments on labor pain that implemented a 30-minute massage intervention on pregnant women during each of the three phases of delivery found a lower VAS score in the intervention group than in the control (no intervention) group in the latent phase (Chang et al., 2002). Moreover, the findings of other studies in the literature are similar to the results of this study, indicating that massage treatments given in the latent phase are effective in controlling labor pain (Chang et al., 2002; Janssen et al., 2012; Khodakarami, Safarzadeh, & Fathizadeh, 2005). However, one study that used a similar approach to examine the effects of acupressure on labor pain found an insignificant difference in VAS score between the acupressure group and no-acupressure group (Heydari, Mojdeh, Mazloun, Tanbakuei, & Judaki, 2008). Other studies using a different approach identified positive effects of acupressure on perceived labor pain during the latent phase (Lee et al., 2004; Park et al., 2003). The results of this study reveal that massage therapy applied during the latent phase of delivery effectively reduces labor pain and that acupressure therapy applied during this phase has no significant labor-pain-reduction effect.

		VAS Score in Transition Phase						VAS Score in Postpartum	
<i>t</i>	<i>p</i>	Preintervention		Postintervention		<i>t</i>	<i>p</i>	<i>M</i>	<i>SD</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
4.419	< .010	9.13	0.63	8.18	1.02	6.238	< .010	2.53	0.57
2.359	.025	9.33	0.71	9.10	0.85	1.882	.070	2.60	0.62
6.484	< .001	9.33	0.18	8.73	0.69	5.288	< .001	2.30	0.70
-2.693	.012	9.96	0.25	9.93	0.25	1.000	.326	2.96	0.72
		10.947		28.159				4.923	
		.001		< .001				.003	

**TABLE 3.**  
**Between-Group Comparison of VAS Scores (Tukey's HSD Test)**

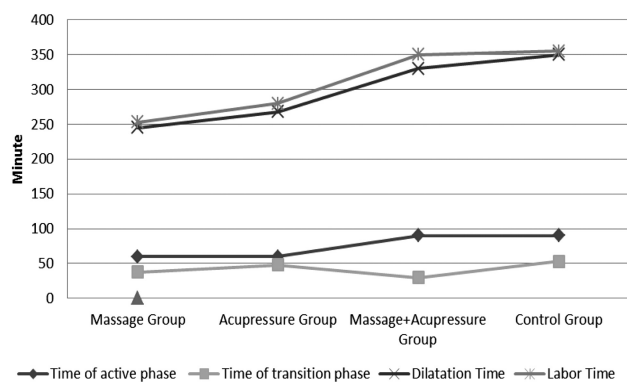
Item/Group	n	Massage-Only Group (M)	Acupressure Group (A)	M + A Group	Control Group
		p	p	p	p
<b>VAS score in latent phase</b>					
Preintervention					
Massage-only group	30	–	.512	.456	.401
Acupressure-only group	30	.512	–	1.000	.998
Massage + acupressure group	30	.456	1.000	–	1.000
Control group	30	.401	.998	1.000	–
Postintervention					
Massage-only group	30	–	.143	.998	.001
Acupressure-only group	30	.143	–	.199	.268
Massage + acupressure group	30	.998	.199	–	.001
Control group	30	.001	.268	.001	–
<b>VAS score in active phase</b>					
Preintervention					
Massage-only group	30	–	.964	1.000	.001
Acupressure-only group	30	.964	–	.964	< .001
Massage + acupressure group	30	1.000	.964	–	.001
Control group	30	.001	< .001	.001	–
Postintervention					
Massage-only group	30	–	.784	.784	< .001
Acupressure-only group	30	.784	–	.244	< .001
Massage + acupressure group	30	.784	.244	–	< .001
Control group	30	< .001	< .001	< .001	–
<b>VAS score in transition phase</b>					
Preintervention					
Massage-only group	30	–	.571	.571	< .001
Acupressure-only group	30	.571	–	1.000	< .001
Massage + acupressure group	30	.571	1.000	–	< .001
Control group	30	< .001	< .001	< .001	–
Postintervention					
Massage-only group	30	–	< .001	.029	< .001
Acupressure-only group	30	< .001	–	.245	< .001
Massage + acupressure group	30	.029	.245	–	< .001
Control group	30	< .001	< .001	< .001	–
<b>VAS score in postpartum</b>					
Massage-only group	30	–	.981	.549	.072
Acupressure group	30	.981	–	.326	.165
Massage + acupressure group	30	.549	.326	–	.001
Control group	30	.072	.165	.001	–

Note. HSD = honestly significant difference; VAS = Visual Analog Scale.

In comparing the mean active-phase VAS scores of the intervention groups, the lowest scores were reported by the massage + acupressure group, followed by the massage-only group and the acupressure-only group, with the control group reporting the highest mean VAS score ( $p < .05$ ). The findings of this study support a positive effect for both massage and acupressure on pain management during the active phase of delivery. Hajiamini et al. (2012) compared the effectiveness of hand ice massage and acupressure interventions in controlling labor pain, finding ice massage to be more

effective than acupressure. Some studies found massage treatments to be effective in managing labor pain (Chang, Chen, & Huang, 2006; Janssen et al., 2012; Lee et al., 2004) and in delaying the use of epidural analgesia (Janssen et al., 2012). A study conducted by Chang et al. (2006) on 60 pregnant women found both physical and mental calming effects for a massage intervention.

Mafetoni and Shimo (2016) and Hjelmstedt et al. (2010) found that an acupressure intervention targeting the SP6 point in the active phase of delivery reduced labor pain



**Figure 1.** Distribution of durations during the stages of labor.

( $p < .05$ ) and that the acupressure-treated groups earned lower pain scores than the nontreated group. Sehhatie-Shafaie, Kazemzadeh, Amani, and Heshmat (2013) and Deepak and Chopra (2013) indicated that acupressure reduced the labor pain perceived in the active phase of delivery and recommended the use of acupressure during labor. Moreover, massage and acupressure were found to be effective in managing labor pain in the active phase of delivery whether administered together or separately. The authors of this study believe that both massage and acupressure stimulate the door control mechanism, induce relaxation, and help pregnant women to “unwind” through the increased release of endorphins and the distraction effect.

The mean transition-phase VAS scores for the massage + acupressure group and the massage-only group were lower than that for the acupressure-only group, suggesting that massage is more effective than acupressure during the transition phase. The effects of massage and acupressure applied on the SP6 point during the transition phase of delivery have not been reported in the literature. Prior studies confirm that massage treatments administered during the transition phase reduce labor pain (Khodakarami et al., 2005; Mortazavi et al., 2012), decrease the cesarean section rate (Khodakarami et al., 2005), and improve the birth experience of the mother (Janssen et al., 2012). In Chang et al. (2006), no changes in VAS scores were found in either the massage or no-massage groups during the transition phase of delivery. In Chung, Hung, Kou, and Huang (2003), an investigation of 127 primipara pregnant women found no difference in VAS scores between the acupressure and no-acupressure groups. This study found all of the three investigated methods to be effective in controlling labor pain when applied during the transition phase, with the massage-only and massage + acupressure interventions having more significant effects than the acupressure-only intervention.

In this study, the massage and acupressure interventions did not affect time of dilatation, similar to results from Janssen et al. (2012), who found no difference in dilatation time between the massage and no-massage groups during the first and second phases of delivery. In addition, one study found no relationship between a massage intervention and duration of delivery (Chang et al., 2002), whereas another found that

SP6-point acupressure did not affect the duration of either the first or second stage of labor (Park et al., 2003). Conversely, several studies showed that acupressure affects the duration of the active phase of labor (Kashanian & Shahali, 2009), dilatation time (Lee et al., 2004), and duration of labor (Kim, Chang, Lee, & Maeng, 2002). The results of this study do not support the effectiveness of massage or acupressure during some phases of delivery.

The massage and acupressure interventions in this study did not affect the APGAR scores of the newborns. Similarly, other studies in the literature highlight statistically insignificant differences in newborn APGAR scores between acupressure and no-acupressure groups (Hjelmstedt et al., 2010; Kashanian & Shahali, 2009; Mortazavi et al., 2012). Moreover, there were no adverse effects from the interventions on the health of newborns.

In this study, participants in the massage + acupressure group experienced increased positive feelings about their delivery, and both interventions positively affected satisfaction. These results may be associated with the effects of massage and acupressure applications in terms of reducing tension, relieving anxiety, and reducing pain as well as the personal support given by midwives during labor. In terms of the respective effects of the interventions on satisfaction, the participants were very satisfied with all three interventions and both confirmed interest in using them during their next delivery and expressed intent to recommend them to others. The participants in all of the intervention groups identified reduced labor pain as the most important reason for their satisfaction. No research in the literature has investigated the satisfaction level of pregnant women with these interventions. A study on couples regarding the effects of massage during delivery by Chang et al. (2002) reported strong satisfaction with the intervention. Some studies have found that massage reduces labor pain, provides psychological support, and improves the labor experience (Pilevarzadeh et al., 2002). In a study by Moradi et al. (2012), which applied acupressure to the GB-21 and SP6 points during the active phase of delivery, higher satisfaction rates and better birth experiences were reported in the acupressure group. In contrast with this study, one study found an acupressure intervention on the SP6 point to have a statistically insignificant effect on the labor experience. The findings of this study confirm that massage and acupressure interventions increased maternal satisfaction and improved the overall labor experience for participants.

## Limitations

The following limitations of this study should be considered. This study was carried out in a single obstetrics clinic on a homogeneous population. The seven participants (two women in the massage-only group, one woman in the acupressure-only group, one woman in the massage + acupressure group, and three women in the control group) who received meperidine and the two participants in the control group who received epidural anesthesia were excluded from the study because of the potential effects of these medications on labor pain, labor time,

and satisfaction. Therefore, the effects of acupressure and massage on those concurrently using analgesia or anesthesia in labor were not evaluated. A future study should investigate this issue.

## Conclusions

In this study, the massage intervention significantly reduced the perceived labor pain of participants during all phases of delivery, whereas the acupressure intervention significantly reduced the perceived labor pain during the active and transition phases of labor only. Both interventions effectively increased maternal satisfaction. Therefore, the following conclusions may be drawn based on these findings: (a) Massage and acupressure interventions are a safe approach for women to use to manage labor pain; (b) primary care personnel should be properly trained in massage and acupressure methods to provide good care to women in labor; and (c) families should receive training on massage during the antenatal period, and a suitable environment should be provided for the application of these methods.

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## Author Contributions

Study design: IMG, FT

Data collection: IMG

Data analysis: IMG, FT

Article writing: IMG, FT

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