Received: 19 November 2018 | Revised: 28 February 2019 | Accepted: 25 March 2019

DOI: 10.1111/jjns.12272

JAPAN JOURNAL OF NURSING SCIENCE WILEY

ORIGINAL ARTICLE

The effect of sacral massage on labor pain and anxiety: A randomized controlled trial

Semra Akköz Çevik[1] | **Serap Karaduman**[2]

[1]Obstetric and Gyneacologic Nursing Department, Gaziantep University of Faculty of Health Sciences, Gaziantep, Turkey

[2]Obstetric Department, Bağcılar Training and Research Hospital, Istanbul, Turkey

Correspondence
Semra Akköz Çevik, Gaziantep University, Faculty of Health Sciences, Obstetric and Gyneacologic Nursing Department, Head of Midwifery Department, Gaziantep, Turkey.
Email: s_akkoz@hotmail.com

Abstract

Aim: Nonpharmacologic pain control methods, which are increasingly becoming widespread in coping with labor pain, are the methods that allow women to completely relax without using any medication and direct them to perceive the pain at the lowest level. This study was conducted to determine the effect of sacral massage on labor pain and anxiety.

Methods: This study was conducted as a randomized controlled experimental study at Bağcılar Hospital, Obstetrics and Gynecology Clinic between March and October 2016. In all, 60 women, 30 of whom were in the control group and 30 of whom were in the experimental group, constituted the research sample. The women in the experimental group were administered a massage to the sacral region for 30 min. The questionnaire form, birth action follow-up form, postpartum interview form, visual analog scale (VAS) and state-trait anxiety inventory were used to collect data in the study.

Results: The latent phase VAS averages (3.57 ± 1.43), active phase VAS averages (7.03 ± 1.5) and transition phase VAS averages (8.83 ± 1.78) of the experimental group were found to be statistically significantly lower than those of the control group ($P < .05$).

Conclusion: It was concluded that sacral massage applied during labor reduced women's labor pain, lowered the levels of concern and anxiety, led to greater feelings of satisfaction among pregnant women in terms of labor, positively affected the perception of labor and had no fetal side effects.

KEYWORDS

anxiety, labor pain, massage, surveys and questionnaires, visual analog scale

1 | INTRODUCTION

Labor is regarded as one of the physiological behaviors in humans that has existed since the beginning of humanity, the formation cycle of which has remained unchanged (Gönenç & Terzioğlu, 2012). Labor is a health state that most women aspire to, at some point in their lives. The first thought that comes to the mind of an expecting woman regarding her delivery is the pain of labor. The pain of labor is the central and universal part of a woman's experience of childbirth. Labor is a normal physiological process, which while it should be an occasion for rejoicing, it also accompanies with it, lots of pain, agony, and discomfort and certain risks. Thus although being a joyful and empowering experience, it can end with negative and tragic results, leaving the woman filled with fear and anxiety for future birth

(Labrecque, Nouwen, Bergeron, & Rancourt, 1999). The causes of labor pain can be either physical or psychological. Physical factors include uterine contractions, cervical dilatations, cervical effacements and so on. Psychological factors include fear and anxiety, previous experiences, inadequate support, inadequate knowledge. Pain perceived during labor may be different for each woman (Sethi & Barnabas, 2017). The fear and anxiety that pregnant women experience during the labor process leads to the stretching of pelvic muscles and creates resistance against the repulsive force of the uterus and the repulsive force exerted by women during labor. The extension of the anxiety-related tension in the pelvic muscles causes general fatigue in pregnant women, increased pain and decreased power to cope with the pain (Gönenç & Terzioğlu, 2012). Anxiety also reduces the self-confidence of an individual. As a result of this situation, pregnant women perceive themselves as incompetent and unskilled. The anxiety experienced during labor directs women to caesarean section by their own will (Fenwick, Staff, Gamble, Creedy, & Bayes, 2010). The essence of midwifery can be with woman providing comfort in labor. Touch communicates caring and reassurance. Manual healing methods used today during delivery include touch and massage therapy. Painful uterine contractions can be treated by applications of pressure with the hands to a woman's back, hips, thighs and sacrum. By massage therapy, pharmacological management during the first stage of labor can be reduced, so fewer negative effects will be there on the fetus and mother (Smith, Levett, Collins, & Jones, 2012). Non-pharmacological and supportive methods that are used to decrease pain are a part of midwifery/nursing practices. Massage is the oldest tactile stimulation method that is used to relieve labor pain. Massage is a manual process performed on the soft tissues of the body for systemic purposes to improve health and well-being. Massage decreases the severity of pain, loosens the spasms and provides general relief during labor (Field, 2010).

1.1 | Aim

This study was performed to determine the effect of sacral massage, on labor pain and anxiety.

2 | MATERIALS AND METHODS

2.1 | Study design

This was a randomized and controlled experimental study aimed to determine the effects of sacral massage on labor pain and anxiety.

2.2 | Setting and samples

The study was performed on volunteer pregnant women who applied to Bağcılar Training and Research Hospital, Delivery Unit, to undergo their first labor between January 25 and October 25, 2016. This unit contains one delivery room (with two tables), two labor follow-up rooms (with five beds), one postpartum room (with five beds) and one nursing room.

According to hospital records, in all, 342 pregnant women who applied to Bağcılar Training and Research Hospital, Delivery Unit to undergo their first labor between January 25 and October 25, 2016, constituted the population of the study. The following inclusion criteria were used to determine participation in the study: (a) 19–40-year-old primiparous pregnant women; (b) singleton pregnancies between 38–42 weeks; (c) pregnant women whose labor began spontaneously; (d) pregnant women with a healthy fetus; (e) pregnant women without any complications that may cause dystocia during labor; (f) pregnant women for whom analgesia and anesthesia were not used during the first phase of labor; (g) pregnant women who volunteered to participate in the research and who could establish verbal communication. In addition, pregnant women with high-risk pregnancies, with caesarean section indication, and pregnant women with a chronic illnesses were excluded.

The sample size was calculated by the Medical Faculty Biostatistics Department using Minitab Program. The sample volume to represent the population was determined as minimum 30 people for each group when considering comparison results of mean scores in the study by Field, with a risk of $\alpha = .05$, an accuracy rate of $1-\alpha = .95$ and a power ratio of $B = 0.20$, $1-B = 0.80$ (Field, 2010).

The study was conducted with two groups, namely the experimental group, and control group. Thirty pregnant women were included in each group; therefore, the study was conducted with a total of 60 pregnant women. The women who participated in the study were randomized as control (double) and experimental (single) groups according to the single or double patient admission numbers.

2.3 | Measurements

In this study, the questionnaire form, birth action follow-up form, postpartum interview form, visual analog scale (VAS) and state-trait anxiety inventory (STAI FORM TX-I) were used to collect the data.

1. Questionnaire form**:** Questions that reflect the sociodemographic characteristics of the patients (age, educational status, social security, marital status), information about pregnancy (drugs used, status of their willingness to become pregnant, gestational week, status of

attending examinations, status of collecting information about labor), the methods used to cope with the pain, and open-ended questions that evaluate the previous use of massage.

2. Birth action follow-up form: Questions that indicate the length of the first phase, the interventions performed to shorten the first phase of labor, the methods used by the patient to cope with the labor pain, the emotional behaviors of the pregnant women during labor, the length of the second phase, adjustment of the pregnant women, the presence of intervention in labor, the status of episiotomy, the total duration of labor and the baby's health. This form was applied to both groups during labor.
3. Postpartum interview form: Open and closed questions that indicate the pregnant women's thoughts about labor, the status of overall satisfaction with labor and how the women feel were included in this form, which was prepared by a researcher in accordance with the relevant literature. This form was applied to both groups after giving birth.
4. VAS: This was used to measure the severity of labor pain. On this scale, numbers from 0 to 10 appear on a horizontal line of 100 mm. The pain level is expressed in figures that range from 0 to 10, as follows: the absence of pain is indicated by "0", while the most severe pain is indicated by "10". In this method, it is explained to the individual that there are two endpoints and that she is free to mark any point that defines her pain.

   The VAS was applied to the participants in the control group once in the latent (3–4 cm), active (5–7 cm) and transition phases (8–10 cm) of labor. The VAS was also applied to those in the experimental group once after the massage in each phase. The diagnosis was made in accordance with the subjective data including the patient's verbal expression.
5. STAI FORM TX-I**:** To determine state and trait anxiety levels of the participants, the STAI FORM TX-I was used. The individual is required to indicate the feelings or behaviors that he/she has experienced in a specific situation according to the degree of severity by marking one of the options such as (a) Never, (b) Little, (c) Very and (d) Completely. The STAI requires the individual to describe how he/she feels at a certain moment and under certain conditions by considering his/her feelings about a specific situation. While high scores indicate high anxiety levels, low scores indicate low anxiety levels. The STAI consists of 20 statements. The score obtained from the scale may vary between 20 and 80. While a high score represents a high anxiety level, a low score represents a low anxiety level. In the scoring performed in accordance with the criteria directive, 0–19 points are regarded as "none", 20–39 points are regarded as "mild anxiety", 40–59 points are regarded as "moderate anxiety", 60–79 points are regarded as "heavy anxiety" and 80 points are regarded as "severe anxiety". In our study, the STAI FORM TX-I was used in the active (5–7 cm) phase in the control group and in the active (5–7 cm) phase after the massage in the experimental group to evaluate the anxiety experienced by women during labor.

2.4 | Data collection

After approval and permission to conduct the study were obtained from the ethics committee, the hospital's head nurse, delivery room charge nurse/midwife and other midwives and nurses were interviewed and informed about the purpose and scope of the study. Data were collected by one of the researchers. The researcher was aware of which patients were assigned to each group. However, the researchers did not interfere in any way with the study results. When they encountered women who met the inclusion criteria of the study, the purpose of the study was explained, and written consents were received from those who agreed to participate in the study. For the women who satisfied the criteria, participation in the study was voluntary. Additionally, during the study, no women requested to withdraw and no women were excluded from the study. Routine care and treatments for the women continued during data collection.

Massage is an old technique that is widely used in childbirth (Field, 2010) and can decrease the childbirth pain by reducing the adrenaline and noradrenaline secretion and increasing the endorphins and oxytocin release thus reducing the childbirth duration by increasing uterine contractions (Alehagen, Wijma, Lundberg, & Wijma, 2005; Cooke, Holzhauser, Jones, Davis, & Finucane, 2007). The complications caused by prolonged labor in mother and fetus are enormous and the massage for shortening of duration of labor is simple, affordable, safe and more acceptable for pregnant women. In the literature massage was applied for 30 min, thus in this study the women in the experimental group were administered a massage to the sacral region under the supervision of a doctor for 30 min at every phase of labor (Gallo et al., 2013; Haghighi, Masoumi, & Kazemi, 2016; Sethi & Barnabas, 2017).

2.5 | Procedure

Before the research data were collected, an informative meeting regarding the purpose and scope of the study was held for the members of the healthcare team who worked in the obstetrics and gynecology clinic of the Turkish Republic Ministry of Health Public Hospitals Administration of

TABLE 1 Comparison of the visual analog scale (VAS) values of the experimental and control groups in the first phase of labor (N = 60)

Features	Control group ($n = 30$)	Experimental group ($n = 30$)	t[a]	P**
VAS in the latent phase (3–4 cm)	4.67 ± 1.37	3.57 ± 1.43	0.03	.004
VAS in the active phase (5–7 cm)	8.43 ± 1.17	7.03 ± 1.5	4.04	.001
VAS in the transition phase (8–10 cm)	9.7 ± 0.53	8.83 ± 1.78	2.55	.013

[a]Student's *t* test.
**$P < .05$.

TABLE 2 Comparison of the state anxiety point averages of the experimental and control groups (N = 60)

Features	Control group ($n = 30$)	Experimental group ($n = 30$)	t[a]	P**
State anxiety scale point averages	39.57 ± 4.17	28.07 ± 2.96	9.18	.001

[a]Student's *t* test.
**$P < .05$.

Turkey, at the Istanbul Province Bağcılar Training and Research Hospital, where the study would be conducted. In addition, cooperation was provided by the members of the healthcare team. For the correct application of the massage, the researcher was trained by the physical therapist who worked at hospital. The massage was applied only to the pregnant women in the intervention group at every phase of labor. There was no intervention in the control group except for routine hospital applications. The steps taken in this study are discussed below.

For the pregnant women included in the experimental group:

- One-on-one interviews were conducted with the pregnant women, and the voluntary disclosure forms, which explained the purpose of the study, were completed.
- The prepared questionnaire form was applied.
- In addition to providing them with routine nursing/midwifery care, the women in the experimental group were administered a massage to the sacral region under the supervision of a doctor for 30 min using the effleurage (patting) (15 min) and vibration techniques (15 min) in the latent (3–4 cm), active (5–7 cm) and transition (8–10 cm) phases of labor. To achieve this, the patients were placed in the left lateral position in the latent (3–4 cm), active (5–7 cm) and transition (8–10 cm) phases of labor.
- The STAI FORM TX-I was applied and evaluated after the massage in the active (5–7 cm) phase.
- The VAS was evaluated after the massage in the latent (3–4 cm), active (5–7 cm) and transition (8–10 cm) phases.
- Birth action follow-up form and postpartum interview forms were applied.

For the pregnant women included in the control group:

- One-on-one interviews were conducted with the pregnant women, and the voluntary disclosure forms, which explained the purpose of the study, were completed.
- The prepared questionnaire form was applied.
- Routine nursing/midwifery care was applied.
- The STAI FORM TX-I was applied and evaluated in the active (5–7 cm) phase.
- The VAS was evaluated in the latent (3–4 cm), active (5–7 cm) and transition (8–10 cm) phases.
- Birth action follow-up form and postpartum interview forms were applied.

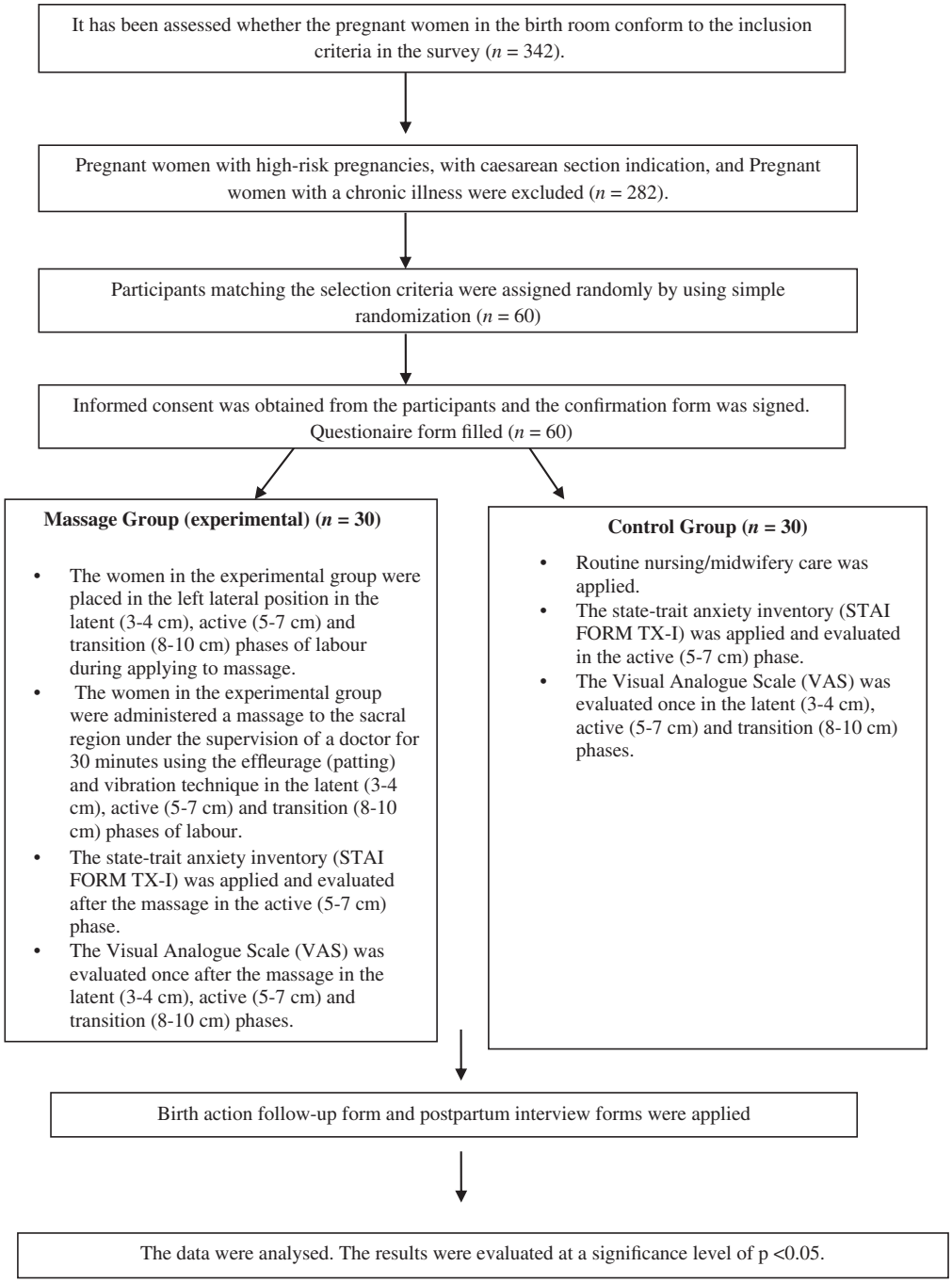
One-on-one interviews were conducted with the women in both groups, and the voluntary disclosure forms, which explained the purpose of the study, were completed. After

TABLE 3 Comparison of the thoughts about labor pain and labor of women in the control and experimental groups (N = 60)

	Control group		Experimental group		χ^{2a}	P**
Features	n	(%)	n	(%)		
Thoughts about labor pain						
It was an unbearable pain	30	100.0	28	93.3	2.07	.151
It was less than I expected	0	0.0	2	6.7		
Thoughts about labor						
It was a difficult labor	24	80.0	8	26.7	17.14	.001**
It was a normal labor	6	20.0	22	73.3		

[a]Chi-square test.
**$P < .05$.

the prepared questionnaire form was applied to the women in the experimental group, routine nursing/midwifery care was provided.



2.6 | Hypotheses of the study

1. Massage applied to the sacral region decreases the perception of a woman's labor pain.
2. Massage applied to the sacral region decreases the woman's levels of concern and anxiety about labor.
3. Massage applied to the sacral region increases the woman's satisfaction with the labor.

2.7 | Data analysis

In the evaluation of the data, in addition to descriptive statistical methods (e.g., percentage, frequency, mean, and standard deviation), the Chi-square test and Student's *t* test were used in the comparison of the qualitative data. The results were evaluated at a significance level of $P < .05$.

The dependent variables of the study are the pain score averages of the pregnant women, the duration of the latent, active and transition phases of labor, and the anxiety level score. The independent variables of the study are the

pregnant women's ages, educational status, working status, and prenatal educational status, as well as the educational status of the husbands of the pregnant women, the women's willingness to become pregnant and the willingness to serve as controls before labor.

2.8 | Ethical consideration

Approval was received from the Ethics Committee for Clinical Investigations of Bağcılar Training and Research Hospital to conduct the study; the approval number is 2015/19/02. Written permission was received from the Chief Physician of Bağcılar Training and Research Hospital so that the study could be performed. Verbal and written consents were received after the necessary explanations regarding the purpose of the study, the application method and the planned outcomes had been given to the patients included in the study.

3 | RESULTS

The average age of the pregnant women included in the study was 23.5 ± 4.47 years. When the data on educational status were examined, 60% of the women in the experimental group and 56.7% of the women in the control group were primary school graduates, and 20% of the women in the experimental and control groups were high school graduates. Moreover, 100% of the pregnant women stated that they intentionally became pregnant. In all, 83.3% of the women in the control group and 96.7% of the women in the experimental group regularly went for examinations throughout their pregnancy. In addition, 83.3% of the women in the control group and 93.33% of the women in the experimental group had received no information about labor. Furthermore, 66.7% of the women in the control group and 63.3% of the women in the experimental group were afraid of the birth process. Finally, 93.3% of the women in the control group and 96.7% of the women in the experimental group asked one of their relatives to accompany them during labor.

The comparison of the VAS values of the experimental and control groups in the first phase of labor is presented in Table 1. Accordingly, the average of the VAS points given by women for pain perception in the latent phase (3–4 cm) was 4.67 (SD = 1.37) in the control group and 3.57 (SD = 1.43) in the experimental group. The VAS point averages of the experimental group in the latent phase (3–4 cm) were found to be statistically significantly lower than those of the control group ($P < .05$) (Table 1). The average of the VAS points given by women for pain perception in the active phase (5–7 cm) was 8.43 (SD = 1.17) in the control group and 7.03 (SD = 1.5) in the experimental group. The VAS point averages of the experimental group in the active phase (5–7 cm) were found to be statistically significantly lower compared with those of the control group ($P < .001$) (Table 1). The average of the VAS points given by women for pain perception in the transition phase (8–10 cm) was 9.7 (SD = 0.53) in the control group and 8.83 (SD = 1.78) in the experimental group. The VAS point averages of the experimental group in the transition phase (8–10 cm) were found to be statistically significantly lower compared with those of the control group ($P < .05$, Table 1).

The comparison of the state anxiety point averages of the experimental and control groups is presented in Table 2. Accordingly, the state anxiety scale (STAI) point averages of the control group and the experimental group were found to be 39.57 ± 4.17 and 28.07 ± 2.96, respectively. The state anxiety scale (STAI) point averages of the experimental group were found to be statistically significantly lower compared with those of the control group ($P < .001$, Table 2).

The comparison of the thoughts about labor pain and labor of the women in the control and experimental groups is presented in Table 3. While 100% of the women in the control group defined labor pain as "an unbearable pain", 93.3% of the women in the experimental group defined labor pain as "an unbearable pain". No statistically significant difference was observed between the two groups in terms of the distributions of thoughts about labor pain ($P > .05$, Table 3). While 80% of the women in the control group stated that their labor was a difficult labor, 26.7% of the women in the experimental group stated that their labor was a difficult labor. The distributions of the finding that women in the experimental group accepted their labor as difficult were found to be statistically significantly lower compared with the control group ($P < .001$, Table 3).

The comparison of the post-natal feelings and overall satisfaction with labor of the women in the control and experimental groups is presented in Table 4. Accordingly, the distributions of the answer of "I'm fine" given in response to the question of "How are you feeling now?" were found to be statistically significantly higher in the experimental group than in the control group ($P < .05$, Table 4). The distributions of the answer of "Yes" given in response to the question of "Are you generally satisfied with the labor process?" by the experimental group were found to be statistically significantly higher compared with the control group ($P < .05$, Table 4).

4 | DISCUSSION

Labor pain is a condition that is affected by many neurophysiological, biochemical, psychogenic, ethnocultural, religious, cognitive, psychological and environmental factors. Labor pains, unlike other pains, do not have a stable intensity and are gradually intensified so that labor can progress (Hosseini, Bagheri, & Honarparvaran, 2013). Moreover,

TABLE 4 Comparison of the post-natal feelings and overall satisfaction with the labor process of women in the control and experimental groups (N = 60)

Features	Control group		Experimental group		χ^{2a}	P**
	n	(%)	*n*	(%)		
Your current feelings						
I'm fine	15	50.0	26	86.7	9.73	.021
I'm tired	7	23.3	2	6.7		
I have pain, I'm not comfortable	6	20.0	2	6.7		
I am relieved	2	6.7	0	0.0		
Overall satisfaction with the labor process						
Yes	9	30.0	20	66.7	8.08	.004
No	21	70.0	10	33.3		

[a]Chi-square test.
**$P < .05$.

60% of nulliparous women and 40% of multiparous women experience this severe condition as a result of the contraction of the uterine muscles and the increased exacerbation of these contractions as well as the interaction among the hormones produced by the mother and the baby and biochemical and immunological factors (Dağlar & Aydemir, 2011). The levels of the pain perceived by pregnant women in the latent, active and transition phases of the first phase of labor are different. Therefore, in our study, the VAS was evaluated in three phases of labor, and the levels of the pain perceived by the pregnant women were evaluated once after the massage in the latent (3–4 cm), active (5–7 cm) and transition (8–10 cm) phases in the experimental group. In our study, the latent phase (3–4 cm) VAS averages, the active phase (5–7 cm) VAS averages and the transition phase (8–10 cm) VAS averages of the experimental group were found to be statistically significantly lower than those of the VAS averages of the control group ($P < .05$). These findings confirmed the hypothesis that "massage applied to the sacral region decreases the perception of women's labor pain", which we put forth at the beginning of the study. Gönenç and Terzioğlu (2012) concluded in their study that both massage and acupressure applications in the transition phase of labor were effective in controlling the labor pain and that acupressure was more effective than massage alone after they compared the use of massage alone and massage and acupressure together (Gönenç & Terzioğlu, 2012). In some studies in the literature, it is stated that massage application at birth is effective in pain management and that it delays the use of epidural analgesia (Gallo et al., 2013; Janssen, Shroff, & Jaspar, 2012; Mortazavi, Khaki, Moradi, Heidari, & Vasegh Rahimparvar, 2012). Similarly, in other studies in the literature, it has been determined that massage application in the transition phase of labor decreases the perceived labor pain (Abbaspoor & Mohammadkhani, 2013; Mortazavi et al., 2012). Janssen et al. (2012) determined that massage application decreases the ratios of caesarean sections that are elected due to the fear of labor and allows mothers to have positive experiences during labor (Janssen et al., 2012). Massage has an important place in modern nursing practices. In addition, massage is now quite popular among complementary initiatives as it is a low-cost, easy-to-apply and effective method that does not require equipment and that does not demand excessive amounts of time for the nurse. Massage is used during labor to provide relaxation, to decrease pain and suffering, to shorten the labor process and to increase the ability of the woman to cope with labor pain (Jones et al., 2012; Smith, Collins, Cyna, & Crowther, 2006). The results of our study support what is shown in the literature. In our study, the STAI point averages of the experimental group were found to be statistically significantly lower compared with those of the control group ($P < .001$). This result confirms the hypothesis that "massage applied to the sacral region decreases the woman's levels of concern and anxiety about labor" that we put forth at the beginning of the study. In the studies performed, it is emphasized that massage application is an effective method that can decrease the anxiety level of pregnant women during the labor process (Lamadah & Nomani, 2016; Mortazavi et al., 2012). Gönenç and Terzioğlu (2012) determined that the active phase state anxiety point average was lower in the group that was administered a massage (Gönenç & Terzioğlu, 2012).

In our study, the total duration of labor was, on average, 7.6 h (457.03 min) in the control group and 7.12 h (427.27 min) in the experimental group. No statistically significant difference was observed between the experimental and control groups with respect to the averages of the duration of the first phase, second phase, and third phase of labor as well as the total duration of labor ($P > .05$). Similar to our findings, in a study performed by Jannsen et al. in 2012, no significant difference was found between the first and second phases of labor in the groups with and without massage application (Janssen et al., 2012). In contrast, in the

study by Haghighi et al. (2016), the durations of the first and second phases of labor in the experimental group were shorter than that in the control group (Haghighi et al., 2016). Similarly, in the study by Lamadah and Nomani (2016), the durations of the first and second stages of labor in the aromatherapy group were shorter than that of the control group (Lamadah & Nomani, 2016).

In our study, while 100% of the women in the control group and 93.3% of the women in the experimental group defined labor pain as "an unbearable pain", 80% of the women in the control group and 26.7% of the women in the experimental group stated that their labor was difficult. The distributions of the finding that women in the experimental group viewed their labor as difficult were statistically significantly lower compared with the control group ($P < .001$). Satisfaction with the labor process and a feeling of well-being after labor in women in the experimental group were statistically significantly higher compared with the control group ($P < .05$). These findings confirm the hypotheses that "massage applied to the sacral region has a positive effect on labor" and "massage applied to the sacral region increases a woman's satisfaction with labor," which we mentioned at the beginning of the manuscript. In the study performed by Mortazavi et al. (2012), which included 120 primiparous women, the effect of massage therapy on pain, anxiety and satisfaction of women during labor was examined. They found that the satisfaction scores in the four phases of labor were significantly higher in the group that was administered a massage compared with the control group (Mortazavi et al., 2012). Similar results were shown in the study by Sethi and Barnabas (2017). In their study, it is stated that back massage had a significant impact on pain and that back massage had a significant role in the reduction of pain and the improvement of the emotional experience of labor (Sethi & Barnabas, 2017).

5 | CONCLUSION

In this study, which was performed to evaluate the effect of sacral massage on labor, it was concluded that sacral massage applied during labor reduced the labor pain of women, decreased the levels of concern and anxiety, resulted in increased satisfaction with the labor process among pregnant women, positively affected the perception of labor and had no fetal side effects.

FUNDING

The authors declare that this study has received no financial support.

CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

AUTHOR CONTRIBUTIONS

S.A.C. and S.K. contributed to the conception and design of this study; S.A.C. and S.K. carried out the statistical analysis of the data and drafted the manuscript; and S.A.C. made critical revisions to the paper for important intellectual content.

ORCID

Semra Akköz Çevik https://orcid.org/0000-0001-5513-1372

REFERENCES

Abbaspoor, Z. & Mohammadkhani, S. L. (2013). Lavender aromatherapy massages in reducing labor pain and duration of labor: A randomized controlled trial. *African Journal of Pharmacy and Pharmacology*, 7(8), 426–430. https://doi.org/10.5897/AJPP12.391.

Alehagen, S., Wijma, B., Lundberg, U. & Wijma, K. (2005). Fear, pain and stress hormones during childbirth. *Journal of Psychosomatic Obstetrics & Gynecology*, 26(3), 153–165.

Cooke, M., Holzhauser, K., Jones, M., Davis, C. & Finucane, J. (2007). The effect of aromatherapy massage with music on the stress and anxiety levels of emergency nurses: Comparison between summer and winter. *Journal of Clinical Nursing*, 6(9), 1695–1703.

Dağlar, G. & Aydemir, N. (2011). Nonpharmacologic practices of midwife care to reduce pain in vaginal delivery. *Continuous Medical Education Journal*, 20, 1–6 (Original Work in TURKISH).

Fenwick, F., Staff, L., Gamble, J., Creedy, D. K. & Bayes, S. (2010). Why do women request caesarean section in a normal, healthy first pregnancy? *Original Research Article Midwifery*, 26(4), 394–400.

Field, T. (2010). Pregnancy and labor massage. *Expert Review of Obstetrics & Gynecology*, 5(2), 177–181.

Gallo, R. B. S., Santana, L. S., Ferreira, C. H. J., Marcolin, A. C., PoliNeto, O. B., Duarte, G. *et al.* (2013). Massage reduced severity of pain during labour: A randomised trial. *Journal of Physiotherapy*, 59(2), 109–116. https://doi.org/10.1016/S1836-9553(13)70163-2.

Gönenç, M. İ. & Terzioğlu, F. (2012). The effect of massage and acupressure on pregnant women anxiety level. *Ankara Health Sciences journal*, 1(3), 129–143 (Original Work in TURKISH).

Haghighi, N., Masoumi, S. Z. & Kazemi, F. (2016). Effect of massage therapy on duration of labour: A randomized controlled trial. *Journal of Clinical and Diagnostic Research*, 10(4), QC12–QC15.

Hosseini, S. E., Bagherı, M. & Honarparvaran, N. (2013). Investigating the effect of music on labour pain and progress in the active stage of first labour. *European Review for Medical and Pharmacological Sciences*, 17, 1479–1487.

Janssen, P., Shroff, F. & Jaspar, P. (2012). Massage therapy and labor outcomes: A randomized controlled trial. *International Journal of Therapeutic Massage & Bodywork*, 5(4), 15–20.

Jones, L., Othman, M., Dowswell, T., Alfirevic, Z., Gates, S., Newburn, M. *et al*. (2012). Pain management for women in labor: An overview of systematic reviews. *The Cochrane Library*, 14 (3), 5–7.

Labrecque, M., Nouwen, A., Bergeron, M. & Rancourt, J. F. (1999). A randomized controlled trial of nonpharmacologic approaches for relief of low back pain during labor. *The Journal of Family Practice*, 48(4), 259–263.

Lamadah, S. M. & Nomani, I. (2016). The effect of aromatherapy massage using lavender oil on the level of pain and anxiety during labour among primigravida women. *American Journal of Nursing Science*, 5(2), 37–44.

Mortazavi, S. H., Khaki, S., Moradi, R., Heidari, K. & Vasegh Rahimparvar, S. F. (2012). Effects of massage therapy and presence of attendant on pain, anxiety and satisfaction during labour. *Archives of Gynecology and Obstetrics*, 286(1), 19–23.

Sethi, D. & Barnabas, S. (2017). A pre-experimental study to evaluate the effectiveness of back massage among pregnant women in first stage of labour pains admitted in labour room of a selected hospital, Ludhiana, Punjab, India. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 6(1), 76–83. https://doi.org/10.18203/2320-1770.ijrcog20164636.

Smith, C. A., Collins, C. T., Cyna, A. M. & Crowther, C. A. (2006). Complementary and alternative therapies for pain management in labor. *Cochrane Database of Systematic Reviews*, 9(4), 1–43.

Smith, C. A., Levett, K. M., Collins, C. T. & Jones, L. (2012). Massage, reflexology and other manual methods for pain management in labour (review). *Cochrane Database of Systematic Reviews*, 2, 1–27.

How to cite this article: Akköz Çevik S, Karaduman S. The effect of sacral massage on labor pain and anxiety: A randomized controlled trial. *Jpn J Nurs Sci*. 2020;17:e12272. https://doi.org/10.1111/jjns.12272