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Effects of Lavender Oil Aromatherapy on Pain, Anxiety, and Comfort after Cesarean Section: A Randomized Controlled Trial

Lavanta Yağı Aromaterapisinin Sezaryen Sonrası Ağrı, Anksiyete ve Konfor Üzerine Etkileri: Randomize Kontrollü Bir Çalışma

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ABSTRACT

Objective: This study aims to determine the effects of lavender oil aromatherapy on pain, anxiety, and comfort after cesarean section.

Methods: This study was conducted as a three-group randomized and controlled trial conducted in a city hospital in Adana, Türkiye between August and December 2020.The study included 93 women who had cesarean section, with 30 women in the experimental group, 31 women in the placebo group, and 32 women in the control group. The study was conducted in four phases including before the cesarean and 1st, 4th, and 8th hours post-cesarean section. Data were collected through the "Personal Information Form", the "Visual Analogue Scale (VAS)", the "Trait Anxiety Inventory (TAI)", the "State Anxiety Inventory (SAI)", and the "Postpartum Comfort Scale (PCS)".

Results: The women in the experimental, control and placebo groups were found to demonstrate statistically significant differences in terms of their VAS mean scores according to the processes (P<.001). The women in the experimental and control group demonstrated statistically significant differences in terms of their SAI mean scores (P<.05). Statistically significant differences were found between the experimental group women's physical comfort, socio-cultural comfort, and PCS total mean scores according to the processes (P<.05).

Conclusion: The results of this study suggest that lavender oil aromatherapy can be used to decrease pain and anxiety and increase comfort after a cesarean section.

Keywords: Lavender oil aromatherapy, cesarean section, pain, anxiety, comfort

ÖZ

Amaç: Bu çalışma, lavanta yağı aromaterapisinin sezaryen sonrası ağrı, anksiyete ve konfor üzerindeki etkilerini belirlemeyi amaçlamaktadır.

Yöntemler: Bu çalışma Ağustos-Aralık 2020 tarihleri arasında üç gruplu randomize kontrollü bir çalışma olarak Adana'daki bir şehir hastanesinde yürütülmüştür. Çalışmaya 30'u deney, 31'i plasebo ve 32'si kontrol grubunda olmak üzere sezaryen olan 93 kadın dahil edilmiştir. Çalışma, sezaryen öncesi ve sezaryen sonrası 1., 4. ve 8. saatler olmak üzere dört aşamada yürütülmüştür. Araştırmanın verileri Kişisel Bilgi Formu, Visual Analog Skala (VAS), Sürekli Anksiyete Ölçeği (SAÖ), Durumluk Anksiyete Ölçeği (DAÖ) ve Doğum Sonu Konfor Ölçeği (DSKÖ) kullanılarak toplanmıştır.

Bulgular: Deney, kontrol ve plasebo gruplarında kadınların süreçlere göre VAS puan ortalamaları açısından istatistiksel olarak anlamlı fark tespit edilmiştir (P<,001). Deney ve kontrol grubunda kadınların süreçlere göre DAÖ puan ortalamaları açısından istatistiksel olarak anlamlı fark tespit edilmiştir (P<,05). Deney grubu kadınların süreçlere göre fiziksel konfor, sosyokültürel konfor ve DSKÖ toplam puan ortalamaları, plasebo grubu kadınların ise fiziksel konfor puan ortalamaları açısından istatistiksel olarak anlamlı fark tespit edilmiştir (P<,05).

Sonuç: Bu çalışmanın sonuçları, lavanta yağı aromaterapisinin sezaryen sonrası ağrı ve anksiyeteyi azaltmak ve konforu artırmak için kullanılabileceğini göstermektedir.

Anahtar kelimeler: Lavanta yağı aromaterapisi, sezaryen, ağrı, anksiyete, konfor

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INTRODUCTION

Cesarean section is an alternative method of delivery when vaginal delivery is not possible or when it poses a risk for the fetus.[1,2] The developments in patient care facilities and technologies have led to an increase in cesarean sections rates worldwide.[1,3]

The "ideal cesarean section rate" targeted by the World Health Organization since 1985 is 10-15% [4,5], yet this rate is much higher in Türkiye and worldwide.[2,6] According to new research from the World Health Organization (WHO), caesarean section use continues to rise globally, now accounting for more than 1 in 5 (21%) of all child births. According to Robson Classification, cesarean delivery rate in Türkiye in 2023 was reported to be 57.55%.[7] Research findings indicate that this number is set to continue increasing over the coming decade, with nearly a third (29%) of all births likely to take place by caesarean section by 2030.[8] Cesarean section, one of the most frequently encountered surgical interventions used today[2], could be the beginning of various physical and psychological problems in women. After a cesarean section, women could experience physical problems such as incision pain, sleep disorders, activity restrictions, gastrointestinal disorders, anesthesia complications, and psychological problems such as anxiety, depression, loss of control, and deterioration in the body image.[9]

Pain after a cesarean section is an acute pain type accompanied by an inflammatory process revealing itself with a surgical trauma with a decrease in the effect of anesthesia.[10,11] Pain after the cesarean section causes women to be reluctant about moving and fear to perform activities, which could restrict them from fulfilling many daily activities such as sitting, walking, meeting their hygiene needs, and breastfeeding their babies.[10,12] Activity restrictions could increase the risk of deep venous thrombosis and wound healing process.[10] Pain and these pain-related problems experienced after cesarean section cause a decrease in women's comfort. In this regard, it is important to plan interventions to increase comfort like relieving pain in the postpartum period.[13]

Adaptation to the postpartum period, which includes a series of renewal processes, is highly important for the mother and the baby.[13,14] Women face many physiological and psychological changes during this period. While most of these changes are considered normal and physiological, complaints and problems such as pain and anxiety require immediate interventions. Complaints and problems such as pain and anxiety are common in the first days following birth.[15]Anxiety could cause patients to experience negative physiological (vasoconstriction caused by noradrenaline discharge, increase in heart rate and contractility, increase in blood pressure and body temperature, hot flashes, sweating, etc.) and psychological effects (difficulty in concentrating, difficulty in performing simple tasks, decreased interest in daily activities, etc.).[9,16] In this regard, pain and anxiety should be assessed and managed in a multidimensional way in the early postnatal period, and interventions should be made to increase mothers' comfort by providing care for their problems.[17]

The literature recommends the use of pharmacological and nonpharmacological methods in tandem for decreasing pain after a cesarean section.[15,17] Lavender oil aromatherapy is one of the nonpharmacological methods used for relieving pain. Lavender is a flowering aromatic plant from the Lamiaceae family unique to the Western Mediterranean and is commonly used in lavender oil aromatherapy.[17,18-20] Today, due to its anti-inflammatory, anti-depressant, hypnotic, soothing, relaxant, anti-bacterial, and antispasmodic effects, lavender oil aromatherapy is utilized to relieve pain, anxiety, depression, insomnia, and fatigue.[18-21] The literature reports that the lavender oil aromatherapy utilized using lavender extract has effects on controlling various acute and chronic pain and decreasing pain after cesarean section.[17,19]

Nurses should know the application method in aromatherapy applications defining the density of oils, choosing the appropriate oil, deciding on the frequency and duration of application giving, observing the change in the patient and revealing the results. It is responsible for directing the applications and providing effective consultancy services.[22,23] Establishing the relationship between lavender oil aromatherapy and the reduction of pain, anxiety, and comfort is highly important for health professionals in terms of determining patients' postoperative responses and meeting their needs. The period after cesarean section is important in terms of controlling postoperative pain, maintaining maternal and infant health, establishing adequate contact and attachment between the mother and the baby, and providing the infant with adequate nutrition.[10-12]

AIM

This study aims to determine the effects of lavender oil aromatherapy on pain, anxiety, and comfort.

Hypothesis

H1a: Using lavender aromatherapy in the postpartum period does not reduce women's pain.

H1b: Using lavender aromatherapy in the postpartum period does not increase women's postpartum comfort.

H1c: Using lavender aromatherapy in the postpartum period does not reduce women's anxiety.

METHODS

Study design and sample

This study was conducted as a three-group randomized and controlled study to determine the effects of lavender oil aromatherapy on pain, anxiety, and comfort in women after cesarean section in a City Hospital in the Mediterranean Region. The study followed the Consolidated Standards of Reporting Trials (CONSORT) guidelines.

The target population of the study was women who had a planned cesarean section in the gynecology and obstetrics clinic between 01.08.2020 and 30.12.2020. Primigravida women between the ages of 18 and 35 who gave birth with spinal anesthesia and who could understand and speak Turkish were included in the study. Patients with blood clotting disorders, migraines, chronic headaches, lavender (Lavandula Angustifolia mill) allergy, and anosmia were not included in the study. Patients were excluded from the study if they developed allergies, had postoperative complications (such as nausea, and vomiting), used different types and doses of analgesics in the postoperative period (Rodinac 75 mg 2x1, IM), and wanted to leave the study.

The sample size was calculated using power analysis after a pilot study was conducted with 15 women (5 experimental, 5 placebo, and 5 control). The number of samples for there search was calculated using the G*Power 3.1.9.7 program. In the calculation, the effect size value obtained as a result of the pilot study for one-way analysis of variance was taken as 0.34 (f = 0.34), and there quired number of samples with a 5% margin of error (α = 0.05) and 80% power (1-1-β = 0.80). Women recruited in the pilot study were not included in the study. The number was calculated as 87 in total, 29 in each group. However, considering the risk of data loss, the required number of samples was determined as 96 by taking 10% more than the determined number of samples (n_1:32; n_2:32; n_3:32). The women who met the research criteria and agreed to participate in the study were divided into groups using a random list. Two patients wanted to withdraw from the study (n=2), and one patient developed a complication after the cesarean section (n=1). Hence, three patients were excluded from the monitoring, and the study was conducted with 93 women: 30 experimental group, 31 placebo group, and 32 control group women (Flow Chart).

Instruments and outcome measures

Data were collected by the researchers face to face, using the Personal Information Form, the Visual Analogue Scale (VAS), the Trait Anxiety Inventory (TAI), the State Anxiety Inventory (SAI), and the Postpartum Comfort Scale (PCS).

The Personal Information Form: The literature was reviewed considering the purpose of the study and the possible factors that may affect the study, and the Personal Information Form prepared by the researchers included 6 questions (women's age, weight, height, pregnancy planning, reason for caesarean section, presence of postpartum complications).[10-12]

The Visual Analogue Scale (VAS): VAS is a very easy, effective, and repeatable pain severity measurement scale that requires minimum tools. It measures the severity of pain rapidly in a clinical environment. VAS is composed of a 10-cm line drawn horizontally or vertically. While one side of the line indicates a lack of pain, the other side of the 10-cm line indicates the worst imaginable pain, and the patient marks the pain she experiences. The length between no pain and the point marked by the patient indicates the patient's pain.[24] In a systematic review aiming to investigate the validity and reliability of VAS for the measurement of pain intensity, the results of many studies were analyzed and it was determined that it is a valid and reliable method.[25]

The State-Trait Anxiety Inventory (STAI): The scale is self-rating and consists of 40 descriptive items divided into two subscales. Among them, items 1–20 are the State Anxiety Inventory (SAI) to measure short-term unpleasant emotional experiences such as tension, fear, and worry. Items 21–40 are the Trait Anxiety Inventory (TAI) to describe underlying and long-term anxiety tendencies. The scores obtained from both of these scales range from 20 to 80. High scores and low scores show high and low anxiety levels, respectively. If the total scores are below 42 on both parts, anxiety levels are normal. If the total scores are above 42, the participant shows high anxiety. The scale was adapted to Turkish by Öner and Le Compte[26]; while reliability was enhanced in 1976, validity was enhanced in 1977. Cronbach's alpha coefficient of the scale was found 0.83 on the pre-test and 0.92 on the post-test.26 In the first phase, the Trait Anxiety Inventory (TAI) was used to determine the women's general anxiety during pregnancy before cesarean section, and in the other phase the State Anxiety Inventory (SAI) was applied to determine their current anxiety.

Postpartum Comfort Scale (PCS): The scale was developed by Karakaplan and Yıldız[27] to determine postpartum comfort. The Likert-type scale consists of 34 items and 3 sub-scales. Each item with a positive statement is scored between "strongly agree" (5 points) and "strongly disagree" (1 point), and each item with a negative statement is scored between " strongly agree" (1 point) and "strongly disagree" (5 points). Hence, scores to be obtained from the scale range between 34 and 170, with higher scores obtained from the scale indicating higher comfort. Sub-scales of the scale and item numbers of each sub-scale include 14 items related to physical and bodily perceptions in the physical comfort sub-scale and 9 items related to spiritual and psychological components in the Psycho-spiritual comfort sub-scale. Sociocultural comfort sub-scale includes 11 items related to interpersonal, family and social relationships, finance, and support systems. Cronbach's alpha reliability of the scale was found to be 0.78 for the total PCS, 0.78 for the first sub-scale, 0.70 for the second sub-scale, and 0.62 for the third sub-scale. Cronbach's alpha reliability of the scale was reported 0.78.[27]

Procedure

Aromatherapy Intervention

Essential oils vary in quality and thus may not all be suitable for use in clinical settings. When using aromatherapy clinically, it is necessary to use high-quality, 100% pure essential oils from a reputable supplier. The oil used in the study was reported to be suitable for labour/lactation in the "National Association for Holistic Aromatherapy (NAHA) Evidence-Based Lists of Prenatal-Intrapartum-Postpartum Essential Oils for Aromatherapy Practitioners" [28]. The principal investigator gave Rosense (30 ml, Isparta lavender, 100% essential oil) brand lavender oil to the patients assigned to the experimental group.

1. Phase

Women who met the inclusion criteria for this research and had planned to undergo a cesarean section were recruited at the clinic where the study was conducted. They were provided with comprehensive information regarding the study's objectives. Subsequently, written consent was obtained from those women who willingly agreed to participate in the study. Randomization was then employed to divide these consenting women into distinct groups. Each group was subjected to preoperatively the completion of a The Personal Information Form and TAI.

2. Phase

"The Postnatal Care Management Guideline" has been used in Türkiye since 2014 to standardize patient care in the postnatal period for mothers who gave normal birth and caesarean section.[29] According to the guideline, women who come to the ward after caesarean section are taken to bed, monitored, administered the fluids to be given during the treatment, administered the medication (analgesic that does not affect breast milk/ patient-controlled analgesic and anti anxiolytic-free, routinely given to all mothers), their vital signs are taken, and lochia follow-up and pad follow-up are performed. After the women received routine standard care provided within the first half hour, 3 drops of lavender essential oil was applied topically on gauze for three minutes to the women in the experimental group. The application time, duration and amount of lavender essential oil used in the study were determined in accordance with the literature.[10,11,19] The gauze containing the essential oil was attached to the collar of the woman's clothing. It is important to note that there were no reported adverse reactions associated with the essential oil during this intervention. Conversely, the placebo group received distilled water instead of essential oil. The control group, in contrast, did not undergo any specific interventions, and data integrity was maintained as each woman was placed in a separate room throughout the study. Data collection forms (VAS, SAI, PCS) in 2nd- phase were completed at the 1st hour after cesarean section.

3. Phase

As per the "The Postnatal Care Management Guideline" established by the Turkish Ministry of Health, women's mobilization is typically initiated during the third monitoring session, which corresponds to the time frame of 6 to 24 hours post-cesarean section. It is worth noting that in the hospital where this study was conducted, women were mobilized at the sixth-hour post-operation.[29] Considering that mobilization could potentially affect pain, anxiety and comfort levels, the study protocol was designed to include a two-hour period before and after mobilization for data collection, 3rd-phase occurring at 4 hours postpartum. After the women received routine standard care provided within the 3 drops of lavender essential oil was applied topically on gauze for three minutes at 3.5 hours after cesarean section to the women in the experimental group. The gauze containing the essential oil was attached to the collar of the woman's clothing. It is important to note that there were no reported adverse reactions associated with the essential oil during this intervention. Conversely, the placebo group received distilled water instead of essential oil. The control group, in contrast, did not undergo any specific interventions, and data integrity was maintained as each woman was placed in a separate room throughout the study. Data collection forms (VAS, SAI, PCS) 3rd- phase were completed at the 4th hour after cesarean section.

4. Phase

In addition to the routine standard care provided, the experimental group of patients received a topical application of 3 drops of lavender essential oil on a gauze bandage for three minutes the 7.5th hours following their cesarean section. The gauze containing the essential oil was attached to the collar of the woman's clothing. It is important to note that there were no reported adverse reactions associated with the essential oil during this intervention. Conversely, the placebo group received distilled water instead of essential oil. The control group, in contrast, did not undergo any specific interventions, and data integrity was maintained as each woman was maintained as each woman was placed in a separate room throughout the study. Data collection forms (VAS, SAI, PCS) 4th- phase were completed at the 8th hour after cesarean section.

Randomization

The participants were randomly assigned to the experiment (n=32), placebo (n=32), and control (n=32) groups via block randomization using a web site (https://www.randomizer.org/). Randomization was carried out by applying a correspondence table created and stored by a blind academic nurse other than the researchers. There searcher analyzing the data was also blind to the patients assigned to the groups.

Statistical analysis

Data were analyzed in the SPSS (IBM SPSS Statistics 22) package program. Normality distribution of the data was done using the Shapiro-Wilks test. Data were analyzed using descriptive statistics, chi-square, One-way ANOVA, and Repeated Measures tests. Statistical significance was taken $P< 0.05$.

Ethical consideration

Before the study was conducted, ethics approval was obtained from the Ethics Board of the School of Medicine at Cukurova University (08.03.2019/86-8); written approval was obtained from the Health Directorate of the Province of Adana; and permissions to use the scales in the study were obtained from the authors by e-mail. In addition, verbal and written consent was obtained from the participants after they were given information about the study.

RESULTS

Table 1 demonstrates the baseline characteristics of the women by the groups. No significant relationships were found between the experimental, control, and placebo groups in terms of age, body image index (BMI), and pre-cesarean TAI mean scores (P>.05). The groups were independent and homogenous in terms of these characteristics.

Table 1. Findings of the Descriptive Characteristics of the Women and Homogeneity of the Groups

Variable	Experimental group (n=30) $\bar{X} \pm MD$	Control group (n=32) $\bar{X} \pm MD$	Placebo group(n=31) $\bar{X} \pm MD$	Statistical analysis * Possibility
Age (year)	30.23±6.12	28.53±4.53	27.58±4.87	F=2.028[a] *P*=.138
BMI (kg/m^2)	28.60±3.54	30.07±5.21	29.96±3.86	F=1.119[a] *P*=.331
1.phase pre-cesarean TAI mean scores	34.53±3.43	38.25±8.04	36.97±6.51	F=2.728[a] *P*=.071

$\bar{X}$, mean; MD, Mean Deviation; [a]One-Way ANOVA

Statistically significant differences were detected in terms of VAS mean scores of the women in the experimental, control, and placebo groups according to the processes (P<.001). Bonferroni corrected pairwise comparisons performed to determine which group caused the significant difference showed that the experimental, control and placebo group women's second-phase total mean scores were higher compared to the 3rd and 4th phases, and the difference was found to be statistically significant. Third and 4th-phase VAS mean scores were found to be significantly lower than those of 2nd-phase mean scores. Similarly, significant differences were found between the 3rd-phase mean scores and the 4th-phase mean scores. Fourth-phase VAS mean scores were significantly lower than the 3rd-phase mean scores (Table 2). The groups demonstrated no significant differences in terms of their 2nd-phase VAS mean scores (P>.05). The groups indicated statistically significant differences in terms of their VAS mean scores according to their 3rd and 4th-phase mean scores (P<.05). VAS mean scores of the women in the experimental group were significantly lower in the 3rd and 4th phases in comparison to the control and placebo group (Table 2).

Women in the experimental and control group were found to have statistically significant differences according to the processes in terms of their SAI mean scores (*P*<.05). Bonferroni corrected paired comparisons were performed to see which group caused the differences, which is demonstrated in (Table 3).

The groups were found to have no statistically significant differences in terms of their 2nd-phase SAI mean scores (*P*>.05). Statistically significant differences were found in terms of 3rd and 4th-phase SAI mean scores according to the groups (*P*<.05). SAI mean scores of the women in the experimental group were found to be lower in the 3rd and 4th phases in comparison to the control group (Table 3).

Table 2. Comparison of Women's VAS Mean Scores

VAS	Experimental group (n=30)(1) $\bar{X} \pm MD$	Control group (n=32)(2) $\bar{X} \pm MD$	Placebo group (n=31)(3) $\bar{X} \pm MD$	Statistical analysis * Possibility
2. phase (1)	5.76±2.44	6.25±2.34	7.00±2.08	F=2.246[a] *P*=.112
3. phase (2)	4.00±1.89	4.93±2.21	5.35±1.56	F=4.006[a] ***P*=.022** [1-3]
4. phase (3)	2.23±1.38	3.59±2.31	3.38±2.34	F=3.828[a] ***P*=.025** [1-2]
Statistical analysis * Possibility	F=36.360[b] ***P*< .001** [1-2,3] [2-3]	F=15.589[b] ***P*< .001** [1-2,3] [2-3]	F=17.573[b] ***P*< .001** [1-2,3] [2-3]	

$\bar{X}$, Mean; MD, Mean Deviation; [a]One-Way ANOVA; [b]Repeated Measures
2.phase: post op 1sthours, 3.phase: post op 4thhours, 4.phase: post op 8thhours

Statistically significant differences were found in the physical comfort, socio-cultural comfort, and PCS mean scores of the women in the experimental group according to the processes, and the women in the placebo group were found to demonstrate statistically significant differences in terms of their physical comfort mean scores (*P*<.05). Bonferroni corrected paired comparison was performed to see which group caused significant differences, and the results are demonstrated in (Table 4).

Table 3. Comparison of Women's SAI Mean Scores

SAI	Experimental group (n=30)(1) $\bar{X} \pm MD$	Control group (n=32)(2) $\bar{X} \pm MD$	Placebo group (n=31)(3) $\bar{X} \pm MD$	Statistical analysis * Possibility
2. phase (1)	35.63±3.92	40.09±8.72	37.84±9.36	F=2.552[a] *P*= .084
3. phase (2)	32.73±3.70	39.53±9.034	35.35±7.93	F=6.839[a] ***P*= .002** [1-2]
4. phase (3)	30.77±3.191	35.63±8.83	34.10±9.09	F=3.285[a] ***P*= .042** [1-2]
Statistical analysis * Possibility	F=33.678[b] ***P*< .001** [1-2,3] [2-3]	F=3.988[b] ***P*= .029** [1-3] [2-3]	F=2.296[b] *P*= .119	

$\bar{X}$, mean; MD, Mean Deviation; [a]One-Way ANOVA; [b]Repeated Measures
2.phase: post op 1sthours, 3.phase: post op 4thhours, 4.phase: post op 8thhours

Experimental, control, and placebo groups were found to have no statistically significant differences in terms of their 2nd, 3rd, and 4th-phase socio-cultural comfort, psycho-spiritual comfort, and PCS total mean scores (Table 4).

The groups were found to have no statistically significant differences in terms of their 2nd and 4th-phase physical comfort mean scores (respectively *P*=.055; *P*=.438). Third-phase physical comfort mean scores were found to have statistically significant differences in terms of their physical comfort mean scores according to the groups (*P*=.008). Physical comfort mean scores of the women in the control group were found to be significantly higher in comparison to the experimental and placebo group (Table 4).

Table 4. Comparison of the PCS and Sub-Scale Mean Scores of the Women

		Experimental group (n=30)(1) $\overline{X} \pm MD$	Control group (n=32)(2) $\overline{X} \pm MD$	Placebo group (n=31)(3) $\overline{X} \pm MD$	Statistical analysis * Possibility
Physical Comfort	2. phase (1)	36.90±2.92	40.50±1.39	40.13±6.83	F=3.005[a] *P*= .055
	3. phase (2)	37.73±3.22	41.06±7.70	36.61±5.42	F=5.030[a] ***P*= .008** [1-2][2-3]
	4. phase (3)	37.60±3.36	39.22±7.33	36.68±11.01	F=0.833[a] *P*= .438
	Statistical analysis * Possibility	F=4.515[b] ***P*= .020** [1-2,3]	F=0.756[b] *P*= .478	F=6.752[b] ***P*= .004** [1-2,3]	
Psycho-Spiritual Comfort	2. phase (1)	15.77±2.59	17.13±5.21	17.55±4.43	F=1.458[a] *P*= .238
	3. phase (2)	16.13±2.41	16.50±3.91	16.87±3.74	F=0.351[a] *P*= .705
	4. phase (3)	16.07±2.46	15.91±3.30	16.94±3.58	F=0.955[a] *P*= .389
	Statistical analysis * Possibility	F=1.892[b] *P*= .170	F=0.686[b] *P*= .511	F=0.539[b] *P*= .589	
Sociocultural Comfort	2. phase (1)	24.13±2.56	24.84±5.68	22.77±4.08	F=1.842[a] *P*= .165
	3. phase (2)	25.10±2.85	25.34±5.56	23.39±2.99	F=2.174[a] *P*= .120
	4. phase (3)	25.53±2.72	26.03±4.96	23.94±3.14	F=2.642[a] *P*= .077
	Statistical analysis * Possibility	F=9.074[b] ***P*= .001** [1-2,3]	F=3.086[b] *P*= .060	F=2.789[b] *P*= .078	
PCS Total	2. phase (1)	76.80±5.75	82.47±14.80	80.45±14.19	F=1.658[a] *P*= .196
	3. phase (2)	78.97±5.86	82.91±13.56	76.87±9.77	F=2.789[a] *P*= .067
	4. phase (3)	79.20±6.16	81.16±10.91	77.55±13.59	F=0.895[a] *P*= .412
	Statistical analysis * Possibility	F=13.751[b] ***P*< .001** [1-2,3]	F=0.464[b] *P*=.633	F=2.398[b] *P*=.109	

$\overline{X}$, mean; MD, Mean Deviation; [a]One-Way ANOVA; [b] Repeated Measures
2.phase: post op 1sthours, 3.phase: post op 4thhours, 4.phase: post op 8thhours

DISCUSSION

Medicine used to relieve pain to enhance adaptation to this process causes adverse effects such as respiratory problems, nausea-vomiting, and itching, is transmitted to the mother's milk, and could cause sedation in the baby. Considering the adverse effects of drugs, nonpharmacological methods should be preferred before pharmacological methods in the management of the process. Therefore, the use of lavender oil aromatherapy is recommended in this process. This study aimed to determine the effects of lavender oil aromatherapy on pain, anxiety, and comfort and found that after the use of lavender oil aromatherapy (3rd and 4th phases), the pain severity of women in the experimental group was significantly lower in comparison to the control and placebo group. A systematic review study including 15 studies on the effects of lavender oil aromatherapy in the postpartum period found that the lavender oil aromatherapy used in this period had effects on decreasing pain, preventing anxiety, and increasing sleep quality.[30] Similarly, Hadi and Hanid[19] found that the VAS mean scores of women in the experimental group who were administered lavender were lower in comparison to the women in the control group.[19] Vaziri et al.[20] found that women administered lavender experienced less perianal and physical pain compared to the women in the control group.[20] The literature includes various studies that support the findings of this study.[11,18] The results of this study and the ones in the literature show that lavender oil aromatherapy can be used as an effective method of decreasing pain in the postpartum period. Lavender oil aromatherapy should be used more commonly to help mothers adapt to the process and decrease the adverse effects of pharmacological methods.

This study found that the SAI mean scores of the groups demonstrated no statistically significant differences in the 2nd phase, but significant differences were detected in the 3rd and 4th phases and their anxiety decreased. Kianpour et al.[31] followed up on women in the 2nd week, 1st month, and 3rd month of the postpartum period.[31]Women in the lavender oil aromatherapy group were reported to experience less anxiety, stress, and depression in the postpartum period in comparison to the women in the control group. The findings reported by Effati Daryani et al.[32] also support the findings in this study.[32] In line with the research findings, Burgess, Harris and Wheeling[33] found that pain and anxiety decreased in women in the lavender group.[33] It could also be useful for eliminating women's anxiety during the postpartum period.

In the first hours of the postpartum period, the mother can become more adequate in terms of meeting her baby's needs and her comfort can increase if her pain is decreased, if her hygienic needs are met, if she can stand up, if she starts normal nutrition pattern, if she is supported in terms of the baby's care, etc. Significant differences were found in the experimental group women's physical comfort, socio-cultural comfort, and PCS total mean scores and the placebo group women's physical comfort mean scores according to the processes (P<.05). No significant differences were detected between the experimental, control, and placebo groups in the 2nd, 3rd, and 4th-phase socio-cultural comfort, psycho-spiritual comfort, and PCS total mean scores. The literature was found to include no studies that investigated the effects of lavender oil aromatherapy on postpartum comfort. Çankaya and Ratwisch[34] investigated the effects of reflexology on postpartum comfort and found that socio-cultural comfort, psycho-spiritual comfort, and PCS mean scores were higher and comfort increased in women in the experimental group.[34] Güney and Uçar[35] reported that women who were given deep tissue massage in the postpartum period had better comfort in comparison to the women in the control group.[35] The findings of this study are in line with the literature. In addition the lack of difference between the groups in the study is thought to be due to the fact that women's views on childbirth, pain and care are different. In addition, comfort is a concept that affects women in many ways, and we believe that the short-term effect of the aromatherapy applied may have been affected.

Limitations of the Study

This study clearly has some limitations. One is that the findings are not generalizable to all women because the study was conducted in only one hospital. Despite these limitations, we believe our study can serve as a springboard for further research on pain and anxiety management and comfort levels after cesarean sections. The research objective and inclusion/exclusion criteria were clearly stated and the sample selection process carried out was based on CONSORT criteria. Moreover, the results were evaluated objectively and were not biased.

Lavender oil effects of lavender oil aromatherapy starting in the first hours of the postpartum period resulted in better physical and mood status compared to the nonaromatic group. Effects of lavender oil aromatherapy may be considered for women during the postpartum period. This study found that the use of lavender oil created a significant result compared to other groups. Study results showed that aromatherapy was effective in reducing pain and anxiety and increasing comfort. Thus, there may be insufficient clinical evidence to support the practical application of these aromatherapies on postpartum

women. Further studies using larger samples and better quality in terms of methodology and end points are necessary to build on current findings.

Etik Komite Onayı: Bu çalışma için Çukurova Üniversitesi Etik Kurulu'ndan etik kurul onayı alınmıştır. Tarih: 8 Mart 2019, Karar Numarası: 86/8
Hasta Onamı: Bu çalışmaya katılan tüm katılımcılardan yazılı bilgilendirilmiş onam alınmıştır
Hakem Değerlendirmesi: Dış bağımsız.
Yazar Katkıları: Fikir- SKY, SD, İKT, EN, SA; Tasarım- SKY, SD, İKT; Denetleme- EN, SA; Kaynaklar- SKY, SD, İKT; Veri Toplanması ve/veya İşlemesi- SKY, SD, İKT; Analiz ve/ veya Yorum- SKY, SD, İKT, EN, SA; Literatür Taraması- SKY; Yazıyı Yazan- SKY; Eleştirel İnceleme- SKY, SD, İKT.
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Ethics Committee Approval: Ethics committee approval was obtained from Cukurova University Ethics Committee (Date: 8 March 2019, Number: 86/8)
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