The Effect of Aromatherapy Massage Using Lavender Oil on the Level of Pain and Anxiety During Labour Among Primigravida Women

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Abstract: *Background:* Labour pain is considered as one of the most intense forms of pain. Psychological challenge such as anxiety can contribute towards women's perception of pain and may also affect their labor and birth experience. There are modern many non-invasive methods to relieve pain during childbirth. Among these methods is aromatherapy which is the most popular complementary therapy during child birth. Therefore this study aimed to assess the effect of aromatherapy massage using lavender oil on the level of pain and anxiety during labor among primigravida women. *Setting:* the study was conducted in the labour department at El-Shatby Maternity University Hospital in Alexandria, Egypt. A purposive sample of 60 pregnant women participated in the study. There were randomly assigned to two groups: The first group (n= 30) received aromatherapy back massage with 2 drops of lavender oil dissolved in 50cc almond oil and the second group (n = 30) received only back massage. *Four tools were used to collect the necessary data:* An Interviewing Assessment Sheet, Partograph, Visual analogue pain intensity scale (VAS) and Spielberger state-trait anxiety questionnaire. *Results* of the current study illustrated that the mean pain score before intervention was (7.0) for aromatherapy group and (8.1) for control group. Then after intervention, the mean pain score decreased to 6.4 during active phase for aromatherapy group compared to 8.9 for control group. Also, the mean pain score decreased to 7.7 during transitional phase for aromatherapy group compared to 9.6 for control group. There is a statistical significant difference between the two groups after the intervention. Moreover, the mean anxiety score before intervention was (55.47 and 50.40) respectively among the aromatherapy and control group. However, it decreased during the active and transitional phase to (38.40, 36.63) respectively among aromatherapy group compared to (45.13, 44.07) respectively among control group. The difference was statistically significant. The present study *concluded* that aromatherapy massage with lavender oil can reduce pain and anxiety during labour. Also, it is an effective way to decrease labor duration. It was *recommended* that lavender aromatherapy massage can be offered to women in labour for pain relief.

Keywords: Aromatherapy Massage, Lavender Oil, Labour Pain, Anxiety

1. Introduction

Child birth is a painful and stressful event in a woman's life. Pregnant women commonly worry about pain during labour and birth. [1] Labour pain is caused by uterine contractions, cervical dilatation, vaginal and pelvic floor stretching. It has been described as one of the most intense forms of pain. [2, 3] During labour, conflicting emotions are present; fear and unease that can be coupled with anticipation and gladness. Anxiety and fear are factors contributing towards women's perception of pain and may also affect their labour and birth experience. [4] The fear of pain during childbirth is one of the major reasons that make women prefer Caesarean section. In a study result reported in Iran, 37.2% of women opted for caesarean section due to anxiety and fear of the labour pain [5].

Also, if the labour pain is not under control, mothers can face certain risks like feeling of fear, anxiety, helplessness, and loss of control throughout the birthing process [6]. Labour pain and loss of control are the two most frequently cited unpleasant experiences of childbirth that may directly affect woman's satisfaction about childbirth. [7]

In addition, anxiety is the most common psychological response of women to labor. In fact, 80% of women in labor have anxiety. According to the control theory, there is a relationship between pain and psychological problems like anxiety. [8, 9] Women with lower levels of anxiety have less pain during labour. In other words, in the presence of anxiety, severe spasm of the pelvic floor and perineal muscles can lead to increase in labour pain. [10]

It is also reported that prolonged labor can increase the risk of complications to mothers, including perineal laceration, postpartum hemorrhage, childbirth infection and cesarean section. Also, it may cause offspring hypoxia and complications. [11, 12]

The nursing management of labour pain is a major goal of intrapartum care. There are many modern non-invasive methods to relieve pain during childbirth. Among these methods is aromatherapy. The use of aromatherapy in nursing care continues to be popular in many settings. Most of the nursing literature relates to the use of essential oils in low doses for massage or use of the oils as environmental fragrances. At the physiological level, this intervention increases endorphins, stimulates nerves which decreases pain, increases circulation and improves blood flow and oxygenation of tissues. [13, 14, 15]

Aromatherapy is "the science of using highly concentrated essential oils or essences distilled from plants in order to utilize their therapeutic properties." The oils may be massaged into the skin, or inhaled by using a steam infusion. The most common application of aromatherapy during labor is by massage, bath or inhalation. [16, 17]

However, lavender oil is commonly used in aromatherapy. Lavender oil is a fabulous multi-purpose essential oil. Because of its analgesic properties it can be used to alleviate pain in different conditions such as changing dressings, palliative care, controlling labor pain as well as chronic pain. The linalyl acetate component of lavender can relax smooth muscles. [18]

Lavender essential oil also has a wonderful calming effect. Inhaling lavender aroma diminishes the secretion of cortisol from the adrenal gland and produces relaxation through inhibiting sympathetic activity and stimulating the parasympathetic system. [19] There are no studies or published evidences that demonstrate harm from essential oils to mother or fetus. [20]

When aroma massage is applied over the skin and enters into the bloodstream through the skin pores, it provides a sense of wellbeing and it reduces the need for invasive methods of pain relief. [21] It was reported in a study that aromatherapy helps to relieve pain, anxiety, depression, fatigue and creates confidence and creativity. [22]

1.1. Significance of the Study

Childbirth is one of the most painful experiences and the most significant physical challenge for women to undergo during their lives. [23] During delivery, excessive pain leads to fear and anxiety which will lead to increased blood levels of hormones such as epinephrine. These will further intensify the pain, and potentially prolong the first and second stages of labor, thus resulting in a very unpleasant experience of childbirth. Also, anxiety and stress during labour may decrease the amplitude and frequency of uterine contractions and thus, increase the labour duration and the likelihood of assisted delivery and even Cesarean section. Moreover, more bleeding during labor and delayed onset of lactation have been observed among anxious women. [24] So, the use of fragrant essential oil like lavender in massage during labour helps to create a state of calmness, alleviate anxiety and reduce pain. Aromatherapy massage is one of the most popular tools that nurses can use to enhance their nursing care and simultaneously empower themselves. [25] As a non-pharmacological intervention, it is easy to administer, cost effective, harmless, do not require much training, and appealing to the mother. This intervention may be used by nurses as a part of their routine when providing care to women during labour. [26] So, this study provides direction to introduce aromatherapy massage in nursing practice by testing its efficacy on relieving labour pain and anxiety.

1.2. Aim of the Study

The aim of this study was to assess the effect of aromatherapy massage using lavender oil on the level of pain and anxiety during labor among primigravida women.

1.3. Research Hypotheses

1. Women who receive aromatherapy back massage with lavender oil during active and transitional phases of first stage of labour experience lower level of labour pain than those who do not receive such an intervention.
2. Women who receive aromatherapy back massage with lavender oil during active and transitional phases of first stage of labour experience lower anxiety level than those who do not receive such an intervention.

2. Subjects and Method

2.1. Study Design and Setting

A randomized control clinical trial was used in this study. The study was conducted in the labour department at El-Shatby Maternity University Hospital in Alexandria, Egypt.

2.2. Subjects

A purposive sample of 60 pregnant women were selected according to the following.

2.2.1. Inclusion Criteria
- Primigravida.
- 18-35 years old, had term, singleton pregnancy.
- Cephalic presentation.
- Did not take analgesic drugs in the past eight hours.
- Did not receive any non-pharmacological methods of pain relief in the past eight hours.

- Did not have any medical and pregnancy complications.
- Normal uterine contractions.
- 3-4 cm cervical dilation.

2.2.2. Exclusion Criteria
- Allergy to oil

After explanation and obtaining oral consent from the women, they were randomly assigned to two groups: The first group (n= 30) received aromatherapy back massage with 2 drops of lavender oil dissolved in 50cc almond oil and the second group (n = 30) received massage only.

2.3. Tools of Data Collection

Four tools were developed and used to collect the necessary data:

Tool I: An Interviewing Assessment Sheet

It was developed by the researcher and includes the following:
- Socio-demographic characteristics such as age, level of education, occupation and residence.
- History of present pregnancy and labour.
- Women's satisfaction regarding massage.

Tool II: Partograph [27]:

It is a standardized design done by WHO (1994) to help in the management of labor. This Partograph is basically a graphic representation of the event of labor plotted against time. Uterine contractions (intensity, duration and frequency in 10 minutes) and maternal vital signs are also assessed. Durations of the three stages of labor were explained as follows (First stage: When the cervix was about 4 cm dilated till 10 cm, second stage: From 10 cm cervical dilatation to the delivery of baby, third stage: from the delivery of the baby to the delivery of placenta. The fetus is also monitored closely on the Partograph by regular observation of the fetal heart rate and color of liquor.

Tool III. Visual analogue pain intensity scale (VAS) [28]:

The pain VAS is a unidimensional measure of pain intensity. It is used to assess pain intensity: which represents pain along a continuum of 2 extremes, from no pain (a score of 0) to extreme pain (a score of 10). The pain scores were recorded before intervention at latent phase and after intervention at 5-7 cm and 8-10 cm cervical dilation. The pain VAS is self-completed by the women. The women were asked to place a line perpendicular to the VAS line at the point that represented their pain intensity. Pain score from 1-3 was considered mild pain, from 4-6 was considered moderate pain and from 7-10 was considered severe pain.

Tool IV: Spielberger state-trait anxiety questionnaire [29]:

It includes 20 items of the mentioned anxiety questionnaire. Since each item was scored as 1-4. The total anxiety score ranged between 20 and 80: (20-40) mild anxiety, (41-60) moderate anxiety and (61-80) severe anxiety. This questionnaire is widely used to measure state-trait anxiety in clinical studies and has a correlation coefficient of 0.85-0.91. [30] The anxiety levels were recorded before intervention and after intervention at 5-7 cm and 8-10 cm cervical dilation.

2.4. Validity and Reliability

Tool I was submitted to five academic nursing experts in the field to test the content validity of it. Modifications were carried out according to the academic nursing experts' judgment on clarity of sentences and the appropriateness of the content. Tool reliability was tested using Alpha Cronbach test. Its result was 0.80 which indicates an accepted reliability of the tool.

2.5. Administrative Design

Approval was obtained from the ethical committee of the Faculty of Nursing- Alexandria.

University and the responsible authorities of the study setting.

2.6. Pilot Study

The study tools were pre-tested on a random sample of 6 women (10%) selected from the same study setting to check the clarity, applicability, any difficulties with their application, and to determine the time needed for completion of the tools. Modification of the tools was done according to the pilot study results. Subjects who shared in the pilot study were excluded from the study subjects.

2.7. Procedure

The study was achieved through three phases namely assessment, implementation and evaluation.

2.7.1. Assessment Phase

The aim of this phase was to collect data about women to determine those who have the inclusion criteria using tool I &II. Then, they were individually interviewed by the researcher to complete the basic data using an Interviewing Assessment Sheet (tool I).

2.7.2. Implementation Phase
- After explanation of the procedure and obtaining oral consent of women, women were randomly assigned to aromatherapy and control groups.
- One group (n=30) received aromatherapy back massage with 2 drops of Lavender oil dissolved in 50 cc almond oil as a carrier oil, the second group (n=30) received back massage only without oil.
- The massage was given to all women in lateral position by the researchers. Back massage was done gently with medium pushing and rhythmic mode in the active phase (cervix dilated 5-7 cm) and transitional phase (8 - 10 cm) of labour for 20 minutes every time.

2.7.3. Evaluation Phase
- Then women were asked to self-rate their level of pain before intervention at latent phase and after intervention at active (5 -7 cm cervical dilatation) and transitional phase (8-10 cm cervical dilatation) using the pain visual analogue scale (tool III).

- Intensity of anxiety in both groups was measured before intervention at latent phase and after the intervention at dilations of 5 -7 cm and 8-10 cm using the Spielberger state-trait anxiety questionnaire (tool IV).
- The women were followed during the labour process by using Partograph (tool II).

2.8. Ethical Consideration

Before the beginning of the study, an informed oral consent was taken from the women after explaining the aim of the study and its phases. The participants were assured of the confidentiality of their personal information. Women were allowed to withdraw from the study at any time. The data was collected over a period of 3 months from the beginning of June to the end of August 2015.

2.9. Statistical Analysis

Data was collected, coded, tabulated and analyzed, by using the SPSS 18.0 statistical software package. Descriptive statistics was used to calculate percentages and frequencies, (t) test was used to estimate the statistical significant differences between variables. A significant P-value was considered when it is less than 0.05 and it was considered highly significant when P value is less than or equal 0.01.

3. Results

As shown in table (1), the age of one third of women in aromatherapy group (33.3%) was between 25- < 30 years old compared to 23.3% of control group. In addition, one third of women in each group (33.3%, 33.3 %) had received university education. More than three quarters of women in control group (83.3%) were housewives compared to 70.0% of women in aromatherapy group. Most of the women in aromatherapy and control group (93.3%, 90.0%) respectively lived in urban area.

Table (2) illustrates the mean pain scores before and after intervention among aromatherapy and control group. The mean pain score before intervention was (7.0) for aromatherapy group

and (8.1) for control group and there is no statistical significant difference between them. Then after intervention, the mean pain score decreased to (6.4) at 5-7 cm and (7.7) at 8-10 cm cervical dilatation for aromatherapy group compared to (8.9) at 5-7 cm and (9.6) at 8-10 cm cervical dilatation for control group. There is a highly statistical significant difference between the two groups (P<0.01).

As shown in table (3), the mean anxiety score was high among the aromatherapy and control group (55.47 and 50.40) respectively before intervention and there is no statistical significant difference between them. However, the mean anxiety score at cervical dilation of 5-7 cm was 38.40 in aromatherapy group compared to 45.13 in control group. The difference was statistically significant (P = 0.050). In addition, the mean anxiety score was 36.63 in aromatherapy group at 8-10 cm cervical dilatation compared to 44.07 among control group. The difference was statistically significant (P<0.05).

As shown in table (4), the mean duration of first stage was 2.73 hours for aromatherapy group and 3.17 hours for control group. A statistically significant difference was found (P < 0.05). During second stage of labour, the mean duration was 23.60 minutes for aromatherapy group compared to 27.23 minutes for control group and a highly statistical significant difference was found (P < 0.01). Finally during the third stage, the mean duration was 11.46 minutes for aromatherapy group and 24.93 minutes for control group and a highly statistical significant difference was found (P < 0.01).

Figure (1) reveals women's satisfaction regarding massage during labour among the aromatherapy and control group. It can be observed that, most of the women (82.0%) in the aromatherapy group were satisfied compared to 69.4 % of women in the control group. Moreover, a minority of women from aromatherapy and control group (3.7 %, 10.0%) respectively were dissatisfied.

As shown in figure (2), all the aromatherapy group (100%) had normal vaginal delivery compared to 96.4% from control group.

Table 1. Distribution of the study subjects according to their socio-demographic characteristics (n = 60).

Items	Aromatherapy group		Control group	
	n = 30	%	n=30	%
Delete this empty raw				
Age				
< 20	2	6.7	8	26.7
20 - < 25	10	33.3	6	20.0
25- < 30	10	33.3	7	23.3
30 - 35	8	26.7	9	30.0
Educational level				
Read and write	5	16.7	4	13.3
Primary	5	16.7	7	23.3
Secondary	10	33.3	9	30.0
University	10	33.3	10	33.3
Occupation:				
House wife	21	70.0	25	83.3
Work	9	30.0	5	16.7

Items	Aromatherapy group		Control group	
	n = 30	%	n=30	%
Delete this empty raw				
Residence				
Urban	28	93.3	27	90.0
Rural	2	6.7	3	10.0
Total	30	100.0	30	100.0

Table 2. Mean pain scores before and after intervention among aromatherapy and control group.

Dilatation stage	Aromatherapy group		Control group		t	p
	Mean	SD	Mean	SD		
Before intervention (Latent phase)	7.0	.11	8.1	.14	4.9	0.08
5-7 cm dilatation (Active phase)	6.4	.20	8.9	.19	16.5	0.002
8-10 cm dilatation (Transitional phase)	7.7	.17	9.6	.50	20.1	0.000

Table 3. Mean anxiety scores before and after intervention among aromatherapy and control group.

Dilatation stage	Aromatherapy group		Control group		t	P
	Mean	SD	Mean	SD		
Before intervention (Latent phase)	55.47	9.91	50.40	5.75	3.04	0.07
5-7 cm dilatation (Active phase)	38.40	6.53	45.13	9.10	8.04	0.05
8-10 cm dilatation (Transitional phase)	36.63	8.05	44.07	9.95	14.9	0.03

Table 4. Mean duration of labor stages among aromatherapy and control group.

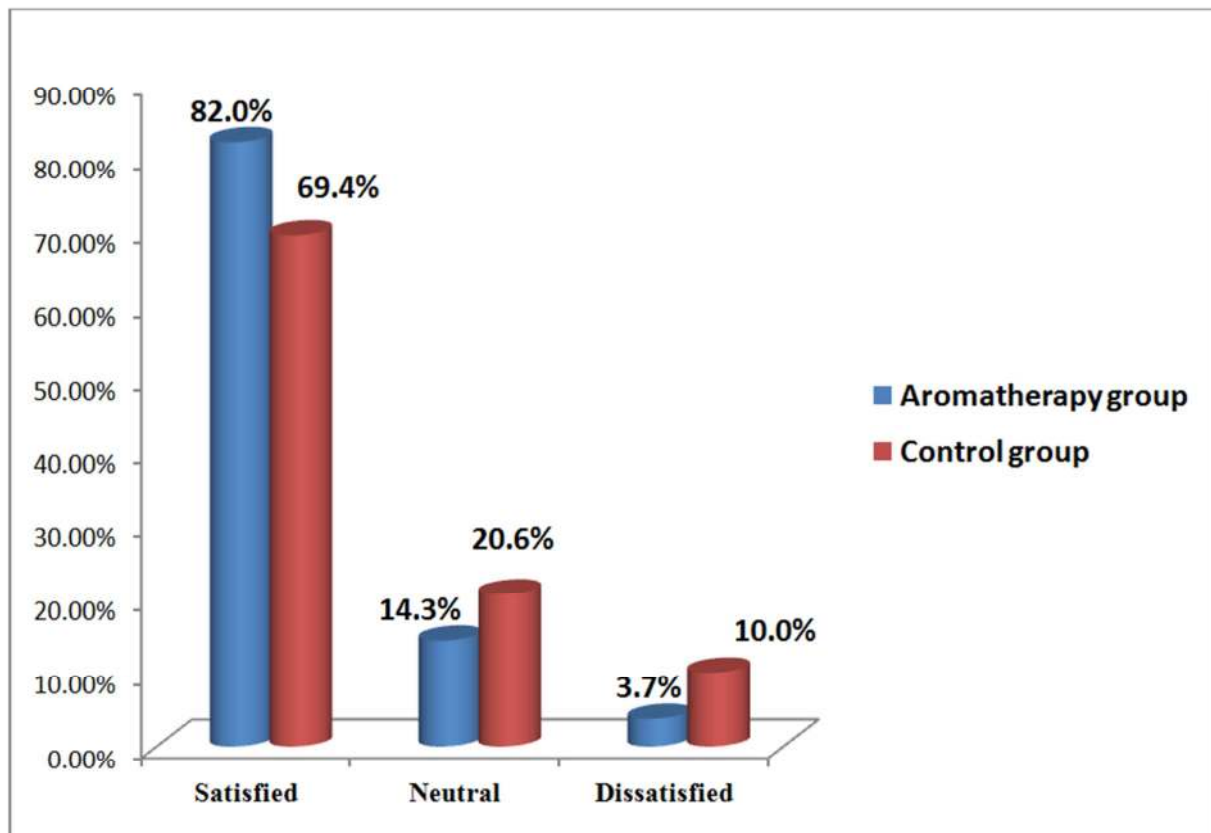| Labour stage	Aromatherapy group		Control group		t	p
	Mean	SD	Mean	SD		
Duration of first stage (Hours)	2.73	1.05	3.17	1.23	12.6	0.04
Duration of second stage (Minutes)	23.60	15.35	27.23	2.21	17.9	0.006
Duration of third stage (Minutes)	11.46	2.31	24.93	8.37	7.81	0.005

Figure (1). Women's satisfaction regarding massage during labour among aromatherapy and control group. (please put it under the figure directly)
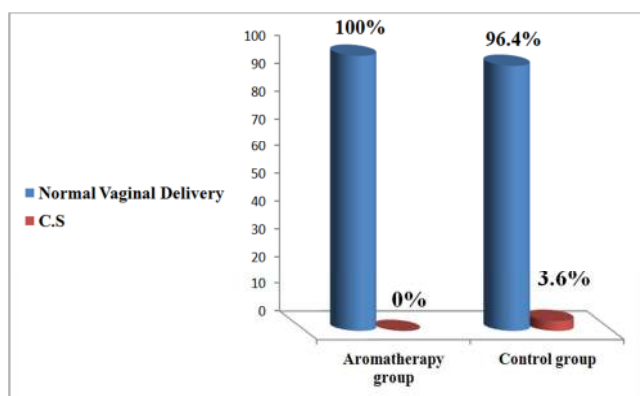
Figure (2). Types of delivery among aromatherapy and control group.

4. Discussion

When a woman faces the childbirth process for the first time, she often feels anxiety because coping with labour pain is usually viewed as an anxious moment. Labour pain is considered the most unpleasant aspect of labour experience. Labour pain is progressive, with rapid alterations of its location and an increase in severity with advancing dilatation and intensity of uterine contractions. [31, 32] Aromatherapy is one of the non-pharmacological methods for pain relief and Lavender oil is a mild sedative and antispasmodic. Also, the essential oil derived from lavender is used in aromatherapy to treat anxiety. [33] The study achieved its hypotheses in demonstrating that lavender aromatherapy massage is effective in relieving labour pain and anxiety.

The results of the current study showed a reduction in the mean pain score among the aromatherapy group compared to the control group and the difference is statistically significant. This means the effectiveness of lavender oil in labour pain reduction which may be due to the sedating effects of linalool acetate in lavender as a narcotic. [34] These results are in line with the results of Janula R and Mahipal S (2015) who reported the effectiveness of aromatherapy massage in reducing labor pain during all labour stages. [21] Also, the results of Zahra A and Leila M (2012) revealed that lavender oil massage was effective method in decreasing pain during labor at cervical dilatation of 4-5cm, 6-7cm and 8-10 cm. [33] In addition, Chang et al (2002) had a study in which aromatherapy massage is effective intervention for labor pain reduction. [35] Burns et al. (2000) also confirmed that aromatherapy is useful way to relieve pain and strengthen the uterine contractions during labor. [34]

A randomized control trial was done in India to assess the effect of aromatherapy massage on labour pain intensity, there were no maternal adverse effects and the study achieved its main objective that, lavender aromatherapy massage was effective in relieving labour pain and its intensity and reducing duration of labour in experimental group whereas in massage only group, there was not a reduction in pain intensity and duration of labour. [26]

However, the results of the current study are contradicted with the results of a systematic review by Smith et al. (2011) on 535 women in comparing aromatherapy with placebo for pain management of labor, there was no difference between groups for the pain intensity and the length of labor. The authors, however, concluded that further research is needed before final recommendations. [36]

The mean anxiety scores among the two groups in the present study showed that Lavender aromatherapy massage could reduce anxiety during labor. These results are congruent with the results of Namazi M et al (2014) who found that the levels of anxiety at dilatations of 3-4 and 6-8 cm were significantly lower in the aromatherapy group compared with the control group. [37] Also, Hee rho et al. (2009) who investigated the effects of aromatherapy massage on the anxiety and self-esteem experienced by elderly Korean women found that, there was a significant difference in the anxiety and self-esteem among the two groups. [38] Imanishi J et al. (2009) reported that anxiety scores significantly decreased after each aromatherapy massage session. [39] According to Smith et al (2011) and Bastard et al (2006), essential oils improved mood and reduced anxiety during labor by stimulating the olfactory pathways in the limbic system. [36, 40]

Moreover, the results of current study are in accordance with the results of a study carried out by Osaka et al (2009) about the administration of a hand massage. Despite the short duration of only five minutes, a statistically significant reduction of the perception of anxiety could be achieved from massage only. [41] Furthermore, Bastered et al (2009) had a study which confirmed that aromatherapy massage have successfully been used to produce significantly greater improvement in reduction of anxiety during labour. [42] Also, Susan Mousley et al (2005) had a study in which aromatherapy massage is aiding relaxation and reducing anxiety during labour. [43] Similarly Jennings and Wilkinson (2004) reported that lavender oil promotes relaxation, and it may give soothing effect to the skin and stimulate the nerve endings when applied like a massage. [15]

Prolonged duration of first stage of labour is an important cause of Caesarean and instrumental vaginal delivery. If duration of labour is prolonged, it may cause offspring hypoxia. [26] The results of the present study reveal that the mean length of labour duration also reduced in the first, second and third stages of labour among aromatherapy group compared to control group and the difference was statistically significant. These results are congruent with the results of Raju and Signh (2014) who found significant difference between aromatherapy and biofeedback group regarding labour duration. [26]

Aromatherapy is an effective, non-pharmacological pain relief method. The present study showed that most of the women in the aromatherapy group were satisfied with the aroma massage. These results are in line with results of Raju and Signh (2014) and Chang et al (2002) who mentioned that the majority of women reported satisfaction about their labour experience. [26, 35]

5. Conclusion and Recommendations

5.1. Conclusion

From the results of the current study, it can be concluded that aromatherapy massage with lavender oil can reduce labour pain and anxiety during labour. Also, it is an effective way to decrease labor duration. Most of the women were satisfied by this intervention. This method can influence the quality of care provided during childbirth by reducing the suffering of women in labour.

5.2. Recommendations

Based on the findings of the present study, the following recommendations are suggested:

1. Aromatherapy massage using lavender oil can be offered to women in labour who want to avoid pharmacological methods for pain relief.
2. Further studies are required to investigate the effects of aromatherapy massage on neonatal outcomes.
3. A comparative study can also be done between the effectiveness of various non-pharmacological measures for labour pain.
4. Provide an educational program for nurses about aromatherapy.

References

[1]   Mortazavi S H, Khaki S, Moradi R et al. Effects of massage therapy and presence of attendant on pain, anxiety and satisfaction during labor. Arch Gynecol Obstet 2012. DOI 10.1007/s00404-012-2227-4.

[2]   Joseph R M & Fernandes P. Effectiveness of jasmine oil massage on reduction of labor pain among primigravida mothers. Nitte University Journal of Health Science 2013; 3(4): 104-107.

[3]   MacKenzie, I. Z., Xu, J., Cusick, C., Midwinter-Morten, H., Meacher, H., Mollison, J. and Brock, M. Acupuncture for Pain Relief during Induced Labour in Nulliparae: A Randomized Controlled Study. BJOG: An International Journal of Obstetrics & Gynaecology 2011; 118, 440-447.

[4]   Manizheh P, Leila P. Perceived environmental stressors and pain perception during labor among primiparous and multiparous women. J Reprod Infertil. 2009; 10: 217-223.

[5]   Beigi NMA, Broumandfar K, Bahadoran P, Abedi HA; Women's experience of pain during childbirth. IJNMR, 2010; 15(2): 77-82.

[6]   Simkin P, Hull K; Pain, suffering, and trauma in labor and prevention of subsequent posttraumatic stress disorder. Journal of Perinatal Education, 2011; 20(3): 166–176.

[7]   Lee SL, Liu CY, Lu YY, Gau ML; Efficacy of Warm Showers on Labor Pain and Birth Experiences during the First Labor Stage. JOGNN 2013; 42(1): 19-28.

[8]   Spice K, Jones SL, Hadjistavropoulos HD, Kowalyk K, Stewart SH. Prenatal fear of childbirth and anxiety sensitivity. J Psychosom Obstet Gynaecol. 2009; 30(3): 168–74.

[9]   Holm L, Fitzmaurice L. Emergency department waiting room stress: can music or aromatherapy improve anxiety scores? Pediatr Emerg Care 2008; 24(12): 836–8.

[10] Alipour Z, Lamyian M, Hajizadeh E. Anxiety and fear of childbirth as predictors of postnatal depression in nulliparous women. Women Birth. 2012; 25(3): e37–43.

[11] Wei-hong Li, Hong-yu Zhang, Yi Ling, Song Jin. Effect of prolonged second stage of labor on maternal and neonatal outcomes. Asian Pacific Journal of Tropical Medicine 2011; 409-411.

[12] Blix E, Kumle M, Oian P. What is the duration of normal labour? Laegeforen 2008; 128: 686–9.

[13] Jones L, Othman M, Dowswell T, et al. Pain management for women in labour: an overview of systematic reviews. The Cochrane Collaboration: John Wiley & Sons, Ltd; 2013.

[14] Cochrane AR. "Perceptions of Labor and Delivery Clinicians on Non-Pharmacological Methods for Pain Relief During Labor" (2015). Senior Honors Theses. Paper 94.

[15] Maddocks-Jennings W. & Wilkinson J. M. Aromatherapy practice in nursing: Literature review. journal of advanced nursing 2004; 48(1): 93–103

[16] Lee MK, Chang SB, Kang DH. Effects of SP6 acupressure on labor pain and length of delivery time in women during labor. J. Altern. Complement. Med 2004; 10(6): 959-965.

[17] Kaviani M, Maghbool S, Azima S, Hosein M. Comparison of the effect of aromatherapy with Jasminum officinale and Salvia officinale on pain severity and labor outcome in nulliparous women. Iran J Nurs Midwifery Res 2014; 19(6): 666–672.

[18] Mohamed M, Hadayat A, Ragaa A, Sally A. Effectiveness of Aromatherapy with Lavender Oil in Relieving Post Caesarean Incision Pain: Journal of Surgery, 2015; 3(2-1): 8-13.

[19] Mohammad N, Mohammad H, Abbas E, Anooshirvan K, Mohammad B. Effect of lavender aromatherapy on hemodynamic indices among patients with acute coronary syndrome: a randomized clinical trial. Iran J Crit Care Nurs. 2015; 7(4): 201-208.

[20] Tracey; What is aromatherapy? Health resources, 2011; 14(2): 23-25.

[21] Janula R, Mahipal S. Effectiveness of Aromatherapy and Biofeedback in Promotion of Labour Outcome during Childbirth among Primigravidas. Health Science Journal 2015; (9)1.

[22] Tournaire M and Theau-Yonneau A. Complementary and Alternative Approaches to Pain Relief During Labor. Evid Based Complement Alternat Med 2007; 4(4): 409–417.

[23] Hajiamini Z, Masoud S N, Ebadi A, Mahboubh A. and Matin, A. Comparing the Effects of Ice Massage and Acupressure on Labor Pain Reduction. Complementary Therapies in Clinical Practice 2012; 18, 169-172.

[24] Dolatian M, Hasanpour A, Montazeri SH, Heshmat R, Alavi Majd H. The Effect of Reflexology on Pain Intensity and Duration of Labor on Primiparas; Iran Red Crescent Med J 2011; 13(7): 475–479.

[25] Buckle J. The role of aromatherapy in nursing care. Nurs Clin North Am. 2001; 36(1): 57-72.

[26] Raju J, Singh M. Effectiveness of Aromatherapy in Reducing Labour Pain and Duration of Labour among Primigravidas: A Pilot Study. International Journal of Health Sciences & Research 2014; 4(2).

[27] World Health Organization. World health organization in management of labor. Lancet 1994; (343): 1399-1404.

[28] Hawker GA, Mian S, Kendzerska T, French M. Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). Arthritis Care Res. 2011; 63(11): 240-252.

[29] Spielberger CD, Gorsuch RL, Lushene RE. Test manual for the State Trait Anxiety Inventory. Palo Alto, California: Consulting Psychologists Press, 1970.

[30] Quek KF, Low WY, Razack AH, Loh CS, Chua CB. Reliability and validity of the Spielberger State-Trait Anxiety Inventory (STAI) among urological patients: a Malaysian study. Med J Malaysia.2004; 59(2): 258–67.

[31] Gallo R B, Santana L S, Ferreira C H et al. Massage reduced severity of pain during labour: a randomised trial. Journal of Physiotherapy 2013; 59.

[32] Liu Y H, Chang M Y, Chen C H. Effects of music therapy on labour pain and anxiety in Taiwanese first-time mothers. Journal of Clinical Nursing 2010; 19 (7-8): 1065-72.

[33] Zahra A, Leila M. Lavender aromatherapy massages in reducing labor pain and duration of labor: A randomized controlled trial. African Journal of Pharmacy and Pharmacology 2013; 7(8): 426-430.

[34] Burns E, Blamey C, Ersser SJ, Lloyd AJ, Barnetson L; The use of aromatherapy in intrapartum midwifery practice. an observational study. Complement The Nurse Midwifery 2000; 6(1): 33-34.

[35] Chang MY, Wang SY, Chen CH. Effects of massage on pain and anxiety during labour: a randomized controlled trial in Taiwan J. Adv. Nurs. 2002; 38(1): 68-73.

[36] Smith C, Collins C, Crowther C. Aromatherapy for pain management in labour. Cochrane Database Syst 2011. Rev. p. 7.

[37] Namazi M, Aromatherapy With Citrus Aurantium Oil and Anxiety During the First Stage of Labor, Iran Red Crescent Med J, 2014 Jun; 16(6): e18371.

[38] Hee rho K, Hee han S, Soon kim K & Soo lee M. Effects of aromatherapy massage on anxiety and self-esteem in korean elderly women: a pilot study. international journal of neuroscience 2009; 116 (12): 1447-1455.

[39] Imanishi J, Kuriyama H, Shigemori I, Watanabe S, Aihara Y, Kita M et al. Anxiolytic Effect of Aromatherapy Massage in Patients with Breast Cancer. Complement Alternat Med. 2009; 6(1): 123-128.

[40] Bastard J, Tiran D. Aromatherapy and massage for antenatal anxiety: its effect on the fetus. Complement Ther Clin Pract. 2006; 12(1): 48-54.

[41] Osaka I, Kurihara Y, Tanaka K, Nishizaki H, Aoki S, Adachi I. Endocrinological evaluations of brief hand massages in palliative care. The Journal of Alternative and Complementary Medicine 2009; 15(9): 981–985. [PubMed].

[42] Bastered J, Reprint of: Aromatherapy and massage for antenatal anxiety: Its effect on the fetus, complementary therapies in clinical practice 2009, Volume 15, Issue 4, Pages 230–233.

[43] Mousley S, Audit of an aromatherapy service in a maternity unit, Goerge Eliot hospital, 2005; 11, 205-210.