

EFFECT OF LAVENDER OIL INHALATION ON LABOR PAIN AMONG PARTURIENT WOMEN

¹Nadia Youssef Ahmed Abd-Ella, ²Tyseer Mohamed Fathy, ³Laila
Elboghday, ⁴Amina Mohamed Rashad El-Nemer

^{1,2,4} Maternity and Gynecology of Nursing, Faculty of Nursing, Mansoura University

³Obstetrics & Gynecology, Faculty of Medicine, Mansoura University

Email: dmadia96@gmail.com

Abstract:

The aim of this study was to investigate the effect of lavender oil inhalation on labor pain among parturient women. **Methods:** A quasi-experimental trial was carried out at Labor and Delivery Unit of Mansoura University Hospital-Mansoura City on 250 parturient women in the active phase of the 1st stage of labor, who were selected by purposive sampling technique. They were free from any medical and obstetric problems, age between 20-35 years, with single viable fetus, occipitoanterior position and gestational age from 37 to 42 weeks. They were divided into either control or intervention group 125 per each group. The intervention group: inhaled two drops of 2% pure Lavender oil while the control group inhaled two drops of placebo oil. Pain score were measured by Numeric Pain Intensity and FLAAC Scales just before, immediately and after 30–40 minutes after oil inhalation. **Results:** pain level of the intervention group was lower than that of the control. **Recommendation:** the study suggests that lavender oil should be integrated into care provided during 1st stage of labor. **Conclusion:** lavender oil inhalation associated with lower pain level during the 1st stage of labor.

Key word: Aromatherapy, inhalation, complementary and alternative medicine, labor pain, lavender oil.

Introduction:

Labor presents a physiological and psychological challenge for women. As labor becomes more imminent this can be a time of conflicting emotions; fear and apprehension can be coupled with excitement and happiness ^(1,2). Pain associated with labor has been described as one of the most intense forms of pain that can be experienced ⁽³⁾. Pain experienced by women in labor is associated with reflex

increases in blood pressure, oxygen consumption and liberation of catecholamine, all of which could adversely affect uterine blood flow and labor progress. However, pain relief on the other hand could minimize these untoward effects ⁽⁴⁾.

Nowadays, interest in Complementary and Alternative Medicine (CAM) has escalated among midwives and the general

public in response to increase the demand from expectant mothers for more choice, control, and continuity in labor ⁽⁵⁾. The attraction of midwives for CAM methods reflects a midwifery model of care in which they can employ to facilitate a woman to maximize her innate coping mechanisms in childbirth ⁽⁶⁾. Within this paradigm, pain in labor is viewed as a complex physiological phenomenon that encompasses psychological, emotional, spiritual and physical dimensions. This approach represents a shift from the medical model, which views labor pain simply as something to be eradicated ^(6,7).

Several CAM have been used to labor pain, including relaxation techniques, acupuncture or acupressure, reflexology, transcutaneous electrical nerve stimulation, hypnosis and biofeedback ⁽⁸⁾. Another

option is the aromatherapy, which is the therapeutic use of the essential oils from herbs, flowers, and other plants such as geranium, jasmine, and lavender^(9,10).

Lavender oil has been particularly attributed with mood-enhancing and analgesic properties in healthy subjects and in experimental nociception⁽⁷⁾. The oil may be massaged into the skin, or inhaled by using a steam infusion or burner. The most common application of Lavender oil during labor is by massage, bath or inhalation^(7, 11, 12). When the diffused lavender oil is breathed by the lungs between contractions, the smelling of this oil sends electrochemical message through the olfactory nerve to the limbic center in the brain and stimulates the release of body endorphins to alleviate the natural pain^(13, 14). Lavender consists of linalool, alcohol, ketones, esters, and aldehydes. The ketones in lavender effectively decrease pain and inflammation, and contribute to falling asleep. Esters prevent muscle spasms, and reduce tension and depression⁽¹⁵⁾. The previous studies have reported the advantages of lavender oil in alleviating anxiety,^(16, 17) insomnia,⁽¹⁸⁾ menopausal symptoms,⁽¹⁹⁾ dysmenorrhea,⁽²⁰⁾ and on episiotomy wound healing⁽²¹⁾. *Hall et al*⁽²²⁾ reported that nurses could use lavender oil to relief nausea and vomiting, promoting relaxation and helping to reduce the need for pain medication during labor. Also, several studies showed that the use of lavender oil is appropriate to be used by nurses in labor and delivery because it has not shown to cause harm to the mother or her baby and is accepted by parturient women^(7, 14, 23, and 24). Therefore, this prompted us to investigate the analgesic effect of Lavender oil on labor pain.

Research hypothesis

Parturient women who inhale Lavender oil exhibit lower pain level than those who inhale placebo oil.

Subjects and Method

Study Design: A quasi-experimental design was utilized.

Study Setting: The study was conducted at Labor and Delivery Unit of Mansoura University Hospital in Mansoura City.

Subjects: 250 parturient women in the active phase of 1st stage of labor were selected through the non-probability purposive sampling technique based on the following criteria: being free of medical and obstetric problems, age 20-35 years, with single viable fetus in occipito anterior position and gestational age from 37 to 42 weeks.

1. Intervention group (n=125): inhaled two drops of 2% pure lavender oil.
2. Control group (n=125): inhaled two drops of placebo oil.

The first 125 parturient women attended the study setting between August 2012 to the end of July 2013; with the predetermined inclusive criteria represented the intervention group while the second 125 parturient women represented the control group.

Tools of Data Collection: four tools used for data collection;

Tool I: General characteristics interview schedule: Designed by the researcher, it concerned with the general characteristics of the enrolled women (e.g., age, education level, occupation and residence).

Tool II: Numeric Pain Intensity Scale: Numeric Pain Intensity Scale was used to assess pain level before and after the intervention. It is a horizontal line numbered from zero to ten, where 0 interpreted as "no pain", 1-3 as "mild pain", 4-6 as "moderate pain" and 7-10 as "severe pain" (Fig. 1) (25)

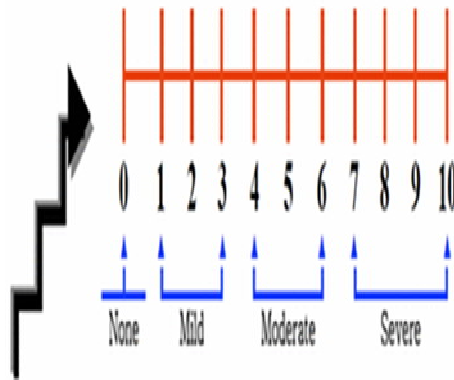


Fig (1): Numeric Pain Intensity Scale

Tool III: The Face, Legs, Activity, Crying and Consolability (FLACC) pain scale: used to assess pain level before and after the intervention. It is an observing rated pain scale, in which each participant was observed by the researcher for at least one minute then repositioned or observed for activity, tenseness and tone. FLACC stands for face, legs, activity, crying and consolability. Each item was scored as 0, 1, or 2 with a minimum score of zero and a maximum score of ten. Score 0 interpreted as "no pain", 1–3 as "mild discomfort", 4–6 as "moderate pain" and 7–10 as "severe discomfort" or pain or both (Tab.1) ⁽²⁶⁾

Table (1): The FLACC pain scale

Criteria	Score 0	Score 1	Score 2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, uninterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting, back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or a sleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractible	Difficult to console or comfort

Tool IV: Women's Satisfaction Scale: Women's satisfaction about the inhaled oil was assessed using a 5 point Likert scale by asking each respondent whether strongly disagree, disagree, undecided, agree or strongly agree; the higher score indicating higher satisfaction.

Ethical Considerations

- Approval was granted from the research ethics committee of the Faculty of Nursing - Mansoura University.
- Official Permissions obtained from the head of Obstetrics and Gynecology

Department and the Director of Mansoura University Hospital.

- Informed consent was obtained from each participant before enrollment in the study.
- Confidentiality of the obtained data was maintained.
- Women had the right to withdraw from the study at any time.

Pilot Study

After preparing the tools, a pilot study were conducted on 10% of the predetermined sample (25 women from both groups) to test the clarity of items and

to estimate the time needed for data collection. Based on the pilot study, few items were reworded and thus the pilot was excluded from the study sample.

Field Work

- Each participant of both groups received the assigned oil. For the intervention group, two drops of pure Lavender oil through inhalation on a piece of cotton for 5 up to 10 minutes. While, the control group, inhaled two drops of paraffin oil in the same way.
- For both groups, the researcher assessed labor pain level using two pain scales; namely, Numeric Pain Intensity Scale and FLACC scale before oil inhalation, immediately after, and 30 minutes after oil inhalation.

Statistical analysis

All statistical analyses were performed using SPSS for windows version 17.0 (SPSS, Chicago, IL). Continuous variables are presented as means ± standard deviations (SD). Categorical variables are reported as number and proportions.

Results:

Table (2) shows the frequency distribution of sociodemographic variables among the intervention and control groups

Table 2. Frequency distribution of sociodemographic variables among the intervention and control groups

Variables	Intervention group		Control group		X ²	P
	N(125)	%	N(125)	%		
Age (mean ±SD)	26.4 ±4.7		25.7 ±4.8		1.1650*	0.2451
Educational level						
Illiterate	19	15.2	12	9.6	1.80	0.179
Primary/preparatory	45	36.0	43	34.4	0.07	0.791
Secondary/university	61	48.8	70	56.0	0.892	0.345
Occupation						
Housewife	97	84.0	107	85.6	2.66	0.103
Employee	28	16.0	18	14.4		
Residence						
Rural	63	53.6	71	56.8	1.03	0.310
Urban	62	46.4	54	43.2		

* Student's t test

control groups Data revealed no statistically significant differences observed among the studied groups related to age, education level, occupation and residence (P >0.05).

Table (3) presents maternal pain level using Numeric Pain Intensity Scale in the intervention and control groups (before, immediately after & 30 minutes after oil inhalation). While pain level was equal in the two groups prior to the intervention, study results showed that the mean pain level in the intervention group was lower than that in the control group (6.83 ± 1.19 versus 7.17 ± 1.32) immediately after inhalation. This difference was significant (95% CI; -0.819 to -0.061, p=0.0334). Thirty minutes after inhalation the pain score in the intervention group was further lower than that in the control group (6.63 ± 1.70 versus 7.29 ± 1.46). This difference was also significant (95% CI; -1.69 to -0.848, p=<0.001).

Figure (1) illustrates maternal satisfaction with oil inhalation to reduce labor pain. Data revealed that, (57% versus 24%) in the intervention and control groups respectively satisfied with oil inhalation for labor pain management.

Table 3. Pain level using Numeric Pain Intensity Scale in the intervention and control groups before and after inhalation of oil (before, immediately and 30 minutes after oil inhalation)

Variables	Intervention group	Control group	Student's t test	
	Mean ±SD	Mean ±SD	t	P
Before oil inhalation	7.29 ±1.36	7.15 ±1.36	0.790	0.430
Immediately after oil inhalation	6.83 ±1.19	7.17 ±1.32	2.139	0.0334
30 minutes after oil inhalation	6.63 ±1.70	7.29 ±1.46	3.268	<0.001

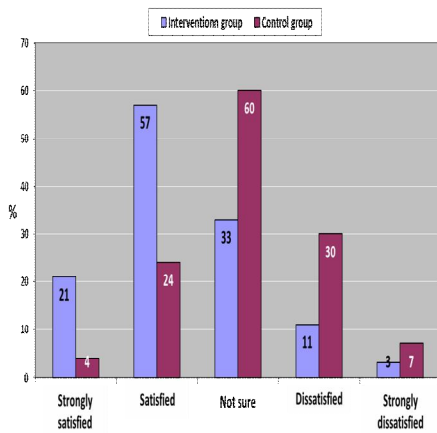


Figure (1). Maternal satisfaction with oil inhalation to reduce labor pain among the intervention and control groups ($\chi^2=43.248, p<0.001$)

Discussion:

This study aimed to investigate the effect of Lavender oil inhalation on labor pain. The study findings support the hypothesis that, the parturient women who inhale Lavender oil exhibits lower pain level compared to those who inhaled placebo oil.

Using Numeric Pain Intensity Scale and FLAAC Pain Scale, pain intensity was assessed in the current study and revealed

that women who inhaled pure lavender oil reported significantly lower pain level immediately after inhalation of lavender than women who inhaled paraffin oil ($p=0.0334$). Moreover, the pain score difference between the two groups was more noticeable 30 minutes after inhalation ($P<0.001$). The change in the severity of labor pain associated with lavender oil inhalation suggesting that, aromatherapy has an alleviating and beneficial effect on the perception of labor pain.

Such study findings are congruent with the results of a large uncontrolled prospective study conducted by **Burns (2000)** in the United Kingdom over 8-year period on 8058 women received aromatherapy during labor. It reported that Lavender oil was helpful for 54% of mothers and midwives to relieve anxiety and fear during labor and 50% of mothers and midwives evaluated lavender as effective in decreasing labor pain ⁽²⁷⁾. **Burns** found that the use of aromatherapy appeared to lead to a further reduction in

the use of systemic opioids in the study center, from 6% in 1990 to 0.4% in 1997 per woman (**Burns et al., 2000**)⁽²⁷⁾. Also, **Burns et al., (2007)** evaluated the use of aromatherapy on 251 parturient women and reported that women and midwives commented favorably on using aromatherapy during labor as a means of easing maternal anxiety, fear, pain and enhancing wellbeing during labor⁽⁷⁾.

Similarly, a randomized trial that was conducted to evaluate and compare the effect of lavender and breathing techniques on the reduction of labor pain indicated that the pain score was significantly lower in the lavender group (**Seraji and Vakilian, 2011**)⁽²⁸⁾. Furthermore, another randomized clinical trial study conducted by **Vakilian et al., (2012)** investigated the effect of cool vapor of lavender oil on labor pain and revealed that the pain score was significantly lowered after intervention⁽²³⁾.

More recently, **Maasumeh et al., (2014)** investigated the effect of lavender oil on pain perception among primiparous women in a randomized controlled trial conducted on 160 participants divided into two groups. The aromatherapy group received 0.1 ml of lavender oil mixed with 1 ml of distilled water via tissues attached to their gowns close to their nostrils, while the control group received 2 ml of distilled water in the same way, and found that the

mean pain intensity in the aromatherapy group was lower than that of the control group⁽²⁴⁾.

The experience of labor pain differs among women, and the response to pain is highly individualized (**ACNM, 2009**)⁽²⁹⁾. It has been evidenced that excessive anxiety in labor increased catecholamine secretion that may actually increase pain perception in the brain and decrease uterine contractions by blocking the release of oxytocin from the posterior pituitary and this action acts against the expulsive muscle fibers in labor, producing tension within the uterine cavity, which is interpreted by the parturient woman as pain (**Field et al., 1997 and Zwelling et al., 2006**)^(30, 31). In addition there is a consistent evidence of coupling between anxiety and pain, leading anxious women to experience more pain (**Shrestha, 2013 and Johnston, 2013**)^(32, 33). Therefore, the current study suggested that women who are particularly fearful of labor may have increased pain so the reduction of the childbirth pain was probably due to the anxiolytic and sedative effects of lavender oil as Lavender oil is recognized as one of the most appropriate oils to treat anxiety and can reduce pain perception via reduction of anxiety.

Patient satisfaction as an outcome measure is a recent focus in health care, thus maternal satisfaction with oil

inhalation was assessed in the present study and revealed that there was a statistically significant difference among both the intervention and control groups with 57% of the intervention group was satisfied with oil inhalation for managing labor pain. These findings are in accordance with the results of **Kim et al., (2006)** **Jones et al., (2013)** **Braden et al., (2009)** and **Olapour et al., (2013)** ^(34, 35, 36 and 37) they reported a higher satisfaction level among the subjects of Lavender group compared to the control group.

Conclusion:

The findings of this study are reflecting that, lavender oil inhalation is associated with lower pain level during the 1st stage of labor and improving women satisfaction of their experience.

Recommendations:

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

- Being safe, simple and cost-effective pain relieve method, lavender oil should be integrated into pain relieve measures that are provided during 1st stage of labor.
- The integration of aromatherapy into the under and post graduate nursing curriculum is recommended.
- Dissemination of the present study findings to all maternity departments

at Mansoura governorate would be helpful.

- Further researches about aromatherapy oils that can help women in reducing their labor pain are needed.

References

1. **Smith CA, Collins CT, Crowther CA. (2011)** Aromatherapy for Pain Management in Labor. *Cochrane Database of Systematic Reviews*, 7, Article ID: CD009215.
2. **Hajiamini Z, Masoud SN, Ebadi A, Mahboubh A, Matin AA. (2012)** Comparing the Effects of Ice Massage and Acupressure on Labor Pain Reduction. *Complementary Therapies in Clinical Practice*, 18, 169-172.
3. **Luo TZ, Huang ML, Xia HA, Zeng YC. (2014)** Aromatherapy for Laboring Women: A Meta-Analysis of Randomized Controlled Trials. *Open Journal of Nursing*, 4, 163-168.
4. **Audu B, Yahaya U, Bukar M, El-Nafaty A, Abdullahi H, Kyari O. (2009)** Desire for pain relief in labour in Northeastern Nigeria. *Journal of Public Health and Epidemiology*, 1(2): 053-057.
5. **Louise, A. (2012)** Aromatherapy and Massage Intrapartum Service Impact on Use of Analgesia and Anesthesia in Women in Labor: A Retrospective

- Case Note Analysis. *The Journal of Alternative and Complementary Medicine* 18(10) 932–938.
6. **Adams J. (2006)** an exploratory study of complementary and alternative medicine in hospital midwifery: models of care and professional struggle. *Complement Ther Clin Pract*; 12:40–7.
 7. **Burns E, Zobbi V, Panzeri D. (2007)** Aromatherapy in childbirth: a pilot randomized controlled trial. *BJOG: An International Journal of Obstetrics & Gynecology*, 114(7): 838-44.
 8. **Jones L, Othman M, Dowswell T, Alfirevic Z, Gates S, Newburn M, Jordan S, Lavender T, Neilson J. (2012)** Pain management for women in labour: an overview of systematic reviews. DOI: 10.1002/14651858.CD009234.pub2
 9. **Tseng YH. (2005)** Aromatherapy in nursing practice. *Hu Li Za Zhi*. 52(4):11-5.
 10. **Potts J. (2009)** Aromatherapy in Nursing Practice. *Australian Nursing Journal*. 16:11.
 11. **Simkin P, Bolding A. (2004)** Update on Nonpharmacological Approaches to Relieve Labor Pain and Prevent Suffering. *Journal of Midwifery & Women's Health*, 49, 489-504.
 12. **Vakilian K, Keramat A. (2013)** the Effects of the Breathing Techniques with and without Aromatherapy on the Length of the Active Phase and Second Stage of Labor. *Nursing and Midwifery Studies*, 1, 115-119.
 13. **Maddocks JW, Wilkinson JM. (2004)** Aromatherapy Practice in Nursing: Literature Review. *Journal of Advanced Nursing* 48(1): 93–103.
 14. **Zahra A, Leila M. (2013)** Lavender Aromatherapy Massages in Reducing Labor Pain and Reduction of Labor: A Randomized Controlled Trial. *African Journal of Pharmacy and Pharmacology*, 7, 426-430.
 15. **Tournaire M, (2007)** Theau-Yonneau A. Complementary and alternative approaches to pain relief during labor. *Evidence-Based Complementary Altern Med.*; 4(4):409-417.
 16. **Kim S, Kim H, Yeo J, Hong S, Lee J, Jeon Y. (2011)** The effect of lavender oil on stress, bispectral index values, and needle insertion pain in volunteers. *Journal of Alternative and Complementary Medicine*. 17(9):823–826.
 17. **Bagheri-Nesami M, Espahbodi F, Nikkhah A, Shorofi S, Charati J. (2014)** The effects of lavender aromatherapy on pain following needle insertion into a fistula in
-

- hemodialysis patients. *Complement Ther Clin Pract.* 20(1):1-4.
18. **Berit j. (2013)** Nurses experience of aromatherapy use with dementia patients experiencing disturbed sleep patterns. An action research project. *Complementary therapies in clinical practice.* 19(4)209-13. DOI:10.1016/j.ctcp.2013.01.003
19. **Taavoni S, Darsareh F, Haghani H. (2013)** the effect of aromatherapy massage on the psychological symptoms of postmenopausal Iranian women. *Complementary Therapies in Medicine,* 21(3)158–163. <http://dx.doi.org/10.1016/j.ctim.2013.03.007>
20. **Raisi Z, Sadat F, Bekhradi R. (2014)** Effect of lavender inhalation on the symptoms of primary dysmenorrhea and the amount of menstrual bleeding: A randomized clinical trial. Elsevier Ltd. <http://dx.doi.org/10.1016/j.ctim.2013.12.011>
21. **Vakilian K, Atarha M, Bekhradi R, Chaman R. (2011)** Healing advantages of lavender essential oil during episiotomy recovery: a clinical trial. *Complement Ther Clin Pract.;* 17(1):50-3.
22. **Hall HG, McKenna LG, Griffiths DL. (2012)** Midwives' support for Complementary and Alternative Medicine: A literature review. *Women and Birth.* 25(1):4–12.
23. **Vakilian K, Karamat A, Mousavi A, Shariati M, Ajami M, Atarha M. (2012)** The effect of Lavender essence via inhalation method on labor pain. *J Shahrekord Univ Med Sci.* 14(1): 34-40.
24. **Maasumeh K, Sara A, Narges A, Mohammad T. (2014)** The effect of lavender aromatherapy on pain perception and intrapartum outcome in primiparous women. 22 (2)25-128.
25. **Williamson A, Hoggart B. (2005)** Pain: a review of three commonly used pain rating scales. *J Clinical Nurs.* 14:798-804.
26. **Voepel-Lewis T, Zanotti J, Dammeyer JA, Merkel S. (2010)** Reliability and validity of the face, legs, activity, cry, consolability behavioral tool in assessing acute pain in critically ill patients. *Am J Crit Care.* 19(1):55-61; quiz 62.
27. **Burns A. (2000)** Might olfactory dysfunction be a marker for early Alzheimer's disease? *Lancet.* 355(9198):84–5.
28. **Seraji A, Vakilian K (2011)** the comparison between the effects of aromatherapy with lavender and
-

- breathing techniques on the reduction of labor pain. *Complement Med.* 1(1):31.
29. **American College of Nurse–Midwives (ACNM) (2009)** Position Statement: Nitrous Oxide for Labor Analgesia.. Online document at: www.midwife.org Accessed 12-5-2014.
30. **Field T, Hernandez-Reif M, Taylor S, Quintino S, Burman I. (1997)** Labour pain is reduced by massage therapy. *J Psychosomatic Obstet Gynecol.* 18:286–291.
31. **Zwelling E, Johnson K, Allen J. (2006)** How to Implement Complementary Therapies for Laboring Women. *American Journal of Maternal Child Nursing.* 31(6):364-370.
32. **Shrestha I, Pradhan N, sharma JF. (2013)** Factors Influencing Perception of Labor Pain among Parturient Women at Tribhuvan University Teaching Hospital. *Nepal J Obstet Gynecol.* 8(1): 26-30.
33. **Johnston RG, Brown AE. (2013)** maternal trait personality and childbirth the role of extraversion and neuroticism. *Midwifery.* 29(11):1244-1250.
34. **Kim J, Wajda M, Cuff G, Serota D, Schlame M, Axelrod D, Guth A, Bekker A. (2006)** Evaluation of aromatherapy in treating postoperative pain: pilot study. *Pain Pract.* 6(4):2737.
35. **Jones L, Othman M, Dowswell T, Alfirevic Z, Gates S, Newburn M, Jordan S, Lavender T, Neilson JP. (2013)** Pain management for women in labour: an overview of systematic reviews. *Cochrane Database Syst Rev.* 14; 3:CD009234.
36. **Braden R, Reichow S, Halm MA. (2009)** the use of the essential oil lavender to reduce preoperative anxiety in surgical patients. *J Perianesthesia Nurs.* 24(6):348–355.
37. **Olapour A, Behaen K, Akhondzadeh R, Soltani F, Al Sadat Razavi F, Bekhradi R. (2013)** The effect of inhalation of aromatherapy blend containing lavender essential oil on cesarean postoperative pain. *Anesthesiology and Pain Medicine.* 3(1):203–207.