DOI: https://doi.org/10.53350/pjmhs211572128

ORIGINAL ARTICLE

Comparison of the effects of aromatherapy with *Lavender* and Entonox gas on labor pain intensity: a randomize clinical trial

SALIMEH AZIZI [1], AMIR BOLANDI GHALE JOUGHI [2], ANDISHEH HAMEDI [3], BENYAMIN FAZLI [4], ADELE SADJADI [5], SEYEDE NARGES BECHAK [6], MOHAMMAD ZAREI [7]

[1]*Department of nursing, Shirvan Center of Higher Health Education, North Khorasan University of Medical Sciences, Bojnurd, Iran*
Email: azizi.s1990@gmail.com; Tel: +985836226623
[2]*Department of nursing, Shahid Hashemi Nezhad Hospital, Mashhad University of Medical Sciences, Mashhad, Iran Email: amir.b0720@gmail.com; Tel: +985136012890*
[3]*Department of epidemiology, Shirvan Center of Higher Health Education, North Khorasan University of Medical Sciences, Bojnurd, Iran Email: ahamedi1364@gmail.com; Tel: +985136012890*
[4]*Department of anesthesiology, Mashhad University of Medical Sciences, Mashhad, Iran*
Email: benjamin.fazli@yahoo.com; Tel: +985136012890
[5]*Department of maternity, Imam Khomeini Hospital, North Khorasan University of Medical Sciences, Bojnurd, Iran Email: adeleh.sadjadi@gmail.com; Tel: +985831510000*
[6]*Department of maternity, Imam Khomeini Hospital, North Khorasan University of Medical Sciences, Bojnurd, Iran Email: asakmed86@yahoo.com; Tel: +985831510000*
[7]*Department of Health in Emergencies and Disasters, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*
Email: zareim51@gmail.com; Tel: +989151811304
Corresponding author: Mohammad Zarei, Department of Health in Emergencies and Disasters, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran. Email: zareim51@gamil.com ; Tel. N.: +989151811304; Postal code:9471637557

ABSTRACT

Objective: This study aimed to compare the effects of aromatherapy with *lavender* and Entonox gas on labor pain.
Methods: This clinical trial was a double-blind randomized in which 72 primiparous women. The subjects were categorized into two groups as: aromatherapy and Entonox gas (control). In the aromatherapy group, the inhalation of fifteen drops of 1.5% *Lavender* essential oil used and the control group received Entonox gas. Both treatments were performed at the beginning of the second phase of labor. Pain was measured using standard pain rating scale (VAS) to assess pain before starting the study and immediately after the intervention (during contractions).
Results: Results of the current study indicated a significant difference between the two methods during the first and second stages of labor.
Conclusion: Aromatherapy with *Lavender* essential oil can be one of the other good ways to treat labor pain.
IRCT: 20180610040032N1
Keywords: Aromatherapy; Pain; Labor; *Lavender*; Entonox

INTRODUCTION

Pain is a universal experience that humans have always sought to eliminate or reduce. Labor pain is one of the most severe and painful phenomena that women experience and prolonged labor and pain by causing anxiety and increasing muscle contraction and lower blood supply to the uterus [(i)]. More than 150 million women become pregnant every year in the world, which is not a welcome event for all of these women [(ii)]. About 35-58% of women have described labor pain as unbearable [(iii)]. Severe labor pain can disrupt the mother's mental health. This pain can negatively affect the mother-infant relationship in the first few days of life, which is very important [(iv)]. Studies show that one of the major causes of elective cesarean section is labor pain [(v)]. Cesarean delivery has a higher risk for the mother than the normal cesarean delivery because the death rate due to cesarean section is seven times that of normal delivery [(vi)]. Regarding the complications of cesarean section, the promotion of natural childbirth is one of the main policies of health services [(vii)].

Nowadays, numerous pharmacological and non-pharmacological methods are used to relieve the pain of natural childbirth [(viii)]. One of the most commonly used pharmaceutical methods for labor analgesia in many countries is a mixture of 50% nitrous oxide inhalation gas and 50% oxygen [(ix, x)]. It is a weak, inorganic, odorless, and colorless gas that is absorbed very quickly from the alveolar wall and transmits only in plasma. It is used during dressing replacement, physiotherapy for pain patients, pain relief after surgery, and in labor rooms for pain relief [(xi)]. Entonox is one of the most commonly used methods due to its rapid effect, short half-life of drug and the need for expensive and sophisticated equipment and convenient maternal use [(xii)]. The method of labor analgesia has increased their concern about its use and even its non-use, Tinnitus, nightmares and short-term memory loss. Nitrous dioxide is used at doses above 70% and there may be prolonged diffuse hypoxia and loss of laryngeal reflexes and complete anesthesia [(11, 12)].

One of the non-pharmacological methods of pain relief is the use of aromatherapy. Aromatherapy is referred to as the use of volatile oils or aromas extracted from aromatic plants for therapeutic purposes and is performed through massage, inhalation and inhalation [(xiii)]. Aromatherapy not only reduces anxiety and pain during childbirth, it also reduces the use of painkillers by 2% and can therefore reduce care costs [(xiv)]. Various studies have shown that the most widely used extract is *Lavender*. Since the emphasis of treatment systems is on the use of low-risk, yet low-cost methods, there is no evidence based on the superiority of these two approaches. The present study investigates these two methods so that the findings of this study can increase the mothers' willingness to deliver natural births by providing appropriate context for applying pain reduction methods in hospitals and maternity hospitals in Iran.

METHODOLOGY

This study was a double-blind randomized clinical trial study in which 72 primiparous women who were candidates for natural delivery referred to Imam Khomeini Hospital in Shirvan were participated. Sampling method was randomly divided into two groups: aromatherapy with *Lavender* (intervention) and Entonox gas (control). Inclusion criteria included age between 18-35 years, gestational age between 37 and 42 weeks, minimum diploma literacy, single pregnancy, 4cm dilatation, low risk pregnancy (non-rupture of more than 6 hours water sac, preterm delivery, absence Third trimester hemorrhage and fetal intrauterine growth retardation, preeclampsia, diabetes and seizures), 24> BMI> 18.5, no history of acute and chronic pain such as migraines, lack of professional exercise (due to changes in pain threshold and phase) Delivery, no drug and alcohol addiction, no smoking, no analgesics within 3 hours before intervention, no history of herbal allergies, no Internal and surgical procedures in mother and fetus, absence of symptoms of fetal distress, lack of clear pelvic stenosis, absence of known mental illness and being in active phase of labor, individual written consent for inclusion, and exclusion criteria including a ban on Nitros Oxide (wherever volumes of air are enclosed in the body, such as pneumothorax), use of sedatives and opiates during the intervention, use of oxytocin to induce and accelerate labor, the onset of intolerable pain during the intervention, sensitivity to *Lavender* during the intervention, their systolic blood pressure below 95 mmHg, bleeding or candidiasis cesarean section during the study and dissatisfaction with the study continued.

Assessment tools included demographic information form, research unit selection checklist, observation and examination form, and numerical pain rating scale (VAS), Intervention Complications Inventory (including headache, dizziness, blurred vision, drowsiness, headache, lethargy, and lethargy). , Ginger & Moore Moore's fingertips, lips, dry mouth, nausea and vomiting, etc., satisfaction questionnaire (satisfaction with intervention, willingness to reuse, mother's opinion of using this method for all women) and hours The standard numbers were Mark City women. The visual analogue scale, a 10cm ruler, was shown to the patient to determine the severity of pain he felt by marking it. Zero means no pain and number ten indicates the highest pain intensity. The severity of pain is zero at moderate level, 3 to 7 at moderate level and more than 7 at severe level. In order to design a questionnaire for satisfaction and evaluation of the complications of interventions, first by extracting credible sources and obtaining information from experts in this field, the items were extracted and a checklist was designed which was completed by interviewer. Content validity will be used to determine the validity of the demographic information questionnaire, research unit selection checklist, observation form and examination. The VAS questionnaire has been used repeatedly in various studies to measure pain and has been validated in this regard. Cronbach's alpha coefficient was used to determine the reliability of this checklist.

Sampling was initiated after the approval and approval of the Ethics Council of Bojnourd University of Medical Sciences and the acquisition of a code of ethics and registration at the Iran Clinical Trials Center, IRCT20180610040032N1, by submitting a written letter to the Imam Khomeini Hospital of Shirvan. At first, the researcher explained the purpose, benefits, and disadvantages of each method to the mothers and then informed consent form. In this study, the subjects were not aware of the type of intervention they received (one-blind). Before the mother enters the active phase of labor (4 cm dilatation), the mother was taught how to use *Lavender* incense. Both treatments were performed at the beginning of the second phase of labor. If the mother reported moderate to severe pain (6 vas), treatment would begin for her. In the aromatherapy group with *Lavender* essential oil (15 drops) prepared by Barij Essential Oil, stoechas, which was distilled at 1.5% concentration of unopened flowers, were used and given to the mothers in cold guided incense. Mothers were asked to inhale cold incense during contraction and pain through a mask. Then, pain was measured using standard pain rating scale (visual-numeric pain scale) to assess pain before starting the study, in 4-6, 6-8, 8-10 cm dilatations and immediately after the intervention (during contractions). The duration of the first and second phases of labor were also measured by the number of seconds and recorded by the researcher. In the Entonox group, training was initially given on the use of the mask and how to breathe during its use in women, and at the beginning of the active phase of labor, administration of Entonox gas was initiated. Mothers inhaled gas at the onset of pain and stopped gasping at the end of the pain and continued until the second phase of labor. The pain was measured using the VAS scale to assess pain before the study, in 4-6, 6-8, 8-10 cm dilatations immediately after the intervention (during contractions) and the duration of the phase. The first and second childbirths were also measured by the number of seconds and recorded by the researcher.

Satisfaction with delivery was completed by satisfaction questionnaire 1-2 hours after delivery in both groups. At all stages of the study, the research units had the right to withdraw from the study and were told that they would not be denied any of their medical rights. It was also emphasized that at each stage of the intervention she would receive routine treatments such as pethidine if the mother needed pain relief.

Implementation problems and limitations included: The accuracy of the research units in responding to questions and their mental state was effective in answering questions. Restrictions should be controlled relatively. Also the threshold of pain tolerance varies in different individuals, which was eliminated by randomization as much as possible.

Data analysis was performed using SPSS software version 5 at the significant level of 5%. The data were described using descriptive indices including frequency tables, appropriate charts, and central and dispersion indices. Independent t-test and analysis of variance for repeated measures, chi-square and linear regression were used to determine the relationship between variables.

RESULTS

In this study, 72 primiparous women who were candidates for natural vaginal delivery were divided into intervention

and control groups. The mean age of the subjects was 26.2 ± 5.5 years and 86.5% were housewives and 56.8% were urban dwellers. Statistical analysis of data showed that both groups were similar in terms of demographic characteristics and anthropometric indices and there was no significant difference between the two groups. Also, all participants reported their earnings to be adequate (Table 1).

We also examined two groups in terms of post-intervention physiological parameters in the present study. The two groups did not differ significantly in most of the physiological parameters such as breathing, blood pressure, temperature and neonatal weight.

Comparison of mean pain severity score at baseline and at various stages of dilatation (4-5 cm) and (6-7 cm) and (8-10 cm) was performed using independent sample t test. . As it can be seen from the table, the mean score of pain intensity at the beginning of the study did not differ significantly between the two groups before the intervention, but at different stages of dilatation, the mean pain intensity score in the group using *Lavender* was significantly lower than the group. It was that Entonox gas was inhaled as shown in Table 2.

Table 1: Comparison of two groups in terms of individual characteristics and anthropometric indices

Variable		Lavender	Entonox	P-Value
M±SD				
Age		26.7±5.5	25.8±5.5	0.48
Pregnancy age		39.05±1.1	39.02±1.1	0.91
Working hours per week		4.1±12.2	3.3±11.4	0.76
Abortion history		0.35±0.75	0.18±0.39	0.25
BMI		29.1±4.7	28.5±4.8	0.63
Weight		75.5±14.8	75.05±12.3	0.86
Height		161±5.9	161±5.4	0.88
Level of Education	Diploma	25(67.6)	26(70.3)	0.80
	Academic	12(32.4)	11(29.7)	
Address	City	21(56.8)	21(56.8)	1
	Village	16(43.2)	16(43.2)	
Occupation status	housewife	32(86.5)	32(86.5)	0.81
	Unemployed	2(5.4)	3(8.1)	
	Employee	3(8.1)	2(5.4)	

Table 2: Mean pain severity score at baseline and at various stages of dilatation in the two groups

Variable	Lavender	Entonox	P-Value
Before intervention	8.7±1.8	8.8±1.5	0.84
The third stage of dilatation	4.7±1.8	6.02±2.04	0.01
The second stage of dilatation	5.1±1.9	6.5±2.1	0.01
The third stage of dilatation	5.9±1.9	6.9±2.2	0.03

DISCUSSION

The present study showed that the effect of pain 2 and 3 in the intervention was significantly different in the two groups and the mean pain in the *Lavender* group was significantly lower in the control group. Yazdakhti and Faran showed that smelling of *Lavender* can significantly reduce labor pain in the control group [(xv)].

Lavender essence stimulates receptors of smell and transfers it to the limbic system. The limbic system is the center of sense in brain that can discharge enkephalins, endorphins, and serotonin in response to stress and it's effective for sense of relaxation [(xvi)]. I one study, aromatherapy in pregnant women showed that *Lavender* suppressed mother's stress and it make less use of epidural anesthesia in this group [(xvii)]. *Lavender* have other material such as synolol [(xviii)] and eugenol that they have antispasmodic effects [(xix)]. Thus, it may cause muscle contractions for mothers and it improve resistant in front of pain [(xx)]. A study conducted by Mohammad Khani Shahri and et al as the effect of *lavender* aromatherapy on the severity of active phase of labor showed that *Lavender* aromatherapy significantly and significantly reduced the intensity of active phase of labor [(xxi)]. Another study showed that in women who had seen the first phase of childbirth for 30 weeks with the aforementioned, the need for more pain medication was significantly higher [(xxii)]. In the present study, a significant difference was observed between the two methods during the first and second stages of labor. The effect mechanism of *lavender* is this form when spreading in the weather and inhaling between uterus contraction by lung, it produces endorphins and reduces pain [(xxiii)]. Studies have shown that this essential oil has positive effects on reducing anxiety [(xxiv)] and fatigue in patients [(xxv)].

CONCLUSION

The present study has shown that aromatherapy can be one of the other good ways to treat pain.

Acknowledgments: We would like to thank the vice-chancellor of research and technology at North Khorasan University of Medical Sciences, who approved this study (No: 97P1097). This project is also in the Iranian Registered Clinical Trials with the number IRCT20180610040032N1.

Authors' contributions

M.Z., S.A., A.H. and B.F contributed to the conceptualization and design of the study, the acquisition, analysis and interpretation of data. M.Z., A.S. and S.N.B

were for drafting the article and revising the article critically for important intellectual content. All authors read and approved the final manuscript.

REFERENCES

1. Gomian N, Hafizi L. Delivery without pain,Delivery without pain work shop , Mashhad ,2004;1-2. (In Persian)
2. Sundin J. Birth skills.1st ed. Australia: Allen &Unwin, 2007; PP:17.
3. Bonica JJ. The management of pain. 2 nd ed. Lea febiger, Philadelphia 1990.
4. Cunningham F, Leveno K, Bloom S, Hauth J, Rouse D, SpongC.Williams obstetrics: 25rd Edition: MC Graw Hill; 2018.
5. Wall PD, Melzack R, Bonica JJ. Text book of pain. New York: Churchill Livingstone; 2013.
6. RahimiKian F, MirmohamadAliei M, Mehran A, AbouzariGazafroudi K, SlmaniBarough N. Effect of education designed based on health belief model on choosing delivery mode Hayat 2008-2009; 14(3-4): 25-32. (In Persian)
7. Gahanishorab N, Mirzakhani K. Effect ofentonox on labour pain, Journal of Sabzevar Medical Science University 2005 ;12(1):27-31. (In Persian).
8. Safarzad A, Khodakarami N, Fathizadeh N, etal. [the effect of massage therapy on labour pain and primipar women delivery] Persian. J Shahrekord Med Sci Univ 2007; 9 (4): 20 - 5.
9. Rooks JP. Nitrous oxide for pain in labour. Birth 2007;3(4): 3-5.
10. Lothian JA. Listening of mothers: Take two. JperinatEduc 2006; 15(4): 41-3.
11. Bahri Binabaj N, Latif Nejad R,Taffazoli M. A study of the effect of continuous professional support during allstages of maternal labor on the level of satisfaction of primigravides from theexperience of labor. JSSU 2003; 11(3):73-9. [In Persian]
12. Rosen MA. Nitrous oxide for relief of labor pain: A systematic review. AMJ Obstet Gynecol 2002; 186(5 suppl Nature): 110-26.
13. Mahmoodi B. Familiar with herbal and .aromatic plant essences and their healing effects.1st ed. NooreDanesh publishing. Tehran 2002, pp: 176.
14. Burns E, Zobbi V .Aromatherapy in childbirth. BJOG 2007; 114: 838 - 44.
15. Yazdkhasti M, Pirak A. The effect of aromatherapy with lavender essence on severity of labor pain and duration of labor in primiparous women. Complement Ther Clin Pract 2016;25:81-6.
16. Habanananda T. Non-pharmacological pain relief in labour. J Med Assoc Thai 2004;87 Suppl 3:S194-202.
17. Burn E, Blamy C, Esser SJ, Lzoyd AJ, Barnetson L. The use of aromatherapy in intrapartum midwifery Practice an evaluation study. Complement Ther Nurs Midwifery 2000 Feb; 6(1): 33-4.
18. Gamez M, Jimenez J, Navarro C, Zarzuelo A. Study of essential oil of lanvandula dentatal. Pharmazie 1990; 45(1): 69-70.
19. Brodin P, Roed A. Effects of eugenol on rat phrenic nerve and phrenic nerve-diaphragm. Preparations. Arch Oral Biol 1984; 29(8): 611-5.
20. Jahdi F, Sheikhan F, Margan Khoyi E, Haghani H. [The effect of lavender essence on the postepisiotomy pain Intensity of perineum. J Sabzevar Univ Med Sci 2009; 3(16): 127-33. [In Persian]
21. Mohammadkhani shahri L, Abbaspoor Z, Aghel N. Effect of massage aromatherapy with lavender oil on reducing the duration of the first and second stage of labor in nulliparous woman. Hormozgan Univ Med Sci 2013; 17(2): 145-154.
22. Tiran D. Complementary therapies education in midwifery. Complement Ther Nurs Midwifery 1995 Apr; 1(2): 41-3.
23. Eriksen M. Aromatherapy for Childbearing [Internet]. California: Ronnie Falcao, LM MS CPM; 1994 [cited 2010 Feb 27]. Available from: http://www. Gentlebirth. org/archives/ aromathr.html
24. Agah J, Baghani R, Tabaraei Y. Comparison of Continuous and Intermittent Inhalation Methods Of Entonox on Labor Pain: A Randomized Clinical Trial. J Mazand Univ Med Sci. 2014; 24(1): 87-93.
25. Hassanzadeh M, Kiani F, Bouya S, Zarei M. Comparing the effects of relaxation technique and inhalation aromatherapy on fatigue in patients undergoing hemodialysis. Complement Ther Clin Pract. 2018;31:210-4