

## A Controlled Trial of the Effect of Aromatherapy on Birth Outcomes Using "Rose Essential Oil" Inhalation and Foot Bath

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### ABSTRACT

**Background & aim:** Aromatherapy is the art and science of using essential oils extracted from aromatic plants, and is concerned with natural balance, coordination and promotion of health. This study was designed to determine the effect of "rose (*Rosa damascena*) essential oil" inhalation and foot bath on the improvement of maternal and neonatal health outcomes.

**Methods:** This study was a randomized clinical trial, conducted on 80 primiparous women in Shahid Akbar Abadi Maternity Hospital, Tehran, Iran. Subjects were randomly assigned to aromatherapy and control groups. Aromatherapy group received methods of inhalation and foot bath with rose essential oil for 10 minutes at the beginning of the active phase and then at the onset of the transitional phase of labor. Control group received the routine care of the delivery room. The measured variables in this study included episiotomy in the second stages of labor, Apgar score, admission to neonatal intensive care unit (NICU), and maternal satisfaction with the administration of pain relievers. Statistical analysis of the extracted data was performed using SPSS version 16 with Chi-square and t student test.

**Results:** Two groups were significantly different in terms of the second stage of labor duration ( $P < 0.001$ ). A noticeable decrease in NICU admissions was observed in the aromatherapy group ( $P < 0.005$ ). Concerning the rates of episiotomy and perineal tears, a significant difference was observed between two groups, i.e. the rates were significantly lower in the aromatherapy group ( $P = 0.001$ ). Maternal satisfaction with labour pain relief in the experimental group was significantly higher than the control group ( $P = 0.001$ ).

**Conclusion:** Use of aromatherapy by rose essential oil inhalation and foot bath during delivery improves the quality of maternal and neonatal health.

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### Introduction

The use of complementary and alternative medicine (CAM) is increasing in many medical centers; this is due to the limited side effects and its simple, low-risk, and cost-effective nature. Scientific-based approaches of randomized clinical

trials show that most CAM practices are safe and have positive health impacts; though further studies are required to indicate the effectiveness and efficiency of this method of treatment (1).

Complementary medicine has become incr-

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easingly important in science as a new maternity care during pregnancy and after childbirth (2). CAM is appealing to midwives as a non-pharmacological method and an obstetrical model. In this paradigm, labor pain as a complex natural phenomenon is influenced by the physical, psychological, and emotional status of the patient. This model has changed the attitudes towards labor pain (3), and can reduce pain and anxiety during delivery; it also leads to the physiologic delivery of the child (4).

Aromatherapy, as one of the methods of alternative medicine, uses scented oils to stimulate the olfactory system and induce relaxation (5). This method can be used in various ways during labor: inhalation, bath, foot bath, and massage (5, 6).

By inhaling the smell, the olfactory receptors send signals to the brain and influence the individual's thoughts, memories and emotions (7, 8). Foot bath is another method of use which is a common practice in aromatherapy (9); foot bath with aroma stimulates the sense of smell and touch (8). The final method is topical heat therapy which is a generally safe and effective form of complementary medicine (10), and merely involves inhaling irritating smells; by the topical application of essential oils, the sense of smell is stimulated, and body's metabolism is activated.

Rose (*Rosa damascena*) scent is effective on the central nervous system including the brain (11, 12). Bathing with rose essential oil is effective in opening the cervix, and softening the ligament; it also opens up the hips of mothers with large or small-sized fetuses, and helps with the improvement of uterus function; also if it is used between contractions, it can lead to increased blood flow. Rose essential oil has relaxant effects on the hip and acts as a sedative during labour (13).

In a review study which focused on the impact of various forms of alternative medicine on labor management, effect of aromatherapy on pain management was acknowledged (14). In another study, the essential oils of ginger and lemongrass were compared, and no significant differences were observed in terms of birth outcomes (15). In another study, aromatherapy is introduced as an effective option for improving the mother's childbirth experience

(16). In a pilot study on the effects of aromatherapy on birth outcomes, significant differences were observed in the following variables: the rate of spontaneous labor, induction of the first and second stages of labor, reduced use of pain relievers, spontaneous rupture of membranes, number of vaginal examinations, episiotomy, duration of labor, and Apgar scores in the intervention and control groups; however, the number of transfers to NICU was significantly higher in the control group (3).

The use of aromatherapy candles containing essential oils of rose and jasmine was reported as ineffective in reducing labor pain; though the pain decreased during the active phase of labor (17). Regarding the effect of aromatherapy during labor and delivery, there are conflicting results due to insufficient research; therefore, more studies are recommended to evaluate the role of aromatherapy in labor (18). According to a study by Myung and colleagues, the difference in results may be due to the use of various techniques in aromatherapy (19).

Using complementary medicine techniques have been widely welcomed, though due to insufficient studies in this field, these methods are less prescribed by physicians (21). Given the previous research, conducting clinical studies is essential to find safe and effective psychotherapeutic approaches which improve labor outcomes.

The aim of this study was to determine the effect of inhaler technique and bathing with rose oil on improving maternal and neonatal outcomes and health care.

## Materials and Methods

This randomized clinical trial was conducted in Shahid Akbar Abadi Hospital in Tehran, 2012. In this study, after obtaining written informed consents, the subjects were randomly assigned to two groups; that is the first 3 people, eligible to participate in the study, were randomly assigned to the intervention or control groups; in total, 80 nulliparous women participated in this study.

The inclusion criteria were as follows: the age range of 18-35 years; gestational age of 38-42 weeks; cephalic presentation and 3 cm dilatation; no history of asthma; and allergies and

**Table 1.** Comparison of demographic characteristics of the two study groups

	Intervention group	Control group	P-value (N=72)
Age (M±SD)	23.08±3.19	22.11±3.1	0.1
Education level N (%)			
below middle school level	13 (1.36%)	16 (4.44%)	0.06
high school to diploma	17 (2.47%)	20 (6.55%)	
university degree	6 (7.16%)	0 (0%)	
Occupation N (%)			
unemployed	30 (3.83%)	35 (2.97%)	0.08
employed	6 (7.16%)	1 (8.2%)	

skin disorders like eczema.

The patients who met the following criteria were excluded from the study: mothers with abnormal labour progression and in need of emergency cesarean section; sensitivity to the used essential oils; and using analgesic drugs and techniques in the first stage of labour (4-10 cm dilatation).

The sample size was estimated 80 ( $\alpha=0.05$ , power=80%, exposure=20%), though 20% of the participants were excluded from the study. Therefore, 36 patients were allocated to each group and the study was conducted on 72 patients (intervention group, n=36) and (control group, n=36).

The reduction in the sample size was due to multiple reasons: 2 subjects due to using opioid (1 from the control, and 1 from the experimental group); 2 people due to lack of cooperation in putting their feet in the foot bath; 1 person due to the drop of fetal heart rate below 100 bpm (the experimental group); 1 person suspected of having abruptio placentae (the experimental group); 1 person due to lack of labor progress (the experimental group); and 1 person due to lack of proper contractions and receiving oxytocin (the control group).

The purpose of the study was explained to

all the subjects and the informed consents were obtained. Rose essential oil used in this study was made by distillation of essential oils by Brenner Pharmaceutical Company, licensed by the Iranian Ministry of Health (building number: 4215). The active ingredients in this oil include citronellol, geraniol, nerol, linalool, and phenylethyl alcohol.

In the intervention group, methods of inhalation and foot bath with rose essential oil were used. Rose essential oil 1% (8 drops of rose oil with 1 liter of water) by Brenner vaporized for 10 minutes in the same room as the patient (while the patient breaths in the air); also, a foot bath with rose essential oil (1%) and water (40° C) was performed. The procedure was carried out first at the beginning of the active phase (4 cm cervical dilatation) and then at the onset of the transition phase (8 cm dilatation). On the other hand, the control group received the routine care of the delivery room. Data concerning mother's dilation, effacement, and fetal head position were recorded every 2 hours. Upon the completion of the active phase, the patient was transferred to the delivery room. Statistical comparison of the extracted data was performed using SPSS version 16;  $P<0.05$  was considered statistically significant.

## Results

The results indicated that the two groups had similar demographic characteristics (Table 1). The mean duration of the first stage of labor was not significantly different among the groups; also, the average length of labor for both groups was less than 4 hours ( $P=0.22$ ). There was a significant difference between the groups in term of the duration of the second stage of labor; for the study group (66.7%), it took less than 30 minutes, and in case of the control

**Table 2.** Comparison between the intervention and control groups regarding child delivery

Birth outcomes	Intervention group	Control group	P-value (N=72)	
First stage of labor (M±SD)	48.1±75.3	14.1±18.4	0.22	
Second stage of labor (M±SD)	21.0±35.0	09.0±38.0	<0.001	
Apgar score (minute 1)	7 ≥	0(0)	3(9/4)	0/13
N (%)	7 <	36 (100)	33 (90.6)	
Apgar score (minute 5)	7 ≥	0(0)	1 (3.1)	0.34
N (%)	7 <	36 (100)	35 (96.9)	
Admission to NICU	1(2.8)	5 (13.9)	<0.05	
Perineal status N (%)				
Intact	17 (2.7)	4 (1.11)	0.001	
Episiotomy	19 (8.52)	30 (9.63)		
Rupture	0 (0)	2 (6.5)		

**Table 3.** Mothers' satisfaction with the intervention

Satisfaction questions	Intervention group	Control group	P-value (N=80)
Intervention effect on reducing labor pain N (%)	19(52.8)	17(47.2)	P=0.001
The recommended method of intervention for delivery N (%)	35(97.2)	1(2.8)	P<0.001

group (61.1%), it was reported as >31 minutes ( $P<0.001$ ). The Apgar scores in the first and fifth minutes were not statistically different between the groups ( $P=0.13$  and  $P=0.34$  in the first and fifth min, respectively) (Table 2).

A significant decrease was observed in the aromatherapy group, in terms of NICU admissions. The rate of episiotomy and tear was considerably different between the intervention and control groups ( $P=0.001$ ) (Table 2). Regarding the maternal satisfaction with pain relievers, two questions were asked. Concerning the first question about the effectiveness of interventions in reducing labor pain, the subjects in the intervention group (52.8%) were highly satisfied, whereas in the control group, 58.3% were moderately satisfied and 47.7% were highly satisfied. The two groups were also compared regarding question number two (whether the mothers recommended the medical intervention to other mothers). In the intervention group, 97.2% of mothers recommended their medical intervention to other mothers in labour; however, in the control group, only 52.8% made such recommendations (Table 3).

## Discussion

This study for the first time, investigated the use of aromatherapy by testing two methods of foot bath and inhalation with rose essential oil. As to the findings, no adverse effects were observed in the intervention group. Use of aromatherapy is suggested during child delivery; also, no side effects were reported in the mothers and neonates. The results are similar to those of other studies in this field (3, 16).

Regarding the average length of first stage of labor in the two groups, no statistically significant difference was observed; on average, the duration was less than 4 hours. However, the average length of the second stage of labor in the study group was less than 30 minutes, and it was more than 30 minutes for the control group.

Aromatherapy candles are considered ineffective in reducing the duration of the first

and second stages of labor. (3). Carvelt's study showed that the use of aromatherapy as ginger oil bath (for 1 hr), is effective in reducing the average duration of labor (15). Also the use of rose and jasmine candle reduced the length of the active phase of labor (17). The similarity of these two studies can be attributed to the type of rose essential oil.

Further research is required regarding the effect of aromatherapy on the average length of labor. As to the findings of the current study, Apgar scores in the first and fifth minute, in the two groups, were not statistically different; however, the number of neonates with Apgar scores (in first and fifth minutes) <7 was higher in the control group compared with the intervention group. The results of the present study are consistent with the results of Burn and Carvelt; also a significant difference in the Apgar score was observed between the aromatherapy and control groups (3, 15).

Results of this study showed that the use of aromatherapy can reduce the need for neonatal admission to the neonatal intensive care unit; Burne and colleagues also found differences in NICU admissions, though Carvelt did not observe any differences between the groups. The discrepancy observed in the results of Carvelt's study is associated with the multiparity status of the mothers and the use of essential oils in both intervention and control groups; this is one of the most controversial points of the present study. The rate of episiotomy and perineal tear in the intervention and control groups were not significantly different; however, the number of women having episiotomy or perineal tear was higher in the control group, in comparison with the intervention group. The study by Burne *et al.* showed that no significant differences exist in the rate of episiotomy between the aromatherapy users and the control group. However, the results showed significant differences in terms of maternal satisfaction with the medical intervention and its effect on reducing labor pain. Results of Burn's study indicate that using aromatherapy during labor is effective in

reducing delivery pain; the results of his study are in consistence with those of the present study. The results of Carvelt's study indicate that aromatherapy does not increase the satisfaction with pain relievers, labour management, delivery experience, mother-child interaction, and breastfeeding (15).

## Conclusion

This study shows that the use of aromatherapy with foot bath and inhalation of essential rose oils is without any side effects and enhances the quality of maternal and neonatal care. Also it can reduce the need for neonatal health care; therefore aromatherapy is suggested during the active stage of labor.

## Conflict of Interest

No conflict of interest exists.

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