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The Effect of the Breathing Technique With and Without Aromatherapy on the Length of the Active Phase and Second Stage of Labor

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ABSTRACT

Background: Long and hard labor is a common complication of labor, which forms an important part of emergency Caesarean deliveries. Labor duration is an influencing factor on the pregnancy outcome and the injuries involving the mother and her fetus, such as infection, hemorrhage, and fetal distress.
Objectives: This study was conducted intending to measure the duration of the first and the second stages of labor in mothers using the breathing techniques with lavender aroma.
Materials and Methods: The project was a randomized trial study that was carried out with two groups of 60 respondents, where both used the breathing technique, one with and one without lavender essence. This study was done in Fatemieh hospital in Shahroud. The laboring mothers, being participated in the study, were candidates for vaginal delivery. The duration of the first stage of labor was recorded from cervical dilatation of three centimeters. The second stage of labor also was recorded from the full cervical dilatation time until child birth. The breathing technique was such that when the contraction began, a deep breath was taken and exhaled. Then fast shallow breathings, being 1.5 times more than ordinary breathing per minute, were performed. The mothers in the experimental group were asked to put the mask on their faces and inhale the lavender essence. In the control group, only the breathing technique was used. T-Test was used to compare the mean lengths of active phase and second phase of labor and demographic variables. Chi square test was used for nominal variables such as education and job.
Results: The mean age in breathing technique with lavender and breathing technique alone were 25.5 ± 4.3 and 26 ± 4.9, respectively .Two groups were comparable in this regards (P = 0.6), but the length of active phase in interventional group was 7.85 ± 3.85 hours and in the control group it was 9.88 ± 6.65 hours. The decrease of the length of labor in the active phase was higher in the experimental group than that in the control group (P = 0.04). In the second stage, length of labor was 16.5 ± 5.7 and 28.9 ± 17.4 minutes in the experimental and control groups, respectively. Difference in length of labor was significant too (P = 0.001).
Conclusions: The research showed that aromatherapy can be used to reduce labor duration.

Keywords: Respiration; Lavandula; Complementary Therapies

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▸Implication for health policy/practice/research/medical education:
Breathing Technique with and without Aromatherapy can be used to facilitate the process of delivery, where midwives can be educated to apply this method.

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1. Background

Long and hard labor is a common complication of labor, which forms an important part of emergency Caesarean deliveries (1). On average, prolonged labor rate is 3-8 percent, and this percentage is 3 times more common among those with their first time labor than those with previous experience in labor (2). Labor duration is an influencing factor on the pregnancy outcome and the injuries involving the mother and the fetus. The excessive prolonging of parturition leads to a proportional increase in the probability of infection, physical-nervous injuries, the death of the fetus and the infant, the risk of the mother bleeding and after childbirth infection, and also derangement due to anxiety, insomnia, and fatigue (3). The most common behavioral technique for labor management is using relaxation, which increases pain tolerance through some mechanisms including reduction of anxiety, decreased response to catecholamine, increased uterine blood flow, and decreased muscle tension (4). Most educational classes held before childbirth present relaxation techniques along with rhythmic breathing patterns intended to provide distraction from labor pain. Breathing patterns are used to enhance a woman's sense of control in own muscle and labor pain. In a survey on 1583 American women, 61% was applied breathing technique. Among the respondents, 69% rated the breathing techniques as very helpful, and 30% rated it as not helpful in labor pain management (5). The studies showed that severe labor pain and anxiety in the active phase of labor can increase catecholamine and cortisol levels; and subsequently, they lead to the decreased strength of uterine contractions, which become uncoordinated; and finally, they prolong labor duration (6). Also in labor management nowadays, obstetrics broadly use complementary medicine practices, one of which is the approach of using aromatherapy (7). Aromatherapy is carried out by the use of essential oils distilled from aromatic plants (5), such as lavender, jasmine, and geranium. Also massage techniques are used as an effective technique during the labor (4). When the diffused essential oil such as lavender is breathed by the lungs between contractions, the endorphins produced in the body are used to alleviate the natural pain. At the time of uterine contractions and when the cervix is opened , 30-minute or more of lavender bath would advance labor in this phase and significantly reduce the need for analgesic medication. The cold compress of lavender and garden sage can reduce pain, fatigue, and revitalize (8). 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 (9, 10). Lavender is originally a Mediterranean plant, but tourists and travelers who came from oversea areas have transferred this plant to their own lands due to its pleasant aroma and its special effects. The Lavender aromatherapy is used to treat depression, amenorrhea, vaginitis, insomnia, and pain. Lavender was used in ancient medicine to treat cough; and was used as a diuretic, carminative, and antispasmodic sedative (11). Analgesic property of lavender has been previously reported in labor pain by Vakilian et al. (12) , and episiotomy wound healing has been also reported by Vakilian et al. (13) .To the best of our knowledge, however, there is no similar study in Iran to assess labor duration by utilizing aromatherapy during breathing technique .

2. Objectives

The aim of this study was to measure the duration of the active phase and the second stage of labor in mothers using the breathing techniques with lavender aroma.

3. Materials and Methods

The project is a randomized trial study. After approval of the proposal and the University Ethics Committee agreement and presenting a letter of introduction to the hospital, sampling was performed on convenient method. Number of samples were analyzed according to a previous study (12). The sample size was calculated with a power of 0.80, selecting α to be lower than 0.05 with equal proportions of experimental and control groups, and the expected odd ratio (OR) was 3. Then 60 participants were estimated to be required in each group. The assigned inclusion criteria is included the following conditions: not having any allergic sensitivity, having a single fetus, not having a history of abortion, to be in gestational age (> 37 weeks of gestation), planned for vaginal delivery, having no obstetrical or non-obstetrical complications, being at first active phase of laboring with cervical dilatation of 4 cm, and no use of oxytocin during labor. Mothers who were allergic to lavender, being unable to tolerate it, whose systolic blood pressure was below 95 mm Hg, having bleeding and/or demanding Caesarean during the research, and also do not like this smell were excluded from the study. Before the study was conducted an inform consent was taken from participants. Women were randomized to the study groups by a computer based randomization in two groups "A" and "B" by Rand Formula in Excel software. Random numbers with allocations were contained in opaque sealed envelopes. As blinding of participants was not possible, one midwife, who was not directly involved in caring for the woman, performed the aromatherapy according to the instructions contained in treatment allocation envelope. The method was that lavender essential oil, from *Stoechas* species, where the essence produced from unopened flowers through distillation method with concentration of 1.5 % by a pharmaceutical company was named Barij, was used in the form of cool inhalation. Pure essence without mixing with water was used for the experimental group. At the beginning

and end of each contraction, participants were reminded to take a deep, cleansing, and relaxing breath. Breathe was done through the mouth in fast shallow breaths at a rate of 15-20 breaths in 10 seconds, throughout the contraction. All the participants were educated in prenatal educational classes how to use breathing technique during labor. Mothers inhaled lavender via nebulizer that was connected to a mask. In the control group, only the breathing technique was used, without any aroma. The duration of the active phase of labor was recorded from cervical dilatation of 4 centimeters. The second stage of labor also was recorded from the full cervical dilatation time until the baby is completely out. Due to Caesarean, one laboring mother was excluded from the experimental group (*Figure 1*). No side effect was observed over the labor and all of the mothers were satisfied to use it. SPSS software version18 was used for data analysis. T-Test was used to compare the mean lengths of active phase and second phase of labor and demographic variables, such as age and weight of newborn. Chi square test was used for nominal variables such as education and job.

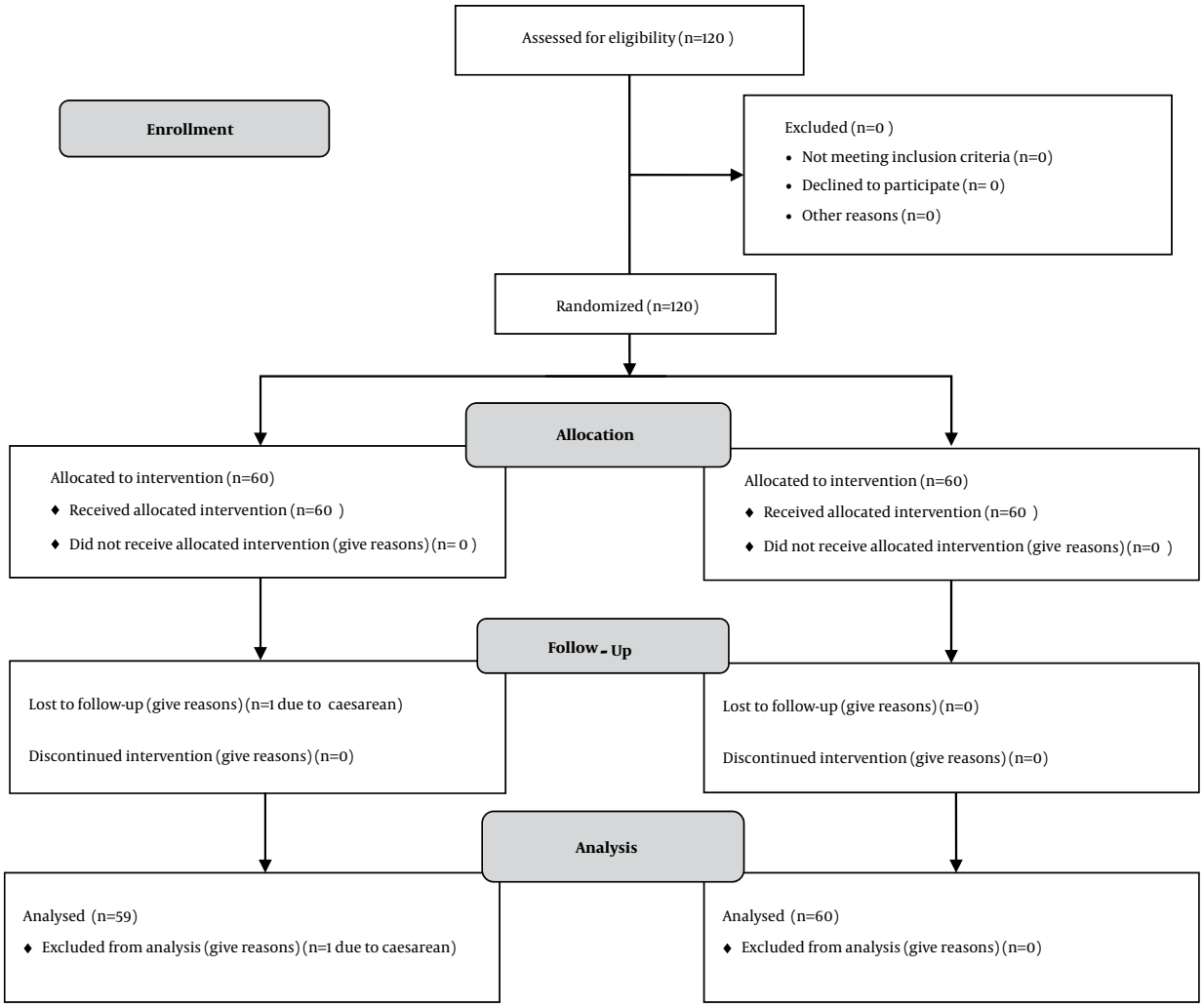

Figure 1. The Study Design

3.1. Ethical Considerations

This study was approved by the Research Ethics Committee of Shahroud University of Medical Sciences. Also before the start of the study, informed consent was taken from participants. The participants were assured of the confidentiality of all their personal information. The re-

searchers tried to observe all the participants rights in accordance to the Helsinki ethical convention.

4. Results

The mean age of participants in experimental and control groups were 25.5 ± 4.3 years and 26 ± 4.9 years, respectively (P = 0.6). The mean number of pregnancy of mothers in the breathing technique group with aromatherapy was 1.31 ± 0.72 and in the breathing technique group alone was 1.22 ± 0.91, and there was no significant difference between them (P = 0.58). The average birth weight of the baby in the breathing technique group with lavender was 3084.9 ± 434.24 g and in the breathing technique group without lavender was 3165.56 ± 289.38 g, and the difference was not significant (P = 0.26). In total, 3 (5.1%) in the experimental group and 11 (22%) in control group were illiterate; and 23 (39%) in the experimental group and 13(26%) in the control group had diplomas, and the difference was significant (P = 0.03). But the length of active phase in interventional group was 7.85 ± 3.85 hours and in the control group it was 9.88 ± 6.65 hours. The decrease of the length of labor in the active phase was higher in the experimental group than that in the control group (P = 0.04). In the second stage, length of labor was 16.5 ± 5.7 and 28.9 ± 17.4 minutes in the experimental and control groups, respectively. Difference in length of labor was significant too (P = 0.001) (*Table 1*).

Table 1. Mean length of Active Phase and Second Stage of Labor in Experimental and Control Groups

Variables	Breathing technique with lavender, Mean ± SD	Breathing technique without lavender, Mean ± SD	95% Confidence Interval of the Difference	P value	t value
Length of active phase, h	7.85 ± 3.85	9.88 ± 6.65	-4.06, -0.005	0.04	1.98
Length of second stage, min	16.5 ± 5.7	28.9 ± 17.4	7.33, 17.34	0.001	4.88

5. Discussion

The present study indicated that the duration of the first and second stages of labor in the group having the breathing technique with lavender had a significant reduction in comparison to the group having the breathing technique alone. The reduction of the childbirth duration was probably due to the anxiolytic and sedative effects of the substance (14), and this obviates the vicious cycle of anxiety-spasm-pain; and in this way it contributes to the more natural procedure of uterine contractions. Studies show that Lavender consists of linalool, which has analgesic and spasmolytic effects on smooth muscles (15). However, in the study done by Alavi et al., the experimental group received 0.1 milliliter of lavender essential oil mixed with 1 milliliter of distilled water, via tissues attached to their gown close to their nostrils, and the control group received just 2 milliliters of distilled water via the same way. In that study the researchers concluded that aromatherapy with lavender did not affect the duration of labor phases (16). In the present study we used aromatherapy through a nebulizer and it seems that this method is more effective than what was reported in the study of Alavi et al. Burns et al. carried out aromatherapy in childbirth by modes of application included acupressure points, taper, compress, footbath, massage, or birthing pool. They reported that aromatherapy was not significantly effective on the duration of the first and the second stages of labor (17). According to another study, the women taking a 30-minute sitting bath with the above essential during the first stage of labor had a better labor progress and their need for analgesic medication was significantly reduced (18). The results of the research done by Slade presented that these techniques reduce pain less than what is imagined (19). Mehdizadeh also reported that although most of studies indicated the helpful and positive effects of the breathing techniques and neuromuscular exercises, but there are still inconsistencies between studies (20). For example, Pugh et al. argue that using the breathing techniques make laboring women tired and result in the delay of the delivery process (21). However, lavender consists of linalyl acetate and linalool that can have sedative and local anesthetic effects (22). It seems that increased secretion of epinephrine, may results in severe uterine pain and reduce the number, frequency, and strength of uterine contractions, and may cause prolongation and disruption in delivery (5). This study shows that lavender essential oil aroma could be used to decrease the length of the delivery. Also the study had some limitations, such as not having attained the first stage of labor. Also mothers had positions such as sitting or standing during labor that the researchers were not able to control them. We recommend midwives to use this kind of aromatherapy in labor. Also we propose other researches to find out other herbs that can help mothers in reducing labor length.

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Authors' Contribution

Katayon Vakilian prepared the first draft of the manuscript and Afsaneh Keramat made critical revisions to the paper and translated it into English language. Both authors had equal roles in the study design and data collection and analysis.

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There are no conflicts of interest among the authors of the study.

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