



Controlled Breathing With or Without Lavender Aromatherapy for Labor Pain at the First Stage: A Randomized Clinical Trial

Katayon Vakilian¹, Afsaneh Keramat², Maryam Gharacheh^{3*}

Abstract

Objectives: There is a wide range of interventions available for managing labor pain. Complementary medicine and non-pharmacological approaches to relieve pain are the components of midwifery practice that can simply be started by midwives. This study aimed to examine the effect of breathing technique with lavender on labor pain compared to breathing technique alone in an Iranian setting in 2015.

Materials and Methods: A single-blind randomized trial was conducted on the pregnant women hospitalized in labor room in Fatemeh maternity hospital. A total of 120 laboring mothers who were eligible for the study were randomly assigned to two groups of breathing technique with lavender and breathing technique with sterile water. The labor pain was measured using the visual analogue scale at different dilatations. Data analysis was done by *t* test and χ^2 using SPSS version 18.0.

Results: The mean age of women in the group of breathing technique with lavender and of breathing technique with sterile water were 25.5 ± 4.3 and 26 ± 4.9 , respectively ($P=0.6$). The mean total pain scores in the experimental and control groups were 6.77 ± 1.89 and 7.44 ± 1.66 (CI: -1.35, 0.014), respectively ($P=0.05$).

Conclusions: The results of the study indicated that breathing technique with lavender reduced labor pain at the end of labor (i.e. at the cervical dilatation of 9-10 cm) compared to breathing technique without lavender. Further research is needed to confirm the effect of lavender aromatherapy on labor pain.

Keywords: Aromatherapy, Labor pain, Breathing technique, Randomized trial

Introduction

Fear of labor pain is one of the main reasons for cesarean delivery in Iran (1,2) and other communities (3,4). Therefore, pain management is one of the most important goals of labor care. There is a wide range of non-pharmacological methods for managing labor pain. Complementary medicine approaches to relieve pain are the components of midwifery practice that can simply be started in labor prior to pharmacological interventions. Non-pharmacological methods used in pain management are based on some theories including the gate control theory of pain, the neuromatrix theory of pain (mechanical, chemical, thermal receptors) and the release of endorphins (5). Behavioral methods are the most common techniques in pain management. One of the best methods is the use of body relaxation. Body relaxation increases pain endurance through reducing anxiety, decreasing response to catecholamines, increasing pelvic blood flow and creating effective uterine contractions. When it is learned and practiced, body relaxation is often effective as a strategy for pain management during labor (6). Body relaxation techniques with rhythmic breathing patterns and distraction may reduce the pain of labor

and increase women's sense of control over themselves as well (7,8). Although most studies have demonstrated beneficial and positive effects of breathing techniques and neuromuscular exercises on labor pain, some reports show that these methods are ineffective (9). For instance, Pugh et al reported that breathing techniques may result in mother's fatigue and postpone the delivery process (10). Therefore, the use of this method in combination with other methods such as aromatherapy seems to have a more favorable effect on pain alleviation. Aromatherapy is the therapeutic consumption of essential oils derived from plants for improving physical and mental health. The essential oils are fat soluble nutrients that are rapidly absorbed when they are applied for external use and breathing. They are excreted through the kidneys or lungs. The essential oils are increasingly used in low dose for massage or as aromatics in health care environments. During labor, oils like lavender or Jasmine in carrier oils can improve relaxation and reduce pain (7). Lavender contains linalool alcohols, ketones, esters and aldehydes. Ketones in lavender effectively decrease pain and improve sleep quality. Esters improve the muscle relaxation and reduce stress and depression (7,11). To the best of our

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¹Department of Reproductive Health, Arak University of Medical Sciences, Arak, Iran. ²Department of Reproductive Health, Shahroud University of Medical Sciences, Shahroud, Iran. ³Nursing Care Research Center, Iran University of Medical Sciences, Tehran, Iran.

*Corresponding Author: Maryam Gharacheh, Email: gharacheh.m@gmail.com



knowledge, this research was performed to examine the effect of breathing technique with and without lavender on the labor pain.

Materials and Methods

A randomized clinical trial with a single-blind design was carried out from April to June 2009 at one of the hospitals of Shahroud, a city in Iran. Calculation of sample size was done with a power of 0.80, $\alpha=0.05$, and CI=95%, with equal proportions of experimental and control groups. The expected odds ratio (OR) was 3. The sample size was estimated to include 60 in each group. Inclusion criteria were the laboring mothers with singleton pregnancy, planned normal delivery without any complications, gestational age more than 37 weeks, cervical dilation greater than 4 cm, without using oxytocin and those attended prenatal education classes. They also had no allergic background. 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 section during the research were excluded from the study. Convenience sampling method was used, but laboring mothers were randomized into 2 groups of A and B with dual block size. Possible feature allocations in each block were 6. Feature allocations were randomized by RAND function in Excel software and ordered in opaque sealed envelopes. One of the researchers performed the randomization but sampling and the measurement of labor pain were carried out by a trained midwife.

Lavender essential oil from *Stoechas* species, whose essence is produced from unopened flowers through distillation method, was used in the form of cool

inhalation with a concentration of 1.5%. 5 cc of pure essence without being mixed with water was applied to the breathing technique group. At the beginning and end of each contraction, the participants were reminded to take a deep, cleansing and relaxing breath. Breathing was done through the mouth in fast shallow breaths at a rate of 15 to 20 breaths during each contraction. All the mothers were trained in prenatal education classes to use breathing technique during labor. Mothers inhaled lavender via nebulizer connected to a mask. In the control group, the breathing technique was used only with sterile water.

The main outcome of the study was pain measurement. The pain was measured using a visual analogue scale. Pain assessment was done at 3 phases of cervical dilatations 4-6, 7-8 and 9-10 cm, respectively. One of the laboring mothers was excluded from the experimental group due to caesarean section delivery (Figure 1). No side effect was observed during labor in the lavender group and all mothers were willing to use it.

Data were analyzed using SPSS software version 18.0. After assessing the normality of data by the Kolmogorov-Smirnov test, we used an independent *t* test to compare the mean pain scores and demographic variables such as age, the number of pregnancy, the weight of newborn and length of first and second stages of labor. In addition, χ^2 test was used to assess nominal features such as the level of education.

Results

The mean age of the participants in the lavender and sterile water groups were 25.5 ± 4.3 and 26 ± 4.9 , respectively ($P=0.6$). In total, 5.1% (3) in the lavender group and 22% (11) in the sterile water group were illiterate, and 39% (23)

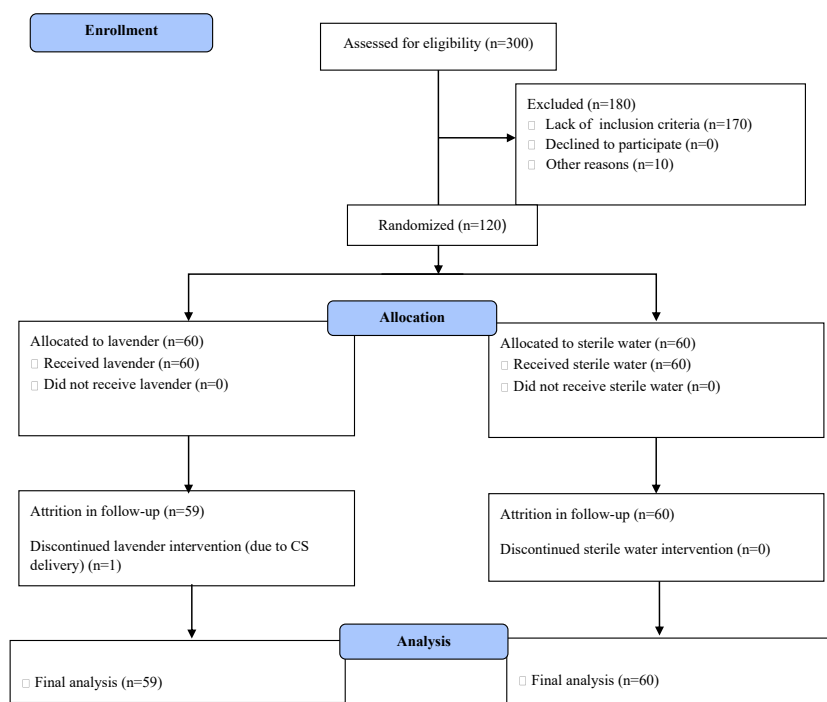


Figure 1. The Flow Diagram of Enrollment.

of the lavender group and 26% (13) of the sterile water group had diplomas, and the differences between them were statistically significant ($P=0.03$). Table 1 presents the other demographic variables. Table 2 shows the mean pain scores at different dilatations in the two study groups. The mean total pain scores for the breathing technique with the lavender group and breathing technique with sterile water were 6.77 ± 1.89 and 7.44 ± 1.66 (CI: -1.35, 0.014; $P=0.05$), respectively. Other pain scores are presented in Table 2.

Discussion

The present study indicated that breathing technique with lavender reduced labor pain at the end of labor (i.e. at the cervical dilatation of 9-10 cm) compared to breathing technique without lavender. In addition, the mean total pain score at different dilatations had a fairly significant decrease in the lavender group compared to the sterile water group. Alavi et al revealed that mothers' pain during labor was significantly alleviated nearly 30 and 60 minutes after aromatherapy with lavender (0.1 cc of lavender and 1 cc of distilled water) on a tissue close to their nostrils compared to the control group (12). In addition, a randomized clinical trial on 120 pregnant women showed that 2 drops of Lavender essence inhaled at the labor phase decreased labor pain at all dilatations 5-6 ($P=0.001$), 7-8 ($P=0.001$) and 9-10 ($P=0.001$) while those in the placebo group with distilled water were not different in terms of pain score (13). The inconsistency of our findings with this could be due to the variation of mothers' ages. The mean age of the mothers in this research was 25 years while it was about 18 years in a study by Yazdkhasti and Pirak. The other study on the effect of aromatherapy massage with the essences of lavender, sage and rose on menstrual pain was conducted in three groups: an experimental group

with essential oils, a placebo group with Almond oil and a control group. Findings indicated that menstrual pain was significantly decreased in the aroma group compared to the other 2 groups (placebo with almond oil and control group) (14).

Lavender essential oil stimulates receptors in the olfactory bulb and transfers olfactory message to the limbic system, which can release encephalin, endorphins and serotonin in response to stress, and it is effective in the creation of a sense of calmness (15). A study by Stringer and Donald on cancer patients showed that inhalation of lavender helped cancer patients feel more relaxed and less stressed (16). Lavender contains linalool (17,18) and eugenol which have spasmolytic effects (18) and can reduce muscle spasms during labor and increase pain tolerance. Therefore, lavender may lead mothers to feel less pain during labor. In the current study, researchers used a guided inhalation system and cold incense without water at 1% concentrations at different dilatations which have not been used in other studies (13, 14). Breathing techniques seem to be less effective than lavender in reducing labor pain in Iranian women. The results of a study by Slade et al also indicated that breathing techniques are less effective than what has been thought in alleviating pain (19). Essential oils may be absorbed by the respiratory tissues and influence the enzymes and ion channels which can stimulate the brain, increase blood flow to the brain and relieve anxiety and depression. Furthermore, these oils can interact with the receptors in the central nervous system via respiration and crossing the blood-brain barrier (20). Their muscle relaxant, carminative and anti-spasmodic effects have been confirmed in other studies. For example, its anti-spasmodic effect on guinea pig ileum and rat uterus in laboratory was confirmed and its mechanism was attributed to the spasmolytic effect of CAMP (cyclic

Table 1. Demographic Variables in the Study Groups

| Variables | Breath Technique With Lavender | Breath Technique With Sterile Water | P Value |
|----------------------------|--------------------------------|-------------------------------------|---------|
| Age (y) | 25.5 ± 4.3 | 26 ± 4.9 | 0.6 |
| Number of pregnancy | 1.31 ± 0.72 | 1.22 ± 0.91 | 0.58 |
| Weight of the newborn (g) | 3084.9 ± 434.24 | 3165.56 ± 289.38 | 0.26 |
| Length of first stage (h) | 7.7±4.5 | 9.06±3.59 | 0.08 |
| Length of second stage (h) | 22.8±15.8 | 16.55±5.7 | 0.13 |

Table 2. Comparison of the Mean Pain Scores at Different Dilatations in the 2 Study Groups

| Pain | Group | Mean± SD | 95% CI | P Value |
|---------------------------|-------------------------------------|------------|-----------------|---------|
| Pain before intervention | Breath technique with lavender | 7.56±1.95 | (-0.319,1.06) | 0.287 |
| | Breath technique with sterile water | 7.19±1.64 | | |
| Pain (dilatation of 4-6) | Breath technique with lavender | 6.53±2.04 | (-1.30, 0.22) | 0.161 |
| | Breath technique with sterile water | 7.07±1.95 | | |
| Pain (dilatation of 7-8) | Breath technique with Lavender | 6.77±2.10 | (-1.35,0.09) | 0.098 |
| | Breath technique with sterile water | 7.41±1.71 | | |
| Pain (dilatation of 9-10) | Breath technique with lavender | 7.01±2.04 | (-1.57, -0.046) | 0.038 |
| | Breath technique with sterile water | 7.82±1.963 | | |
| Total mean pain | Breath technique with lavender | 6.77±1.89 | (-1.35,0.014) | 0.055 |
| | Breath technique with sterile water | 7.44±1.66 | | |

adenosine mono-phosphate) (21). Therefore, lavender may control uterine contractions and labor pain via different mechanisms.

Conclusions

This study illustrated that lavender essential oil reduced the pain of late labor. We recommend midwives to use this kind of aromatherapy during labor to alleviate labor pain. However, further research is needed to confirm the effect of lavender aromatherapy on labor pain.

Conflict of Interests

None.

Ethical Issues

An ethical code was given by the Research Ethics Committee of Shahroud University of Medical Sciences (No. 8702). Before entering the study, the pregnant women signed an informed consent form, and all the participants' rights were observed according to The Declaration of Helsinki. Moreover, this project was registered in Iranian Registry of Clinical Trial Database (identifier: IRCT138804031557N2).

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