# Effect of Two Different Nursing Techniques on Labor pain, Duration, and Anxiety Level among Primiparous Women

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## Abstract

**Background***:* Labor pain is considered as one of the most intense forms of pain. Psychological challenge such as anxiety can contribute towards women's perception of pain and may affect their labor and birth experience. Aromatherapy is one of modern many non-invasive methods and is the most popular complementary therapy to relieve pain during childbirth. The a**im** of this study was to evaluate the effect of two different nursing techniques on labor pain, duration, and anxiety level among primiparous women. A Quasi-experimental **design** was utilized to achieve the aim of the study, conducted at labor and delivery unit at Shaqra Governate general hospital, KSA. **Sample:** A total of 150 laboring women were recruited (75 for each group). **Tools:** four **tools** were used; 1) A structured interviewing questionnaire schedule, 2) Subjective labor pain scale (visual-analogue scale [VAS]), 3)- Partograph and 4)- Spielberger state-trait anxiety questionnaire. **Results**: There were statistically significant differences between the two groups in labor pain scores at active phase after the intervention at ($p<0.001$), and in transitional phase after the intervention at ($p = 0.06$). There was significant difference toward total labor duration among studied sample. Nearly half (49.3%) of the lavender group were satisfied and referenced it for future pregnancies. **Conclusion**: Two different nursing techniques were effective methods for reducing pain intensity, duration of labor and anxiety level. It can be clinically recommended as an alternative, safe and affordable method of pain relief during labor. However, lavender aromatherapy is more effective in decreasing pain during labor, and anxiety than breathing technique. **Recommendations** Educational program facilities and methods about non-pharmacological methods as; lectures, handout, and videos should be developed and become accessible to all pregnant women in the outpatient clinics.

**Keyword:** Primiparous laboring women, Breathing Technique, lavender aromatherapy, labor pain, duration of labor and anxiety level.

## Introduction

Pain is an unavoidable reality of labor and the most noticeable determinant of the labor experience, can be very diverse in terms of the intensity felt and its location. The main cause of pain during labor is due to cervical dilation, contractions of the uterus, and the uterine extension for vaginal delivery (**Gholipour, et al, 2017)**. Inadequate labor pain management can be associated with negative physiological and psychological consequences. Additionally, it has been indicated that there is an association between labor pain and anxiety. Anxiety stimulates the sympathetic nervous system and releases stress-related hormones, which consequently increase the severity of labor pain as well as the duration of labor **(Lowe & Corwin, 2011)**. Therefore, finding a way to provide a maximum pain relief feeling and calmness, with the minimum complications, is one of the most important issues during labor **(Lamadah, & Nomani, 2016).** Pharmacological and non-pharmacological approaches are two general methods that are currently used to alleviate labor pain and anxiety. Nowadays, non-pharmacological approaches such as relaxation techniques, acupuncture, acupressure, massage therapy, and aromatherapy have been identified as a prominent area in midwifery science due to their low cost popularity, simplicity of use, and low risks **(Michalczyk, Torbe, & Torbé, 2018), (Almushait & Ghani, 2014)**. Aromatherapy, as a non-pharmacologic, complementary and

alternative therapy, is the application of essential oils from natural crops to relax and control the mind and body through aromatic compounds and essential oils with neurological and physiological effects **(Forrester, et al, 2014)**. Using aromatherapy in the care of women has a long history. Among pregnant women, complementary and alternative therapies are common approaches. Evidence from different countries indicates rates of use of aromatherapy in pregnant women increasing from 13% to 78% **(Hall, Griffiths & McKenna, 2011)**. Besides, the use of aromatherapy is suggested during labor, with no significant reported side effects in the mothers and neonates. Aromatherapy offers relaxation enhances the mother's ability to cope with the pain in labor. It is effective in reducing fear and anxiety during childbirth and reduces the need for analgesics during the birth as well **(Kheirkhah, et al, 2014)**. Managing and controlling labor pain is an essential part of midwifery services and is the main goal of childbirth care. Nurses have a significant role in the delivery room to provide the childbearing woman with clear, balanced, and concise information regarding efficient pharmacologic and non-pharmacological measures to relieve labor pain. Nurses should be knowledgeable about the most recent scientific studies on labor pain-relieving modalities, to ensure that unbiased and accurate information on effective pain-relieving measures is available to women, help the women determine an acceptable labor pain measures, and allow the mother to choice pain-relieving method. The nurse aids the laboring woman to cope with labor pain, and preserve a sense of capability and well-being **(Mirzaiinajmabadi, 2018)**. As literature refers that, breathing technique and aromatherapy are two beneficial methods to relieve the pain perceptions, having fewer side effects and cost-free as compared to pharmacological methods. Therefore, the current study aims to evaluate the effect of two different nursing techniques on labor pain, duration, and anxiety level among primiparous women **(Tabatabaeichehr, & Mortazavi, 2020).**

## Significant of the study

Labor is one of the most severe pains a woman experience in her life. This pain is more severe and longer in primiparous women, which can lead to invert effects such as fear, anxiety, and loss of self-confidence **(Rajeshwari, 2013)**. Continuous and severe labor pain affects the respiratory system, endocrine glands, blood circulation, and other activities of the body and might harm the infant and mother relationship **(Behmanesh, Pasha, & Zeinalzadeh, 2009)**. Fear and anxiety increase the hormones as epinephrine that further intensify the labor pain and potentially prolong the labor, thus resulting in a very unpleasant experience of childbirth. Also, anxiety and stress during labor may decrease the frequency of uterine contractions and thus, increase the labor duration, the likelihood of assisted delivery, bleeding, delayed lactation, and others **(Mello, Nobrega, & Lemos, 2010)**. [14] So, it is required to provide effective pain relief to treat the distress and reduce the harmful effects of stress on the baby as well as on the mother (Dolatian, et al., 2011). Non-pharmacological pain-relieving methods, is easy to administer, cost-effective, harmless, do not require much training, and appealing to the mother **(Dabiri, & Shahi, 2014) and (Dolatian, et al., 2011)**. Aromatherapy helps to create a state of calmness, alleviate anxiety and reduce pain during labor and is one of the most popular tools that nurses can use as a part of their routine when providing care to women during labor **(Buckle, 2001) and (Janula, 2014)**

## Aim of the study

This study aims to evaluate the effect of two different nursing techniques on labor pain, duration, and anxiety level among primiparous women through the following:

1. Identify the labor pain intensity level among primiparous women who receive inhalation aromatherapy with lavender oil compared to women who receive breathing technique.
2. Determine the labor duration among primiparous women who receive inhalation aromatherapy with lavender oil compared to women who receive breathing technique.
3. Evaluate the anxiety level among primiparous women who receive inhalation aromatherapy with lavender oil compared to women who receive breathing technique.

**Research Hypothesis** to fulfill the aim of the current study the following research hypothesis was formulated:

H1. Laboring women, who receive inhalation aromatherapy with lavender oil, will experience less labor pain than women who receive breathing technique.

H2. Laboring women, who receive inhalation aromatherapy with lavender oil, will experience less duration of labor than women who receive breathing technique.

H3. Laboring women, who receive inhalation aromatherapy with lavender oil, will experience less anxiety level than women who receive breathing techniques.

## Subjects and Methods

***Research Design***

A Quasi-experimental research design was utilized to achieve the aim of the study. A quasi-experiment is an empirical interventional study used to estimate the causal impact of an intervention on target population without random assignment. It typically allows the researcher to control the assignment to the treatment condition, but using some criterion other than random assignment ***(Lo Biondo-Wood, and Haber 2014).***

**Setting**

The study was conducted at labor and delivery unit at the Shaqra Governate general hospital, KSA from September to June 2018. It is a university affiliated. It provided free care for pregnant women during normal and abnormal pregnancy, women with gynecological problem, and infertile women. Care was provided by obstetricians, as well as professional and diploma nurses who were responsible for providing nursing care.

***Subjects:***

A purposive sampling technique was used to recruit 150 primiparous women who attended at the labor and delivery unit and met the ***inclusion criteria***: healthy primiparaous aged 18-35 years old, with term singleton pregnancy, cephalic presentation, in early active acceleration phase (cervical dilatation 3-4 cm), not allergic to aromatherapy, without using analgesics or anesthesia and welling to participate in this study. ***Exclusion criteria:*** women who have a high-risk pregnancy or abnormal fetal condition, allergy to aromatherapy oil were excluded. The sample size was calculated according to the following statistical formula;

$$n = \frac{t^2 \times p\,(1-p)}{m^2}$$

n = required sample size
t = confidence level at 95% (standard value of 1.96).
p = estimated prevalence of vaginal delivery.
m = margin of error at 5% (standard value of 0.05)

After explanation and obtaining oral consent from the women, they were assigned into two groups: The first group (n= 75) received inhalation aromatherapy with lavender essence, and the second group (n = 75) received breathing technique.

1. ***Tools for data collection:*** Four tools were used for data collection.

***Tool (1).*** **A Structured Interviewing Questionnaire schedule;** was developed by the researchers to collect data after extensive literature review related to 1-a) demographic characteristics (age, name & educational level); 1-b) obstetrical data (gestational age) and women satisfaction regarding two techniques. [8,9] it is Likert scale. This tool consists of 3 items and 1 points scale ranged from 1-3. Score (3) denote satisfied level (2) denote neutral satisfied and score (1) denote dissatisfied **(Kheirkhah, et al, 2014) and (Mirzaiinajmabadi, 2018).**

***Tool (2).*** **Partograph:** It is a standardized design done by **WHO (1988)** to follow the progress of labor. It is used to assess uterine contractions (intensity, duration and frequency in 10 minutes) and maternal vital signs. Durations of the three stages of labor were explained. The fetus is also monitored closely on the Partograph by regular observation of the fetal heart rate and color of liquor.

***Tool (3).*** **Visual Analogue Scale (VAS):** is adopted from (**Wewers and Lowe 1990**) used to measure pain intensity. It consists of a

blank line anchored at each end of the line by adjectives that describe the extremes of pain. The anchoring adjectives commonly used are "no pain" (a score of 0) and "severe pain" (worst possible pain) the top score (10). The validity is concurrent and its reliability was not reported. The woman is asked to place a mark on the line that best indicates the pain being experienced. The dimensions measured by this scale are sensory and effective. This tool takes 2 to 5 minutes to be completed.

**Scoring system**: the scale items were divided into three main parts; score from (0-3) reflects mild pain, score from (4-7) reflects moderate pain, and from 8-10 for sever pain.

***Tool (4).*** **Spielberger state-trait anxiety questionnaire:** It includes 20 items of the mentioned anxiety questionnaire. Since each item was scored as 1-4. The total anxiety score ranged between 20 and 80: (20-40) mild anxiety, (41-60) moderate anxiety and (61-80) severe anxiety. This questionnaire is widely used to measure state-trait anxiety in clinical studies and has a correlation coefficient of 0.85-0.91. The anxiety levels were recorded before intervention and after intervention at 5-7 cm and 8-10 cm cervical dilation **(Spielberger, Gorsuch, & Lushene, 1970).**

***Validity and Reliability***

Tool I was submitted to a panel of experts' professors in the fields of maternity nursing and obstetrician to test the face and content validity. Modifications were carried out according to the academic nursing experts' judgment on clarity of sentences and the appropriateness of the content. Tool reliability was tested using Alpha Cronbach test (r = 0.80), which indicates an accepted reliability of the tool. Reliability analysis was conducted to investigate the instrument internal consistency which describes the extent to which all the items in a questionnaire measure the same concept or construct; Cronbach's alpha coefficients were calculated for assessing the measurement reliability with multipoint items **(Tavakol, & Dennick, 2011).**

***Ethical consideration:***

An official approval was obtained from Scientific Research Ethical committee in Faculty of Nursing, Shaqra University before starting the study. Researchers introduced themselves to women who met the inclusion criteria and informed them about the purpose of this study in order to obtain their acceptance to participate voluntary and obtain their oral consent. It was ensured that, the study posed no risk or hazards on their health. Each participant had right to withdrawal from the study at any time and all data that obtained were considered confidential.

***Pilot study:***

The tools of data collection were pre-tested on a random sample of 10% (15 women) selected from the same study setting to check the clarity, applicability, any difficulties with their application, and to determine the time needed for completion of the tools. Modification of the tools was done according to the pilot study results. Women who shared in the pilot study were excluded from the study subjects.

***Procedure:***

An official permission was obtained from the Hospital as well as oral informed consent from women who met the inclusion criteria. The study was carried out: Interviewing and assessment, implementation, and evaluation.

**Interviewing and assessment**

Each woman in the lavender group (group I) and breathing groups (group II) was interviewed individually to collect data (the researcher asked question and recorded the answer. The interview took around 15-20 minutes for each laboring woman). Data related to socio-demographic as age, level of education, occupation, and residence, gestational age, medical history; and obstetric history (tool 1&2).

**Implementation**

Two groups were used in the current study; aromatherapy lavender oil group and breathing group.

- Group (I) (n=75) received breathing technique as the following: 1)Start with an organizing breath (a slow deep breath as the contraction starts and then slowly breathe out, releasing all physical tension from head to toes); 2)Breath in through nose and out through mouth; 3) Keep

breathing as slow as possible, but speed it up as the intensity of the contraction increases, and relax shoulders; 4) As the contraction peaks and breathing rate increases, switch to light breathing both in and out through mouth — about one breath per second; and 5) As the intensity of the contraction decreases, slow breathing and go back to breathing in with nose and out with mouth **(American Society Association, 2020).**

- Group (II) (n=75) received inhalation aromatherapy with lavender essence (10%) was diluted with distilled water 1:10 (Pure lavender essence is highly concentrated and can cause irritation) **(Yazdkhasti & Pirak, 2016)**. The diluted lavender essence was used by a vaporizer in the mother room, then women were asked to inhale it for 3 minutes.

**Evaluation**

- In both groups, the laboring women were asked to self-rate their level of pain in two points during the active phase (at cervical dilatation of 5-7 cm) and during the transitional phase (at cervical dilatation of 8-10 cm), using the pain visual analogue scale (tool 3).
- The laboring women were followed during the labor process to measure duration of labor by using Partograph (tool 2).
- Level of anxiety in both groups was measured during the active phase (at cervical dilatation of 5-7 cm) and during the transitional phase (at cervical dilatation of 8-10 cm), using the Spielberger state-trait anxiety questionnaire (tool 4).

***Statistical design***

Collected data were coded, tabulated, and analyzed using a Statistical package for social science (SPSS) version 20. Descriptive statistics was used to calculate frequencies and percentages. Inferential statistics was used to answer research hypotheses. Student's t-test was used to compare means of two different groups, chi-square was used to compare between two qualitative variables. Statistical significance was considered at p-value <0.05.

## Results

**Characteristics of the participants:**

Table (1) illustrates the mean age of the women in lavender aromatherapy group was 28.1±5.29 years compared to 26.78±5.38 years in breathing technique group. In lavender aromatherapy groups, (39.3%) have primary school as compared to (22.7%) in breathing group. Regarding to the occupation of women, less than half of the women (48%) in lavender group were working compared to (58.7%) in the breathing group. In relation to the residence, more than half of the women (52% & 56%) in both groups from rural area in lavender and breathing group respectively.

**Obstetrical profile**

During the previous pregnancy, inhalation aromatherapy with lavender oil group and breathing technique group did not have any medical problems or complications. The mean gestational age for the lavender aromatherapy group was (38.8 ±1.3 weeks) compared to (38.6 ± 0.56 weeks) in the breathing technique group.

**Labor Pain intensity**

As shown in table (2), the mean pain score before intervention at "cervical dilation of 5-7 cm" was (7.45±2.7) for inhalation aromatherapy oil group and (8.33±2.98) for breathing group, while at "cervical dilation of 8-10 cm" was (7.76±2.3) and (7.89±2.02) respectively with no statistical significant difference between groups. While after intervention, the mean labor pain score at "cervical dilation of 5-7cm" was (5.49 ± 1.9) and (6.76 ±2.2) for inhalation aromatherapy and breathing technique group respectively with highly statistically significant differences between both groups at (p = 0.01). In addition, the mean labor pain score at "cervical dilation of 8-10 cm " was (6.25 ±1.7) and (7.58 ± 2.3) for inhalation aromatherapy and breathing technique respectively with highly statistically significant difference at (p = 0.027).

**Duration of the course of labor**

As shown in Table (3), the mean duration of labor pain in the first stage of labor was (8.1±2.8) for inhalation aromatherapy group

compared to (11.8±5.1) in breathing group, while in the second stage of labor, the mean labor pain was (17.8±11.4) for aromatherapy group compared to (22.96±12.6) in breathing group with statistically significant differences between groups at ($p < 0.01$). On the other hand, the mean duration of labor pain in the third stage of labor was (5.98±2.7) for inhalation lavender aromatherapy group compared to (6.6±3.4) in breathing group with no statistically significant difference between groups at ($p= 0.21$).

**Anxiety during labor**

Table (4) reveals the mean anxiety score before intervention at "cervical dilation of 5-7 cm" was high in inhalation aromatherapy and breathing technique group (50.45 ±5.77) and (56.47 ±9.92) respectively, while at "cervical dilation of 8-10 cm" was (49.65±7.34) and (54.08±8.89) respectively with no statistical significant differences between groups. While after intervention, the mean anxiety score at "cervical dilation of 5-7 cm" was (39.40± 6.56) and (46.14 ± 9.11) in inhalation aromatherapy and breathing technique group respectively with statistically significant differences between them at ($p=0.002$). On other hands, the mean anxiety score at "cervical dilation of 8-10 cm" was (35.65± 8.06) in inhalation aromatherapy compared to (41.08 ± 9.96) in breathing technique group with statistically significant differences between them at ($p=0.001$).

**Satisfaction with the technique during labor**

It was observed in figure (1) that, nearly half of the study sample (49.3%) was satisfied with the technique in inhalation aromatherapy group as compared to (23.3%) in breathing technique group, while a minority of women from inhalation aromatherapy (8%) compared to (20.5%) in breathing group were dissatisfied with the technique and the differences was statistically significant between groups at ($p=0.002$).

**Table (1):** Distribution of the demographic characteristics among the studied sample.( n=150)

| Items | Inhalation Lavender aromatherapy group (n=75) No (%) | Breathing technique group (n=75) No (%) | Test |
|---|---|---|---|
| Mean maternal age (in years) | 28.1±5.29 | 26.78±5.38 | t=1.51,p=0.13 |
| Mothers Education | | | |
| - Can't read & write | 7(9.3%) | 11(14.7%) | |
| - Read & write | 10(13.3%) | 13(17.3%) | $x^2$=5.28, p=0.25 |
| - Primary education | 11(39.3%) | 17(22.7%) | |
| - Secondary education | 25(14.7%) | 15(20 %) | |
| - University education | 22(29.3%) | 19(25.3%) | |
| Mothers Occupation | | | |
| - Working | 36 (48%) | 44(58.7%) | $x^2$=1.71, p=0.25 |
| - House wives | 39(52%) | 31(41.3%) | |
| Residence | | | |
| - Rural | 39(52%) | 42(56%) | $x^2$=0.24,p=0.74 |
| - Urban | 36(48% ) | 33(44% ) | |

**Table (2).** Mean pain scores among inhalation aromatherapy and breathing technique group.) n=150)

| **Labor pain** | **Inhalation Lavender aromatherapy group (n=75)** | **Breathing technique group (n=75)** | **t** | **p-value** |
|---|---|---|---|---|
| | **Mean± SD** | **Mean± SD** | | |
| At Active phase (5-7cm dilation) | | | | |
| - Before intervention | 7.45±2.7 | 8.33±2.98 | -0.76 | 0.45 |
| - After intervention | 5.49 ± 1.9 | 6.76 ±2.2 | -2.58 | 0.01* |
| At Transitional phase (8-10cm dilation) | | | | |
| - Before intervention | 7.76±2.3 | 7.89±2.02 | 1.06 | 0.29 |
| - After intervention | 6.25 ±1.7 | 7.58 ± 2.3 | -2.23 | 0.027* |

**Statistically significant at p<0.05*

**Table (3):** Mean Labor Duration among inhalation aromatherapy and breathing technique group.( n=150)

| Labor Duration | Inhalation Lavender aromatherapy group (n=75) | Breathing technique group (n=75) | t | p-value |
|---|---|---|---|---|
| | Mean± SD | Mean± SD | | |
| 1st stage of labor (hrs.) | 8.1±2.8 | 11.8±5.1 | 5.48 | 0.001* |
| 2nd stage of labor (min.) | 17.8±11.4 | 22.96±12.6 | 2.62 | 0.01* |
| 3rd stage of labor (min.) | 5.98±2.7 | 6.6±3.4 | 1.27 | 0.21 |
| ***Total labor duration (hrs.)*** | ***7.45±1.20*** | ***10.46±3.18*** | ***7.67*** | ***0.001**** |

**Statistically significant at p ≤0.05*

**Table (4):** Mean Anxiety scores among inhalation aromatherapy and breathing technique group.( n=150)

| Anxiety | Inhalation Lavender aromatherapy group (n=75) | Breathing technique Group (n=75) | t | p-value |
|---|---|---|---|---|
| | Mean± SD | Mean± SD | | |
| At Active phase (5-7cm dilation)<br>- Before intervention<br>- After intervention | <br>50.45±5.77<br>39.4±6.56 | <br>56.47±9.92<br>46.14 ±9.11 | <br>0.73<br>3.13 | <br>0.467<br>0.002* |
| At Transitional phase (8-10cm dilation)<br>- Before intervention<br>- After intervention | 49.65±7.3<br>35.65± 8.06 | 54.08±8.89<br>41.08 ±9.96 | 1.55<br>3.25 | 0.122<br>0.001* |

**Statistically significant at p<0.05*

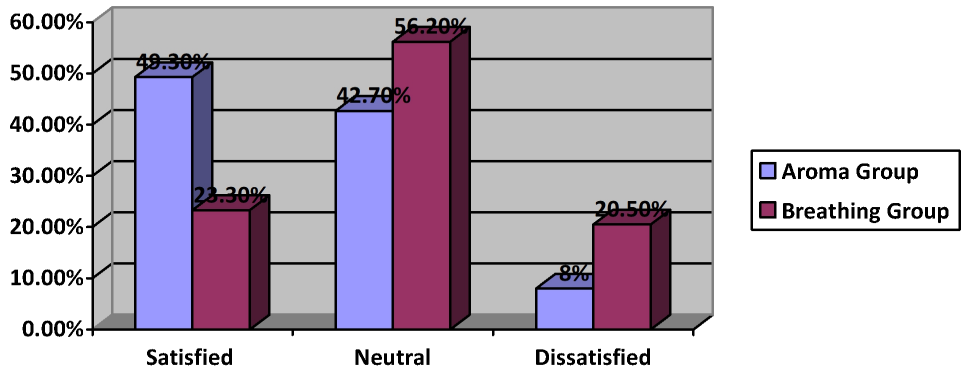


**Figure (1):** Women's satisfaction among two different techniques (n=150)

## Discussion

Scientific document suggested that childbirth can be one of the most stressful times in a woman's life and the need for a supportive and caring environment is well documented. Pain is a strong stressor which can have great impacts on women's reproductive, and physical health; therefore, its harmful effects should be reduced. The intention of this study is aims to evaluate the effect of two different nursing techniques on labor pain, duration, and anxiety level among primiparous women. Findings of the present study are discussed within the following frame of references, 1) A description of the sample by demographic characteristics 2) Pain intensity during labor, 3) Duration of the course of labor, 4) Anxiety during labor, and 5)

Satisfaction with the used technique during labor.

*Concerning demographic characteristics*, the mean age of women in lavender aromatherapy group was 28.1±5.29 as compared to 26.78±5.38 in breathing technique group. Only less than half of the women in both groups have secondary and higher education. A higher percentage of laboring women in the breathing technique group were working compared to lavender aromatherapy group. About half of the women in both groups were from urban area. All study sample was primiparous women with no statistical significant differences between them.

*Regarding labor pains*, results of the current study indicated that both inhalation aromatherapy with lavender essence and breathing technique had an effective role in reducing pain intensity during labor, but lavender aromatherapy was more effective than the breathing technique. Mean Pain score was lower in lavender aromatherapy group compared to breathing technique group with statistically significant differences during the active and transitional phase of labor. This means the effectiveness of lavender oil in labour pain reduction which may be due to the sedating effects of linalool acetate in lavender as a narcotic. In the same line with **Mirzaiinajmabadi et al (2018)** who conducted a study named "An Update on the Effect of Massage and Inhalation Aromatherapy with Lavender on Labor Pain Relief", they mentioned that, the results of examined clinical trials showed a reduction in labor pain in cases of aromatherapy massage and inhalation with lavender among pregnant women. Moreover, the results by **Ahmadi et al., Vakilian et al. and Seraj and Vakilian** suggested a significant reduction in labor pain intensity of the women in the intervention group by using aromatherapy with lavender essential oil inhalation, which is consistent with the findings of our research. Also, the results of a study conducted by **Zahra and Leila (2012)** named Lavender aromatherapy massages in reducing labor pain and duration of labor; they revealed that lavender oil massage was effective method in decreasing pain during labor at cervical dilatation of 4-5cm, 6-7cm and 8-10 cm. The integration of lavender essential oils into a biological signal of the receptor cells in the nose when inhaled. The signal is transmitted to limbic and hypothalamus parts of the brain via olfactory bulb. These signals cause brain to release neuro messengers like serotonin, endorphin etc., to link our nervous and other body systems, assuring a desired change and to provide a feeling of relief **(Ali et al, 2015).**

*Concerning anxiety during labor*, after intervention, laboring women in lavender aromatherapy had low mean anxiety score than women in breathing technique in active and transitional phases with statistical significant differences between groups. In the same line with **Mohammad KhaniShahri, (2012)** study on " effect of massage aromatherapy with lavender oil on pain intensity of active phase of labor in nulliparous women "; the result was message aromatherapy with lavender essential oil would significantly decrease anxiety and pain intensity of labor. Also, our study results are congruent with the results of **Namazi M et al (2014)** who found that the levels of anxiety at dilatations of 3-4 and 6-8 cm were significantly lower in the aromatherapy group compared with the control group. A recent study done by **Lakhan, Sheafer& Tepper. (2016)** to examine the effect of aromatherapy massage using lavender oil on the level of pain and anxiety during labour among primigravida women. *They reported that,* a reduction in the mean pain score among the aromatherapy group compared to the control group and the difference is statistically significant. Also, concluded that, aromatherapy massage with lavender oil can reduce pain and anxiety during labour. Moreover, it is an effective way to decrease labor duration. It was recommended that lavender aromatherapy massage can be offered to women in labor for pain relief.

The present results of the current study are contradicted with the results of a systematic review by (**Smith and his colleges, 2011)** on 535 women in comparing aromatherapy with placebo for pain management of labor, there was no difference between groups for the pain intensity and the length of labor. The authors, however, concluded that further research is needed before final recommendations. Also, the obtained difference in our present study

with other surveys is due to the method of using lavender essential oil.

Prolonged duration of first stage of labour is an important cause of Caesarean and instrumental vaginal delivery. If duration of labour is prolonged, it may cause offspring hypoxia **(Seraji, & Vakilian, 2011).** The present study showed that the two different techniques had a significant reduction of the duration of first and second stage of labor in lavender aromatherapy inhalation and breathing technique with statistically significant differences between groups, however there was no statistically significant difference in third stage of labor between groups, which is consistent with the results of the survey " The effect of lavender essence on labor pain in nulliparous women" by **Burns et al. (2000, 2007)**. These results are congruent with the results of **Ahmadi et al., (2013) and Mohammadkhani et al., (2012)** who found that duration of the first and second labor stages of the subjects in lavender aromatherapy group were shorter than the control ones.

Also, our study results are in agreement with the results of **Raju (2014)** "Effectiveness of aromatherapy in reducing labour pain and duration of labour among primigravidas"; who found significant difference between aromatherapy and biofeedback group regarding labour duration. The reduction of the childbirth duration was probably due to the anxiolytic and sedative effects of the substance, 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 **(Cline et al, 2008).** [36] According to the results of a study by **Lamadah, & Nomani, (2016)** showed a reduction in the mean pain score, duration of labor and anxiety among the aromatherapy group compared to the control group and the differences was statistically significant, which are congruent with our study findings.

On the other hand, there was no significant difference in labor stage duration in the control and experimental groups of the study by **Vakilian et al., (2012)** on " The effect of Lavender essence via inhalation method on labor pain " and a study by **Seraj, & Vakilian, (2012)** on "The comparison between the effects of aromatherapy with lavender and breathing techniques on the reduction of labor pain" which are inconsistent with our findings. The differences between our study findings and other findings is related to different culture, inclusion criteria and the using method.

The present study showed that most of the laboring women in the aromatherapy group satisfied with the inhalation of aromatherapy with lavender essence. These results are in accordance with results of **Raju (2014*)*** who mentioned that the majority of women reported satisfaction about their labour experience. Also, a study conducted by **Lamadah, & Nomani, (2016)** "The effect of aromatherapy massage using lavender oil on the level of pain and anxiety during labour among primigravida women "; they found that the majority of women satisfied with the experience of aromatherapy during labor.

**Implications for Practice:**

Non-pharmacologic methods of pain relief can be initiated during labor. Nurses and childbirth educators must be ready to provide a comprehensive childbirth education that informs women to a diversity of pain management options. They also are willing to provide a sensitive and continuous care that is a cooperative effort with the woman to help her in conquering with pain and mastering the experience of childbirth. A diversity of pain management strategies in the childbirth education classes can permit more options for women to use in the childbirth experience. One of the non-pharmacologic methods of pain relief is lavender aromatherapy and breathing technique.

## Conclusion

Based on the study findings and research hypothesis, the following was concluded that the two different techniques were effective methods for reducing pain intensity, and decrease the level of anxiety during labor. It can be clinically recommended as an alternative, safe and affordable method of pain relief during labor. However, lavender aromatherapy is more effective in decreasing

pain during labor and anxiety level than breathing technique.

## Recommendation

Based on the findings of the present study, the following recommendations are suggested

1. Lavender Aromatherapy using lavender oil and breathing technique can be offered to women in labor who want to avoid pharmacological methods for pain relief.
2. A comparative study can also be done between the effectiveness of various non-pharmacological measures for labor pain with large sample size to generalize the findings.
3. Further studies are required to investigate the effects of lavender Aromatherapy using lavender oil and breathing technique on neonatal outcomes.

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