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The comparison of the impact of lavender and Valerian aromatherapy on reduction of the active phase among Nulliparous women: A double blind randomized controlled trial

Mahin Kamalifard[1], Abbas Delazar[2], Nilofar Satarzade[3], Mojgan Mirghafourvand[4] and Rana Dousti[5]

[1]Academic trainer, Department of nursing and midwifery, Medical Sciences University of Tabriz
[2]Professor, Department of pharmacology, Medical Sciences University of Tabriz
[3]Assistant Professor, Department of nursing and midwifery, Medical Sciences University of Tabriz
[4]Assistant Professor, Department of nursing and midwifery, Medical Sciences University of Tabriz
[5]MA student, Department of nursing and midwifery, Medical Sciences University of Tabriz,

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ABSTRACT

One of the important points in health care of nulliparous women is reduced pain, anxiety coping and reduced delivery time. Aromatherapy is one of the effective non-pharmacological methods. The present study is aimed to evaluate the impact of lavender and Valerian aromatherapy on reduction of active phase among nulliparous women. A double blind randomized controlled trial was conducted on 141 nulliparous women. The subjects were assigned using randomized blocking to three groups of Lavender, Valerian and placebo. Lavender group inhaled lavender essence with concentration 1.5% with olive oil, valerian group inhaled valerian essence with concentration 1.5% with olive oil and placebo group inhaled olive oil each hour for 10 minutes. There was no statistically significant difference between three groups in terms of individual, social and midwifery characteristics (mother-child) (P>0.05). There was a significant difference in the mean of active phase of delivery in three groups (P<0.001). Valerian group had significantly the lowest active phase (P<0.001). The active phase duration of lavender was significantly lower than that of placebo group (P<0.003) The results showed that apgar of the infant at the first and fifth minutes, the age mean and weight were similar in three groups (P>0.05). Lavender and valerian aromatherapy reduced active phase duration among nulliparous women and this reduction was higher in valerian than that of lavender.

Keywords: Valerian, Lavender, Active phase of delivery

INTRODUCTION

Pain is unavoidable in labor [1]. Despite new progress in medicine, delivery complication is a challenging issue among women [2]. Labor pain is one of the most important factors in selected cesarean delivery requiring more costs and complications for mothers. Thus, mitigation of pronged labor pain is one of the main measurements taken to reduce cesarean delivery. The smooth muscle of the uterus and cervix have muscarinic receptors and their activation leads to smooth muscle contraction [3,4]. Severe pain and anxiety in the active phase on labor causes

increased levels of catecholamine and plasma level of cortisol hormone leading to reduced uterine contraction strength, prolonged delivery and reduced labor progress [4].

Mitigation of pain severity, anxiety and fear among patients and shortening labor duration is one of the important aspects of health care. Aromatherapy is one of the effective non-pharmacological methods to achieve the mentioned purposes. Today, controlled use of oil essence is applied in aromatherapy to reduce pain and anxiety. It is believed that an aroma activates sense of smelling in nasal cavity and this stimulates limbic system, the region associated with feelings and memory [5, 6].

Lavender oil is one of the aromatic volatile oils in aromatherapy. In law book, it is defined that lavender has narrow and red hair similar to barley and its leaves are longer than that of barley. Its wood is yellow and has no flower like epithymum. It is bitter. Lavender is hot and dry [7]. Lavender has been used for its anti-bacterial, anti-fungal, muscle relaxing, sedative and cicatrizing properties. This plant is used in aromatherapy with sedative, relaxing and anti-contraction effects via neural system [8]. Valerian is a fragrant plant smelling valernic acid or iso-valernic [9]. The root of this plant is used for relaxation of neural system. Its root is hot and dry in accordance to Iran medicine. The important properties of this plant include: Anti-seizure, anti-hysteria, anti-spasm, sedative, relieving fever, relaxing, anti-anxiety, Migraine and low Dysmenorrhea and episiotomy pain after delivery [11]. In clinical studies, there is no serious complication or sensitivity to valerian [10, 12]. Valerian has no risk in pregnancy and breastfeeding and it is group A food in Australia and in FDA of US with code CFR §182.20[1991]21 is not harmful [13, 14].

As it was said, one of the most important effects of anxiety is observed in labor progress [15]. Burns et al., conducted a study to apply herbal essences in labor. The results showed that one of the useful essences to reduce labor anxiety was lavender essence [16]. Kheyrkhah et al. showed that aromatherpay with Rose essence was effective on reduction of anxiety of the active phase of delivery among nulliparous women [17].

The studies have shown that aromatherapy with oil essence of lavender was effective on the mind of mothers [18, 19]. When the diffused essential oil such as lavender is breathed by the lungs between contractions, the endorphins produced in the body are used to mitigate the natural pain. Also, the cold compress of lavender on forehead can reduce pain, fatigue, anxiety and revitalize [20].

Nemati showed that lavender was useful in active phase of delivery to reduce pain [21]. Burns et al. offered aromatherapy to relieve anxiety, pain, nausea and/or vomiting or to strengthen contractions on labor. The results showed the shortening of active phase and second phase of delivery and increased satisfaction of this technique [16]. Mohammadkhani et al., [2008] showed that active phase duration on labor in aromatherapy was significantly lower than that of massage group with almond oil and massage group [22]. Pirak et al showed that labor first phase in lavender group was significantly less than that of control group [23]. In the study of Ahmadi et al., the length of first and second phase of delivery in aromatherapy group with lavender was shorter than that of control group [24]. Hall et al., showed that women who received lavender essence in bath for 31 minutes, had better labor progress and lower need to anti-pain medicine significantly [25].

Gilani et al. evaluated the smooth muscles of ileum and jejunum muscles of rabbit and guinea pig using valerian and supported the anti-spasmodic effects on valerian [26]. Occhiuto et al., [2009] showed the relaxant and antispasmodic effect of valerian extract on the uterus of non- pregnant women who had a hysterectomy [27]. Andreatini et al evaluated the effect of valerian on anxiety disorder as a randomized placebo-controlled pilot study in which the similar sedative effect of valerian with Diazepam was achieved [28].

It seems that based on anxiety reduction, we can reduce pain and labor duration and this leads a good experience of delivery. Based on biochemical properties of valerian and lavender, the present study aimed to compare the effect of lavender and valerian aromatherapy on reduction of first phase on labor among Nulliparous women.

MATERIALS AND METHODS

This is a double blind randomized controlled trial (participants and testers) conducted on 141 Nulliparous women in maternity section of Fateme hospital in Miandoab, Iran. The ethics code was obtained from Medical Sciences University of Tabriz-Iranlou in IRCT, NO. 201504236582n10.the sample size is computed by α=0.05, β=20%. As

shown in the previous studies (39) and by considering exclusion 10% of samples, 47 people in each group are computed. The total sample size is 141.

The inclusion criteria included pregnant women who: 1) were nulliparous aged 18-38 years, gestation age =37-41 weeks, singleton pregnancy; 2) were with 4 cm dilatation, indicating the onset of active phase of labor,cephalic presentation, no smelling problem, no addiction and smoking, no chronic systemic cardiovascular-Respiratory diseases, nopreeclampsia, eclampsia and Placenta previa, no amniorrhexis more than 18 hours, no history of infertility, tendency to be included in study, no history of sensitivity and low risk pregnancy. The exclusion criteria were: receiving anti-pain medication during 3 hours before study and systolic blood pressure lower than 95mmHg. Those meeting inclusion criteria were assigned randomly and by random computer values via 6 and 9 blocks to receive the treatment in three groups. Glass dropper bottles with the same color and forms with lavender and placebo were provided by Barij essence pharmaceutical company. Lavender glasses consisted of lavender essence with concentration 1.5% with olive oil, valerian glasses with valerian essence concentration 1.5% with olive oil and placebo glasses were olive oil. A third person rubbed all glasses with a similar fragrant matter and put No 1, 2 on glasses, respectively and put in similar envelopes based on the assigned group. The envelopes were given to the tester with similar cotton balls. The subjects received intervention based on the No on envelopes. Each hour, the essence of glasses was dropped as 3 on a cotton ball and was given to the subjects to inhale it for 10 minutes. If the mother couldn't do this, an assistant helped here. In all stages working with cotton balls and glasses, a three-layer mask was applied.

The data collection measures of the current study include demographic questionnaire, partograph form of delivery. The questionnaire of demographic data was completed by interview and checklist of maternity data including dilation, effacement, station, amniotic fluid condition, FHR, number and length of contractions were determined based on visits and are recorded in partograph form. The condition of membrane, fluid color, heartbeat of fetus, drugs, cervical dilation and fetal descent, number and length of contractions is extracted via observation and examination of recorded information by researcher in partograph. Apgar score entered in the first and fifth minutes of infant by required criteria by research and was entered in data record. The data of study were applied using descriptive method (mean, standard deviation and percent frequency), mean difference test of ANOVA variance analysis to evaluate the length of active phase and Tukey test to compare the groups as paired. Chi-square test was used to compare the frequency distribution of data among three groups. The analyses are evaluated using SPSS, 20 Software. P-value <0.05 is significant statistically.

RESULTS

In this study, the age mean of participants in valerian was 23.9±4.81 and in lavender group 23.83±4.4 and in placebo group 24.75±4.51. According to variance analysis test, there was no significant difference in the age of three groups (Table 1). The evaluation of other individual and social characteristics (Table 1) based on Chi-square test showed that body mass index, job, income and ethnicity were similar in three groups. Also, evaluation of midwifery characteristics (mother-infant) including gestational age, pregnancy as good experience, miscarriage and dysmenorrhea history were similar based on chi-square test in three groups ($P<0.05$).

The midwifery properties (mother-infant) showed (Table 1) that about half of participants had Gestational age (based on LMP) between 37-39 weeks. More than half of born infants were boy. Except 4 participants, all mothers stated pregnancy as a good experience. Lower than 10% of participants received previous information about labor. Miscarriage history in three groups was less than 10% and about half of mothers had dysmenorrhea. Chi-square didn't show significant difference in midwifery properties (mother-infant) of three groups ($P<0.05$).

The infant apgar in the first and fifth minutes, age mean and infant weight were similar in three groups (Table 2). The frequency of infant admission in infants ward was two infants in each group. The frequency of type of delivery showed that lavender and placebo groups had no vaginal delivery without episiotomy. But vaginal delivery with episiotomy in lavender group was 97.9 and caesarian delivery in placebo group was 10.6%. There was no significant difference in the type of delivery in three groups (Table 2). The results of exact Fisher's test didn't show significant difference in terms of frequency distribution of partograph curve and side-effects among the studied groups.

Table 1- The individual and social characteristics and midwifery properties (mother-infant) in the studied groups

Midwifery characteristics (Mother-infant)					Individual and social characteristics				
P value	Placebo (n=47)	Lavender (n=47)	Valerian (n=47)		P value	Placebo (n=47)	Lavender (n=47)	Valerian (n=47)	
	Gestational age based on LMP (week)				0.13*	24.7 (4.5)	22.8 (4.40)	23.9 (4.81)	Age (year)
	(12 /8)6	(14.9)7	(8.5)4	37				BMI	
0.130	(51.1)24	(68 /1)32	(61.7)29	37–39		0 (0)	0 (0)	0 (0)	<18.5
	(36 /2)17	(17)8	(29.8)14	40–41	0.402	3 (6.5)	5 (10.9)	3 (6.4)	18.5-24.9
	Infant gender					21 (45.7)	25 (54.3)	25 (53.2)	25–29.9
0.172	(34)16	(53.2)25	(42.6)20	Girl		22 (47.8)	16 (34.8)	19 (40.4)	≥30
	(66)31	(46 /8)22	(93.6)27	Boy				Education	
	Pregnancy as a good experience					4 (8.5)	5 (10.6)	3 (4.3)	Primary
†1	(97.9)46	(97.9)46	(95.7)45	Yes		10 (21.3)	17 (36.2)	9 (19.1)	Guidance
	(2.1)1	(2.1)1	(4.3)2	No	0.011	20 (42.6)	12 (25.5)	14 (29.8)	High school
	Receiving previous information about delivery					6 (12.8)	10 (21.3)	14 (29.8)	Diploma
†0.384	(6.4)3	(12.8)6	(4.3)2	Yes		7 (14.9)	3 (6.4)	8 (17.0)	Academic
	(93.6)44	(87.2)41	(95.7)45	No					Job
	Miscarriage history				†0.731	45 (95.7)	45 (95.7)	43 (91.5)	Homemaker
†0.731	(8.5)4	(4.3)2	(4.3)2	Yes		2 (4.3)	Yes	4 (8.5)	Employed
	(91.5)43	(95.7)45	(95.7)45	No			Adequacy of monthly income		
	Dysmenorrhea history					3 (6.4)	0 (0)	1 (2.1)	Inadequate income
	(10.6)5	(14.9)7	(14.9)7	Never	†0.488	28 (59.6)	33 (70.2)	32 (68.1)	Average income
0.330	(6.4)3	(21 /3)10	(12.8)6	Rarely		16 (34)	14 (29.8)	14 (29.8)	Adequate income
	(29.8)14	(19.1)9	(17)8	Often Severe					Ethnicity
	(53.2)25	(44.7)21	(55 /3)26	Always severe	0.200	38 (80.9)	37 (78.7)	37 (78.7)	Azeri
						9 (19.1)	10 (21.3)	10 (21.3)	Kurdish

P value of chi-square test † *Fisher test* **one-way variance analysis*

Table 2- The comparison of infant outcomes and infants characteristics, delivery type, partograph curve, side-effects in the studied groups

P value	(n=47)Placebo	(n=47) Lavender	(n=47) Valerian	
				Infant outcomes and infants characteristics
0.859‡	8.68 (0.70)	8.75 (0.65)	8.75 (0.61)	† Infant apgar in the first minute
0.621‡	9.73 (0.58)	9.75 (0.65)	9.83 (0.44)	†Infant apgar in the fifth minute
0.823‡	39.12 (0.98)	39.04 (1.22)	39.17 (1.05)	Infant age †
0.324‡	3421.28 (412.81)	3298.94 (37.49)	3346.81 (403.71)	Infant weight†
[1]	2 (4.3)	2 (4.3)	2 (4.3)	*Infant admission in infants ward
				*Delivery type
	0(0)	0(0)	2(4.3)	Vaginal without episiotomy
0.118†	42(89.4)	46(97.9)	44(93.6)	Vaginal withepisiotomy
	5(10.6)	1(2.1)	1(2.1)	Cesarean section
				*Partogrpah curve
	4 (8.5)	11 (23.4)		Left side of lineAlert
	43 (91.5)	36 (76.6)		And Alertbetween Action
	0 (0)	0 (0)		Right side of lineAction
				*Side effects
	46 (97.9)	44 (93.6)		Natural
	1 (2.1)	3 (6.4)		More than natural

*Fisher's test† variance analysis‡Frequency (%) *†Mean (SD)*

Table 3- The comparison of the mean of active phase duration of three participant groups

P value*	(n=47)Placebo Mean (SD)		(n=47)Lavender Mean (SD)		(n=47)Valerian Mean (SD)		Groups
<0.001	338.9(53.0)		298.7 (53.4)		233 (67.8)		Active phase duration
	Valerian with lavender		Lavender with placebo		Valerian with placebo		
	P value	MD(95%CI)#	P value	MD(95%CI)#	P value	MD(95%CI)#	
	<0.001	-65.6 (-94.2 تا -37.0)	0.003	-40.2 (-to68.8 -11.6)	<0.001	-105.8 (-to134.4–77.2)	Active phase duration

*P value*variance analysis* *P valueTukey test* *#Mean difference (confidence interval 95%)*

The evaluation of active phase of delivery in the study groups according to variance analysis (Table 2) showed that the mean active phase duration on labor had significant difference in three groups ($p<0.001$). The pairwise comparison of groups in accordance to Tukey test showed that valerian group significantly had lowest active phase in three groups ($p<0.001$). Lavender was significantly lower than placebo group ($P<0.003$).

DISCUSSION

The age mean of patients in valerian group was 23.9±4.81, lavender 22.83±4.40 and in placebo group 24.75±4.51. The weight mean of mothers in lavender group was 76.54±10.13 and in placebo group 9.88±77.64. In the studied group, about half of mothers had BMI of 25-29.9. The highest percent of people in terms of education in high school was about 90% of homemakers and 80% of mothers were Azeri ethnicity. More than half of participants in three groups were at 37-39 weeks of gestational age. About 95% of participants in both groups mentioned pregnancy as a good experience. 45 participants (97.5%) of valerian group, 41 participants (87.2%) of lavender group and 44 (93.6%) of placebo group believed that they didn't receive information about delivery before. Also, about 90% of participants in both groups had vaginal delivery with episiotomy. 2 participants (4.3%) of valerian, 2(4.3%) of lavender and 4(8.5%) of participants of placebo group had miscarriage history. About half of people in three groups had dysmenorrhea always. In the present study, active phase duration on labor in the studied group in variance analysis in three groups had significant difference ($p<0.001$). The pairwise comparison of groups in accordance to Tukey test showed that valerian group significantly had the lowest active phase in three groups ($p<0.001$). Lavender group was significantly lower than placebo group ($P<0.003$).

Nemati showed that lavender aromatherapy in active phase on labor was useful on pain reduction (29). Burns et al. showed that lavender aromatherapy showed shortening active phase on labor and increased satisfaction of this method (16). Mohammadkhani et al. in a study on 90 Nulliparous women shoed that active phase on labor in massage group was 321±2.52 minutes and in massage with almond oil 349±2.81 and in aromatherapy group 245±1.95 minutes. In aromatherapy group, it was significantly less than two other groups (22). Pirak et al. showed that active phase on labor in lavender was 170±91.07 and in control group 181.5±93.6 minutes and independent t-test didn't show significant difference among two groups (23). In the study of Ahmadi et al., the length of first and second phase of delivery in aromatherapy group with lavender was shorter than that of control group (24). Another study showed that in women using bath for 31 min in first phase of labor using lavender, labor progress was better and anti-medications were lower significantly (25). All the mentioned studies were consistent with the results of present study. In this paper, first phase duration in lavender was significantly lower than that of placebo group. Aromatherapy is effective on sense of smell and by adjusting neurotransmitters of smelling and the effect on limbic system and increasing feelings in a person can reduce pain (30). Lavender consists of alcohol linalool, ketone, esters and Aldehydes and the ketones reduce pain and we can sleep easily (31). Linalool in lavender inhibits acetylcholine release and alters ion channel function at the neuromuscular junction and as linalyl acetate has a narcotic function and linalool acts as a sedative factor, this justifies using this plant as a sedative traditionally (32).

It seems that lavender aromatherapy by stimulating smelling sense affects hypothalamus and reduces corticotropin-releasing hormone and then adrenocorticotropic secretion is reduced from pituitary glandand reduces cortisol secretion from adrenal gland (33).Perhaps, aromatherapy mechanism is as activating environmental neural receptors reducing anxiety and fear of mothers and increasing endorphins, reducing pain and secretion of catecholamine and increased uterus contractions of reducing catecholamine and this also reduces labor duration (34, 35).

In the study of Alavi et al., the effect of lavender aromatherapy had no impact on the first and second phases duration (36) and this is not consistent with the result of present study. This inconsistency is regarding the sample size**,** age mean and the method of using aromatherapy and its length.

One of the important results of this study is the effect of valerian on reduced active phase as this reduction is considerable compared to that of lavender. The study on the impact of valerian on different phases of delivery was not considerable and its effect on active phase was studied for the first time.

Gilani et al. showed that valerian extract had antispasmodic effects on smooth muscle of the rabbit and guineapig ileum and jejunum. Valerian inhibited contractions of smooth muscle (ileum and jejunum) resulting from cellular depolarization because it opened potassium channels and blocked calcium channels. When potassium channels are opened, the intracellular calcium concentration decreases, which in turn relaxes muscle (26). Antispasmodic effects

on smooth muscle of the ileum have also been demonstrated for valtrate, isovaltrate, and valranon, the active ingredients in valerian root (37).Occhiuto et al., (2009) showed the relaxant and antispasmodic effect of valerianextract on the uterus of non- pregnant women who had a hysterectomy. In this study, the effect of valerian extracts on spontaneous and agonist-induced contractions was studied. Valerian extracts and valepotriates inhibited uterine contractility in a concentration-dependent manner (27).

Andreatini et al evaluated the effect of valerian on anxiety disorder as arandomized placebo-controlled pilot study in which the similar sedative effect of valerian with Diazepam was achieved (28). MIrabi et al., (39) and Jenabi et al., (40) showed the effect of valerian root on reduction of early dysmenorrhea. There has been no study regarding the effect of valerian aromatherapy on active phase but all above studies supported the anti-spasmodic and relaxant properties of valerian, also it is used to relieve anxiety and fear. Based on the results of current study, valerian had better impact compared to lavender on reduction of active phase. It is proposed to evaluate complete studies of the effect of valerian on different phases of delivery by applying various methods of using this plant.

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