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Effect of Inhalation of Aroma of Geranium Essence on Anxiety and Physiological Parameters during First Stage of Labor in Nulliparous Women: a Randomized Clinical Trial

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ABSTRACT

Introduction: Anxiety increases significantly during labor, especially among nulliparous women. Such anxiety may affect the progress of labor and physiological parameters. The use of essential oils of aromatic plants, or aromatherapy, is a non-invasive procedure that can decrease childbirth anxiety. This study examined the effect of inhalation of the aroma of geranium essential oil on the level of anxiety and physiological parameters of nulliparous women in the first stage of labor.

Methods: In study, was carried out on 100 nulliparous women admitted to Bent al-Hoda Hospital in the city of Bojnord in North Khorasan province of Iran during 2012-2013. The women were randomly assigned to two groups of equal size, one experimental group (geranium essential oil) and one control (placebo) group. Anxiety levels were measured using Spielberger's questionnaire before and after intervention. Physiological parameters (systolic and diastolic blood pressure, respiratory rate, pulse rate) were also measured before and after intervention in both groups. Data analysis was conducted using the x^2 test, paired t-test, Mann-Whitney U test, and Wilcox on test on SPSS 11.5.

Results: The mean anxiety score decreased significantly after inhalation of the aroma of geranium essential oil. There was also a significant decrease in diastolic blood pressure.

Conclusion: Aroma of essential oil of geraniums can effectively reduce anxiety during labor and can be recommended as a non-invasive anti-anxiety aid during childbirth.

Introduction

During labor, the level of anxiety increases significantly, especially among nulliparous women. This can affect normal muscle contractions in response to changes in the sympathetic nervous system and may increase physiological parameters, resulting in higher oxygen demand. If anxiety persists, it can cause maternal and fetal hypoxia.[1]

Relaxation techniques, specific breathing patterns, listening to music, and complementary medicine are the most common non-pharmaceutical and non-invasive procedures used to help reduce anxiety during labor. Complementary medicine as an effective non-pharmacological method has increased in recent years.[2] Complementary and alternative medicine comprises a wide range of health care practices, products and therapies that includes the use of medicinal plants and their essences,[3] and

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aromatherapy.[4] Studies have shown that aromatherapy can reduce anxiety in patients undergoing coronary angiography, dentistry, and in menstruation-related anxiety.[5-7] Tahmasbi et al., reported that aromatherapy can effectively reduce anxiety and the physiological parameters of blood pressure, pulse and respiratory rate in patients undergoing angiography.[7] Essential oils of aromatic plants have also been used to control anxiety and stress during labor; however, the number of studies is limited, their outcomes inconsistent, and the number of essential oils studied limited. Mirzaei et al., found herbal essential oils useful in reducing anxiety during labor[8], Hur et al., reported that aromatherapy had no effect on reducing anxiety levels during childbirth.[9]

Pelargonium graveolens (rose geranium) is an herbaceous plant in the genus Geranium with a height of 40-100 cm having a scent resembling that of roses.[10] Apart from its pleasant aroma, geranium essential oil has anti-inflammatory, antidepressant, sedative, anxiety-reducing, and muscle-relaxing properties.[11] It also facilitates blood circulation and eases breathing.[4] Kim et al., reported that geranium essential oil is one of the most effective herbal essences for reducing menstrual-related anxiety.[5]

The general effect of aromatherapy in reducing anxiety during childbirth has not been comprehensively explored. The present study examined the effect of inhalation of the aroma of geranium essential oil on the level of anxiety and physiological parameters of nulliparous women in the first stage of labor.

Materials and methods

This study was conducted as a randomized clinical trial. The study population comprised all nulliparous women admitted to the maternity ward of Bint al-Hoda Hospital in the city of Bojnordin, North Khorasan province, Iran from August 2012 and 2013.

The inclusion criteria used were: being nulliparous**,** being full-term pregnant**,** being 18 to 35 years of age**,** showing cervical dilatation measuring 3-5 cm on vaginal examination, no history of or current chronic diseases (such as hypertension (≥140/90 mmHg), migraine, epilepsy, and asthma), absence of olfactory impairment, no allergies or previous unpleasant experiences to specific scents, no use analgesic or anxiolytic medicine for at least 3 h before the onset of intervention, no symptoms of fetal distress or high risk pregnancy. Exclusion criteria were lack of desire to continue, symptoms of fetal distress or disturbance during labor, any use of analgesics during the intervention.

The size of the groups (50 each) was determined from a preliminary study at a 95% confidence interval (80% power, variance of 6) with a clinically-acceptable rate difference of 3 and replacements in the formula of averages for comparison. To prevent duplicate samples and unwanted effects of geranium essential oil on the control group, only one type of intervention was applied to any one patient (geranium essence or placebo) during a single work shift in a single day. Similar envelopes used for both treatment groups to randomize allocation during each work shift.

Pelargonium graveolens, is a rose-scented species of the genus Geranium. The 2% concentrated essential oil was extracted and prepared by the Medicinal Plants Research Center of North Khorasan. The extraction process was done using a Clevenger hydro distillation device on the aerial parts of the pelargonium graveolens. The extracted oil was kept in a refrigerator in appropriate air-tight opaque containers.

The Ethics Committee granted permission for the study and issued a letter of referral to North Khorasan University of Medical Sciences in 2012. The sampling phase then began at Bint-al-Hoda Hospital. After preliminary selection based on the aforementioned inclusion criteria, all

qualified individuals completed a written consent form along with a demographic questionnaire. Some patients who did not meet study eligibility requirements asked to participate in the study. Out of ethical considerations, their requests were not denied, but their respective data was excluded from final analysis. Two drops of 2% concentrated geranium essential oil and the equal amounts of distilled water were used for the experimental and control groups, respectively. The essences were dropped onto similar odorless non-absorbent pieces of fabric attached to the participant's collar. Upon measurement of cervical dilatation of 3-5 cm and in the intervals between contractions, the anxiety level and physiological parameters of systolic and diastolic blood pressure, pulse and respiratory rate were recorded before and 20 min after intervention for all participants. This period (20 min) was chosen because the olfactory receptors of participants became insensitive to inhaling the aroma of the undiluted essential oils at the bedside by 20 min after intervention.[12] During the examinations, blood pressure was always measured using the same device on the same arm. Respiratory and pulse rates were counted during a 1 min interval.

Spielberger's State-Trait Anxiety Inventory (STAI) was used to determine the level of anxiety of the participants.[8,13] STAI questionnaires consist of 40 questions; in the present study, only the first 20 questions focusing on anxiety were used. Scores of between 20 and 80 were recorded for questions about state anxiety. STAI is a popular anxiety measurement questionnaire[2,14] and Spielberger's validity is approved for use in Iran.[2] The reliability of the Spielberg state anxiety questionnaire as assessed by Cronbach's alpha at α= 0.90.

Blinding was not possible in this study because of the diffusion of oil molecules in the air. During the study, 2 participants in the control group and 1 participant in the experimental group were unwilling to continue; therefore, final analysis was based on 97 participants (Figure 1).

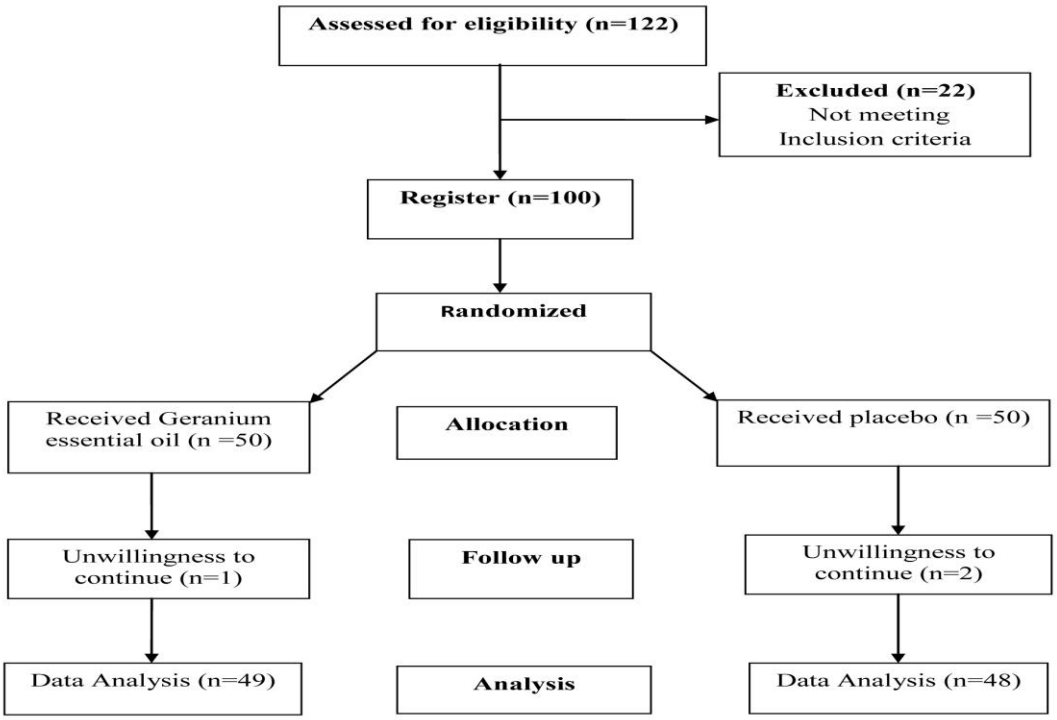

Figure 1. Consort flow chart of participants

Data analysis was conducted using the x^2 test, paired t-test, Mann–Whitney U test, and Wilcox on test on SPSS 11.5. In all calculations, P<0.05 was considered to be significant.

Results

There were no significant differences between the experimental and control groups in terms of the demographic characteristics of age, education level, employment status, spouse employment status and fetal gender (Table 1).

The Kolmogorov-Smirnov test was used to evaluate the normality of the main variables measured pre-test and post-test. For normal variables, parametric tests were used and, for non-normal variable, nonparametric tests were used.

Table 1. Compared demographic characteristics in the Geranium and control groups

Variables	Geranium group	Control group	P
Age (year)	23 (7)*	21 (5)*	0.06†
Level education (%)			
Illiterate	2 (4.1)	2 (4.2)	0.06**
Less than diploma	17 (34.7)	29 (60.4)	
Diploma	22 (44.9)	9 (18.8)	
Higher than diploma	8 (16.3)	8 (16.7)	
Fetal sex (%)			
Male	24 (49)	21 (43.8)	
Female	25 (51)	27 (56.2)	0.6**
Woman employment status (%)			
Housewife	44 (89.8)	42 (87.5)	
Employed	3 (6.1)	3 (6.2)	0.88**
Student	2 (4.1)	3 (6.2)	
Spouse employment status (%)			
Self - employed	28 (57.1)	26 (54.2)	
Workman	12 (24.5)	14 (29.2)	
Staff	6 (12.2)	3 (6.2)	0.54**
Unemployed	1 (2)	0 (0)	
Farmer	1 (2)	4 (8.3)	
Student	1 (2)	1 (2.1)	

*Middle (interquartile range),†Mann-Whitney U test,**Chi-square test

In the experimental group, mean anxiety scores before and after intervention were 56.75 (9.9), 52.73 (11.7), respectively, which showed a significant decrease (P =0.001) in state anxiety. In the placebo group, mean anxiety scores before and after the intervention were 53.45 (6.1) and 52.31 (6.2), respectively, which also showed a significant decrease (P =0.003). Anxiety levels before and after intervention showed differences of -4.02 and -1.14 for the experimental and control groups, respectively.

Table 2 shows that there were no significant differences in the physiological parameters measured, except for diastolic blood pressure, which changed significantly between groups (P <0.05) after the intervention.

Discussion

Aromatherapy during childbirth is a safe and non-invasive method of easing anxiety. Burns et al., reported that the use of aromatherapy during labor produced no significant differences in neonatal or maternal outcomes such as caesarean section, vaginal delivery and vacuum use.

Table 2. Intra-group comparison of anxiety level and physiological parameters before and after receiving the Geranium essential oil with control group

Variables	Before MD (SD)**	After MD (SD)**	P
Geranium group			
Anxiety	56.75 (9.9)	52.73 (11.7)	0.001*
Systolic blood pressure (mmHg) ***	110 (20)	110 (12)	0.08†
Diastolic blood pressure (mmHg) ***	70 (10)	70 (10)	0.005†
Pulse rate*	84 (9)	82 (8)	0.056†
Respiration rate*	18 (4)	18 (4)	0.52†
Control group*			
Anxiety*	53.45 (6.1)	52.31 (6.2)	0.003*
Systolic blood pressure (mmHg) ***	100 (10)	100 (18)	0.28†
Diastolic blood pressure (mmHg) ***	65 (10)	60 (20)	0.03†
Pulse rate*	80 (16)	80 (10)	0.13†
Respiration rate*	16 (4)	16 (4)	0.79†

* Paired test, **Mean (Standard deviation), *** Middle (interquartile range), † Wilcoxon test

On the other hand, the numbers of infants hospitalized in the NICU was lower for the aromatherapy treatment group;[15] moreover, mothers and midwifes generally approve of the use of aromatherapy during childbirth.[16]

The present study showed that state anxiety (anxiety during labor) decreased over that for the control group. Diastolic blood pressure (as a physiological parameter) decreased significantly after inhalation of the aroma of geranium essential oil. No similar study has been found that used this particular essence. Mirzaei et al., examined the effects of inhalation of the aroma of lavender essence under similar conditions. They concluded that anxiety decreased significantly in the experimental group.[8] Tafazoli et al., reported similar results using herbal essential oil.[2] Their study investigated both state and trait anxiety, whereas the present study investigated only state anxiety, which better reflects anxiety in a specific situation. The results of these studies are consistent with those of the present study. Hur et al., evaluated the effects of aromatherapy on anxiety during labor in nulliparous women and found no difference in anxiety levels.[9] The reason for this inconsistency could related to differences in the intervals used to evaluate state anxiety using the STAI.

Of the physiological parameters used in the present study, only diastolic blood pressure showed a significant decrease. Mirzaei et al., investigated additional physiological parameters of systolic and diastolic BP and heart rate after intervention and reported no significant change in theseparameters.[8] Kim et al., examined the effects of aromatherapy using different essences including geranium oil on the first clinical experience of nursery students to intravenous injection. They reported that of the parameters of systolic and diastolic BP and pulse rate, only pulse rate had showed a significant decrease.[14] The different and sometimes inconsistent reports on changes in physiological parameters that have been reported (including this one) may relate to the type of essence, its concentration, the duration of inhalation, precision of measurement and of the equipment used. The decrease in anxiety in the control group in this study could be the influence of the physical presence of the investigator during study and the ongoing care and monitoring during that period, which was likely to reassure patients and reduce anxiety in the

control group. It must be noted that these factors held true for both the intervention and control groups. Although the influence of these factors could account for part of the result in the intervention group, this group showed a greater decrease in anxiety with appears to relate to the use of aromatherapy using geranium essential oil.

One limitation of this study was the impossibility of blinding because of the diffusion of oil molecules into the environment

Conclusion

There is a clear advantage to inhalation of aroma instead of applying the oil to the skin of the patient. Application risks irritation for individuals with sensitive skin and patients may be disinclined to apply a substance to their skin during labor. The results of this study along with the pleasant aroma of geranium essential oil means aromatherapy using geranium essential oil during labor is an effective method of reducing state anxiety.

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Ethical issues

None to be declared.

Conflict of interest

The authors declare no conflict of interest in this study.

References

1. Abbasi Z, Abedian Z, Fadayi A, Esmaeil H. Effect of massage on physiologic responses on primiparous women. The Horizon of Medical Sciences 2007; 13 (1): 28-33.
2. Tafazoli M, Zaremobini F, Mokhber N, Emami A. The Effect of Lavender oil Inhalationon the level of anxiety during first atge of labor in primigravida women. Fundamentals of Mental Health 2011; 13 (48): 721-6.
3. Berek JS. Berek & Novak's gynecology. 14th ed. Phila delphia: Lippincott Williams & Wilkins; 2007.
4. Firoozi M. Aromathrapy and massage for mother and child. Mashhad: Sokhangostar puplication; 2004. (Persian).
5. Kim YJ, Lee MS, Yang YS, Hur MH. Self-aromatherapy massage of the abdomen for the reduction of menstrual pain and anxiety during menstruation in nurses: a placebo-controlled clinical trial. European journal of integrative medicine 2011; 3 (3): e165-e8. doi:10. 1016/ j.eujim. 2011.08.007.
6. Lehrner J, Marwinski G, Lehr S, Johren P, Deecke L. Ambient odors of orange and lavender reduce anxiety and improve mood in a dental office. Physiol Behav 2005; 86 (1-2): 92-5. doi:10.1016/j.physbeh.2005. 06.031
7. Tahmasbi H, Mahmoodi G, Mokhberi V, Hassani S, Akbarzadeh H, Rahnamai N. The impact of aromatherapy on the anxiety of patients experiencing coronary angiography. Zahedan Journal of Research in Medical Sciences 2012; 14 (3): 51-5.
8. Mirzaei F, Keshtgar S, Kaviani M, Rajaeifard A. The effect of lavender essence smelling during labor on cortisol and serotonin plasma levels and anxiety reduction in nulliparous women. Journal of Kerman University of Medical Sciences 2009; 16 (3): 245-54.
9. Hur MH, Cheong N, Yun H, Lee M, Song Y. Effects of delivery nursing care using essential oils on delivery stress response, anxiety during labor, and postpartum status anxiety. Taehan Kanho Hakhoe Chi 2005; 35 (7): 1277-84.

10. Mohamadi B. Herbal essential oil and their healing effects. Tehran: Nooredanesh Publication; 2002. (Persian).
11. Sulong MF. Extraction of essential oil from jasmine flower using solvent extraction method. [Thesis]. Malaysia: Faculty of Chemical & Natural Resources Engineering, Universiti Malaysia Pahang; 2006.
12. Kanany M, Mazloum R, Emami A, Mokhber N. Lavender essential oils fragrance therapeutic effect on anxiety of patients undergoing hemodialysis. Journalof Nursing and Midwifery, Mashhad 2011; 10 (3-4): 63-71.
13. Sangestani G, Khatiban M, Pourolajal J, Oshvandi Kh. Influence of Doula on the Primiparous Parturients Anxiety in the Delivery Ward. Hayat 2013; 19 (4): 48-60.
14. Kim M, Hwangbo HH. Randomized trial evaluating the aroma inhalation on physiological and subjective anxiety indicators of the nursing students experiencing the first intravenous injection. International Journal of Bio-Science and Bio-Technology 2010; 2 (4): 1-9.
15. Burns E, Zobbi V, Panzeri D, Oskrochi R, Regalia A. Aromatherapy in childbirth: a pilot randomised controlled trial. BJOG 2007; 114 (7): 838-44.doi: 10.1111/j. 1471-0528. 2007. 01381.x
16. Brown ST, Douglas C, Flood LP. Women's evaluation of intrapartum nonpharmacological pain relief methods used during labor. The Journal Of Perinatal Education 2001; 10 (3): 1-8. doi: 10.1624/ 1058 12 401 x88273.

