The Effect of Lavender Aromatherapy on the Pain Severity of Primary Dysmenorrhea: A Triple-blind Randomized Clinical Trial

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Abstract

Background:

Primary dysmenorrhea is the most common complaint in adolescents and adult young women that disturbs their daily life performance.

Aim:

The current study investigated the effect of lavender aromatherapy on pain severity in primary dysmenorrhea.

Subjects and Methods:

This triple-blind randomized clinical trial was conducted on 200 students of Ardabil University of Medical Sciences, Iran. Subjects were allocated randomly into intervention (lavender) and control (placebo) groups. The researcher assistant asked the participants to smell the lavender in the first 3 days of menstruation, 30 min in a day in two menstrual cycles. Control group was also administered placebo (diluted milk) to be used as lavender in treatment group. Pain severity was scored by visual analog scale in the first 3 days of menstruation before intervention and 2 months after intervention. Data were analyzed through descriptive statistics and independent and paired samples t-tests.

Results:

There was a significant difference in average pain severity between treatment and control groups after intervention. However, students in the treatment group reported significantly less pain severity 2 months after intervention ($P < 0.01$).

Conclusion:

Using lavender aromatherapy for 2 months may be effective in decreasing the pain severity of primary dysmenorrhea.

Keywords: Aromatherapy, Lavender, Menstruation, Pain, Primary dysmenorrhea

Introduction

Primary dysmenorrhea is the most common gynecologic complaint in adolescent and young women, and it is linked to the biological cycle of ovulation.[1,2] About 75% of women experience primary dysmenorrhea during their fertility period.[3] Berk reported the prevalence of primary dysmenorrhea as 60%,[4]

It has been estimated that 7–15% of women suffer from severe pain which causes disturbances in their performance for 1–3 days in a month,[5] and 14–52% of female students miss school because of complaining dysmenorrhea.[6] This issue is associated with decline in career and educational function and results in disturbed quality of life and emerging economic problems.[7] Various reasons have been proposed for primary dysmenorrhea such as progesterone reduction in the final stages of luteal phase that causes lissome rupture and subsequent release of A2 phospholipase of the endometrium. Origin of increasing phospholipase is prostaglandin that causes retraction of uterine muscles vessels which finally result in ischemia and pain.[8] However, mild physical activities, proper diet, relaxation, massage, biofeedback techniques, some Yoga exercises, contraceptive pills, and nonsteroidal anti-inflammatory drugs such as mefenamic acid and ibuprofen are recommended for decreasing the pain of primary dysmenorrhea.[9,10] Since most of the drugs utilized for controlling the pain of dysmenorrhea have various side-effects and also are expensive, most of the nonpharmacological methods are in the category of complementary medicine for this disorder. The use of nonpharmacological methods such as aromatherapy, massage, acupuncture, and acupressure are also having been popular in the recent years.[11]

Traditionally, aromatherapy has been used as one of the nonpharmacological methods for reducing the symptoms of dysmenorrhea, releasing uterine cramps, and decreasing the pain and anxiety after childbirth.[12]

However, a common complementary drug which has been used in aromatherapy is lavender that belongs to the Mediterranean region and it is found in Africa and India.[13] Lavender is just a little herbaceous plant with narrow and long leaves, covered by white cottony fluff and purple flowers and is in the form of a spike. Its essence is made from distilling flowers from blossoming plants, and its muscle relaxant and antispasmodic effects have been confirmed by many studies.[14,15] Some studies suggest lavender and its main extract such as linalool acetate and linalool had topical analgesic effects on laboratory animals,[16] which is made by increasing regional perfusion.[17] Results of studies supporting aromatherapy suggest that essential oils stimulate the receptors in the olfactory bulb and transfer the message of olfaction to limbic system and cause releasing endorphin, encephalin, and serotonin, which results in the sense of relaxation and stress reduction.[18]

About the prevalence of the primary dysmenorrhea and the side effects of the current treatments and because of lack of similar studies in this field, we decided to perform a study on the female students in dormitories of Ardabil University of Medical Sciences with the aim of determining the effect of lavender aromatherapy on the pain severity in primary dysmenorrhea.

Subjects and Methods

This study, a triple-blinded randomized clinical trial, was done on 200 female students who had primary dysmenorrhea settled in the dormitories of Ardabil University of Medical Sciences in 2013. According to the population of female students at the medical university dormitories that 420 of them had dysmenorrhea, The number of samples is determined using a formula sample size was estimated 200 people. The inclusion criteria were being single, age range 20–30-year-old, onset of menstrual pain before the age of 20, having regular menstruation cycles with 21–35 days interval, menstrual bleeding without clots disposal (low and medium bleeding), onset and duration of menstrual pain several hours before bleeding to maximum 5th day of menstruation, and having dysmenorrhea.

Whereas exclusion criteria were very severe and intolerable dysmenorrhea that limits activities and not controllable by medicine, onset of menstruation pain after 20-years-old, having chronic disease (diabetes, hyperthyroidism, and hypothyroidism), previous allergy to medicinal plants, pelvic inflammatory disease and pelvic mass, gynecologic surgery (cyst, tumor, and pelvic adhesions), unwillingness to participate in the study, and occurrence of any allergies during study.

Sampling has been conducted by the cluster sampling method in female dormitories of Ardabil University

of Medical Sciences, but placement in groups was done by a simple random method through randomized blocks of four and six. After listing all possible four and six blockings and assigning their numbers, using True Random Number Generator software, Randomness and Integrity Services Limited, Ireland. Several blocks were selected till reaching to 200 subjects. There was no significant difference between two groups according to their demographic properties.

After approving this project by the research deputy of the Ardabil University of Medical Sciences, the researcher assistant started sampling in the dormitories and explaining the goals and research method and stressing on the autonomy of subjects for surrender from research in every stage of the study and confidentiality of obtained information, the students interested in taking part in the study were invited to sign the consent form to show their agreement for taking part in this study.

Afterward, subjects were embedded in two lavender (A) and diluted milk (B) groups. The researcher assistant expressed instructive guidelines on filling the questionnaire and quantifying the pain severity by using visual analog scale (VAS) to all the subjects. Both groups completed the questionnaire which included demographic characteristics and pain severity in the first cycle of menstruation (nonintervention cycle). After filling questionnaires, Groups A and B were offered a glass of 10 cc lavender essences and 10 cc diluted milk, respectively. Then, the subjects were asked for strew three drops of the solution to a piece of cotton and smell that for the first 3 days of menstruation, daily 1 time for 30 min in two continual cycles and complete the VAS in the first and second menstruation. None of the students had the need for more analgesics. Glasses with a same appearance in number from 1 to 200 were prepared by the pharmacological firm in Tabriz, Iran; and the researcher assistant and the subjects had no information about the content; also the statistical analyzer had no information about study groups. At the end of the sampling, the questionnaires were gathered and descriptive statistics done for calculating frequency, mean, and standard deviation. In addition, independent and paired t-tests and Chi-square were utilized to analyze data in SPSS version 21 (IBM, USA).

Results

The age range of subjects was 19–29-year-old, and 80% (160/200) of them were single. The average age of subjects at menarche was 13.0 (1.3) years. Eighty-five percent (170/200) of participants had dysmenorrhea for more than 4 years, 60% (120/200) had never used analgesics, and 76% (152/200) had intermediate bleeding according to their own disclosure.

The mean (and standard deviation) of pain severity in the treatment group has decreased after 1st and 2nd month, which was statistically significant ($P < 0.01$) [Table 1]. As well in the control group, the mean of pain severity has not been reduced in cycle-1, 7.06 (1.43) and cycle-2, 7.04 (1.33) after intervention [Table 1].

The mean difference in pain severity was not statistically significant between the two groups before the intervention (cycle-0), while it was significantly different in the 1st and 2nd month after the intervention ($P = 0.001$ and $P < 0.01$) [Table 2].

Discussion

The findings showed that lavender had a significant effect on primary dysmenorrhea and pain.

Aroma inhalation is effective for mental and physical stability, refreshing, and concentration. In this method, the essential oil is absorbed into the lung and blood through the nose.[18,19] Lavender is used as a sedative, anti-depressant,[20] anti-spasmodic,[19] anti-flatulent,[21] and also to treat infertility, infection, anxiety, fever, stress,[21,22] restlessness or colic in infants,[23] varicose ulcers,[24] and carpal tunnel syndrome.[25]

Amiri-Farahani et al. referred to the effect of massage with lavender oil and mint essence on decreasing the pain intensity of menstruation which showed a significant difference in pain intensity between groups.[26] Furthermore, Ou et al. in a research in 2012 reported aromatherapy with lavender, clary sage, and marjoram oils in a 2:1:1 ratio reduced pain intensity of dysmenorrhea, which was statistically significant ($P < 0.001$),[18] whereas aromatherapy with lavender did not decreased the pain of intrauterine device (IUD)

placement in the study of Shahnazi et al. in 2012.[27] These controversial findings maybe because of the duration of lavender essence inhalation, which was inhaled for 30 min in our research, while in the study of Shahnazi et al. the time was about 20 min. In addition, the reason of difference between the results may be due to different etiology and mechanism of pain in two studies (IUD and dysmenorrhea).

The study by Kane et al. also suggested that lavender essence can decrease the pain scores in changing wound bandage ($P < 0/05$).[28] Similarly, Han et al. compared the pain in the 1st and 2nd days just in one cycle of menstruation, in which the mean pain intensity in the group of aromatherapy with lavender, rose, and salvia was significantly lower than the group undergoing massaging with almond oil and the group without the intervention.[29] In addition, the study of Kim et al. on 100 patients in the Intensive Care Unit suggested massaging with lavender decreases the pain intensity about 50%.[30]

A study showed that lavender and linalool have antispasmodic effect and increase the local blood flow.[31] Moreover, Shokohi et al. studied the effect of lavender aroma in the pain of cesarean section; the results showed that treatment with lavender aroma has a significant effect on the pain of cesarean section compared to placebo.[32] In 2007, Kim et al. has done study with the title, "effect of treatment with lavender aromatherapy in the postanesthesia care unit on opioid requirements of morbidly obese patients undergoing laparoscopic adjustable gastric banding" that showed significantly more patients in the placebo group required analgesics for postoperative pain (82%) than patients in the lavender group (46%) ($P = 0.007$).[33]

This study had several limitations, including that there was a possible treatment bias (exceeding the recommended treatment duration) because the participants performed the self-inhalation freely following instructions. We should also acknowledge the limitation in use of the VAS for measuring pain severity. It has been reported that the VAS is difficult to use in clinical practice and has a higher failure rate than other scales including the verbal rating scale and the numerical rating scale.[34]

Conclusion

Findings showed the positive effect of lavender inhalation in reducing pain severity during menstruation. Because there were no side-effects reported by subjects, aromatherapy can be regarded as a safe and effective treatment for menstrual pain. Further randomized studies, using more objective measures, larger samples, and long-term follow-up are needed to verify self-aromatherapy massage's effects on menstrual pain and anxiety.

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Conflicts of interest

There are no conflicts of interest.

Acknowledgment

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Figures and Tables

Table 1

Pain intensity group	Cycle-0	1st month later	2nd month later	P* The difference cycle-0 and other months
Lavender	7.27 (1.24)	5.09 (1.02)	5.04 (1.01)	<0.001
Diluted milk	7.03 (1.04)	7.06 (1.43)	7.04 (1.33)	0.67

*Paired t-test analysis

The mean (standard deviation) of pain severity in two groups, before and after 1st and 2nd month of treatment

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Table 2

The time of study	Means difference (SE)	Df	t	P*
Cycle-0	0.06 (0.22)	198	1.923	0.72
1st month later (cycle-1)	1.57 (1.53)	198	6.23	0.001
2nd month later (cycle-2)	1.93 (1.87)	198	8.17	<0.001

*Independent t-test. SE: Standard error

Difference of pain severity between lavender and placebo groups over the study