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INVESTIGATING THE EFFECT OF CHAMOMILE ESSENTIAL OIL ON REDUCINGANXIETY IN NULLIPAROUS WOMEN DURING THE FIRST STAGE OF CHILDBIRTH

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ABSTRACT

Background and Purpose: Anxiety is the most common emotional reaction of women during childbirth. Nulliparous women experience severe anxiety during childbirth which will reduce the chances of vaginal delivery. According to the importance of reducing anxiety, this study aims to investigate the effect of chamomile essential oil on reducing anxiety in nulliparous women during the first stage of childbirth.

Methodology: This randomized clinical trial was performed on 130 nulliparous women (65 in intervention group and 65 in control group) who were qualified and referred to Abhar Emdadi Hospital. The anxiety level was measured in both groups at the beginning of the

study. In aromatherapy group, 2 drops of chamomile essential oil, and in control group, 2 drops of distilled water were spilled on sterile gauze.It was inhaled by the patients at a distance of 7-10 cm from their nose and prescription of aroma and distilled water was repeated every half hour. At first, the anxiety level was measured by using Spielberger questionnaire at dilatations of 3-4 and 8-10 cm. Samples weremonitoreduntil delivery and the baby's birth.The tools for data collection includedmidwifery and demographic information questionnaire, clinical observation and examination checklist, and Spielberg's questionnaire.Independent t-test, Mann-Whitney and Chi-Square tests were used to analyze the data collected. They were analyzed using SPSS 22.The significance level was considered 0.05.

Research Results: At baseline, both intervention and control groups had moderate anxiety. But after intervention, the anxiety level in intervention group at dilatations of 3-4 and 8-10 cm was respectively (46.12 ± 3.70) and (39 ± 3.70) which was significantly decreased ($P < 0.005$) in comparison with control group at dilatations of 3-4 and 8-10 cm which it was respectively (60.00 ± 4.3) and (61.24 ± 4.61).

Conclusion: The findings of this study showed that aromatherapy by chamomile essential oil reduces the anxiety level during childbirth; therefore, it is recommended in order to reduce anxiety.

Keywords: Chamomile, Anxiety, Complementary Medicine, Medicinal Plants, Aromatherapy

INTRODUCTION

Childbirth is one of the stressful events which mothers experience during their life (1). Anxiety is the most common emotional reaction of women during childbirth (2) which increases by 30 percent during pregnancy (3), and by 80 percent during childbirth (4). Anxiety leads to tachypnea, hyperthermia, arterial contractions (5), and increasing blood pressure and pulse rate (6). In response to stress, hormones such as catecholamine, cortisol, epinephrine, and beta-endorphin are released leading to smooth muscle contraction of arterial system, decreasing utero-placental blood circulation, increasing fetal heart rate abnormally (7), reducing uterine contractions and as a result disorders in childbirth process and prolonged labor (8), and finally instrumental and cesarean delivery. Anxiety can be treated in two ways including drug and non-drug treatment (9). Drug treatment comes with various complications such as fatigue, confusion, agitation (10), side effects and

drug dependence (11); therefore, non-pharmacological treatment of anxiety has recently been important. Aromatherapy is one of the non-drug treatments to reduce anxiety (12). It is done by essential oils extracted from plants. The extracted oils can be absorbed into the body through the skin or olfactory system (6). Aromatherapy is a simple, safe, inexpensive, and non-invasive way to improve physical, emotional, and psychological function (13). It is applied in many ways like topical use, inhalation, bathing and massage (14). Aromatherapy leads to relieving pain and relaxation and psychological health (6), and various studies have also shown that aromatherapy reduces anxiety level (15), (6), (14), (13). In a study conducted by Dhanyet al., in 2012, since aromatherapy has been used, use of other methods of sedation and anesthesia has been inconceivably reduced during childbirth. It leads to reducing anxiety inpatients (16). In a study conducted by Mirzaei, he concluded that inhalation of Lavender essential oil can reduce anxiety during laborand secretion of cortisol from the adrenal gland and increase the secretion of serotonin. Molaeinejad showed that aromatherapy can reduce anxiety, stress, and labor pain (17).

In 2012, Smith et al. found that there are various results about the effectiveness of aromatherapy on labor anxiety, and recommended more research (18). Chamomile is one of the plants used in aromatherapy which is a medicinal plant from Asteraceae family, and it is known as the star of medicinal plants. This plant is native to southern and eastern Europe and is found in Sardinia (19), Morocco (20), and Brazil (21).

Chamomile is an annual plant with fusiform roots and branching and climbing stems, long and narrow leaves with two or three parts and golden-yellow petals. It is 1.5 to 2.5 mm in length, with yellow-brown fruit. This plant grows at 2 to 20 degrees Celsius, and September is the most appropriate time of harvest (22). The use of chamomile as a medicinal plant dates back to the Ancient Greeks and Romans (23). Chamomile has been used as a traditional medicine since a long time ago because of its soothing effects. It has calming effects and chamomile essential oil can be well tolerated (11). FDA classifies Chamomile essential oil as a safe and secure herbal medicine (24). The main components of this plant are terpenoids, alpha-bisabolol, oxides, and azulenes such as chamazulene (25). Some of flavonoid ingredients of chamomile are as follows: Apigenin, Quercetin, Patuletin, Luteolin, and Glucosids. Apigenin is one of the active constituents of chamomile (23) which

bounds with benzodiazepine receptors and reduces GABA activity (11).

Anti-anxiety effects of Chamomile have been shown in animal models (26), (27), and (28). Its anti-anxiety effects have been shown in humans in several studies (11) and (15). Despite the widespread use of Chamomile for its calming effects, there no clinical trial on the effects of the Chamomile on labor anxiety. The exact mechanism of anti-anxiety effect of Chamomile has not been determined; however, there is some evidence showing that one or more flavonoids create anti-anxiety effects by acting on GABA, noradrenaline, dopamine and serotonin, or have an effect on the regulation of hypothalamic-pituitary-adrenocortical axis (11). Lorenzo et al., found that Chamomile inhibited the activity of monoamine oxidase in a laboratory mouse model (29) and its effects on temper has been proven (30). Chamomile has a positive effect on reducing anxiety in patients undergoing coronary angiography (15). In 2012, Amsterdam et al., conducted a randomized double-blind, placebo-controlled study to investigate anti-anxiety and anti-depressant effects of Chamomile in patients with symptoms of anxiety and depression. There were 57 participants who were investigated for 8 weeks based on Hamilton Anxiety Rating Scale (HARS). They were using capsules containing standardized Chamomile essential oil with 1.2 % Apigenin. This study showed that Chamomile has clinically significant antidepressant with anti-anxiety effects (30). A study performed by Burns et al., on 8058 mothers during labor; it was the greatest study on the use of aromatherapy in the health care sector and lasted 8 years, in which the effect of aromatherapy and its results were tested on midwifery care during labor. 10 types of essential oils including Chamomile as well as a base oil were used through skin absorption and inhalation. The results showed that aromatherapy is effective in reducing pain, anxiety, and fear during childbirth (31).

MATERIALS & METHODS

This study was a randomized clinical trial on two groups conducted on nulliparous women who referred to Abhar Emdadi Hospital (Zanjan, Iran) in 2013; it aimed to investigate the effect of Chamomile essential oil on reducing anxiety level in mentioned women. In this study, 130 samples were selected using the following formula (65 women in the intervention group and 65 women in control group).

$$n = \frac{2(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2 \delta^2}{(\mu_{1-} \mu_2)^2} = 65$$

$$\alpha = 0.05$$

$$\beta = 0.2$$

$$effect\ size = \frac{(\mu_1 - \mu_2)}{\sigma} = \frac{(5.79 - 5.1)}{1.32} = 0.52$$

Sampling was conducted from September to March in 2013. Inclusion criteria included the following features: 1. Nulliparous pregnant women, 2. Being Iranian, 3. age range of 18 to 35, 4. gestational age range of 37 to 42 weeks, 5. Having single and live fetus, without major anomalies, with cephalic presentation and normal weight of 2500-3400, 6. Mothers with normal pelvic organ and BMI, 7. Having ability to fill out the questionnaire, 8. Lack of hearing, olfactory, and mental disorders, acute and chronic neuropsychiatric diseases, acute and chronic pain such as migraine, 9. Mothers who have not received narcotics about 8 hours before active stage of labor, 10. Mothers who had no cesarean indications such as previous uterus surgery, placenta previa, cephalo pelvic disproportion, severe preeclampsia and fetal distress, 11. Mothers who had no history of allergy to Chamomile, 12. Mothers who had 3-5 contractions in10 minutes.

Exclusion criteria included the following features:

1. Having any kind of allergy to Chamomile and not being able to tolerate it, 2. If any disturbance in the childbirth process leads to bleeding or high blood pressure, or abnormal fetal heart rate, prolapsed umbilical cord, placenta abruption, prolonged PROM, lack of progress in labor, and argumentation of labor and decision on instrumental delivery and surgery or fetal meconium.

The researcher has referred to labor ward of Abhar Emdadi Hospital after determining the validity and reliability of the study, receiving ethics committee approval at No. 400/4013, registering it in Iranian Registry Clinical Trial Center at No. IRCT201308066807N7 and receiving a cover letter from Education and Research Deputy of Shahid Beheshti University of Medical Sciences. Then, women who agreed to participate in this study and were qualified were selected and enough explanations about objectives and groups were given to them. Written consent documents were collected from samples. Data collection tools in this study included midwifery and demographic information forms (including mother's age, gestational age, occupation, education, wanted pregnancy, receiving prenatal care), observation and examination checklist (including monitoring mother's vital signs in different dilatations, vaginal examination and determination of the Bishop score, measuring the severity and duration, of uterine contractions), and Spielberger Anxiety Inventory which contains 20 questions related to fleeting feeling of

excitement and categorizes the anxiety level between the lowest score of 20 and the highest score of 80. Individuals are divided into four groups (without anxiety (0-20), mild anxiety (21-40), moderate anxiety (41-60), and severe anxiety (61-80)).Validity of midwifery and demographic form was achieved through the content validity. Thus, the form was prepared according to sources and studies conducted; after correction by advising and consulting professors, it was given to ten faculty members of Shahid Beheshti School of Nursing & Midwifery. In this way, the necessary amendments based on the comments of faculty members and opinions of advising and consulting professors were considered. It was used after their confirmation.

Equivalent test was used to determine the reliability of observation and examination checklist. Thus, checklist was completed by the researcher and a teammate with similar experience and its correlation was determined 85%. Spielberger Anxiety Inventory is among the best known tools for measuring anxiety level; this questionnaire enjoys high validity and reliability and has been widely used in studies (32) & (33). Its reliability was determined using Cronbach's alpha coefficient (α = 0.8). The samples were assigned to case or control group according to days divided by pockets A and B; in the way that name of each of the intervention and control groups was written inside two pockets; and each day one of them was selected. Qualified nulliparous women were place in one of the aromatherapy with Chamomile and control groups in random days. Before starting, demographic questionnaire and observation and examination checklist were completed and the anxiety level was measured at baseline. Aromatherapy started in dilatation of 4 cm and the anxiety level was immediately measured after the start of aromatherapy. Aromatherapy continued to the end of the delivery. In Aromatherapy group, 2 drops of Chamomile essential oil were spilled on sterile gauze; it was inhaled by pregnant women at the distance of 7-10 cm. In this way, prescription of Chamomile essential oil was repeated in every specified dilatation rang one to three times every half hour. Chamomile essential oil was obtained from flowers' head by distillation devices. It is formed at the bottom of disc florets in Schizogenous secretory canals in spherical shape (34). The aromatic scent of this plant relates to volatile essential oil called Chamazulene (35). This plant contains aqueous extract 0.20 to 1.9 percent (22). In this study, the essential oil prepared from Shirazi Chamomile which was obtained by distillation, was the product of Zarband

Company. This product was known based on1.5 g of Chamomile essential oil per 100 products containing Sesame oil. Chemical compounds of Chamomile are as follows: phenolic compounds, primary flavonoids, Apigenin, Quercetin, Patuletin, and Glucosids. The main compounds include terpenoids, alpha-bisabolol, oxides, and azulenes such as chamazulene (25). Chamomile has anti-oxidant,, anti-anxiety, anti-microbial, anti-viral, anti-inflammatory, antiseptic, antispasmodic, and anti-bloat effect. It protects stomach, promotes healing of wounds (36), and is effective in treatment of nervous indigestion, motion sickness, and restlessness (37).

Two drops of distilled water were spilled on sterile gauze in control group. It was inhaled by the patients at a distance of 7-10 cm from their nose and prescription of aroma was repeated every half hour. The anxiety level was measured in dilatations of 3-4 and 8-10 cm. Samples were monitored until delivery and the baby's birth. Mother's vital signs, fetal heart rate, uterine contractions, and vaginal examination of individuals in both groups were measured and recorded. Independent t-test, Mann-Whitney, and Chi-Square tests were used to compare groups, and SPSS 22 was used to analyze the data collected. In all tests, the significant level and reliability coefficient were respectively considered 0.05 and 0.95.

RESULTS

In this clinical trial, the intensity of labor pain during first stage of labor was compared between two groups of women. In this study, 130 women were studied who were divided into two groups of 65 women. One mother in aromatherapy group and two in control group underwent emergency cesarean section due to problems in childbirth; however they were involved in the final analysis of data. In present study, the mean of gestational age in aromatherapy group was 39.307 ± 1.30, and 39.246 ± 1.23 in control group.

The mean of individuals' age in aromatherapy group was 25.58 ± 6.18, and 26.86 ± 5.82 in control group. The mean of Bishop Score before intervention in aromatherapy group was 11.61 ± 1.30, and 11.27 ± 1.23 in control group. The majority had elementary education (40 percent in aromatherapy group and 40.4 percent in control group). The majority were housekeepers (72.3 percent in aromatherapy group and 72.4 percent in control group). The majority had wanted pregnancy (89.2 percent in aromatherapy group and 90.8 percent in control group). Most of t hem had received prenatal care (75.4 percent in aromatherapy group and 73.8 percent in control group; there was no

significant statistical difference between two groups p = 0.840)). Most of them had received prenatal care in Health Center (67.3 percent in aromatherapy group and 52.9 percent in control group). According to the findings of the study, participants in both groups were similar due to interventional factors such as age (p = 0.462), education (p = 0.935), occupation (p = 0.945), gestational age (p = 0.375), Bishop Score (p = 0.429), wanted pregnancy (p = 0.770), receiving prenatal care (p = 0.229), and social status (p = 0.981).In relation to the purpose of this study; determination and comparison of anxiety level in nulliparous women, most of them in both groups had moderate anxiety at baseline (96.9 percent in aromatherapy group and 93.8 percent in control group) and 3.1 percent of women in aromatherapy group and 4.6 percent in control group had mild covert anxiety. In dilatation of 3-4 cm, most of women in aromatherapy group had moderate anxiety (95.4 percent in aromatherapy group), and (96.9) percent in control group had severeanxiety. In dilatation of 8-10 cm, most of participants in aromatherapy group had mild anxiety (73.8) percent, and (23.1) percent had moderate anxiety, but in control group, the majority had severe anxiety (95.9 percent) and (23.3) percent had moderate anxiety. No one had mild anxiety. Mann-Whitney test showed no difference in anxiety level between two groups of intervention and control at baseline (P = 0.947); however, there was a significant difference in dilatations of 3-4 cm (P = 0.0005), and 8-10 cm (P = 0.0006). Difference in anxiety scores (Table 3) between two groups showed that aromatherapy with Chamomile reduces anxiety level.

Table 1: Distribution of personal and midwifery information in nulliparous women in separate groups

Variable	Aromatherapy Group	Control Group	Result
	SD ± M	SD ± M	
Mother's Age (year)	25.58 ± 6.18	26.86 ± 5.82	P = 0.462
Gestational Age (week)	39.30 ± 1.30	39.24 ± 1.23	P = 0.379
Bishop score before intervention	11.61 ± 1.30	11.72 ± 1.23	P = 0.429
Duration of uterine contractions (second) in dilatation of 3-4 cm	22.92 ± 4.66	22.84 ± 4.2	P = 0.941
Duration of uterine contractions (second) in dilatation of 5-7 cm	25.66 ± 5.33	27.15 ±4.91	P = 0.112
Duration of uterine contractions (second) in dilatation of 8-10 cm	30.15 ± 4.14	31.53 ± 4.83	P = 0.120
Number of uterine contractions (in 10 minutes) in dilatation of 3-4 cm	3.46 ± 1.07	3.38 ± 1.18	P = 0.881
Number of uterine contractions (in 10 minutes) in dilatation of 5-7 cm	5.07 ± 0.73	5.04± 0.69	P = 0.790
Number of uterine contractions (in 10 minutes) in dilatation of 8-10 cm	5.56 ± 0.68	5.75 ± 0.43	P = 0.197

Table 2

Variable		Aromatherapy Group Number (percent)	Control Group Number (percent)	Result
Education	High school and lower levels	58 (89.2%)	60 (92.3%)	P = 0.935
	Academic	7 (10.8%)	5 (7.7%)	
Occupation	Housekeeping	47 (72.3%)	48 (72.4%)	P = 0.945
	Employed	18 (27.7%)	17 (27.6%)	
Wanted pregnancy		58 (89.2%)	59 (90.8%)	P = 0.770
Receiving optimum prenatal care		49 (75.4%)	48 (73.8%)	P = 0.840

Table 3: Distribution of anxiety level during childbirth in nulliparous women in different dilatations and separate groups

Stages of Dilatation / Groups	Before Intervention SD ± M	Dilatation of 3-4 cm (after intervention) SD ± M	Dilatation of 8-10 cm (after intervention) SD ± M
Aromatherapy Group	47.44 ± 4.05	46.12 ± 3.70	39 ± 3.78
Control Group	48.10 ± 4.84	60.00 ± 4.3	61.24 ± 4.61
Independence T-Test Result	P = 0.947	P = 0.0005	P = 0.0006

DISCUSSION

The results of this study conducted to investigate the effect of Chamomile essential oil on anxiety level during first stage of labor in nulliparous women showed that Chamomile reduces anxiety level during first stage of labor. Chamomile is an old medicinal plant which has been widely used in medical procedures (37). Anti-anxiety and soothing effects of Chamomile are because of flavonoids compounds, Apigenin, and phyto-estrogen which influence central nervous system. Apigenin and Luteoline have anti-anxiety effect which bound with benzodiazepine receptors and lead to reducing anxiety (24). Use of aromatherapy oils reduces stress hormones and increases the secretion of beta-endorphin; as a result, the anxiety level is reduced (38).Aromatherapy is based on the general rule that olfactory sense has a major role in public health and humans' physical and mental relaxation.

The human brain shows positive and emotional reaction to perfume and pleasant scents; therefore, when something is smelt, its molecules pass through the olfactory system to the limbic system. This part is closely related with other parts and systems which control memory, emotion, and hormones. It causes the release of neurotransmitters such as encephalin, endorphin, noradrenaline, and serotonin which ultimately lead to reducing anxiety. Aromatherapy is effective in reducing anxiety both psychologically and physiologically (17). In a study conducted by Burns et al., different aromatherapy oils such as Salvia, Jasmine, Lavender, and lemon have been used during labor for 6 months. Various methods such as inhalation, massage, and bath were applied.

In this study, positive effects of essential oil on reducing pain and anxiety in women were reported (39). In another study, the effect of aromatherapy with Lavender, Chamomile, and Rosemary was tested on the level of anxiety and self-confidence in older women, and their positive effect on anxiety level wasshown (40). In a case study, Cook et al., reported that oils extracted from plants lead to quick reducing of anxiety (41).

Aromatherapy with rose oil leads to reducing anxiety and more safety, comfort, and satisfaction through decreasing sympathetic stimulation (18). Chamomile's Apigenin and flavonoids cause hypnotic effects through the regulation of GABA receptors. Researchers found that use of Chamomile essential oil for 12 weeks improves sleep disorders and fatigue in patients more than a placebo (42). In a study, the use of Chamomile gel had led to calmness and also less night waking and less morning sleepiness in comparison to placebo group. In a study, Chamomile oil led to increasing calmness and decreasing recording Alpha 1 ($\propto_1$)waves with the length of 8-10 Hz in Parietal and Temporal EEG. Another study showed that Chamomile prevents negative mental imagery and improves positive judgment (43). In a study, Can et al., tested the effect of Chamomile oil on central nervous system of mice using some behavioral methods. They concluded that Chamomile increases the numbers of spontaneous locomotor activities and has also anti-anxiety effects (44, 45). In 2009, Amsterdam et al., conducted a randomized double-blind, placebo-controlled study to investigate the effect of Chamomile on 61 patients with mild to moderate GDA, the samples were studied during8 weeks and capsules containing Chamomile with a standard dose of 1.2 % placebo were used. This study demonstrated that Chamomile has a strong anti-anxiety effect on patients with mild to moderate GDA (11).Since, the studies conducted on the effect of Chamomile on anxiety level during labor are limited, more research in this part is recommended.

CONCLUSION

The results of this study showed that aromatherapy with Chamomile essential oil leads to reducing anxiety level during labor; sinceit is a low-cost and low-complication procedure, and due to availability of this plant in Iran, its use is recommended to pregnant women in order to reduce anxiety level during childbirth.

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