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# Investigating the effect of Swedish massage with chamomile oil on labor pain and anxiety of primiparous women: A clinical trial

Fatemeh Eskandari, Parvaneh Mousavi<sup>1</sup>, Mahboubeh Valiani<sup>2</sup>, Saeed Ghanbari<sup>3</sup>, Mina Iravani<sup>4</sup>

M.Sc. Student in Midwifery, Reproductive Health Promotion Research Center, School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran, <sup>1</sup>Faculty Instructor, Reproductive Health Promotion Research Center, School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran, <sup>2</sup>Assistant Professor, Department of Midwifery and Reproductive Health, School of Nursing and Midwifery, Reproductive Sciences and Sexual Health Research Center, Isfahan University of Medical Sciences, Isfahan, Iran, <sup>3</sup>Assistant Professor, Department of Biostatistics and Epidemiology, School of Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran, <sup>4</sup>Associate Professor, Department of Midwifery, Reproductive Health Promotion Research Center, School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

**Address for correspondence:**

Dr. Mina Iravani,  
Reproductive Health Promotion Research Center, Midwifery Department, Nursing and Midwifery School, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.  
E-mail: minairavani2004@yahoo.com

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## Abstract:

**BACKGROUND:** Labor pain and fear of childbirth increase anxiety and stress in pregnant women. Therefore, the present study was conducted with the aim of determining the effect of Swedish massage with chamomile oil on pain and anxiety in a clinical trial.

**MATERIALS AND METHODS:** The present study is a clinical trial on 159 women who were referred to 22 Bahman Hospital in Masjid Sulaiman City in 2021. The samples were randomly divided into three groups (Swedish massage with and without chamomile oil and control group). Pain intensity was assessed using the McGill Pain Scale and anxiety was assessed using the Vandenberg Anxiety Questionnaire. The data were analyzed with SPSS-20 software at a significance level of 0.05. Descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statistics (Chi-square, Fisher's exact, analysis of variance, and paired *t*) were used for data analysis.

**RESULTS:** There were no significant statistical differences between the three groups in terms of obstetric and demographic information ( $P > 0.05$ ). There was no significant relationship between the studied groups before the intervention in terms of labor pain intensity ( $P = 0.9$ ) and anxiety ( $P$ -value = 0.426). After the intervention, the intensity of labor pain and mother's anxiety was significantly lower in the two intervention groups compared to the control group, and it was lower in the Swedish massage group with chamomile oil than the other two groups ( $P < 0.001$ ).

**CONCLUSION:** In the present study, Swedish massage with and without chamomile oil led to a decrease in pain intensity and anxiety. As a result, this method can be used as an effective method to reduce the intensity of pain and anxiety of pregnant mothers.

## Keywords:

Anxiety, chamomile oil, health, pain, Swedish massage

## Introduction

The experience of childbirth in women is different, and these experiences can deeply affect not only the mother but also all her family members.<sup>[1]</sup> In cases where the mother and fetus are not in danger, the best type of delivery is natural delivery.<sup>[2]</sup> In recent years, the demand for cesarean delivery by pregnant women has increased, and this increase not only leads to an increase in

childbirth complications but also imposes additional costs on families, the government, and insurance organizations. It is possible to involve pregnant women in decision making by educating them on pregnancy control.<sup>[3]</sup> This is despite the fact that most natural births do not require medical intervention, and only by providing education to mothers and their care and monitoring during childbirth, most mothers can go through this physiological and natural process safely.<sup>[4]</sup> But because of the painful nature of this process, humans

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have long sought to find a way to reduce pain as one of the consequences of childbirth. About 59% of the causes of cesarean section occur because of the fear of the pain of natural childbirth. Fear of the pain of natural childbirth can lead to an increase in the number of cesarean deliveries in pregnant women.<sup>[5]</sup> The fear of childbirth and the pain caused by it in primiparous women have a direct relationship with their level of obvious anxiety. Labor pain and fear of childbirth increase anxiety and stress in pregnant women. Fear and worry about the presence of pain is also associated with increased pain, anxiety, distress, and disability.<sup>[6]</sup> The presence of pain, anxiety, and severe stress during labor and delivery leads to an increase in the secretion of catecholamines and a decrease in uterine activity as a result of prolonged labor and delivery.<sup>[7,8]</sup> The duration of labor pains and the anxiety caused by it also causes a disruption in the normal functioning of the respiratory, endocrine, and blood circulation systems, which ultimately increases the risk of difficult labor and the lack of normal labor progress. In addition, it increases the rate of intervention in labor and instrumental delivery and the birth of babies with low Apgar. Also, lengthening the duration of childbirth increases the risk of infection, uterine atony and bleeding after childbirth, excessive fatigue, mental damage, and anxiety of the pregnant mother.<sup>[9]</sup> Therefore, making the experience of childbirth and motherhood pleasant by reducing pain and at the same time shortening the length of labor can lead to a decrease in the desire and demand of women to perform elective cesarean sections.<sup>[10]</sup> Considering the refusal of mothers to use medicinal methods and the side effects of these methods to manage labor pain, the use of non-medicinal supportive methods, which include massage therapy and heat therapy, is of interest to researchers.<sup>[11]</sup> Massage is defined as a systematic form of touching the soft tissues of the body by hands for therapeutic purposes, such as relieving pain, increasing the comfort, and comfort of patients.<sup>[12,13]</sup> Based on the results of the studies, performing massage during childbirth greatly reduces anxiety and increases psychological support for women in labor.<sup>[14]</sup> Studies show that a 30-min massage of the abdominal, sacral, shoulder or back, and back areas reduces pain and anxiety, significantly reduces the intensity of fatigue, the need for painkillers, and increases the sense of control during the active stage of labor.<sup>[14]</sup> Swedish massage is a set of simple massage therapy techniques that was first used by a Swedish doctor named Dr. Henrik Ling.<sup>[15]</sup> This type of massage includes the following five main techniques to stimulate blood circulation through the soft tissues of the body: exfoliation (long strokes), petrissage (lifting and kneading the muscle), friction (firm, deep, and circular rubbing movements), tapotment (quick shock movements), and vibration (quick muscle tremors).<sup>[14]</sup> In the massage method with aromatic and volatile plant oils, these substances are gradually absorbed through the

skin (between 10 and 30 min) and exert herbal therapeutic effects, such as sedative, analgesic, anti-contraction, and anti-clogging effects.<sup>[16]</sup> During childbirth, massage with oil promotes the progress of different stages of labor. One of the purposes of using oil massage is to reduce anxiety, fear, and help to relax.<sup>[10]</sup> Among the vegetable oils that can be used is chamomile oil. Because of the presence of several benzodiazepines and phytoestrogens, as well as apigenin flavonoids (which have a strong affinity for the benzodiazepine receptor), chamomile also causes sleep-inducing and anti-anxiety effects.<sup>[17]</sup> In a study, Rahnavardi *et al.* investigated the effect of chamomile scent on anxiety and some outcomes of childbirth in primiparous women, and the results showed that chamomile scent can be used during childbirth to reduce maternal anxiety.<sup>[17]</sup> In addition, the safety of chamomile plant has been recognized by the Food and Drug Organization and its clinical use has been reported as safe.<sup>[18]</sup> Because of the fear of labor pains, the number of women who use cesarean section for childbirth is increasing. However, Interventions such as caesarean section has side effects and is expensive. Also, considering the soothing and uncomplicated effects of medicinal plants such as chamomile, the present study was conducted with the aim of determining the effect of Swedish massage with chamomile oil on pain and anxiety in a clinical trial.

## Materials and Methods

### Study design and setting

This research was a randomized clinical trial study without blinding in three groups (two intervention groups and one control group) that was conducted between 09-10-2020 and 04-19-2021. In this study, the effect of Swedish massage with chamomile oil during labor on labor pain and anxiety of primiparous women admitted to 22 Bahman Hospital, Masjid Suleiman, Khuzestan was investigated.

### Study participants and sampling

The required sample size in each group was determined using the average comparison formula and based on the findings of previous studies<sup>[18]</sup> and through med-calc software. The sample size in each group was calculated as 43 people (taking into account 95% confidence level, 85% power,  $\alpha = 0.05$ ,  $\beta = 0.15$ ,  $sd1: 10.4$ ,  $sd2: 16$   $m1 = 28.3$ , and  $m2 = 19.4$ ). Considering the possibility of about 20% of people dropping out during the study, the final sample size was considered to be 159 people in total (3 groups, each group of 53 people).

$$n = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 (S_1^2 + S_2^2)}{(\mu_1 - \mu_2)^2}$$

The inclusion criteria were the following: Primiparous women in the age range of 18–35 years, having consent to

participate in the study, literacy for reading and writing, normal body mass index, singleton pregnancy, cephalic presentation of the fetus, gestational age 37–41 weeks, reactive fetal heart rate, uncomplicated pregnancy, 5-cm dilatation of the cervix, having three contractions in 10 min, and obtaining an anxiety score more than 150 by the mother. The exclusion criteria were as follows: emergency caesarean section, unwillingness of the participants to continue cooperation, and allergy to massage oils used during the study.

### Data collection tool and technique

At first, permission was obtained from the ethics committee of Jundishapur Ahvaz University of Medical Sciences (code: IR.AJUMS.REC.1399.157) and the study was registered in the clinical trial center (code: IRCT20200513047430N1). Then, while coordinating with the medical center and obtaining written and informed consent from the participants in the study, sampling began. The research samples were selected among the primiparous women who referred to the hospital for natural delivery. Through continuous sampling, 159 patients were included in the study. Allocation of samples was done randomly using numbered cards. By removing card A, the patients entered the Swedish massage intervention group using chamomile oil; by removing card B, they entered the Swedish massage group without using chamomile oil; and by removing card C, they entered the control group (routine and standard care without any intervention).

Before the intervention, the demographic and clinical information questionnaire (age, education, occupation, gestational age, and body mass index) was completed through a short interview and information recorded in the file. McGill Pain Scale was used to evaluate pain intensity. This tool is a standard tool. Validity and reliability of this tool have been confirmed. The McGill Pain Questionnaire includes two independent factors (1 – Sensory pain: describing the pain experience in the individual; 2 – Emotional pain: describing the emotional effect of the pain experience).<sup>[19]</sup> The Vandenberg Anxiety Questionnaire was used to measure mother's anxiety. This questionnaire is related to the evaluation of worries and fears during pregnancy and was proposed by Vandenberg in 1989. This questionnaire has 58 questions.<sup>[20]</sup> The short version of this questionnaire has 17 questions. These 17 questions measure five factors, which are as follows: fear of childbirth (3 years), fear of giving birth to a physically or mentally disabled child (four questions), fear of changes in marital relations (four questions), fear of changes in mood and self and its consequences on the child (three questions), and self-centered fear or fear of changes in the mother's personal life (three questions). The score of each statement is graded between one and

seven. The final score of this questionnaire is obtained by adding up the scores of each statement. Therefore, the pregnancy anxiety score can be between 17 and 119.<sup>[21]</sup> In the psychometric study of this questionnaire, Huizink *et al.* showed its correlation coefficient with Spielberger's state-trait anxiety questionnaire to be acceptable and Cronbach's alpha of all subscales was reported as 0.76 throughout pregnancy.<sup>[22]</sup> Karamozian *et al.*<sup>[21]</sup> in Iran translated the pregnancy anxiety questionnaire into Farsi and reported the reliability of the questionnaire based on Cronbach's alpha coefficient of 0.78. Also, the test–retest reliability coefficient of this questionnaire was between 0.65 and 0.72.

Patients with dilatation of 5 cm were included in the study. Before the intervention, to check the lack of sensitivity to the used oils, the intervention group underwent a sensitivity test by rubbing some oil on areas with healthy skin. Five Swedish massage techniques on the sacrum are the following: Efflorage (superficial and long strokes) in the area of the head, shoulders, arms, legs, and the spine; petrisage (strong stroke of the waist, back, and shoulders); friction (firm, deep, and circular rubbing movements); vibration (quick shaking of the muscles); compression (pressure massage). To start the work, from 5-cm dilatation to 8-cm dilatation of the cervix, back surface stroke massage (for head, shoulders, hands, and feet) and vertebral column exfoliation were performed for 10 min each time. As soon as 8-cm dilatation started, petrisage or strong stroke massage was performed in the lower back area (B shaped and heart shaped), petrisage of the head and shoulders and both sides of the vertebral column (waking and spiral), vibration, and compression of the sacrum. This massage was performed every time for 10 min, until the dilation of 10 cm and the full opening of the cervix. At each stage (dilation of 5–8 cm and 8–10 cm), at least three times of massage (six times in total) were performed once every 20 min and each time for 10 min. The interval between the massages was proportional to the progress of the mother. After the complete dilatation of the cervix, because of the condition of the mother and placement in the lithotomy position and lack of access to the sacrum, it was not possible to perform massage. At each stage, the type of massage was selected according to the intensity of the pain and emotional needs of the mother. In the first stage of massage (dilation of 5–8 cm), because the intensity of the pain is less, it is necessary to have a gentle massage to relax the mother. But in the second stage of the massage (8–10 cm dilatation), because the intensity of the pain increases, it is necessary to concentrate more of the massages on the lower back and sacrum to reduce the intensity of the mother's pain. In all three groups (group A: Swedish massage using chamomile oil, group B: Swedish massage without chamomile oil, and group C: control group), pain intensity was

evaluated in four stages (5-cm, 8-cm, 10-cm dilatation, and immediately after delivery) by the researcher. Maternal anxiety was measured by Vandenberg questionnaire in a self-reported manner by research units at 5-cm dilatation (before intervention) and after delivery (immediately after delivery).

### Data analysis

Descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statistics (Chi-square, Fisher's exact, analysis of variance, and paired *t*) were used for data analysis. Data analysis was done in SPSS version 20 software. The significance level was considered less than 0.05.

### Ethical considerations

At first, permission was obtained from the ethics committee of Jundishapur Ahvaz University of Medical Sciences (code: IR.AJUMS.REC.1399.157) and the study was registered in the clinical trial center (code: IRCT20200513047430N1). Then, while coordinating with the medical center and obtaining written and informed consent from the participants in the study, sampling began.

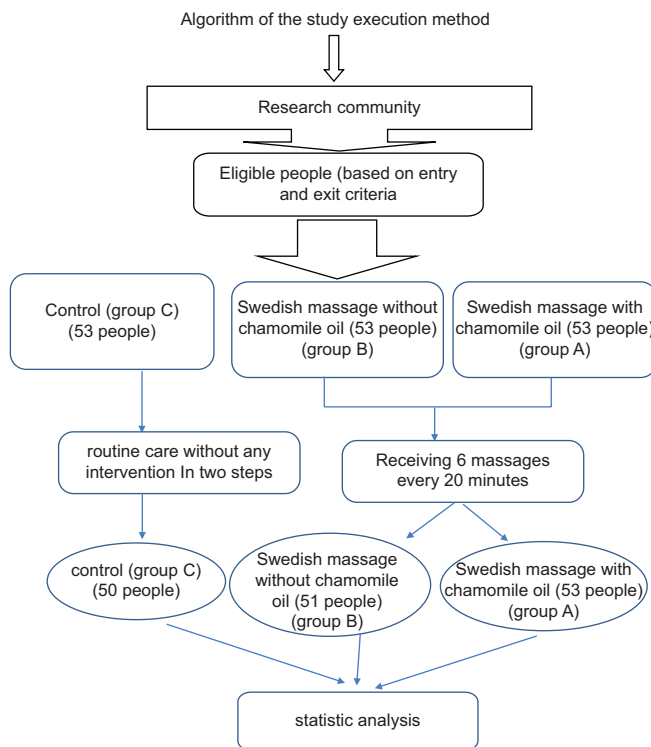
the participants in all three groups were homogeneous in terms of age, gestational age, occupation, education, and body mass index [Table 1].

There is no significant difference between the studied groups in terms of pain intensity in 5-cm cervical dilatation (before intervention) ( $P$ -value = 0.9). However, a statistically significant difference was observed between the three groups in terms of pain intensity in 8-cm and 10-cm dilatations of the cervix ( $P$ -value < 0.001) [Table 2].

Before delivery, no significant difference was observed between the three groups in terms of average anxiety in primiparous women ( $P$ -value = 0.426). But after delivery, there was a significant difference between the three groups in terms of the average anxiety score ( $P$ -value < 0.001). This difference was the highest in the Swedish massage group with chamomile oil and the lowest in the routine care group [Table 3].

### Discussion

The results of the present study showed that Swedish massage with chamomile oil reduced the intensity of pain and anxiety during childbirth in primiparous women, which indicates the effect of this non-pharmacological method on reducing pain and anxiety during childbirth. In fact, it can be said that massage, as a safe soothing method, can sufficiently affect some of the inseparable characteristics of childbirth, such as pain, and reduce them appropriately.<sup>[23,24]</sup> Along with the results of this review, in the study of Khodakarmi *et al.*,<sup>[25]</sup> the results showed that the pain intensity in women who received massage during childbirth was significantly lower compared to the control group. Also, they stated that massage therapy can reduce medical interventions and the use of painkillers during the labor and significantly reduce the duration of the first stage of labor. The results of Lighaei *et al.*<sup>[26]</sup> study showed the effect of oil massage during childbirth by stimulating the release of beta-endorphins in reducing pain and delivery time. Another study by Kimber *et al.*<sup>[27]</sup> claims that massage therapy along with relaxation technique from late pregnancy to delivery is a supportive method that can reduce labor pain. The results of Widyawati *et al.*<sup>[28]</sup> study showed that efflorige massage, which is one of the techniques used in Swedish massage, can significantly reduce labor pain in pregnant women. They also reported that its effectiveness depends on various factors, such as pregnancy age, duration of massage, and the amount of pressure applied to the site. Majidnia *et al.*<sup>[29]</sup> study showed that the intensity of pain in the massage therapy group decreased more compared to the warm compress group, whereas the usual care group did not have a significant difference before and after the intervention. Alavi Fili *et al.* study showed that compared to aromatherapy and usual care, massage



### Results

In this research, 159 people were included in the study, of which 5 people (two people from the Swedish massage group without chamomile oil and three people from the control group) were excluded from the study. The results of the analysis of the demographic findings showed that

**Table 1: Average distribution of demographic variables of primiparous women**

Group Variable	Standard deviation±mean			P
	Swedish massage with chamomile oil (53 people)	Swedish massage without chamomile oil (51 people)	Control (50 people)	
Age	21/98±3/69	22/82±3/48	23/00±3/12	0/277*
Gestational age	39/15±1/08	39/29±1/04	38/82±0/90	0/057*
BMI before pregnancy	21/45±1/64	20/89±1/23	27/27/1/41	0/134*
	<b>number (percentage)</b>			
Education				
Primary school	19 (35/8)	12 (23/5)	8 (16)	0/057#
Secondary school	12 (22/6)	5 (9/8)	6 (12)	
Diploma	19 (35/8)	28 (54/9)	30 (60)	
University	3 (5/7)	6 (11/8)	6 (12)	
Job				
Employed	7 (13/2)	5 (9/8)	8 (16)	0/660#
Housewife	46 (86/8)	46 (90/2)	42 (84)	

\*Analysis of variance, #Chi-square test

**Table 2: Comparison of the frequency of pain intensity of dilatation 5, 8, 10, and the second stage of labor in the three study groups**

Group Pain intensity	Swedish massage with chamomile oil (53 people)	Swedish massage without chamomile oil (51 people)	Control (50 people)	P
Pain intensity in 5-cm dilatation				
Mild	3 (5/7)	3 (5/9)	6 (12)	0/9*
Upsetting	28 (52/8)	27 (52/9)	27 (54/0)	
Annoying	20 (37/7)	19 (37/3)	16 (32/0)	
Intense	2 (3/8)	2 (3/9)	1 (2)	
Pain intensity in 8-cm dilatation				
Mild	4 (7/5)	2 (3/9)	0 (0/0) (0)	0/001<*
Upsetting	27 (50/9)	19 (37/3)	13 (26/0)	
Annoying	24 (41/5)	26 (51/0)	26 (52/0)	
Intense	0 (0/0)	4 (7/8)	11 (22/0)	
Pain intensity in 10-cm dilatation				
Mild	12 (22/6)	6 (12)	3 (6/5)	0/001<*
Upsetting	37 (69/8)	34 (69/4)	11 (23/9)	
Annoying	4 (7/5)	8 (16/3)	32 (69/6)	
Intense	0 (0/0)	1 (2)	0 (0/0)	
Pain intensity in Second stage				
Mild	2 (3/9)	1 (2/2)	3 (7/3)	0/001<*
Upsetting	29 (56/9)	19 (41/3)	5 (12/2)	
Annoying	20 (39/2)	22 (47/8)	26 (63/4)	
Intense	0 (0/0)	4 (8/7)	7 (17/1)	

\*Chi-square test

**Table 3: Average distribution of anxiety in primiparous women**

Group Anxiety score (PRAQ)	Standard deviation±mean		Control (50 people)	P
	Swedish massage with chamomile oil (53 people)	Swedish massage without chamomile oil (51 people)		
Before intervention	72/14±4/76	70/98±4/42	71/42±3/73	0/426*
After the intervention	31/80±5/28	41/07±4/79	76/00±10/74	0/001>*
Changes	-40/34±6/34	-29/91±4/70	4/58±9/01	-
P	0/001<	0/001<	0/004	

\*Kruskal-Wallis test

therapy leads to a reduction in labor pain in all stages of labor.<sup>[10]</sup> Janssen *et al.*<sup>[30]</sup> study showed that the Swedish massage technique is effective in reducing labor pain, but no statistically significant difference was found in

reducing the duration of the first stage of labor. Massage prevents the transmission of pain by stimulating the thick nerve fibers and stimulating the release of endorphins. Therefore, it is possible that the reduction of pain in the

present study is also because of the effect of massage on increasing the serum level of endorphins. Also, massage reduces anxiety, serum cortisol, and increases sleep.<sup>[26]</sup>

One of the problems that mothers face during childbirth is long labor. Prolonged childbirth is associated with adverse maternal and fetal complications and is a period full of worry and anxiety and stimulates the secretion of stress hormones, especially cortisol. Prolonged labor by reducing energy and increasing fatigue of the mother causes the duration of labor to be prolonged and the spirit of mother's cooperation during labor decreases.<sup>[26,31-35]</sup>

In line with the results of the present study, Akköz Çevik *et al.* reported in a clinical trial study in Turkey that the use of massage therapy as an effective method during childbirth by reducing pain and increasing the relaxation of the mother leads to a decrease in her anxiety level.<sup>[31]</sup> The study by Rahnavardi *et al.*<sup>[34]</sup> showed that the use of chamomile scent can reduce the level of anxiety of women in the second stage of labor to some extent. The study of Najafi Ghezalje *et al.*<sup>[35]</sup> showed that Swedish massage and music therapy reduced the anxiety of the subjects under study. However, Swedish massage reduced anxiety more than music therapy. From the findings of the study, it was concluded that massage can play an effective role in reducing people's anxiety. However, in the study of Chang *et al.*,<sup>[36]</sup> no significant difference was reported in the massage therapy group and the control group in terms of pain and anxiety scores, and only a slight decrease in the first stage of labor was reported in the massage therapy group. The reason for this inconsistency in the results could be because in Chang *et al.* study, the massage techniques were performed by the wife, and in our study, Swedish massage techniques were performed by the midwife. In his study, Field stated that performing massage techniques by a doula is more effective than performing techniques by a spouse.<sup>[36]</sup> In Janssen *et al.*<sup>[30]</sup> study, although the results of the study showed the effectiveness of the Swedish massage technique in reducing labor pain, no statistically significant difference was found in reducing the duration of the first stage of labor. The reason for the inconsistency of the study can be attributed to the non-use of oil for massage and the use of several Swedish massage techniques in our study compared to the above study.

### Limitations and recommendation

Some research units did not cooperate with the researcher, which was reduced by considering the sample drop in the calculated sample size. Also, while explaining the objectives of the research to the research units, the researcher obtained their consent for cooperation.

This study was one of the few studies that used in Iran using the Swedish massage technique with and without

chamomile oil to reduce pain, anxiety, and improve delivery outcomes of primiparous women. It is suggested to consider the use of other massage techniques, such as Thai massage, and other oils, such as rosemary and jojoba.

## Conclusion

The results of the study show that the use of Swedish massage techniques with and without the use of chamomile oil can be used to reduce pain and improve the outcomes of childbirth, such as the duration of the first and second stages of labor, reducing anxiety, increasing satisfaction, etc. Complementary medicine methods such as massage can be used to reduce women's pain in different stages of childbirth because of less side effects compared to pharmaceutical painkillers, lower cost, and more efficiency.

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### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Isfahan University of Medical Science.

### Conflicts of interest

There are no conflicts of interest.

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