

## The Effect of Hand and Foot Massage on Post-Cesarean Pain and Anxiety

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| ARTICLE INFO  | ABSTRACT   |
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| <p><i>Article type:</i><br/>Original article</p>  | <p><b>Background &amp; aim:</b> Pain and anxiety are the most common complications after cesarean section. The use of medications is the most common strategy for alleviating these problems. However, the adverse effects of these drugs and lack of access to them for some patients, has led to an increase in application of non-drug methods such as massage.</p> <p><b>Methods:</b> This blind clinical trial was performed in Omolbanin Hospital of Mashhad, Iran. A total of 80 pregnant women referring to maternity ward for elective cesarean, who had the inclusion criteria were selected through convenience sampling method. Subsequently, the participants were randomly assigned to two groups, and the visual analog scale was used to determine the level of pain and anxiety. Each foot and hand was massaged for five minutes, and then the levels of pain and anxiety were evaluated before the intervention and immediately, 60 and 90 minutes after the intervention. Data were analyzed performing Mann-Whitney, Chi-square, repeated measures ANOVA and Bonferroni test using SPSS, version 16.</p> <p><b>Results:</b> The findings of this study showed that there was no significant difference between the two groups concerning their levels of pain and anxiety before the massage (<math>P&gt;0.05</math>). However, the levels of pain and anxiety significantly decreased in the intervention group, immediately, 60 and 90 minutes after the intervention (<math>P&lt;0.001</math>).</p> <p><b>Conclusion:</b> According to our results, hand and foot massage is associated with reduced pain and anxiety, and it can be used as a complementary method to alleviate pain and anxiety.</p> |
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### Introduction

Despite the global approach towards promoting physiological birth, cesarean birth is still prevalent around the world (22.5% of deliveries are by caesarean section). In Iran, some studies have reported the rate of cesarean birth to be 49.8% (1).

Cesarean section is a surgical procedure, which can affect the overall health of mothers and their babies. The main problems resulting from

cesarean birth are postoperative pain and anxiety (2), the results of studies have shown that 79% of patients suffer from severe and moderate pain within 48 hours after operation (3). Post-cesarean pain can be influenced by several factors such as age, gender, surgical technique, complications during the procedure, the support of family and healthcare personnel, weight and gender of baby, social and cultural issues and

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previous experience of the procedure (4).

Pain stimulus can be physical or psychological in nature, therefore, it can be caused by the surgical wound, flatulence, uterine contractions or psychological stress and tension such as fear, anxiety and depression (2). Physiological responses to pain include respiratory, cardiovascular, gastrointestinal, urogenital and metabolic changes, as well as endocrine and mood disorders. Anxiety after cesarean surgery might be due to fear of pain or concerns over losing sexual function, body image, return to the normal daily activities and even job (5).

Pain and anxiety are unpleasant conditions experienced during the postoperative period, which has been experienced by most women (6). Effective relief of pain and anxiety can cause comfort, life quality improvement, faster return to everyday life, shorter hospital stays and lower costs (3). Additionally, pain and anxiety can impair the mothers' ability to optimally care and breast-feed their infant in the postpartum period (2, 3).

There are several pharmacological methods to control pain and anxiety, but in the recent years, several studies have been done on non-pharmacological methods of pain management due to their temporary effects and side effects of pharmacological methods such as benzodiazepines and analgesics (7). Two of the widely accepted non-pharmacological methods are reflexology (a form of foot massage that targets points on the foot which are believed to correspond with body parts) and simple massage therapy (8).

One of the complementary therapy methods to reduce pain is foot and hand massage. Massage is a systematic and rhythmic form of touch, using certain manipulations of the soft tissues of the body in order to promote patients' comfort, well-being and pain relief. Foot and hand massage stimulates the nerve fibers to produce pain-relieving endorphins (9). Since the highest concentration of pain receptors are in the hands and feet (each of the extremities has more than 7,000 nerve endings), foot and hand massage and neurons' stimulation may be a good technique for assuaging pain and anxiety after cesarean section (8, 9).

The frequency and duration of massage are

different in various studies, and contradictory results have been reported regarding its effectiveness (10). Chang Sy (2008) observed that hand massage was effective in pain, anxiety and depression management ( $P=0.002$ ) (11). Degirmen et al. (2006) assessed the effectiveness of foot and hand massage in post-cesarean pain management in a group of Turkish pregnant women. The results indicated that the reduction in pain intensity was significant in intervention groups, as compared to control group ( $P=0.001$ ) (12).

In another study, Hulme et al. (2005) investigated the effect of foot massage on patients' perception of care following laparoscopic sterilization. It was suggested that massage did not reduce pain intensity significantly ( $P=0.371$ ) (13). However, in studies conducted by Najari et al. (2011) and Latifi et al. (2011), foot and hand massage was effective in alleviating postoperative pain (14, 15).

However, few studies have been performed on massage therapy and its impact on post-cesarean pain and anxiety. Most studies have been carried out on specific population groups, such as patients in intensive care units, the elderly, pregnant women, patients undergoing chemotherapy, patients with multiple sclerosis, cancer patients and patients with non-surgical conditions (16). Considering the facts that safe and effective post-cesarean pain relief methods are of great importance, since the results can influence the early interactions of mothers with their infants, and the rate of cesarean in Iran is higher than the international acceptable rates, this study was performed to determine the effect of foot and hand massage on post-cesarean pain and anxiety.

## Materials and Methods

This single-blinded, randomized clinical trial was conducted on 80 women referring to the maternity ward for elective cesarean in Omolbanin Hospital, Mashhad, Iran, from July to September of 2013. The participants were selected through convenience sampling method. In this study we aimed to determine the effect of foot and hand massage on pain, anxiety and vital signs of patients after cesarean section. A pilot study was conducted on 30 patients and the sample size was determined considering the

correlation coefficient ( $\alpha=0.05$ ,  $\beta=0.2$ ).

Participants were randomly assigned to a control and intervention group using color cards. The inclusion criteria included the following: having basic education, full-term pregnancy, having two or three parities, healthy baby, first minute Apgar score of above 7, healthy skin in the massage area, full consciousness after the surgery, willingness to receive massage, no addiction, not having medical conditions such as diabetes, cardiovascular diseases, psychological, sensory and motor disorders, visual or hearing impairment, not having healthy feet and hands or history of severe emotional crisis such as death, migration or divorce during the last six months.

The exclusion criteria included severe postoperative complications such as excessive bleeding, infection, admission to intensive care units, spinal anesthesia, lack of necessary conditions for performing the intervention such as discomfort, complaints and unwillingness to participate in the study.

To gather the data, we employed demographic, observation and examination checklists and visual analogue scale (VAS) for measuring pain and anxiety (with zero representing no pain and anxiety and 10 (100 mm) indicating intense and unbearable pain and anxiety). After giving the necessary explanations to the patients regarding the scale, patients' level of pain were recorded. The intervention was conducted by the researcher after taking a training course by a Chinese medicine specialist. Validity and reliability of the VAS has been confirmed in several studies (Bond, Pilowski 1996, Melzac 1991 and Gift 1989) (14, 17, 18). Moreover, inter-rater reliability of pain and anxiety visual analog scale was estimated to be  $r=0.95$  and  $r=0.96$ , respectively.

Firstly, a written permission letter was obtained from the university's Ethics Committee. The objectives and the importance of the study and the intervention were explained to the participants, and informed consents were obtained from the participants. Then, the demographic questionnaire was completed by interviews, and the levels of pain and anxiety were measured using VAS (100 mm). The massage intervention was performed by the researcher for 20 minutes on extremities (5 minutes for each).

In the intervention group, the massage was applied as follows: initially, the researcher established a friendly relationship with patient by having small talks. Then, the patient lied back on the bed and the researcher, after washing her hands and cleaning the patient's feet and hands with a wet towel, performed the massage intervention for 20 minutes on patient's extremities (5 minutes for each). The main specialized massage techniques included rotational friction movements, stretching, grasping and flexing on different parts of hands and feet from wrist to toes without focusing on a certain point (19). In the control group, in the other hand, the researcher went to the patients' bedside for 20 minutes, and had an informal chat with them.

The researcher measured pain and anxiety four hours following the surgery, and then did the massage intervention in experimental group. Immediately, 60 and 90 minutes after the massage, the levels of pain and anxiety were assessed by the researcher's co-worker, who was blindfolded during the randomization process.

The analgesic drug doses were recorded in a form. Prior to the intervention, analgesic drug administration was similar in the two groups, i.e., all the patients received a single dose of 100 mg diclofenac suppository in the evening on a daily basis.

After collecting the data and recording them in a computer, descriptive statistical analysis (for determining frequency, mean and standard deviation), chi-square and Mann-Whitney tests were performed to compare participants in the experimental and control groups. To compare the mean scores of pain and anxiety in both groups, repeated measures ANOVA and Bonferroni test were performed to determine the mean differences between the two groups. P-value less than 0.05 was considered statistically significant.

## Results

Overall, 86 women were enrolled in this study, six of whom were excluded due to problems such as fever, preterm delivery and unwillingness to continue participation in the study. Then, the participants were divided into two groups of experimental and control, each

consisting of 40 patients.

Table 1 shows the comparison of the two groups concerning mean of demographic quantitative variables including age, body mass index, gestational age and newborn's weight.

Based on this table, the mean of demographic quantitative variables in the two groups were not significantly different ( $P>0.05$ ), in other words, the two groups were homogeneous regarding these variables.

**Table 1.** Comparing the mean of demographic quantitative variables in the two groups

| variables              | intervention<br>Mean±SD | Control<br>Mean±SD | Mann-Whitney test |
|------------------------|-------------------------|--------------------|-------------------|
| Age (year)             | 29.25±4.78              | 29.35±4.88         | 0.88              |
| Gestational age (week) | 39.1±0.9                | 39.4±0.7           | 0.72              |
| BMI (kg/cm*2)          | 22.14±3.1               | 23.2±2.2           | 0.23              |
| Newborn's weight (gr)  | 3222±480                | 3225±420           | 0.81              |

**Table 2.** Comparing the frequency of demographic quantitative variables in the two groups

| variable                               | intervention | control    | test         | P-value |
|--|--------------|------------|--------------|---------|
|  | Number (%)   | Number (%) |              |         |
| <b>Tendency to pregnancy</b>           |              |            |              |         |
| Yes                                    | 24 (60)      | 25 (62.5)  | Chi-square   | 0.5     |
| No                                     | 16 (40)      | 15 (37.5)  |              |         |
| <b>Education</b>                       |              |            |              |         |
| Under diploma                          | 22 (52.5)    | 23 (57.5)  | Mann-Whitney | 0.9     |
| Diploma                                | 18 (45)      | 16 (40)    |              |         |
| university                             | 1 (2.5)      | 1 (2.5)    |              |         |
| <b>Occupation</b>                      |              |            |              |         |
| Housewife                              | 31 (77.5)    | 29 (72.5)  | Chi-square   | 0.5     |
| Student                                | 9 (22.5)     | 10 (25)    |              |         |
| employed                               | 0 (0)        | 1 (2.5)    |              |         |
| <b>Satisfaction with baby's gender</b> |              |            |              |         |
| Yes                                    | 28 (70)      | 29 (72)    | Chi-square   | 0.12    |
| No                                     | 12 (30)      | 11 (28)    |              |         |
| <b>Socioeconomic level</b>             |              |            |              |         |
| Level 1                                | 5 (12.5)     | 8 (15)     | Mann-Whitney | 0.46    |
| Level 2                                | 30 (75)      | 30 (75)    |              |         |
| Level 3                                | 5 (12.5)     | 4 (10)     |              |         |
| <b>Cesarean history</b>                |              |            |              |         |
| Yes                                    | 21 (52.5)    | 24 (60)    | Chi-square   | 0.32    |
| No                                     | 16 (47.5)    | 16 (40)    |              |         |

Table 2 compares the frequency of demographic qualitative variables in the two groups. According to this table, demographic qualitative variables such as willingness to have pregnancy in future, level of education, occupational status, newborn's gender, cesarean history and socioeconomic level were not significantly different in the two groups ( $P>0.05$ ).

Table 3, which compares the mean scores of pain and anxiety before and after the intervention using Mann-Whitney test,

demonstrates that the mean of pain and anxiety in the two groups were not significantly different

before the intervention ( $P>0.05$ ), while the mean of pain after the intervention was significantly different ( $P<0.001$ ). According to the findings of repeated measures ANOVA and Bonferroni test, the mean scores of anxiety and pain in the two groups immediately, 60 and 90 minutes after the intervention were significantly different, that is, the mean scores of pain and anxiety reduced after the massage intervention ( $P<0.001$ ).

**Table 3.** Comparing the mean scores of pain and anxiety before, immediately, 60 and 90 minutes after the intervention in the two groups

| Variable                  |                    | Number | Mean±Sd  | Repeated Measures  | Anova           |
|---------------------------|--------------------|--------|----------|--------------------|-----------------|
| <b>pain</b>               |                    |        |          |                    |                 |
| Before massage            | Intervention group | 40     | 53.9±10  | Time effect        | P<0.001<br>F=45 |
|                           | Control group      | 40     | 51.7±15  |                    |                 |
| Immediately After massage | Intervention group | 40     | 33.74±12 | Group effect       | P<0.001<br>F=52 |
|                           | Control group      | 40     | 53.26±14 |                    |                 |
| 60 minutes After massage  | Intervention group | 40     | 33.38±15 | Interaction effect | P<0.001<br>F=32 |
|                           | Control group      | 40     | 47.65±18 |                    |                 |
| 90 minutes After massage  | Intervention group | 40     | 32.60±20 | Interaction effect | P<0.001<br>F=32 |
|                           | Control group      | 40     | 48.40±14 |                    |                 |
| <b>anxiety</b>            |                    |        |          |                    |                 |
| Before massage            | Intervention group | 40     | 51.7±11  | Time effect        | P<0.001<br>F=23 |
|                           | Control group      | 40     | 52.1±12  |                    |                 |
| Immediately After massage | Intervention group | 40     | 39.14±12 | Group effect       | P<0.001<br>F=56 |
|                           | Control group      | 40     | 51.22±13 |                    |                 |
| 60 minutes After massage  | Intervention group | 40     | 38.24±16 | Interaction effect | P<0.001<br>F=32 |
|                           | Control group      | 40     | 47.75±17 |                    |                 |
| 90 minutes After massage  | Intervention group | 40     | 35.40±10 | Interaction effect | P<0.001<br>F=32 |
|                           | Control group      | 40     | 46.30±12 |                    |                 |

## Discussion

The obtained results of the present study showed that foot and hand massage was effective in reducing the amount of pain and anxiety after cesarean section. Although the precise mechanism of action in massage therapy is not known, it seems to regulate the central nervous system neurotransmitters and as a result, improve anxiety disorders and alleviate pain (20).

Several studies have suggested that massage causes the release of certain neurotransmitters such as serotonin, which can lead to sense of relaxation and well-being (9, 21, 22). Other studies have indicated release of certain peptides during massage, which have sedating and analgesic effects resulting in lowered activity of sympathoadrenal system activated during stressful situations such as surgery (23).

The findings of the current study are consistent with the results of studies carried out by Najar et al. (2011) and Latifi et al. (2011) demonstrating the effect of foot and hand massage on pain intensity after cesarean section (14, 15).

A study by Wang et al. (2004) showed that

foot and hand massage after surgery reduced postoperative pain (19). Additionally, Susanne et al. (2010) assessed the impact of massage on level of pain and anxiety in cardiac surgical patients, it was found that pain and anxiety scores had significantly decreased in patients receiving a 20-minute massage (24). The results of these two studies were in line with ours.

Degirmen et al. (2010) reported that 20 minutes of foot and hand massage significantly reduced post-cesarean pain within the first 24 hours in Turkish women. As in the massage group, 90 minutes following the intervention a 2-point reduction in the mean score of pain was observed, while in the control group the average pain score had slightly increased. The pain assessment scale in Degirmen study was 10 cm, while in the present study we employed a 100 mm scale. In the present study, the mean pain score in the massage group was reduced by 20 points, but in the control group it decreased by 3 points. This difference might be due to the amount and type of analgesia, as well as the study environment (12).

Hulme et al. (2001) conducted an experimental study in North of England for determining the effect of foot massage on

patients' perception of care following laparoscopic sterilization. It was observed that massage therapy did not cause any significant differences in the pain experienced by the two groups ( $P=0.371$ ). This result was not in agreement with ours, since Hulme et al. employed a retrospective approach for pain measurement, while we measured pain prospectively (13).

Maryami et al. (1391) carried out a study to determine the effect of foot massage on pre- and post-hysterectomy anxiety (25). The results showed that after the intervention, there was a significant difference between the two groups regarding their anxiety scores ( $P<0.001$ ). While hysterectomy surgery and cesarean section are different in terms of postoperative care and hospital stay, both studies showed similar results in terms of reducing postoperative anxiety. Moreover, the findings of Billhult, assessing the effect of 20 minutes of massage on anxiety of women with breast cancer undergoing chemotherapy, were inconsistent with ours (26). It seems the nature of disease (malignant or benign) have an impact on the beneficial effects of massage therapy.

Pain and anxiety are subjective experiences and their assessment (using VAS) depends on the perception of subjects and the amount of anxiety. These factors are considered as limitations of this study since we did not control them. The strength of this study was the effective relief of pain (according to the results) without any side effects on babies in the early hours after birth.

Post-cesarean pain relief with no adverse effects on mothers and babies is of utmost importance, since mothers have to breastfeed and take care of their infants immediately after delivery. Whereas pain and side effects of analgesics may impair the mother's ability to optimally care for her infant, which may adversely affect the early mother and infant interactions and lactation process. Finally, it is recommended to perform further comparative studies on the effect of different massage techniques on pain and anxiety of patients undergoing surgery to reduce the physical and psychological problems, and also to evaluate the effects of hand and foot massage on the use of analgesics after cesarean.

## Conclusion

Hand and foot massage was effective in lowering the level of post-cesarean pain and anxiety. Midwives and nurses can relieve the postoperative pain using this simple, non-invasive and available technique.

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## Conflict of Interest

The authors declare no conflicts of interest.

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