The Effect of Foot Reflexology on Anxiety, Pain, and Outcomes of the Labor in Primigravida Women

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Abstract- Reflexology is a technique used widely as one of non-pharmacological pain management techniques. The present study aimed to review and determine the effect of foot reflexology on anxiety, pain and outcomes of the labor in primigravida women. This clinical trial study was conducted on 80 primigravida mothers who were divided randomly into an intervention group (Foot reflexology applied for 40 min, n=40) and control group (n=40). The pain intensity was scored immediately after the end of intervention and at 30, 60 and 120 min after the intervention in both groups, based on McGill Questionnaire for Pain Rating Index (PRI). Spielberger State-Trait Anxiety Inventory (STAI) was completed before and after intervention in both groups. Duration of labor phases, the type of labor and Apgar scores of the infant at the first and fifth minute were recorded in both groups. Descriptive and inferential statistics methods (t-test and chi-square test) were applied in analyzing data. Application of reflexology technique decreased pain intensity (at 30, 60 and 120 min after intervention) and duration of labor as well as anxiety level significantly ($P<0.001$). Furthermore, a significant difference was observed between two groups in terms of the frequency distribution of the type of labor and Apgar score ($P<0.001$). Results of this study show that reflexology reduces labor pain intensity, duration of labor, anxiety, frequency distribution of natural delivery and increases Apgar scores. Using this non-invasive technique, obstetricians can achieve, to some extent, to one of the most important goals of midwifery as pain relief and reducing anxiety during labor and encourage the mothers to have a vaginal delivery.

Introduction

Labor is one of the important events of life experienced by a woman. Negative outcomes of this event lead to negative psychological effects for the woman and her family. Fear of labor pain is one of the most important reasons that women do not accept natural vaginal delivery. Active participation of the mother in labor can lead to decreasing rate of cesarean and duration of labor without deleterious effects on both the mother and fetus (1-4). One of the common factors is the fear and anxiety because of lack of information or having wrong information about labor. In addition, elimination of fear and anxiety not only causes satisfactory labor but also increases motivation to create a good mother and child relationship. Severe labor pain can lead to long-term psychological disturbance, disturb the mental health of the mother and affect the mother-infant relationship negatively. For this reason, effective control of labor pain like other acute pains is the most important social and health challenge. Labor pains alleviation should be somehow such that consciousness of the mother is not disturbed and the mother can help, without fetal side effects or any disturbance in labor process or in umbilical uterine blood flow (5). Non-pharmacological methods for relief of labor pain are simple and cheap and can be used as alternative treatment or minor treatment with drugs. In non-pharmacological methods, the woman herself takes the decision. Thus, strength and control feelings are created in her that are effective in reduction of labor time (5). Pain relief methods can be divided into two main

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groups: pharmacological and non-pharmacological ones. Reflexology is a non-pharmacological method for pain relief. In reflexology, by using pressure on reflexive points of sole and sometimes the palm that is in accordance with each part of the body, the balance returns to all over the body and improves comfort (6,7). Ferrer de Dios believed that applying such pressure on sole affects the psychological responses of people and causes comfort and relief in different organs of the body (8). Reflexologists believe that pressure on certain reflex points of the sole and palm during disease breaks calcium crystals and uric acid accumulated in nerve endings and opens blocked nerve pathways, and improves blood flow in the entire body (7). During labor, we can benefit from stimulation of pituitary gland, hypothalamus, solar plexus, and uterine to decrease pain, anxiety and stress (7). The studies showed that reflexology can have a positive effect on the management of low back pain (7,9). Grealish and colleagues found that foot reflexology significantly reduces nausea and pain in the patients with cancer (10). Reflexology has been used during pregnancy for treatment of nausea and vomiting, constipation, edema, fatigue, headache and to help breastfeeding (11,12). In a study conducted by McNeill *et al*., they showed that reflexology reduces labor pain intensity and its duration, but did not have any influence on labor outcomes such as Apgar and the type of labor (13). Also, McVicar found that reflexology can be used to reduce anxiety (14). There have been few studies conducted on the effect of reflexology on outcomes of labor. Furthermore, medical statistics shows high rate of cesarean and less application of non-pharmacological methods for pain relief during the delivery. Therefore, the present study aimed to determine the effect of foot reflexology on anxiety, pain and outcomes of the labor on in primigravida women attending the maternity wards of Karaj city during 2010-2011.

Materials and Methods

This study was conducted after the approval of ethics committee in medical researches of Islamic Azad University of Karaj-Iran department and receiving an ethical code and taking informed consent of all participants in the research. Also, this study was recorded with the code of 201103015948N1 in Iran Trial Clinical center (IRCT).

Participants

A total of 80 primigravida women attending Alborz and Bahonar hospitals of Karaj were included in this study. The inclusion criteria were as the following:

Primigravida singleton mothers and displaying cephalic being in active phase of labor (dilatation 3-4 cm) with no medical or obstetric complications and they didn't use any anesthesia methods and induction labor. Also, the women didn't have any active psychological and anxiety diseases based on Beck and Spielberger State-Trait Anxiety Inventory.

The exclusion criteria were as the following:

The unwillingness of the mother to admit or continue the study, miscarriage history and occurrence of any problem during the study (e.g. Umbilical cord prolapsed, Decolman, *etc.*). The sampling method was continuous randomized in two groups of intervention and control, and this continued until the required samples were achieved. The number of participants with confidence interval 95% and test power 90% was gained for each 32 groups, considering sample drop during the study, the number of participants in each group was increased to 40 people.

Intervention

After rubbing the sole with sunflower oil, intervention in reflexology group was performed by mild massage of all feet sole (by relaxation techniques that loosened the foot and prepared it to do specific reflexology techniques) and then fixed or rotating pressure was applied on pituitary gland (Pituitary gland is located in the center of thumb) , Solar plexus, and uterine for 40 minutes (20 minutes for each foot). In the control group, routine cares and the massage was performed in other parts of the foot. All common cares of the ward were done for reflexology group. If we divide the sole into three parts, solar plexus in the border of upper and middle one-third of sole (where foot wrinkle is created when the sole bends) is located in the second and third toes. The pituitary gland is located in the center of thumb, and uterine is located in the indented region between the inner ankle and sole. The evaluation of pain intensity was again performed immediately after the end of intervention and within half, one and two hours after the intervention in both groups by McGill Questionnaire for Pain Rating Index (PRI). In this study, data collection was done by observation and diagnosis by four-item questionnaire. The first part of the questionnaire was related to the personal characteristics e.g. fertility including age, education, occupation, economic status and pregnancy age and is designed to investigate the homogeneity of control and case groups. The second part of the questionnaire was about the length of the first, second

and third stage of labor, the type of labor and Apgar score of the infant in the first and fifth minute. The third part of the questionnaire was McGill Questionnaire for Pain Rating Index (PRI) that was marked by sample population at the required times. The fourth part of the 20-item questionnaire was Spielberger State-Trait Anxiety Inventory in which the lowest score was 20 (The lack of anxiety), and the highest score was 80 (the highest anxiety amount) (15). McGill Questionnaire for Pain Rating Index (PRI) and Spielberger State-Trait Anxiety Inventory are standard questionnaires (16-20).

At first, the researcher explained the procedure and Questionnaire for Pain Rating Index (PRI) for each group separately. In labor room of the maternity ward, participants of the study were separated (if possible) and in entire duration of the study, emotional, verbal and non-verbal relationship and spiritual support were established between the pregnant mother and the researcher. Before any intervention, personal-fertility information of participants were asked and pain intensity at the beginning of dilatation of 3-4 cm (the beginning of active phase of labor) was measured by McGill Questionnaire for Pain Rating Index (PRI) in both groups. In addition, Spielberger State-Trait Anxiety Inventory was completed in both groups. The length of first, second and third stages of labor, the type of labor and Apgar score were recorded in the first and fifth minutes.

Statistical analysis

The data are presented as the mean (standard deviation) ± SEM and frequency (%) for quantitative and qualitative variables, respectively. The normal distribution of data, which is one of the assumptions of parametric tests, was evaluated by Kolmogorov–Smirnov test (K–S test) and descriptive statistics such as skewness and elongation indices. To compare the mean score of anxiety, pain intensity before and after the intervention, the duration of labor, Apgar score of the first and fifth minutes between the two groups and independent t-test was performed. To perform inter-group analyzes of mean comparisons of above items in each group, paired *t*-test was used. To compare the frequency of the type of labor, the *chi*-square test was used. For all the tests, significance level was considered 0.05 and the data were analyzed by SPSS statistical software, version 13.

Results

This study was conducted on 80 primigravida mothers (40 participants in the intervention group and 40 in the control group). Age average in both groups was 25.56 ±4.08 years and the education level of most of the participants was Diploma (45%), and the majority of them were employed (41.25%). The mean of anxiety score in the first stage of labor before intervention was not significant in both groups (*P*>0.05) but after intervention, the mean anxiety score in intervention group was significantly decreased in comparison with the control group (Table 1).

There was no statistically significant difference with respect to mean pain intensity score before and immediately after the intervention in both groups (*P*>0.05) but difference in half, one and two hours after intervention for both groups was statistically significant (Table 2).

The mean and standard deviation of pain intensity score and its comparison in intervention and control groups before and after intervention

As it is shown in table 3, statistically significant difference was observed between the mean of the duration of labor in both groups.

In terms of the frequency of the type of labor, 92.5% in intervention group and 80% in the control group had natural vaginal delivery. A significant difference was observed between two groups in terms of frequency of the type of labor by *chi*-square test (*P*<0.001). The mean of Apgar score in the first minute in the intervention group was 8.73±0.71 and in control group 8.23±0.94, and there was a significant difference between two groups by t-test (*P*<0.001). Also, the mean of Apgar score in the fifth minute was 9.6 ± 0.49 in intervention group and 9.07 ± 0.85 in control group and there was significant difference between two groups by independent *t*-test (*P*<0.001).

Discussion

The results of the study showed that anxiety decreased after using reflexology method in the intervention group, but the anxiety increased in the control group. Consistent with this finding, Oleson, and Flocco *et al.*, showed that reflexology improves mood and decreases anxiety (21).

Although McVicar *et al.*, showed that reflexology considerably decreases state anxiety, but it didn't change trait anxiety (14). Lee in a study found that considerable difference presents in before and after reflexology in terms of reduction of depression and stress (22). The mechanism of reflexology function is not recognized well. Reflexology makes systematic and local physiological changes, looseness of muscles, better

blood circulation in the body and finally a deep feeling of comfort and mind balance is created and the symptoms of stress are reduced (23,24). Also, endorphins or enkephalins, which are natural painkillers of the body and improve the mood, are released in response to reflexology (25).

In the present study, the results of pain intensity of labor showed that reflexology can reduce pain intensity of the mother considerably. Dolatian *et al*., revealed that pain intensity in reflexology group was less than two groups of support and routine care that is consistent with the current study results (26). Samuel and Ebenezer showed that reflexology increases both pain tolerance and threshold (27). In the study conducted by Bering Liisberg, most of the mothers (89.71%) believed that reflexology was effective in relieving labor pain (28). However, in a study conducted by McNeill on pain relief and reflexology, it was shown that the only significant difference between case and control groups is using less Entonox gas in reflexology group (13). According to "the pain gate theory", reflexology by stimulating touching sense can suppress pain impulses (29). Stimulation of the foot activates the parasympathetic nervous system and activates the responses of the gate control mechanism and hyperstimulation analgesia. Many nerve endings on the feet correlate with acupressure points. When stimulated, these points trigger the release of endorphins and other endogenous chemicals. In addition, major plexuses of the lymph system are located in the hands and feet. Compressive forces in these areas stimulate lymphatic movement (30).

The results of the labor duration showed that duration of labor was less in the intervention group. Dolatian *et al*., showed that the duration of labor in reflexology group is less than support and routine care groups (26). However McNeill *et al*., showed no significant difference in the duration of labor between the two groups of reflexology but in control group the people who had four or more reflexology treatments (60 minutes) had less duration of labor than control group (13).

According to the studies, fear and anxiety increase adrenaline and noradrenaline acting on the contrary to oxytocin. This can disturb uterine contractions and decrease the duration of labor (31). Reflexology by decreasing adrenaline and nor-adrenaline and increasing endorphins and inner oxytocin increase uterine muscle contractions and activities and can affect the duration of the labor (32).

The results of the above research showed that in the intervention group, frequency of natural vaginal delivery was more than the control group. The results of the study of McNeill *et al.,* showed that in terms of the type of labor, no statistical difference presents two groups of reflexology and control. Their study was retrospective, but it is better to conduct such prospective studies.

The results regarding Apgar indicated that the mean of Apgar score in the first and fifth minute after performing reflexology in the intervention group was more than the control group. Valiani *et al.,* in their study showed that Apgar score was significantly higher after reflexology that is consistent with the results of the current study (33). But the results of the retrospective study of McNeill showed that using reflexology during labor had no effect on Apgar score in the first and fifth minute (13). Continuous pain and fear in the labor affects respiratory system, circulatory, endocrines and other activities of the body that would lead to hard and difficult labor and consequently would increase rate of labor with instruments and cesarean and reduce the Apgar score (33).

In conclusion, it seems that reflexology reduces anxiety, labor pain intensity and short labor duration and increases natural vaginal delivery and Apgar score. Therefore, considering the high rate of cesarean in the world which is mainly because of the fear of vaginal delivery, by applying reflexology as an easy, cheap and non-invasive method to reduce labor pain high rate of cesarean worldwide can be reduced.

Acknowledgment

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