

The Effect of Acupressure at GB-21 and SP-6 Acupoints on Anxiety Level and Maternal-Fetal Attachment in Primiparous Women: a Randomized Controlled Clinical Trial

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Background: Delivery is one of the most stressful events in women's life. Excessive anxiety, in turn, increases delivery and pregnancy complications. Mother's positive experience of delivery leads to more effective maternal-fetal attachment in the first few hours of birth.

Objectives: The present study aimed to compare the effects of acupressure at two different acupoints on anxiety level and maternal-fetal attachment in primiparous women.

Materials and Methods: In this study, 150 primiparous women were allocated to acupressure at GB-21 acupoint, acupressure at SP-6 acupoint, and control group. The women in their active phase of delivery were enrolled in the study and pressure was applied to the acupoints for 20 minutes. Mother's anxiety level was assessed using Spielberger's questionnaire before and one hour after the intervention. In addition, maternal-fetal attachment behaviors were evaluated using Avant's questionnaire during the first breastfeeding. Then the data were introduced to the SPSS (v.13) and were analyzed using t test and one way ANOVA.

Results: The results revealed no significant difference among the three groups regarding the anxiety level before the intervention ($P > 0.05$). One hour after the intervention, this measure was significantly lower in the intervention groups in comparison to the control group ($P < 0.001$). However, no significant difference was found between the two intervention groups in this regard ($P > 0.05$). Moreover, maternal-fetal attachment was higher in the intervention groups in comparison with the control group ($P < 0.001$).

Conclusions: Acupressure at both acupoints reduced anxiety level and increased maternal-fetal attachment. This method can be easily used in the delivery room.

Keywords: Acupressure; Anxiety; Maternal-Fetal Relations

1. Background

Pregnancy and delivery are among the most stressful events in women's life (1). Negative delivery experiences related to unexpected medical interventions, severe pain, or fear from death cause great fear and anxiety for mothers and eventually lead to anxiety disorders (2). Fear and anxiety increase muscle tension and direct blood oxygen towards mother's brain and muscles. Therefore, mother's tension, fatigue, and sensitivity toward pain are increased and her compatibility with pain is decreased (3). Despite the scientific advances regarding the physical problems in pregnancy, psychologic problems are still a major issue in pregnant women's health (4). Delivery is an important experience in women's life and the quality of this experience leads to short-term as well as long-term effects. Negative delivery experiences cause psychologic problems as

well as sexual disorders and affect the emotional relationship between mother and her infant after delivery. On the other hand, fear and anxiety increase the surgical interventions. Thus, in order to reduce these interventions, delivery pain associated anxiety must be changed into a desirable experience (5, 6). One other outcome of fear from delivery pain is the increase in the number of elective cesarean sections (7). Additionally, studies have shown that abnormal fetal heart rate and reduction of the first- and the fifth- minute Apgar scores are more common among the mothers experiencing severe pain and anxiety (8). Thus, sedating pain during delivery is highly essential and improves breastfeeding behaviors. Consequently, control of delivery pain is among the first and the most important responsibilities of the healthcare staff (9).

Attachment is defined as a stable, warm, and intimate relationship between mother and child. This relationship is pleasurable for both mother and child and facilitates their interaction. Evidence has shown that improve in attachment results in creation of a stable relationship between mother and child and reduce the mother's anxiety (9). Pillitteri believes that attachment can create a desirable relationship between mother and child and improves child's cognitive, emotional, and social growth (10).

Acupressure is based on the rules of acupuncture and is applied on the same points used in acupuncture (11). It can be easily learned and performed and does not have any negative effect even if it is not performed efficiently. Acupressure involves applying stable, gentle pressure on one or some of the 365 energy points on the 12 body meridians and in this way creates balance and releases energy (11). From Chinese medicine point of view, these points are located in the strategic areas of the body. Acupressure as a noninvasive method eliminates imbalance in vital energy, removes pain, reduces muscle tension, improves blood circulation and vital activities, and decreases the anxiety symptoms (12).

Anxiety leads to physical and psychologic disorders, increase in heart rate, sweating, and worry; in addition, it has negative effect on individual's function and relationship with others (13). According to a study conducted by Kaviani et al. acupressure on Hugo point could decrease the prenatal mean anxiety in comparison with the control group (14). Another study showed that attachment and relaxation skills training programs during pregnancy reduced anxiety during pregnancy as well as postpartum depression (15). Similarly, a previous study indicated that maternal anxiety was reduced by dry cupping therapy (16). Another study demonstrated that higher anxiety levels during labor were accompanied by more pain and less control on maternal behaviors (17). As a practical strategy with no side effects that can control and reduce anxiety, this nonpharmacologic method has motivated researchers to perform studies in this field.

Agarwal et al. indicated that acupressure at specific points could reduce preoperative anxiety (18). Moreover, Tokumaru et al. conducted a study to investigate the effect of acupressure on myoelectric activity of the stomach. In that study, acupressure was first applied at P6 point for one minute, rest was taken for a minute, and the process continued for 30 minutes. Electrogastrogram was assessed 30 minutes before, during, and immediately after the intervention. In addition, changes in the samples' heart rate was used to evaluate their autonomic nervous function. Overall, the results revealed a significant difference between the intervention and the control groups (19). Furthermore, Wang et al. performed a study on the parents of the children undergoing surgery and revealed the effectiveness of acupressure at the third-eye point in reduction of preoperative anxiety (20). Since all the previous studies have measured the effects of acu-

pressure on labor pain and have revealed the effect of this method on reduction of pain intensity, the present study aimed to assess the effects of acupressure on maternal-fetal attachment. No study was conducted on this issue up to the time of this report. Moreover, the present study compared the effects of acupressure at two acupoints, while previous studies evaluated the effect of acupressure at only one point on labor pain (15, 16, 21, 22). Furthermore, evidence has demonstrated that the cause of many elective cesarean deliveries is maternal anxiety and fear of pain. Therefore, using alternative medicine not only is effective in reducing anxiety, but also does not impose any costs on families. In addition, pain and anxiety during labor have a negative effect on maternal-fetal attachment.

2. Objectives

The present study aimed to compare the effects of acupressure at two different acupoints on anxiety level and maternal-fetal attachment in primiparous women. The study aimed to answer the following questions: Do different acupressure points have different effects on maternal anxiety? Does reduction of maternal anxiety increase the intensity of maternal-fetal attachment?

3. Materials and Methods

3.1. Subjects

This randomized controlled clinical trial was conducted on 150 primiparous women with term pregnancy who were referred to the obstetrics wards of Shoushtari and Hafez hospitals, Shiraz, Iran, in 2010. The participants with inclusion criteria were consecutively recruited into the study and were allocated into the three groups (A: GB-21 acupoint, B: acupressure at SP-6 acupoint, and C: control group) using a block randomization method.

In order to eliminate the psychologic effect of various interventions on the study results, only one type of intervention was performed each day. Before the intervention, written informed consents were obtained from all the participants. Moreover, the researcher learned the correct way of performing acupressure under the supervision of a specialist in this field.

Acupressure was applied in the semi-recumbent position on the left arm so that reduction of blood pressure would be prevented. According to the specialist's opinion and since meridian energy flow circulation cycle is approximately 20 minutes, acupressure was performed for 20 minutes (5).

The inclusion criteria were being primiparous, being 18 to 35 years old, singleton pregnancy, gestational age of 37 to 41 weeks, cephalic presentation, being before or at the beginning of the active phase of labor (3- to 4-cm dilation), having middle- school or high- school degrees, and signing written informed consents.

The exclusion criteria were any psychologic (e.g., psychosis or schizophrenia) or anatomic disorder (e.g., uter-

ine disorders or pelvic stenosis), chronic diseases (e.g., cardiovascular diseases, pulmonary disorders, hypertension, and diabetes), skin disorders (e.g., eczema and superficial skin infections), high-risk pregnancy (e.g., pregnancy hypertension, polyhydramnios, oligohydramnios, membranes rupture for > 12 hours, and history of infertility), using oxytocin for labor induction, abnormal fetal heart rate pattern leading to cesarean delivery, occurrence of any problems during labor necessitating

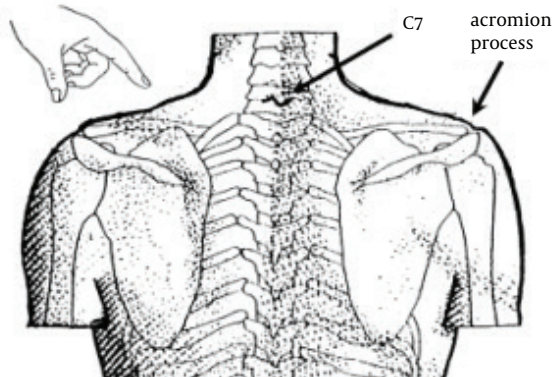


Figure 1. Images for Jianjing Acupuncture (Acupressure) Point



Figure 2. Image for Acupressure Sanyinjiao SP-6 point

emergency cesarean section, administration of the analgesic methods before the study, and reluctance to continue participation in the study.

3.2. Intervention

The first and the second intervention groups underwent acupressure at GB-21 and SP-6 acupoint (Figures 1 and 2), respectively, at 3- to 4-cm cervical dilation. In the control group, the acupoints were only touched, but were not pressed in order to control the psychological and supportive effects. SP-6 acupoint is located four woman's fingers width above the tip of the medial malleolus (the shinbone inside the ankle). Stimulation of this point is effective in reduction of pain. In addition, GB-21 acupoint is located in the middle of an imaginary line between the bony prominence of the neck and the top of the shoulder joint (the acromion process). In acupressure resources, this acupoint has been introduced to be effective in reduction of delivery pain (11). In both intervention groups, the researcher applied pressure by both hands at the beginning of the contractions at 3- to 4-cm dilation. In the first intervention group, GB-21 acupoint on the left shoulder was pressed by the right thumb and the GB-21 point

on the right shoulder was pressed by the left thumb. In the second group, on the other hand, SP-6 point on the right leg was pressed by the left thumb and the SP-6 point on the left leg was pressed by the right thumb. After applying pressure for 30 seconds, the researcher took a rest for 30 seconds but the hands were still in touch with the acupoints. This process was continued for 20 minutes. In the control group, however, the acupoints were only touched. In this group, GB-21 acupoint was touched in 25 patients and SP-6 acupoint was touched in the rest.

The researcher's hands pressure was measured using a digital scale in order to apply a fixed amount of pressure throughout the intervention. After learning how to apply pressure, right and left thumbs amounts of pressure were calculated at 171 and 1350 mm Hg, respectively. In order to make sure about the amount of pressure, it was computed using the following formula:

$$P = F/A$$

Where P is the amount of pressure (mmHg), F stands for force (Kg), and A is the area of the thumb (m^2). The difference in the amount of applied pressure was reduced to the least possible by repetition and practice.

3.3. Measurement

The study data were gathered using demographic information form, and Spielberger's anxiety questionnaire (SAQ). The validity of demographic information form was assessed using content validity. Besides, concurrent validity was used to determine the correct location of GB-21 and SP-6 acupoints as well as the method of pressure application. Before and one hour after the intervention, anxiety was assessed through SAQ, which includes two sections, namely, state and trait anxiety. In this study, we only used the state anxiety section, which assesses the transient emotions associated with specific occasions. Each questionnaire item included four choices, which were very low, low, high, and very high with respective scores of one to four. The minimum and maximum scores of the questionnaire were 20 and 80, respectively. SAQ scale has been widely used in previous studies (23, 24). In a study on 150 patients undergoing surgery, Aghamohammadi et al. reported the reliability coefficient of this instrument to be 0.97 (25).

Mother's attachment behaviors were evaluated using Avant's observation form (AOF) during the first breastfeeding and without her awareness. This instrument was utilized by Vakilian et al. in Iran (26). It was also used by Khoramrody who improved its Farsi translation (27). AOF consists of a checklist including emotional behaviors (looking, fondling, kissing, talking, smiling, and moving the cradle), proximity behaviors (hugging without touching mother's body, hugging close to mother's body, and hugging by wrapping arms around the baby), and care behaviors (changing diapers, tapping the baby for gastric outlet, and tidying baby's clothes). These behaviors were observed for 15 minutes. The researcher observed

the behaviors for 30 seconds and recorded them in the next 30 seconds. Therefore, one behavior could occur for a maximum of 15 times during 15 minutes. Since a total of 11 behaviors were observed for 15 minutes, the maximum score of each study participant would be 165. Then mean and standard deviation of the behaviors were calculated. The content validity of this instrument was confirmed in a study by Khoramrody. Moreover, its reliability coefficient was calculated as 0.85 (27).

3.4. Data Analysis

The collected data were encoded and introduced to the SPSS (version 13, SPSS Inc., Chicago, IL, USA). Comparisons of the variables before and after the intervention were made using paired-samples t test. Independent samples t test was used in order to compare two groups at each stage. Additionally, one way ANOVA was used to compare the intervention and control groups. P value < 0.05 was considered as statistically significant.

3.5. Ethical Considerations

This study was approved by the Research Ethics Committee of Fasa University of Medical Sciences. In addition, written informed consent was obtained from each participant before beginning of the study. The participants were also assured of the confidentiality of all their personal information. The researchers tried to observe all the participants' rights in accordance with Declaration of Helsinki.

4. Results

The study results revealed no significant difference among the three groups regarding gestational age (range,

37-42 weeks) and level of education ($P > 0.05$). The mean age of the participants was 25.88 ± 3.47 , 24.86 ± 3.90 , and 25.02 ± 4.65 years in the GB-21, SP-6, and in the control groups, respectively, and the difference was not statistically significant. In addition, the mean gestational age was 38.26 ± 0.82 , 38.68 ± 0.74 , and 38.52 ± 0.88 weeks in the acupressure at GB-21, SP-6, and the control group, respectively ($P < 0.001$) (Table 1). Moreover, no significant difference was observed among the study groups concerning the education levels.

The mean anxiety level in the GB-21 group was 55.21 and 44.41 before and one hour after the intervention, respectively. These measures were respectively calculated at 55.86 and 43.43 in the SP-6 group and at 55.43 and 63.38 in the control group. According to the results of paired-samples t test (Table 2), the mean reduction in anxiety was significant in all the three groups. Moreover, the results of one-way ANOVA showed a significant difference among the three groups regarding their anxiety scores one hour after the intervention ($P < 0.001$). Before the intervention, no significant difference was found among the three groups regarding anxiety level ($P = 0.93$). One hour after the intervention, however, the anxiety level was significantly lower in the intervention groups in comparison with the control group ($P < 0.001$) (Table 2). Nevertheless, no significant difference was observed between the two intervention groups ($P > 0.05$).

Maternal-fetal attachment score was higher in the intervention groups in comparison to the control group ($P < 0.001$). The mean score of the attachment behaviors was 85.1 ± 9.9 , 84.2 ± 9.2 , and 65.8 ± 11.5 in the GB-21, SP-6, and in the control group, respectively, and the difference was statistically significant ($P < 0.001$).

Table 1. Comparison of the Study Participants' Mean Age and Gestational Age^a

Age	Group			
	Acupressure at GB-21 Point	Acupressure at SP-6 Point	Control Group	P Value
Participants' Mean Age, y	25.88 ± 3.47	24.86 ± 3.90	25.02 ± 4.65	> 0.05
Mean of Gestational Age, w	38.26 ± 0.82	38.68 ± 0.74	38.52 ± 0.88	> 0.05

^a Data are presented as mean \pm SD.

Table 2. Comparison of the Means of Anxiety Level of the Study Groups Before and One Hour After the Intervention^a

Time	Group			
	Acupressure at GB-21 Point	Acupressure at SP-6 Point	Control	P Value
Before the Intervention	55.21 ± 4.02	55.86 ± 4.65	55.43 ± 6.39	> 0.05
After the Intervention	44.41 ± 7.84	43.43 ± 7.02	63.38 ± 8.41	< 0.001

^a Data are presented as mean \pm SD.

Table 3. Comparison of Maternal-Fetal Attachment During the First Breastfeeding in the Study Groups^a

Different Dimensions of Maternal-Fetal Attachment Behaviors	Acupressure at GB-21 Point	Acupressure at SP-6 Point	Control Group	P Value
Emotional Behaviors	25.3 ± 8.7	26.5 ± 7.5	13.2 ± 5.6	< 0.001
Proximity Behaviors	44.8 ± 1.4	42.4 ± 1.2	6.41 ± 4.7	< 0.001
Care Behaviors	3.9 ± 2.4	3.8 ± 2.1	3.7 ± 2.6	< 0.001
Total Attachment Behaviors	85.1 ± 9.9	84.2 ± 9.2	65.8 ± 11.5	< 0.001

^a Data are presented as mean ± SD.

Nevertheless, no significant difference was observed between the two intervention groups ($P = 0.65$). The means scores of the three types of behaviors were also separately calculated for the study groups. The highest and lowest means in the three groups were related to proximity and care behaviors, respectively (Table 3).

5. Discussion

The results of this study showed that the anxiety level decreased in the two intervention groups, but increased in the control group. Kober et al. showed that acupressure while transferring the patients to hospital was effective in reducing anxiety level (28). Moreover, Fassoulaki et al. indicated that acupressure was effective in reducing anxiety and elevating mood (29). Similarly, the results of the study by Agarwal et al. showed that acupressure at specific acupoints decreases preoperative anxiety (18). In addition, Wang et al. investigated the effect of acupressure on anxiety and reported that acupressure had reduced anxiety level of the intervention group (20). In agreement with aforementioned studies, Barker et al. demonstrated that acupressure reduced the patients' anxiety level (30). The mechanism of acupressure has not been identified up to now; however, the type of used touch and pressure seems to have a considerable effect beyond a simple touch. Acupressure causes physiologic, systemic, and local changes in the body and creates calmness and balance throughout body and mind. It also reduces the symptoms of stress. Although the main mechanism of acupressure has not been known yet, several studies have shown that this method leads to release of neurotransmitters such as serotonin, which can affect individuals' tranquility (31, 32). Some other studies have indicated that acupressure results in release of specific peptides with analgesic effects and reduces the activity of the sympathoadrenal system, which is activated in stressful conditions (33). Furthermore, Lewith et al. believed that the interventions used in the studies on complementary medicine could change the rate of fear, anxiety, bronchoconstriction, heartbeat, blood pressure, and skin temperature. The reduction of anxiety might be due to the effectiveness of the intervention, self-hypnosis, or even the feeling of security resulting from the presence of the

researcher as one of the healthcare staff (34). To date, acupuncture and acupressure have attracted considerable attention as nonpharmacologic methods and World Health Organization has confirmed application of these two methods in 100 conditions. When these methods are performed accurately, they are highly safe. They can even be performed by the individuals themselves, do not have high costs, and do not require any special facilities (35).

Up to this date, nurses and midwives have investigated various interventions on the effect of acupressure on the different problems and have employed various interventions to prevent anxiety disorders (36). The findings of the present study showed that acupressure could enhance maternal-fetal attachment after delivery. In addition, the results revealed a significant difference between the intervention groups and the control group regarding the attachment behaviors. This difference might result from reduction of anxiety and mother's feeling of tranquility and health after delivery. Thus, maternal-fetal attachment might have increased due to the effect of acupressure on anxiety. In fact, acupressure leads to release of endogenous opioids that eventually result in reduction of anxiety (33). In general, performance of various interventions during pregnancy and delivery can be effective in reduction of anxiety and increase of attachment after delivery. Complementary medicine interventions were shown to decrease anxiety and enhance maternal-fetal attachment after delivery in the studies by Kim and Cho, Griffith et al., and Bellieni et al. (37-39). The findings of the current study demonstrated that acupressure as a simple and noninvasive method was effective in reducing the pain and anxiety and could be easily used in labor rooms. Reduction of pain, in turn, increases maternal-fetal attachment. Regarding no significant difference between the two acupoints in reducing pain intensity, both points can be effective. One of the limitations of this study was the frequent vaginal examinations in the labor room by residents and medical students. In addition, the study might have low external validity and generalizability due to its large number of inclusion and exclusion criteria. Nevertheless, the strong points of the study were the large number of samples and its double-blind design.

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Authors' Contributions

Zahra Moradi and Marzieh Akbarzadeh prepared the first draft of the manuscript. Marzieh Akbarzadeh and Parvin Moradi made critical revisions to the paper and translated it into English. Monieh Toosi helped in searching for articles. Dr. Mohammad Javad Hadianfard helped with training acupressure.

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