Original Article

The Effect of H7 Acupressure on Amniocentesis Anxiety in Pregnant Women: A Randomized Controlled Trial

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ABSTRACT

Background: Amniocentesis is the most common invasive procedure for diagnosing fetal abnormalities. Most pregnant women are anxious about fetal abnormalities and screening tests. **Objectives:** This study was conducted to determine the effect of H7 acupressure on amniocentesis anxiety in pregnant women. **Methods:** This clinical trial was conducted on 56 pregnant women candidates for amniocentesis. In the intervention group, acupressure was performed at H7 acupoint for 5 min in each hand, 30 min before amniocentesis, and then daily for 10 days. The control group did not receive any intervention. Data collection was done using a demographic questionnaire, the Spielberger state-trait anxiety inventory, and a daily acupressure recording checklist. Data were analyzed using the independent samples *t*-test, Chi-square test, repeated measures analysis, Bonferroni *post hoc* test, and paired *t*-test. **Results:** The mean state anxiety scores in the intervention group were 38.70 ± 5.64 and 30.22 ± 6.70 immediately and 10 days after amniocentesis. However, at the same times, the mean state anxiety scores in the control groups were 49.03 ± 2.30 and 50.86 ± 2.01, respectively, which were significantly higher than the intervention group ($P < 0.001$). The mean scores of trait anxiety were significantly lower in the participants of the acupressure group than the control group 10 days after amniocentesis ($P < 0.001$). **Conclusion:** The H7 acupressure could be effective in reducing state and trait anxiety in pregnant women during amniocentesis and when they are waiting for the test results.

Keywords: *Acupressure, Amniocentesis, Anxiety, Pregnancy*

Introduction

The diagnosis of fetal malformations before birth is an emotional, critical, and stressful event for women. Amniocentesis is a method for diagnosing fetal abnormalities. It is performed at 15–20 weeks of gestation and its results are available in 7–14 days.[1] High levels of anxiety have been observed in women undergoing amniocentesis.[2] Such high anxiety might be attributable to the fear of pain, fetal injury, and abortion, and worry about abnormal test results.[3] Most women undergoing amniocentesis described anxiety as a painful mental experience. A positive correlation has been found between the level of anxiety and pain severity.[4] Anxiety has also adverse effects on both mother and baby during pregnancy. Anxiety in early pregnancy may lead to loss of fetus, and in the second and third trimesters, it may result in preterm and low birth weight delivery, prolonged labour, and the need for cesarean delivery.[5] High and prolonged anxiety during pregnancy may also result in emotional problems, hyperactivity disorder, decentralization, and impaired cognitive development in children.[6] In a study by Karimi *et al*., the severity of anxiety was high among mothers who were candidates for amniocentesis.[7] The waiting period for amniocentesis is also anxious.

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This anxiety causes psychological reactions, worries about the future, and a feeling of lack of control.[3] Pharmacological and nonpharmacological methods have been considered to control anxiety during pregnancy.

Benzodiazepines with a shorter half-life are commonly used to alleviate anxiety, but these medications may be associated with adverse effects.[8,9] For this reason, alternative methods such as acupressure,[10] massage,[11] relaxation,[12] and music[13] have been increasingly used to reduce anxiety. These methods not only reduce anxiety, heart rate, and blood pressure, but are also low risk and low cost. In a study by Chuenwattana *et al*., supportive information could alleviate the anxiety in women awaiting amniocentesis results.[14] Hanprasertpong *et al*. examined the effect of aromatherapy in reducing the pain and anxiety caused by amniocentesis and reported that aromatherapy could not significantly reduce the anxiety caused by amniocentesis.[15] A study also reported that light foot massage during amniocentesis was not effective in reducing pain and anxiety caused by the procedure.[16]

Acupressure is a branch of alternative medicine that is widely used to alleviate anxiety.[10] There are certain points in the body on which applying pressure can help relieve pain, reduce muscle tension, improve blood circulation, and reduce anxiety symptoms.[17,18] Stimulation of acupressure points leads to the release of endorphins.[19,20] It has been shown that 30 min after the onset of stimulation, endorphins reach their highest level and remain high for 10 h.[21] Despite the studies on the effectiveness of acupressure on anxiety reduction, a study reported that acupressure was not effective in reducing anxiety in patients with primary dysmenorrhea.[22]

The H7 acupoint is located at the wrist crease, on the radial side of the flexor carpi ulnaris tendon, between the ulna and the pisiform bones.[21] It has been reported that intense and frequent stimulation of H7 acupoint, in addition to releasing endorphins, increases the level of serotonin in the pons and also releases dynorphins at the spinal cord.[23] Some of the studies also reported that stimulation of the H7 acupoint could effectively reduce the anxiety of women waiting for a cesarean delivery[21] and patients undergoing coronary angiography.[24] However, some studies reported that anxiolytic interventions have limited effects in mothers awaiting genetic amniocentesis.[15,16] Moreover, no earlier study has examined the effect of H7 acupressure on the anxiety of mothers awaiting amniocentesis.

Objectives

The present study aimed to determine the effect of H7 acupressure on amniocentesis anxiety in pregnant women.

Methods

Study design and participants

A parallel, single-blind clinical trial was conducted from June to September 2020, on women who visited the ultrasound clinic for amniocentesis in Birjand city. The sample size was estimated using the formula of means comparison and based on the findings of a Chen study that compared the effect of acupressure on anxiety and pain after cesarean delivery and reported that the mean postintervention anxiety in the intervention and the control groups were 3.33 ± 0.96 and 5.07 ± 3.33, respectively.[25] Then, with 95% confidence level, 80% test power, and S_1 of 0.96, S_2 of 3.33, $\overline{X}_1$ of 3.33, and $\overline{X}_2$ of 5.07, sample size was calculated to be approximately 30 for each group.

The eligibility criteria were gestational age of 15–18 weeks, literacy, wanted pregnancy, score ≤53 of the Spielberger anxiety inventory, no medical illness and obstetrics problem, no smoking and substance abuse, no abnormal findings in hands, maternal body mass index (BMI) in the range of 18.5< BMI < 30, no history of recurrent abortions (more than three consecutive abortions) and amniocentesis, no known mental disorders, receiving no psychoactive medications, and experiencing no traumatic events during the last 6 months. The participants were excluded from the study due to unwillingness to cooperate, having active vaginal bleeding, hospitalization, failure to perform the intervention twice a week or three intermittent days during the study, attempting amniocentesis more than once, and unusual sensitivity to touch of the pressure point. Sampling was performed convenience, and the women were randomly assigned into the intervention and the control groups through drawing lots.

Data collection instruments and follow-up

A three-part instrument was used to collect data including a personal information questionnaire, the Spielberger's State-Trait Anxiety Inventory (STAI), and a daily acupressure recording checklist. The first part included items on the participants' education level, occupation, gestational age, the number of pregnancies and deliveries, the number of abortions, disabled children, the reason for amniocentesis, and the spouse's education level. This part was answered by the participants at their entry to the study. The STAI was used to measure the participants' anxiety and the

changes in the score of the STAI were considered as the study outcome. The STAI consists of 40 items in two subscales, 20 for measuring state anxiety (items 1–20) and 20 for measuring trait anxiety (items 21–40). All items are responded on a 4-point Likert scale. The 4-point scale for the state subscale is as follows: 1 – Not at all, 2 – Somewhat, 3 – Moderately, and 4 – Very much. The 4-point scale for trait subscale is as follows: 1 – Almost never, 2 – Sometimes, 3 – Often, and 4 – Almost always. Thus, the lowest and the highest possible total scores in each subscale are, respectively, 20 and 80, with higher scores showing higher anxiety.[20] The STAI has been used frequently by Iranian researchers[25,26] and its Cronbach's alpha was reported 0.94.[12] The state anxiety subscale was completed by the participants at the beginning of the study, immediately after, and 10 days after amniocentesis. The researcher made an appointment with the participants in the ultrasound office to complete the questionnaire. The trait anxiety subscale was also completed at the beginning of the study and 10 days after amniocentesis.

The daily acupressure checklist included 10 columns to record acupressure use. Mothers were instructed to mark each time in the relevant column. There was also a column to record the cause if acupressure was not performed.

For the control group, the researcher completed the personal information form and the STAI at times similar to the intervention group. For the consistency of the conducts, the researcher sat next to the participants in the control group for 30 min before amniocentesis.

Intervention

The intervention group received individual and face-to-face training on how to apply acupressure at the H7 acupoint [Figure 1]. They also received educational pamphlets on how to find the H7 acupoint and perform acupressure. The first acupressure session for each participant was held 30 min before the amniocentesis, in a quiet room with plenty of light, and while the mother was lying down in the supine position on a bed. The researcher located the H7 acupoint (next to the ulnar and pisiform bones in the transverse crease of the wrist), applied a drop of nonvolatile oil (Firooz baby oil) on the area to reduce friction, and massaged on the pressure point for 5 min per hand. Every mother in the intervention group was asked to show the pressure points where the massage was performed to confirm the correctness of the points. The participants were also explained that the intensity of the massage should be in a way that she felt numb in the area. All mothers in the intervention group were trained to perform the H7 acupressure for 10 consecutive days (i.e., during the 10 days that they were waiting for the amniocentesis results). The daily acupressure recording checklist was provided to the women in the intervention group to record whether or not acupuncture was performed daily and the reasons for nonperformance, if any. During the study, the researcher sent daily SMS to the intervention group and reminded them to perform acupressure and complete the acupressure checklist. The researcher also answered the participants' questions during the research. There was no intervention in the control

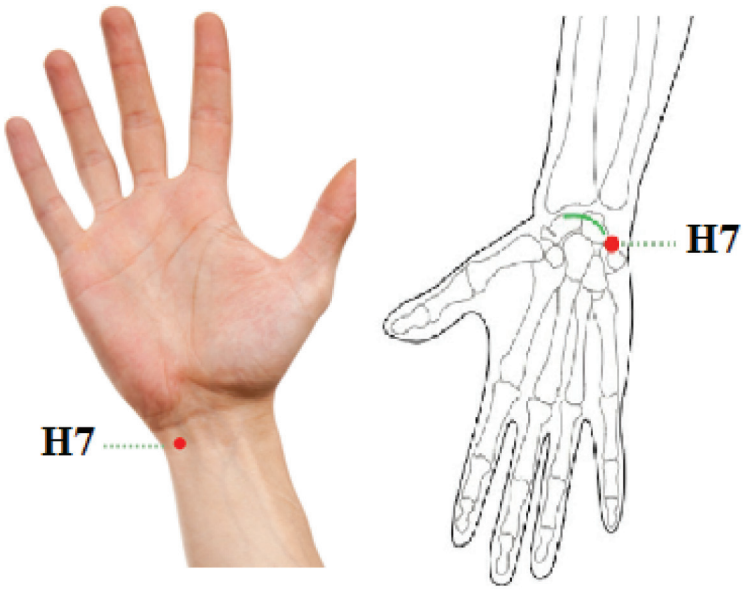

Figure 1: The H7 accupoint

group. However, a text message was sent to them daily and their questions were answered, if any.

Ethical considerations

The study was approved by the Ethics Committee of Birjand University of Medical Sciences, Birjand, Iran (approval number: IR.BUMS.REC.1398.394) and registered at the Iranian Registry of Clinical Trials with the code (IRCT20200401046914N1). At the beginning of the study, the patients were given explanations about the purpose and research method. They were also informed about their right to either participate in or withdraw from the study at any time. They were asked to sign written informed consent form at the onset of the study and were assured of the confidentiality of their personal information.

Data analysis

After coding and entering the data into the statistical software SPSS 16 (SPSS Inc., Chicago, IL, USA), the characteristics of the participants were described using descriptive statistics, including frequency, mean, and standard deviation. The normal distribution of quantitative variables was investigated using the Kolmogorov–Smirnov test. The independent samples *t*-test was used for the between-group comparison of means of variables with normal distribution. The Chi-square or the Fisher's exact tests were used to compare the categorical variables between the two groups. Repeated measures analysis of variance and Bonferroni *post hoc* test were used to conduct within- and between-group comparison of the mean anxiety scores across the three measurement time points. Paired *t*-test was utilized for the within-group comparison of trait anxiety. The statistical significance was set at <0.05.

Results

Out of 84 patients who were assessed for eligibility, 60 were included in the study. Three subjects in the intervention group and one subject in the control group were lost to follow-up [Figure 2]. The two study groups were homogenous in terms of their personal characteristics [Table 1].

The mean scores of state anxiety were not significantly different between the two groups before the intervention (P = 0.99). However, immediately and 10 days after amniocentesis, the mean scores of state anxiety were significantly lower in the acupressure group compared to the control group (P < 0.001). The results of repeated measures analysis showed that the mean changes of state anxiety varied over time (P < 0.001). Therefore, acupressure is assumed effective in reducing anxiety in mothers undergoing amniocentesis. Due to the significant interaction between the time and group (P < 0.001), the *t*-test was conducted and indicated that the mean scores of state anxiety were significantly lower in the acupressure group than the control group immediately after and 10 days after amniocentesis (P < 0.001). Bonferroni test also showed that the control group experienced higher state anxiety 10 days later compared to immediately after amniocentesis (P < 0.001). However, in the acupressure group, the mean state anxiety significantly decreased over the three measurements (P < 0.001) [Table 2].

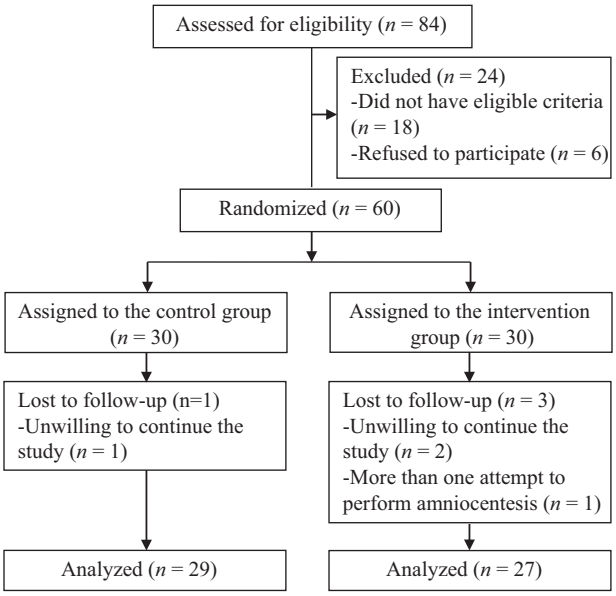

Figure 2: The study flow diagram

The *t*-test also indicated that the mean scores of trait anxiety were not significantly different between the two groups before the intervention (P = 0.35). However, 10 days after amniocentesis, the mean score of trait anxiety was significantly lower in the acupressure group compared to the control group (P < 0.001). Furthermore, the paired *t*-test showed that in the control group, the mean score of trait anxiety significantly increased 10 days after amniocentesis as compared to before the intervention (P = 0.01) [Table 3]. The acupressure group reported no problem during the study.

Discussion

The present study showed that the mean state and trait anxiety in the control group increased significantly during 10 days, while women were waiting for the test results. However, the acupressure group experienced a decreasing trend in their anxiety during the study. The mean scores of state anxiety immediately and 10 days after amniocentesis were significantly lower in the participants in the H7 acupressure group than the control

Table 1: Demographic and obstetrics characteristics in the two groups

Variable	Groups		*P*
	Control, *n* (%)	H7 acupressure, *n* (%)	
Education level			
Primary school	4 (13.8)	8 (29.6)	0.16
Secondary and high school	14 (48.3)	7 (25.9)	
Academic	11 (37.9)	12 (44.4)	
Occupation			
Housewife	25 (86.2)	22 (81.5)	0.86
Student	1 (3.4)	2 (7.4)	
Employee	3 (10.3)	3 (11.1)	
Husband's education level			
Primary school	8 (27.6)	7 (25.9)	0. 73
Secondary and high school	14 (48.3)	11 (40.7)	
Academic	7 (24.1)	9 (33.3)	
Gestational age (weeks)			
15–16	22 (75.9)	17 (63)	0.29
16–18	7 (24.1)	10 (31)	
Number of pregnancies (times)			
1–2	14 (44.8)	11 (40.7)	0.82
3–4	11 (37.9)	11 (40.7)	
5 and more	4 (13.7)	5 (18.5)	
Number of deliveries			
None	8 (27.6)	2 (7.4)	0.07
1	8 (27.6)	11 (40.7)	
2	9 (31)	5 (18.5)	
3–4	4 (13.8)	9 (33.4)	
History of abortion			
No	22 (75.9)	20 (74.1)	0.49
Yes	7 (24.1)	7 (25.9)	
Disabled child			
No	28 (93.1)	27 (100)	0.51
Yes	1 (3.4)	0	
Cause of amniocentesis			
First screening	11 (37.9)	10 (37)	0.88
Second screening	6 (20.7)	7 (25.9)	
High nuchal translucency	12 (41.4)	10 (37)	

Table 2: Comparison of mean scores of state anxiety in both groups before the intervention, immediately after, and 10 days after amniocentesis

Group	Time[a]			*P*-value (repeated measures test)		
	Before	Immediately after	After 10 days	Time	Group × time	Group
Control	50.06 ± 2.15	49.03 ± 2.30	50.86 ± 2.01	<0.001	<0.001	<0.001
H7 acupressure	50.29 ± 2.07	38.70 ± 5.64	30.22 ± 6.70			
P-value (*t*-test)	0.99	<0.001	<0.001		-	

[a]Data presented as mean ± SD. SD = standard deviation

group. Moreover, the mean scores of trait anxiety were significantly lower in the participants of the acupressure group than the control group 10 days after amniocentesis.

Our findings are consistent with the results of previous studies regarding the effect of the H7 acupressure on the reduction of anxiety. Arami *et al*. in a clinical trial compared the effect of H7 and third eye acupressure on anxiety in patients undergoing coronary angiography. The researchers concluded that both methods were effective in reducing anxiety.[24] Choubsaz *et al*. compared the effect of P6 and H7 acupressure on preoperative anxiety in women undergoing caesarian delivery. The results showed that H7 acupressure was more effective in reducing patients' anxiety.[21] Sharifirizi *et al*. examined the effect of acupressure on pain intensity, anxiety, and physiological indexes of patients with cancer undergoing bone marrow biopsy. The results indicated that the

Table 3: Comparison of mean scores of trait anxiety in the participants before the intervention and 10 days after the amniocentesis[a]

Group	Time		*P*[b]
	Before the intervention	After 10 days	
Control	48.33 ± 2.63	49.47 ± 2.39	0.01
H7 acupressure	47.67 ± 2.89	34.10 ± 4.89	<0.001
P[c]	0.35	<0.001	-

[a]Data presented as mean±SD, [b]Paired *t*-test, [c]*t*-test. SD: Standard deviation

combined acupressure of LI4 and H7 points was effective in reducing anxiety and pain.[27] Ranjkesh *et al*. also conducted a study to determine the effect of acupressure of SP6, LI4, H7, and Neima points on childbirth anxiety of nulliparous women. The results indicated that the stimulation of points SP6, LI4, H7, and Neima was effective in reducing state and trait anxiety in nulliparous women.[17] The two latter studies applied acupressure on a combination of pressure points. However, we only applied pressure on the H7 point and found that stimulating this point could not only reduce amniocentesis-related anxiety but also reduce maternal anxiety while waiting for test results. Nonetheless, Honda *et al*. reported that a 4-week self-administered acupressure intervention could not reduce perceived stress in college students.[28] The reasons for the discrepancy between Honda *et al*. and the current study involve differences in the acupressure points used, the duration of acupressure, target population, and the instruments used.

Several possible mechanisms can explain the findings. Stress and cortisol are related. As stress increases, so does cortisol. Studies have shown that the stimulation of acupressure points modulates hormonal–neuronal responses in the hypothalamic-pituitary-adrenal axis, which ultimately regulates cortisol secretion and causes relaxation. In addition, acupressure can increase the secretion of serotonin and dopamine by stimulating the anterior pituitary.[29] Increased plasma levels of serotonin and dopamine decrease cortisol production.[30] The acupressure point stimulation releases endorphins, which reach their highest level 30 min after the onset of stimulation and remain high for 10 h. Similarly, the intense and high-frequency stimulation of the H7 acupoint releases endorphins and increases serotonin levels.[21]

Concerning limited studies conducted on amniocentesis-related anxiety, further studies with larger sample sizes are recommended to be carried out to confirm the results of the present study.

The individual characteristics and the different responses of people to the treatment might have affected the results. Furthermore, this study was only single-blind, however, double-or triple-blind studies (although almost impossible) are recommended to confirm the results of this study.

Conclusion

The results indicated that the H7 acupressure was effective in reducing state and trait anxiety in pregnant women during amniocentesis and when they were waiting for their amniocentesis results. Since a midwife has an important role in providing the necessary advice and recommendations during pregnancy and childbirth, she can recommend the use of acupressure to pregnant mothers who are candidates for amniocentesis to decrease their anxiety.

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Conflicts of interest

There are no conflicts of interest.

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