ORIGINAL ARTICLE

Efficacy of Auricular Point Acupressure with Magnetic Plates on Postpartum Anxiety and Depression in Low Risk Parturient at Thammasat University Hospital: A Randomized Clinical Controlled Trial

Rosemawatee Hajeeyeh, MD[1], Komsun Suwannarurk, MD[1], Paradi Sangwattanakul, PhD[2], Puckjira Iaocharoen, MD[1], Jenny Kim[1,3], Junya Pattaraarchachai, PhD[2], Kornkarn Bhamarapravatana, PhD[4]

[1] Department of Obstetrics and Gynecology, Faculty of Medicine, Thammasat University, Pathum Thani, Thailand; [2] Chulabhorn International College of Medicine, Thammasat University, Pathum Thani, Thailand; [3] Medical student, Faculty of Medicine, Thammasat University, Pathum Thani, Thailand; [4] Department of Preclinical Science, Faculty of Medicine, Thammasat University, Pathum Thani, Thailand

Objective: To study the effectiveness of auricular acupressure (AC) with and without magnetic plates in reducing anxiety and depression levels among parturients.

Materials and Methods: The present study was a randomized controlled trial conducted at the department of Obstetrics and Gynecology, Thammasat University Hospital, Pathum Thani, Thailand, between March 2022 and February 2023. All participants were term nulliparous pregnant women delivered who during the study period. Participants were randomly allocated into three groups with control for non-AC, study for AC with magnetic plates, and placebo for AC with non-magnetic plates. Three specific auricular points, namely Shenmen (HT7), Heart (CO15), and Subcortex (AT4) were selected. Thai Hospital Anxiety and Depression Scale (Thai HADS) was evaluated at 2, 14, 28, and 42 days postpartum.

Results: Two hundred twenty-five cases were recruited and divided evenly into control, study, and placebo groups. The mean age of participants was 28.5 years old. Body mass index (BMI), education level, and demographic characteristics among the three groups were comparable. Prevalence of anxiety and depression was 4.4% (10/225) and 7.5% (17/225). Participants in placebo and study groups had statistically significant relief of anxiety levels within six weeks when compared to the control group. All subjects had lower depression scores within four weeks of delivery. AC with and without magnetic plates reduced postpartum depression compared to the control group. Satisfaction of AC was reported at 84% (126/150).

Conclusion: AC with or without magnetic plates at HT7, CO15, and AT4 significantly reduced anxiety and decreased depression with less confidence in postpartum subjects.

Keywords: Auricular acupressure; Anxiety; Depression; Postpartum; Magnetic plates

Received 2 June 2023 | Revised 10 October 2023 | Accepted 24 October 2023

J Med Assoc Thai 2023;106(11):1041-8

Website: http://www.jmatonline.com

Pregnancy is a condition that entails massive physiological changes. After delivery, these changes can be reversed to pre-pregnancy state within six weeks[1]. Minor psychological problems during pregnancy were anxiety or depression[2]. Adverse maternal and child outcomes during parturition were associated with anxiety[2]. Diagnosis of anxiety can be made according to the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-V)[3]. Parturients with anxiety might encounter difficulty with general childcare including breastfeeding[4].

Dysregulation of the hypothalamic-pituitary-adrenocortical axis is believed to be a major cause of psychological dysregulation during pregnancy[5]. The release of stress hormones, namely cortisol and catecholamines, lead to placental hypoperfusion. Intrauterine growth restriction is a consequence of placental insufficiency[5]. Depression among parturients is typically called postpartum blues or postpartum depression (PPD)[5]. Depression has a wide range of severities. Severity of PPD varies from unpleasant mood to suicidal ideation or action[5]. Fluctuation of sex hormones during parturition is a critical biological contributing factor to increased

Correspondence to:

Suwannarurk K.

Department of Obstetrics and Gynecology, Thammasat Hospital, Khlong Luang, Pathum Thani 12120, Thailand.

Phone: +66-2-9269343

Email: k_suwannarurk@yahoo.com

How to cite this article:

Hajeeyeh R, Suwannarurk K, Sangwattanakul P, Iaocharoen P, Kim J, Pattaraarchachai J, et al. Efficacy of Auricular Point Acupressure with Magnetic Plates on Postpartum Anxiety and Depression in Low Risk Parturient at Thammasat University Hospital: A Randomized Clinical Controlled Trial. J Med Assoc Thai 2023;106:1041-8.

DOI: 10.35755/jmedassocthai.2023.11.13912

risk of depression and anxiety. Female brains are plastic and vulnerable to estrogen level fluctuations[6]. The transition from pregnancy to non-pregnant state typically requires approximately six weeks[1].

Complementary and non-pharmacological approaches may be worth considering as an adjunct to lower anxiety and depression levels in the new mothers during the postpartum period[7]. Needle acupuncture and auricular acupressure (AC) are ancient methods from Traditional Chinese Medicine (TCM). TCM is accepted as an alternative approach with modern medicine among Thai people[8].

Massaging at auricular acupuncture points reflects the inner working of various organs within the body. Its benefits include relaxation, lowered stress, enhanced immune response, and improved quality of sleep. Stimulation of the ear caused a response in neurological reflex, neurotransmitters, cytokines, immune system, and inflammation[9]. In TCM, there are 12 meridian channels mapped within our body that contain blood and qi. The 12 meridians spread out into a network of connections, supplying their flow through the entire body[9]. The helpful materials for ear stimulation method included needles, seeds, magnetic stones, and auricular massage by hand. The release of endorphins and neurotransmitters, namely serotonin, norepinephrine, and GABA in brainstem, midbrain, and hypothalamus are believed to be effects of AC[9]. In a previous study from Tanitsookarn, AC applied at Shenmen (HT7), Penqiang (TF5), and Erzhong (HX1) could significantly relieve unexplained post cesarean pain between 18 and 72 hours[10].

The aim of the present study was to study the effectiveness of AC with and without magnetic plates in reducing anxiety and depression levels among parturients.

Materials and Methods

The present study was a randomized controlled trial conducted at the Department of Obstetrics and Gynecology, Thammasat University Hospital, Pathum Thani, Thailand. The period of study was between March 2022 and February 2023. The present study was approved by the Ethical Committee on Clinical Research of the Faculty of Medicine, Thammasat University (MTU-EC-OB-2-327/64). The Clinical Trial Registration number was TCTR 20220128001.

Enrollment of participants was taken during antenatal visits of the patients during the last trimester. Participants were given consent forms to sign after thorough counseling during labor in the labor room. Inclusion criteria consisted of term, nulliparous pregnant women, aged between 20 to 40 years old, and had delivery during the study period. Exclusion criteria consisted of cases with multiparity, underlying diseases requiring immediate intervention, mental illness, active medication used in altering the nervous system, complications during labor or postpartum, assistance received by delivery tools during labor, injury to or disease of one or both ears, and participation refusal. Withdrawal or termination criteria included participants experiencing side effects suspected to be caused by the research such as intense pain during AC, non-compliance, inability or unwillingness to cooperate with researchers as agreed, and deterioration of vital signs or clinical symptoms resulting in inability to participate.

Demographic data collected included age, underlying diseases, body mass index (BMI), occupation, education level, income, status, religion, history of previous surgery, and delivery route. Anxiety and depression levels were evaluated according to the scoring system of the Thai Hospital Anxiety and Depression Scale (Thai HADS). The questionnaire had two categories covering anxiety and depression[11,12]. Each category consists of seven questions with a maximum score of 21 points in each category. Diagnosis of anxiety or depression was made in those with scores higher than 11.

Participants were divided into three groups, control, study, and placebo. The control group did not receive AC. AC with and without magnetic plates FENG FAN® (Hengshui Fengfan Medical Device Trading Co., Ltd., Hengshui, China) was applied to the study and placebo groups, respectively. Flow study is presented in Figure 1. Instructions on how to perform AC were given to participants within six hours postpartum. The sites of acupressure for the study were referenced according to Oleson's Textbook of Auriculotherapy[13]. Adhesive patches attached to magnetic plates were placed at three locations, namely, Shenmen (HT7), heart (CO15), and subcortex (AT4) on either the right or left ear within six hours after the delivery and stayed until six weeks postpartum as presented in Figure 2. The placebo group had the same patches placed accordingly without magnetic plates on either right or left ear. Magnetic plates can be replaced in case of any damage or loss. Both study and placebo groups were advised to massage onto each auricular point patch, the three points, for 60 seconds each, totaling to three minutes of massaging per ear three

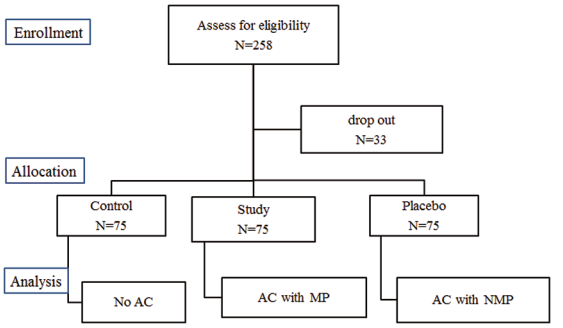

Figure 1. Flow study.

AC: auricular acupressure, AC with MP: auricular acupressure with magnetic plate, AC with NMP: auricular acupressure with non-magnetic plate

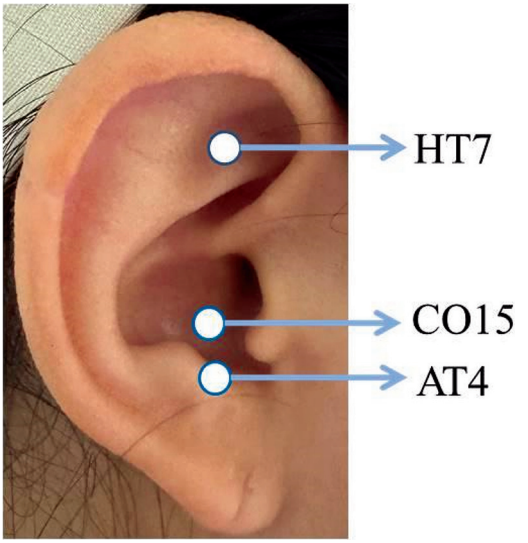

Figure 2. Auricular point acupressure.

HT7: Shenmen, CO15: Heart, AT4: Subcortex

times per day. Participants answered the anxiety and depression questionnaire themselves in writing or QR code to answer online within 2, 14, 28, and 42 days postpartum. The researcher additionally conducted a phone interview with each participant to evaluate any additional symptoms arising throughout the study.

Statistical analysis

The sample size was calculated using the G-power program version 3.1.9.4 (UCLA, LA, USA). The effective size was set at a level of 0.25. Alpha and beta errors were set at a level of 0.05. Total sample size was at least 207 cases. Due to the possibility of incomplete data, the sample size was increased by 10%. The number of three study groups combined amounted to approximately 225 participants and so each group contained 75 cases. Data collection was taken during antenatal visits of patients in the last trimester. The present study was set as quasi-experimental research using a time series design.

Statistical package for the IBM SPSS Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY, USA) was used for statistical analysis. Demographic characteristics of each group were analyzed and expressed as mean and standard deviation. Categorical data were analyzed and expressed as chi-square or Fisher's exact test with appropriate conditions. Anxiety and depression levels of each participant throughout the 42 days period were analyzed using a generalized linear model for ANOVA repeated measures, mean and standard deviation analysis. The p-value was set at level 0.05 for statistically significant.

Results

During the present study period, 225 cases were recruited in control, study, and placebo equally. The mean age of the participants was 28.5 years old without statistical significance. Four-fifths (184/225) participants had BMI classified as overweight or more (p=0.934). The percentage of employees and government officers was 60% (133/225), without statistical significance. Two thirds of participants (135/225), had an education level equal or higher than a bachelor's degree. Demographic characters of participants were comparable as presented in Table 1.

There were one, three and six cases of anxiety, with a score higher than 11 in the control, study, and placebo groups, respectively. Prevalence of anxiety in postpartum women in the present study was 4.4% (10/225 participants). The anxiety level of the intervention groups for the study and placebo group was better than the control group at six weeks postpartum with statistical significance. The intervention groups subjects performed auricular massage two weeks after delivery. The placebo group who received AC had a statistically significant reduction of anxiety level larger than the study group at 42 days as shown in Figure 3. Thirty-two percent (48/150) and 14% (21/150) of the subjects continued AC massage at one and two weeks, respectively.

The control, study, and placebo groups had four, five, and eight cases diagnosed with PPD, thus a depression score greater than 11, respectively. All diagnosed cases had spontaneous resolution without any medication at the six weeks of postpartum follow-up. All subjects in these three groups had comparable reduction of depression level as shown

Table 1. Demographic character of participants (75 cases per group)

	Control	Study	Placebo	p-value
Age (years); mean±SD	28.38	28.88	28.09	0.546
BMI (kg/m^2); n (%)				0.934
Normal (18.5 to 22.9)	15 (20.0)	14 (18.7)	12 (16.0)	
Overweight (23.0 to 24.9)	10 (13.3)	13 (17.3)	15 (20.0)	
Obese (25.0 to 29.9)	37 (49.3)	35 (46.6)	37 (49.3)	
Morbid obesity (>30.0)	13 (17.4)	13 (17.4)	11 (14.7)	
Occupation; n (%)				0.426
Employee	28 (37.3)	25 (33.3)	26 (34.7)	
Government officer	18 (24.0)	19 (25.3)	17 (22.7)	
Self employed	13 (17.3)	11 (14.7)	8 (10.7)	
Agriculture	9 (12.0)	15 (20.0)	20 (26.6)	
Housewife	7 (9.4)	5 (6.7)	4 (5.3)	
Education; n (%)				0.763
Secondary or lower	33 (44.0)	32 (38.7)	25 (33.3)	
Bachelor or higher	42 (56)	43 (57.3)	50 (66.7)	
Income (USD/month); n (%)				0.903
<264	9 (12.0)	6 (8.0)	9 (12.0)	
264 to 440	13 (17.3)	20 (26.7)	24 (32.0)	
>440	53 (70.7)	49 (65.3)	42 (56.0)	
Married/couple; n (%)	75 (100)	75 (100)	73 (97.3)	0.157
Buddhist; n (%)	73 (97.3)	73 (97.3)	69 (92.0)	0.525
Underlying disease; n (%)				0.808
None	59 (78.7)	60 (80.0)	62 (82.6)	
DM	6 (8.0)	4 (5.3)	2 (2.7)	
CHT	1 (1.3)	3 (4.0)	2 (2.7)	
Anemia	5 (6.7)	5 (6.7)	5 (6.7)	
Others	4 (5.3)	3 (4.0)	4 (5.3)	
No Sx Hx; n (%)	72 (96.0)	72 (96.0)	71 (94.7)	1.000
Vaginal delivery; n (%)	37 (49.3)	37 (49.3)	37 (49.3)	0.871

Sx Hx=history of surgery; DM=diabetes mellitus; CHT=chronic hypertension; SD=standard deviation

in Figure 4. AC had no effect on PPD reduction. Prevalence of PPD in the current study was 7.5% (17/225 participants).

Subjects in study and placebo groups reported high satisfaction of auricular massage at 84% (126/150 participants).

Discussion

The present study was conducted in nulliparous women to prevent any bias from participants' previous delivery. Participants in the present study could follow AC protocol. A majority of subjects in the current study were overweight. Ear pinna have no subcutaneous fat. The obese or lean subjects had no difference of subcutaneous fat that might interfere with AC[14].

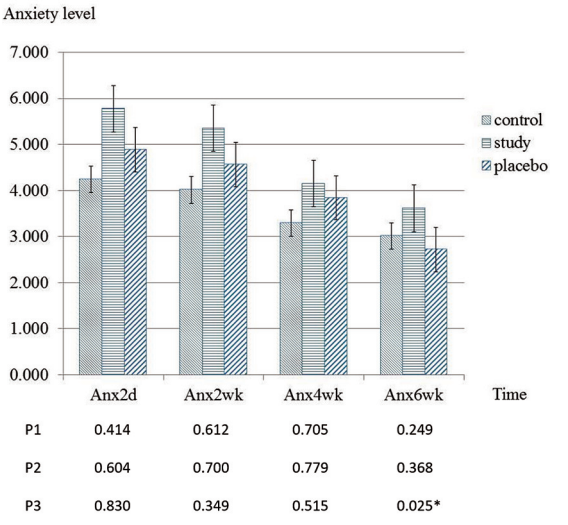

Figure 3. Anxiety level after auricular acupressure with and without magnetic plate and control group.

Control: no auricular acupressure, Study: auricular acupressure with magnetic plate, Placebo: auricular acupressure without magnetic plate, Anx2d: anxiety level after postpartum within 2 days, Anx2wk: anxiety level after postpartum within 14 days, Anx4wk: anxiety level after postpartum within 28 days, Anx6wk: anxiety level after postpartum within 42 days, P1: p-value of the control group compared with study group, P2: p-value of the control group compared with placebo group, P3: p-value of the study group compared with placebo group

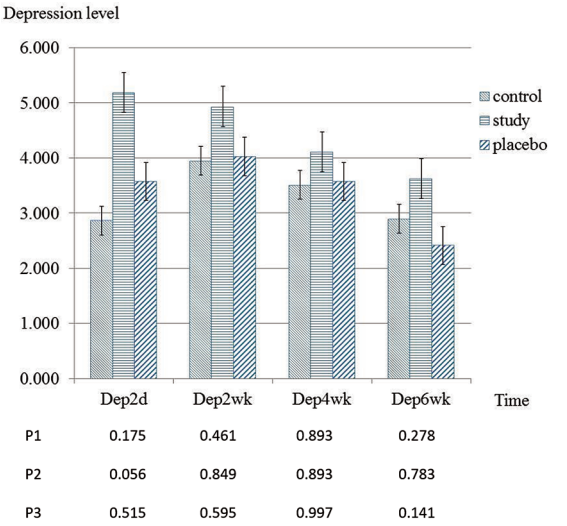

Figure 4. Depression level after auricular acupressure with and without magnetic plate and control group.

Control: no auricular acupressure, Study: auricular acupressure with magnetic plate, Placebo: auricular acupressure without magnetic plate, Dep2d: depression level after postpartum within 2 days, Dep2wk: depression level after postpartum within 14 days, Dep4wk: depression level after postpartum within 28 days, Dep6wk: depression level after postpartum within 42 days, P1: p-value of the control group compared with study group, P2: p-value of the control group compared with placebo group, P3: p-value of the study group compared with placebo group

Auricular acupoint stimulation can be executed via either needle puncture or massage. Auricular massage was chosen in the current study to avoid prolonged needle puncture at the body site. The non-invasive nature of auricular acupoint massage is more widely accepted[15]. Each acupressure points in TCM stimulated all sympathetic and parasympathetic nervous systems. AC at HT7 could be used to relieve anxiety and depression, as well as keep the flow of blood and qi in homeostasis[16]. Tseng et al. reported from Taiwan in 2020 that AC at HT7 in elderly subjects could significantly reduce anxiety levels[16]. Chueh's 2018 work in nurse volunteers reported that AC at HT7 could significantly reduce anxiety level[17]. AC at HT7 could reduce anxiety level in either young or elderly subjects[16,17]. Another study from Taiwan in 2016, Kuo et al. reported that anxiety levels in postpartum participants could be relieved by HT7 massage[18]. In the current study, AC at HT7, CO15, and AT4 could reduce anxiety levels among postpartum subjects with a high satisfaction score. The current result supported the studies of Tseng et al., Chueh et al., and Kuo et al. Significant result of non-invasive AC is widely accepted. From review of literature in 2021, non-pharmacologic applications for anxiety reduction were encouraged to be performed during pregnancy and postpartum period, but not during labor[19].

From TCM concepts, all diseases are caused by the imbalance of qi and blood. Excess or deficiency of qi and blood could imbalance the status of Yin-Yang[13], to be fixed with stimulation or drainage. Postpartum anxiety (PPA) was believed to be caused by blood loss[13]. AC at HT7 is known to stimulate or add blood according to TCM for balance of qi and blood. From the current study, the use of AC with magnetic plates at HT7 reduced the anxiety level of postpartum subjects to a lesser extent than the results from the non-magnetic group. Magnetic plates were used for subjects for an effective and precision massage to stimulate the blood flow. However, excessive stimulation could result in imbalance of qi and blood[13]. In the present study, AC at HT7 without magnetic plates was enough to establish a proper balance of qi and blood. This might be an explanation, according to TCM, that the use of AC without magnetic plates had better results than those AC with magnetic plates in anxiety relief. PPA patients were classified as those with deficiency of blood according to TCM[13]. The use of AC with magnets had stronger stimulation on qi or blood than the use of AC without magnets[13]. For the current study, AC without magnet was appropriate for balancing qi and blood to relieve PPA.

Cheng et al. reported from Taiwan in 2019 that AC massaging could decrease PPD among parturients. Sanyinjiao (SP6), Shenshu (BL23), Dachangshu (BL25), Guanyuanshu (BL26), and Weiyang (BL40) were chosen as AC points. Cheng's work had nursing staff perform AC on patients' both ears five days per week for one month[20]. Wei's 2021work from China performed AC by a TCM physician on a patient during the active phase of labor, thus between two uterine contractions. AC points in Wei study were Guanyuan (CV4), Hegu (LI4), Kunlun (BL60), Zhongji (CV3), and Sanyinjiao (SP6)[21]. Both studies reported that AC massaging decreased PPD. The similar points of both studies were SP6 points. There were many AC points that could be used to decrease PPD. Variation of AC point, frequency, or duration of stimulation and type of operator such as the patients themselves or trained personnel, were the confounding factors for reduction of depression reported.

From the current study, the AC massage at HT7, CO15, and AT4 decreased PPD in the study, placebo, and control groups without statistical significance. The result of the current study was not in line with the study of Tseng et al. and Chueh et al., which reported that AC massage at only HT7 in nurse and elderly subjects could decrease depression level. Both Chueh et al. and Tseng et al. reported that AC massage at HT7 could decrease depression and anxiety level as mentioned in the former paragraph[16,17]. A comparison of previous literature and the current study is summarized and presented in Table 2.

Subjects in Tseng's and Chueh's study performed AC by TCM trained personnel at both ears for two and four weeks, respectively without music listening. When AC was practiced alongside other activities such as listening to music, meditation, or exercise, it could stimulate blood flow and release the imbalance of qi in the liver[13]. According to TCM, retention of qi in the liver was believed to cause depression. Drainage of qi could be accomplished by performing AC at the liver point (CO12) from three to four times a day[13].

Criteria for PPD diagnosis according to DSM-V was depression onset that occurred during pregnancy or within the first four weeks after delivery. Payne and Maguire (2019) stated that the four-week time-period remained controversial and there had been a push to increase this window to six months following delivery[22]. At six weeks evaluation in the current

Table 2. Comparison of auricular acupressure for relieve anxiety and depression to previous literatures

	Wei	Tseng	Cheng	Chueh	Kuo	Present
Year	2021	2020	2019	2018	2016	2023
Country	China	Taiwan	Taiwan	Taiwan	Taiwan	Thailand
Intervention	AC	AC	AC	AC	AC	AC
Subject	PP	Elderly	PP	Nurse	PP	PP
Cases (n)	85	47	70	36	80	225
Anxiety	Dc	Dc		Dc	Dc	Dc
Depression	Dc	Dc	Dc	Dc		NA
Quality sleep				Ic		
Point						
HT7		X		X	X	X
CO15						X
AT4						X
CV4	X					
LI4	X					
BL60	X					
CV3	X					
SP6	X		X			
BL23			X			
BL25			X			
BL26			X			
BL40			X			

AC=auricular acupressure; PP=postpartum women; Elderly=old age subjects; Dc=decrease, Ic=increase; NA=not applicable; HT7=Shenmen; CO15=heart; AT4=subcortex; CV4=Guanyuan; LI4=Hegu; BL60=Kunlun; CV3=Zhongji; SP6=Sanyinjiao; BL23=Shenshu; BL25=Dachangshu; BL26=Guanyuanshu; BL40=Weiyang

study, there was no subject that performed AC for more than one month. Most cases were healthy and happy during the interview at two, four, and six weeks of postpartum.

Prevalence of PPA at six months from reviewed literature was 13%[23]. One-third and two-third of young and highly educated participants developed PPA, respectively[23]. However, working women were at high risk of PPA at 52%, according to Field's study[23]. Paul's American work reported that 20% of nulliparous parturients developed PPA[24]. Young age, high education, working women, and nulliparity were the risk factors for PPA. These cases should be counseled and treated. However, prevalence of PPA in the current study was 4.4%, which was lower than that of the western reports.

The literature showed a higher prevalence of PPD in adolescent mothers than those in adulthood[25]. Incidence rate of PPD in nulliparous adolescent and adult women were 14% to 32% and 7.2% to 16%, respectively[25]. This current study showed the prevalence of 7.5% in the adult parturient in line with the results from previous studies. Subjects in the current study could regularly perform AC during their hospital admission. Study and placebo groups had only five and eight cases of PPD. Most of them were diagnosed with PPD, with a score greater than 11, at two weeks postpartum. PPD resolved at four weeks postpartum. Participants stopped AC by this time. It was reported that participants felt AC massaging might interfere with the ability to nurse their newborns. In the control group, four participants had PPD at two weeks postpartum, which spontaneously resolved at four weeks postpartum. It was uncertain whether PPD is reduced by effect of AC or natural progression.

From the closing interview, a majority of participants felt relaxed in their new mother roles by two weeks postpartum. As result, they stopped their AC practice because they did not need it. The stopped practice had affected the statistical significance of AC effect on depression reduction.

During the interview at two, four, and six weeks, subjects in the current study reported appreciation of the method and reported satisfaction with their hospital experience. This could be a result of anxiety and depression management. The subjects in the current study had high education level and enough income for life spending. The baseline of anxiety and depression for socioeconomic factors was lower than that of previous studies[23,26]. The lower prevalence of anxiety and depression than expected could affect the statistical significance of the present study.

This current work carefully chose one ear manipulation of three spots. New mothers have many activities to do regarding infant care, self-care, and family duty. Therefore, one ear manipulation was selected because it could be done even when the mother was holding an infant in one arm. Therefore, there was no excuse for mothers not to do it. The study was a success as all mothers showed 100% participation in the early weeks. Other works had health care providers giving new mothers the manipulation. In the present study medical school hospital setting, the authors had no workforce to do AC for patients on a daily basis. The strength of the current study was a prospective randomized controlled trial among nulliparous participants for prevention of previous obstetric experience. The low prevalence of PPA, PPD, and potential bias from the auricular patch or not, were inevitable events and the limitation of the present study.

In conclusion, introducing AC with or without magnetic plates at HT7, CO15, and AT4 in single ear

for postpartum women decreased PPA with uncertain decreased PPD. Easy, convenient, and low-risk application was appropriate for use among postpartum patients. There were no downsides in AC. PPA and PPD in patients mostly occurred during the first two weeks postpartum. Better education for benefits, information of no side effects, and continuous AC as long as they felt unhappy were recommended.

Conclusion

AC with or without magnetic plates at Shenmen (HT7), heart (CO15), and subcortex (AT4) significantly reduced anxiety and uncertain decreased PPD in postpartum subjects.

What is already known on this topic?

Anxiety and depression could occur during pregnancy and reverse to pre-pregnant stage within six weeks. Diagnosis of anxiety and depression was according to DSM-V criteria. Dysregulation of the hypothalamic-pituitary-adrenocortical axis was believed to be the cause of anxiety and depression during pregnancy. In TCM, there are 12 meridian channels mapped within our body that contain blood and qi. Imbalance of qi and blood was believed to be the cause of PPA and depression. AC was an ancient method from TCM that was accepted as an alternative approach. Release of endorphins and neurotransmitters in brainstem, midbrain, and hypothalamus were believed to be the effect of AC.

What does this study add?

This study showed AC with or without magnetic plates at Shenmen (HT7), heart (CO15) and subcortex (AT4) in a single ear for postpartum women decreased PPA with uncertain decreased PPD within two weeks. AC was introduced as an easy, convenient, and non-invasive method with a high satisfaction score of 84%.

Acknowledgement

The present study was supported by the research fund of Thammasat University, Pathum Thani, Thailand in 2021.

Conflict of interest

The authors declare no conflict of interest.

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