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REVIEW

Effect of Body Acupuncture on Pregnancy-Related Low Back Pain and Pelvic Pain: A Systematic Review

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Abstract
Objective: The aim of the authors of this study was to determine the effect of body acupuncture on the symptoms of low back pain and pelvic pain suffered during pregnancy.
Material-Method: In this systematic review, 8 international databases (Cinahl, PubMed, Web of Science, Google Scholar, Science Direct, Scopus, Ebsco Host, Cochrane Library) comprising the period between January 2000 and March 2020 were screened. Articles that are not in English and Turkish were excluded. Three authors screened the related articles based on the titles and abstracts independently of each other.
A data extraction form was filled in for each appropriate study. The quality of the studies included in the study was assessed using the Jadad scale and PRISMA guidelines.
Results: Finally, six studies conducted in 3 countries between January 2000 and March 2020 with 838 pregnant women with complaints of low back pain and pelvic pain were included in the review. The results showed that body acupuncture reduced pregnancy-related low back pain and pelvic pain complaints and that it had no side effects.
Conclusion: We think that body acupuncture, a non-pharmacological method, will help clinicians to relieve the symptoms of pregnancy-related pelvic pain and low back pain.
Keywords: Body Acupuncture, Pregnancy, Low Back Pain, Pelvic Pain

INTRODUCTION

While pregnancy-related lower back pain (LBP) spreads from the upper part of the sacrum to the 12th costa, pelvic girdle pain (PGP) is felt near the sacroiliac joint, extending from the posterior iliac crest to the gluteal region.[1] The etiology of these pains that can last more than a week during pregnancy and may sometimes cause serious clinical problems is not exactly known.[2-4] The review of the literature demonstrates that approximately 34% to 76% of pregnant women experience lower back pain, pelvic girdle pain, or both.[5-10]

Lower back pain and pelvic girdle pain that are likely to affect activities of daily living and quality of life during pregnancy are thought to develop due to hormonal, mechanical, circulatory and psychosocial changes.[11] In several studies conducted on the issue, many factors such as age, parity, physical activity, body mass index, exhausting working conditions, history of back pain and pelvic girdle pain and history of trauma to the pelvis have been reported to pose a risk for pregnancy-related pelvic girdle pain and lower back pain.[1,5,12-14] Pregnancy-related lower back pain and pelvic girdle pain usually begin in the 18th week of pregnancy and peak between the 24th and 36th weeks of pregnancy. The differential diagnoses of LBP and PGP are mostly similar, but taking a careful clinical history and physical examination may help make a definitive diagnosis.[1] In order to distinguish these two pains from each other, several pain provocation tests and palpation tests should be performed.[1,15] The treatment includes individualized education and training programs, physical therapy, exercise and medication use. In the trainings, the aim is to teach anatomy, ergonomics, correct posture, pain management strategies and relaxation techniques.[13,15] Physical

therapy and exercise include practices that help gain muscle strength, flexibility and endurance, repair injured tissues and maintain normal activities of daily living.[15,16] Today, in addition to these methods, many alternative and complementary therapies such as transcutaneous electrical nerve stimulation (TENS), acupuncture, massage and aromatherapy are used.[13,15,17] Acupuncture is among the Complementary and Alternative Medicine (CAM) methods that are frequently preferred in management of LBP and PGP.[21,22,24,28,29] Acupuncture is one of the oldest known therapeutic treatment forms that is characterized by inserting needles into a certain part of the body to stimulate a response.[18,43] Acupuncture is performed by inserting thin needles in acupuncture points in certain parts of the body for 15-20 minutes.[20] With the acupuncture method, all types of touch-sensitive and mechanically sensitive pain fibers and deep tissue receptors are activated.[44] Acupuncture, which is an effective method in treatment of chronic pain involves pain management mechanisms such as 'gate-control' spinal cord mechanisms, 'diffuse noxious inhibitory control (DNIC)' and top-down effects such as expectations of pain relief.[19,45-48] Acupuncture stimulation involves sensory-discriminative and affective dimensions. In the discriminative aspect, de qi, which is related to needling, includes a blend of various sensations, such as heaviness, numbness, soreness and distension. In the sensory aspect, acupuncture may rise feelings of calm and wellbeing in the person by activating C tactile fibers with mild manual tactile stimulation.[19] As a result of this, with the increased activity of C tactile afferents, 'limbic' touch response, which leads to the emergence of emotional and hormonal reactions, forms.[49] In the field of neuroscience, while it is thought that behavioral and neurophysiological response to C tactile afferents is well-established, the role of emotional touch in acupuncture stimulation is not well-known.[49] In the literature, it is stated that acupuncture provides effective analgesia in women suffering pregnancy-related PGP and/or LBP during pregnancy.[3-4,21-24,28,29] It is a realistic and urgent need to investigate the effectiveness and safety of the body acupuncture method used to reduce the symptoms of pregnancy-related pelvic girdle pain and lower back pain.

Aim and question of the research

In this systematic review, it was aimed to investigate and summarize the available evidence about the effectiveness of the body acupuncture method used to reduce the symptoms of pregnancy-related lower back pain and pelvic pain. The study sought answers to the following question: What is the effectiveness of the body acupuncture method used to reduce pregnancy-related low back pain and pelvic pain symptoms?

MATERIALS AND METHODS

Design

In this quantitative systematic review, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were used for the analysis of previously published articles.[25] The PRISMA checklist ensures a clear and transparent review of the articles included in review for the integrity of the review. In this study, the focus was on the search of articles analyzing the effectiveness of the body acupuncture method used to reduce pregnancy-related lower back pain and pelvic girdle pain.

After duplicate articles were eliminated, the study was carried out through a three-stage process:

1. Screening of the relevant articles based on their titles and abstracts,
2. Article selection based on the reading of the entire text,
3. Analysis of the texts by at least two of the four referees independently of each other (ASK, SDA, ND, SKO). One of the referees analyzing the texts was not included this study.

Search methods

This study was carried out by retrospectively screening papers published between January 2000 and February 2020 to analyze the effectiveness of the body acupuncture method implemented to reduce pregnancy-related lower back pain and pelvic girdle pain. To this end, the CINAHL, Medline (Pubmed), Google Scholar, Science Direct, Isi Web of Science, Ebsco Host, Cochrane Library and Scopus databases were screened over the internet access networks of Kocaeli University and Kırklareli University by using the following search terms: "back pain", "lower back pain", "pelvic gridle pain", "pelvic pain", pregnancy", "pregnant women" and "acupuncture".

Search outcomes

Original studies which met the following inclusion criteria were included in the study:

1. Randomized controlled clinical trial studies (RCT)
2. Studies published in English or Turkish

3. Studies published between January 2000 and February 2020.
4. Studies conducted on the body acupuncture method, one of the acupuncture methods, used for reduction of pregnancy-related lower back pain and pelvic girdle pain.

After 500 duplicate articles were removed, three authors of the study (AS, ND and SDA) reviewed the remaining 97 articles. They determined whether or not the titles and abstracts of the articles met the inclusion criteria. In case of disagreement, the referees made a decision after discussing the matter. If the referees could not reach a consensus, then the fourth referee, who was not included in the study, was consulted. If the information in an article was considered insufficient, more information was requested from the author of the article via e-mail. The referees agreed that 97 articles were acceptable. After the full texts of these articles were read, some articles were excluded from the study due to the following reasons:

1. Studies in which the acupuncture application was not limited to the pregnancy period (i.e. the application started when the women had pain during pregnancy and continued in the postpartum period).
2. RCTs in which the ear acupuncture and Korean hand acupuncture methods were used.

Quality appraisal

The quality assessment of the studies was performed in accordance with the Cochrane Handbook for Systematic Reviews of Interventions.[26] Therefore, the quality of the studies that were reviewed was rated using different methods to evaluate different designs of study.

Assessment of the risk of bias is part of the conduct and reporting of systematic studies. Within this context, the JADAD scale was used to assess the risk of bias and the quality of RCTs.[27] The JADAD scale consists of 3 items: describing randomization, blinding and accountability (dropout and withdrawals).

Rating process of randomization

If randomization was mentioned in the study, it was given 1 point, and if it was appropriate for the randomization method, it was given 1 point. Additionally, if it was inappropriate for the randomization method, 1 point was subtracted.

Rating process of blinding

If blinding was mentioned in the study, it was given 1 point, and if it was appropriate for the blinding method, it was given another 1 point. If it was not suitable for the blinding method, 1 point was subtracted.

Finally, we assigned 1 point if the accountability was known; if there were no data, the reason should have been stated. Scores to be obtained from the JADAD Scale range between 0 and 5. If the JADAD score is ≥3 points, the study is considered a high-quality study, and if it is ≤2 points, the study is considered a low-quality study.[27]

Similarly, the Consolidated Standards of Reporting Trials (CONSORT) checklist was used to assess the reporting quality of the studies. Studies that did not meet at least 70% of the items included in the CONSORT statements were considered to contain significant methodological flaws.

Data extraction

A data extraction document was prepared for the analyzed studies. In the document, the following information was recorded: the title, authors and publication year of the study, the country where the study was performed, type of the study, location of the study, inclusion criteria for the study, age and gestational age of the participants, sample size, data collection, details of the interventions and results.

RESULTS

Study selection

From the databases, 30,160 studies were selected. However, 29,660 of them were excluded because they were not in English or Turkish, or they were duplicates. As a result, 500 studies were screened based on their titles and abstracts. Of the 500 studies, 97 were reviewed in detail to assess their suitability. Finally, 6 studies were included. The process was summarized in a flow diagram in Figure 1. Detailed information of these 6 studies is given in Table 1.

Study characteristics

At the final stage, the authors agreed on 6 RCTs conducted between January 2000 and February 2020 to investigate the effect of body acupuncture method on women with pregnancy-related lower back pain and pelvic girdle pain. The sample sizes of the studies varied between 47 and 321 participants. The pregnant women in these studies were in the age group of 18-30 years. The quality of these 6 RCTs was assessed using the JADAD scale. The quality score range of these studies was ≥3. All of these 6 studies were included in the study based on the items studied.

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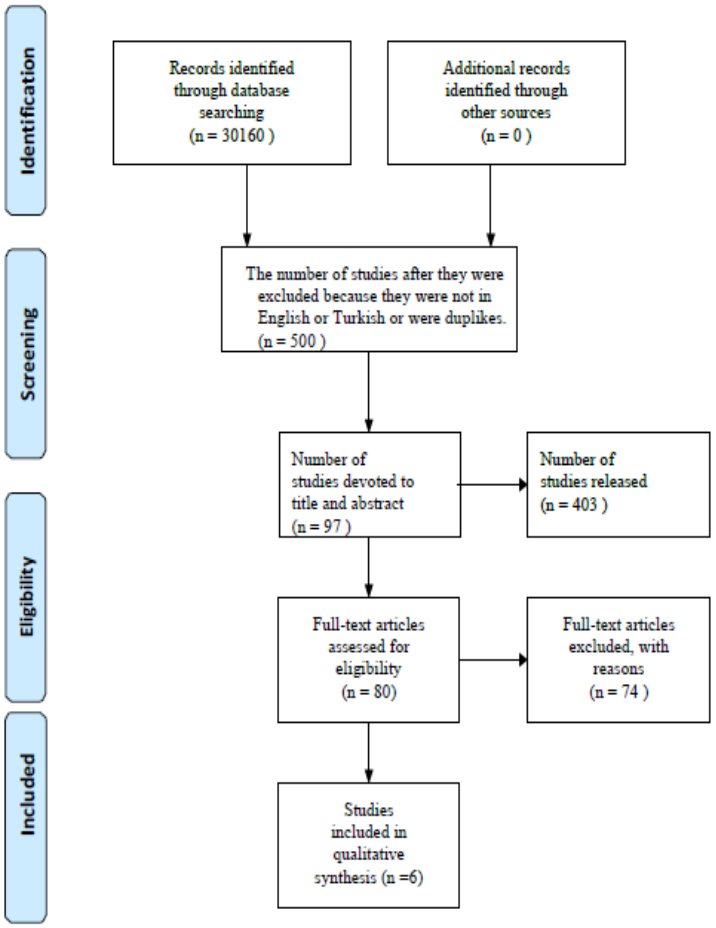

Figure 1. Study selection process

Interventions characteristics

Types of body acupuncture interventions and administration method

In the 6 studies reviewed in this study, the body acupuncture method was used. One of these studies was a prospective randomized open study conducted by Kvorning et al. in 2004.[4] The sample of their study conducted in Sweden included 72 30-year-old pregnant women whose gestational age ranged between 24 and 37 weeks. The Visual Analog Scale (VAS) was used to assess the severity of lower back pain and pelvic girdle pain in these women. Body acupuncture was applied on the pregnant women once or twice a week until they gave birth, or their pain was alleviated. At the end of the study, acupuncture was found to be effective in reducing pregnancy-related LBP or pelvic pain. The study was rated using the JADAD scale and given 3 out of 5 points.

In Elden et al.'s randomized controlled single-blind study conducted with 321 pregnant women whose gestational ages ranged between 12 and 31 weeks in Sweden (2005), the mean age of the participating women was 30 years.[21] The women suffered from pelvic girdle pain. VAS was used to assess the severity of their pain. The women participating in the acupuncture group underwent needle acupuncture application for 30 minutes twice a week for 6 weeks. The women participating in the other intervention group had six hours of stabilizing exercises for 6 weeks (exercise movements integrated into activities of daily living and increasing the mobility, strength and endurance capacity of the muscles were performed in short sessions several times throughout the day). The women participating in the control group received the standard treatment (education, home program for exercises and pelvic belt).

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Table 1. Effect of body acupuncture on pregnancy-related low back pain and pelvic pain

Effect of body acupuncture on pregnancy-related low back pain and pelvic pain: a systematic review and meta-analysis of randomized trials published between 2000 and 2020														
Type of Acupuncture	**Title of the manuscript**	**First Author Year**	**Country**	**Type of study**	**Place**	**Gestational age (weeks)**	**Age**	**Type of pain**	**Acupuncture sites**	**Sample size**	**Tools of data**	**İntervention (Treatment) arm**	**Comparison (Control) arm**	**Primary outcome**	**Quality**
Body-acupuncture	Acupuncture relieves pelvic and low-back pain in late pregnancy	Kvorning et al., 2004	Sweden	Prospective, randomized, open study	Maternity ward center	24-37 w	Average age 30 y	LBP or pelvic pain	LR3, GV20, local tender points	72	Visual analog scale (VAS)	Applied to the acupuncture points once or twice a week until the women gave birth or their pain was alleviated.	No additional treatment or no sham stimulation	The severity of pain in women in the acupuncture group was reported to be less than was that in the women in the control group. (60% acupuncture group vs 14% control group, P <.01).	Jadad: 3/5
Body-acupuncture	Effects of acupuncture and stabilizing exercises as adjunct to standard treatment in pregnant women with pelvic girdle pain: randomized single blind controlled trial	Elden et al., 2005	Sweden	Randomized single blind controlled trial.	Maternity care center	12-31 w	Average age 30 y	Pelvic gridle pain	GV 20, LI 4, BL26, BL32, BL33, BL 54, KI 11, BL 60, EX 21, GB 30, SP12, ST 36	321	Visiual analog scale (VAS)	1st group: Acupuncture was applied twice a week for 6 weeks. The duration of the application was 30 minutes (during this time, every 10 minutes, the needles were manually moved). Before and after the procedure, fetal heart rate and maternal heart rate, and maternal blood pressure were measured. 2nd group: Stabilizing exercises for 6 weeks.	Standard treatment consisting of advice, education, home program for exercises (increase strength abdominal and gluteal muscles), pelvic belt	Acupuncture stabilizing exercises are very effective in reducing pelvic girdle pain. It also effectively complemented the standard treatment.	Jadad: 4/5

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Table 1 (continue). Effect of body acupuncture on pregnancy-related low back pain and pelvic pain

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Body-acupuncture	Decrease of pregnant women's pelvic pain after acupuncture: A randomized controlled single-blind study	Lund et al., 2006	Sweden	Prospective randomized controlled single-blind study	Maternity health care center	22-36 w	Average 29 y	LBP or pelvic pain	BL 27, 28, 29, 31, 32, 54, KI 11, CV 3, SP 6, LR 2, LI 4	47	-Nottingham Health Profile (NHP) questionnaire for health-related quality of life -Visual analog scale (VAS)	30-minute acupuncture was applied to the pregnant women who had pain twice a week for 5 weeks together with a physiotherapist.	Unclear	Acupuncture can be a suitable treatment for relieving pregnancy-related pelvic pain.	JADAD:3/5
Body-acupuncture	Acupuncture as an adjunct to standard treatment for pelvic girdle pain in pregnant women: randomized double-blinded controlled trial comparing acupuncture with non-penetrating sham acupuncture	Elden et al., 2008	Sweden	Randomized double-blinded controlled trial	Hospital, Antenatal care units	12-29 w	Average 30 y	Pelvic girdle pain (PGP)	BL 26, 28, 32, 33, 54, 60, GV20, LI4, GB 30, EX 21, KI 11, ST36	107	Questionnaire (demographic data) -Visual analog scale (VAS) - European Quality of Life 5 Dimensions Questionnaire (EQ-5D) - European Quality of Life health instrument (EQ-5D VAS) - Oswestry Disability Index (ODI)	- Standard treatment (training on exercise to be done at home to strengthen the muscles in the abdominal and gluteal region was given) + acupuncture (12 30-minute acupuncture treatments, twice a week for 4 weeks and once a week for 4 weeks)	Standard treatment + non-penetrating sham acupuncture (the protocol applied to the experimental group was applied)	Acupuncture was found to have no significant effect on pain and degree of disease compared to penetrating sham acupuncture.	JADAD:5/5

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Body acupuncture	Evaluating acupuncture and standard care for pregnant women with back pain: the EASE Back pilot randomized controlled trial	Bishop et al., 2016	UK	Randomized single-blinding controlled trial	Antenatal and physiotherapy clinics, Hospital	13-31 w	18 years and over	LBP and pelvic girdle pain (PGP)	BL 23, BL 24, BL 25, BL 26, BL 27, BL 28, BL 54, BL 31, BL 32, BL 33 GB 30, HJJ L4, HJJ L5, GB 34, ST 36, LR 3, LI 4, BL 60, BL 62	91	Questionnaire - Oswestry Disability Index -Pelvic Girdle Questionnaire (PGQ) -EuroQol EQ-5D-5L -SF-12 - Numerical rating scale (NRS)	-1st group standard care (exercise approaches, heat, massage, manual therapy and issuing of pelvic supports/belts)+ true acupuncture: (6 to 8 20-30-minute treatment sessions were applied for 6 weeks) 2nd group standard care (exercise approaches, heat, massage, manual therapy and issuing of pelvic supports/belts)+ non-penetrating acupuncture (without needles, 0-30-minute hand acupuncture sessions were applied for 6 weeks)	-3rd group standard care: 2-4 treatment sessions for 6 weeks (exercise approaches, heat, massage, manual therapy and issuing of pelvic supports/belts)	No side effects of acupuncture were reported; however, long-term studies will help to understand the effect of acupuncture on pregnancy-related LBP and pelvic girdle pain (PGP) more clearly.	Jadad: 3/5
Body acupuncture	Cost-effectiveness of acupuncture versus standard care for pelvic and low back pain in pregnancy: A randomized controlled trial	Nicolian et al., 2019	France	Randomized control study	Hospital	16-34 w	18 years and over	Pelvic and low back Pain	40V, Weizhong and A Shi points	199	- Numerical rating scale (NRS) - Oswestry disability self-questionnaire—OSW -Visual Analog Scale (VAS)	-Standard care (pregnancy belt, lifestyle recommendations, and exercises, pain killer if necessary)+ acupuncture (needles were kept in the treatment area for 30 minutes during each session. 5 sessions were performed (2 of them in the first week. 3 of them in the next 3 weeks once a week)	-Standard care (pregnancy belt, lifestyle recommendations, and exercises, pain killer if necessary)	Acupuncture is an effective method to relive pregnancy-related pelvic and low back pain.	Jadad: 4/5

The results of the interventions demonstrated that acupuncture was superior to stabilizing exercises, and it supported the standard treatment significantly. The study was rated using the JADAD scale and given 4 out of 5 points.

In Lund et al.'s prospective randomized controlled single-blind study conducted with 47 pregnant women whose gestational ages ranged between 22 and 36 weeks in Sweden (2006), among the women participating in the acupuncture group, those who had pain underwent acupuncture application for 30 minutes twice a week for 5 weeks.[22] To assess the severity of the pain of the participants, VAS and the Nottingham Health Profile (NHP) were used. At the end of the study, acupuncture was found to be effective in reducing pain. The study was rated using the JADAD scale and given 3 out of 5 points.

In Elden et al.'s double-blind controlled study conducted with 107 pregnant women suffering from pelvic girdle pain (2008), the data were collected using a Questionnaire (demographic data), VAS, the European Quality of Life 5 Dimensions Questionnaire (EQ-5D), the European Quality of Life health instrument (EQ-5D VAS) and the Oswestry Disability Index (ODI). At the end of the study, the severity of the pain experienced by the participants in the standard care group who did home exercises to strengthen the muscles in the abdominal and gluteal region and the participants in the acupuncture group who underwent 12 sessions of acupuncture treatments, each of which took 30-minutes, twice a week for 4 weeks and once a week for 4 weeks did not decrease significantly in comparison to the participants in the control group.[28] The study was rated using the JADAD scale and given 5 out of 5 points.

In Bishop et al.'s prospective randomized single-blind study conducted in the UK with 91 pregnant women whose gestational ages ranged between 13 and 31 weeks (2006), it was reported that acupuncture reduced pain, but the effect of acupuncture on pregnancy-related LBP and PGP should be clarified by conducting long-term studies.[29] In Bishop et al.'s study, the data were collected using ODI, the Pelvic Girdle Questionnaire (PGQ), EuroQoL EQ-5D-5L, SF-12 and the Numerical rating scale (NRS). The study was rated using the JADAD scale and given 5 out of 5 points.

In Nicolian et al.'s prospective randomized control study conducted with 199 pregnant women (2019), acupuncture needles were kept inserted in place in the treatment group for 30 minutes during each treatment session. The participants underwent 5 sessions, 2 of which were performed in the first week. In the following 3 weeks, 1 session was performed during each week. The participants also received standard care (pregnancy belt, lifestyle recommendations, exercises and painkillers if necessary).[24] the data were collected using NRS, VAS and the Oswestry Disability Self-Questionnaire (OSW). At the end of the study, acupuncture was determined to be effective in reducing pregnancy-related pelvic pain and lower back pain. The study was rated using the JADAD scale and given 3 out of 5 points.

DISCUSSION

Our systematic review in which the effectiveness and reliability of body acupuncture on pregnancy-related pelvic girdle pain and lower back pain was assessed is expected to contribute to the literature with its results. The review consists of four parts: identification, inclusion, data extraction and data synthesis. In our study, we reviewed 6 randomized controlled trials. These RCTs were rated using the JADAD scale. According to the JADAD scale assessments, two studies received 5 out of 5 points, one study received 4 out of 5 points, and 3 studies received 3 out of 5 points.

In this review, the studies in which both lower back pain and pelvic girdle pain were examined were included. Normally, lower back pain and pelvic girdle pain are health problems which have clinically different origins and whose prognosis and treatment in women differ from those in men.[30-32] However, the prognosis and intervention patterns of lower back pain and pelvic girdle pain in pregnancy are similar,[12] and in many studies, they are investigated together.[15,33,34] Therefore, we investigated body acupuncture intervention in pregnancy-related lower back pain and pelvic girdle pain.

Acupuncture is an alternative form of treatment that involves inserting very thin needles into strategic points of the body at various depths. Acupuncture is applied in two ways: body acupuncture and ear acupuncture.[35] Acupuncture is most commonly used in pain relief therapies.[36,37] However, there are studies showing that it is also used in different clinical symptoms and diseases.[38,40]

In this study, we only reviewed randomized

controlled trials conducted on the body acupuncture method. Among the reviewed studies, Elden et al.'s (2008) and Bishop et al.'s (2016) studies which received 5 out of 5 points from the JADAD scale were quite adequate. In their systematic review conducted in 2008 on the effects of acupuncture on pregnancy-related pelvic girdle pain and back pain, Ee CC et al. reported that Elden et al.'s study (2005) had a good evidence level.[41] In the aforementioned study of Elden et al. (2005), pregnant women were divided into 3 groups as the acupuncture, exercise and standard treatment groups. The women in the acupuncture group received acupuncture application on multiple acupuncture points (GV 20, LI 4, BL26, BL32, BL33, BL 54, KI 11, BL 60, EX 21, GB 30, SP12, ST 36) 2 times a week for 6 weeks. The data were assessed by using VAS. As a result of the study, it was determined that the pelvic girdle pain of the women in the acupuncture group decreased substantially in comparison to those in the exercise and standard treatment groups. Elden et al.'s study was rated 4 out of 5 in our review.

In our review, we noticed that, in particular, the studies by Elden et al. (2008) and Bishop et al. (2016) were well-planned and managed. In the results of these two studies, the effect of body acupuncture on pain was described clearly and comprehensibly.[28,29]

In Elden et al.'s (2008) study, pregnant women were divided into two groups are standard treatment + penetrating sham acupuncture and standard treatment + non-penetrating sham acupuncture. In the study, on women in the experiment group, penetrating sham acupuncture application was made for 30 minutes in each session 2 times a week for 4 weeks and 1 time a week for another 4 weeks on multiple acupuncture points (BL 26, 28, 32, 33, 54, 60, GV20, LI4, GB 30, EX 21, KI 11, ST36). The control group received standard treatment + non-penetrating sham acupuncture. The data of the study were analyzed by using VAS, EQ-5D, EQ-5D VAS and ODI. At the end of the study, it was found that the pain and morbidity levels in the women in the experiment group significantly decreased.[28]

In the study by Bishop et al. (2016), pregnant women were divided into 3 groups as the standard care + true acupuncture, standard care + non-penetrating acupuncture and standard care only groups. In the study, in women in the standard care + true acupuncture group, application was made for 30 minutes for 6 weeks on multiple acupuncture points (BL 23, BL 24, BL 25, BL 26, BL 27, BL 28, BL 54, BL 31, BL 32, BL 33 GB 30, HJJ L4, HJJ L5, GB 34, ST 36, LR 3, LI 4, BL 60, BL 62). Application was also made on women in the standard care + non-penetrating acupuncture group for 30 minutes for 6 weeks. The control group received standard care in 2 to 4 sessions for 6 weeks. The data of the study were analyzed using the Oswestry Disability Index, PGQ, EuroQol EQ-5D-5L, SF-12 and NRS. The study by Bishop et al. reported that, although acupuncture applied for LBP and PGP did not have any side effects, the effectiveness of acupuncture could be more clearly understood in long-term studies to be conducted.[29] This is why the results of their study were not as clear as those reported by Elden et al. in 2005 and 2008. As a reason for this it may be considered that other implementations made alongside acupuncture may have been confounding factors on complete analysis of the effect of acupuncture.

The CONSORT checklist is an important criterion in assessment of the quality of randomized controlled trials.[42] We reviewed the studies within this framework. One of the studies we reviewed was Kvorning et al.'s (2004) prospective randomized open study.[4] The study by Kvorning et al. (2004) was one of the oldest studies conducted on this topic. While VAS was used to analyze the data in the study, acupuncture application was made on the LR3, GV20, local tender points 1 or 2 times a week from the 24-37th week of pregnancy until delivery.[4] Kvorning et al. (2004) compared the acupuncture group to the control group that did not receive an additional treatment or sham stimulation. In their study, the pain suffered by the women in the acupuncture group was reported to be lower than was that suffered by the women in the control group, but we decided that this study was not strong enough because there was no other intervention group. Similarly, in another systematic review examining the same study, the study was not considered strong enough for the same reason.[41] Likewise, in Lund et al.'s (2006) study and Nicolian et al.'s (2019) study, there was only one intervention group and a control group each. Lund et al. (2006) used VAS and NHP to assess the data of their study, and application was made for 30 minutes 2 times a week on women in their 22-36th week of pregnancy on multiple acupuncture points (BL 27, 28, 31, 32, 54, KI11, CV3, SP 6, LR 2, LI4). The intervention made on

the women in the control group was unclear. As a result of the study, the LBP of the women was determined to decrease.[22] Nicolian et al. (2019) analyzed the data in their study by using NRS, the Oswestry Disability Self-Questionnaire—OSW and VAS. Application was made on the women in the control group on 3 different acupuncture points (40V, Weizhong and A Shi points) 2 times in the first week and 1 time in each of the following 3 weeks in addition to standard care. The control group received standard care only. As a result of the study, it was determined that acupuncture was an effective method in reducing pelvic girdle pain and lower back pain.[24]

The different aspect of the studies by Nicolian (2019) and Kvorning (2004) in comparison to the other studies we reviewed was that they applied acupuncture applications on only 3 different acupuncture points once a week and reported that it was a highly effective method in reducing PGP and LBP. There was no other intervention group. In both of these studies, acupuncture was found to be an effective method in reducing pregnancy-related pelvic girdle pain and lower back pain.[4, 24] These studies were not strong enough, because there was no other intervention group.

Limitations

Two of the 6 studies we reviewed in our systematic review were quite adequate and provided strong evidence to the literature. While it was a strength of our review that the assessment of the studies was conducted using the JADAD scale, many studies conducted on this topic that were in Chinese were excluded from the review due to the inclusion criteria allowing articles written in English and Turkish, which was a limitation of our review. On the other hand, it was noteworthy that the studies included in our review which were carried out in various countries of Europe were designed quite well.

While screening the databases, we noticed that, in studies investigating the effects of acupuncture on reducing pregnancy-related pelvic girdle pain and lower back pain, body acupuncture was used more commonly than ear acupuncture. Therefore, we reviewed only studies on body acupuncture, which limited the number of studies we reached. Therefore, the finding that body acupuncture reduced the symptoms of pelvic girdle pain and lower back pain in the studies included in our systematic review cannot be generalized.

CONCLUSION

According to the results of the studies we reviewed, body acupuncture is a non-pharmacological method that is effective in reducing lower back and pelvic girdle pain arising in pregnancy. We hope this review will help clinicians and provide significant information for patients and healthcare professionals on body acupuncture as a non-pharmacological method used to relieve the symptoms of pregnancy-related pelvic girdle pain and lower back pain.

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