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Unveiling the latest evidence: an updated systematic review and meta-analysis and GRADE assessment on the effectiveness of acupressure in managing labor pain

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Abstract

Background Labor pain is a significant challenge during childbirth, highlighting the necessity for effective pain management strategies. Acupressure has been recognized as a non-pharmacological method; however, its efficacy requires comprehensive evaluation. This updated systematic review and meta-analysis seeks to consolidate the most recent evidence regarding the effectiveness of Acupressure in alleviating labor pain and to evaluate the quality of this evidence using the GRADE framework.

Methods An updated systematic review was conducted by querying multiple databases for randomized controlled trials (RCTs) that evaluated the impact of Acupressure on labor pain. Studies were included based on predefined eligibility criteria. The risk of bias was assessed using the Cochrane risk-of-bias method for randomized trials (RoB). Meta-analyses were performed to determine the overall effect size, and the GRADE approach was applied to assess the certainty of the evidence. Meta-analyses of all the data were done using RevMan 5.4.

Results A total of 37 studies met the inclusion criteria. The meta-analysis revealed that Acupressure significantly reduces labor pain compared to touch (MD = -1.19, 95% CI -1.66 to -0.72, $p < 0.00001$), Sham (MD = -1.41, 95% CI -2.55 to -0.27, $p = 0.01$), and no intervention group (MD = -2.32, 95% CI -2.87 to -1.76, $p < 0.00001$). Although both SP6 and LI4 Acupressure points reduced pain, SP6 had more of an impact compared to previous reviews. The funnel plot comparing the effect of Acupressure with a touch on labor pain intensity suggested a possible publication bias. The GRADE assessment indicated a moderate to low level of certainty regarding these results.

Conclusions Acupressure seems to be a viable method for alleviating labor pain, supported by moderate to low-quality evidence. Additionally, it is advisable to conduct well-designed RCTs to enhance the validity of these findings and investigate the underlying mechanisms that contribute to the effectiveness of Acupressure in this setting.

Keywords Acupressure, Labor pain, Systematic review, Meta-analysis, GRADE, Non-pharmacological management

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Background

Labor pain management remains a critical aspect of obstetric care, significantly impacting maternal experiences and birth outcomes [1]. Among various non-pharmacological interventions, Acupressure has garnered attention for its potential to alleviate labor pain without the side effects associated with pharmacological methods [2]. Acupressure, a key component of traditional Chinese medicine, involves applying physical pressure to specific points on the body, known as acupoints, to balance the body's energy flow and promote healing. This technique is hypothesized to stimulate the release of endorphins, the body's natural painkillers, and block pain pathways, thereby reducing the perception of pain during labor [3, 4].

Despite the growing body of research on Acupressure for labor pain, findings have been inconsistent. Numerous meta-analyses and systematic reviews have validated the significant reduction in labor pain achieved through Acupressure, which also enhances maternal satisfaction [5–8]. Specifically, Acupressure at points such as SP6 and LI4, as well as auricular Acupressure, has demonstrated notable pain relief during labor [9–11]. Furthermore, the combination of Acupressure with birthing ball exercises is particularly effective in mitigating labor pain [12]. In contrast, Some studies suggest that the evidence supporting Acupressure's role in decreasing labor pain is limited and inconsistent [13, 14].

Tanjung et.al highlighted that many studies suffer from methodological flaws such as small sample sizes and lack of blinding, making it difficult to draw definitive conclusions [11]. However, Smith highlighted the variability in Acupressure techniques and acupoints used, which could affect the generalizability of their findings [15], further emphasize the insufficient evidence to support Acupressure's widespread use, calling for more robust and well-designed clinical trials [16]. Xu et al. (2022) also evaluated existing evidence and concluded that the effectiveness of Acupressure for labor pain is not well-supported by high-quality research [17], recommending alternative pain management strategies until more conclusive evidence is available. In contrast, Chen et al. (2019) reported significant pain relief and reduced need for pharmacological analgesia with Acupressure but pointed out substantial heterogeneity among studies and potential publication bias [6]. Similarly, Karimi et al. (2020) reported that although Acupressure positively impacted labor pain, the quality of the included studies was generally moderate. They recommended that further high-quality research is necessary to confirm the effectiveness of Acupressure [5]. A review of the existing literature indicates that although certain studies have demonstrated considerable pain alleviation through Acupressure, others have identified methodological shortcomings, including limited sample sizes, absence of blinding, and discrepancies in Acupressure techniques. These variations and inconsistencies underscore the necessity for a comprehensive systematic review to consolidate the available evidence and offer a more precise understanding of the efficacy of Acupressure in managing labor pain. This updated systematic review and meta-analysis, supplemented by a Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach, aims to comprehensively and rigorously evaluate the current literature. The GRADE framework was chosen because of its ability to systematically assess the quality of evidence, considering factors such as risk of bias, inconsistency, indirectness, imprecision, and publication bias. This approach allows for a transparent and rigorous assessment of the evidence, which is particularly important given the heterogeneity observed in the existing literature on Acupressure for labor pain. By assessing the quality of evidence and the strength of recommendations, this study seeks to inform clinical practice and guide future research in this field. The findings are expected to contribute to the broader understanding of non-pharmacological pain relief methods and their application in obstetric care.

Methods

Study design

This systematic review and meta-analysis followed the recommended guidelines in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement [18]. Adhering to the PRISMA guidelines enhances the credibility and trustworthiness of the study's results by providing a standardized approach to conducting and reporting systematic reviews and meta-analyses.

Information sources

The search strategy ensured thoroughness in sourcing relevant studies. PubMed, Cochrane Library, Web of Science, Scopus, Cinahl, and Embase were scrutinized from their inception up to 13/01/2025. Furthermore, grey literature, conference abstracts, and the reference lists of selected studies were meticulously explored to augment the breadth of the review.

Search strategy

The search terms included a combination of keywords related to Acupressure, acupoint, childbirth, labor pain, and pain relief. The search strategy was tailored to each database and was conducted by two independent reviewers (see Appendix 1).

Criteria for study selection

Types of studies Only randomized controlled trials (RCTs) were included. Studies reported in abstract form were considered if sufficient information was available to assess bias risk. Cluster trials were eligible, but none were found. Studies were excluded if they were Crossover trials and quasi-randomized trials, involved mixed interventions, lacked adequate data, or had irrelevant control groups. This exclusion criteria ensured that only high-quality, relevant studies were included, although it may have limited the breadth of the review by excluding studies with different designs or methodologies.

Types of participants Women who were laboring spontaneously or inducedly, regardless of parity and gestation status, were included. Both singleton and multiple pregnancies were included.

Types of interventions Any type of Acupressure compared to sham, touch, no treatment, or routine care.

Outcome measures

Our outcome of interest was the intensity of labor pain, measured by any scale. Specifically, we aimed to assess the effectiveness of Acupressure in reducing labor pain intensity compared to standard care or placebo interventions.

Data extraction

First, a data extraction form was created. Two reviewers independently extracted data from eligible studies. Disagreements were resolved through discussion or consultation with a third reviewer. Data were then entered into Review Manager software (RevMan 5.4) and their accuracy was verified. In instances where data were either missing or ambiguous, we made efforts to reach out to the lead authors for further clarification. If we did not receive a response, the study was excluded from the meta-analysis to prevent the introduction of bias through imputation techniques.

Bias assessment

We evaluated the risk of bias in the included randomized controlled trials (RCTs) using the Cochrane Risk of Bias (RoB) tool [19]. This tool encompasses five key domains of bias that are critical for assessing the validity of the studies:

1. Selection Bias: This domain examines the random sequence generation and allocation concealment to ensure participants were assigned to interventions in a manner that minimizes selection bias.
2. Performance Bias: This involves evaluating the blinding of participants and study personnel during the trial to reduce the impact of biases related to their expectations and behaviors.
3. Detection Bias: Assessed by determining whether outcome assessors were blinded to the intervention status, thereby ensuring that the assessment of outcomes was not influenced by knowledge of the assigned groups.
4. Attrition Bias: This domain is concerned with the completeness of outcome data, analyzing the extent and reasons for participant dropouts or exclusions during the study.
5. Reporting Bias: This involves evaluating whether the outcomes reported were consistent with those originally proposed, to identify any selective reporting that may distort the findings.

Each domain was rated as having a low, high, or unclear risk of bias. Two reviewers independently assessed the risk of bias for each study, and any disagreements were resolved through discussion or by consulting a third reviewer. The bias assessment results were used to inform the interpretation of the meta-analysis findings and to conduct sensitivity analyses and Grade assessment.

Measures of treatment effect

In the included RCTs, various scales were employed to assess labor pain intensity, including the Visual Analog Scale (VAS), the McGill Pain Questionnaire (MPQ), and the Numeric Rating Scale (NRS). To measure the treatment effect, we calculated the mean differences (MD) between groups, because the scales, once transformed to a common 0–10 range, allowed for direct comparison without the need for standardization. Notably, the study that used the McGill Pain Questionnaire also utilized the VAS, which we considered in the analysis.

Assessment of heterogeneity

To assess heterogeneity among included RCTs, we used the following methods:

1. Visual inspection of forest plots: We visually inspected forest plots to identify any obvious differences in the direction and magnitude of effects across studies.
2. Statistical tests:

    - Chi-square test (Q test): We used the Chi2 test to assess whether observed differences in results were consistent with chance alone. A p-value of less than

0.10 was considered to indicate significant heterogeneity.
- I-squared statistic (I^2): We calculated the I^2 statistic to quantify the percentage of total variation across studies that was due to heterogeneity and not chance. Values of 25%, 50%, and 75% were considered low, moderate, and high heterogeneity, respectively.

3. Subgroup analysis: We also performed subgroup analyses to examine how different subgroups within studies contributed to the overall heterogeneity. Subgroup analyses were conducted based on the specific points used (e.g., SP6 and LI4), the number of points targeted (single-point vs. multiple-point Acupressure), and the type of control groups (e.g., touch, smell, no intervention). These variables were selected to explore potential sources of heterogeneity and assess whether different Acupressure techniques or protocols influenced the results.
4. Sensitivity Analyses: (see sensitivity analysis).

These methods allowed us to thoroughly assess and address heterogeneity, ensuring the robustness and reliability of our meta-analysis findings.

Assessment of reporting bias

For meta-analyses that included 10 or more studies, we employed funnel plots to visually inspect for asymmetry. The presence of asymmetry in funnel plots may indicate publication bias—i.e., the possibility that studies with negative or unexpected results are less likely to be published.

Data synthesis

Statistical analyses were performed using RevMan 5.4. A fixed-effects model was initially contemplated for the analysis, based on the assumption that all studies exhibit a uniform effect size. Nevertheless, due to the considerable heterogeneity identified among the studies included, a random-effects model was ultimately selected as the more suitable option. This model effectively addresses the variability in treatment effects that may result from differences in study populations, settings, and methodologies, thereby offering a more precise and adaptable analysis of the data. For random-effects analyses, results were presented as the average treatment effect with 95% confidence intervals and estimates of Chi2 and I2.

Sensitivity analysis

To ensure the robustness of our meta-analysis results, we conducted sensitivity analyses by:

1. Assessing the impact of including or excluding RCTs based on different quality thresholds.
2. Comparing results from fixed-effect and random-effects models to evaluate the consistency of the findings.
3. Conducting leave-one-out analyses to identify any single study that disproportionately affects the overall results.
4. Excluding studies with extreme effect sizes to assess their impact on the overall results

Assessment of Certainty of Evidence Using the GRADE Approach

The certainty of the evidence was assessed using the GRADE approach, as outlined in the GRADE Handbook [20]. This method was applied to evaluate the body of evidence for the primary comparisons: Acupressure vs. sham control, Acupressure vs. usual care, and Acupressure vs. touch control.

The GRADE framework was selected due to its ability to offer a structured and transparent method for evaluating the quality of evidence. This framework enables us to determine our level of confidence in the findings by taking into account several essential factors. It is especially beneficial when integrating evidence from studies that employ varying methodologies or possess differing levels of quality, as it promotes a fair and trustworthy analysis of the data. The GRADE approach assesses the certainty of evidence for each outcome by considering five critical factors:

1. Study limitations: This factor refers to the risk of bias in studies, assessing potential flaws that could affect the validity of the results.
2. Consistency of effect: Considers the extent to which results are similar across studies, which indicates reliability.
3. Imprecision: This relates to the precision of the effect estimate, which includes confidence intervals and sample size of studies.
4. Indirectness: This assesses the applicability of the evidence to a specific research question and assesses whether the populations and interventions studied are relevant to the context in which the findings are applied.
5. Publication bias: This addresses the potential for selective publication of studies, which can skew the overall evidence if certain results are more likely to be published than others.

By analyzing these domains, the GRADE approach provides a comprehensive framework for determining the

overall certainty of evidence related to specific outcomes. The evidence was downgraded to one level for serious risk of bias, inconsistency, indirectness, or imprecision and to two levels for very serious concerns in these areas. Publication bias was also considered, and evidence was reduced if the asymmetry of the funnel plot suggested potential bias.

Ethical considerations

We attempted to observe all scientific ethics requirements in this investigation. Since we conducted the research using public databases, we did not require approval from the ethics committee. The authors avoid plagiarism and data manipulation for personal advantage. As part of our commitment to transparency and reproducibility, we provided our raw data, processing details, and review technique overview.

Results

Search results

Figure 1 displays the PRISMA 2020 flow chart for systematic reviews. Initially, 696 primary articles were retrieved from databases. After removing duplicates, 408 articles proceeded to the first screening phase. Articles that seemed relevant based on the abstract and title were kept at this stage, while others were excluded. Subsequently, 139 articles underwent the second screening phase. Ultimately, following a thorough review of the full text of articles, 37 were included in the systematic review, and 33 were included in the meta-analysis.

Included RCTs

Table 1 shows the characteristics of included RCTs. All RCTs featured a parallel design, with 14 RCTs being

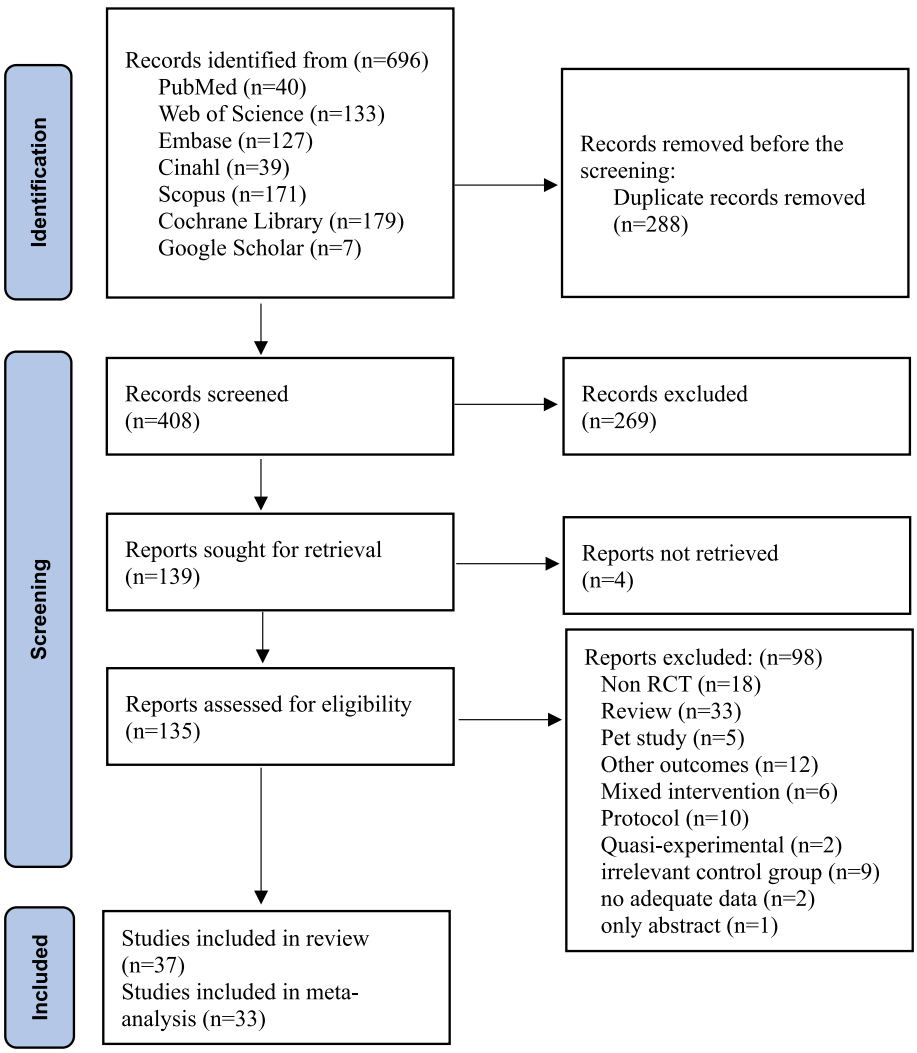

Fig. 1 PRISMA 2020 flow diagram for systematic reviews

Table 1 Characteristics of included RCTs

Author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Abd El Hamid 2012 [21]	Egypt	Parallel RCT	N=100 The study recruited primiparous mothers with a single fetus, aged 20–30 years, at 37–40 weeks gestation, with normal FHR (120–160 bpm), intact membranes, and 3–4 cm cervical dilation, who were literate	Group 1= 24.85 (2.64) Group 2= 24.47 (2.65)	SP6	Group 1=Acupressure was applied with the thumb or index finger to both legs for one minute per uterine contraction, totaling 30 minutes	Group 2= Routine care	VAS	before, immediately after the intervention, 30, 60, and 120 minutes after intervention
Akbarzadeh 2014 [34]	Iran	3-arm RCT	N=150 Women aged 18–35 at term with a single fetus, intact membranes, no medical or pregnancy complications, and spontaneous labor with contractions every 5–10 minutes and cervical dilation of 3–4 cm.	18–35 years	BL32	Group 1= Acupressure started at 3–4 cm dilation and continued until the end of the first stage (including the 7–8 cm transitional phase). During each contraction, gentle 30-second thumb pressure was applied (1405 mmHg and 1277 mmHg), synchronized with the start and end of contractions. Group 2= A doula (also the researcher) provided continuous support from admission at 3–4 cm dilation through to the end of the second stage of labor.	Group 3= routine care	VAS	after 30-minute intervention
Alimoradi 2020 [35]	Iran	3-arm RCT	N=90 Eligible participants were single-fetus pregnant women between 37–42 weeks, aged 19–35 years, over 150 cm tall, without chronic diseases or pregnancy issues. They were admitted with a cervical dilation of 3–4 cm. Exclusions were self-withdrawal, abnormal contractions, rapid labor, fetal distress, placental issues, oxytocin use, CS, or painless delivery methods.	Group 1= 24.23 (4.94) Group 2= 24.23 (5.21) Group 3= 24.30 (4.47)	GB21, GB30 BL32, LI4 SP6 (group1) zero, genitalia, Shen Men, thalamic, prostaglandin, oxytocin, and uterus 1 and 2 (group 2)	Group 1= received thumb pressure on specific points (GB21, GB30, BL32, LI4, SP6) for two minutes at cervical dilations of four, six, and eight centimeters, enough to whiten a third of the thumbnail. Group 2= had Vaccaria seeds attached to the left ear, pressed every thirty minutes for thirty seconds in a set order on designated acupoints	Group 3= routine care	VAS	At a cervical dilation of 4 and 10 cm

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Ashtarkan 2021 [40]	Iran	3-arm RCT	N=150 Literate Iranian women aged 18–35, in their first or second pregnancy (37–42 weeks), with spontaneous labor onset, a healthy single cephalic fetus, intact membranes (<12 hours), and 3–4 cm cervical dilation were eligible. Exclusion criteria included chronic diseases, high-risk pregnancies, fetal complications, skin conditions affecting Acupressure, recent severe mental/family crises, unwillingness to continue, or opting for cesarean delivery.	Group 1= 25.23 (5.15) Group 2= 26.27(5.35) Group 3= 25.73(5.36)	SP6 SP8	During cervical dilation of 3–4 cm, pressure was applied to the SP6 (group 1) and SP8 (group 2) acupoints on both feet in the intervention group, alternating between 60 seconds of pressure and 60 seconds of rest for up to 20 minutes	Group 3= similar pressure at a neutral point located 2 cm lower and 1 cm behind the SP8 point. This procedure was repeated for dilations of 5–7 cm and 8–10 cm	VAS	immediately, and at 15- and 30-minutes post-intervention
Calik 2014 [22]	Turkey	single-blind, parallel RCT	N=100 The study included primiparous mothers at 37–41 weeks gestation, with a single fetus weighing 2500-4000 g, 2 cm cervical dilation, no SP6 acupoint issues, no pregnancy complications, and who were communicatively proficient with at least primary education, without systemic or neurological conditions, and similar obstetric and socio-demographic backgrounds	Group 1= 58% of participants were older than 25 years. Group 2= 48% of participants were between 20 and 24 years old.	Sp6	Group 1= Acupressure was applied 35 times to match uterine contractions: 15 times at 2–3 cm dilation, and 10 times each at 5–6 cm and 8–9 cm dilations. Pressure was applied with thumbs on both legs for each contraction's duration.	Group 2= Identical care, excluding the application of Acupressure	VAS	Before, immediately after the intervention, 30 and 60 minutes after the intervention

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Çelik 2019 [24]	Turkey	single-blind, parallel RCT	N=100 Study participants were nulliparous women aged 18–49, in their first pregnancy, experiencing at least three contractions over 10 minutes, fluent in Turkish, at 37–42 weeks gestation, with a single fetus in vertex presentation and spontaneous labor at 4–5 cm dilation. Exclusion criteria included systemic or mental health issues, SP6 acupoint damage, sedation or analgesic use during labor, or voluntary withdrawal	Group 1= 28.8 (4.4) Group 2= 27.5 (3.8)	SP6	Group 1=Acupressure was applied vertically with the researcher's thumb at 4 cm cervical dilation, for 30 minutes. Five applications were made every ten minutes during contractions, alternating between 60 seconds of pressure and rest. Adequate pressure turned the nail bed partially white	Group 2=Touch	VAS	Before, immediately after the intervention, 30 and 60 minutes after intervention
Chung 2003 [39]	Taiwan	Single-blind, 3-arm RCT	N=127 Women in the first stage of labor, between 37 and 42 weeks, with a low-risk pregnancy, single fetus, ability to speak Chinese were included. The study did not include women who had been administered oxytocin to induce labor, those who had received an epidural block, or those who had scheduled a CS	Most participants in each group were 15–30 years old	LI4 BL67	Group 1= In the Acupressure group, the intervention spanned 20 minutes, involving 5 minutes of pressure applied to the both acupoints. Within these 5 minutes, 5 Acupressure cycles were completed, each consisting of 10 seconds of continuous pressure followed by a 2-second interval without pressure. Group 2= In the effleurage group, a 10-minute massage was given to the left and right upper arms.	Group 3= The midwife remained with the participant for 20 minutes, either taking notes or engaging in conversation with the participant or their family members.	VAS	Before and after the intervention.

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Dabiri 2014 [37]	Iran	3-arm RCT	n=149 The study included singleton pregnant women who were between 37 and 42 weeks of gestation, exhibited a cephalic presentation, and had a cervical dilation of 4–5 cm with a natural commencement of labor. Women who had not experienced any high-risk pregnancies in the past, had not undergone a CS or had conditions such as CPD, and had not used narcotics in the previous 8 hours were eligible for the study	Group 1= 25.46) 4.48(Group 2= 25 (6.35) Group 3= 25.48) 5.7(	LI4	Group 1=In the Acupressure group, bilateral pressure was applied during contractions. Patients were instructed to inhale deeply before pressure application. Rotational and vibrational pressures were then applied for 60 seconds, followed by a 60-second pause, repeated over 30 minutes.	Group 2= Touch Group 3= Usual care	VAS	Both before and after the intervention at 30 minutes, 1 hour, and subsequently on an hourly basis until the completion of the first stage of labor
Gönenç 2020 [55]	Turkey	4-arm RCT	N=120 Eligible women were primiparous mothers aged 20–30 years, less than 4 cm dilated, at 38–42 weeks gestation, with a single fetus in vertex presentation, no labor complications, and no pain relief during early labor.	Group 1= 23.4 (3.2) Group 2= 24.1 (3.4) Group 3= 23.7 (2.9) Group 4= 22.4 (3.0)	SP6	Group 1= Received a 30-minute massage on various body parts during all labor phases (cervical dilatation of 3–4 cm, 6–7 cm, and 8–9 cm) Group 2 = Received a 30-minute Acupressure during the latent, active, and transition phases. Group 3 (Combined Group) = Underwent massage and Acupressure treatments simultaneously throughout the latent, active, and transition phases.	Group 4= Routine care	VAS	Immediately before and immediately after the interventions when cervical dilation was at 3–4 cm, 6–7 cm, and 8–9 cm, as well as during the postpartum period.

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Hajighasemali 2015 [36]	Iran	3-arm RCT	N=92 The study criteria included Iranian women in their first or second pregnancy, aged 18 to 35 years, with a GA of 37 to 42 weeks. Participants had a single, live fetus with cephalic presentation, women at the start of the active labor phase with regular uterine contractions, no history of infertility, no indications for CS, no amniotic sac rupture for more than 12 hours, low-risk pregnancies without chronic diseases. Criteria for withdrawal from the study included undergoing a CS for any reason, lack of willingness to continue the intervention	Group 1= 22.71 (3.7) Group 2= 24.73 (4.7) Group 3= 24.94 (4.7)	SP6	Group 1=Interventions were conducted in two 30-minute stages at cervical dilations of 4–5 cm and 7–8 cm across three groups. In the Acupressure group, pressure was applied to the acupoint for 2 minutes, followed by a 1-minute rest, totaling 60 minutes of pressure application. Group 2=In the reflexology group, a gentle foot massage was given first to prepare. Reflexology was then applied to the solar plexus and uterine points on the same foot during the same 30-minute period as the Acupressure.	Group 3= Touching a point on the surface of the foot, in line with the third and fourth toes, which is not a meridian passage point, for 20 minutes in two stages of cervical dilation of 4–5 and 7–8 cm	VAS	Before and after each intervention
Hamidzadeh 2012 [25]	Iran	Single-blind, parallel RCT	N=100 The inclusion criteria were: the women on their first to third pregnancy, aged 20–40 years, with no drug dependencies, who were literate in reading and writing. Over 37 weeks of gestation, singleton pregnancy with a cephalic presentation in the anterior position, spontaneous start to labor, a cervical dilation ranging from 3 cm to 5 cm, no prior experience with, no damage, bruising, sensitivity, or irritation at the acupoint. Additionally, not undergone any previous CS	20–40 years old (no additional adata)	LI4	Group 1= At the beginning of the active labor phase, the Awas applied at the start and continued for the length of each uterine contraction, totaling a 20-minute session. Acupressure was simultaneously performed on both hands, with five applications of pressure to the acupoint each minute. Each application consisted of 10 seconds of pressure followed by a 2-second pause	Group 2= Touch on the acupoint without massage	VAS	Before the intervention, immediately following it, at 20 minutes and 60 minutes post-intervention, and then hourly thereafter until delivery

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Hamlaci 2017 [23]	Turkey	Parallel RCT	N=44 The study included pregnant women at 37–40 weeks of gestation, confirmed by ultrasonography, carrying a single fetus with an EFW of 2500–4000 g. Participants had no complications such as threatened abortion or hyperemesis gravidarum, and no systemic diseases like gestational diabetes, hypertension, or heart disease. They had naturally initiated labor with cervical dilation under 5 cm and intended to have a vaginal delivery.	Most participants in each group were 20–24 years old	LI4	Group 1= Acupressure treatment began at 4–5 cm cervical dilation and was repeated at 7–8 cm. In both sessions, pressure was consistently applied to the acupoint on both hands during each contraction. The procedure was performed 16 times—8 times at 4–5 cm dilation and 8 times at 7–8 cm dilation. The first session lasted about 1 hour, while the second session lasted 30 minutes.	Group 2= Routine care	VAS	6 times: when the pregnant woman was first admitted to the hospital, before and after, and within 2 hours after delivery
Heidari 2008 [26]	Iran	double-blind RCT	N=128 The study included pregnant women who were either nulliparous or in their second pregnancy (multiparous), at 37 weeks of gestation, with the fetus in a cephalic presentation, a cervical dilation of 3 cm, and who were admitted to the hospital.	Group 1= 24.4 (5.04) Group 2= 24.4 (3.41)	SP6	Group 1= The 30-minute Acupressure involved cycles of 6 seconds of pressure during contractions, causing slight pain, and 2 seconds of rest. Pressure varied from moderate (average 1600 mmHg right thumb, 1300 mmHg left thumb) to severe (2000 mmHg right thumb, 1800 mmHg left thumb)	Group 2= 30 minutes of touch on acupoints	VAS	Before the intervention, immediately after the intervention, 30 minutes following the intervention, and then hourly until the conclusion of the first stage of labor

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Hjelmstedt 2010 [38]	India	Single blind, 3-arm RCT	N=212 Inclusion Criteria were nulliparous women admitted to the labor room, cervical dilation between 3 cm and 7 cm, healthy individuals with an uncomplicated pregnancy, full-term gestation, live fetus in cephalic presentation. Exclusion Criteria were any hypertensive disorders or pre-eclampsia, diabetes, neuropathic pain, IUFD, multiple gestations, breech presentation, gestational age less than 38 weeks or greater than 42 weeks, cervical dilation less than 3 cm or greater than 7 cm, scheduled for an elective cesarean section, use of pharmacological pain relief methods	Group 1= 22.4 (2.7) Group 2= 22.7 (2.9) Group 3= 22.9 (3.4)	SP6	Group 1= Acupressure was applied to both sides simultaneously during contractions, spanning a 30-minute session. The treatment was not administered again if, after 2 hours, the woman had not progressed to the second stage of labor or had not given birth. The pressure intensity was individually tailored to align with each woman's personal pain tolerance.	Group 2= Light touch at the acupoint Group 3= Standard care	VAS	Before, immediately after the intervention, and 30, 60 and 120 minutes after the intervention
Hossein Pour 2012 [42]	Iran	3-arm RCT	*N*= 135 Eligible participants were nulliparous women with a single pregnancy at 38–42 weeks, fetus in vertex presentation, intact membranes, and no conditions like skin or heart disorders that would preclude Acupressure or electrical skin stimulation	No data	SP6	Group 1= Acupressure was applied with each labor contraction starting at 3–4 cm cervical dilation Group 2= TENS electrodes targeted the same area, delivering a 30-minute electrical stimulation at 4 Hz frequency and 200 microseconds pulse width, adjusting intensity for patient comfort	Group 3=no intervention	VAS	Before the intervention, immediately, 30, and 60 minutes after the intervention

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Kashanian 2009 [27]	Iran	Single-blind, parallel RCT	N=120 The study included women aged 18–35 years, primiparous, carrying a single, cephalic fetus, at 37–41 weeks gestation, with intact membranes, and 3–4 cm cervical dilation, experiencing regular contractions. Exclusions were sedative use during labor, abnormal or non-viable fetus, fetal distress, meconium passage, uterine scar history, pregnancy-related complications, drug use beyond supplements, vaginal bleeding, or high-risk pregnancy classification.	Group 1= 23.17 (4.53) Group 2= 23.15 (4.78)	SP6	Group 1= The investigator performed Acupressure at specific points on the body during labor contractions. This technique was carried out for a continuous period of 30 minutes	Group 2= Touch	VAS	Before and after the intervention,
Kaviani 2012 [41]	Iran	3-arm RCT	N=165 Study entry criteria included term single pregnancies with vertex presentation, spontaneous onset of labor, and cervical dilation of 3–4 cm. Exclusion criteria were lack of participant consent to continue, underlying diseases or pregnancy complications like preeclampsia or diabetes, and need for special care, pain medication, or CS	No data	LI4	Group 1 = At 3–4 cm dilation, researchers applied pressure to LI-4 points on both hands for 30 minutes at each contraction's start, using a scale to ensure forces of 1405 mmHg (approx. 3.5 kg) and 1277 mmHg (approx. 3 kg) under the right and left thumbs, respectively. Group 2 = LI4 points were massaged with an ice pack for 30 minutes during contractions, refreshing the pack every 10 minutes	Group 3=touch without ice pack	VAS	Before and immediately after the intervention

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Kordi 2009 [44]	Iran	3-arm RCT	N=102 GA of 38 to 42 weeks, singleton fetus with vertex presentation, spontaneous onset of uterine contractions	Group 1= 23.9 (4) Group 2= 24.6 (4.4) Group 3= 24.2 (4.2)	SP6	Group 1= With a cervical dilation of 3–4 cm at the onset of contraction, bilateral rotational pressure was applied with the researcher's thumbs, adjusted to induce Qi sensation, and ceased with contractions. This was repeated for 30 minutes per contraction. The researcher's finger pressure was pre-measured, averaging 3250 grams for the right and 3125 grams for the left	Group 2= Touch Group 3= Standard care	VAS	Immediately after the intervention, 30, 60, 90, and 120 minutes, after the intervention
Kordi 2011 [46]	Iran	3-arm RCT	N=83 Eligibility Criteria included nulliparous women with GA of 38–42 weeks, presence of a single fetus, cephalic presentation, intact membranes, no medical or obstetric complications, cervical dilation measuring between 3 cm and 4 cm	Group 1= 21.44 (2.67) Group 2= 22.96 (3.41) Group 3= 21.79 (3.02)	LI4	Group 1= During a 40-minute session (initially 20 minutes with the mother's left hand and then 20 minutes with the right hand), the LI4 point was pressed by the researcher's thumb and index finger from the beginning to the end of each contraction at a rotational manner and the direction of the clock's hands, to the extent that it caused a change in the color of the researcher's fingernail	Group 2= Touch at LI4 Group 3= Usual care	VAS	Immediately after the intervention, 30 minutes, and then every hour after the intervention
Lee 2004 [2]	Korea	Single-blinded, parallel RCT	N=75 The study's eligibility requirements included women who were over 37 weeks into their pregnancy, carrying a single fetus, intending to have a vaginal birth, and in overall good health. Women with suspected multiple pregnancies, diagnosed gynecological issues (e.g., inflammation, fibroids, precancerous conditions), and psychotherapeutic drug use were excluded	Group 1= 29.5 (3.2) Group 2= 29.1 (3.6)	SP6	Group 1= The Acupressure technique was applied on both legs, coinciding with each contraction, over 30 minutes. The pressure exerted was 2150 mmHg.	Group 2= touch	VAS	Before, immediately after, 30, and 60 minutes after the intervention

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Mady 2024 [28]	Egypt	Parallel RCT	N=100 The study included primiparous pregnant women aged 18–28 years, at 37–41 weeks gestation, in early labor with 3–6 cm dilation, carrying a single, cephalic fetus, with no complications, an intact membrane, normal FHR, and 2–3 contractions every 10 minutes without any acupoint issues	Most participants in each group were 20–26 years old	LI4	Group 1= These women received Acupressure with the thumbs' rounded parts from the start to the end of each contraction for 30 minutes	Group 2= Touch	Both VAS and MPQ	Before, immediately after, 30, and 60 minutes after the intervention
Mafetoni 1 2016 [43]	Brazil	Single blinded, 3-arm RCT	N=156 Included were women of any age or from the 37 th week onwards, anticipating childbirth (either induced or spontaneous) with the following criteria: cervical dilation of at least 4 cm, a minimum of two contractions within 10 minutes, and complete coverage of the SP6 bilateral point by skin. The fetus had to be alive, in cephalic presentation, and healthy. We excluded participants with severe preeclampsia, placenta previa, urgent CS requirements, cervical dilation of 8 cm or more, and those who took analgesics less than six hours before entering the study.	Group 1= 26.8(7.1) Group 2= 26.4(6.4) Group 3= 25.2(7.3)	SP6	Group 1= This woman received bilateral medium-intensity thumb pressure (from 5 kg to 15 kg), with abrupt and rapid decompression; during contractions, for 20 minutes	Group 2= Touch Group 3= usual care	VAS	immediately and 60 minutes after the treatment

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Mafetoni 2 2016 [45]	Brazil	Double-blinded, 3-arm RCT	N=30 The criteria for inclusion in the study were as follows: participants could be of any parity, at least 37 weeks into their pregnancy, in natural, medically induced, or enhanced labor with a dilation greater than 4 cm, experiencing at least 2 contractions every 10 minutes, possessing unbroken skin at the auricle pavilion, and carrying a living fetus positioned vertex with stable vital signs. The exclusion criteria were a dilation greater than 7 cm, a diagnosis of severe pre-eclampsia, the presence of placenta previa, a history of CS, or any immediate medical need for a CS	Group 1= 22.2 (6.3) Group 2= 22.8 (5.8) Group 3= 22.9 (4.5)	Shen men, uterus, neurasthenia, endocrine points	Group 1= The intervention consisted of auriculotherapy using crystal beads, which were pressed onto specific ear points for 1 minute until causing tolerable pain to induce stimulation.	Group 2= a placebo approach was used with glass beads that were not manipulated. Group 3= Neither auriculotherapy nor placebo	VAS	At admission and 30, 60, and 120 minutes after the intervention

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Mammadov 2024 [47]	Cyprus	3-arm RCT	N=66 The study includes primiparous women, with a cervical dilation of 3 cm, carrying a full-term, single, healthy fetus in vertex presentation, and anticipating a natural delivery. Excluded are those with pregnancy complications, systemic diseases, or who have received analgesia or anesthesia during early labor	45.5 % of the women were between the ages of 24–29 years old	LI4	Group 1= Acupressure was administered by applying finger pressure. This technique was performed three times during each labor phase—latent, active, and transition—for three minutes at peak contractions. Group 2= Participants, after giving informed consent, had their cervical dilation measured at 3 cm, marking the latent phase of labor. Sacral massage involved gentle pressure and fingertip rubbing on the sacral area while the participant lay on her side, supported by a pillow. During rest, an endorphin massage with circular finger motions was performed along the spine, culminating in effleurage from the sacrum to the scalp. Each labor phase—latent, active, and transition—received a 10-minute massage	Group 3= routine care	VAS	Before and after each session, amounting to six evaluations

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Mansouri 2018 [48]	Iran	Single-blinded, 3-arm RCT	N=165 Eligible for the study were primiparous mothers, 37+ weeks pregnant, aged 18–35 years, with a single cephalic fetus, EFW of 2500-4000 g, in labor with 4–5 cm dilation, experiencing at least two 20-second contractions within 10 minutes, healthy Acupressure points, no complications, and pain intensity of 50 mm+ on the VAS. Excluded were those using pain medication, having rapid labor, requiring emergency CS, with abnormal FHR, no labor progress, or choosing to withdraw	18–35 years old	BL5, BL8, BL9 GV20 (group 1) GB8, GB16, GB17, GB18, GV20 (group 2)	Group 1= Initial labor involved semi-upright seating and thumb pressure at BL5, BL8, BL9, and GV20 for 60 seconds, creating fullness or tingling. This occurred in five 4-minute cycles with 30-minute intervals, summing to 20 minutes. The pressure was reapplied with 10 cm cervical dilation at the second labor stage. Group 2= First labor stage had pressure on GB8, GB16, GB17, GB18, and GV20 for 60 seconds per contraction. Four 5-minute cycles with 30-minute gaps were conducted, totaling 20 minutes of intervention. A single pressure cycle marked the second labor stage onset.	Group 3= Routine care	VAS	immediately after the intervention, at 30 minutes, and then every 30 minutes until labor's first and second stages end
Mirzaee 2021 [49]	Iran	Single-blind, 3-arm RCT	N=90 Study eligibility criteria included women 37–40 weeks into gestation with a single fetus weighing 2500-4500 g, confirmed via ultrasound or medical history, and starting labor naturally. Exclusions were emergency cesarean, oxytocin-augmented labor, high-risk pregnancy history, systemic or psychological disorders, pharmacological pain relief, or conditions like tumors, inflammation, skin issues, fractures, or burns	Group 1 = 25.16 (3.67) Group 2 = 25.03 (3.75) Group 3 = 26.93 (5.33)	LI4	Group 1 = Acupressure protocol included 30 minutes at 4 cm cervical dilation. Postcontraction, pressure was applied to LI-4 points on both hands, alternating thumbs, with breaks between contractions. Group 2 = Ice massage involved applying a small ice bag to the same acupoints, pausing postcontraction, with the ice bag refreshed every ten minutes	Group 3= Touch without ice bags	VAS	Before and after treatment

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Moradi 2012 [50]	Iran	3-arm RCT	N=150 Eligible participants were primiparous mothers aged 18–35 years with a single pregnancy at 37–41 weeks and a cephalic presentation, entering active labor with 3–4 cm dilation. Exclusions included mental or anatomical disorders, chronic diseases, high-risk pregnancy, lack of education, skin conditions affecting, oxytocin use, and prior anesthesia. Participants needed good health, no intervention restrictions, and written consent	18–35 years old (no additional data)	SP6 GB21	In the intervention groups, researchers applied pressure at Acupressure points of GB21 (group 1) and SP6 (group 2) during contractions, alternating between 30 seconds of pressure and rest for 20 minutes in 3–4 cm and 7–8 cm dilatations. A digital scale ensured consistent pressure equivalent to 1710 mmHg under the right thumb and 1350 mmHg under the left thumb	Group 3= Touch	VAS	Before, immediately after the intervention. 30 and 60 minutes after the intervention
Norhapifah 2024 [32]	Indonesia	2-arm parallel RCT	N=80 Nulliparous women with normal pregnancies (37–42 weeks gestation), a single fetus in cephalic presentation, and no contraindications for Shiatsu massage or vaginal birth were included. Exclusion criteria were unwillingness to participate, fetal distress, maternal complications, or co-occurring health conditions.	Group 1= 23.58 (2.65) Group 2= 23.63 (2.84)	BL31 BL32 BL33 BL34 L4 KI1 HP8 HP6	Group 1= The intervention involved three Shiatsu massages during each phase of labor. In the latent phase (1–3 cm dilation), a 16-minute massage was performed on points BL31 to BL34. In the active phase (4–7 cm dilation), pressure was applied to the buttock spot near the L4 segment. In the transition phase (8–9 cm dilation), points KI-1, HP-8, and HP-6 were targeted for one minute each.	Group 2= Routine care	NRS	before the intervention, at the latent phase, and at the transition phase

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Ozgoli 2016 [51]	Iran	3-arm RCT	N=105 The study included nulliparous mothers aged 19–35 years in the active phase of labor, with a term pregnancy of more than 37 weeks, planning a vaginal delivery without any obstetric or non-obstetric complications, cephalic presentation, a cervical dilation of 4 cm or more, and at least 3 uterine contractions within 10 minutes. The only exclusion criterion was the mother's decision to no longer participate in the study.	Group 1= 22.86 (3.16) Group 2= 22.69 (3.11) Group 3= 24.31 (4.10)	LI4 BL32	Group 1= Participants chose a comfortable position while the researcher, positioned in front, applied thumb pressure to the LI4 point on the right hand at the onset of pain. The pressure was deep and oscillating until the researcher's nail bed color changed. This was paused at each contraction's end and resumed at the next's start, for six contractions. Post-sixth Acupressure, pain severity was assessed. The procedure was repeated when cervical dilation reached 6–7 cm and 8–10 cm Group 2= Participants sat comfortably with the researcher behind them for sacral access. Upon pain notification, the researcher exerted deep, rotational pressure on both BL32 points until her nail bed color changed. Pain measurement frequency and method matched the LI4 group	Group 3= usual care	NRS	before and after the intervention in each dilation period

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Salehian 2011 [52]	Iran	3-arm RCT	N=90 The study targeted nulliparous women at the onset of the active labor phase, with a GA ranging from 38 to 42 weeks, carrying a single fetus in vertex presentation, in good health without any specific diseases, having a cervical dilation of 4 cm, and experiencing 2 or 3 uterine contractions every 10 minutes	The average age of participants was 18, with a minimum age of 14 and a maximum age of 26.	LI4 SP6	Group 1= During contractions, pressure was applied to the LI4 point, increasing from gentle to intense over 30 seconds, held for 1 minute, and then gradually released. This was done for 20 minutes during contractions. Pain intensity was measured after 20 minutes and at dilations of 6, 8, and 10 centimeters, with the process repeated at each stage. Group 2= All the above steps were executed for the SP6 point	Group 3= routine care	VAS	Before and after reaching cervical dilations of 4 cm, 6 cm, 8 cm, and 10 cm.
Samadi 2010 [53]	Iran	3-arm RCT	N=131 age of 18–35 years, in labor at 38–42 weeks of pregnancy, with one or two prior births. no prior medication use, a cervical dilation of 3–5 cm, regular contractions, a BMI under 29, and no medical issues. Exclusions were non-consent, excessive oxytocin, fetal distress signs, or newborns outside the 2500-4000 g weight range	Group 1= 24.2 (3.6) Group 2= 24.9 (3.6) Group 3= 24.8 (3.9)	SP6	Group 1=First, a 2-minute pressure was applied in such a way that the participant experienced a pleasant pain, and care was taken to ensure that the color of the nail remained constant throughout the pressure. Then regardless of the contractions, one minute of rest and one minute of pressure was applied in such a way that the total duration of the applied pressures reached 30 minutes. This technique takes an hour in total	Group 2= touch Group 3= usual care	VAS	After 2 minutes of intervention, after 30 minutes of intervention and 30 minutes after the end of the intervention

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Sehhatie-Shafaie 2013 [31]	Iran	2-group parallel RCT	N=84 Eligible participants were nulliparous women aged 18–35 years, with a GA of 37–42 weeks as confirmed by LMP. They were required to have a single fetus, a cervical dilation of at least 4 cm indicating the start of active labor, cephalic presentation an intact amniotic sac or no more than 6 hours since its rupture. Candidates should have begun labor spontaneously and been considered low-risk, EFW under 4000 g (as estimated by the Johnson formula), no CPD detectable in a vaginal exam, a maternal height over 145 cm, no skin lesions at Acupressure points, and no disabilities affecting communication.	Group 1= 22.23 (4.11) Group 2= 21.50 (3.83)	SP6 LI4	Group 1= At 4 cm cervical dilation, Acupressure was administered. Thumb pressure was applied at SP6 points, increasing until tingling or numbness occurred, indicated by the assistant's thumbnail whitening. This was maintained for 1 minute, followed by a 30-second break, then LI4 hand points were pressed for 5 minutes, and SP6 points for another 5 minutes, in a 20-minute cycle	Group 2= Pressure was applied to areas of the legs and hands that are not traditionally associated with effective Acupressure points. The timing and conditions were identical to those of the experimental group	VAS	In 4, 6, 8, and 10 dilations before and after the intervention
Sayyedzadeh Aghdam 2012 [30]	Iran	Single blind, parallel RCT	N=130 Primiparous and singleton women who did not have a specific internal surgical disease or a specific obstetric problem and were in the active phase of labor with 3–4 cm dilation and were willing to participate in the research	Group 1= 21.92 (3.66) Group 2= 23.28 (5)	GB21 BL32	Group 1= Acupressure was administered at the beginning of each contraction for one minute using standard Acupressure cups	Group 2= received placebo pericardium6 point Acupressure for one minute at the start of every contraction in the first stage of labor	VAS	before and after intervention
Sebastian 2014 [33]	India	2-arm parallel RCT	N= 60 Primiparous women (no additional data)	No data	LI4	Group 1= Acupressure was applied at acupoint intermittently for a total duration of 30 minutes, starting at the onset of each contraction and continuing until the contraction subsided.	Group 2= no intervention	NRS	before and after intervention

Table 1 (continued)

First author, year	Country	Design	Participants	Age [mean (SD) or range]	Acupoint(s)	Intervention	Control	Tool	Measurement time
Torkiyan 2021 [56]	Iran	3-arm RCT	N=174 Eligible participants were nulliparous pregnant women aged 18–35, at 37–41 weeks gestation, intending to use pain relief, in early active labor with a cephalic fetus, and without mental, anatomical disorders, chronic diseases, or high-risk pregnancy history. Exclusions were those opting out or requiring emergency CS	Group 1= 22.71 ± 3.54 Group 2= 23.17 ± 4.25 Group 3= 22.14 ± 3.46	GB21	Group 1= The midwife applied thumb pressure to the point during contractions, using rotational movements to avoid discomfort until the visible nail bed color changed. This was halted at the contraction's end and resumed with the next, for 20 minutes, and repeated as dilation reached 6–7 cm and 8–10 cm	Group 2=The sham group received similar pressure on a non-acupoint one F-Cun from GB21 Group 3= Routine care	NRS	before and after the intervention
Türkmen 2019 [29]	Turkey	Single blind, parallel RCT	N=60 The study included primiparous mothers who were at least 37 weeks pregnant with a single, healthy fetus, had a cervical dilation of 4 cm, regular contractions, no pain relief, and no associated risks. Participants provided written consent. All received a standard oxytocin infusion of four drops per minute, increasing by four drops per hour. Excluded were women with previous births, high-risk or multiple pregnancies, preterm labor, or those needing labor pain medication.	Most participants in each group were 29 years old or younger	SP6	Group 1= Acupressure was administered during each contraction from the active phase (4–7 cm dilation) to the transition phase (8–10 cm dilation) of labor. Participants were positioned either sitting or lying on their left side. The acupoint received approximately 90 applications (40–48 during the active phase and 35–45 during the transition phase), with labor pain measured at each application.	Group2= touch	NRS	Immediately after each intervention
Wan 2018 [54]	China	4-arm RCT	N=241 The study criteria required women aged 20–35 years, in their first pregnancy at 37–41 weeks with a single, cephalic fetus, and no severe risk symptoms under examination. Exclusions were obstetric complications, alcohol, or smoking	Group 1= 26.18 (3.25) Group 2= 25.57 (3.11) Group 3= 26.70 (3.87) Group 4= 26.02 (2.90)	LI4	Group 1= Acupressure was applied rotationally for 10 minutes, consisting of 5 minutes of pressure followed by a 15-minute break Group 2= music was played with a 20 min break every two hours Group 3= received Acupressure and music-combined treatment	Group 4= no treatment	VAS	1, 4, 8, 16, 24 hours after intervention

CS Cesarean Section, *CPD* Cephalopelvic disproportion, *VAS* Visual Analog Scale, *MPQ* McGill pain questionnaire, *FHR* Fetal Heart Rate, *RCT* Randomized Controlled Trial, *NRS* Numeric Rating Scale, *TENS* Transcutaneous electrical nerve stimulation, *IUFD* Intrauterine Fetal Death, *EFW* Estimated Fetal Weight

two-armed [2, 21–33], 21 RCTs being three-armed [29, 34–53], and 2 having four arms [54, 55]. Acupressure intervention was implemented in nearly all studies during the active phase of labor. The total sample sizes ranged from 30 [45] to 241 [54] across the included studies. The included trials were published between 2003 [39] and 2024 [47]. Among these, 21 studies were conducted in Iran [25–27, 30, 31, 34–37, 40–42, 44, 46, 48–53, 56], five in Turkey [22–24, 29, 55], two in Brazil [43, 45], Egypt [21, 28], and India [33, 38] and one in Taiwan [39], Korea [2], Cyprus [47], Indonesia [32], and China [54]. The majority of participants were low-risk pregnant women with an average age ranging from 20 to 30 years. No analyses were conducted to compare pain levels among different age groups in the studies reviewed. Most studies included women in their first or second pregnancy, with gestational ages between 37 and 42 weeks. However, few studies provided detailed information on parity, which may have influenced the results.

Interventions and comparisons

In 9 RCTs, Acupressure was compared with touch [2, 24–29, 41, 49], 11 studies compared Acupressure with standard care [21–23, 32–34, 39, 42, 47, 54, 55], and 3 studies compared it with a Sham treatment [30, 31, 36]. 7 trials compared Acupressure with touch and standard care [37, 38, 43–46, 53], while one study compared Acupressure with Sham and routine measures [56]. Within 6 trials, two types of Acupressure were compared with touch [50], Sham [40], or standard care practices [35, 48, 51, 52] (Table 1).

Risk of bias

Table 2 and Fig. 2 show the risk of bias in studies individually and across domains within all included studies. Overall, none of the included studies were classified as having a low risk of bias across all domains. The domain of random sequence generation was assessed as low risk in 75% of studies (28 studies). 11 trials utilized block randomization [22, 25, 27, 29, 31, 34–36, 43, 46, 52], 5 studies employed computer-generated randomization [38, 40, 44, 51, 56], 6 studies used lot drawing [37, 41, 47, 49, 50, 55], two studies used the lottery method [23, 33], one used systematic randomization [42], two used a table of random numbers [2, 32], and one study utilized a coin toss [39]. In 32% of RCTs (n=12), the concealment of randomization was rated as low risk when sealed envelopes were used. Among all domains, the domain related to blinding of participants and personnel regarding risk was most prone to bias, with 62% of studies [23 trials] at risk of performance bias. 30% of RCTs (n=11) were at high risk of detection bias due to the lack of blinding of outcome assessment. 57% of studies (n=21) were judged to be at low risk of attrition bias. 73 % of studies were assessed as having an unclear risk of bias regarding selective reporting due to the absence of their protocols.

Meta-analysis findings

Thirty-three trials had enough information to perform a meta-analysis. The findings of the meta-analysis in three parts of the effect of Acupressure versus touch, Sham, and no intervention are presented as follows**.**

1-Effect of Acupressure versus touch

1-1. Common effect size

Figure 3 shows the forest plot of the pooled MD of the effect of Acupressure versus touch on the labor pain intensity. A random-effects meta-analysis of 15 studies including 1401 participants showed a statistically significant effect of Acupressure compared to touch on labor pain intensity (MD = −1.19, 95% CI −1.66 to −0.72, $p < 0.00001$). There was significant heterogeneity across studies ($Chi^2 = 114.81$, $I^2 = 88\%$, $p < 0.00001$). This result indicates that Acupressure was associated with a reduction in labor pain intensity compared to touch.

1–2. Sub-groups analysis

All included studies utilized a single acupoint for Acupressure. Subgroup analyses were conducted based on the specific acupoints used: SP6 and LI4. Both the SP6 Acupressure (MD = −0.69, 95% CI: −1.00 to −0.37, p < 0.0001) and LI4 Acupressure (MD = −1.87, 95% CI: −2.73 to −1.00, p < 0.0001) demonstrated statistically significant effects in reducing labor pain. Despite heterogeneity, a random-effects model was employed due to the variability observed across studies.

1–3. Sensitivity analysis

In our sensitivity analysis, we explored various factors, including the exclusion of studies, different statistical models, and weighting strategies. However, the findings remained consistent.

1–4. Publication Bias

Figure 4 shows the funnel plot of the effect of Acupressure versus touch on the labor pain intensity. The funnel plot revealed potential publication bias in the included studies, as evidenced by its asymmetry. Smaller studies with significant results favoring Acupressure, particularly SP6, were more prevalent, while studies with neutral or negative findings were underrepresented. Larger studies tended to cluster near the MD line, suggesting more reliable and less variable outcomes. The heterogeneity observed may be attributed to differences in study protocols, Acupressure techniques, and population characteristics. This highlights the need for more robust,

Table 2. Risk of bias judgment for included studies

First author's name, year	D1	D2	D3	D4	D5	D6	D7
Abd El Hamid 2012 [21]	Unclear	Unclear	High	Unclear	Low	Unclear	Unclear
Akbarzadeh 2014 [34]	Low	Unclear	High	Unclear	Low	High	Unclear
Alimoradi 2020 [35]	Low	Low	High	Low	Low	Low	Low
Ashtarkan 2021 [40]	Low	Unclear	Low	Unclear	Low	Low	Low
Calik 2014 [22]	Low	Low	High	High	High	Unclear	Unclear
Çelik 2019 [24]	High	Unclear	Low	High	Low	Unclear	Unclear
Chung 2003 [39]	Low	Low	Unclear	Unclear	Low	Unclear	Low
Dabiri 2014 [37]	Low	Low	High	Low	Low	Unclear	Unclear
Gönenç 2020 [55]	Low	Unclear	High	High	Unclear	Unclear	Low
Hajighasemali 2015 [36]	Low	Unclear	High	Unclear	Unclear	High	Unclear
Hamidzadeh 2012 [25]	Low	Unclear	High	Low	Low	Unclear	Unclear
Hamlaci 2017 [23]	Low	Low	High	High	Low	Unclear	Low
Heidari 2008 [26]	Unclear	Unclear	Low	Low	High	Unclear	Unclear
Hjelmstedt 2010 [38]	Low	Low	Unclear	Low	Low	Unclear	High
Hossein Pour 2012 [42]	Low	Unclear	High	Unclear	Low	Unclear	Unclear
Kashanian 2009 [27]	Low	Low	Unclear	Low	Unclear	Unclear	Low
Kaviani 2012 [41]	Low	Unclear	High	Unclear	Unclear	Unclear	Unclear
Kordi 2009 [44]	Low	Unclear	High	High	Unclear	Unclear	Unclear
Kordi 2011 [46]	Low	Unclear	High	Unclear	Unclear	Unclear	Unclear
Lee 2004 [2]	Low	Unclear	Low	Low	Unclear	Unclear	Low
Mady 2024 [28]	High	Unclear	Unclear	Unclear	Low	Unclear	Unclear
Mafetoni 1 2016 [43]	Low	Unclear	Low	Low	Unclear	Unclear	Unclear
Mafetoni 2 2016 [45]	Unclear	Low	Low	Low	High	Unclear	Low
Mammadov 2024 [47]	Low	Unclear	High	Unclear	Low	Low	Low
Mansouri 2018 [48]	Unclear	Low	High	Low	Low	Unclear	Low
Mirzaee 2021 [49]	Low	Unclear	Low	High	Low	Low	Unclear
Moradi 2012 [50]	Low	Unclear	High	High	Low	Unclear	Unclear
Norhapifah 2024 [32]	Low	Unclear	High	Unclear	Low	Low	Unclear
Ozgoli 2016 [51]	Low	High	High	High	Low	Unclear	Low
Salehian 2011 [52]	Low	Low	High	Unclear	Low	Unclear	Unclear
Samadi 2010 [53]	Unclear	Unclear	High	High	Low	Unclear	Unclear
Sebastian 2014 [33]	Low	Unclear	High	Unclear	Unclear	Low	Unclear
Sehhatie-Shafaie 2013 [31]	Low	Unclear	Low	Unclear	Unclear	Low	Low
Sayyedzadeh Aghdam 2012 [30]	Unclear	Unclear	Low	High	Unclear	Unclear	Unclear
Torkiyan 2021 [56]	Low	Low	High	Unclear	Low	High	Low
Türkmen 2019 [29]	Low	Low	Low	High	Low	Unclear	Low
Wan 2018 [54]	Unclear	Unclear	High	Low	Unclear	Unclear	Unclear

D1: Random sequence generation
D2: Allocation concealment
D3: Blinding of participants and personnel
D4: Blinding of outcome assessment
D5: Incomplete outcome data
D6: Selective reporting
D7: Other sources of bias

large-scale studies with standardized methodologies to reduce bias and provide more conclusive evidence on the efficacy of Acupressure for labor pain relief.

2-Effect of Acupressure versus Sham

2-1. Common effect size

Figure 5 shows the forest plot of the pooled MD of the effect of Acupressure versus Sham on the labor pain

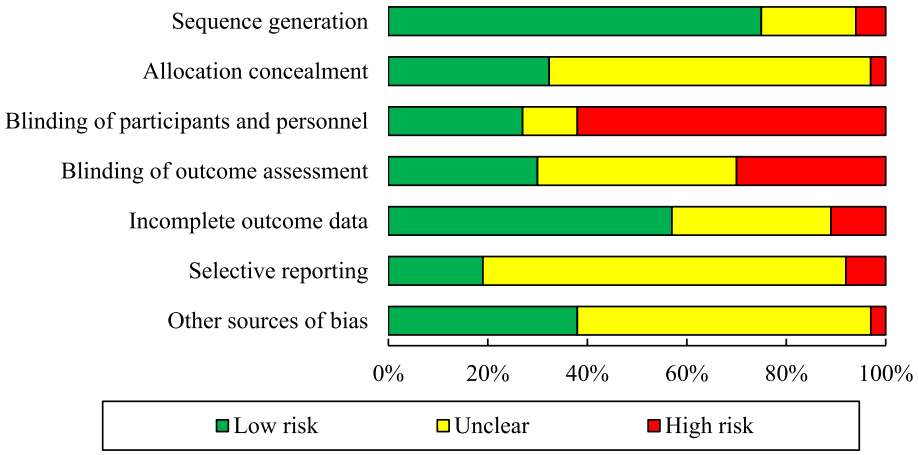

Fig. 2 A visual representation of the risk of bias regarding each methodological quality domain, displayed across all included studies

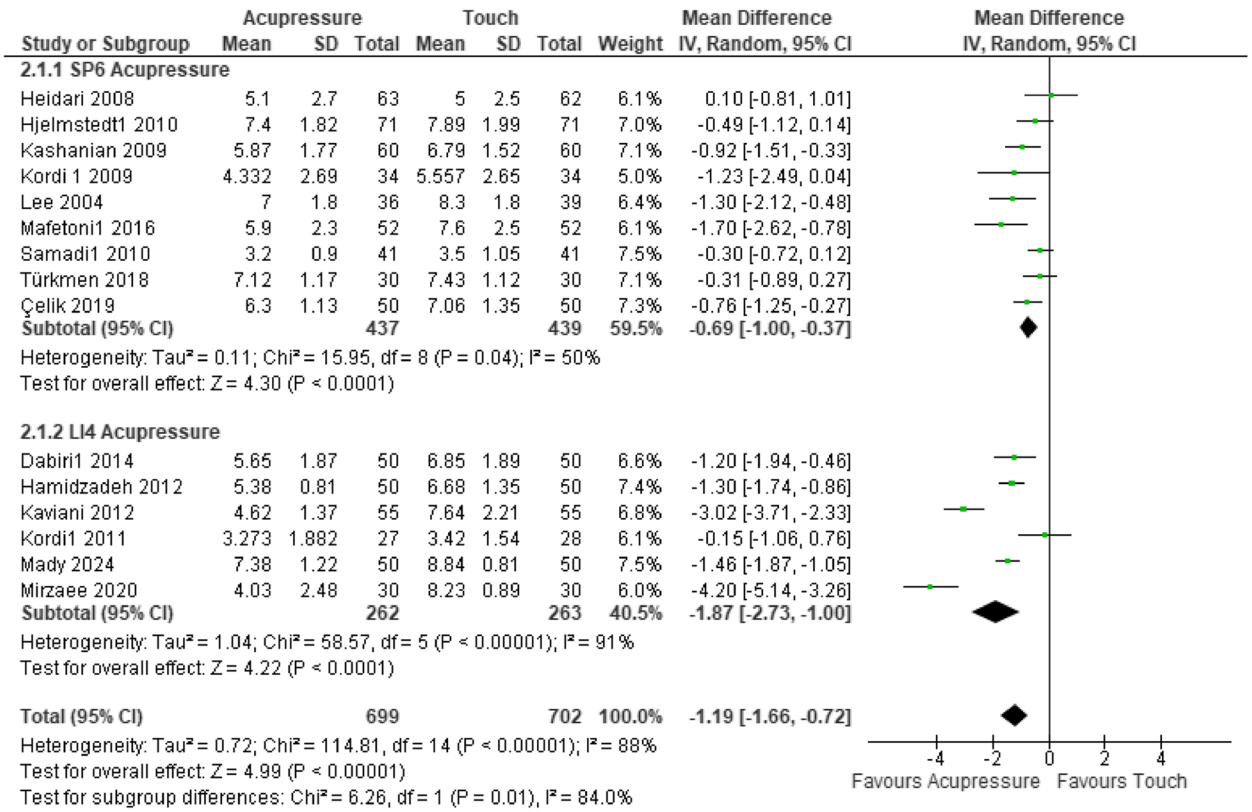

Fig. 3 Forest plot of the pooled MD of the effect of Acupressure versus touch on the labor pain intensity

intensity. The plot indicated a significant effect favoring Acupressure over Sham treatment (MD = −1.41, 95% CI −2.55 to −0.27, p = 0.01). These findings suggest that Acupressure may have a more pronounced effect than sham treatment, according to the data compiled from the included studies. The high heterogeneity (Chi^2 = 129.70, I^2 = 97%, p<0.00001) indicates variability in the study results, which is an important consideration when interpreting the data.

2-2. Sub-groups analysis

In our analysis, some studies utilized a single acupoint for Acupressure, while others simultaneously applied pressure to dual acupoints. We conducted a subgroup

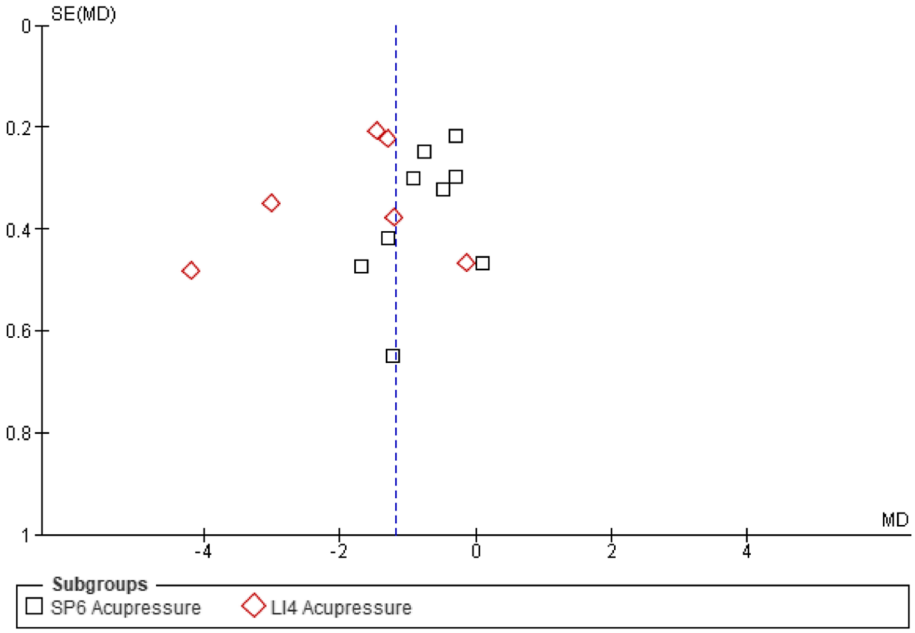

Fig. 4 Funnel plot of the effect of Acupressure versus touch on the labor pain intensity

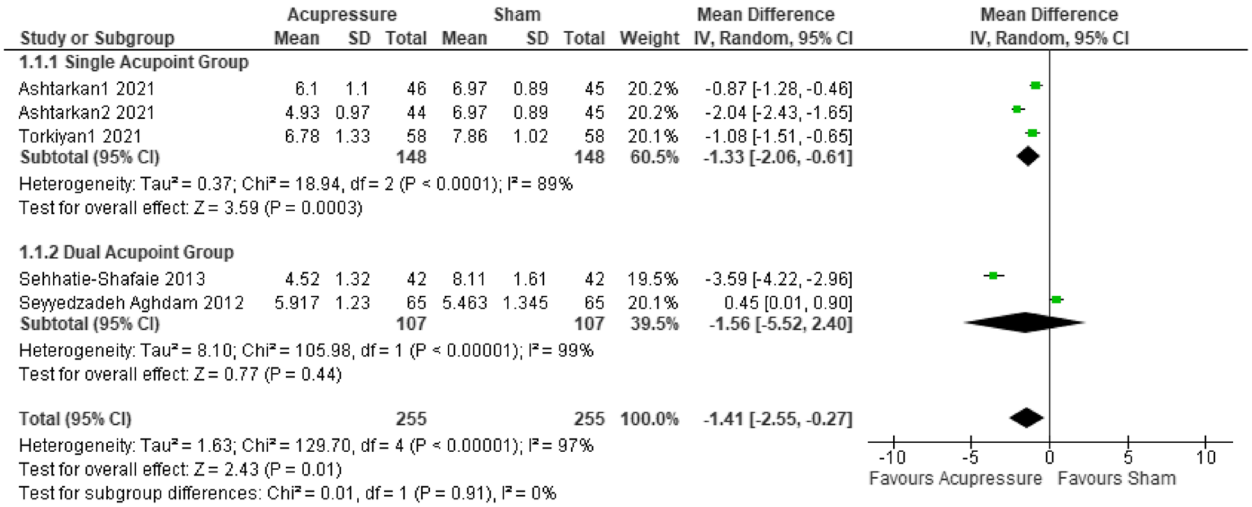

Fig. 5 Forest plot of the pooled MD of the effect of Acupressure versus Sham on the labor pain intensity

analysis based on these approaches. In summary, both single-point and dual-point Acupressure sub-groups demonstrated meaningful pain reduction during labor, but the reduction was statistically significant in the single-point approach (MD = −1.33, 95% CI −2.06 to −0.61, $p = 0.0003$).

2–3. Sensitivity analysis

Our sensitivity analysis revealed intriguing insights into the robustness of these findings. When we conducted the sensitivity analysis by systematically removing individual studies from the analysis, we found that the results became non-significant with the exclusion of all studies except for Sayyedzadeh Aghdam's study [30]. This suggests that the overall effect observed in the Acupressure group may be heavily influenced by the results of specific studies. Conversely, when only Study of Sayyedzadeh Aghdam et al. was excluded from the analysis, the results became more statistically significant. This indicates that the mentioned study may have had a considerable impact on the overall findings, and its presence in the analysis could be masking the true effect

of Acupressure on pain relief during labor. These findings emphasize the need for a cautious interpretation of the Acupressure's effect on labor pain, as the removal of certain studies alters the statistical significance of the results. This highlights the importance of the quality and reliability of individual studies in meta-analytic assessments. Further investigation and more robust studies are necessary to confirm the efficacy of Acupressure in this context.

3-Effect of Acupressure versus no intervention

3-1. Common effect size

Figure 6 shows the forest plot of the pooled MD of the effect of Acupressure versus no intervention on labor pain intensity. 25 RCTs of 1969 women were included in the meta-analysis. The majority of studies favor Acupressure, indicating its potential effectiveness in pain reduction. Based on a random effects model, the overall test statistics show a significant effect of Acupressure on pain relief during labor, with a Z-value of 8.18 and $p < 0.00001$. The pooled MD was −2.32, with a 95% CI of −2.87 to −1.76, suggesting a moderate to large effect size. There was considerable heterogeneity among the studies ($Chi^2 = 686.64$, $I^2 = 97\%$, $p<0.00001$). The considerable heterogeneity identified in the meta-analysis is probably attributable to variations in study protocols, Acupressure methods, and the characteristics of participants. Discrepancies in the implementation of Acupressure, including factors such as pressure intensity, duration, and the specific Acupoints selected, may have played a role in this heterogeneity. Furthermore, variations in the quality of the studies, including issues like the absence of blinding or inadequate allocation concealment, could influence the outcomes. These findings suggest that Acupressure may be a beneficial non-pharmacological intervention for pain management during labor. However, the high heterogeneity indicates that further research is needed to understand the varying effects across different contexts.

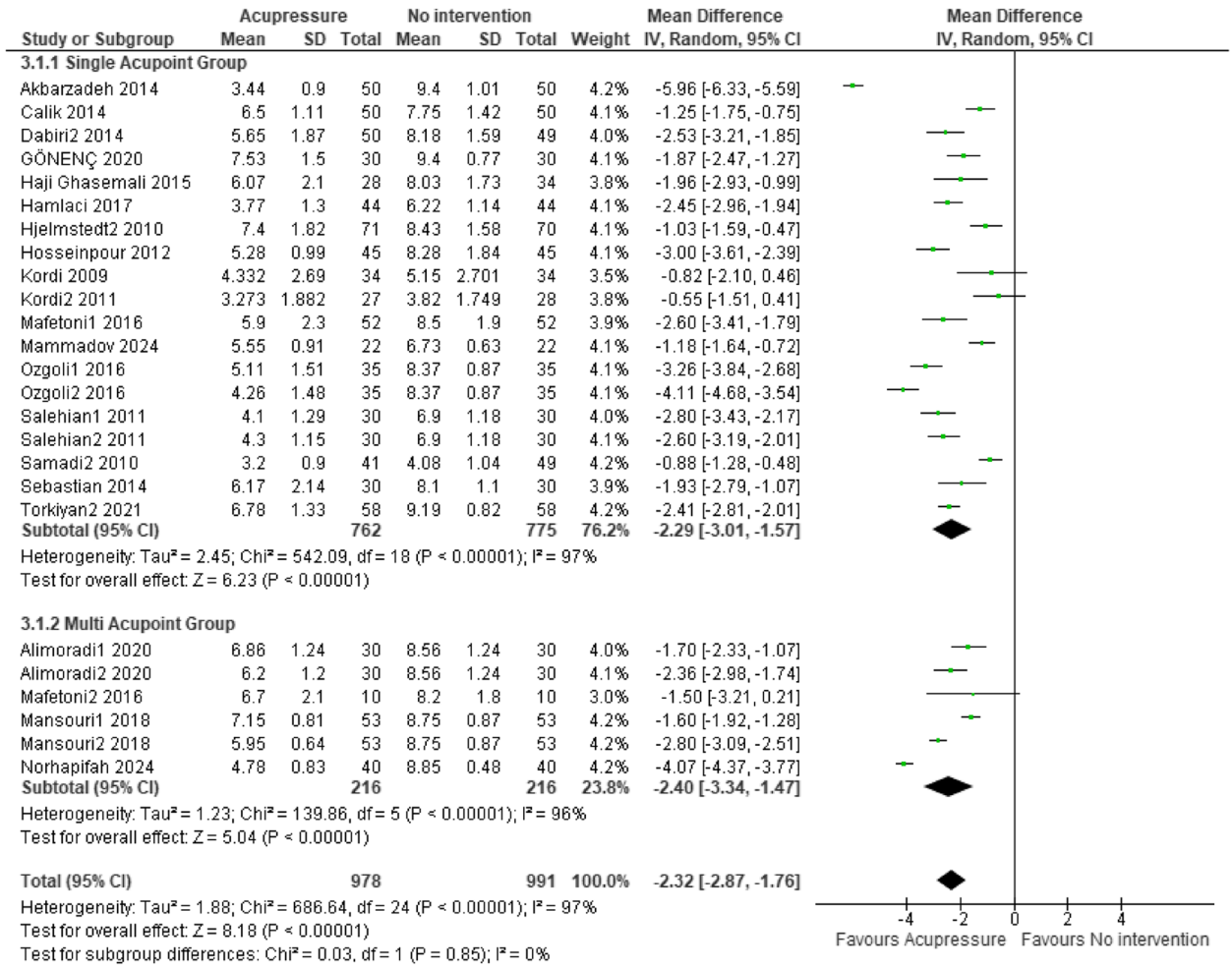

Fig. 6 Forest plot of the pooled MD of the effect of Acupressure versus no intervention on the labor pain intensity

3-2. Sub-groups analysis

The subgroup analysis was conducted based on the number of Acupressure points. Studies that used a single point were compared with those that simultaneously utilized several points for Acupressure. Overall, both single-point (MD = −2.29, 95% CI −3.01 to −1.57, $p <$ 0.00001) and multi-point Acupressure (MD = −2.40, 95% CI −3.34 to −1.47, $p <$ 0.00001) appear to have positive effects compared to no intervention. However, individual study weights and confidence intervals should be considered when interpreting these results.

3-3. Sensitivity analysis

Sensitivity analysis across all scenarios consistently demonstrated that the effect size remains unchanged. Regardless of variations in study characteristics or inclusion criteria, the overall impact remains stable.

3–4. Publication Bias

Figure 7 shows the funnel plot of the effect of Acupressure versus no intervention on labor pain intensity. The funnel plot comparing single and multi-acupoint interventions reveals moderate symmetry, suggesting a lower likelihood of significant publication bias. However, slight asymmetry is visible, with smaller studies showing more variable results. Multi-acupoint studies, represented by red diamonds, exhibit wider dispersion, indicating heterogeneity in outcomes, possibly due to variations in the number, combination, or application of acupoints. Conversely, single acupoint studies, shown as black squares, cluster more closely around the MD line, reflecting more consistent findings. The asymmetry at the lower precision end suggests potential underreporting of studies with non-significant or less favorable results, particularly for multi-acupoint interventions. This emphasizes the importance of additional high-quality studies to ensure comprehensive evidence for comparing these approaches.

Certainty of evidence

Table 3 presents the GRADE profile of evidence. The certainty of evidence regarding the effect of Acupressure in comparison to touch was assessed as low. This assessment reflects a two-level downgrade due to significant concerns regarding bias and the possibility of publication bias. Furthermore, the certainty of evidence for the effect of Acupressure versus sham was also rated as low, with a similar two-level downgrade accepted due to serious risks of bias and heterogeneity. Lastly, the evidence grading for the effect of Acupressure compared to no intervention was classified as moderate, with a one-level downgrade attributed to a serious risk of bias.

While Acupressure has demonstrated potential benefits for pain relief during labor, the low certainty of evidence indicated in the GRADE profile emphasizes the need for more rigorous randomized controlled trials (RCTs) to substantiate these claims. The downgrades related to serious bias risks and heterogeneity suggest that, although there may be some positive outcomes associated with Acupressure, the dependability of these findings remains uncertain. To validate Acupressure as a reliable intervention in obstetric care, it is crucial

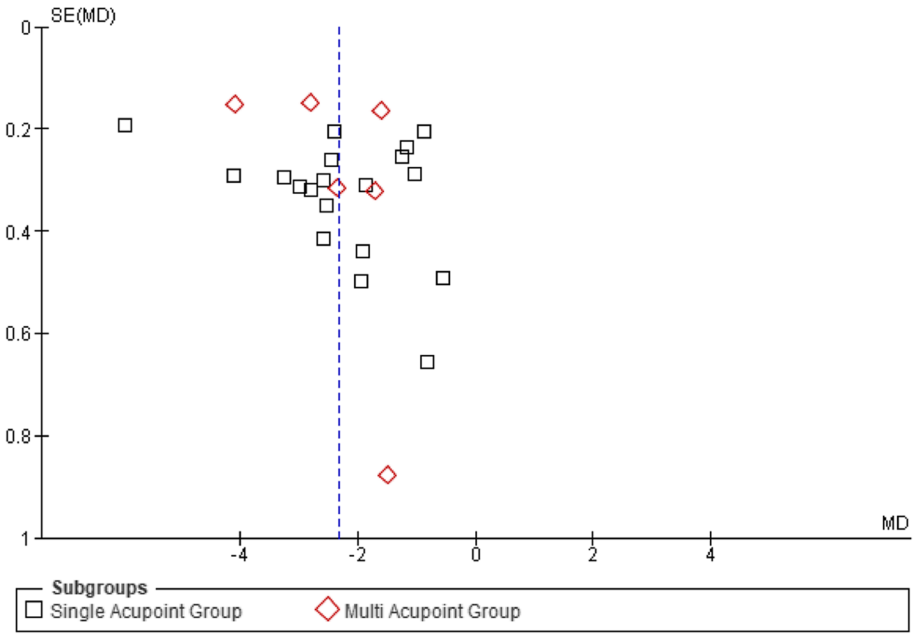

Fig. 7 Funnel plot of the effect of Acupressure versus no intervention on the labor pain intensity

Table 3 GRADE evidence profile

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**[Acupressure]**	**[Comparison]**	**Relative (95% CI)**	**Absolute (95% CI)**		
Effect of Acupressure versus touch												
15	randomised trials	serious[a]	not serious[b]	not serious	not serious	publication bias strongly suspected[c]	699	702	-	MD **1.19 lower** (1.66 lower to 0.72 lower)	⨁⨁◯◯ Low	CRITICAL
Effect of Acupressure versus Sham												
5	randomised trials	serious[a]	serious[d]	not serious	not serious	none	255	255	-	MD **1.41 lower** (2.55 lower to 0.27 lower)	⨁⨁◯◯ Low	CRITICAL
Effect of Acupressure versus no intervention												
25	randomised trials	serious[a]	not serious[b]	not serious	not serious	none	978	991	-	MD **2.32 lower** (2.87 lower to 1.76 lower)	⨁⨁⨁◯ Moderate	CRITICAL

CI: confidence interval

Explanations

[a] Majority of included studies have high or unclear risk

[b] Although that heterogeneity is high, the heterogeneity is caused by differences in the magnitude of effectiveness rather than by effectiveness and ineffectiveness

[c] The funnel plot analysis indicated a potential publication bias

[d] Significant heterogeneity exists

to conduct high-quality research that addresses these issues. Future investigations should focus on minimizing biases and employing standardized protocols to improve the consistency and validity of results. By developing well-structured randomized controlled trials, researchers can offer clearer insights into the actual effectiveness of Acupressure during labor. Only through thorough investigation and enhanced evidence quality can we confidently incorporate Acupressure into pain management strategies for childbirth, potentially leading to improved GRADE ratings in subsequent evaluations.

Discussion

The current systematic review and meta-analysis seeks to consolidate and critically evaluate the efficacy of Acupressure in alleviating labor pain, drawing from 37 RCTs. In this analysis, heterogeneity was assessed using the I^2 statistic, with thresholds of 25%, 50%, and 75% representing low, moderate, and high levels of heterogeneity, respectively. Sensitivity analyses were conducted by omitting studies that exhibited large effect sizes or a significant risk of bias, while subgroup analyses were utilized to investigate potential sources of heterogeneity. Outliers were detected through a visual examination of forest plots and were excluded in the sensitivity analysis to enhance the reliability of the findings.

Sham Acupressure and blank controls are typically designed to help mitigate bias when assessing Acupressure's specific effects. The analysis of 15 RCTs found that Acupressure had a statistically significant effect on reduced labor pain intensity compared to touch. In recent years, there have been some meta-analyses on the effect of Acupressure on labor pain intensity that consistence with our results [5, 6, 57, 58]. A meta-analysis conducted in 2020, which included 18 RCTs, found that Acupressure significantly reduced labor pain in the intervention group compared to the control group [5]. In this study, Acupressure was not compared with Sham intervention. Most studies used points SP6 and LI4 for their interventions. Acupressure on the SP6 and L14 points can help to reduce labor pain. By activating and increasing the production of endorphins, Acupressure at these points can reduce pain. Activity in the large and small nerve fibers influences the sensation of pain. Pain impulses travel through small-diameter fibers. These nerve fibers are responsible for blocking the impulses that pass through these small-diameter fibers. Stimulating acupuncture points on the skin's surface, which contain large-diameter sensory nerve fibers and blood vessels, helps close the gates on the transmission of pain-causing impulses, thereby reducing or eliminating pain [59]. The results of another meta-analysis of nine articles related to the effect of Acupressure on significantly reducing dysmenorrhea pain showed that Acupressure could reduce primary dysmenorrhea pain in women. Authors stated that non-pharmacological management or complementary therapy to Acupressure therapy can be considered a way to treat primary dysmenorrhea because of its high level of safety and more affordable costs. Further studies are needed to explore the impacts of variables such as Acupressure strength, intensity, and duration on fatigue reduction [60].

Another finding was that the results of 5 RCTs demonstrated a significant effect favoring Acupressure over Sham treatment. To perform a Sham Acupressure, lightly touch the acupoint location or areas other than the actual acupoints without applying any pressure. A meta-analysis, conducted up to 2018, compared Acupressure to sham Acupressure in eight trials. The combined results of these studies yield a significant pain reduction in favor of Acupressure immediately after treatment at the active phase of labor and the transitional phase of labor. There was also a significant difference between the groups in favor of Acupressure for 30 min and 1 h after treatment. However, after 2 hours of treatment, they found no significant difference between the groups [61]. Based on a systematic review and critique (2015) with sixty-six RCTs showed that Acupressure therapy was a beneficial approach in managing a variety of health problems, and the therapeutic effect was found to be more effective in the true Acupressure groups than that in the sham comparative groups. The authors stated that they cannot conclude about the association between sham alternatives and treatment outcomes due to clinical heterogeneity in the trials. Additionally, they recommend the use of non-acupoints, but caution should be exercised when locating them. Instead of stimulating the active intervention acupoint, investigations using single sham acupoints on hands or legs should use identical Acupressure devices. In pain studies, avoid activating sham acupoints [62]. Bal et al. (2024) conducted a sham-controlled trial aimed to analyze the effects of Acupressure on pain, anxiety, and vital signs in patients who underwent coronary angiography. Results showed that, compared to the sham and control groups, the pain scores in the Acupressure group decreased significantly after Acupressure [63].

We used a random-effects model because we identified substantial heterogeneity between studies. The review of the articles revealed that the frequency of Acupressure for pain reduction lasts approximately 30 minutes, potentially influencing the reduction of pain in pregnant women during labor. In this research, the sham procedures utilized in the studies varied significantly; some employed thumb pressure on non-acupoints, while others implemented placebo devices. To enhance the validity of future trials, it would be beneficial to adopt a more

rigorous and standardized sham protocol, such as applying pressure to non-acupoints with identical devices, thereby ensuring consistent control of the placebo effect across different studies.

Another results analysis of 25 RCTs showed a significant effect of Acupressure versus no intervention on pain relief during labor. We obtained the same results when we compared Acupressure to usual care without any intervention. The usual care was specific to each trial and involved measures other than the intervention treatments, such as the presence of a nurse and/or midwife, massage in the lower back region, breathing exercises, and liberty of movement. Although the effectiveness of Acupressure in relieving pain has been confirmed, the heterogeneity is relatively large. This could be attributed to the wide range of research subjects included in this study, aside from chance variation and methodological differences, clinical differences as they relate to the study participants (age, parity, mood, and tolerance) are presumably the source of these observed differences of individual study results. This could also be due to factors such as the choice of acupoints and massage duration. We recommend designing and implementing a standard methodology for labor pain in future research, taking into account the variations in pressure points and intervention duration across the reviewed studies.

Overall, we deemed none of the included studies low-risk across all domains. Seventy-five percent assessed the domain of random sequence generation as low-risk. They rated the evidence's certainty for the effect of Acupressure compared to touch, Sham, or no intervention as low. Variations in the methods of randomization and allocation concealment—such as the use of sealed envelopes versus computer-generated techniques—may have led to selection bias. Additionally, the lack of blinding in numerous studies could have contributed to performance and detection bias, as both participants and outcome assessors might have been aware of the intervention being provided. Such biases can potentially influence the reported treatment effects, particularly in studies where outcomes, such as pain intensity, depend on subjective assessments. To establish Acupressure as a credible intervention in obstetric settings, it is essential to conduct high-quality research that addresses these concerns. Future studies should aim to minimize biases and utilize standardized protocols to enhance the consistency and validity of their findings. By producing well-designed RCTs, researchers can provide clearer insights into the true efficacy of Acupressure during labor. Only with rigorous investigation and improved evidence quality can we confidently integrate Acupressure into childbirth pain management strategies, potentially increasing our GRADE ratings in future assessments. We conducted funnel plot analyses when 10 or more studies were included in the analysis. For the comparison of Acupressure versus touch, funnel plot asymmetry was observed, which led to the decision to downgrade the evidence. This finding underscored the importance of exercising caution when interpreting the overall effect size and highlighted the need to consider study characteristics and their potential influence on the observed asymmetry.

Our study benefits from several strengths. Firstly, we focused our review on the effect of Acupressure as a standalone treatment, excluding studies involving mixed therapies, and conducted a subgroup study of sham Acupressure or blank control in the control group to verify whether Acupressure's effectiveness in treating labor pain. Secondly, our review included 37 RCTs with larger sample sizes and a variety of Acupressure points. Thirdly, the included studies were conducted at multiple locations and in different countries, covering a diverse range of ethnicities and cultures, potentially reducing selection bias and improving external validity. Fourthly, we conducted sensitivity analysis and funnel plot, indicating that the meta-analysis was stable, robust, and free from publication bias. Lastly, in this review, no time or linguistic restrictions were applied when searching the databases. There are limitations to consider when interpreting these results. The studies included in this meta-analysis exhibited a high level of statistical heterogeneity due to the use of different methodologies from different countries. There is the potential for publication bias that may have arisen from the failure to identify unpublished negative studies. There is a potential for exaggerating the impact of the therapy in interventions, particularly in trials where blinding and/or allocation concealment are not properly implemented. Finally, the overall quality of the studies was low, particularly concerning allocation concealment and participant and personnel blindness.

Future studies

Future research should aim to tackle the limitations identified in our analysis, including the selection of specific acupoints (for instance, SP6 or LI4), the duration of sessions (such as 30 minutes per session), and the intensity of pressure applied (for example, by employing standardized scales for pressure measurement). Maintaining consistency in these factors will reduce variability and improve results'comparability across various studies. Larger, well-designed RCTs are essential to validate the effectiveness of Acupressure in labor pain management. Additionally, studies exploring the long-term effects of Acupressure on maternal and neonatal outcomes are warranted. Systematic reviews examining the integration

of Acupressure into standard obstetric care could provide further insights into its role within diversified pain management strategies.

Public health implications

The results of our meta-analysis underscore the potential of Acupressure as a non-drug approach for managing labor pain. This could have significant implications for public health, especially in areas where access to pain medications is restricted or where women prefer non-pharmacological methods. Greater awareness and training in Acupressure for healthcare providers could support its wider adoption, promoting a more comprehensive approach to maternity care and improving the overall birthing experience for women.

Clinical implications

From a clinical perspective, Acupressure may serve as a valuable tool for alleviating labor pain, improving patient satisfaction, and potentially decreasing reliance on pain-relieving medications. Healthcare professionals should explore integrating Acupressure into standard labor care practices, particularly for women interested in alternative or complementary pain management strategies. Additionally, educating pregnant women about Acupressure techniques could empower them to take a more active role in managing their pain during childbirth.

Conclusion

The findings from this study affirm that Acupressure represents a noninvasive technique capable of significantly alleviating pain. However, to create evidence-based guidelines, further clinical trials with standardized intervention procedures are required.

Appendix

Table 4 Appendix 1 Search strategy

PubMed	
(("Acupressure"[Title/Abstract] OR"acupoint"[Title/Abstract] OR"shiatsu"[Title/Abstract] OR"zhi ya"[Title/Abstract] OR"chih yang"[Title/Abstract] OR"acupuncture point"[Title/Abstract]) AND ("labor"[Title/Abstract] OR"labour"[Title/Abstract] OR"birth"[Title/Abstract] OR"active phase"[Title/Abstract] OR"parturitions"[Title/Abstract] OR"vaginal delivery"[Title/Abstract]) AND ("pain"[Title/Abstract] OR"pain"[MeSH Terms])) AND (randomizedcontrolledtrial[Filter])	40 results
Scopus	
TITLE-ABS-KEY (Acupressure OR acupoint OR shiatsu OR"zhi ya"OR"acupuncture point") AND TITLE-ABS-KEY (labor OR labour OR birth OR"vaginal delivery"OR"active phase") AND TITLE-ABS-KEY (pain OR"visual analogue scale") AND (LIMIT-TO (DOCTYPE,"ar"))	171 results
PubMed	
Web of Science	
# Web of Science Search Strategy (v0.1) # Database: Web of Science Core Collection # Entitlements: - WOS.IC: 2009 to 2014 - WOS.CCR: 2009 to 2014 - WOS.SCI: 1985 to 2025 - WOS.AHCI: 1985 to 2025 - WOS.BHCI: 2005 to 2025 - WOS.BSCI: 2005 to 2025 - WOS.ESCI: 2005 to 2025 - WOS.ISTP: 1990 to 2025 - WOS.SSCI: 1985 to 2025 - WOS.ISSHP: 1990 to 2025 # Searches: 1: ((((TS=(Acupressure)) OR TS=(acupoint*)) OR TS=("acupuncture points")) OR TS=(shiatsu)) OR TS=("zhi ya") Date Run: Mon Jan 13 2025 09:08:03 GMT+0330 (Iran Standard Time) Results: 9615 2: (((((TS=(labor)) OR TS=(labour)) OR TS=(birth)) OR TS=("active phase")) OR TS=("vaginal delivery")) OR TS=("childbearing") Date Run: Mon Jan 13 2025 09:09:32 GMT+0330 (Iran Standard Time)Results: 919277 3: ((TS=(pain)) OR TS=(discomfort)) OR TS=("visual analogue scale") and Pain Management (OR – Search within topic) Date Run: Mon Jan 13 2025 09:10:43 GMT+0330 (Iran Standard Time) Results: 991465 4: DT=(Article)Date Run: Mon Jan 13 2025 09:12:37 GMT+0330 (Iran Standard Time)Results: 50185888 5: #1 AND #2 AND #3 AND #4Date Run: Mon Jan 13 2025 09:12:54 GMT+0330 (Iran Standard Time)	133 results
Cinahl	
AB (Acupressure or acupoint therapy or acupoint pressure or Acupressure or acupuncture points) AND AB (labor or labour or childbirth or birth or delivery) AND AB (pain or discomfort or distress) AND (randomised controlled trial or randomized controlled trial or rct)	39 results
Embase	
#1'Acupressure'/exp OR'Acupressure'OR'acupuncture point'/exp OR'acupuncture point'OR'shiatsu'/exp OR'shiatsu'OR'acupoint'/exp OR acupoint OR shiatzu 14,740 #2'pain'/exp OR pain 2317156 #3'labor'/exp OR'labor'OR'labour'/exp OR labour OR'childbirth'/exp OR childbirth OR'birth'/exp OR birth OR'active phase'867716 #4'randomized controlled trial'/exp OR'randomized controlled trial'OR'clinical trial'/exp OR'clinical trial'2631027 #5('Acupressure'/exp OR'Acupressure'OR'acupuncture point'/exp OR'acupuncture point'OR'shiatsu'/exp OR'shiatsu'OR'acupoint'/exp OR acupoint OR shiatzu) AND ('pain'/exp OR pain) AND ('labor'/exp OR'labor'OR'labour'/exp OR labour OR'childbirth'/exp OR childbirth OR'birth'/exp OR birth OR'active phase') AND ('randomized controlled trial'/exp OR'randomized controlled trial'OR'clinical trial'/exp OR'clinical trial') 127	127 results
Cochrane library	
Date Run:12/01/2025 02:26:57 Comment: IDSearchHits #1 Acupressure2540 #2MeSH descriptor: [Acupressure] explode all trees612 #3acupoint4302 #4MeSH descriptor: [Acupuncture Points] explode all trees2854 #5 shiatsu73 #6"zhi ya"6 #7#1 OR #2 OR #3 OR #4 OR #5 OR #68390 #8MeSH descriptor: [Parturition] explode all trees925 #9 labor21246 #10 labour21246 #11birth44064 #12"vaginal delivery"4658 #13#8 OR #9 OR #10 OR #11 OR #1260234 #14pain274378 #15MeSH descriptor: [Pain] explode all trees74559 #16"visual analogue scale"70787 #17#14 OR #15 OR #16300749 #18MeSH descriptor: [Clinical Trial] explode all trees45 #19RCT53229 #20"randomized controlled trial"730238 #21"randomised controlled trial"730238 #22"clinical trial"512403 #23"interventional"28886 #24#18 OR #19 OR #20 OR #21 OR #22 OR #23944614 #25#7 AND #13 AND #17 AND #24179	179 results

Abbreviations

CPD	Cephalopelvic disproportion
CS	Cesarean Section
EFW	Estimated Fetal Weight
FHR	Fetal Heart Rate
GA	Gestational Age
IUFD	Intrauterine Fetal Death
MPQ	McGill pain questionnaire
NRS	Numeric Rating Scale
RCT	Randomized Controlled Trial
TENS	Transcutaneous Electrical Nerve Stimulation
VAS	Visual Analogue Scale

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Authors'contributions
SMa. and ML. conducted the search process, title screening, and full-text screening. SMa., SMo., LK., and ML. extracted data. S.Ma and LK. carried out an assessment of potential bias and applied GRADE. SMa. and LK. formulated the final tables and drafted the first version of the manuscript. SHJ. provided methodological and content expertise, and supervised all steps of it. All authors reviewed the article and approved its content.

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Declarations

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Consent for publication
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Competing interests
The authors declare no competing interests.

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