Auricular Acupressure for Pain Relief in Labour : A Systematic Review and Meta-Analysis

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Abstract

ABSTRACT Background Labour pain ranks consistently among the most severe types of pain that a woman will experience during her lifetime and leads harmful effects on both mother and baby. As a complementary method, auricular acupressure has been used in the pain management for many diseases and many RCTs showed it has a pain-reliving effect in labour. However, no meta-analysis has been conducted to provide systematic evidence for pain relief in labour. Objectives To perform a systematic review to assess the efficacy of auricular acupressure for labor pain. Search Strategy PubMed, Cochrane Library, Embase, Web of Science databases, SinoMed, CNKI, WanFang Data and VIP were searched for studies using keywords "auricular acupressure" combined with "labor" and "RCTs." Selection Criteria: Eligible criteria included RCTs, full-text studies, English, and Chinese literature, whereas exclusion criteria included incomplete information, duplicated publications, and studies combined with other analgesic methods. Data Extraction and Analysis: The selection of eligible items and assessment of methodological quality were performed independently by two researchers. A meta-analysis was performed to analyze the treatment effects on pain intensity reduction, maternal satisfaction and safety. Main Results: 17 RCTs were included in this review involving a total of 2574 parturients. Auricular acupressure showed significant efficacy in the reduction of pain intensity and improvement of maternal satisfaction. Conclusions: Auricular acupressure showed a pain-relieving effect compared with the routine care. Although the evidence is limited and high quality studies are needed.

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Funding: Health Talents Project of Shandong Province

Keywords: Labor analgesia ;Auricular Acupressure;

Labour pain ranks consistently among the most severe types of pain that a woman will experience during her lifetime, and 60% of them complained their pain as severe or extremely severe.[1-2]Besides being unpleasant, the sharp pain may lead to harmful effects on both mother and baby such as fetal hypoxia and metabolic acidosis.[3]

Since the introduction of chloroform for labour analgesia in 1847[4], different methods and medications have been used to relieve the pain of labour, including neuraxial analgesia, nitrous oxide and systemic opioids. However, the side effects can also arise from the analgesic process. For example, hypotension occurs during 25% to 85% of spinal or epidural anesthetics, and total spinal anesthesia or local anesthetic toxicity may also occur[5]. Accordingly, the non-pharmacologic techniques like progressive muscle relaxation, breathing, music, mindfulness have been recommended by WHO as complementary methods for pain relief during labour.[6]

Auricular therapy has been used for diagnosis and treatment of diseases for thousands of years in China. It has developed into a distinct treatment system since Dr. P. Nogier discovered the correspondence between the auricle and the internal organs in 1957 He suggested that the distribution of auricular points was shaped like an inverted fetus.[7] Under this theoretical framework, the auricle is divided into dozens of areas corresponding to different organs of the body. We can attach magnetic beads or the seed of cowherb to these special areas to treat different diseases in corresponding organs. For example, in labour analgesia, we can attach the seeds to the corresponding points of uterus and pelvis.

For its remarkable efficacy and simplicity, auricular acupressure has been applied for the treatment of epilepsy, anxiety, obesity, and insomnia.[8] A meta-analysis showed it has positive effects on pain management of several diseases.[9]

Many published clinical studies, including randomized controlled trials (RCTs), have explored auricular acupressure as a treatment option for labour pain, and most reports have shown positive clinical effects. However, to the best of our knowledge, no meta-analysis has been conducted on this topic. In the current review, we assessed the effectiveness of auricular acupressure for labour pain by using a meta-analysis.

Methods

This systematic review and meta-analysis (PROSPERO registration No. CRD42021268033) focused on RCTs involving auricular acupressure interventions for pain relief during labour.

1.1 Search strategy.

We selected relevant studies by searching PubMed, Embase, Web of Science, Cochrane Library, SinoMed, CNKI, WanFang Data and VIP. We also searched Chinese Clinical Trial Registry (*https://www.chictr.org.cn/*) and Clinical Trials.gov (*https://clinicaltrials.gov/*). All the databases were searched from inceptions to July, 2021. The search strategy consisted of 3 components: participant (parturition, parturitions, birth, childbirth, deliveries), intervention (auricular acupuncture, auricular acupressure) and study type (randomized clinical trial).

Study Selection

Two independent investigators (Z.W. and H. Z.) reviewed study titles and abstracts. Studies that satisfied the inclusion criteria were retrieved for full-text assessment.

1.2.1 Inclusion criteria. Relevant studies were included if the following criteria were met. (1) Types of studies: randomized controlled trials (RCTs) with or without blinding. (2) Participants: women intended vaginal delivery with a fetus at full term. (3) Types of intervention: with obstetric care routine, treatment groups that received auricular therapy (including auricular acupressure and auricular acupuncture) during the whole labour process or only the first stage of labour were included; we compared ear point therapy with obstetric care routine during the whole labour process or the first stage of labour. (4) Types of outcome measures: we included studies that measured pain level, visual analogue scale (VAS) score, duration of any stage of labour, maternal satisfaction, neonatal Apgar score, number of spontaneous delivery cases, number of caesarean section cases and postpartum blood loss.

1.2.2 Exclusion criteria. (1) Duplicate publications. (2) Studies with incomplete information which was still not available after attempts to contact the authors. (3) Studies combined other acupuncture therapies (manual/laser acupuncture, electroacupuncture, body acupressure, moxibustion and transcutaneous electrical nerve stimulation).

1.3 Data Extraction.

Two investigators (H. Z. and YN.L.) independently extracted data from each paper using predesigned form and reached consensus on all items; disagreements were resolved by a third investigator (J.H.). We extracted the following data from each selected study: authors, year of publication, sample size, age, interventions and main outcomes.

1.4 Quality Assessment

Two independent reviewers (Z.H. and YN.L.) assessed the risk of bias in each study according to the risk of bias tool in the Cochrane Handbook for Systematic Reviews of Interventions (version 5.1.0); discrepancies were resolved by discussion with a third investigator (J.H.). Six domains assessed for each included study were as follows: (1) random sequence generation and allocation concealment; (2) blinding of participants and personnel; (3) blinding of outcome assessors; (4) incomplete outcome data; (5) selective reporting; (6) other bias.

1.5 Synthesis of Evidence

We used the Reviewer Manager Software (version 5.3) for meta-analysis. We analyzed dichotomous variables with risk ratio (RR); for continuous variables, the mean difference (MD) was calculated with a 95% confidence interval (CI) and p value. We did χ^2testing to assess the heterogeneities between studies (α=0.05), with ap value<0.05 orI^2>50% as being indicative of statistical heterogeneity. When a heterogeneity was detected, a random effect model was applied, and subgroup analysis was conducted to identify potential sources of heterogeneity. If a $p$value>0.05 or I^2<50%, a fixed effect model was conducted. Sensitivity analysis was conducted to test whether the results were was robust by excluding the study one by one and comparing the rest of the studies' effects with all the studies' total effects. Funnel plots were generated if there were sufficient studies included in the meta-analysis.

2.Results

2.1 Characteristics of Included Studies.

We identified 332 potentially eligible articles. A total of 127 duplicates were excluded, and 150 unrelated records were also excluded by reading their abstracts. After reading 55 full-text articles, 38 records were excluded for reasons such as not a RCT, insufficiency of data and inconsistence of interventions or outcomes. Eventually, 17 RCTs[10-26] were included in the systematic review and 15 were included in the meta-analysis[10-11,13-25], all of which were published in Chinese. The study flow diagram is shown in Figure 1.

In this meta-analysis, a total of 2574 parturient women were selected, including 1288 cases in treatment groups and 1286 cases in control groups. The controls of all selected trials received obstetric care routine, such as psychological comfort and Doula delivery; the intervention measures in treatment groups included auricular acupressure (16 trials) and auricular acupuncture (1 trial). The main outcome measures were WHO pain level (5 trials) [15-16,19, 22-23], VAS score (4 trials)[10, 14,21, 24] and maternal satisfaction (3 trials)[10, 14,24]; the secondary outcome measures included duration of three stages of labour (1st 9 trials[10-11, 13-14,18-19, 21-24], 2nd 6 trials[13,16, 19, 22-23,25], 3rd 4 trials[13, 19,22-23]), postpartum blood loss (2 trials)[15, 25], neonatal Apgar score (4 trials)[10, 14,18, 24], number of spontaneous delivery cases (4 trials)[15-17,25] and number of caesarean section cases (3 trials)[15, 17,25]. Table 1 shows the main characteristics of the studies.

2.2 *Methodological Quality of Included Studies.*

Out of all the 17 randomized controlled trials, only 6 of them reported details about random sequence generation, 3 studies with a random number table tool and 3 studies with date. No studies mentioned any details related to allocation concealment. As for blinding, although 2 studies claimed they were single-blind trials, since the materials and manipulations used in the treatment were totally different in the test and control groups, it's difficult to avoid performance bias. However, at least the outcome assessors should have been blinded, the detection bias of all studies was therefore classified as unclear. Most of the articles showed a low risk of incomplete outcome bias and selective reporting bias.

2.2 Meta-analysis.

According to different phases of intervention and outcome measures, we divided the 17 selected studies into 2 subgroups.

2.2.1 The first stage of labour

2.2.1.1 VAS score in latent phase and active phase Four studies assessed the VAS score in the latent and active phase of labour. We adopted a random effect model, because heterogeneity between the studies was observed (p <0.01; I^2=99%, 96%). Pooled analysis of the 4 studies showed that VAS score in auricular acupressure groups was significantly lower than the controls during latent phase (MD=-2.56, 95%CI: [-4.26,0.86], p =0.003). However, there were no significant differences in active phase (Figure 4). Sensitivity analysis indicated that the results were robust.

2.2.1.2 Maternal satisfaction in latent phase Three studies reported maternal satisfaction in latent phase. There was no between-study heterogeneity (I^2=0%), so a fixed effect model was conducted. The pooled analysis indicated that satisfaction rate in the auricular acupressure groups was significantly higher than in the control groups (RR=1.29, 95%CI [1.18, 1.41],p <0.05) (Figure 5). Sensitivity analysis indicated that the results were robust.

2.2.1.3 Duration of the first stage of labour Pooled analysis of the 6 studies that reported duration of the first stage of labour showed a significant reduction in duration of the first stage when participants were treated with auricular acupressure compared with the controls (MD=-1.24, 95%CI [-1.86, -0.61, p <0.05]), with significant between-study heterogeneity (I^2=97%) (Figure 6). Sensitivity analysis indicated that the results were robust.

2.2.1.4 Neonatal Apgar score Four studies reported neonatal Apgar score in both 1 minute and 5 minutes with significant heterogeneity (I^2=87%) and no heterogeneity (I^2=0%) respectively. We pooled studies and found no significant difference between groups (Figure 7). Sensitivity analysis indicated that Li et al.[18] appeared to add significant heterogeneity to 1 min Apgar score. Removing this study eliminated this heterogeneity (I^2=0%), and changed the effect size of the pooled result (Z = 0.27, P = 0.79) , but there was still no significant difference between groups.

2.2.2 All stages of labour

2.2.2.1 Analysis of pain level Five studies assessed incidence of pain at 3 levels including I, II and III, in which pain at level III had the greatest impact on participants. For meta-analysis, the incidence of pain at level III was converted into a dichotomous variable. We pooled the studies and found that auricular acupressure significantly reduced the incidence of pain at level III compared to the controls (RR=0.17, 95%CI [0.13, 0.24], p <0.05), with no heterogeneity (I^2=0%) (Figure 8). Sensitivity analysis indicated that the results were robust.

2.2.2.2 Duration of each stage of labour Six studies investigated duration of each stage of labour. Summary results showed a significant reduction in duration of the first stage in the study groups compared to the control groups (MD=-2.57, 95%CI [-3.69, -1.45],p <0.05), with statistically significant heterogeneity (I^2=81%, 97%, 99%). Nevertheless, there were no significant differences in the second and third stage of labour (Figure 9). Sensitivity analysis indicated that the results were robust.

2.2.2.3 Postpartum blood loss Two trials reported postpartum blood loss. Pooling the data of the studies showed no significant difference between auricular acupressure intervention and obstetric care routine, with significant heterogeneity (I^2=97%) (Figure 10). Sensitivity analysis indicated that the results were robust.

2.2.2.4 Incidence of spontaneous delivery Pooled analysis of four studies that assessed incidence of spontaneous delivery showed no significant difference between the study groups and the control groups with significant heterogeneity (I^2=84%) (Figure 11). Sensitivity analysis indicated that Ye et al.[25]appeared to add to significant heterogeneity. Removing this study eliminated this heterogeneity (I^2=0%), and changed the effect size of the pooled result (Z = 2.89, P = 0.004), but the difference is still not significant.

2.2.2.4 Incidence of caesarean section Three studies reported incidence of caesarean section. A fixed effect model was applied, for there was no evidence of heterogeneity (I^2=0%). Summary results indicated a lower incidence of caesarean section in auricular acupressure groups compared to the control groups (RR=0.36, 95%CI [0.20, 0.65], p =0.0006) (Figure 12). Sensitivity analysis indicated the results were robust.

3. Discussion

3.1 Main findings

Meta-analysis showed that auricular acupressure was more effective for latent analgesia in the first stage of labour, but not in the active stage, which may be related to different severity of pain in the active and latent stages of labour. However, the incidence of grade III pain throughout labour was reduced in the auricular acupressure group, suggesting that auricular acupressure is effective in relieving breakthrough pain in labour. Since breakthrough pain after receiving pain relief can increase patient's dissatisfaction[27],the maternal satisfaction shown in the meta-analysis was improved.

For the duration of labour, the first stage of labour was shorter in the auricular acupressure group, whereas the second and third stages of labour were not significantly different, which may be associated with the longer duration of the first stage of labour.

The safety of auricular acupressure is investigated through Apgar score, delivery mode and postpartum hemorrhage. These outcomes did not show any significant difference between auricular acupressure groups and the controls.

3.2 *Limitations*

First, only published Chinese and English articles were retrieved, which may lead to publication bias due to incomplete literature collection. Second, most included studies did not provide methodological details on randomization, allocation concealment and blinding, which reduced the reliability of the findings. Besides, although only one study used auricular acupuncture, the stimulation of auricular acupressure and auricular acupuncture is different, and the intensity of stimulation may vary between studies due to the degree or frequency of pressure. The significant heterogeneity of some outcomes may be attributable to this. In addition, although labour pain is different between nulliparous and multiparous women, the size of the fetus can also affect labour pain, some studies failed to specify these factors.

3.3 *Implication for clinical trial design*

As a subjective feeling, labour pain is highly complex, further well-designed trials with high methodological quality should be conducted, and careful trained clinicians and standardized intervention protocols are needed to minimize the subjective effect. Besides, to explore the differential analgesic effects among nulliparous and multiparous women and the effect of fetus size on labour analgesia, further studies as well as the manipulate methods (e.g. acupressure and acupuncture) are needed.

4. Conclusion

According to our findings, auricular acupressure showed a pain-relieving effect compared with the routine care. Although the evidence is limited and high quality studies are needed, this review has lent a support for the efficacy of auricular acupressure in the clinical management of labour pain .

Disclosure of interest

The authors have no conflicts of interests to disclose.

Contribution to authorship

Jing Han, Hao Lv and Zhe Wang wrote the protocol. Zhe Wang performed the search. Hao Zheng, Zhe Wang and Yanan Li independently selected eligible studies and extracted data. Differences of opinion were registered and resolved by consensus with Jing Han. Zhe Wang and Hao Zheng performed the meta-analyses. Yanan Li, Hao Zheng and Zhe Wang participated in the interpretation of the data and writing of the review

Details of ethics approval

Ethical approval was not needed for this meta-analysis

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References:

1. Sng BL, Sia A. Maintenance of epidural labour analgesia: The old, the new and the future. Best Pract Res Clin Anaesthesiol 2017,**31** (1)**:** 15-22.

2. Nanji JA, Carvalho B. Pain management during labor and vaginal birth. Best Pract Res Clin Obstet Gynaecol 2020, **67:** 100-112.

3. Lam KK, Leung M, Irwin MG. Labour analgesia: update and literature review. HONG KONG MED J 2020, **26** (5)**:** 413-420.

4. Eley VA, Callaway L, van Zundert AA. Developments in labour analgesia and their use in Australia. Anaesth Intensive Care 2015, **43 Suppl:** 12-21.

5. Mark B. Landon M, Henry L. Galan M, Eric R. M. Jauniaux MPF, Deborah A. Driscoll M, Vincenzo Berghella MF. *Gabbe's Obstetrics Essentials Normal and Problem Pregnancies* . ELSEVIER: Philadelphia, 2018.

6. *WHO recommendations: Intrapartum care for a positive childbirth experience* . World Health Organization: Geneva, 2018.

7. Huang L. *Auricular points theraputics* . Scientific and technology documentation press: Beijing, 2017.

8. Hou PW, Hsu HC, Lin YW, Tang NY, Cheng CY, Hsieh CL. The History, Mechanism, and Clinical Application of Auricular Therapy in Traditional Chinese Medicine. Evid Based Complement Alternat Med 2015, **2015:**495684.

9. Asher GN, Jonas DE, Coeytaux RR, Reilly AC, Loh YL, Motsinger-Reif AA, Winham SJ. Auriculotherapy for pain management: a systematic review and meta-analysis of randomized controlled trials. J Altern Complement Med 2010, **16** (10)**:** 1097-1108.

10. Chen L, Qin Z, Zhao H, Zhao H, Yan J, Shi H, Mao H. Effects of ear acupoint pressing bean method combined with epidural labor analgesia for labor analgesia on the levels of catecholamine of puerpera. Hebei Medical Journal 2021, **43** (09)**:** 1343-1346.

11. Ding J, Zeng Q. Effect of auricular acupressure therapy on latent contraction pain and regulation of TRPV1 and TRPA1 in primiparous women. Modern Journal of Integrated Traditional Chinese and Western Medicine 2019,**28** (32)**:** 3581-3584.

12. Fu D, Wang B. The effects of auricular seed embedding on pain control of puerperants in the latent phase of labor. Chinese Journal of Nursing Education 2018, **15** (05)**:** 373-375.

13. Gao F. Observation of the analgesic effect of auricular pressure on labor and accelerating the progress. Chinese Practical Medicine 2009,**4** (21)**:** 44-45.

14. He J, Luo M, Luo C, Su D. Effects of auricular point press therapy for labor analgesia in the latent period on pain degree and expression of inflammatory cytokines in parturients. China Medicine and Pharmacy 2020,**10:** 110-112, 153.

15. Hu L, Zhang R, Wang F, Chen L. Evaluation of the effectiveness of auricular acupressure for labor analgesia and acceleration of labor process. Chinese Journal of Practical Nursing 2011(32)**:** 38-39.

16. Hu S. Clinical observation on the shortening of the second stage of labor and analgesic effect of auricular magnetic bead pasting. Zhejiang Journal of Traditional Chinese Medicine 2012, **47** (01)**:**31.

17. Jiang W, Xu Z, Chen S, Shi L, Shao Y. A prospective study of auricular acupuncture analgesia in doula delivery. CURRENT ADVANCES IN OBSTETRICS AND GYNECOLOGY 1997(03)**:** 50-51.

18. Li Y, Wei Z, Huang Z, Su D, Sun W, Jia J. Effect of Auricular Point Plaster Therapy for Labor Analgesia at Latent Phase. Modern Hospital 2017,**17:** 1381-1383.

19. Liu Y. Observation of auricular acupressure for latent labor analgesia and accelerating labor process. Health Way 2017,**0** (2)**:** 18.

20. Liu Y, Heng Y, Chen S. The Application of Ear Point Taping and Pressing Therapy to Relieve the Uterine Contraction Pain at First Stage. Western Journal of Traditional Chinese Medicine 2016,**29** (12)**:** 106-108.

21. Lu M. Effectiveness of auricular acupressure for latent labor analgesia and accelerating labor. Chinese Baby 2016**:** 36.

22. Song C. Application of Auricular Point Taping and Pressing Therapy in Doula Type Labor. CHINESE ACUPUNCTURE & MOXIBUSTION 2002(08)**:** 18-19.

23. Tian Q, Ma Y, Ma Q, Ma J. 50 cases of labor analgesia with auricular acupressure. CHINESE ACUPUNCTURE & MOXIBUSTION 2006(03)**:** 212.

24. Wei Z, Jia J, Zhao G, Huang Z, Zhang J. Clinical research on auricular acupoint plaster therapy applied in labor analgesia in latent phase. Nursing and Rehabilitation Journal 2016, **15** (08)**:** 732-734.

25. Ye L, Guo L, Tang W. Effects of vaginal birth analgesia using auricular pressure beans on birth outcomes. Journal of Mathematical Medicine 2016, **29** (01)**:** 106-107.

26. Zhao Y, Li Y, Wang J, Wang J, Zhang X. Application of auricular acupressure on latent labor analgesia. KANGYI 2020**:** 255.

27. Akerman N, Dresner M. The management of breakthrough pain during labour. CNS DRUGS 2009, **23** (8)**:** 669-679.

Authors	Sample size	Sample size	Age	Age	Intervention	Intervention	Interven
	T	C	T	C	Stage	Intervention measures	Auricula
He 2020	50	50	33.5±2.4	36.2±8.5	Latent phase	A	TF_2, AI
Li 2017	40	40	30.57±2.14	31.04±4.62	Latent phase	A	TF_4, TI
Wei 2016	100	100	27.0±2.6	26.1±2.9	Latent phase	A	AH_{6a}, T
Lu 2016	50	50	26.32±3.35	27.22±3.09	Latent phase	A	AH_9, TI
Ding 2019	100	100	27.5±3.1	27.5±3.1	Latent phase	A	AH_9, TI
Liu2016	100	100	20-35	20-35	First stage of labor	A	CO_{18}, T
Chen 2021	100	100	28.20±3.38	28.41±3.40	Latent phase	A	TF_2, TI
Fu 2018	102	100	31.30±8.70	31.30±8.70	Latent phase	A	TF_2, CO
Zhao 2020	34	34	31.20±8.6	31.20±8.6	Latent phase	A	TF_2, CO

Table 1: Characteristics of included studies

Authors	Sample size	Sample size	Age	Age	Age	Intervention	Intervention
	T	C	T	T	C	Stage	Intervention
Hu 2012	200	200	19˜32	19˜32	19˜32	Active phase-end of labor	A
Song 2002	30	30	20˜36	20˜36	20˜30	All stages of labor	A
Tian 2006	50	50	22˜31	22˜31	22˜31	All stages of labor	A
Liu 2017	92	92	26.51±3.90	26.51±3.90	26.51±3.90	All stages of labor	A
Hu 2011	110	110	21˜40	21˜40	21˜42	All stages of labor	A
Ye 2016	50	50	18.8±4.5	18.5±4.6	18.5±4.6	All stages of labor	A
Gao 2009	50	50	20˜35	20˜35	20˜35	All stages of labor	A
Jiang 1997	30	30	26±3.58	27±3.65	27±3.65	All stages of labor	B

Table 1: Characteristics of included studies

A, auricular acupressure B, auricular acupuncture C, blank control or care routine

a, VAS score during latent phase of the first stage of labor

b, VAS score during active phase of the first stage of labor c, maternal satisfaction

d, duration of the first stage of labor

e, duration of the second stage of labor

f, duration of the third stage of labor

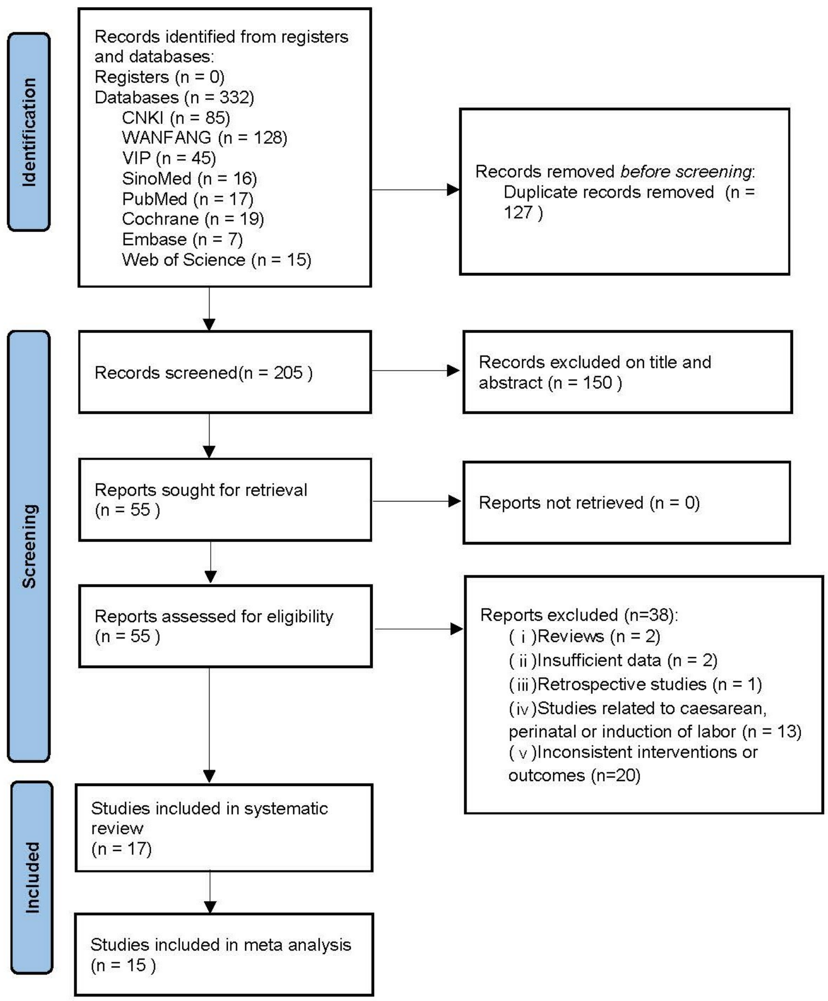
g, neonatal Apgar score

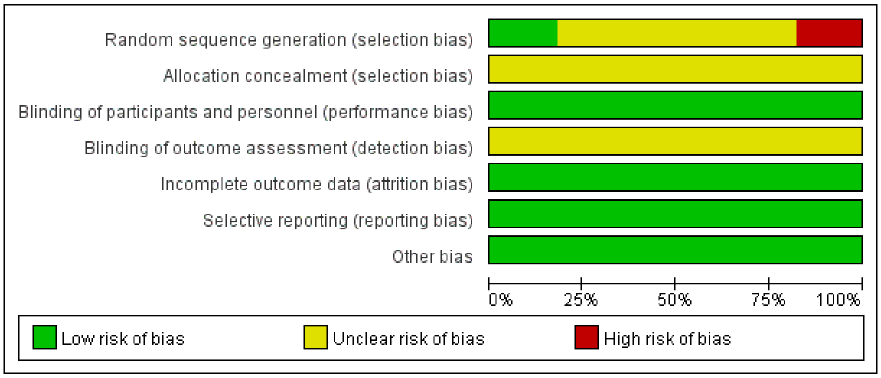
h, WHO pain levels

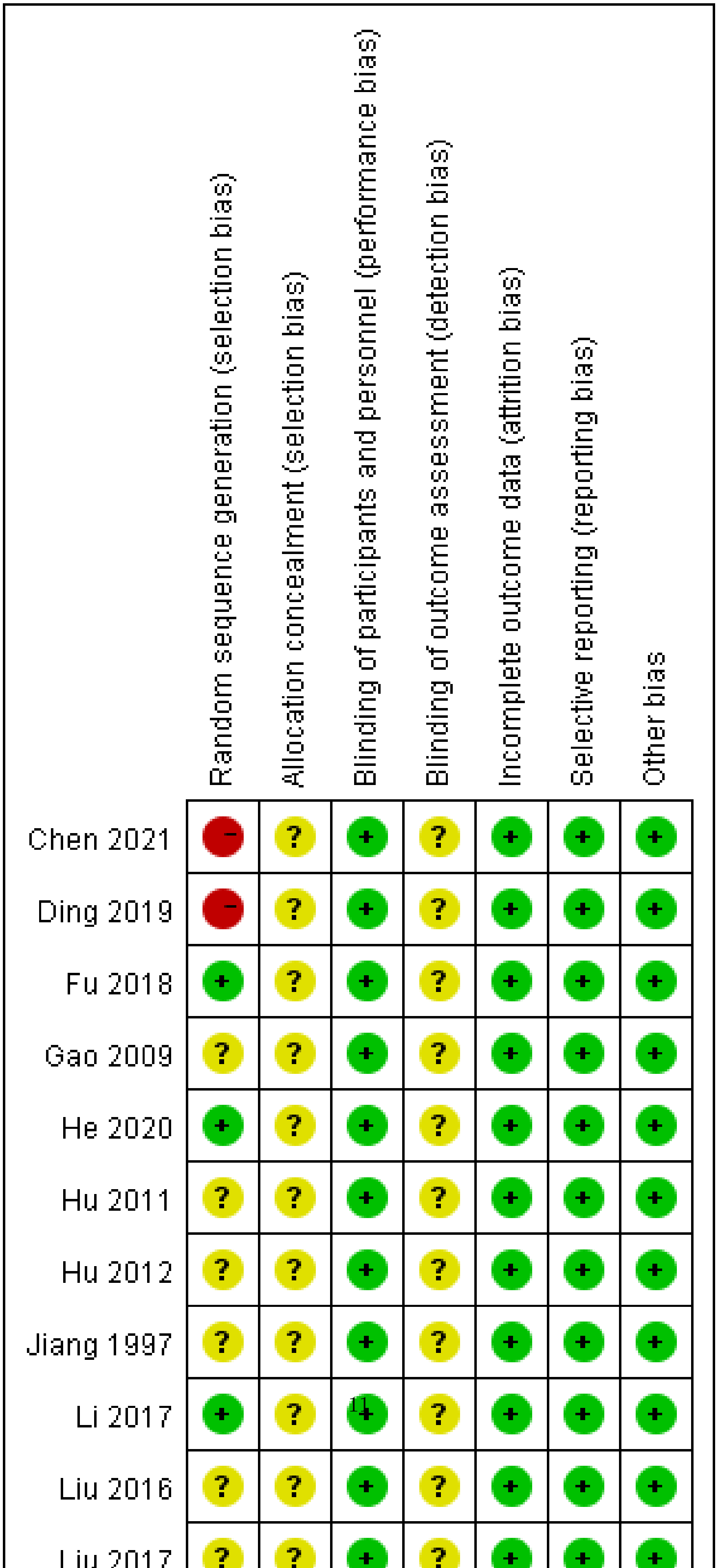
i, postpartum blood loss

j, number of spontaneous delivery cases

k, number of caesarean section cases




Random sequence generation (selection bias)
Allocation concealment (selection bias)
Blinding of participants and personnel (performance bias)
Blinding of outcome assessment (detection bias)
Incomplete outcome data (attrition bias)
Selective reporting (reporting bias)
Other bias
0%
25%
50%
75%
100%
Low risk of bias
Unclear risk of bias
High risk of bias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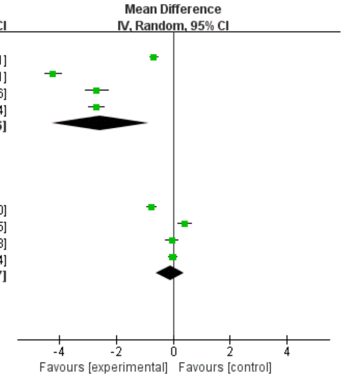
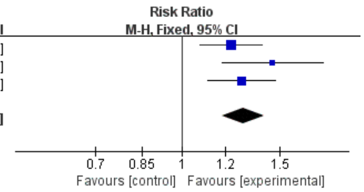
Incomplete outcome data (attrition bias)
Selective reporting (reporting bias)
Other bias
Chen 2021
Ding 2019
Fu 2018
Gao 2009
He 2020
Hu 2011
Hu 2012
Jiang 1997
Li 2017
Liu 2016
Liu 2017

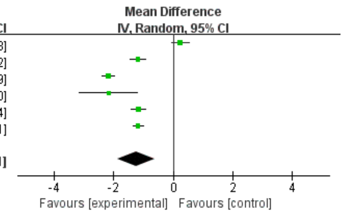
Study or Subgroup	Experimental Mean	Experimental SD	Experimental Total	Control Mean	Control SD	Control Total	Weight	Mean Difference IV, Random, 95% CI
1.1.1 Latent phase								
Chen 2021	2.93	0.52	100	3.6	0.62	100	25.1%	-0.67 [-0.83, -0.51]
He 2020	1.54	0.35	50	5.75	1.02	50	25.0%	-4.21 [-4.51, -3.91]
Lu 2016	2.23	0.74	50	4.9	1.26	50	24.8%	-2.67 [-3.08, -2.26]
Wei 2016	2.21	0.75	100	4.91	1.12	100	25.0%	-2.70 [-2.96, -2.44]
Subtotal (95% CI)			**300**			**300**	**100.0%**	**-2.56 [-4.26, -0.86]**
Heterogeneity: Tau² = 2.98; Chi² = 507.03, df = 3 (P < 0.00001); I² = 99%								
Test for overall effect: Z = 2.96 (P = 0.003)								
1.1.2 Active phase								
Chen 2021	2.41	0.62	100	3.18	0.6	100	25.3%	-0.77 [-0.94, -0.60]
He 2020	2.56	0.76	50	2.15	0.45	50	24.5%	0.41 [0.17, 0.65]
Lu 2016	2.12	0.55	50	2.16	0.58	50	24.7%	-0.04 [-0.26, 0.18]
Wei 2016	2.14	0.56	100	2.15	0.51	100	25.5%	-0.01 [-0.16, 0.14]
Subtotal (95% CI)			**300**			**300**	**100.0%**	**-0.11 [-0.58, 0.37]**
Heterogeneity: Tau² = 0.23; Chi² = 75.64, df = 3 (P < 0.00001); I² = 96%								
Test for overall effect: Z = 0.44 (P = 0.66)								



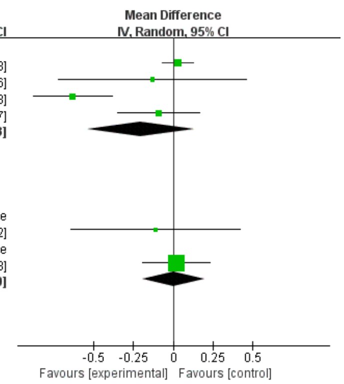
Study or Subgroup	Control Events	Control Total	Experimental Events	Experimental Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Chen 2021	92	100	75	100	41.9%	1.23 [1.08, 1.39]
He 2020	48	50	33	50	18.4%	1.45 [1.18, 1.79]
Wei 2016	91	100	71	100	39.7%	1.28 [1.11, 1.47]
Total (95% CI)		**250**		**250**	**100.0%**	**1.29 [1.18, 1.41]**
Total events	231		179			
Heterogeneity: Chi² = 1.91, df = 2 (P = 0.39); I² = 0%						
Test for overall effect: Z = 5.82 (P < 0.00001)						



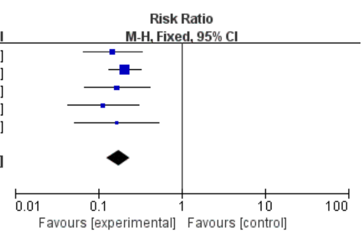
Study or Subgroup	Experimental Mean	Experimental SD	Experimental Total	Control Mean	Control SD	Control Total	Weight	Mean Difference IV, Random, 95% CI
Chen 2021	6.96	0.96	100	6.72	1.15	100	17.3%	0.24 [-0.05, 0.53]
Ding 2019	6.08	0.9	100	7.26	0.95	100	17.4%	-1.18 [-1.44, -0.92]
He 2020	5.44	0.41	50	7.63	0.61	50	17.6%	-2.19 [-2.39, -1.99]
Li 2017	7.85	3.42	100	10.03	3.67	100	12.5%	-2.18 [-3.16, -1.20]
Lu 2016	6.04	0.55	50	7.21	0.64	50	17.5%	-1.17 [-1.40, -0.94]
Wei 2016	6.02	0.54	100	7.2	0.66	100	17.7%	-1.18 [-1.35, -1.01]
Total (95% CI)			**500**			**500**	**100.0%**	**-1.24 [-1.86, -0.61]**
Heterogeneity: Tau² = 0.57; Chi² = 185.50, df = 5 (P < 0.00001); I² = 97%								
Test for overall effect: Z = 3.85 (P = 0.0001)								



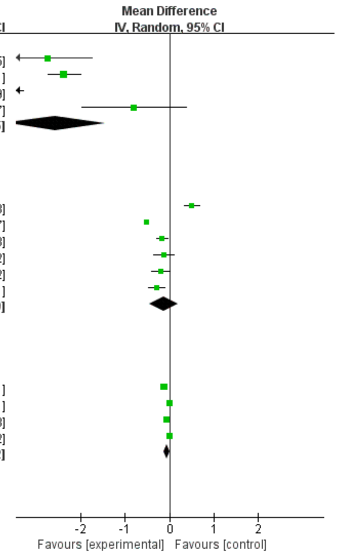
Study or Subgroup	Experimental Mean	Experimental SD	Experimental Total	Control Mean	Control SD	Control Total	Weight	Mean Difference IV, Random, 95% CI
1.4.1 Auricular point vs control : 1 min Apgar score								
Chen 2021	9.94	0.31	100	9.91	0.38	100	30.6%	0.03 [-0.07, 0.13]
He 2020	8.35	1.64	50	8.48	1.35	50	16.1%	-0.13 [-0.72, 0.46]
Li 2017	9.13	0.48	40	9.76	0.65	40	26.8%	-0.63 [-0.88, -0.38]
Wei 2016	8.63	0.88	100	8.72	0.98	100	26.5%	-0.09 [-0.35, 0.17]
Subtotal (95% CI)			**290**			**290**	**100.0%**	**-0.20 [-0.54, 0.13]**
Heterogeneity: Tau² = 0.09; Chi² = 23.38, df = 3 (P < 0.0001); I² = 87%								
Test for overall effect: Z = 1.19 (P = 0.24)								
1.4.2 Auricular point vs control :5 mins Apgar score								
Chen 2021	10	0	100	9.99	0.1	100		Not estimable
He 2020	9.36	1.35	50	9.47	1.37	50	13.4%	-0.11 [-0.64, 0.42]
Li 2017	9.96	0.21	40	10	0	40		Not estimable
Wei 2016	9.15	0.71	100	9.13	0.8	100	86.6%	0.02 [-0.19, 0.23]
Subtotal (95% CI)			**290**			**290**	**100.0%**	**0.00 [-0.19, 0.20]**
Heterogeneity: Tau² = 0.00; Chi² = 0.20, df = 1 (P = 0.66); I² = 0%								
Test for overall effect: Z = 0.03 (P = 0.98)								



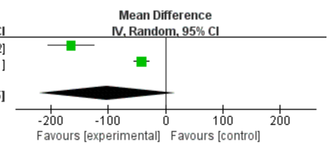
Study or Subgroup	Experimental Events	Experimental Total	Control Events	Control Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Hu 2011	6	110	40	110	19.1%	0.15 [0.07, 0.34]
Hu 2012	19	200	91	200	43.4%	0.21 [0.13, 0.33]
Liu 2017	5	92	30	92	14.3%	0.17 [0.07, 0.41]
Song 2002	3	30	30	30	14.6%	0.11 [0.04, 0.31]
Tian 2006	3	50	18	50	8.6%	0.17 [0.05, 0.53]
Total (95% CI)		**482**		**482**	**100.0%**	**0.17 [0.13, 0.24]**
Total events	36		209			
Heterogeneity: Chi² = 1.44, df = 4 (P = 0.84); I² = 0%						
Test for overall effect: Z = 10.49 (P < 0.00001)						



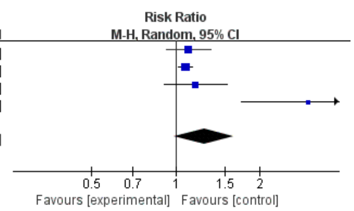
	Experimental			Control				Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI
2.2.1 Duration of 1st stage of labor								
Gao 2009	6.94	1.54	50	9.69	3.25	50	26.3%	-2.75 [-3.75, -1.75]
Liu 2017	6.91	1.11	92	9.29	1.42	92	32.1%	-2.38 [-2.75, -2.01]
Song 2002	12.58	0.46	30	17.74	5.2	30	17.3%	-5.16 [-7.03, -3.29]
Tian 2006	8.86	3.17	50	9.66	2.81	50	24.3%	-0.80 [-1.97, 0.37]
Subtotal (95% CI)			**222**			**222**	**100.0%**	**-2.57 [-3.69, -1.45]**
Heterogeneity: Tau² = 0.99; Chi² = 15.99, df = 3 (P = 0.001); I² = 81%								
Test for overall effect: Z = 4.50 (P < 0.00001)								
2.2.2 Duration of 2ndt stage of labor								
Gao 2009	1.09	0.48	50	0.58	0.37	50	16.7%	0.51 [0.34, 0.68]
Hu 2012	0.5	0.18	200	1.02	0.28	200	17.5%	-0.52 [-0.57, -0.47]
Liu 2017	0.8	0.46	92	0.96	0.47	92	17.0%	-0.16 [-0.29, -0.03]
Song 2002	1.81	0.46	30	1.93	0.47	30	16.0%	-0.12 [-0.36, 0.12]
Tian 2006	0.88	0.52	50	1.07	0.55	50	16.3%	-0.19 [-0.40, 0.02]
Ye 2016	0.73	0.33	50	1.02	0.58	50	16.5%	-0.29 [-0.47, -0.11]
Subtotal (95% CI)			**472**			**472**	**100.0%**	**-0.13 [-0.45, 0.19]**
Heterogeneity: Tau² = 0.15; Chi² = 161.59, df = 5 (P < 0.00001); I² = 97%								
Test for overall effect: Z = 0.81 (P = 0.42)								
2.2.3 Duration of 3rd stage of labor								
Gao 2009	0.018	0.008	50	0.14	0.04	50	25.4%	-0.12 [-0.13, -0.11]
Liu 2017	0.097	0.035	92	0.102	0.055	92	25.4%	-0.00 [-0.02, 0.01]
Song 2002	0.249	0.031	30	0.317	0.087	30	24.2%	-0.07 [-0.10, -0.03]
Tian 2006	0.107	0.052	50	0.112	0.058	50	25.0%	-0.01 [-0.03, 0.02]
Subtotal (95% CI)			**222**			**222**	**100.0%**	**-0.05 [-0.12, 0.02]**
Heterogeneity: Tau² = 0.00; Chi² = 205.17, df = 3 (P < 0.00001); I² = 99%								
Test for overall effect: Z = 1.40 (P = 0.16)								



	Experimental			Control				Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI
Hu 2011	220	143	110	385	162	110	48.7%	-165.00 [-205.38, -124.62]
Ye 2016	98	28.8	50	140	36.5	50	51.3%	-42.00 [-54.89, -29.11]
Total (95% CI)			**160**			**160**	**100.0%**	**-101.95 [-222.45, 18.55]**
Heterogeneity: Tau² = 7330.64; Chi² = 32.35, df = 1 (P < 0.00001); I² = 97%								
Test for overall effect: Z = 1.66 (P = 0.10)								



	Experimental		Control			Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI
Hu 2011	79	110	71	110	28.9%	1.11 [0.93, 1.33]
Hu 2012	192	200	177	200	33.7%	1.08 [1.02, 1.15]
Jiang 1997	26	30	22	30	25.0%	1.18 [0.91, 1.53]
Ye 2016	33	50	11	50	12.4%	3.00 [1.72, 5.24]
Total (95% CI)		**390**		**390**	**100.0%**	**1.27 [0.99, 1.62]**
Total events	330		281			
Heterogeneity: Tau² = 0.05; Chi² = 18.52, df = 3 (P = 0.0003); I² = 84%						
Test for overall effect: Z = 1.88 (P = 0.06)						



	Experimental		Control			Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI
Hu 2011	8	110	21	110	56.0%	0.38 [0.18, 0.82]
Jiang 1997	0	30	4	30	12.0%	0.11 [0.01, 1.98]
Ye 2016	5	50	12	50	32.0%	0.42 [0.16, 1.10]
Total (95% CI)		**190**		**190**	**100.0%**	**0.36 [0.20, 0.65]**
Total events	13		37			
Heterogeneity: Chi² = 0.75, df = 2 (P = 0.69); I² = 0%						
Test for overall effect: Z = 3.41 (P = 0.0006)