Acupuncture or acupressure for pain management in labour (Review)

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[Intervention Review]

Acupuncture or acupressure for pain management in labour

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ABSTRACT

Background

Many women would like to avoid pharmacological or invasive methods of pain management in labour and this may contribute towards the popularity of complementary methods of pain management. This review examined evidence supporting the use of acupuncture and acupressure for pain management in labour.

Objectives

To examine the effects of acupuncture and acupressure for pain management in labour.

Search strategy

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register and The Cochrane Complementary Medicine Field's Trials Register (October 2010), the Cochrane Central Register of Controlled Trials (*The Cochrane Library* 2010, Issue 4), MEDLINE (1966 to October 2010), and CINAHL (1980 to October 2010).

Selection criteria

Published and unpublished randomised controlled trials comparing acupuncture and acupressure with placebo, no treatment or other non-pharmacological forms of pain management in labour. We included all women whether primiparous or multiparous, and in spontaneous or induced labour.

Data collection and analysis

We performed meta-analysis using risk ratios (RR) for dichotomous outcomes and mean differences (MD) for continuous outcomes. The outcome measures included pain intensity, satisfaction with pain relief, use of pharmacological pain relief, relaxation, caesarean section rate, augmentation with oxytocin, length of labour and anxiety.

Main results

We included 13 trials with data reporting on 1986 women. Nine trials reported on acupuncture and four trials reported on acupressure. Less intense pain was found from acupuncture compared with no intervention (standardised mean difference (SMD) -1.00, 95% confidence interval (CI) -1.33 to -0.67, one trial, 163 women). One trial increased satisfaction with pain relief compared with placebo control (RR 2.38, 95% CI 1.78 to 3.19, 150 women). Reduced use of pharmacological analgesia was found in one trial of acupuncture compared with placebo (RR 0.72, 95% CI 0.58 to 0.88, 136 women), and compared with standard care, however, there was significant heterogeneity (RR 0.68, 95% CI 0.56 to 0.83, three trials, 704 women). Fewer instrumental deliveries from acupuncture were found compared with standard care (RR 0.67, 95% CI 0.46, 0.98, three trials, 704 women). Pain intensity was reduced in the acupressure group compared with a placebo control (SMD -0.55, 95% CI -0.92 to -0.19, one trial, 120 women), and a combined control (SMD -0.42, 95% CI -0.65 to -0.18, two trials, 322 women). No trial was assessed as being at a low risk of bias for all of the quality domains.

Authors' conclusions

Acupuncture and acupressure may have a role with reducing pain, increasing satisfaction with pain management and reduced use of pharmacological management. However, there is a need for further research.

PLAIN LANGUAGE SUMMARY

Acupunture or acupressure for relieving pain in labour

Acupuncture or acupressure may help relieve pain during labour, but more research is needed.

The pain of labour can be intense, and may be worsened because of a woman's tension, anxiety and fear affecting their labour and birth experience . Many women would like to labour without using drugs or invasive methods of pain management, and turn to alternatives to manage the pain. The review of 13 trials, with data reporting on 1986 women, found that acupuncture or acupressure may help relieve labour pain. Single or limited numbers of trials reported less intense pain, increased satisfaction with pain relief and reduced use of analgesic drugs with acupuncture compared with placebo or usual care. Acupressure also reduced pain intensity. Acupuncture involves the insertion of fine needles into different parts of the body to correct the imbalance of energy in the body. The intervention was administered at term as individualised treatment (six trials) or at standardised acupuncture points in the majority of trials but with wide variation in the mode of stimulation, duration of needling, number of points used, depth of needling and duration of the trial.

BACKGROUND

This review is one in a series of Cochrane reviews examining pain management in labour. These reviews contribute to an overview of systematic reviews of pain management for women in labour (Neilson 2011b), and share a generic protocol (Neilson 2011a).

Description of the condition

Labour presents a physiological and psychological challenge for women. As labour becomes more imminent, this can be a time of conflicting emotions: fear and apprehension can be coupled with excitement and happiness. Tension, anxiety and fear are factors contributing towards women's perception of pain and may also affect their labour and birth experience. Pain associated with labour has been described as one of the most intense forms of pain that can be experienced (Melzack 1984). Pain experienced by women in labour is caused by uterine contractions, the dilatation of the cervix and, in the late first stage and second stage, by stretching of the vagina and pelvic floor to accommodate the baby. However, the complete removal of pain does not necessarily mean a more satisfying birth experience for women (Morgan 1982). Effective and satisfactory pain management need to be individualised for each woman.

Description of the intervention

The use of complementary and alternative medicine (CM) has become popular with consumers worldwide. Studies suggest that between 36% and 62% of adults in industrialised nations use some form of CM to prevent or treat health-related problems (Barnes

2004). Complementary therapies are more commonly used by women of reproductive age, with almost half (49%) reporting use (Eisenberg 1998). It is possible that a significant proportion of women are using these therapies during pregnancy. A recent review of 14 studies with large sample sizes (N ≥ 200) on the use of CM in pregnancy identified a prevalence rate ranging from 1% to 87% (with nine falling between 20% and 60%) (Adams 2009). The review identified use of various complementary therapies including acupuncture and acupressure, aromatherapy, massage, yoga, homeopathy and chiropractic care. The review also showed many pregnant women had used more than one complementary product or service (Adams 2009). Many women would like to avoid pharmacological or invasive methods of pain relief in labour and this may contribute towards the popularity of complementary methods of pain management (Bennett 1999).

The Complementary Medicine Field of The Cochrane Collaboration defines complementary medicine as 'practices and ideas which are outside the domain of conventional medicine in several countries', which are defined by its users as 'preventing or treating illness, or promoting health and wellbeing' (Manheimer 2008). This definition is deliberately broad, as therapies considered complementary practices in one country or culture may be conventional in another. Many therapies and practices are included within the scope of the Complementary Medicine Field. These include treatments people can administer themselves (e.g. botanicals, nutritional supplements, health food, meditation, magnetic therapy), treatments providers administer (e.g. acupuncture, massage, reflexology, chiropractic and osteopathic manipulations), and treatments people can administer under the periodic supervision of a provider (e.g. yoga, biofeedback, Tai Chi, homoeopathy, Alexander therapy, Ayurveda).

The most commonly cited complementary medicine and practices associated with providing pain management in labour can be categorised into mind-body interventions (e.g. yoga, hypnosis, relaxation therapies), alternative medical practice (e.g. homoeopathy, traditional Chinese medicine), manual healing methods (e.g. massage, reflexology), pharmacologic and biological treatments, bioelectromagnetic applications (e.g. magnets) and herbal medicines. Acupuncture has a long history of use in Asia, including China, Korea and Japan. Traditional Chinese medicine (TCM), with acupuncture as one of the major modalities, describes a state of health maintained by a balance of energy in the body. Acupuncture performed within the context of TCM is a complex intervention involving not only technical needling skill but development of a therapeutic relationship, formulation of a diagnosis, provision of lifestyle advice, and often administering co-interventions such as gua sha (scrapping), tuina (massage), moxibustion (a type of Chinese medicine which involves burning a herb close to the skin) or electrical stimulation. In clinical practice, use of co-interventions is not uncommon although acupuncture is the primary focus. Acupuncture involves the insertion of fine needles into different parts of the body to correct the imbalance of energy in the body. TCM and Classical acupuncture explain disease and physiological function based on theoretical concepts of Yin and Yang and the Five Elements. A westernised medical application of acupuncture involves the use of acupuncture using trigger points, segmental points and commonly used formula points. Auricular therapy, a form of Western acupuncture, involves the use of the ear to make a diagnosis and subsequent needling to points on the ear. Medical acupuncture may involve the application of acupuncture based on the principles of neurophysiology and anatomy, rather than TCM principles and philosophy. The style and approach of acupuncture characterises the acupuncture point selection and related treatment parameters administered in clinical practice and research.

Acupressure has its origins in early China, and is based on the same paradigm as described for acupuncture. When acupressure is applied, the therapist uses their hands and fingers to activate the same points as applied by acupuncture. Sometimes only a few points need touch applied to alleviate pain, or bring about a feeling of relaxation. In other circumstances a combinations of points will be used to achieve a greater effect. There are several forms of acupressure, which draw on the same knowledge and philosophical system as other forms of traditional Asian medicine. Some of these systems are applied by trained health professionals and others can be applied by the individual as a form of self-massage.

How the intervention might work

Acupuncture has been used to treat a number of painful conditions, and several theories have been presented as to how acupuncture may work. It has been proposed that acupuncture may modify the perception of pain, or alter physiological functions (Stux 1995). Since the majority of acupuncture points are either connected to, or located near, neural structures, this suggests that acupuncture stimulates the nervous system. From a Western acupuncture perspective, points selected are based according to the innervation of the target organ, e.g. the uterus. Activation of muscle afferents at this segmental level transmits signals in the spinal cord and in the central nervous system. During needle stimulation of common acupuncture points for pain, signals are transmitted to the spinal cord, and via afferent pathways to the midbrain. The perception of pain emerges from the resulting flow and integration of this information among specific brain areas, and may lead to a change in the perception of pain. Another theory suggests that acupuncture stimulates the body to produce endorphins, which reduce pain (Pomeranz 1989). Other pain-relieving substances called opioids may be released into the body during acupuncture treatment (Ng 1992). Both segmental and central mechanisms of acupuncture are likely to be involved in the total effect of acupuncture (Stener-Victorin 2006).

Why it is important to do this review

There is interest by women to use additional forms of care to assist with their pain management in labour. It is important to examine the efficacy, effectiveness and safety of under-evaluated forms of treatment to enable women, health providers and policy makers to make informed decisions about care. A number of clinical trials have been performed to study the efficacy of acupuncture for pain in labour although it remains uncertain whether the existing evidence is rigorous enough to reach a definitive conclusion.

This review is one in a series of Cochrane reviews examining pain relief in labour. These reviews contribute to an overview of systematic reviews of pain relief for women in labour (Neilson 2011b) and share a generic protocol (Neilson 2011a).

OBJECTIVES

To examine the effects of acupuncture and acupressure for pain management in labour.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs) only. (We have planned not to include results from quasi-RCTs in the analyses but we may be discuss them in the text if little other evidence is available.)

Types of participants

Women in labour. (This includes women in high-risk groups, e.g. preterm labour or following induction of labour. We planned to use subgroup analysis for any possible differences in the effect of interventions in these groups.)

Types of interventions

This review is one in a series of Cochrane reviews examining pain management in labour. These reviews contribute to an overview of systematic reviews of interventions for pain management in labour (Neilson 2011b), and share a generic protocol (Neilson 2011a). To avoid duplication, the different methods of pain management have been listed in a specific order, from one to 15. Individual reviews focusing on particular interventions include comparisons with only the interventions above it on the list. Methods of pain management identified in the future will be added to the end of the list. The current list is as follows.

1. Placebo/no treatment
2. Hypnosis
3. Biofeedback (Barragán 2006)
4. Intracutaneous or subcutaneous sterile water injection (Derry 2011)
5. Immersion in water (Cluett 2009)
6. Aromatherapy (Smith 2011)
7. Relaxation techniques (yoga, music, audio)
8. Acupuncture or acupressure (this review)
9. Manual methods (massage, reflexology)
10. Transcutaneous electrical nerve stimulation (TENS) (Dowswell 2009)
11. Inhaled analgesia
12. Opioids (Ullman 2010)
13. Non-opioid drugs (Othman 2011)
14. Local anaesthetic nerve blocks
15. Epidural (including combined spinal-epidural) (Anim-Somuah 2005; Simmons 2007)

Accordingly, this review includes comparisons of any type of acupuncture or acupressure compared with any other type of acupuncture or acupressure, as well as any type of acupuncture or acupressure compared with: 1. placebo/no treatment; 2. hypnosis; 3. biofeedback; 4. intracutaneous or subcutaneous sterile water injection; 5. immersion in water; 6. aromatherapy; 7. relaxation techniques (yoga, music, audio).

Types of outcome measures

Primary outcomes

Effects of interventions

- Pain intensity (as defined by trialists)
- Satisfaction with pain relief (as defined by trialists)
- Sense of control in labour (as defined by trialists)
- Satisfaction with childbirth experience
- Use of pharmacological pain relief

Safety of interventions

- Effect (negative) on mother/baby interaction
- Breastfeeding (at specified time points)
- Assisted vaginal birth
- Caesarean section
- Side effects (for mother and baby; review specific)
- Admission to special care baby unit/neonatal intensive care unit (as defined by trialists)
- Apgar score less than seven at five minutes
- Poor infant outcomes at long-term follow-up (as defined by trialists)

Other outcomes

- Cost (as defined by trialists)

Secondary outcomes

Maternal

Length of labour; mode of delivery; need for augmentation with oxytocin; perineal trauma (defined as episiotomy and incidence of second- or third-degree tear); maternal blood loss (postpartum haemorrhage defined as greater than 600 ml); relaxation; anxiety.

Neonatal

Need for mechanical ventilation; neonatal encephalopathy.

Search methods for identification of studies

Electronic searches

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register by contacting the Trials Search Co-ordinator (October 2010).

The Cochrane Pregnancy and Childbirth Group's Trials Register is maintained by the Trials Search Co-ordinator and contains trials identified from:

1. quarterly searches of the Cochrane Central Register of Controlled Trials (CENTRAL);
2. weekly searches of MEDLINE;
3. handsearches of 30 journals and the proceedings of major conferences;
4. weekly current awareness alerts for a further 44 journals plus monthly BioMed Central email alerts.

Details of the search strategies for CENTRAL and MEDLINE, the list of handsearched journals and conference proceedings, and the list of journals reviewed via the current awareness service can be found in the 'Specialized Register' section within the editorial information about the Cochrane Pregnancy and Childbirth Group.

Trials identified through the searching activities described above are each assigned to a review topic (or topics). The Trials Search Co-ordinator searches the register for each review using the topic list rather than keywords.

We searched the Cochrane Complementary Medicine Field's Trials Register using the terms (labor OR labour).

In addition, we searched the Cochrane Central Register of Controlled Trials (T*he Cochrane Library* 2010, Issue 4), MEDLINE (1966 to October 2010), and CINAHL (1980 to October 2010) using a combination of subject headings and text words. See Appendix 1.

We did not apply any language restrictions.

Data collection and analysis

We used the following methods when assessing any reports identified by the search.

Selection of studies

C Smith (CS), CT Collins (CTC) or K Levett (KL) screened the titles and abstracts of articles found in the search, and discarded trials that were clearly not eligible. Two out of the four review authors (CS, CTC, KL, CA Crowther (CAC)) undertook trial selection.

CS, KL or CTC independently assessed whether the trials met the inclusion criteria, with disagreements resolved by discussion with the fourth author (CAC). When articles contained insufficient information to make a decision about eligibility, CS attempted to contact authors of the original reports to obtain further details.

Data extraction and management

Following an assessment for inclusion CS, KL or CTC independently extracted data using the form designed by the Review Group for this purpose. We resolved discrepancies through discussion or, if required, we consulted a fourth person. For each included trial, we collected information regarding the location of the trial, methods of the trial (as per assessment of risk of bias), the participants (age range, eligibility criteria), the nature of the interventions, and data relating to the outcomes specified above. We collected information on reported benefits and adverse effects. When information regarding any of the above was unclear, we attempted to contact authors of the original reports to provide further details. We entered data into Review Manager software (RevMan 2011) and checked for accuracy.

Assessment of risk of bias in included studies

Two review authors independently assessed the risk of bias for each study using the criteria outlined in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011). We resolved any disagreement by discussion or by involving a third assessor.

(1) Random sequence generation (checking for possible selection bias)

We described for each included study the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups.

We will assessed the method as:

- low risk of bias (any truly random process, e.g. random number table; computer random number generator);

- high risk of bias (any non-random process, e.g. odd or even date of birth; hospital or clinic record number); or
- unclear risk of bias.

(2) Allocation concealment (checking for possible selection bias)

We described for each included study the method used to conceal allocation to interventions prior to assignment and assessed whether intervention allocation could have been foreseen in advance of, or during recruitment, or changed after assignment.
We assessed the methods as:

- low risk of bias (e.g. telephone or central randomisation; consecutively numbered sealed opaque envelopes);
- high risk of bias (open random allocation; unsealed or non-opaque envelopes, alternation; date of birth);
- unclear risk of bias.

(3) Blinding (checking for possible performance bias)

We judged that blinding of participants and caregiver would not be possible due to the type of intervention being assessed. For this reason we assessed whether the lack of blinding was likely to have introduced bias in the measure of outcomes of interest. We assessed blinding for primary outcomes as:

- low, high or unclear risk of bias.

(4) Incomplete outcome data (checking for possible attrition bias due to the amount, nature and handling of incomplete outcome data)

We described for each included study, and for each outcome or class of outcomes, the completeness of data including attrition and exclusions from the analysis. We stated whether attrition and exclusions were reported and the numbers included in the analysis at each stage (compared with the total randomised participants), reasons for attrition or exclusion where reported, and whether missing data were balanced across groups or were related to outcomes. Where sufficient information is reported, or can be supplied by the trial authors, we will re-include missing data in the analyses which we undertake.
We assessed methods as:

- low risk of bias (e.g. no missing outcome data; missing outcome data balanced across groups);
- high risk of bias (e.g. numbers or reasons for missing data imbalanced across groups; 'as treated" analysis done with substantial departure of intervention received from that assigned at randomisation);
- unclear risk of bias.

(5) Selective reporting (checking for reporting bias)

We described for each included study how we investigated the possibility of selective outcome reporting bias and what we found. We assessed the methods as:

- low risk of bias (where it is clear that all of the study's pre-specified outcomes and all expected outcomes of interest to the review have been reported);
- high risk of bias (where not all the study's pre-specified outcomes have been reported; one or more reported primary outcomes were not pre-specified; outcomes of interest are reported incompletely and so cannot be used; study fails to include results of a key outcome that would have been expected to have been reported);
- unclear risk of bias.

(6) Other bias (checking for bias due to problems not covered by 1 to 5 above)

We described for each included study any important concerns we had about other possible sources of bias.
We assessed whether each study was free of other problems that could put it at risk of bias:

- low risk of other bias;
- high risk of other bias;
- unclear whether there is risk of other bias.

(7) Overall risk of bias

We made explicit judgements about whether studies are at high risk of bias, according to the criteria given in the *Handbook* (Higgins 2011). With reference to (1) to (6) above, we assessed the likely magnitude and direction of the bias and whether we considered it likely to impact on the findings. We planned to explore the impact of the level of bias through undertaking sensitivity analyses - *see* Sensitivity analysis.

Measures of treatment effect

Dichotomous data

For dichotomous data, we presented results as summary risk ratio with 95% confidence intervals.

Continuous data

We expressed continuous data as mean differences with 95% confidence intervals, or as standardised mean differences if outcomes were conceptually the same in the different trials but measured in different ways.

Unit of analysis issues

We planned to include cluster-randomised trials in the analyses along with individually randomised trials, and adjust their sample sizes or standard errors using the methods described in the *Handbook* using an estimate of the intra-cluster correlation co-efficient (ICC) derived from the trial (if possible), from a similar trial or from a study of a similar population. If we used ICCs from other sources, we planned to report this and conduct sensitivity analyses to investigate the effect of variation in the ICC. If we identified both cluster-randomised trials and individually-randomised trials, we planned to synthesise the relevant information. We considered it reasonable to combine the results from both if there was little heterogeneity between the study designs and the interaction between the effect of intervention and the choice of randomisation unit was considered to be unlikely.

We also planned to acknowledge heterogeneity in the randomisation unit and perform a sensitivity analysis to investigate the effects of the randomisation unit.

Dealing with missing data

For included studies, we noted levels of attrition. We aimed to explore the impact of including studies with high levels of missing data in the overall assessment of treatment effect by using sensitivity analysis.

For all outcomes, we carried out analyses, as far as possible, on an intention-to-treat basis, i.e. we attempted to include all participants randomised to each group in the analyses, and all participants were analysed in the group to which they were allocated, regardless of whether or not they received the allocated intervention. The denominator for each outcome in each trial was the number randomised minus any participants whose outcomes are known to be missing. We excluded trials with greater than 20% missing data from the analysis.

Assessment of heterogeneity

We assessed statistical heterogeneity in each meta-analysis using the T^2, I^2 and Chi^2 statistics. We regarded heterogeneity as substantial if T^2 was greater than zero and either I^2 was greater than 50% or there was a low P value (less than 0.10) in the Chi^2 test for heterogeneity.

Assessment of reporting biases

If there were 10 or more studies in the meta-analysis we planned to investigate reporting biases (such as publication bias) using funnel plots. We would assess funnel plot asymmetry visually, and would use formal tests for funnel plot asymmetry. For continuous outcomes we would use the test proposed by Egger 1997, and for dichotomous outcomes we would use the test proposed by Harbord 2006. If we detected asymmetry in any of these tests or by a visual assessment, we proposed to perform exploratory analyses to investigate it.

Data synthesis

We carried out statistical analysis using the Review Manager software (RevMan 2011). We used fixed-effect meta-analysis for combining data where it was reasonable to assume that studies were estimating the same underlying treatment effect: i.e. where trials were examining the same intervention, and the trials' populations and methods were judged sufficiently similar. If there was clinical heterogeneity sufficient to expect that the underlying treatment effects differed between trials, or if substantial statistical heterogeneity was detected, we used a random-effects meta-analysis to produce an overall summary if an average treatment effect across trials was considered clinically meaningful. We treated the random-effects summary as the average range of possible treatment effects and we planned to discuss the clinical implications of treatment effects differing between trials. If the average treatment effect was not clinically meaningful we would not combine trials.

If we used the random-effects analyses, we have presented the results as the average treatment effect with its 95% confidence interval, and the estimates of T^2 and I^2.

Subgroup analysis and investigation of heterogeneity

We investigated substantial heterogeneity using subgroup analyses and sensitivity analyses. We considered whether an overall summary was meaningful, and if it was, we undertook a random-effects analysis.

We planned to carry out the following subgroup analyses.

1. Spontaneous labour versus induced labour.
2. Primiparous versus multiparous
3. Term versus preterm birth
4. Continuous support in labour versus no continuous support

For fixed-effect inverse variance meta-analyses we planned to assess differences between subgroups by interaction tests. For random-effects and fixed-effect meta-analyses using methods other than inverse variance, we planned to assess differences between subgroups by inspection of the subgroups' confidence intervals; non-overlapping confidence intervals indicate a statistically significant difference in treatment effect between the subgroups.

Sensitivity analysis

Where subgroup analysis failed to explain the heterogeneity, we planned to analyse the data using the random-effects model. A priori, we planned to perform sensitivity analyses on results to look at the possible contribution of: (1) differences in methodological quality, with trials of high quality (low risk of bias) compared to all trials; and (2) publication bias by country. If publication bias was

present we planned to undertake a sensitivity analysis excluding trials from countries where there was a greater publication bias.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification; Characteristics of ongoing studies.

Results of the search

The original review included a range of complementary therapies. This updated review includes acupuncture and acupressure trials only; we included 13 studies, and excluded nine studies. We included eight new studies (Borup 2009; Hantoushzadeh 2007; Hjelmstedt 2010; Huang 2008; Kashanian 2010; Martensson 2008; Qu 2007; Ziaei 2006) and five studies await further assessment. *See* Characteristics of included studies, Characteristics of excluded studies, Characteristics of studies awaiting classification, and Characteristics of ongoing studies.

Included studies

Study design

All studies were parallel design. Eight studies had two groups (Hantoushzadeh 2007; Kashanian 2010; Lee 2004; Martensson 2008; Nesheim 2003; Qu 2007; Ramnero 2002; Skilnand 2002). Four studies had three groups (Borup 2009; Chung 2003; Hjelmstedt 2010; Ziaei 2006) and one study had four arms (Huang 2008). Comparative and control groups varied. Six studies used placebo controls (Hantoushzadeh 2007; Hjelmstedt 2010; Kashanian 2010; Lee 2004; Skilnand 2002; Ziaei 2006). Placebo techniques varied between invasive and non-invasive techniques. Comparison with medication was used in two studies (Borup 2009; Huang 2008). Other control groups included standard care; passive supportive care by the midwife (Chung 2003); or unspecified care standard care in three studies (Hjelmstedt 2010; Nesheim 2003; Ramnero 2002). Huang 2008 used transcutaneous electrical nerve stimulation and a breathing group; Martensson 2008 used sterile water injections, and no intervention was reported in two studies (Qu 2007; Ziaei 2006).

Sample sizes

Studies included in the review ranged from 36 (Qu 2007) to 607 (Borup 2009).

Study location and sources of women

Three studies were undertaken in Iran (Hantoushzadeh 2007; Kashanian 2010; Ziaei 2006), two studies each were undertaken in China (Huang 2008; Qu 2007), Norway (Nesheim 2003; Skilnand 2002) and Sweden (Martensson 2008; Ramnero 2002), and one study each in Denmark (Borup 2009), India (Hjelmstedt 2010), Korea (Lee 2004) and Taiwan (Chung 2003).

Participants

Seven studies recruited both nulliparous and primiparous women (Borup 2009; Chung 2003; Lee 2004; Martensson 2008; Nesheim 2003; Ramnero 2002; Skilnand 2002). Nulliparous women were recruited in three studies (Hantoushzadeh 2007; Hjelmstedt 2010; Kashanian 2010). Parous women only were recruited in two studies (Huang 2008; Qu 2007), and parity was unclear in one study (Ziaei 2006). Women were recruited in spontaneous labour in eight studies (Chung 2003; Hantoushzadeh 2007; Martensson 2008; Nesheim 2003; Qu 2007; Ramnero 2002; Skilnand 2002; Ziaei 2006). Two studies recruited women in both spontaneous and induced labour (Borup 2009; Hjelmstedt 2010). Reporting on the onset of labour was unclear in three studies (Huang 2008; Kashanian 2010; Lee 2004).

The intervention was administered at term for the majority of trials studies except Huang 2008 where details were not reported.

Types of intervention

Four studies used acupressure (Chung 2003; Hjelmstedt 2010; Kashanian 2010; Lee 2004) and nine studies used acupuncture (Borup 2009; Hantoushzadeh 2007; Huang 2008; Martensson 2008; Nesheim 2003; Qu 2007; Ramnero 2002; Skilnand 2002; Ziaei 2006) (includes manual and electro-acupuncture). Acupuncture and acupressure varied in point selection, frequency of treatment and number of treatments, with commonly used points included SP6, LI4, BL23, BL32, HT7, GB34, LR3, ST36. A fixed set of acupuncture points only were administered in three studies (Qu 2007; Skilnand 2002; Ziaei 2006). A fixed set of acupressure points was used in four studies (Chung 2003; Hjelmstedt 2010; Kashanian 2010; Lee 2004). Individualised treatment was administered in six studies (Borup 2009; Hantoushzadeh 2007; Huang 2008; Martensson 2008; Nesheim 2003; Ramnero 2002). *See* Characteristics of included studies.

Outcome measures

All studies reported on pain. Maternal outcomes (satisfaction, sense of control) were reported in nine studies (Borup 2009; Chung 2003; Hjelmstedt 2010; Huang 2008; Lee 2004; Martensson 2008; Qu 2007; Ramnero 2002; Ziaei 2006), and clinical outcomes were reported in the majority of studies except for Huang 2008. See details of all outcomes reported within Characteristics of included studies.

Excluded studies

We excluded nine trials; *see* Characteristics of excluded studies. One study did not meet the inclusion criteria based on the criteria for interventions: for example, the use of point injection therapy (Zhang 2000). We excluded four studies due to insufficient reporting of randomisation, or other aspects of study design, or no clinically relevant data (Bo 2006; Deen 1985; Li 2006; Ternov 1998) and we were unable to ascertain true randomisation status from the author. No clinically relevant outcomes were reported in three trials (Li 1996; Shalev 1991; Shang 1995). One study was reported as an abstract only with insufficient reporting to determine inclusion (Park 2003). Further background information on these trials is presented in Characteristics of excluded studies.

Risk of bias in included studies

See Figure 1 and Figure 2 for a graphical summary of the risk of bias assessments by authors of the included studies based on the six risk of bias domains. No study was at a low risk of bias on all domains.

Figure 1. Methodological quality graph: review authors' judgements about each methodological quality item presented as percentages across all included studies.

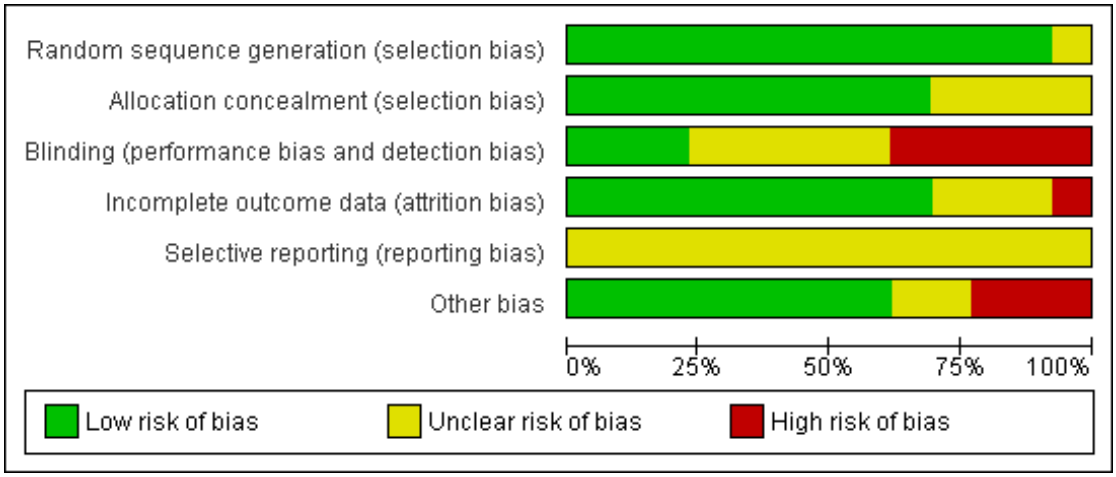
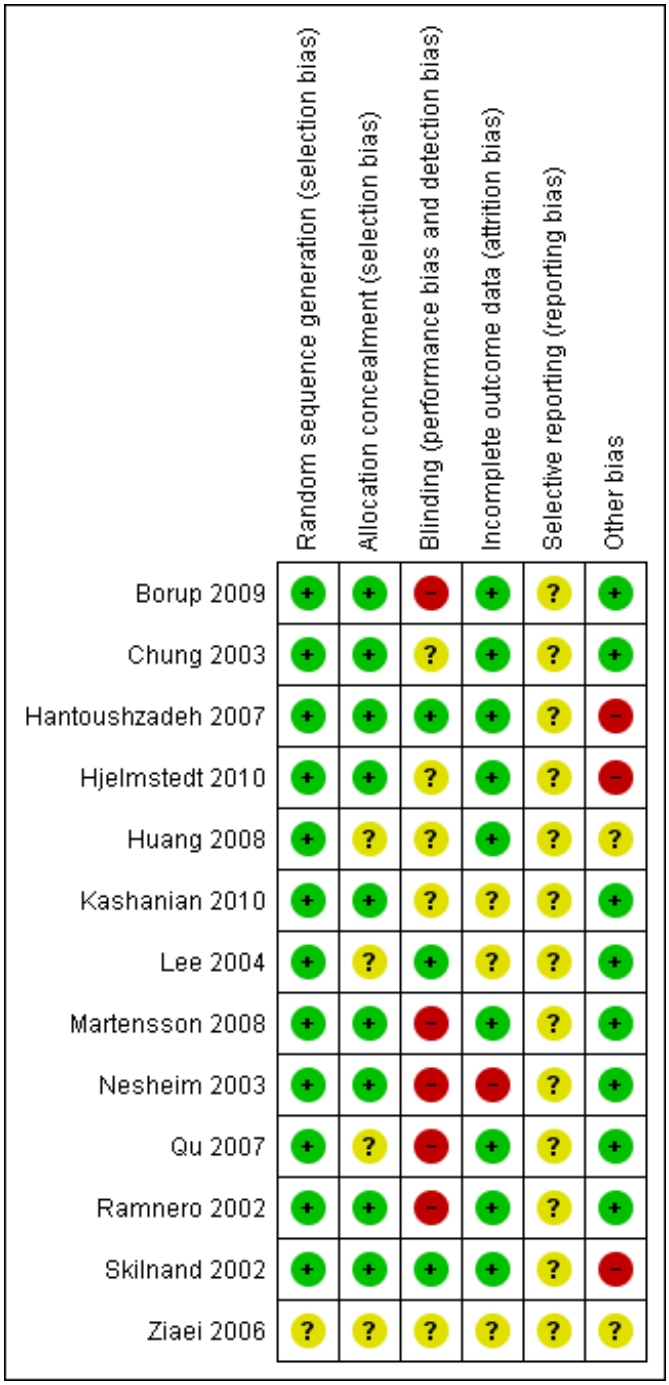


Figure 2. Methodological quality summary: review authors' judgements about each methodological quality item for each included study.



Allocation

Method of allocation

Most of the trials (92%) were rated at a low risk of bias for adequate generation of the randomisation sequence. In 53% of the trials the sequence was computer generated (Borup 2009; Hantoushzadeh 2007; Hjelmstedt 2010; Huang 2008; Kashanian 2010; Martensson 2008; Nesheim 2003). The sequence was by lot drawing in two trials (Qu 2007; Skilnand 2002), coin tossing in one trial (Chung 2003), random number tables in one trial (Lee 2004), and shuffling cards in one trial (Ramnero 2002).

Allocation concealment

Allocation concealment was described as low risk in nine trials (69%). Sealed envelopes were used in seven trials (Hantoushzadeh 2007; Hjelmstedt 2010; Kashanian 2010; Martensson 2008; Nesheim 2003; Ramnero 2002; Skilnand 2002), central randomisation in one trial (Borup 2009) and sequential numbers in one trial (Chung 2003).

Blinding

Blinding was assessed at low risk in three trials (Hantoushzadeh 2007; Lee 2004; Skilnand 2002). The risk of blinding was unclear in five trials due to poor reporting. The intervention could not be administered blind.

Incomplete outcome data

Outcome reporting was assessed at a low risk of bias in 69% of trials.

Selective reporting

The risk of bias from selective reporting was unclear in all trials due to the absence of a study protocol.

Other potential sources of bias

The risk of bias from other sources of bias was rated as low in eight trials (Borup 2009; Chung 2003; Kashanian 2010; Lee 2004; Martensson 2008; Nesheim 2003; Qu 2007; Ramnero 2002).

Effects of interventions

We included 12 trials in the meta-analysis with data reporting on 1950 women using different modalities of pain management. Data were not reported in a form that could be included in the meta-analysis from the Qu 2007 study.

1) Acupuncture

Primary outcomes

1.1) Outcome: pain intensity

Data on pain intensity were reported from four trials with 493 women (Analysis 1.1).

1.1.1 Placebo control

There was significant heterogeneity indicated by the I^2 statistic and we applied a random-effects model. There was no difference in the intensity of pain between groups (standardised mean difference (SMD) 0.04, 95% confidence interval (CI) -0.22 to 0.30, two trials 240 women).

1.1.2 Standard care

There was no difference in pain intensity between groups (SMD -0.14, 95% CI -0.55 to 0.28, one trial, 90 women).

1.1.3 No treatment

Women receiving acupuncture reported less intense pain compared with women receiving no intervention (SMD -1.00, 95% CI -1.33 to -0.67, one trial, 163 women). The electro-acupuncture group reported a lower intensity of pain compared with the control group (26 participants, one trial Qu 2007 study (P = 0.018)).

1.2) Outcome: satisfaction with pain relief in labour

Data on satisfaction with pain relief in labour were available from four trials and 784 women (Analysis 1.2).

1.2.1 Placebo control

Acupuncture increased satisfaction with pain relief in labour compared with placebo control (risk ratio (RR) 2.38, 95% CI 1.78 to 3.19, one trial, 150 women).

1.2.2 Standard care

There was no difference in satisfaction between groups (RR 1.08, 95% CI 0.95 to 1.22, one trial, 90 women). Comparative data between two groups were not available, from the Borup 2009 trial, 59% of women receiving acupuncture thought acupuncture gave some or substantial pain relief.

1.2.3 Water injection

Continuous data were reported and not included in the meta-analysis from the Martensson 2008 trial. Women receiving water injection were more satisfied with pain relief from water injection compared with acupuncture (mean difference (MD) 18.60, 95% CI 11.54 to 25.66, one trial, 128 women).

1.3) Outcome: use of pharmacological analgesia

Five trials, 968 women (Analysis 1.3).

1.3.1 Placebo control

One small trial of acupuncture compared with placebo found a reduction in the use of pharmacological analgesia (RR 0.72, 95% CI 0.58 to 0.88, one trial, 136 women).

1.3.2 Standard care

Use of pharmacological analgesia was lower in the acupuncture group compared with standard care, however there was significant heterogeneity (RR 0.68, 95% CI 0.56 to 0.83, three trials, 704 women).

1.3.3 Water injection

There were no differences between groups (RR 0.84, 95% CI 0.54 to 1.30, one trial, 128 women).

1.4) Outcome: caesarean section

Data on caesarean delivery were reported in seven trials and 1245 women (Analysis 1.4).

1.4.1 Placebo control

There was no difference between groups with caesarean delivery (RR 1.39, 95% CI 0.62 to 3.10, three trials, 448 women).

1.4.2 Standard care

There was no difference between groups with caesarean delivery (RR 0.86, 95% CI 0.47 to 1.60, two trials, 506 women).

1.4.3 No treatment

There was no difference between groups with caesarean delivery (RR 0.76, 95% CI 0.35 to 1.83, one trial 163 women).

1.4.4 Water injection

There was no difference between groups with caesarean delivery (RR 1.33, 95% CI 0.37 to 4.73, one trial, 128 women).

1.5) Outcome: assisted vaginal birth

Six trials reported on this outcome, 1203 women (Analysis 1.5).

1.5.1 Placebo control

There was no difference between groups (RR 0.64, 95% CI 0.27 to 1.50, one trial, 208 women).

1.5.2 Standard care

Three trials found a reduction with instrumental delivery favouring acupuncture compared with standard care (RR 0.67, 95% CI 0.46 to 0.98, 704 women).

1.5.3 No treatment

There was no difference between groups (RR 0.49, 95% CI 0.18 to 1.38, one trial, 163 women).

1.5.4 Water injection

There was no difference between groups (RR 1.60, 95% CI 0.47 to 5.39, one trial, 128 women).

1.6) Outcome: Apgar score less than seven at five minutes

Four trials, 914 women reported on this outcome (Analysis 1.6).

1.6.1 Placebo control

The number of babies with low Apgar scores at five minutes was small. There was no difference between groups (RR 0.32, 95% CI 0.01 to 7.79, one trial, 208 women).

1.6.2 Standard care

There were no differences between groups (RR 0.60, 95% CI 0.12 to 2.99, three trials, 706 women).

1.7) Outcome: vaginal delivery

Three trials, 415 women reported on this outcome (Analysis 1.7).

1.7.1 Placebo control

There was significant statistical heterogeneity between trials. There were no differences between groups (RR 1.00, 95% CI 0.87 to 1.14, two trials, 325 women).

1.7.2 Standard care

There were no differences between groups (RR 0.98, 95% CI 0.89 to 1.08 women, one trial, 90 women).

1.8) Outcome: augmentation with oxytocin

Five trials, 710 women reported on this outcome (Analysis 1.8).

1.8.1 Placebo control

There was significant heterogeneity between trials; there were no differences between groups (RR 0.62, 95% CI 0.15 to 2.52, two trials, 358 women).

1.8.2 Standard care

There were no differences between groups (RR 0.88, 95% CI 0.72 to 1.08, two trials, 224 women).

1.8.3 Water injection

There were no differences between groups (RR 1.16, 95% CI 0.85 to 1.58, one trial, 128 women).

1.9) Outcome: relaxation

Three trials reported on this outcome, 308 women (Analysis 1.9).

1.9.1 Placebo control

There were no differences between groups (SMD -0.27, 95% CI -0.72 to 0.17, one trial, 90 women).

1.9.2.Standard care

Acupuncture increased relaxation compared with standard care (SMD -0.51, 95% CI -0.93 to -0.09, one trial, 90 women).

1.9.3 Water injection

Water injection increased women's reported of relaxation compared with acupuncture (SMD 0.55, 95% CI 0.20 to 0.91, one trial 128 women).

1.10) Outcome: length of labour

Length of labour was reported differently between trials, and not combined in a meta-analysis.

1.10.1 Placebo control (two trials)

The active phase of labour was shorter in the acupuncture group compared with control (3.41, 3.06 to 3.77 versus 4.45, 4.06 to 4.83, P < 0.001) (Hantoushzadeh 2007). Length of labour from the initiation of acupuncture was significantly in favour of acupuncture (MD 71 fewer minutes, 95% CI -123.70 to -18.30) (Skilnand 2002).

1.10.2 Standard care

Ramnero 2002 reported on the duration of labour from less than 4 cm to birth, there was no difference between groups (MD-0.30, 95% CI -1.79 to 1.19, one trial, 100 women).

1.10.3 Water injection

Martensson 2008 reported on the time from treatment to delivery in minutes, there was no difference between groups (MD -90.1, 95% CI -187.02 to 6.82, one trial 300 women).

2) Acupressure

Primary outcomes

2.1) Outcome: pain intensity

Three trials, 462 women reported on this outcome (Analysis 2.1).

2.1.1 Placebo control

Pain intensity was reduced in the acupressure group compared with the placebo control (SMD -0.55, 95% CI -0.92 to -0.19, one trial, 120 women).

2.2.2 Combined control (placebo and no treatment)

Pain intensity was reduced in the acupressure group compared with the combined control (SMD -0.42, 95% CI -0.65 to -0.18, two trials, 322 women).

2.2) Outcome: satisfaction with childbirth

One trial, 211 women reported on this outcome (Analysis 2.2).

2.2.1 Combined control

There was no difference between groups (MD 4.80, 95% CI -2.29 to 11.89, one trial, 211 women).

2.3) Outcome: use of pharmacological analgesia

Two trials, 287 women reported on this outcome (Analysis 2.3).

2.3.1 Placebo control

There was no difference between groups (RR 0.54, 95% CI 0.20 to 1.43, one trial, 75 women).

2.3.2 Combined control

There was no difference between groups (RR 0.94, 95% CI 0.71 to 1.25, one trial, 145 women).

2.4) Outcome: caesarean section

Two trials, 332 women reported on this outcome (Analysis 2.4).

2.4.1 Placebo control

Caesarean section was reduced in the acupressure group compared with the placebo control group (RR 0.24, 95% CI 0.11 to 0.54, one trial, 120 women).

2.4.2 Combined control

Caesarean section was reduced in the acupressure group compared with the placebo control group (RR 0.48, 95% CI 0.22 to 1.04, one trial, 222 women).

2.5) Outcome: assisted vaginal birth

One trial, 222 women (Analysis 2.5).

2.5.1 Combined control

There was no difference between groups (RR 0.81, 95% CI 0.39 to 1.67, one trial, 212 women).

2.6) Outcome: Apgar score less than seven at five minutes

2.6.1 Placebo control

One trial reported on this outcome. No infants met this criteria (Analysis 2.6).

2.7) Outcome: augmentation with oxytocin

Two trials, 332 women reported on this outcome (Analysis 2.7).

2.7.1 Placebo control

Augmentation was lower in the acupressure group compared with placebo control (RR 0.66, 95% CI 0.46 to 0.94, one trial, 120 women).

2.7.2 Combined control

There was no difference between groups (RR 1.01, 95% CI 0.77 to 1.31, one trial, 222 women).

2.8) Outcome: length of labour

2.8.1 Placebo control

There was significant heterogeneity between trials; length of labour was lower in the acupressure group compared with placebo control (SMD -1.06, 95% CI -1.74 to -0.38, two trials, 195 women) (Analysis 2.8).

2.9) Outcome: anxiety

2.9.1 Placebo control

Acupressure reduced anxiety compared with placebo control (MD -1.40, 95% CI -2.51 to -0.29, one trial, 75 women) (Analysis 2.9).

Sensitivity analysis

It was proposed to undertake a sensitivity analysis on the results to look at the possible contribution of: (1) differences in methodological quality, with trials of high quality (low risk of bias) compared to all trials; and (2) publication bias by country. This was not done due to the small number of trials overall. There were no trials of high quality; there were also too few trials within comparisons to make comparisons to examine the influence of publication bias. Where there was heterogeneity, we applied a random-effects model.

Subgroup analysis

We did not undertake subgroup analysis, based on insufficient reporting of trials with the variables of interest by outcome.

DISCUSSION

Summary of main results

Evidence from 13 trials and 1950 women included in the review suggest a limited benefit from acupuncture and acupressure in relation to the primary outcomes of reduced pharmacological analgesia, less intense pain and increased maternal satisfaction. There was a reduced use of pharmacological analgesia found in one trial of acupuncture compared with placebo (risk ratio (RR) 0.72, 95% confidence interval (CI) 0.58 to 0.88), and from three trials compared with standard care; however, there was significant heterogeneity (RR 0.68, 95% CI 0.56 to 0.83). There was a reduction in pain intensity in one trial of acupuncture compared with no intervention (standardised mean difference (SMD) -1.00, 95% CI -1.33 to -0.67). One trial reported increased satisfaction with pain

relief in labour compared with placebo control (RR 2.38, 95% CI 1.78 to 3.19). There was a reduction with instrumental delivery from acupuncture compared with standard care (RR 0.67, 95% CI 0.46 to 0.98). Pain intensity was reduced in the acupressure group compared with the placebo control (SMD -0.155, 95% CI -0.92 to -0.19) and a combined control group (SMD -0.42, 95% CI -0.65 to -0.18). Currently there are a small number of trials included within each comparison, and this limits the power of the review to detect meaningful differences between groups and analyses, suggesting these limited benefits should be interpreted with caution.

Overall completeness and applicability of evidence

There remain relatively few trials of acupuncture and acupressure that assess the role of these interventions in the management of pain relief in labour. The completeness and applicability of the evidence is limited from the 13 included trials, with no trial at a low risk of bias on all domains. The inclusion of relevant outcomes has improved with over 50% of the acupuncture trials reporting on outcome of safety, and effectiveness. A weakness of a number of trials continues to be the inclusion of few outcomes and omission of safety clinical outcomes.

Trials recruited low-risk nulliparous and primiparous women at term, mostly in spontaneous labour. Studies were conducted in different countries and consequently this reflects the different styles of acupuncture administered in the studies.There are many styles of acupuncture, including individualised traditional Chinese medicine, as illustrated by six trials administering individualised treatment (Borup 2009; Hantoushzadeh 2007; Huang 2008; Martensson 2008; Nesheim 2003; Ramnero 2002) and those using standardised acupuncture points as used in the majority of trials in this review. The systematic review documented wide variation in the mode of stimulation, duration of needling, number of points used, depth of needling and duration of the trial. It is unclear how representative the treatment protocols used in the research are generalisable to acupuncture as it is usually practiced. There was insufficient reporting of the rationale of the acupuncture used in the research setting. The variation may also reflect the context in which acupuncture is practiced.

Quality of the evidence

The risk of bias table (Figure 1; Figure 2) demonstrates that acupuncture has not been consistently subjected to consistent rigorous study. The quality of reporting was poor in over 50% of trials. The risk of bias was low in respect to randomisation (90% and 68%). No one trial was rated at a low risk of bias on all domains. Rates of follow-up were high in the majority of trials with only a small number of trials reporting a small loss of participants. For many studies blinding of participants and the practitioner was not possible, and reporting indicated that the outcomes could have been influenced by a lack of blinding and consequently were rated at a high risk of bias. The small number of studies within comparisons and lack of high-quality trials suggest there remains insufficient evidence of a consistent treatment effect from acupuncture. The chief investigators of some studies were contacted to provide additional methodological and statistical information; however, we obtained only a few responses (Chung 2003; Huang 2008; Kashanian 2010).

The quality of evidence was affected by unexplained heterogeneity in some comparisons arising from both the heterogeneity of the clinical interventions and study designs. The small number of studies within comparisons, and lack of high quality trials prevented further investigation of the heterogeneity and the impact on treatment effects.

Potential biases in the review process

We attempted to minimise publication bias. Our search was comprehensive and we included studies identified in languages other than English. However, we cannot rule out the possibility that some studies have been missed. The variation in the duration, frequency and selection of acupuncture points suggests that the acupuncture may not have been therapeutically effective and in some cases may not represent best clinical practice.

Agreements and disagreements with other studies or reviews

There is one other systematic reviews of acupuncture to treat depression (Cho 2010). This review included trials for which we were unable to ascertain the randomisation details or we excluded because the trials did not meet the eligibility criteria. Our findings and conclusions concerning the role of acupuncture for pain relief in labour are similar to this review.

AUTHORS' CONCLUSIONS

Implications for practice

The data available suggest acupuncture and acupressure may be a helpful therapy for pain management in labour. However, there is insufficient evidence to make clinical recommendations. There are insufficient data to demonstrate whether acupuncture and acupressure are more effective than a placebo control, or whether there is additional benefit from acupuncture when used in combination with usual care. The risk of bias was high in the majority of trials and recommendations for practice cannot be made until further high quality research has been undertaken.

Implications for research

Further randomised controlled trials of acupuncture and acupressure for pain management in labour are needed. Further randomised trials should be adequately powered and include clinically relevant outcomes such as those described in this review. There is a need for improving the quality and reporting of future trials. In particular, consideration should be given in the analysis and reporting on the person providing the intervention: for example, their training, length of experience and relationship to the woman. In addition, further research is required which include data measuring neonatal outcomes and the effects on analgesia requirements in institutions with and without an 'on demand' epidural service. A cost-benefit analysis should be incorporated into the design of future studies.

Future studies may need to consider the use of both effectiveness designs using medication, or other forms of standard care, and efficacy designs using placebo controls.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Borup 2009

Methods	Randomised trial of acupuncture, TENS or traditional analgesics.
Participants	607 healthy, Danish-speaking women in labour with a normal singleton pregnancy who were giving birth at term (37-42 completed weeks) and with a fetus in cephalic presentation were eligible for the study. Women were recruited from a university hospital. Women were excluded if they had medical complications, or already received analgesics in labour.
Interventions	Acupuncture group: acupuncture was administered by midwives who had completed a 5-day course in Western techniques of obstetric acupuncture, and received at least 6 months' clinical training using acupuncture during labour. Treatment was individualised, according to location of pain and woman's mobility, needles used of 3 depths 0.20 x 15, 0.30 x 30, 0.35 x 50 mm. Duration of needling 30-120 minutes and could be repeated. Needles removed if woman uncomfortable or if obstetric pathology. Supplementary analgesics provided on request as per control group. Acupuncture points included BL 23, 24, 25, 26, 31-34, 36, 60, CV20 and sishongong, ear points uterus, shenmen, endocrine, EX-HN3 yintang, LR3, SP6, SP9, ST36, GB34, HT7, PC6, LI10,11, LU7, LI 4. Control group: traditional analgesics: women randomised to the traditional group could choose among all analgesic methods available (sterile water papules, nitrous oxide, warm tub bath, pethidine, and epidural analgesia).
Outcomes	Need for pharmacological pain relief, pain intensity, overall experience and satisfaction,duration of labour, use of oxytocin, mode of delivery, postpartum haemorrhage, Apgar score, umbilical cord pH.
Notes	Study duration: 1/3/2002- 29/2/2004.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated sequence, with randomisation in a ratio of 2:1.
Allocation concealment (selection bias)	Low risk	Central randomisation voice response.
Blinding (performance bias and detection bias) All outcomes	High risk	Women, midwife acupuncturists were not blind to their group allocation. It was unclear if the outcome assessor or analyst was blind to group allocation.

Borup 2009 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	Data were missing from 8%, with the reasons similar between groups: no project midwife available, did not want the allocated treatment, rapid progression of labour, other reasons.
Selective reporting (reporting bias)	Unclear risk	The study protocol is not available but the study reports the expected outcomes.
Other bias	Low risk	The study appears free of other biases.

Chung 2003

Methods	Single-blind, randomised controlled trial of acupressure, effleurage and a control group. It was not feasible for the participant and therapist to be blind to their group allocation.
Participants	127 women participated in the trial, during their first stage of labour. Participants needed to be between 37 and 42 weeks pregnant, a low-risk pregnancy, singleton pregnancy and able to speak Chinese. Women who were induced with oxytocin, or received an epidural block or who planned a caesarean section were excluded from the study. The trial was undertaken in Taiwan; no other details were reported.
Interventions	Trained midwives administered the acupressure to women. The intervention lasted 20 minutes, consisting of 5 minutes pressure to points LI4 and BL67. 5 cycles of acupressure were completed in 5 minutes, with each cycle comprising 10 seconds of sustained pressure and 2 seconds of rest without pressure. A protocol was established to control finger pressure, accuracy of points and accuracy of technique. For the effleurage group, the left and right upper arms were massaged for 10 minutes. In the control group, the midwife stayed with the participant for 20 minutes, taking notes or talking with the participant or family members.
Outcomes	A VAS scale was used to measure the intensity of labour pain. This was administered before and after the intervention. Qualitative data were also collected on women's experience of labour pain 1-2 hours after delivery. The frequency and intensity of uterine contractions were measured from electronic fetal monitors.
Notes	There was no power analysis. An intention-to-treat analysis was not performed.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Coin tossing.
Allocation concealment (selection bias)	Low risk	Sequentially numbered.

Chung 2003 (*Continued*)

Blinding (performance bias and detection bias) All outcomes	Unclear risk	Partial. The outcome assessors were blind to women's group allocation but unclear for analyst.
Incomplete outcome data (attrition bias) All outcomes	Low risk	23 (18%) women withdrew from the study due to a need for a caesarean section, pain medication. The reason for attrition was similar across groups and due to the need for induction or pain relief.
Selective reporting (reporting bias)	Unclear risk	Unclear.
Other bias	Low risk	No other sources of bias detected.

Hantoushzadeh 2007

Methods	Single blind randomised controlled trial of acupuncture versus placebo acupuncture using sham needling. Duation: February to September 2005. Setting: government general hospital, Tehran, Iran.
Participants	150 women with a singleton pregnancy, at term (37 weeks), nulliparous, parturient and in spontaneous active labour. Exclusion criteria: presence of medical or surgical disease, indication for caesarean section, pace-maker, emphysema, history of anticoagulation, HIV, HCV or HBV infection, pregnancy-related complications, e.g. chorioamnionitis, placental abruption, placenta praevia and pre-eclampsia/eclampsia, cervical dilation > 6 cm.
Interventions	The study group received acupuncture administered by the study investigator, who was trained to practice acupuncture. Points were selected bilaterally according to parturient symptoms, and needles were inserted at 45 degree or perpendicularly with a depth that depended on the thickness of the subcutaneous fat. The selection of points was done according to acupuncture principles and was subject to variation from patient to patient. Needles were manually stimulated until the de chi sensation (sensation of warmth, numbness, tingling, or heaviness) was achieved. The needles were not taped and were removed either when delivery occurred or the patient herself asked to do so or when the effect terminated or there was no effect. The following points and there indication were reported as follows: LI4- analgesia, BL32-back pain, BL60 back pain, SP6 severe pain during contractions, ST36 general pain, LR3 analgesia, GB34 cervical rigidity, HT7 anxiety, nervousness. The control group received minimal acupuncture which involved insertion of acupuncture needles away from true acupuncture points. Participants were not asked about de qi and the needles were manually stimulated for about 20 minutes. Both groups received care from health providers, routine analgesia was not available.
Outcomes	Pain scores measured using VAS scale, at beginning, 30 minutes, 60 minutes, 120 minutes, then every hour until end of labour. Duration of active labour, amount of oxytocin used, vaginal birth, birthweight, Apgar

Hantoushzadeh 2007 (*Continued*)

	score at 1 minute, acceptability of acupuncture.	
Notes		
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer generated.
Allocation concealment (selection bias)	Low risk	Sealed opaque envelopes.
Blinding (performance bias and detection bias) All outcomes	Low risk	Partcipants blind to group allocation (assessment of blinding not reported), administering clinician unblinded, care provider unclear, outcome assessor blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	5 losses in the acupuncture group: 3 caesarean section, 2 labour stopped. 1 loss in the control group caesarean section. No intention to treat.
Selective reporting (reporting bias)	Unclear risk	Protocol not available.
Other bias	High risk	Partcipants in the control group had significantly lower pain scores before intervention commenced.

Hjelmstedt 2010

Methods	Parallel randomised controlled trial of acupressure compared with light touch or standard care.
Participants	Public hospital in Trivandrum, India. 212 women randomised to the trial. Inclusion criteria: nulliparous, transferred to labour room, dilation 3-7 cm, healthy, uncomplicated pregnancy, term, live fetus, cephalic presentation. Exclusion criteria: hypertensive disorder, pre-eclampsia, diabetes, neuropathic pain, multiparous, intrauterine death, multiple fetuses, breech presentation, gestation < 38 or > 42 weeks, dilation < 3 or > 7 cm, elective caesarean section, presence of pharmacological pain relief.
Interventions	Group 1: acupressure at acu-point Sp6 bilaterally during contractions over a 30-minute period. Treatment was not repeated after 2 hours if the woman was not in second stage or had not delivered**.** Intensity of pressure adapted to each woman's pain threshold. Group 2: (TG) receive light touch at SP6 bilaterally during contractions. Group 3: (SCG) standard care. Acupressure and touch was delivered by same person who had undergone 3 days of

Hjelmstedt 2010 (*Continued*)

	training by a certified acupressure therapist.
Outcomes	Participant's self-assessment of in-labour pain via VAS pain scores, oxytocin augmentation, pharmacological pain relief, caesarean section, mode of delivery, episiotomy, birthweight, birth length, Apgars (5 minutes). Retrospective ratings of labour pain, coping with labour pain and experience of childbirth.
Notes	Trial duration: 1/9/2007-30/4/2008.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer generated.
Allocation concealment (selection bias)	Low risk	Sealed opaque envelope.
Blinding (performance bias and detection bias) All outcomes	Unclear risk	It was unclear if the participant was blind to light touch or acupressure, the clinician was not blind to group allocation, the outcome assessor was blind to group allocation.
Incomplete outcome data (attrition bias) All outcomes	Low risk	1 women withdrew from the standard care group.
Selective reporting (reporting bias)	Unclear risk	Study protocol unavailable.
Other bias	High risk	Baseline pain scores were significantly different between APG and SC, and boarding on significance between APG and TG. Therefore scores were not used for a between group comparison, but were used for a within-group comparison over time.

Huang 2008

Methods	Single blind RCT, 4-arm study: 1) electro-acupuncture group N = 82; TENS group N = 82; control group (breathing) N = 81; spinal-epidural analgesia group N = 79. Unit of randomisation: 1:1:1:1.
Participants	Delivery unit at the Beijing Gynaecolgoy and Obstetrics Hospital, China. Inclusion criteria: 324 primiparae women aged 22-34 years, vaginal delivery, monocyesis, not cephalopelvic disproportion, no abnormal fetal position, no serious complications of pregnancy, agreement to labour analgesia. Exclusion criteria**:** not explicitly stated.

Huang 2008 (*Continued*)

Interventions	1) Electro-acupuncture. *Shi diagnosis* labour pain mainly located in the lumbosacral and with bearing-down sensation, sturdy body, desiring cold and fearing of warmth, good appetite, normal or dry stool, normal or less yellow urine, good sleep, normal red tongue with thin and whitish or slightly thicker tongue coating, wiry, drooling and strong pulse. *Xu diagnosis:* labour pain mainly located in the lower abdomen and distending, weak body, seeking warmth and fearing of cold, poor appetite, loose stool, clear abundant urine, increased nocturnal enuresis, worse sleep, easily waken up in the night, fatty and whitish tongue with teeth mark, thicken and greasy coating, deep and thin, weak pulse. Electro-acupuncture group applied self-developed acusector on selected acu-points according to syndrome differentiation, and needling and galvanism were combined on the acu-points. Main acu-points were ST36, CV3 and CV4. Additional points for Shi were BL32 and LR3) and for Xu were LI4 and SP6. Radio frequency electrodes (self-developed, putting auricular needle in the centre of electrode plate with thumb-tack needle) were inserted and connected to Han's acu-point nerve stimulator. Dilatational wave of 2Hz/100 Hz operated as a stimulator and the strength adjusted to the woman's tolerance level. 2) TENS group used Han's acu-point nerve stimulator and stimulated point with 2/100 Hz of dilatational wave. 3) Spinal-epidural analgesia group received combined spinal and epidural block anaesthesia. 4) Advice on breathing during contraction and local massage during severe pain.
Outcomes	VAS scores of pain applied at pre-pain, 30 minutes, 60 minutes, 120 minutes after pain analgesia, at the end of active stage (cervical dilation of 7-8 cm), complete dilation of cervix, second stage of labour, third stage of labour and 1 day after labour. 0-no pain, 1-mild pain, 10-most severe and intolerable pain. Degree of satisfaction to labour analgesia 2 hours after delivery. Satisfied: pain completely relieved without evident discomfort. Relatively satisfied: pain relieved to some extent without evident discomfort. Unsatisfied: pain not relieved with evident discomfort. Mode of delivery, maternal and labour complications.
Notes	Trial duration: April 2004-February 2005.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer generated.
Allocation concealment (selection bias)	Unclear risk	No details reported.
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Women provided self reported pain and were not blind, other outcomes unlikely to be influenced by lack of blinding, although status of outcome assessor unclear.

Huang 2008 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	No participant loss.
Selective reporting (reporting bias)	Unclear risk	Study protocol unavailable.
Other bias	Unclear risk	Insufficient reporting.

Kashanian 2010

Methods	Single blind randomised controlled trial of acupressure at SP6 or light touch control group.
Participants	120 women were recruited from the labour ward at Akbaradi teaching hospital, Iran. Setting: labour ward at Akbarabadi Teaching hospital in Tehran. Inclusion criteria**:** age: 18-35 years, nulliparous, singleton, cephalic presentation, gestational age 37-41 weeks, intact membranes, cervical dilation 3-4 cm, established contractions ($\geq$ 3:10 minutes 45-60 seconds duration). Exclusion criteria**:** any sedation during labour, abnormal or deceased fetus, fetal distress, meconium passage, previous hysterotomy or uterine scar, any medical or surgical complications of pregnancy, drug use except usual supplements, vaginal bleeding and high-risk pregnancy.
Interventions	Acupressure, performed by investigator, at SP6 during contractions for a total acupressure time of 30 minutes. Control: touch at SP6, performed by same investigator, for same duration of time.
Outcomes	Severity of pain as measured by VAS, duration of active phase of labour, mode of delivery, use of oxytocin, neonatal weight, and Apgar scores.
Notes	Study duration: March to September 2007. The research was supported by Iran University.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	4 part block randomisation method (seems to be computer generated).
Allocation concealment (selection bias)	Low risk	Sealed envelopes.
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Participant: unclear. Clinician: no. Outcome assessor: yes. Describe: treatment was known and administered by the investigator. Unclear

Kashanian 2010 (*Continued*)

		whether there was an attempt to conceal that the control treatment of touch was not the intervention.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No discussion of loss of participants at data collection points. No discussion of exclusions after randomisation but exclusion criteria of any sedation during labour or any sign of fetal distress could indicate exclusion after randomisation.
Selective reporting (reporting bias)	Unclear risk	The study protocol was unavailable.
Other bias	Low risk	No imbalances at randomisation.

Lee 2004

Methods	Single-blind, randomised controlled trial of acupressure or touch control.
Participants	89 women were randomly allocated to the trial. Inclusion criteria for the study were: greater than 37 weeks pregnant, singleton pregnancy, planning a vaginal delivery and in good health. Women were recruited to the study from publicity materials in the outpatient department of a general hospital in Korea.
Interventions	Women allocated to the intervention group received acupressure at SP6, or to the control group touch at SP6. The acupressure involved pressure at SP6 on both legs during a contraction during a 30-minute time period during each contraction. The pressure applied was 2150 mmHg. The control group received touch with no pressure from the thumbs.
Outcomes	Pain was measured along a VAS and assessed at entry, before the intervention was administered, after the intervention, and 30 and 60 minutes after the intervention. Other outcomes included duration of labour, use of pain relief, and maternal anxiety.
Notes	No power analysis was reported. An intention-to-treat analysis was performed.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	The randomisation sequence was generated from random-number tables.
Allocation concealment (selection bias)	Unclear risk	Unclear.
Blinding (performance bias and detection bias) All outcomes	Low risk	The participants and outcome assessors were blind to group allocation.

Lee 2004 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Unclear risk	14 (15%) women did not complete the study. Reasons given were caesarean section, withdrawal or incomplete data. No information was reported by group allocation.
Selective reporting (reporting bias)	Unclear risk	Study protocol unavailable. All pre-specified outcomes were reported.
Other bias	Low risk	No other bias detected.

Martensson 2008

Methods	Randomised controlled trial of acupuncture compared with sterile water injections.
Participants	128 women admitted to labour ward in Sweden. Inclusion criteria were: 37-42 weeks' gestation, spontaneous onset of labour, frequency of 3 contractions during 10 minutes and a requirement for pain relief. Exclusion criteria were: no opoid analgesics, acupuncture, TENS, or sterile water injection in the previous 10 hours, or had received paracervical nerve block, epidural or intrathecal analgesia or augmentation of labour.
Interventions	Acupuncture group: all women were treated at GV20, LI4 and SP6. Local acupuncture points were selected individually depending on where the pain was perceived; the midwives could choose 4 to 7 points from BL23-24, BL54, EX19, GB25-29 and KI11. The acupuncture points were chosen both from recommendations in the literature and in cooperation with the midwives, the latter in an attempt to imitate normal clinical practice. The needles (Hegu AB, Landsbro, Sweden) were made of stainless steel (0.3030 or 0.3550 mm). After insertion, the needles were stimulated to evoke needle sensation (De Qi), a feeling of heaviness, numbness and distension, reflecting activation of muscle-nerve afferents. The needles were left in place for 40 minutes, and were stimulated manually, as described, every 10 minutes. The first assessment after treatment took place 30 minutes after all the needles were in place. The treatment was repeated if necessary. Water injection group was given 48 subcutaneous injections of 0.5 ml sterile water. The injections were administered in the area where the woman felt pain; the injections could be repeated if necessary. A 2-ml plastic syringe (B. Braun Omnifix†) with a thin needle (B. Braun Omnifix†; diameter: 0.40 mm, length: 20 mm) was used. The injections were administered during a contraction. The first assessment after treatment took place 30 minutes after all the injections were given. 40 midwives administered acupuncture and/or injections of sterile water. All midwives were equally trained in administration of acupuncture and injection of sterile water. All protocols were thoroughly standardised.
Outcomes	Pain and relaxation was assessed using a VAS immediately before and 30, 60, 90, 120, 150 and 180 minutes after treatment. The woman was asked to mark her degree of pain and relaxation on the 100-mm line with the following endpoints: 0 = no pain at all and 100 = worst conceivable pain, and 0 = totally relaxed and 100 = very tense, for pain and relaxation, respectively. Obstetric outcomes were also assessed. After delivery, the woman was asked the extent to which the treatment had provided pain relief and relaxation, and

Martensson 2008 (*Continued*)

	if she would accept the same treatment during a future delivery.	
Notes	Stratified by parity, randomisation in blocks of 10.	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer generated.
Allocation concealment (selection bias)	Low risk	Sealed opaque envelopes.
Blinding (performance bias and detection bias) All outcomes	High risk	Women and the care providers were not blind to their group allocation. No other details reported.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Dropouts defined as events after randomisation leading to no treatment or events after treatment, such as delivery or requirement for other methods of pain relief. Another midwife undertook women's assessment of pain and relaxation. The reasons for drop-out were similar between groups.16 women in the acupuncture group and 11 women in the injection group dropped out (total 17% drop out).
Selective reporting (reporting bias)	Unclear risk	Study protocol was not available.
Other bias	Low risk	There was a slight imbalance in age, there appears to be no other source of bias.

Nesheim 2003

Methods	A single-blind, controlled trial of acupuncture versus standard care.
Participants	198 women were enrolled into the trial of acupuncture versus standard care, from a labour ward in a University hospital in Norway. Women were recruited to the trial who were at term, experiencing regular contractions and had an ability to speak Norwegian. Women were excluded if their labour was induced, planning a caesarean section, a plan to request an epidural block, medical reasons for an epidural, or experiencing any infectious diseases.
Interventions	8 midwives were educated and trained to practice acupuncture for the trial. All women received other analgesics on demand. The acupuncture points used were selected based on the participants' needs and included points BL32, GV20, BL60, BL62, HT7, LR3, GB34, CV4, LI10, LI11, BL23, BL27, 28, 32, LI4, SP6, PC6,7, ST36. De qi was

Nesheim 2003 (*Continued*)

	obtained. Needles were left in place for 10-20 minutes, or removed after the needling sensation was obtained, or taped and left in place. Women in the control group received conventional care.
Outcomes	Clinical outcomes included use of meperidine, use of other analgesics, duration of labour, mode of delivery and Apgar score. Participants also rated their pain relief along a VAS scale and asked to report any side effects from the treatment.
Notes	A power analysis was undertaken. An intention-to-treat analysis was performed.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer generated.
Allocation concealment (selection bias)	Low risk	Adequate, sealed opaque envelopes.
Blinding (performance bias and detection bias) All outcomes	High risk	Participants, the therapist and care givers were not blind. Blinding of the analyst was unclear.
Incomplete outcome data (attrition bias) All outcomes	High risk	6 drop outs, 1 drop out from acupuncture.
Selective reporting (reporting bias)	Unclear risk	Study protocol was unavailable.
Other bias	Low risk	Demographic baseline characteristics comparable between groups.

Qu 2007

Methods	Randomised controlled trial of electro-acupuncture or control (no pain relief).
Participants	Affiliated hospital of Heilongjiang University of Chinese Medicine, China. 36 study participants. Inclusion criteria**:** primiparous women, with a normal single pregnancy with spontaneous onset of labour, cephalic presentation, cervical dilation < 6 cm at admission, gestational age 37-42 completed weeks. Exclusion criteria:diabetes, pre-eclampsia, hypertension, kidney disease, thrombocytopenia, psychological distress or anorexia, infectious blood disease, atopic eczema or psoriasis.
Interventions	Acupuncture group: bilateral acupuncture points stimulation of points LI4 and SP6. Treatment started at beginning of active phase of first stage of labour. When de-Qi achieved, needles retained for 2 minutes, then connected to electro-acupuncture stimulator, at a frequency of 2-100Hz, current: 14-30mA. Stimulation increased gradually and

Qu 2007 (*Continued*)

	needles removed after 20 minutes. When dilation reached 7-8 cm, procedure performed again. Control group: no pain relief.
Outcomes	Assessment of pain intensity and degree of relaxation throughout the labour. (Assessed hourly. Assessment tool 11-point scale: 0 = painless and well relaxed; 10 = worst pain imaginable and very tense.)
Notes	Study duration August 2004 to May 2005.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Lot drawing.
Allocation concealment (selection bias)	Unclear risk	"Neither the doctors, midwives, nor the primiparas could predict the group allocation."
Blinding (performance bias and detection bias) All outcomes	High risk	Women and the study practitioner was not blind to the study groups. No other details reported.
Incomplete outcome data (attrition bias) All outcomes	Low risk	3 women excluded from the analysis, 2 acupuncture (no pain or relaxation data available), 1 woman from the control group (no spontaneous labour).
Selective reporting (reporting bias)	Unclear risk	Study protocol not available.
Other bias	Low risk	No imbalances at baselines, the study appears free of other biases.

Ramnero 2002

Methods	Parallel single-blind, randomised controlled trial of acupuncture. The trial was stratified by parity. Women received acupuncture or no acupuncture.
Participants	100 women were recruited from an antenatal clinic in Sweden. Randomisation took place in the delivery suite following admission. Inclusion criteria: 37+ weeks' gestation, spontaneous labour, cephalic presentation, cervical dilatation < 7 cm at admission. Exclusion criteria: diabetes, pre-eclampsia, kidney disease, thrombocytopenia, psychological distress or anorexia, infectious blood disease, atopic eczema or psoriasis.

Ramnero 2002 (*Continued*)

Interventions	All women had access to conventional analgesia. Eleven midwives completed a 4-day course in acupuncture for labour pain. These midwives administered acupuncture to the treatment group. Acupuncture treatment was individualised with relaxing points combined with local and distal analgesic points. Needles were inserted at 45 or 90 degrees, stimulated manually until de qui (needling sensation) was obtained. Needles were left in situ and removed after 1-3 hours.
Outcomes	Pain intensity and degree of relaxation was assessed once every hour, prior to any analgesic and 15 minutes after. Other outcomes included; the use of analgesics, augmentation of labour with oxytocin, duration of labour, outcome of birth, antepartum haemorrhage, Apgar scores, and infant birthweight.
Notes	No sample-size calculation was described. An intention-to-treat analysis was performed.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Randomisation was generated by shuffling cards.
Allocation concealment (selection bias)	Low risk	Adequate, concealed in sealed, opaque envelopes.
Blinding (performance bias and detection bias) All outcomes	High risk	The outcome assessor was not blind and it was unclear if the analyst was blind to treatment allocation. Women and the practitioner were not blind to group allocation.
Incomplete outcome data (attrition bias) All outcomes	Low risk	10 (10%) were excluded from the analysis after not meeting the inclusion criteria (breech presentation, not in active labour, not in spontaneous labour, missing pain and relaxation data). 5 from each group relating to not in active labour, breech presentation, not in spontaneous labour, emergency caesarean section, no assessment of pain.
Selective reporting (reporting bias)	Unclear risk	Study protocol unavailable.
Other bias	Low risk	Baseline characteristics comparable between groups, no other identifiable source of bias.

Skilnand 2002

Methods	Single-blind, randomised controlled trial of acupuncture versus minimal acupuncture.
Participants	210 women were recruited from the maternity ward of a hospital in Norway. Women with a singleton pregnancy, cephalic presentation, in spontaneous active labour met the inclusion criteria. 110 women refused to participate in the trial.
Interventions	Real acupuncture followed a treatment protocol. The protocol specified obtaining the de qi sensation, needles were taped and left in place until delivery or until conventional analgesics were required. Acupuncture points included HT7, LU7, ST30, ST29, GB34, ST36, SP8, SP6, KI3, GB41, LR3, GV20, BL34, BL32, LI4, BL67, BL60. Minimal acupuncture involved the same procedure but needles were inserted away from the meridians. Some needles were removed after 20 minutes if insufficient pain relief was provided by the treatment and control interventions. Conventional pain relief was made available. Midwives providing the intervention had received formal training in acupuncture.
Outcomes	Pain was assessed along a 10 cm VAS, recorded at 30 minutes, 1 and 2 hours after treatment, the need for conventional pain relief and use of oxytocin.
Notes	No power analysis was reported.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Randomisation was assigned by drawing lots.
Allocation concealment (selection bias)	Low risk	Adequate, randomisation concealed in sealed in opaque envelopes.
Blinding (performance bias and detection bias) All outcomes	Low risk	Women were blind to their group allocation and study personnel collecting data were unaware of women's study group allocation.
Incomplete outcome data (attrition bias) All outcomes	Low risk	2 women were excluded from the control group because they delivered prior to the intervention being administered.
Selective reporting (reporting bias)	Unclear risk	Study protocol unavailable.
Other bias	High risk	There was an imbalance in parity at baseline.

Ziaei 2006

Methods	Randomised controlled trial of acupuncture compared with placebo acupuncture and no intervention.
Participants	90 women were recruited from a hospital in Tehran, Iran. Inclusion criteria: were normal singleton pregnancy of 37 weeks or longer and a spontaneous onset of labour, cephalic version, cervical dilatation of 3-6 cm.
Interventions	Acupuncture (30 women): solid titanium needles GV20, Yingtang, ST36, SP6, LI4, CV2, 3. Needle insertion began when pre-treatment pain score of 3 or higher was reached. A feeling of de qi was obtained. Nedles left in place until delivery. Control group 1 (30 women): 'pretend' acupuncture, solid titanium needles of same type as intervention, inserted at 6 points normally used for vaccinations and other injections. Control group 2 (30 women): npo intervention.
Outcomes	Pain intensity, relaxation, duration of labour, need for augmentation by oxytocin, caesarean delivery.
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	The study was randomised but unclear methods in the brief communication.
Allocation concealment (selection bias)	Unclear risk	The study was randomised but unclear methods in the brief communication.
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Women were blind to their group allocation. The study practitioner was not blind to group allocation. The status of the outcome assessor and analyst was unclear.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient reporting.
Selective reporting (reporting bias)	Unclear risk	Insufficient reporting.
Other bias	Unclear risk	Insufficient reporting.

TENS: transcutaneous electrical nerve stimulation
VAS: visual analogue scale

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Bo 2006	We were unable to establish study details to determine details of randomisation, blinding and data completeness.
Deen 1985	We were unable to establish study details to determine the exact study design.
Li 2006	We were unable to confirm if the study was a randomised controlled trial following communication with the authors.
Li 1996	This trial evaluated the effect of 2 acupuncture points on the strength and timing of uterine contractions following acupuncture. It did not report on any primary outcomes relevant to this review by study group.
Park 2003	Abstract only published. Insufficient data reported to assess if eligibility criteria met.
Shalev 1991	25 women recruited during labour at a maternity hospital in Israel. 13 women randomised to receive electroacupuncture and 12 women received no analgesia at the start of the active phase of labour (cervical dilatation 4 cm, effacement 60%). The study reported on beta endorphin levels and did not report on any measures relevant to this review.
Shang 1995	In this trial of 161 women, the effect of acupuncture on Hegu point was examined in relation to the length of the second stage of labour and the amount of postpartum bleeding. The study was excluded as it did not examine the effect on pain relief.
Ternov 1998	We were unable to establish the study design quasi-random or a controlled clinical trial.
Zhang 2000	The evaluation of point injection therapy did not meet our eligibility criteria.

Characteristics of studies awaiting assessment *[ordered by study ID]*

Fei 1985

Methods	
Participants	
Interventions	
Outcomes	
Notes	Awaiting translation.

Su 2001

Methods	
Participants	
Interventions	
Outcomes	
Notes	Awaiting translation.

Wang 1994

Methods	
Participants	
Interventions	
Outcomes	
Notes	Awaiting translation.

Xu 2000

Methods	
Participants	
Interventions	
Outcomes	
Notes	Awaiting translation.

Zhang 2002

Methods	
Participants	
Interventions	
Outcomes	
Notes	Awaiting translation.

Characteristics of ongoing studies *[ordered by study ID]*

MacKenzie 2005

Trial name or title	Acupuncture for pain relief during induced labour for nulliparae.
Methods	Randomised controlled trial, double blind (subject, caregiver, outcome assessor).
Participants	105 women aged 18 years of greater, nulliparous having an induction of labour for prolonged pregnancy or mild hypertension, no previous experience of acupuncture.
Interventions	No details reported.
Outcomes	Use of epidural.
Starting date	August 2005
Contact information	IZ MacKenzie, University of Oxford.
Notes	Recruitment complete.

Martensson 2008

Trial name or title	Acupuncture to reduce labour pain.
Methods	Randomised controlled trial of electro-acupuncture compared with manual acupuncture.
Participants	300 Swedish women admitted to labour ward in spontaneous labour (latent or active labour phase). Nulliparous, singleton pregnancy, cephalic presentation, gestation 37+0 to 41.6 weeks and days, with an expressed need for pain relief, Swedish speaking. Exclusion criteria: no pharmacological pain relief within 24 hours prior to inclusion in the study, pre-eclampsia, treatment with oxytocin at the time of randomisation, use of anticoagulants, pacemaker.
Interventions	Manual acupuncture compared with electro-acupuncture.
Outcomes	Experience of labour pain, use of epidural.
Starting date	October 2008.
Contact information	Dr Lena Martensson, University of Skovde, lena.martensson@his.se, phone +46500448000.
Notes	Recruiting.

Mohamadinia 2008

Trial name or title	Comparing Hoku point (LI4) acupressure and San-Yin-Jiao (SP6) acupressure on labour pain and length of delivery time in nulliparous women in Iran hospital 2008-2009.
Methods	Randomised single blind trial.
Participants	60 Iranian women in active labour, with a gestational age between 38-42 weeks, singleton pregnancy, cephalic presentation, primiparous, good health, planning a vaginal delivery. Exclusion criteria: psychotic and diagnosed anatomic disorder, chronic disease inflammation or eczema in the acupressure region, gestational diabetes, polyhydramnios, reduced fetal movements, intrauterine growth restriction, fetal death, history of chronic pelvic pain, abnormal fetal heart rate, taking psychotherapeutic medication.
Interventions	Intervention administered over 20 minutes.
Outcomes	Labour pain, duration of labour.
Starting date	January 2008.
Contact information	Mrs Neda Mohamadina, Midwifery Dept, Iranshahr Faculty of Medical Sciences, Iranshahr, Iran. Phone 00985473310482, email Tahninehslehian@yahoo.com
Notes	Recruitment complete.

DATA AND ANALYSES

Comparison 1. Acupuncture versus control

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain intensity	4		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Placebo control	2	240	Std. Mean Difference (IV, Fixed, 95% CI)	0.04 [-0.22, 0.30]
1.2 Standard care	1	90	Std. Mean Difference (IV, Fixed, 95% CI)	-0.14 [-0.55, 0.28]
1.3 No treatment	1	163	Std. Mean Difference (IV, Fixed, 95% CI)	1.00 [-1.33, -0.67]
2 Satisfaction with pain relief in labour	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
2.1 Placebo control	1	150	Risk Ratio (M-H, Fixed, 95% CI)	2.38 [1.78, 3.19]
2.2 Standard care	1	90	Risk Ratio (M-H, Fixed, 95% CI)	1.08 [0.95, 1.22]
3 Use of pharmacological analgesia	5		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
3.1 Placebo control	1	208	Risk Ratio (M-H, Random, 95% CI)	0.72 [0.58, 0.88]
3.2 Standard care	3	704	Risk Ratio (M-H, Random, 95% CI)	0.68 [0.56, 0.83]
3.3 Water injection	1	128	Risk Ratio (M-H, Random, 95% CI)	0.84 [0.54, 1.30]
4 Caesarean section	7		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
4.1 Placebo control	3	448	Risk Ratio (M-H, Fixed, 95% CI)	1.39 [0.62, 3.10]
4.2 Standard care	2	506	Risk Ratio (M-H, Fixed, 95% CI)	0.86 [0.47, 1.60]
4.3 No treatment	1	163	Risk Ratio (M-H, Fixed, 95% CI)	0.76 [0.35, 1.63]
4.4 Water injection	1	128	Risk Ratio (M-H, Fixed, 95% CI)	1.33 [0.37, 4.73]
5 Assisted vaginal birth	6		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
5.1 Placebo control	1	208	Risk Ratio (M-H, Fixed, 95% CI)	0.64 [0.27, 1.50]
5.2 Standard care	3	704	Risk Ratio (M-H, Fixed, 95% CI)	0.67 [0.46, 0.98]
5.3 No treatment	1	163	Risk Ratio (M-H, Fixed, 95% CI)	0.49 [0.18, 1.38]
5.4 Water injection	1	128	Risk Ratio (M-H, Fixed, 95% CI)	1.60 [0.47, 5.39]
6 Apgar score < 7 at 5 minutes	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
6.1 Placebo control	1	208	Risk Ratio (M-H, Fixed, 95% CI)	0.32 [0.01, 7.79]
6.2 Standard care	3	706	Risk Ratio (M-H, Fixed, 95% CI)	0.60 [0.12, 2.99]
7 Spontaneous vaginal delivery	3		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
7.1 Placebo control	2	358	Risk Ratio (M-H, Random, 95% CI)	1.00 [0.87, 1.14]
7.2 Standard care	1	90	Risk Ratio (M-H, Random, 95% CI)	0.98 [0.89, 1.08]
8 Augmentation with oxytocin	5		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
8.1 Placebo control	2	358	Risk Ratio (M-H, Random, 95% CI)	0.62 [0.15, 2.52]
8.2 Standard care	2	506	Risk Ratio (M-H, Random, 95% CI)	0.88 [0.72, 1.08]
8.3 Water injection	1	128	Risk Ratio (M-H, Random, 95% CI)	1.16 [0.85, 1.58]
9 Relaxation	3		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
9.1 placebo control	1	90	Std. Mean Difference (IV, Fixed, 95% CI)	-0.27 [-0.72, 0.17]
9.2 Standard care	1	90	Std. Mean Difference (IV, Fixed, 95% CI)	-0.51 [-0.93, -0.09]
9.3 Water injection	1	128	Std. Mean Difference (IV, Fixed, 95% CI)	0.55 [0.20, 0.91]

Comparison 2. Acupressure versus control

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain intensity	3		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 Placebo control	1	120	Std. Mean Difference (IV, Random, 95% CI)	-0.55 [-0.92, -0.19]
1.2 Combined control	2	322	Std. Mean Difference (IV, Random, 95% CI)	-0.42 [-0.65, -0.18]
2 Satisfaction with childbirth	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Combined control	1	211	Mean Difference (IV, Fixed, 95% CI)	4.80 [-2.29, 11.89]
3 Use of pharmacological analgesia	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
3.1 Placebo control	1	75	Risk Ratio (M-H, Fixed, 95% CI)	0.54 [0.20, 1.43]
3.2 Combined control	1	212	Risk Ratio (M-H, Fixed, 95% CI)	0.94 [0.71, 1.25]
4 Caesarean section	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
4.1 Placebo control	1	120	Risk Ratio (M-H, Fixed, 95% CI)	0.24 [0.11, 0.54]
4.2 Combined control	1	212	Risk Ratio (M-H, Fixed, 95% CI)	0.48 [0.22, 1.04]
5 Assisted vaginal birth	1		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
5.1 Combined control	1	212	Risk Ratio (M-H, Fixed, 95% CI)	0.81 [0.39, 1.67]
6 Apgar score < 7 at 5 minutes	1	120	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.1 Placebo control	1	120	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7 Augmentation with oxytocin	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
7.1 Placebo control	1	120	Risk Ratio (M-H, Fixed, 95% CI)	0.66 [0.46, 0.94]
7.2 Combined control	1	212	Risk Ratio (M-H, Fixed, 95% CI)	1.01 [0.77, 1.31]
8 Length of labour	2		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
8.1 Placebo control	2	195	Std. Mean Difference (IV, Random, 95% CI)	-1.06 [-1.74, -0.38]
9 Anxiety	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
9.1 Placebo control	1	75	Mean Difference (IV, Fixed, 95% CI)	-1.40 [-2.51, -0.29]

WHAT'S NEW

Last assessed as up-to-date: 1 February 2011.

Date	Event	Description
1 July 2011	Amended	We deleted "however, there was significant heterogeneity" from the Results section within the Abstract because, according to Analysis 1.5, assisted vaginal birth, there was no significant heterogeneity.

HISTORY

Review first published: Issue 7, 2011

CONTRIBUTIONS OF AUTHORS

Caroline Smith and Carmel Collins conceptualised and wrote the protocol, reviewed trials, performed data extraction and jointly wrote the review and its update. Caroline Smith is the guarantor of the review. Caroline Crowther commented on each draft of the protocol and review and its update. Kate Levett performed data extraction and commented on the review.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- The University of Adelaide, Adelaide, Australia.
- Child Health Research Institute, Australia.
- Child, Youth and Women's Health Services, Adelaide, Australia.

External sources

- No sources of support supplied

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

This updated review differs from the previously published Cochrane systematic review 'Complementary and alternative therapies for pain management in labour' (Smith 2006). This review has now been revised to three separate reviews.

NOTES

This new review is one of three which, collectively, update the previous review on a range of complementary therapies (Smith 2006). This review includes only trials of acupuncture or acupressure.

INDEX TERMS

Medical Subject Headings (MeSH)

Acupressure [*methods]; Acupuncture Therapy [*methods]; Analgesia, Obstetrical [*methods]; Labor Pain [*therapy]; Randomized Controlled Trials as Topic

MeSH check words

Female; Humans; Pregnancy