BMJ Open

Acupuncture for chronic knee pain: a protocol for an updated systematic review

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To cite: Zhang Q, Yue J, Sun Z, *et al*. Acupuncture for chronic knee pain: a protocol for an updated systematic review. *BMJ Open* 2016;**6**: e008027. doi:10.1136/bmjopen-2015-008027

► Prepublication history for this paper is available online. To view these files please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2015-008027).

Received 21 February 2015
Revised 9 July 2015
Accepted 16 July 2015

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ABSTRACT

Introduction: The aim of this study is to evaluate the efficacy and safety of acupuncture for patients with chronic knee pain.

Methods and analysis: MEDLINE, EMBASE, CENTERAL, CINAHL and four Chinese medical databases will be searched from their inception to present. We will also manually retrieve eligible studies. Randomised controlled trials (RCTs) in which acupuncture is assessed as the sole treatment or as an adjunct treatment for chronic knee pain will be included. The primary outcome of our analysis is pain measured by the visual analogue scale (VAS), the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain subscale or the 11-point numeric rating scale (NRS). The secondary outcomes will include the quality of life, measured by the 36-item Short-Form Health Survey (SF-36) and adverse events. Two researchers will conduct the study selection, data extraction and quality assessment independently. Any disagreement will be resolved through discussion with a third reviewer. The Cochrane risk-of-bias criteria and the Standards for Reporting Interventions in Controlled Trials of Acupuncture (STRICTA) checklist will be used to assess the methodological quality of the trials.

Dissemination: This systematic review will assess the current evidence on acupuncture therapy for chronic knee pain. It uses aggregated published data instead of individual patient data and does not require an ethical board review and approval. The findings will be published in a peer-reviewed journal and disseminated in conference presentations. It will provide the latest analysis of the currently available evidence for acupuncture treating chronic knee pain.

Trial registration number: CRD42014015514.

INTRODUCTION

Chronic knee pain affects 46.8% of older adults and is the most commonly reported cause of pain in this population,[1 2] especially among people aged 50–69 years.[3 4] Knee pain is typically caused by knee joint osteoarthritis and frequently leads to functional limitations, which is often accompanied by psychological impairment[5] and a decreased quality of life. Pharmacological therapy may offer some limited benefit for patients with chronic knee pain, but it can also cause serious adverse effects.[6] Joint replacement and other surgeries are an effective way to treat patients with advanced disease.[7] However, surgery may be contraindicated in patients with significant comorbidities and is quite expensive.

Acupuncture therapy involves the insertion of disposable needles into specific points on the body surface known as acupuncture points, or acupoints.[8] It has a relatively high safety profile when performed by qualified acupuncturists.[9 10]

Acupuncture is widely used to treat a variety of conditions, such as pressure ulcers,[11] neck pain,[12] chronic knee pain[13 14] and others. It is a popular treatment for pain associated with osteoarthritis. For example, a study reported that 61% of patients with osteoarthritis had used acupuncture in the UK.[15] However, whether acupuncture actually reduces chronic knee pain remains controversial. Proponents argue that acupuncture is effective at relieving symptoms and chronic pain, while improving the quality of life.[13 14 16] In addition, acupuncture is associated with fewer adverse effects than conventional medical approaches for treating chronic knee pain. However, a recent study[17] in the *Journal of the American Medical Association* (*JAMA*) concluded that acupuncture negatively affected chronic knee pain, though the study had several shortcomings in its clinical design.[18–25]

The efficacy of acupuncture for chronic knee pain has been evaluated in several previous systematic reviews.[12 14 26] All those studies failed to include all of the relevant articles published in China.[12 14 26] Furthermore, new papers have been published since those reviews.[17] The most recent systematic review and meta-analysis of acupuncture for chronic knee pain found that

acupuncture can significantly reduce pain intensity and improve functional mobility and the quality of life.[27] However, this conclusion was based in part on data of pain intensity that was incorrectly pooled from four studies. In addition, the heterogeneity of the pooled data for functional mobility was excessively high. These weaknesses limit the veracity of the study conclusions. Therefore, this systematic review aims to update the previous systematic review and to further critically assess the efficacy and safety of acupuncture for chronic knee pain with the inclusion of additional studies.

OBJECTIVES

We will conduct a systematic review to assess the efficacy and safety of acupuncture for chronic knee pain. We want to establish at the study population level to determine whether real acupuncture is superior to no-acupuncture control for treating knee pain.

METHODS/DESIGNS

Phase I: systematic review to identify eligible papers

Study registration

The protocol for this systematic review is registered with PROSPERO 2014 (registration number: CRD42014015514). This protocol is conducted and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) statement guidelines,[28] while our review will be operated depending on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines.[29]

Trial eligibility criteria

Study types

We will consider randomised controlled trials (RCTs) comparing acupuncture with non-acupuncture in patients with chronic knee pain. Non-randomised studies will be excluded.

Participants

Patients of any age, gender or ethnicity described as having chronic knee pain will be included.

Sample size

The study should have a formal sample size determination prior to the trial implementation.

Interventions

Any type of acupuncture used as the sole treatment or as a significant adjunct to other treatments for chronic knee pain will be included, such as acupuncture compared with non-acupuncture, or acupuncture combined with another intervention (non-acupuncture) compared with the other treatment alone (the same as the acupuncture group).

Outcome measures

Primary outcomes

Chronic knee pain will be assessed by the visual analogue scale (VAS) (0–100),[30] the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score pain subscale[31 32] or the 11-point numeric rating scale (NRS).[33]

Secondary outcomes

Quality of life will be measured by the 36-item Short-Form Health Survey (SF-36).[34] In addition, any adverse events will be recorded.

Search methods to identify studies

We will electronically search the following databases from their inception through present: MEDLINE, EMBASE, CENTERAL, CINAHL, the Chinese Biomedical Literature Database (CBM), the China National Knowledge Infrastructure (CNKI), VIP Information (VIP) and Wanfang Data (WAN FANG). We will also retrieve unpublished protocols and summary results through a search of the clinical trial registry at https://clinicaltrials.gov/. The provisional search strategy has been decided after discussion with all reviewers. The keywords will include 'pain', 'knee', 'knee pain', 'chronic knee pain', 'arthritis', 'osteoarthritis', 'rheumatology', 'acupuncture', 'acupuncture therapy', 'manual acupuncture', 'electroacupuncture' or 'scalp acupuncture'. The search words to be used in the Chinese databases have the same meaning as those used in the English databases. In addition, we will search the reference lists of previously published reviews related to chronic knee pain and acupuncture.

Phase II: trial evaluation and data collection

Study selection

Studies will be selected independently by two reviewers (JY and QZ). Disagreements will be resolved with a third reviewer (ZS or YL) through discussion. No language restrictions will be imposed. The entire process of study selection is summarised in the PRISMA flow diagram (figure 1).

Data extraction

All included trials will be read by two reviewers (JY and QZ) independently, and the data will be extracted using a predefined data extraction sheet. The extracted data will include the author, title, publication year, journal, country, participant characteristics, study size, randomisation, allocation concealment, blinding, acupuncture intervention, control intervention, main outcomes, adverse effects, follow-up, withdrawals, conflicts of interest and the Standards for Reporting Interventions in Controlled Trials of Acupuncture (STRICTA) checklist.

Quality assessment

Quality will be assessed using the Cochrane risk-of-bias tool outlined in the Cochrane Handbook for Systematic

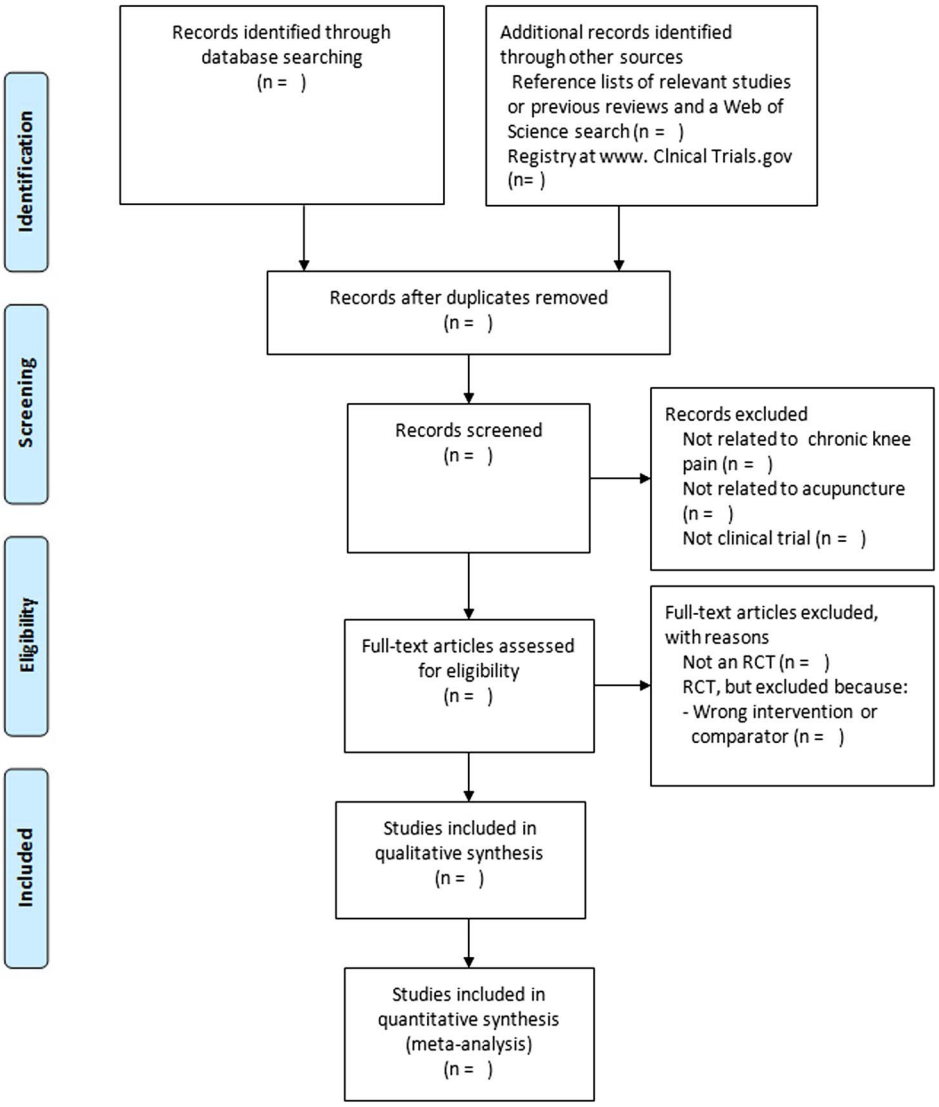

Figure 1 Flow diagram of the trial selection process. RCT, randomised controlled trial.

Reviews of Interventions[35] and completeness of STRICTA checklist independently by two reviewers (YH and ZH). All discrepancies will be resolved by discussion with the fourth author (YL).

Measures of treatment effect

For continuous outcomes such as pain scales, the mean difference (MD) with a 95% CI will be used. Other forms of continuous data will be converted into MD values. For dichotomous data (eg, adverse events), a risk ratio (RR) with a 95% CI will be used. Other binary data will be converted into an RR value.

Unit of analysis concerns

We will not include cluster-randomised trials and cross-over studies because they lack the appropriate design for the study objectives.

Missing data

We will contact the original study authors for missing data whenever possible. Only the available data will be analysed if it is not possible to acquire the missing data.

Phase III: statistical methods

Data synthesis

We will use the random-effects or fixed-effects model for the meta-analysis, if possible. Review Manager (V.5.3) software (Review Manager (RevMan) [Computer program], Version 5.3; Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014) (The Cochrane Collaboration, Oxford, England) will be used to conduct the meta-analysis and calculate the RR with the 95% CI for dichotomous data, and the MD with the 95% CI for continuous data. If heterogeneity is not high ($I^2 \leq 50\%$), then the RR and MD will be calculated by the fixed-effects model; otherwise, the random-effects model will be used. If quantitative synthesis is not appropriate, we will report the results as the narrative description.

Assessment of heterogeneity

Heterogeneity will be investigated by the I^2 and χ^2 tests. Significant heterogeneity will be assumed if I^2 is >50%, which is the cut-off point for our I^2 statistical analysis.[36] If significant heterogeneity is observed, then we will conduct a subgroup analysis to explore the possible causes.[36]

Subgroup analysis

Subgroup analysis will be performed to assess the heterogeneity between the studies. The analysis will include the acupuncture type (including manual acupuncture and electroacupuncture), type of control, countries and different outcomes.

Sensitivity analysis

Sensitivity analysis will be conducted by removing the impact of lower quality studies if heterogeneity remains after subgroup analysis or studies with incomplete results according to the STRICTA checklist. The meta-analysis will be repeated after lower quality studies are excluded. The results of these two meta-analyses will then be compared and discussed according to their sample size, strength of evidence and influence on the pooled effect size.

Assessment of reporting biases

If a sufficient number of included studies (at least 10 trials) are available, then the publication bias will be evaluated using funnel plots.[37] We will also examine impacts of possible selective reporting, reporting deviations from the original protocols, effect of protocol compliance and adherence.

DISCUSSION

Acupuncture therapy is a suggested alternative intervention to treat chronic knee pain. This systematic review will provide a detailed summary of the current evidence for the effects of acupuncture on chronic knee pain. However, this study might suffer from high heterogeneity, potential missing data and meta-biases, which may limit the quality of evidence. As our review will be based on aggregated trial data and primary focuses on the treatment effect of acupuncture, we may not have sufficient information to address efficacy at different causes of knee pain. Nonetheless, the results of this study will provide the latest analysis of the currently aggregated evidence for the efficacy of acupuncture in treating chronic knee pain, which will benefit practitioners, patients and healthcare policy-makers.

Contributors QZ, JY, ZS and YL conceived the study, designed the study protocol and drafted the manuscript. All authors contributed to the further writing of the manuscript as well as read and approved the final manuscript.

Funding The first author was supported by the Foundation of Heilongjiang University of Chinese Medicine (number 2012RCQ64) and the Foundation of Graduate Innovative Plan of Heilongjiang Province (number YJSCX2012-357HLJ).

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

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