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REVIEW

Acupuncture Therapy for Sciatica: An Overview of Systematic Reviews and Meta-Analysis

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Purpose: Acupuncture shows potential as a treatment for sciatica, but the credibility and consistency of supporting evidence remain unclear, warranting critical and comprehensive evaluation. This overview is aims to assess the reliability, adequacy, and limitations of current evidence on acupuncture for sciatica using a multidimensional approach and further examine its efficacy through a secondary meta-analysis.

Methods: Systematic reviews and meta-analyses (SRs/MAs) meeting PICOS criteria were identified from eight databases by two independent reviewers. Evidence reliability was assessed using AMSTAR-2, ROBIS, PRISMA-A, and the GROOVE tool across four domains: methodological quality, bias risk, reporting accuracy, and study overlap. Duplicate randomized controlled trials (RCTs) were excluded based on the Corrected Covered Area (CCA) analysis, and a secondary meta-analysis was conducted. Sensitivity analyses and funnel plots assessed robustness and publication bias.

Results: Seven SRs/MAs were included. AMSTAR-2 revealed significant methodological flaws, particularly due to a lack of protocol pre-registration. ROBIS assessments showed a high risk of bias, with most studies relying on single-database searches and lacking comprehensive strategies. PRISMA-A indicated generally low reporting quality, especially regarding descriptions of acupuncture sensation. The GROOVE tool yielded a CCA of 7.23%, reflecting moderate study overlap. The secondary meta-analysis showed that acupuncture significantly improved treatment effectiveness (RR = 1.23; 95% CI: 1.20–1.26; $P = 0.008$), reduced pain intensity, and increased pain threshold. Sensitivity analyses confirmed the robustness of results, while funnel plots suggested some publication bias. Acupuncture was generally considered safe across studies.

Conclusion: Although current evidence is limited by methodological flaws, publication bias, and poor reporting quality, acupuncture shows promising clinical potential for sciatica. High-quality, rigorously designed studies are needed to confirm its efficacy.

Keywords: acupuncture, sciatica, meta-analysis, systematic review, evidence synthesis, complementary therapy

Introduction

Sciatica is a neuropathic pain syndrome resulting from inflammatory injury or mechanical compression of the lumbosacral nerve roots (L4–S1). It typically presents as radiating pain from the buttocks down the leg along nerve distribution and may be accompanied by sensory disturbances and motor dysfunction.[1] Although symptoms may resolve spontaneously in some cases, only 55% of individuals with sciatica experience meaningful clinical improvement within 1 year of onset.[2] Approximately 34% of affected individuals develop chronic pain lasting beyond 2 years,[3] which may lead to neurological deficits or motor impairments and severely reduce patients' quality of life.[4] In addition, the financial burden of long-term treatment further complicates disease management.

Conservative therapies, such as functional exercises and spinal manipulation, remain the first-line approach for managing sciatica symptoms.[1] However, the effectiveness of conservative treatment remains controversial, as several meta-analyses have reported no significant improvement in sciatica symptoms.[5,6] Commonly prescribed analgesics— including nonsteroidal

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anti-inflammatory drugs (NSAIDs), opioids, and corticosteroids—are frequently associated with adverse events such as nausea, vomiting, and palpitations, which often compromise treatment adherence.[7] Moreover, several studies have found that these medications offer limited benefits in reducing pain or disability.[8] Given these limitations, there is a pressing need to identify safe, effective, and affordable adjunctive therapies.

Acupuncture, a core modality in traditional Chinese medicine, involves the insertion of fine needles into specific acupoints to elicit the "Deqi" sensation, to contribute to therapeutic effects. Its potential efficacy in sciatica has been preliminarily demonstrated in several clinical studies.[9–11] A recent high-quality trial reported that, compared with sham acupuncture, acupuncture significantly improved treatment effectiveness, reduced pain intensity, increased pain threshold, and enhanced functional outcomes in patients with sciatica.[10] Despite growing evidence supporting acupuncture, inconsistencies across studies highlight the need to comprehensively evaluate its reliability, limitations, and methodological shortcomings to inform future research. A prior evidence review conducted in 2015[12] lacked methodological depth due to the limited use of evaluation tools. Since the emergence of new studies, an updated and more rigorous synthesis is warranted.

Therefore, this overview aims to evaluate the current body of evidence on acupuncture for sciatica from a multidimensional perspective, incorporating assessment of methodological quality, reporting standards, and study overlap. A secondary meta-analysis was conducted to synthesize efficacy outcomes. The goal is to identify limitations in existing research and provide clearer guidance for future studies and clinical decision-making.

Methods

This overview was conducted in accordance with the PRIOR reporting guidelines.[13] The initial draft was prepared by one author (ZJW) and subsequently reviewed and revised by another (GZN).

Protocol and Registration

This protocol for this overview was pre-registered in the International Prospective Register of Systematic Reviews (PROSPERO), under registration number CRD42024619007 (http://www.crd.yorkac.uk/PROSPERO/).

Search Strategy

A total of eight databases were searched, including four Chinese databases— China National Knowledge Infrastructure (CNKI), Wanfang, Technology Journal Database (VIP), and Sinomed—and four English databases: PubMed, Embase, Web of Science (WOS), and the Cochrane Library. Two researchers (ZJW and WLY) independently conducted the search, covering the period from each database's inception to November 26, 2024, and updated the search when necessary.

The search strategy included both Medical Subject Heading (MeSH) and free-text terms. Key MeSH terms included "Sciatica" "Sciatic Neuralgias" "Acupuncture" "Systematic review" and "Meta-analysis" and were adapted as appropriate for each database. All search strategies were reviewed by a third investigator (GZN) to ensure consensus and completeness. Manual searches and reference list screening were performed to minimize the risk of missing relevant literature. An example of the PubMed search strategy is presented in Table 1, while detailed strategies for all databases are provided in Supplementary Box 1.

Inclusion Criteria

Inclusion criteria were defined according to the Participants, Interventions, Comparisons, Outcomes, and Study design (PICOS) framework. All studies meeting these criteria were included for evaluation and analysis. Details of the PICOS framework are summarized in Table 2.

Exclusion Criteria

SRs/MAs were excluded if they included non-RCT study designs, case reports, narrative reviews, network MAs, etc.

Table 1 Search Strategy of PubMed

Search Number	Query
#1	("Acupuncture"[Mesh] OR "Acupuncture Therapy"[Mesh] OR "Acupuncture, Ear"[Mesh]) OR "Electroacupuncture"[Mesh]
#2	((((((((((Pharmacopuncture[Title/Abstract]) OR (Acupuncture Treatment[Title/Abstract])) OR (Therapy, Acupuncture[Title/Abstract])) OR (Pharmacoacupuncture Treatment[Title/Abstract])) OR (Pharmacoacupuncture Therapy[Title/Abstract])) OR (Acupotomy[Title/Abstract])) OR (Acupotomies[Title/Abstract])) OR (Acupunctures, Ear[Title/Abstract])) OR (Ear Acupunctures[Title/Abstract])) OR (Acupuncture, Auricular[Title/Abstract])) OR (Ear Acupuncture[Title/Abstract])
#3	#1 OR #2
#4	"Sciatica"[Mesh]
#5	((((((Neuralgia, Sciatic[Title/Abstract]) OR (Neuralgias, Sciatic[Title/Abstract])) OR (Sciatic Neuralgias[Title/Abstract])) OR (Sciatic Neuralgia[Title/Abstract])) OR (Sciatica, Bilateral[Title/Abstract])) OR (Bilateral Sciatica[Title/Abstract])) OR (Bilateral Sciaticas[Title/Abstract])
#6	#4 OR #5
#7	("Meta-Analysis" [Publication Type]) OR "Review" [Publication Type]
#8	((((((meta[Title/Abstract]) OR (meta analysis[Title/Abstract])) OR (review[Title/Abstract])) OR (search[Title/Abstract])) OR (Review, Systematic[Title/Abstract])) OR (Umbrella Review[Title/Abstract])) OR (systematic review[Title/Abstract])
#9	#7 OR #8
#10	#3 AND #6 AND #9

Table 2 The PICOS of Inclusion Criteria

PICOS	Inclusion Criteria
Patient (P)	Patients diagnosed with Sciatica (No restriction on age, sex, and country)
Intervention (I)	1. Acupuncture therapy as a sole treatment 2. Acupuncture therapy as an adjunct to standard therapy (eg acupuncture therapy combined with standard care/conventional treatment)
Comparison (C)	Control group treatment, including sham acupuncture, standard care, and conventional treatment/no treatment.
Outcome (O)	Primary outcomes: Treatment effectiveness Secondary outcomes: 1. Pain Intensity 2. Pain Threshold value 3. Adverse event
Study type and others (S)	1. Only SRs /MAs of RCTs are included. 2. Language is not restricted.

Study Selection

The screening process was conducted in three stages: (1) All retrieved records were imported into EndNote 21.0, where initial deduplication was performed using the software's built-in function, followed by manual removal of remaining duplicates; (2) Titles and abstracts were reviewed, and studies that did not meet the inclusion criteria based on the PICOS framework were excluded; (3) Full texts were assessed for final inclusion, and reasons for exclusion were documented. Two reviewers (ZJW and WLY) conducted the screening independently. Disagreements or uncertain cases were resolved through discussion with a third reviewer (GZN). A list of excluded studies and reasons for exclusion is provided in Supplementary Table S1.

Data Extraction

Data was extracted using a pre-designed form in Microsoft Office Excel 2021 and included general study characteristics and statistical outcomes. Extracted study characteristics included authors, publication year, country, sample size, trial registration, acupuncture type, and outcome measures. Statistical data from the original RCTs were also collected for

secondary statistical analysis, including sample sizes, means, and standard deviations (SDs). Study authors were contacted for clarification in cases of missing or unclear data. Two reviewers (ZJW and WLY) independently extracted all data, followed by cross-checking for accuracy. Discrepancies were resolved in consultation with a third reviewer (GZN).

Methodological Quality Assessment of SRs/MAs

The methodological quality of the included SRs/MAs was assessed using the AMSTAR-2,[14] which comprises 16 items designed to evaluate methodological rigor from multiple dimensions. Seven items (2, 4, 7, 9, 11, 13, and 15) are considered critical domains. Each item is rated as "Yes" "Partial Yes" or "No." According to AMSTAR-2 guidelines, reviews with no critical flaws and no more than one non-critical weakness are rated as high quality; those with two or more non-critical flaws are rated as moderate quality; reviews with one critical flaw are considered low quality; and those with two or more critical flaws are rated as very low quality. Two independent reviewers (ZJW and WLY) conducted the assessments using the official AMSTAR-2 website (www.amstar.ca). Any disagreements were discussed and resolved in consultation with a third reviewer (GZN) based on the AMSTAR 2 guidance document, ensuring objectivity, accuracy, and consistency. Final result were used to visually summarized via bar charts.

Risk of Bias

ROBIS is a specialized evaluation tool for assessing the risk of bias in SRs/MAs.[15] It evaluates two main dimensions: relevance and risk of bias. The latter comprises four domains, with each domain rated as "Yes" "Probably Yes" "No" "Probably No" or "No information." The overall risk of bias is categorized as "low" "high" or "unclear." Two reviewers (ZJW and WLY) independently conducted the ROBIS assessments, followed by cross-verification. Any discrepancies were resolved in consultation with a third reviewer (GZN) to ensure accuracy and objectivity. Final result were used to visually summarized by ROBVIS (www.riskofbias.info).

Reporting Quality Assessment

The PRISMA for Acupuncture (PRISMA-A) checklist is an extension of the PRISMA statement, developed to improve the reporting quality of systematic reviews in the field of acupuncture.[16,17] It consists of 27 items, including five new items and six modified elements addressing the title, basic rationale, search strategy, data extraction, study characteristics, and other relevant aspects. Each item is rated as "Yes" "Partially" or "No." Two evaluators (ZJW and WLY) independently assessed the reporting quality of the included SRs/MAs using the PRISMA-A checklist, followed by cross-checking. Discrepancies were discussed and, if necessary, resolved with input from a third reviewer (GZN). Final scores were converted to proportions and visually summarized by R 4.3.3.

Degree of Overlap Between SRs/MAs

The GROOVE tool was used to calculate the Corrected Coverage Area (CCA) and quantify the degree of overlap among SRs/MAs. The formula used to calculate is ("N" is the number of original studies in all SRs/MAs; "r" is the number of original studies; "c" is the number of SRs/MAs). The CCA was interpreted as follows: <5% indicates mild overlap, 5%–<10% moderate overlap, 10%–<15% high overlap, and ≥15% extremely high overlap. Two reviewers (ZJW and WLY) independently extracted citation data—including authors, publication year, and study title—and entered them into the GROOVE matrix. All data were cross-checked. Discrepancies were resolved through discussion with a third reviewer (GZN) to ensure data accuracy.

Data Statistical Analysis

Meta-analyses were performed using R Studio version 4.3.3 Dichotomous variables were expressed as relative risk (RR) with 95% confidence intervals (95% CI). In comparison, continuous variables were reported as mean difference (MD) or standardized mean difference (SMD) with 95% CI, depending on the consistency of measurement units across studies. Statistical significance was set at 0.05. Heterogeneity was assessed using the I^2, which quantifies the proportion of variation attributable to between-study differences rather than chance. $I^2 \leq 50\%$ indicated low heterogeneity, and values > 50%

indicated substantial heterogeneity. Depending on the degree of heterogeneity, either fixed-effects or random-effects models were applied. Subgroup analyses were conducted to explore sources of heterogeneity for highly heterogeneous outcomes. Sensitivity analyses were also performed using a one-by-one exclusion method. When ten or more studies were included, funnel plots were generated to evaluate potential publication bias, while the Egger's test and Begg's test were calculated with the meta package in R studio for further evaluation.

Results

Study Selection

A total of 1,204 records were retrieved through a comprehensive search of eight databases. After deduplication, 608 articles remained. Titles and abstract screening excluded 564 articles that did not meet the eligibility criteria. To ensure the timeliness of the literature search, we updated the search for relevant literature from November 26, 2024, to August 8, 2025. During the search process, we updated 60 articles, removed 18 duplicate articles, and the remaining 42 articles were all excluded because they did not meet the inclusion criteria. Finally, leaving 44 for full-text review. Of these, 37 were excluded—primarily for not being systematic reviews or meta-analyses—resulting in the inclusion of 7 SRs/MAs.[18–24] The screening process is illustrated in Figure 1, and detailed exclusion reasons are provided in Supplementary Table S1.

General Characteristics

A total of seven SRs/MAs were included, comprising one systematic review and six SRs/MAs. The studies were published between 2014 and 2024. Six were conducted in China, and one was a collaborative study between the

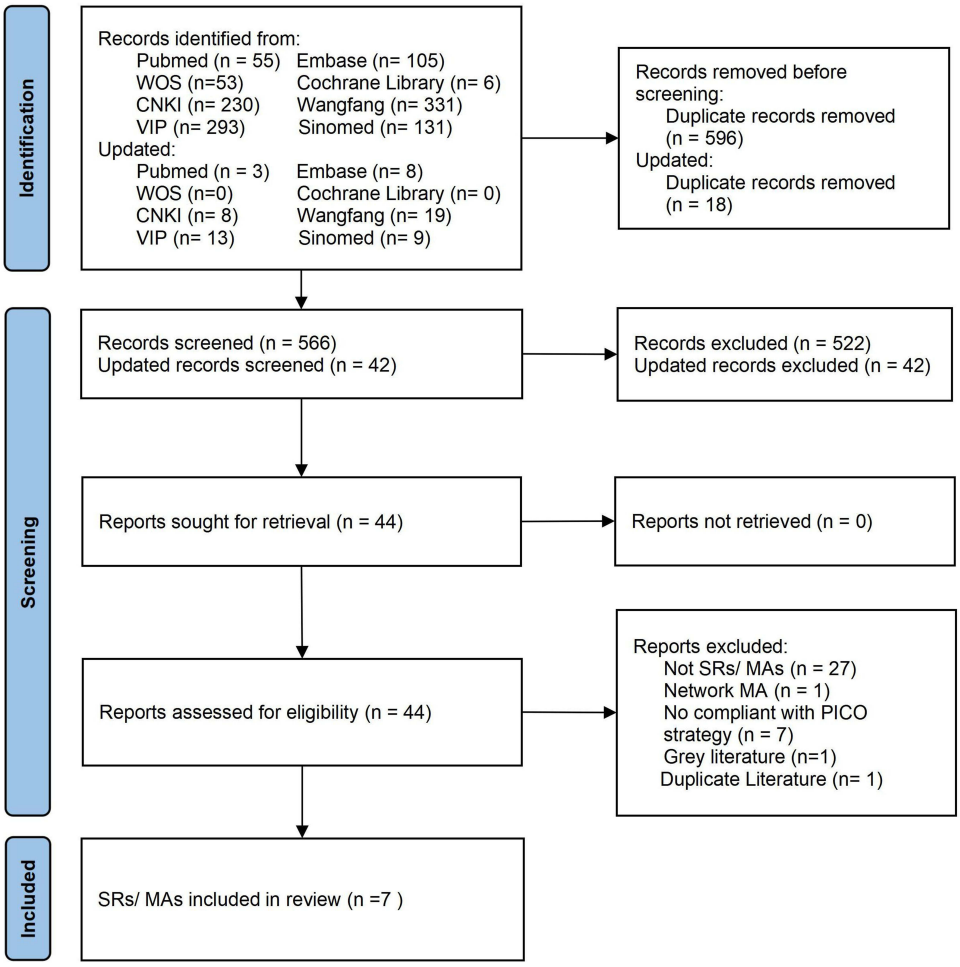

Figure 1 Flow diagram of screening process.

United States and South Korea. The number of RCTs included per review ranged from 5 to 30, with sample sizes varying from 482 to 2,707 participants. Acupuncture interventions included manual acupuncture, electroacupuncture, warm acupuncture, auricular acupuncture, and others. Intervention groups received acupuncture alone, acupuncture combined with medication, or acupuncture combined with conventional therapy. Control groups primarily received sham acupuncture, Western medicine treatment, and standard of care.

All reviews were evaluated using methodological tools such as the Cochrane risk of bias tool (ROB 1.0 and ROB 2.0), the Jadad scale, and, in one case, the CLEAR NPT tool—a non-conventional assessment method. Of the six meta-analyses, one did not conduct a heterogeneity analysis. Five studies evaluated the safety of acupuncture, while two did not report safety outcomes. Only three studies applied the STRICTA/CONSORT guidelines to assess the reporting quality of the included RCTs. Overall, the conclusions regarding acupuncture's effectiveness for sciatica varied across the seven SRs/MAs. Detailed study characteristics are presented in Table 3.

Methodological Quality Assessment

Methodological quality was assessed using the AMSTAR-2 tool. Five of the seven SRs/Mas were rated as "critically low" quality and two as "moderate" quality. The studies varied widely in methodological rigor. Among the critical items, major weaknesses included a lack of study protocol registration, insufficient reporting on study conduct, and the absence of excluded study lists. Specifically, 57.1% (n = 4) did not review the study protocol prior to conducting the research, and 61.4% (n = 5) did not report registration numbers. Furthermore, 85.7% (n = 6) did not clarify whether the study execution adhered to the original protocol or explained deviations. The same proportion failed to list excluded studies with corresponding reasons. One study employed the CLEAR NPT tool, which is not widely used in this context.

Regarding non-critical items, the most frequent issues involved unclear rationale for study selection, inadequate reporting of data extraction methods, and lack of transparency about funding. None of the studies (n = 7, 100%) explained the rationale for selecting specific study designs; three articles (42.9%) did not describe their data extraction methods; and none disclosed funding sources for the included RCTs. Details are presented in Table 4 and Figure 2.

Risk of Bias in SRs/MAs

The ROBIS tool was used to assess the risk of bias in the included SRs/MAs. All seven studies were rated as low risk in the first phase (relevance assessment). The second phase (bias risk assessment) covered four domains. In the first domain, four studies were rated high risk due to poorly defined inclusion and exclusion criteria and lack of appropriate restrictions, which may limit the applicability of findings. In the second domain, five studies were rated as high risk for relying solely on database searches, with no supplementary methods such as manual searching or trial registries. In contrast, all seven studies were rated low risk in the third domain (data collection and extraction). In the fourth domain (data synthesis and outcomes), two studies were rated high risk for failing to address potential bias in the included studies or ensure robustness of findings. One systematic review without a meta-analysis was rated as unclear in this domain.

In the final ROBIS phase, three studies were rated as having a low risk of bias. In contrast, four were rated high risk due to unresolved methodological concerns identified in earlier phases. Figures 3 and 4 display the distribution of domain ratings, and Table 5 provides detailed assessments for each study.

Report Quality of SRs/MAs

The SRs/MAs were assessed item by item using the PRISMA-A reporting checklist. Overall, reporting completeness was suboptimal. Reporting was relatively standardized (n = 7, 100%) for basic components such as titles, study selection, inclusion and exclusion criteria, study screening, limitations, and future directions. However, notable deficiencies were observed across other PRISMA-A items.

All studies provided structured abstracts (n = 7, 100%), but five failed to report a registration number. Most introductions lacked descriptions of acupuncture and failed to differentiate between acupuncture types. Regarding inclusion criteria, 85.7% (n = 6) of the studies clearly defined eligibility, but one study did not reference internationally recognized diagnostic criteria. PRISMA-A further recommends including diagnostic frameworks from traditional

Table 3 General Information of Included Studies

Study ID	Country	RCTs	Sample Size	Acupuncture Type	Control	Assessment Tool	STRICTA/ CONSORT	Data Analysis Method	Outcome	Safety	Protocol Register	Conclusion	Funding
Chao Han 2014[18]	China	19	2521	TA	Drug or other	CLEAR NPT	×	SR	×	×	×	Effective	×
Fanghan Cui 2024[24]	China	5	482	TA or MT	No restricted	Jadad	×	MA	①②③	Yes	×	Effective	No funding
Kyou-Hwan Han 2022[21]	USA, Korea	28	2707	TA	Drug	RoB 2.0	×	MA	①②③⑧	Hypodermal bleeding=2, heartbeat and fainting reaction=1	√	Effective	No funding
Mei Ji 2015[23]	China	12	1842	TA	Drug	ROB 1.0.	√	MA	①②③⑧	Hypodermal bleeding=2	×	Effective	√
Yiyan Han 2017[19]	China	14	1314	TA	Drug, TENS, Drug injection	Jadad	×	MA	①③	×	×	Effective	×
Zhihui Zhang 2023[22]	China	30	2662	TA or TA plus MT	Drug, SA	ROB 1.0, GRADE	√	MA	①②③④⑧	Yes	√	Effective	√
Zongshi Qin 2015[20]	China	11	962	TA	NT, SA, Drug	Cochrane Collaboration tool	√	MA	①②③⑤⑥⑦⑧	Hypodermal bleeding=5	√	Effective	×

Notes: √, indicated that the corresponding item was implemented in this study; ×, indicated that the corresponding item was not implemented in this study; ①, Treatment effectiveness; ②, Pain Intensity; ③, Pain threshold value; ⑤, Quality of life; ⑥, Physical examinations; ⑦, Patient satisfaction; ⑧, Withdrawal or adverse events.

Abbreviations: TA, Acupuncture; SA, Sham acupuncture; MT, moxibustion; TENS, Transcutaneous electrical stimulation; NT, no treatment.

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Table 4 AMSTAR-2 of Included SRs/MAs

Study ID	Chao Han 2014[18]	Fanghan Cui 2024[24]	Kyou-Hwan Han 2022[21]	Mei Ji 2015[23]	Yiyan Han 2017[19]	Zhihui Zhang 2023[22]	Zongshi Qin 2015[20]
Item 1	Y	Y	Y	Y	Y	Y	Y
Item 2*	N	N	PY	N	N	Y	Y
Item 3	N	N	N	N	N	N	N
Item 4*	PY	PY	PY	PY	PY	PY	PY
Item 5	Y	Y	Y	Y	Y	Y	N
Item 6	N	N	Y	Y	N	Y	Y
Item 7*	N	N	N	N	N	Y	N
Item 8	PY	PY	Y	Y	Y	Y	Y
Item 9*	PY	PY	Y	Y	PY	Y	Y
Item 10	N	N	N	N	N	N	N
Item 11*	NM	Y	Y	Y	Y	Y	Y
Item 12	NM	Y	Y	Y	Y	Y	Y
Item 13*	N	Y	N	Y	Y	Y	Y
Item 14	N	Y	Y	Y	Y	Y	Y
Item 15*	NM	Y	Y	Y	Y	Y	Y
Item 16	N	N	N	Y	N	Y	N
Quality	**Critically low**	**Critically low**	**Critically low**	**Critically low**	**Critically low**	**Moderate**	**Moderate**

Notes: 2*, 4*, 7*, 9*, 11*, 13*, and 15* were the key items.

medicine and terminology specific to acupuncture outcomes—an area largely omitted due to the limited uptake of PRISMA-A.

All studies reported database sources and basic search strategies, but some did not disclose strategies for each database. Most relied solely on database searches and did not employ supplementary methods such as reference tracking or registry searches.

Only a few studies included a list of excluded articles and reasons for exclusion. Three studies did not perform dual extraction during data extraction, increasing the risk of data inaccuracies in the raw data or final results. Although the original study's characteristics were generally described, few mentioned the "Deqi" sensation, a key feature in acupuncture research.

Regarding risk of bias and statistical analysis, most studies performed adequately. One systematic review, however, used the CLEAR NPT tool for quality assessment, which was not fully applicable due to the absence of meta-analysis. Regarding registration, only three studies reviewed a research protocol, and only two reported specific registration details. Three studies did not mention funding status, but only two provided detailed funding information. Comprehensive evaluation results are presented in Table 6 and Figure 5 (Figure 5A was the degree of completion of every items; Figure 5B was the total score of every studies).

Degree of Overlap Between SRs/MAs

The GROOVE tool was used to quantify overlap among the included SR/MA by calculating the CCA value based on a pre-designed matrix. The initial unadjusted overlap rate was 20.48%, while the corrected CCA was 7.23%, indicating a moderate level of redundancy overall.

A total of 119 RCTs were identified across SRs/MAs before deduplication, with 83 unique RCTs remaining afterward. Specifically, 1 RCT appeared in 4 SRs/MAs, 6 RCTs were found in 3 SRs/MAs, 21 RCTs were included in 2 SRs/MAs, and 55 RCTs were unique to individual reviews.

The overlap heatmap revealed two cross-comparisons with extremely high overlap (≥15%), with one reaching 34.9%. Three pairings showed high overlap (10%–<15%), three showed moderate overlap (5%–<10%) overlap, and the remaining showed mild overlap (<5%). Further details are provided in Table 7 and Figure 6.

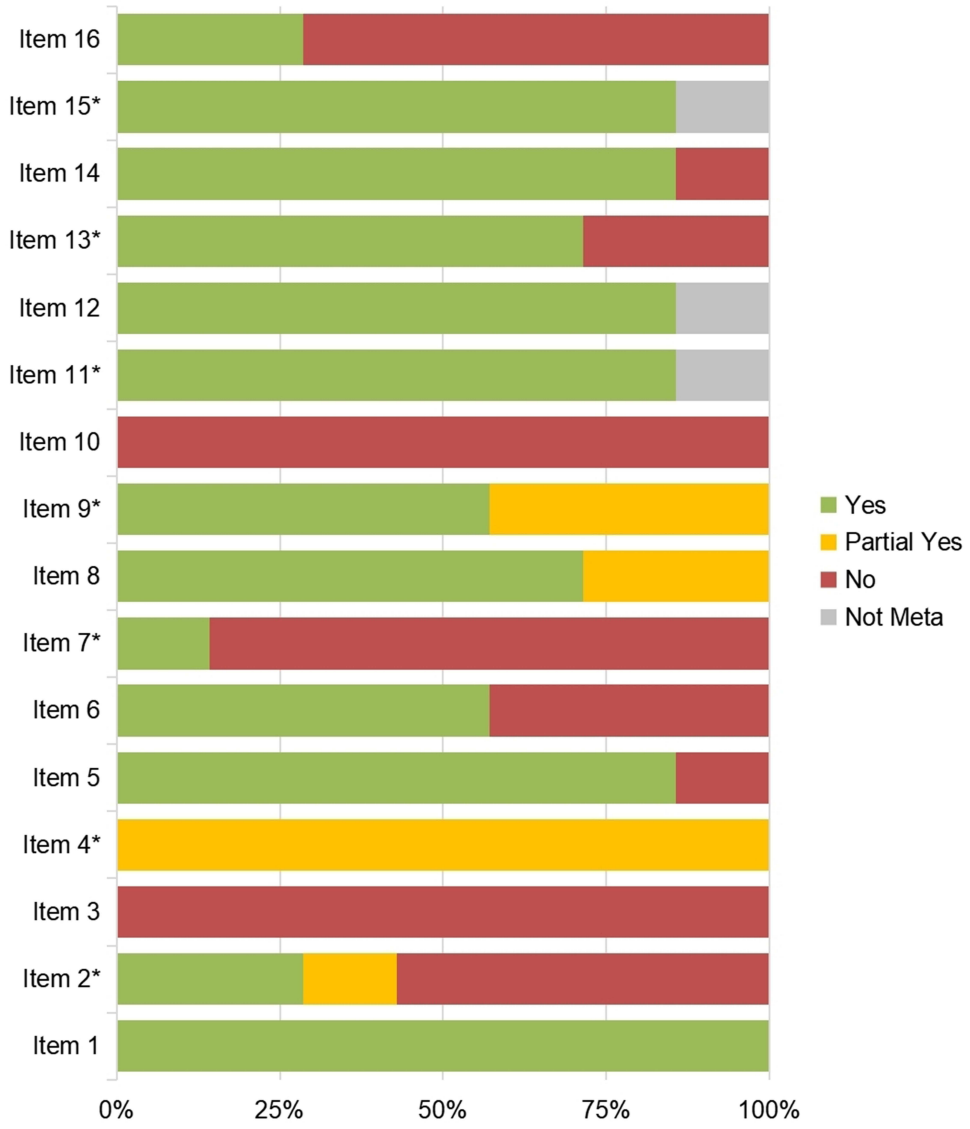

Figure 2 Overview of the AMSTAR-2.
Notes: The items (item 2, 4, 7, 9, 11, 13, and 15) with the symbol (*) are the critical domains in the AMSTAR-2.

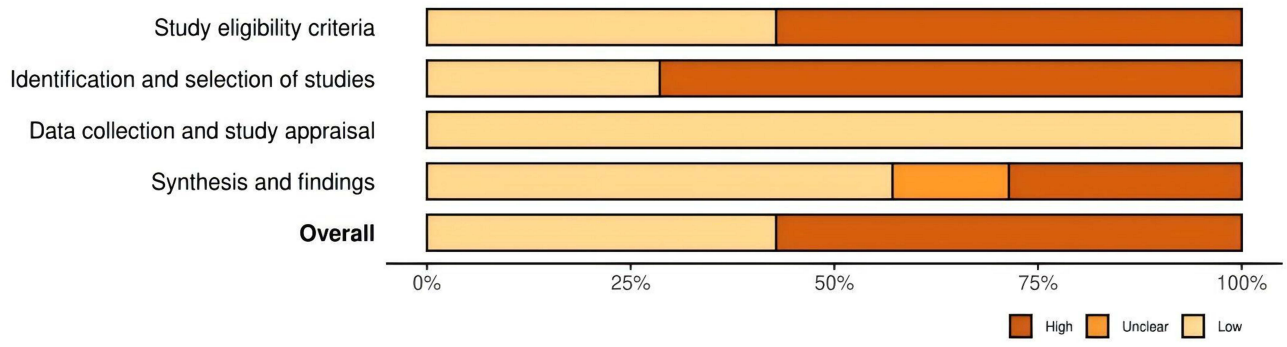

Figure 3 Summary Plot of included SRs/MAs.

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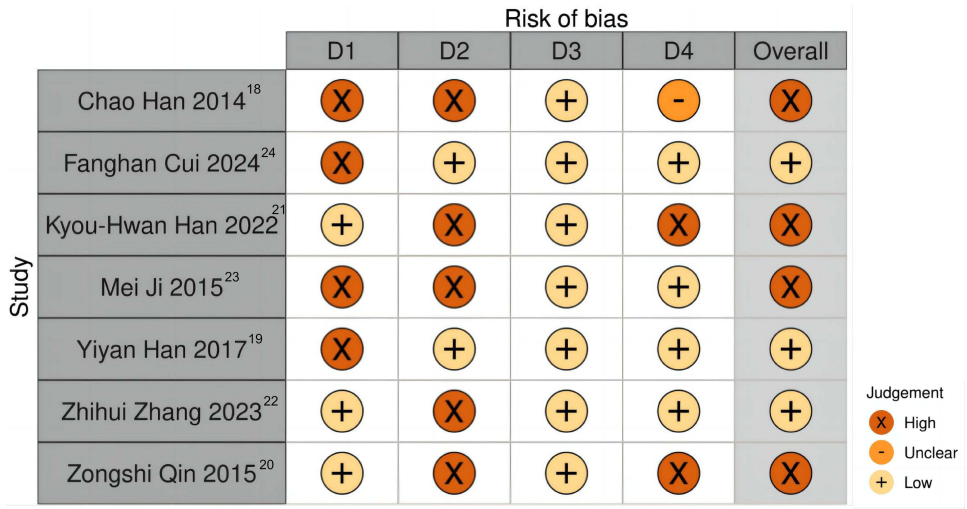

Figure 4 Risk of bias of included SRs/MAs.
Notes: D1, Study eligibility criteria; D2, Identification and selection of studies; D3, Data collection and study appraisal; D4, Synthesis and findings.

Outcome Assessment of Sciatica

To avoid duplication caused by overlapping SRs/MAs, we excluded redundant RCTs before conducting a secondary meta-analysis aimed at comprehensively evaluating the efficacy of acupuncture for sciatica. After deduplication, also exclude the literature covered in the SR,67 original RCTs[25–91] were included in the meta-analysis. Additionally, one recently published RCT[10] identified through a manual search was incorporated, bringing the total number of studies analyzed to 68.

Treatment Effectiveness

Fifty-nine RCTs[25–33,35–50,52–61,62–66,68–74,76–85,89,90] assessed treatment effectiveness, with a combined sample of 6,298 participants (3,178 in the acupuncture group and 3,120 cases in the control group). Meta-analysis revealed that acupuncture significantly improved treatment effectiveness compared to control interventions (RR = 1.23; 95% CI: 1.20–1.26; $P = 0.008$). Heterogeneity was moderate ($\chi2 = 87.13$; df = 58; $P = 0.008$; $I^2 = 33\%$), indicating acceptable consistency across studies and supporting the efficacy of acupuncture in treating sciatica (Figure 7). Sensitivity analysis confirmed the robustness of these findings (Figure S1).

Pain Intensity

Pain intensity was assessed using the visual analog scale (VAS) in 22 RCTs.[10,32,38,40,43,44,46,54,56,65,67,70,75,79,86,87,89,90] Of these, 8 studies used post-treatment pain scores, and 13 reported a change in pain intensity from baseline. One study was

Table 5 ROBIS of SRs/ MAs

Review	Phase 1	Phase 2				Phase 3
	Assessing Relevance	2.1 Study Eligibility Criteria	2.2 Identification and Selection of Studies	2.3 Data Collection and Study Appraisal	2.4 Synthesis and Findings	Risk of Bias in the Review
Chao Han 2014[18]	Low	High	High	Low	Unclear	High
Fanghan Cui 2024[24]	Low	High	Low	Low	Low	Low
Kyou-Hwan Han 2022[21]	Low	Low	High	Low	High	High
Mei Ji 2015[23]	Low	High	High	Low	Low	High
Yiyan Han 2017[19]	Low	High	Low	Low	Low	Low
Zhihui Zhang 2023[22]	Low	Low	High	Low	Low	Low
Zongshi Qin 2015[20]	Low	Low	High	Low	High	High

Notes: Low, Low risk of bias; High, High risk of bias; Unclear, Unclear risk of bias.

Table 6 PRISMA-A Checklist of the Included SRs/MAs

Study ID	Chao Han 2014[18]	Fanghan Cui 2024[24]	Kyou-Hwan Han 2022[21]	Mei Ji 2015[23]	Yiyan Han 2017[19]	Zhihui Zhang 2023[22]	Zongshi Qin 2015[20]
Item 1	Y	Y	Y	Y	Y	Y	Y
Item 2	P	P	P	P	P	Y	P
Item 3	P	N	P	P	N	Y	N
Item 4	Y	Y	Y	Y	Y	Y	Y
Item 5	N	N	P	N	N	Y	N
Item 6	N	P	P	P	P	P	P
Item 7	P	P	Y	Y	P	Y	P
Item 8	N	N	Y	Y	N	Y	Y
Item 9	Y	Y	Y	Y	Y	Y	Y
Item 10	N	N	Y	Y	N	Y	Y
Item 11	N	P	P	P	P	P	P
Item 12	Y	Y	Y	Y	N	Y	Y
Item 13	N	Y	Y	Y	Y	Y	Y
Item 14	N	Y	Y	Y	Y	Y	Y
Item 15	N	Y	P	Y	Y	Y	Y
Item 16	N	Y	Y	Y	N	Y	Y
Item 17	Y	Y	Y	Y	P	Y	Y
Item 18	N	P	P	P	P	P	P
Item 19	P	N	Y	Y	Y	Y	N
Item 20	N	Y	Y	Y	Y	Y	Y
Item 21	N	Y	Y	Y	Y	Y	Y
Item 22	N	Y	Y	Y	Y	Y	Y
Item 23	N	N	Y	Y	N	Y	N
Item 24	N	Y	N	Y	P	Y	P
Item 25	Y	Y	Y	Y	Y	Y	Y
Item 26	Y	Y	Y	Y	Y	Y	Y
Item 27	N	P	P	Y	N	Y	N

excluded due to incomplete data. To avoid bias from converting between these outcome types, we conducted separate meta-analyses for post-treatment pain scores and pre-post differences.

Eight studies assessing post-treatment pain included 680 cases (343 cases in the acupuncture group and 337 in the control group). Meta-analysis showed that acupuncture significantly reduced pain intensity compared to that in the control group (SMD = −1.05; 95% CI: −1.21–-0.88; $P < 0.001$). However, heterogeneity was high (I^2= 84%). Subgroup analysis based on intervention duration revealed that heterogeneity was substantially lower in studies with a 3-week treatment period (I^2 = 14%), suggesting that treatment duration may contribute to the observed between-study heterogeneity (Figure 8). Meanwhile, subgroup analysis using control measures as the grouping factor did not observe a significant reduction in heterogeneity (Figure S2). Sensitivity analysis using the one-by-one exclusion method showed that removing the study by Meng (2014) reduced heterogeneity from 84% to 63% (Tau^2 = 0.11, Tau = 0.33), indicating that this study may be a major source of inconsistency. The overall results remained robust (Figure S3).

Ten studies evaluated the change in pain intensity before and after treatment, with 812 cases (413 in the acupuncture group and 399 in the control group). Meta-analysis indicated that pain intensity was significantly lower in the acupuncture group than in the control group (SMD = −1.11; 95% CI: −1.27–-0.95; $P < 0.001$), though heterogeneity was very high (I^2 = 96%). Subgroup analysis showed no heterogeneity (I^2 = 0%) among studies with a 4-week treatment duration, while other subgroups remained highly heterogeneous (Figure 9). Meanwhile, Meanwhile, subgroup analysis using control measures as a grouping factor observed that the heterogeneity in the group with sham acupuncture as the control measure decreased to 0%, while there was still considerable heterogeneity between different subgroups,

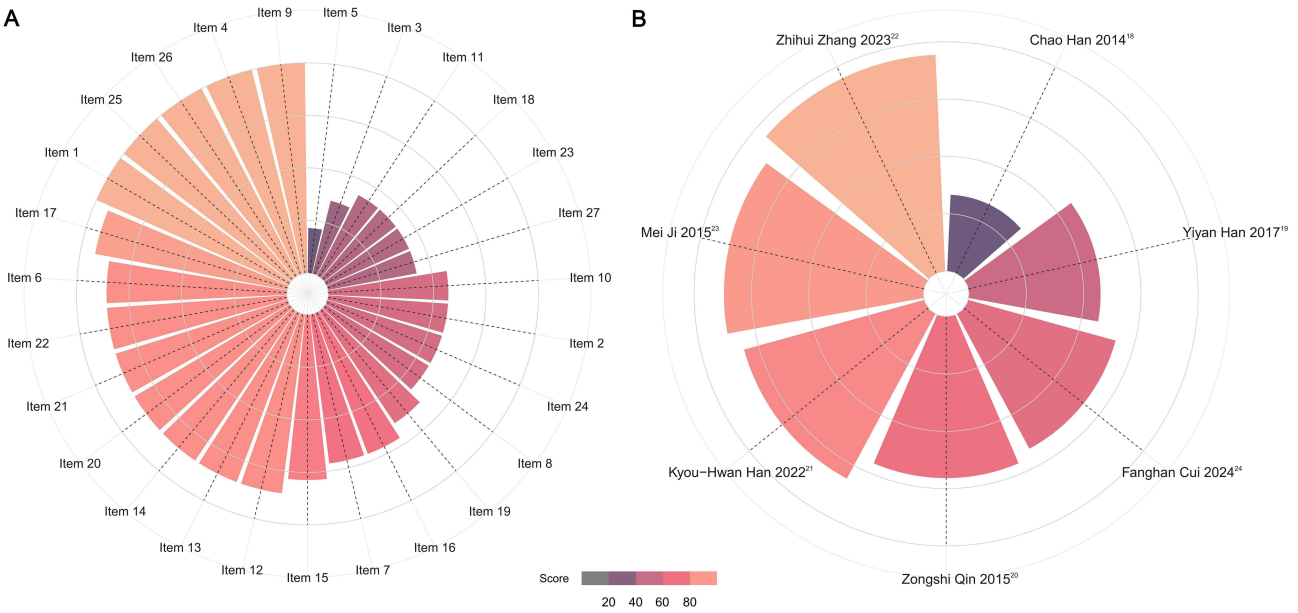

Figure 5 The PRISMA-A of included studies.
Notes: (**A**) Degree of completion of every items; (**B**) Total score of every studies.

indicating that control measures may be a partial source of heterogeneity rather than the main source (Figure S4). Sensitivity analysis did not identify any single study as a major source of heterogeneity, and the results remained robust (Figure S5).

Pain Threshold Value

Seven RCTs[30,31,51,52,69] assessed changes in pain threshold, including 431 cases (216 cases in the acupuncture group and 215 in the control group. Meta-analysis showed that pain threshold was significantly higher in the acupuncture group than in the control group (SMD = 2.08; 95% CI: 1.84–2.32), although heterogeneity was high ($\tau^2 = 0.25$, $\chi^2 = 20.88$, df = 6, $P = 0.002$, and $I^2 = 71\%$). (Figure 10A). Sensitivity analysis revealed that excluding the study by Liu (2016) reduced heterogeneity to zero ($Tau^2 = 0$; Tau = 0), suggesting this study introduced methodological consistency and was excluded from reanalysis (Figure S6). The revised meta-analysis of the remaining six RCTs yielded a higher pooled effect size (SMD = 2.31; 95% CI: 2.05–2.57), with no heterogeneity between studies ($\tau^2 = 0$; $\chi^2 = 3.26$; df = 6; $P = 0.66$; $I^2 = 0\%$) (Figure 10B). Sensitivity analysis confirmed the stability of these findings (Figure S7), supporting the conclusion that acupuncture significantly increases pain threshold in patients with sciatica.

Table 7 Overall Results of Included SRs/MAs

Overall Results		
Number of columns (number of reviews)	c	7
Number of rows (number of index publications)	r	83
Number of included primary studies (including double counting)	N	119
Covered area	N/ (rc)	20.48%
Corrected covered area	(N-r)/ (rc-r)	7.23%
Interpretation of overlap	***Moderate overlap***	
Structural Zeros	X	0
Corrected covered area (adjusting by structural zeros)	(N-r)/ (r c-r-X)	7.23%

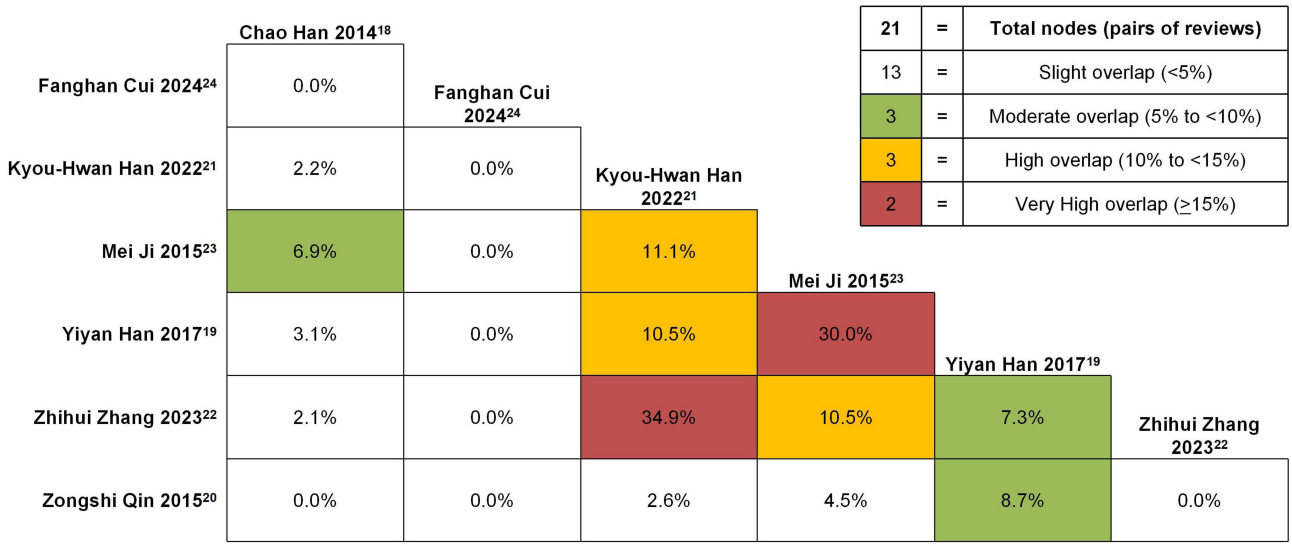

Figure 6 Graphical Representation of overlap for Overviews.

Publication Bias

Funnel plots (Figure 11) showed generally symmetrical distribution, although a few outliers suggested possible publication bias. Meanwhile, the Egger's test and Begg's test further clarified that publication bias existed in the study, these may be attributed to variations in sample size, study design, participant characteristics, intervention methods, or outcome measures.

Adverse and Withdrawal Events

Most SRs/MAs reported that acupuncture is a safe intervention. Two studies did not assess safety, while three reported mild adverse events—subcutaneous bleeding, tachycardia, and vasovagal syncope—all occurring at a low incidence rate. Overall, acupuncture demonstrated a favorable safety profile.

Perspectives on the Efficacy of Acupuncture

The findings from the included SRs/MAs suggest that acupuncture is effective for managing sciatica. It was associated with improved treatment response, reduced pain intensity, and increased pain threshold, indicating strong clinical potential.

Discussion

Summary of Key Findings

This study used multiple evaluation tools—ROBIS, AMSTAR-2, PRISMA-A, and the GROOVE tool—to comprehensively assess the reliability of existing evidence on acupuncture for sciatica. A secondary meta-analysis was also performed to provide an updated synthesis of clinical efficacy. Although the meta-analysis results were promising, indicating that acupuncture can improve treatment effectiveness, reduce pain intensity, and increase pain threshold, significant limitations remain. Many of the included SRs/MAs showed methodological weaknesses, high overlap in included RCTs, and poor adherence to reporting standards. Sensitivity analyses confirmed the robustness of findings, but substantial heterogeneity persisted, only partly explained by differences in intervention duration and study quality. Other potential sources—such as variations in study design, intervention protocols, and outcome assessment methods—may have contributed. Furthermore, many included SRs/MAs, and their underlying trials exhibited a high risk of bias, raising concerns about the pooled evidence's credibility. Taken together, while acupuncture shows therapeutic promise, the overall reliability of the current evidence remains insufficient, and further high-quality studies are required.

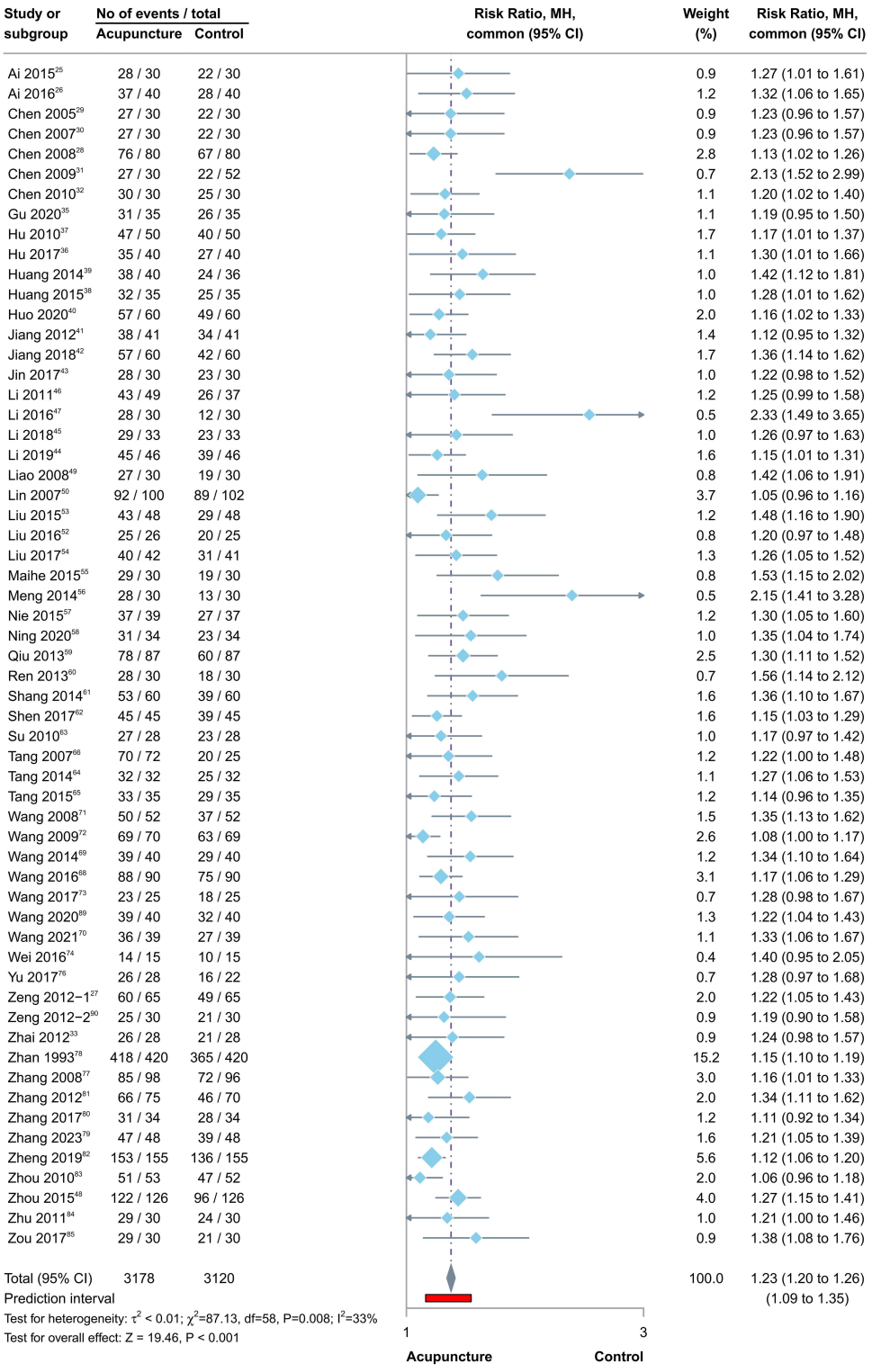

Figure 7 Forest plot of treatment effectiveness.

From a methodological standpoint, the included SRs/MAs had several key weaknesses: (1) lack of justification for selecting only RCTs; (2) absence of a list of excluded studies; (3) use of limited search strategies (often only one database); (4) lack of pre-registration; and (5) failure to apply duplicate data extraction. Methodological rigor is closely tied to evidence quality, and these gaps undermine the reliability of findings. Although RCTs are often considered the

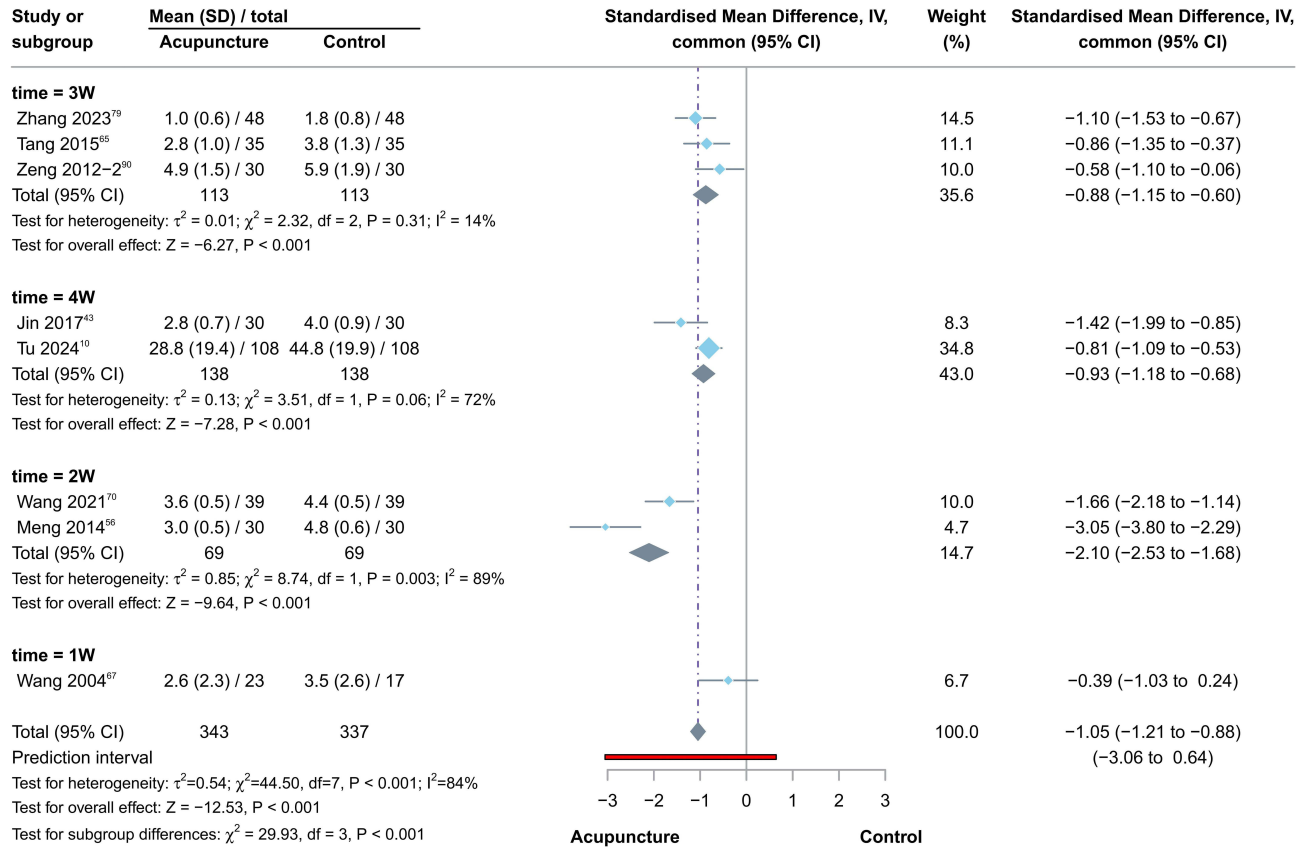

Figure 8 Forest plot of Pain intensity (post-treatment).

gold standard, excluding other forms of real-world evidence, such as cohort or case-control studies, may omit valuable insights on the durability of acupuncture's effects, long-term safety, and adverse events in routine clinical settings. Thus, authors should clearly justify exclusive reliance on RCTs. Additionally, poor transparency in reporting, such as omitting excluded studies or failing to pre-register protocols, reduces reproducibility. Inadequate search strategies and the absence of duplicate review increase the risk of missing relevant trials and introduce potential bias during data extraction, ultimately compromising the comprehensiveness of the synthesized evidence.

Regarding study overlap, the degree of redundancy among original RCTs across SRs/MAs was moderate. Overlap typically reflects similarities in search timeframe, strategy, and methodology. However, some SRs/MAs conducted during similar periods had minimal or no overlap in included studies—an unexpected finding that suggests possible deficiencies in search strategies, inconsistencies in inclusion criteria, or reliance on single-database searches. These issues may have led to the omission of relevant literature and warrant further investigation.

In terms of reporting quality, PRISMA-A evaluation showed that many SRs/MAs failed to describe core elements of acupuncture practice. Specifically, most reports lacked descriptions of needling sensation ("Deqi"), omitted the theoretical basis of acupuncture, and did not explain the target conditions using traditional medical terminology. Additionally, we reviewed the original RCTs included in the SRs/MAs and found that the vast majority of these original RCTs lacked reports on the "Deqi" sensation. However, "Deqi" sensation is a key factor in the therapeutic effect of acupuncture, and there is a positive correlation between acupuncture efficacy and the intensity of "Deqi" sensation - that is, the stronger the "Deqi" sensation, the better the therapeutic effect of acupuncture. "Deqi" sensation mainly includes two aspects: the subjective sensations of numbness, dull pain, heaviness, soreness, distension, or fullness experienced by the patient, and the resistance sensation under the needle perceived by the acupuncturist.[92] Therefore, factors such as the patient's constitution, the acupuncturist's experience and technique all have a significant impact on the therapeutic effect of acupuncture. However, in the current field of acupuncture treatment for sciatica, neither clinical practice guidelines nor

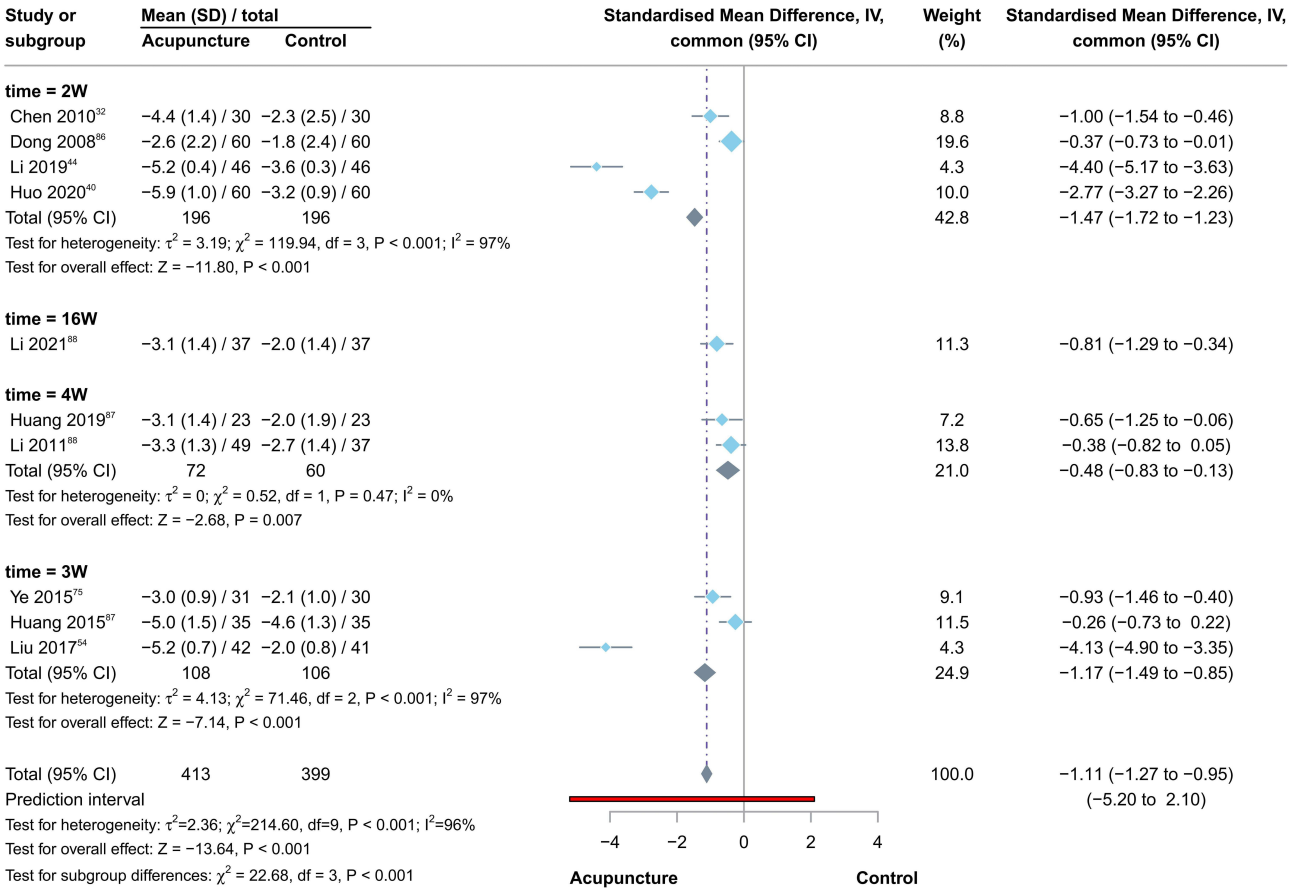

Figure 9 Forest plot of Pain intensity (differences of before and after treatment).

expert consensus have yet established standardized specifications for acupoint selection or acupuncture manipulation. This undoubtedly causes different studies to have varying deviations in therapeutic effects due to the aforementioned differences among acupuncturists, making it difficult to accurately reflect the true therapeutic efficacy of acupuncture. Future research needs to pay more attention to the influence of "Deqi" sensation on acupuncture treatment effects.

In conclusion, although the secondary meta-analysis demonstrated significant clinical benefits of acupuncture for sciatica, limitations in methodology, study overlap, and reporting quality necessitate cautious interpretation. High-quality, rigorously conducted RCTs are still needed to validate these findings. Future SRs/MAs in this field should strictly adhere to established standards such as AMSTAR-2 and ROBIS for methodological evaluation and PRISMA-A for transparent and complete reporting to enhance the reliability and clinical relevance of the evidence base.

Clinical Implications

Acupuncture, a major complementary and alternative therapy, has shown strong clinical potential for clinical application in treating sciatica. A recent high-quality RCT[10] demonstrated that acupuncture significantly improved pain intensity and the Oswestry Disability Index (ODI) scores. Notably, the largest improvements were observed at week 4, with benefits diminishing thereafter. This suggests that prolonged treatment may not yield proportionate benefits, raising questions about the possibility of therapeutic "inertia." The therapeutic "dose" of acupuncture—defined by frequency, duration, and number of sessions—appears to influence outcomes.[93,] Identifying an optimal dose could inform treatment protocols and potentially reduce healthcare costs.

Cost-effectiveness is also an important consideration in treatment decision-making. Patients with sciatica often face substantial expenses from prolonged conservative care, along with side effects from pharmacologic therapies. Acupuncture offers a low-cost, non-pharmacologic alternative with a favorable safety profile and promising efficacy.

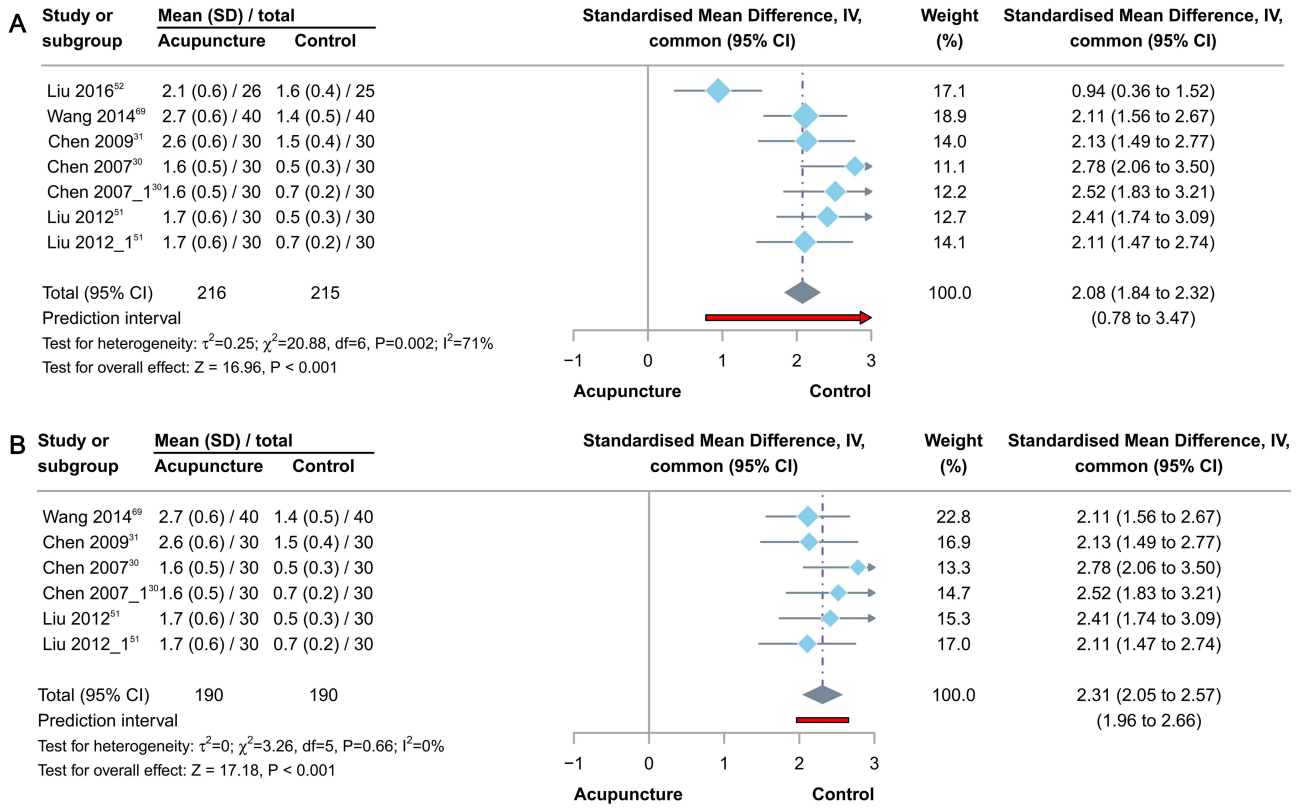

Figure 10 Forest plot of pain threshold value.
Notes: A, Forest plot of pain threshold before removing high heterogeneous RCT; B, Forest plot of pain threshold after removing high heterogeneous RCT.

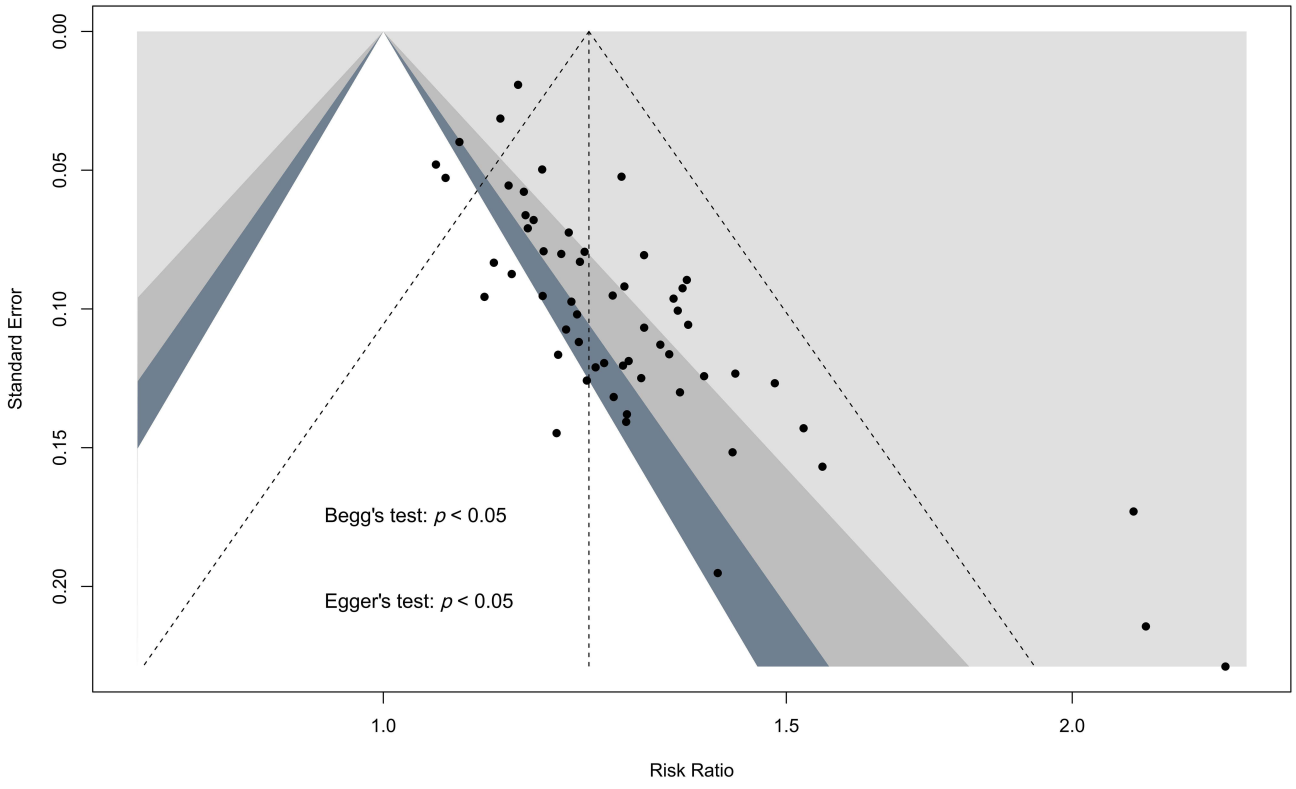

Figure 11 Funnel plot of treatment effectiveness.

https://doi.org/10.2147/JPR.S549214

Although uncertainties remain regarding its long-term utility, this study supports acupuncture's potential to expand access to high-quality, individualized care and reduce treatment costs in routine clinical practice.

Future Implications

Acupuncture continues to be regarded by some as an empirical therapy, largely due to its reliance on subjective outcome measures in clinical research. Most studies on acupuncture for sciatica use patient-reported scales, which are susceptible to participant or evaluator bias and lack objective validation. It is critical to develop dual-validation frameworks that integrate subjective scales with objective biological markers to enhance credibility and international recognition. Functional magnetic resonance imaging (fMRI) has recently been introduced in acupuncture research and offers a promising tool for elucidating its underlying mechanisms. Preliminary findings suggest that acupuncture may modulate neuropathic pain by affecting neural activity in the right superior parietal lobule (SPL) and right postcentral gyrus.[94,] However, further studies are needed to confirm these findings and clarify the neurophysiological pathways of acupuncture-induced analgesia. Applying neuroimaging techniques like fMRI may represent a breakthrough in transitioning acupuncture from empirical to evidence-based medicine.

A key challenge in acupuncture research is the use of sham acupuncture as a control to eliminate non-specific effects. Although sham procedures are widely accepted for maintaining blinding, they cannot fully eliminate placebo responses, as no absolute "placebo needle" currently exists. This limitation complicates efforts to distinguish specific effects of acupuncture from contextual or psychological influences. In the studies included in this overview, control groups primarily received either sham acupuncture or conventional medical therapy. While sham acupuncture is effective for blinding, its inability to completely suppress placebo effects introduces a risk of overestimating or underestimating true treatment efficacy. The lack of validated, placebo-free control strategies remains a fundamental obstacle in clinical trials on acupuncture. As a result, many studies have shifted toward real-world controls, such as standard clinical care, to better reflect clinical practice and assess adjunctive benefits. However, existing evidence is limited by small sample sizes and the absence of adequately powered head-to-head trials. Future research should prioritize larger, methodologically rigorous studies and explore innovative control designs to clarify the true efficacy and generalizability of acupuncture.

Strengths and Limitations

This study has several limitations: (1) Although no language restrictions were applied during the literature search, the included studies were limited to Chinese or English due to the language coverage of the databases searched. As a result, relevant studies published in other languages may have been missed. (2) The assessment of methodological quality and reporting standards relied on tools that involve subjective judgment. Although two independent reviewers conducted evaluations in duplicate, some subjectivity was unavoidable. Moreover, we did not calculate inter-rater reliability (eg, using the Kappa coefficient), limiting the evaluation process's transparency and reproducibility.

This study also has notable strengths. We adhered to the latest PRIOR reporting guidelines to ensure methodological rigor and transparency. In addition, we quantitatively assessed overlap among primary studies using CCA values—an aspect often overlooked in prior research. By removing duplicates and incorporating newly published RCTs, we conducted a comprehensive secondary meta-analysis that provides an updated and more accurate picture of acupuncture's clinical efficacy for sciatica.

Conclusion

As research on acupuncture for sciatica continues to grow, the number of published SRs/MAs in this field is also increasing. Most findings suggest that acupuncture offers meaningful clinical benefits, supporting its role as a complementary and alternative treatment option for sciatica. However, the overall quality of the current evidence is limited by methodological flaws, risk of bias, and poor reporting standards. To establish stronger clinical recommendations, future studies must generate high-quality, rigorously conducted evidence to confirm the therapeutic efficacy of acupuncture in treating sciatica.

Ethics Approval and Consent to Participate

Ethical approval was not required since this manuscript is an overview.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

Jiewen Zhang and Zining Guo are co-first authors for this study. The authors report no conflicts of interest in this work.

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