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REVIEW

Effectiveness and Safety of Acupuncture as an Adjunctive Therapy for Post-Stroke Depression: An Overview of Systematic Reviews

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Background: Post-stroke depression (PSD) is a common and serious neuropsychiatric complication that requires effective treatment options. Acupuncture as an adjuvant therapy shows promise, though current systematic reviews exhibit significant discrepancies in effectiveness/safety evidence with insufficient methodological rigor.

Purpose: To evaluate systematic reviews assessing acupuncture as an adjuvant therapy for PSD.

Methods: Electronic searches were conducted across eight databases from their inception to March 2024. The main search terms include "acupuncture and moxibustion therapy", "post-stroke depression" and "systematic evaluation". All systematic reviews underwent rigorous methodological evaluation employing four complementary assessment tools: AMSTAR 2 for methodological quality, ROBIS for risk of bias, PRISMA 2020 for reporting standards, and GRADE for evidence grading. The consistency level between the two reviewers is evaluated using the k-index.

Results: Ten systematic reviews evaluated acupuncture as an adjuvant therapy for PSD. Using the AMSTAR 2 tool, 9 SRs (90%) were rated with a "very low" confidence level. According to the ROBIS criteria, only 3 SRs (30%) showed a low risk of bias. Although the report is overall comprehensive according to the PRISMA 2020 guidelines, there are significant shortcomings in areas such as evidence quality assessment (2/10, 20%). Employing the GRADE approach, 58.8% (20/34) as "very low". The reliability among evaluators is satisfactory. Acupuncture as an adjuvant therapy combined with conventional treatments significantly improved HAMD/NIHSS scores versus monotherapy.

Conclusion: While acupuncture as an adjuvant therapy seems to offer benefits in improving depressive symptoms and daily functioning among PSD patients, the overall low methodological quality of current systematic reviews limits the strength of this conclusion. More rigorous and high-quality evidence is needed to confirm these findings.

Systematic Review Registration: PROSPERO CRD 42024533181.

Keywords: post stroke depression, acupuncture, overview, systematic review, meta analysis

Introduction

Post-stroke depression (PSD), characterized by emotional lows, loss of interest, and cognitive slowing, is a prevalent affective disorder following strokes, often accompanied by physical symptoms.[1] Approximately one-third of stroke survivors develop post-stroke depression (PSD) at some point following the event, with the highest incidence occurring within the first year.[2] In China, where stroke is a leading cause of death and disability,[3] PSD represents a significant neuropsychiatric complication after stroke,[4] with high prevalence rates ranging from 20% to 70%, approximately 34.9%

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in China.[5] As the population ages, PSD incidence is expected to rise, increasing societal burden. PSD patients may experience self-neglect and suicidal tendencies,[6] with higher mortality risk compared to non-depressed stroke survivors.[7] PSD severely impacts quality of life and mental health, potentially triggering recurrent strokes. Its multifactorial etiology includes familial, social influences, and diminished therapeutic confidence among those with communication or motor impairments.[8] PSD predominantly manifests within the first month post-stroke, potentially evolving into chronic depression.[9] This negative state hinders functional recovery and impedes overall rehabilitation progress in stroke patients.

Currently, clinical treatments for PSD are categorized into pharmacological and non-pharmacological approaches.[10] Pharmacotherapy primarily involves antidepressant medications, which can lead to addiction, numerous side effects, and an increased risk of stroke recurrence over long-term use. Non-pharmacological interventions include psychotherapy and physical therapy, although these methods require extended treatment durations and entail substantial costs. Given the limitations of conventional therapies alone, there is growing interest in identifying safe and effective adjunctive treatments to enhance overall management outcomes for PSD. In this context, acupuncture has emerged as a promising candidate. As an adjunctive therapy, acupuncture offers several advantages: minimal side effects, favorable outcomes, economic feasibility, and broad applicability. Consequently, an increasing number of patients are opting for acupuncture, supported by extensive research indicating its superior efficacy superior efficacy as an add-on therapy and fewer adverse reactions compared to pharmacotherapy alone.[11–14] Traditional meta-analyses have already established the effectiveness of acupuncture used in conjunction with conventional therapy for treating PSD treating PSD.[15]

Although numerous randomized controlled trials (RCTs) and systematic review literature[16–19] have evaluated the effectiveness of acupuncture as a treatment (including as monotherapy or adjunctive therapy) for post-stroke depression (PSD), the conclusions drawn from these studies are not consistent. Crucially, variations in the design and application of acupuncture (eg, standalone vs combined with conventional treatment) across primary studies contribute to the heterogeneity and challenge in synthesizing clear conclusions. Despite being considered reliable sources of evidence, the internal validity and reliability of individual trials within systematic reviews may be compromised by potential bias risks and specific methodological details as well as reporting quality.[20] Without rigorous quality assessment, the conclusions of systematic reviews could mislead clinicians and patients.[21] Given these critical considerations, a meticulous assessment of systematic review reliability and rigorous evaluation of evidentiary quality are imperative, particularly regarding the precise implementation of acupuncture as an adjunctive therapeutic modality. The overview of systematic reviews employs standard methods to assess the quality of clinical evidence and integrates the findings of multiple studies on evidence-based clinical decision-making (Figure 1). A comprehensive review can objectively describe the current state of research and assess the quality of evidence supporting the issue at hand, thereby providing more reliable guidance for clinical practice.[22] Until now, systematic reviews focusing specifically on acupuncture as an adjunctive therapy for PSD have not been collectively assessed in an overview to synthesize the evidence and offer consolidated recommendations for guiding clinical practice for guiding clinical practice.

Therefore, in this overview, we critically appraise systematic reviews (SRs) of acupuncture specifically used as an adjunctive therapy for post-stroke depression (PSD). Our aim is to furnish robust and objective evidence regarding the added benefit and safety of acupuncture when combined with conventional treatments for both patients and clinicians. The analysis also pinpoints sources of potential discrepancies to inform future high-quality investigations.

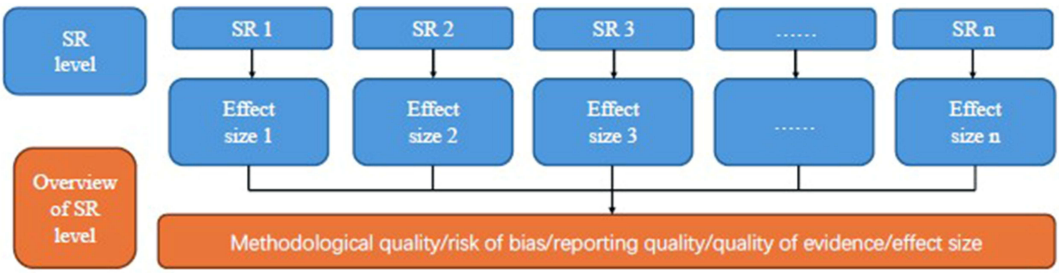

Figure 1 Schematic diagram of the overview of systematic reviews.
Abbreviation: SR, systematic review.

Methods

Protocol and Registration

The protocol for this overview has been prospectively registered in PROSPERO (CRD4202433181) and is accessible on the PROSPERO website (https://www.crd.york.ac.uk/prospero/). As this study involves a review, ethical approval is not required.

Inclusion and Exclusion Criteria

SRs were included if: (1) they must encompass all randomized controlled trials (RCTs) of acupuncture for post-stroke depression (PSD), limited to Chinese and English languages; (2) Patients were diagnosed with PSD based on scores exceeding abnormal thresholds on standardized depression scales or according to the criteria outlined in the DSM-III, IV, and V, utilizing structured or semi-structured psychiatric interviews.[23] The diagnosis was not restricted by gender, age, race, etiology, onset time, case source, or disease duration; (3) intervention groups were to receive acupuncture, either alone or in combination with standard care, with the requirement that acupuncture procedures were invasive, though specifics of the acupuncture were not restricted; (4) control groups were to be treated with sham acupuncture or standard treatments, such as antidepressants, basic care, psychological counseling, and physical rehabilitation; (5) outcomes measures included treatment efficacy rates, Hamilton Depression Rating Scale (HAMD) scores, Self-Rating Depression Scale (SDS) scores, National Institutes of Health Stroke Scale (NIHSS), Activities of Daily Living Scale (ADL), Treatment Emergent Symptoms Scale (TESS), Modified Edinburgh-Scandinavian Stroke Scale (MESSS), and the incidence of adverse effects.

The Hamilton Depression Rating Scale (HAMD) is a widely utilized 17-item clinical assessment tool for quantifying the severity of depression in diagnosed patients.[24] The Self-Rating Depression Scale (SDS) comprises 20 items, with patients selecting one of four options—"always", "often", "sometimes", or "rarely"—for each, to assess the subjective severity of depression.[25] The National Institutes of Health Stroke Scale (NIHSS) consists of 15 items used for neurological function evaluation.[26] The Daily Activity Level (DAL) scale assesses patients' ability to perform activities of daily living, encompassing basic self-care tasks such as eating, grooming, toileting, bathing, and dressing, alongside functional mobility skills including bed-chair transfers, walking, and stair climbing. The scoring system ranges from a minimum of 0 points to a maximum of 100 points, with higher scores indicating better performance in daily life activities.[27] The Treatment Emergent Symptom Scale (TESS), developed by the National Institute of Mental Health (NIMH) in 1973, is utilized to assess the safety of psychopharmacological treatments in adult patients. This scale serves as an instrument to gauge adverse effects across various systems, thereby providing a comprehensive evaluation of medication-related side effects.[28] The Modified Edinburgh-Scandinavian Stroke Scale (MESSS) is a critical instrument for evaluating the severity of higher central nervous system damage following a stroke,[29] as well as for prognostic assessment. It quantifies the extent of neurological impairment by examining the patient's functional performance. Barthel Index (BI), consisting of ten items, is designed to evaluate basic activities of daily living. Higher scores indicate greater independence in these activities for individuals with depression.[30]

SRs were excluded if: (1) other types of depression; (2) did not primarily involve acupuncture as the intervention; (3) employed non-invasive treatments such as transcutaneous electrical acupoint stimulation, auricular point pressing, moxibustion, laser acupuncture, etc.; (4) were network meta-analyses, commentaries, reviews, systematic review protocols, conference abstracts, or duplicate publications; (5) contained incorrect data or lacked obtainable data.

Search Strategy

We systematically searched four Chinese databases (Sino Med, CNKI, Wan Fang, VIP) and four international databases (Cochrane Library, Embase, PubMed, Web of Science) from inception to March 5, 2024, without language restrictions. We identified key search terms through MESH database subject headings, including "acupuncture", "post-stroke depression", "meta-analysis", and "systematic review". We adapted the PubMed search strategy (Table 1) to suit the specific requirements of each database. To ensure comprehensiveness, we also reviewed references cited in retrieved articles and manually searched relevant literature to identify additional eligible studies.

Table 1 Search Strategy Used in PubMed

No.	Search Items
# 1	Stroke. Mesh.
# 2	Depression. Mesh.
# 3	Post stroke depression. ti, ab.
# 4	Post-stroke depression. ti, ab.
# 5	PSD. ti, ab.
# 6	Post stroke. ti, ab.
# 7	After stroke. ti, ab.
# 8	Stroke. ti, ab.
# 9	Depression. ti, ab.
# 10	Or/1–9
# 11	Acupuncture therapy. Mesh.
# 12	Acupuncture. ti, ab.
# 13	Manual acupuncture. ti, ab.
# 14	Acupuncture points. ti, ab.
# 15	Electroacupuncture. ti, ab.
# 16	Electric stimulation therapy. ti, ab.
# 17	Warm acupuncture. ti, ab.
# 18	Or/11–17
# 19	Meta-analysis.pt.
# 20	Meta-analysis. ti, ab.
# 21	Meta analysis. ti, ab.
# 22	Review.pt.
# 23	Systematic evaluation. ti, ab.
# 24	Systematic review. ti, ab.
# 25	Or/19–24
# 26	10 and 18 and 25

Study Screening

All search results were imported into EndNote X9.1, duplicates were removed, and two reviewers independently screened titles, abstracts, and keywords to identify studies meeting the inclusion criteria. After initial screening, full-text articles were assessed for further evaluation. In this section, we list all excluded articles and reasons for exclusion. Any disagreements between reviewers were resolved by a third reviewer. Details of the literature screening process are shown in Figure 2.

Data Extraction

Two reviewers independently extracted information from each included paper, including first author, publication year, number of RCTs, sample size, interventions, control groups, quality assessment methods, outcome measures, adverse events, and main conclusions. Any discrepancies in the extracted information were checked and resolved by a third member.

Evaluation Methods

The methodological quality, risk of bias, reporting quality, and evidence quality of the SRs were independently assessed by two reviewers using AMSTAR 2, ROBIS, PRISMA 2020, and GRADE tools. Any discrepancies arising between the two reviewers were resolved by a third reviewer.

AMSTAR 2[31] is primarily used to assess the methodological quality of systematic reviews that include randomized or non-randomized controlled trials. It consists of 16 items, with seven being critical items, which cover aspects such as research question, PICO elements of inclusion criteria, protocol registration, types of included study designs, literature search strategy, study selection, data extraction, specific details on excluded studies, risk of bias assessment of included studies, appropriateness of statistical analysis, accuracy of result interpretation, and funding sources and conflicts of interest. The fulfillment of evaluation standards is rated as "Yes", "Partially Yes", or "No"; fully meeting the standard is

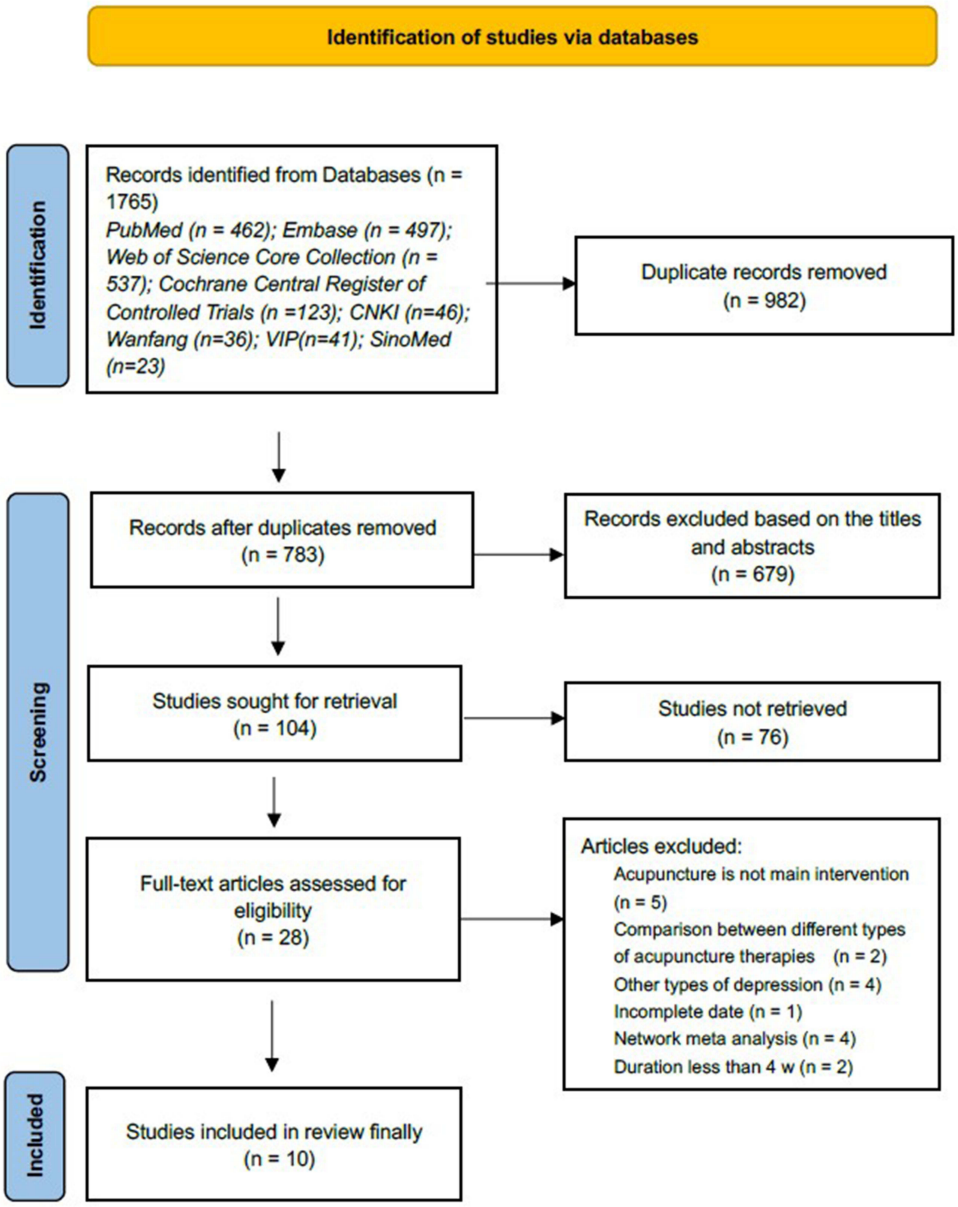

Figure 2 Flow diagram of literature screening process.
Abbreviations: CNKI, Chinese National Knowledge Infrastructure; VIP, Chinese Science and Technology Periodical Database.SinoMed; CBM, Chinese Biological Medicine Database.

rated as "Yes", partially meeting it as "Partially Yes", and lack of reported information in the systematic review is rated as "No". Finally, all SRs are graded based on overall scientific credibility: High (0 or 1 non-critical weakness), Moderate (2 or more non-critical weaknesses), Low (1 critical flaw with or without any non-critical weaknesses), and very low (2 or more critical flaws with or without any non-critical weaknesses).

The ROBIS tool,[23] developed by the Department of Social Medicine at the University of Bristol in 2014, is specifically designed to assess the risk of bias in systematic reviews. Two reviewers used this tool to conduct a risk of bias assessment across four domains of the systematic review (SR): "inclusion/exclusion criteria of studies", "searching and selecting studies", "data extraction and quality assessment", and "synthesizing data and presenting findings". A final overall risk of bias assessment was then conducted, categorizing the risk level for each domain as "low risk", "high risk", or "unclear risk".

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[32] are widely used for reporting systematic reviews. In March 2021, these guidelines were updated and revised to form PRISMA 2020,

which was published online in the British Medical Journal (BMJ). PRISMA 2020 includes 27 items, each of which can be rated as "yes", "partially yes", or "no". The scoring of these items helps to assess the quality and completeness of the systematic review report.

The Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) system[33] was used to assess the strength of evidence in the included systematic reviews (SRs). The GRADE system evaluates the quality of evidence based on factors such as risk of bias, inconsistency, indirectness, imprecision, and publication bias. Evidence quality is categorized into four levels: high, moderate, low, and very low. The quality of evidence provided within individual SRs may impact the overall outcomes of the review.

Assessment of Between-Reviewer Agreement

To assess the concordance between the two reviewers employing the AMSTAR 2, Robis, Prisma 2020, and GRADE instruments, we utilized the Kappa statistic.[34] The Kappa values were interpreted as follows: <0.4 indicated poor agreement, 0.4–0.75 suggested moderate concordance, and >0.75 denoted excellent consensus.

Data Synthesis

Due to heterogeneity between intervention and control groups in systematic reviews (SRs) and overlap in study content among randomized controlled trials (RCTs), this study adopted a descriptive analytical approach for selected SRs, eschewing quantitative synthesis. Data were compiled as percentages and frequencies of each item assessed using AMSTAR 2, ROBIS, PRISMA 2020, and GRADE. Characteristics of each report, findings from investigations, and results of these tools will be presented in detail through tables and figures.

Results

Literature Selection

A comprehensive literature search across eight databases yielded 1765 potentially relevant studies. Duplicates were winnowed out, reducing the count by 982. Subsequent screening of titles and abstracts led to the exclusion of 679 non-relevant articles. A more in-depth review of the full texts from the remaining 104 studies resulted in the exclusion of 76 studies that failed to meet the criteria. Of the 28 full-text articles assessed, 18 were excluded for not adhering to the detailed inclusion criteria. Ultimately, 10 systematic reviews (SRs) on acupuncture for post-stroke depression met the eligibility criteria and were included in the analysis.[13,19,35–42] The PRISMA flow diagram illustrating the study selection process is provided in Figure 2.

Basic Characteristics of Included SRs

The eligible studies were published between 2012 and 2023, with 9 articles (90%) appearing after 2017,[13,19,35–41] including five in 2021. All ten studies originated from China, with six published in English journals[13,19,36,37,40,42] and four in Chinese journals.[35,38,39,41] The number of RCTs included in each systematic review varied from 7 to 24, with sample sizes ranging from 414 to 1860 participants. The primary interventions were manual acupuncture and electro-acupuncture, while two SRs also considered scalp acupuncture and warm needling. Two SRs documented the procedural details of acupuncture, two provided specifics on acupoint selection, and one focused on acupuncture frequency. Control groups received various treatments, such as conventional antidepressant medications (eg, fluoxetine, paroxetine, sertraline, escitalopram oxalate tablets, pethidine mesylate tablets), standard psychotherapy, sham acupuncture, non-acupoint needling, and traditional Chinese herbal medicine. In terms of outcomes, most SRs (84.62%) used the Hamilton Depression Rating Scale (HAMD); four SRs (76.92%) reported overall efficacy rates;[13,36–38] four SRs utilized the National Institutes of Health Stroke Scale (NIHSS);[35,36,38,41] and two SRs employed the Self-rating Depression Scale (SDS).[13,39] For assessing bias risk, nine SRs applied the Cochrane Risk of Bias Tool,[13,19,35–41] except for one SR that did not specify its risk assessment method.[42] All ten SRs included Meta-analysis, with nine conducting subgroup analysis,[13,19,35–41] six performing sensitivity analysis,[13,19,35,37,38,41] and seven evaluating publication bias.[13,19,35,38–41] Detailed characteristics of all studies are presented in Table 2.

Table 2 Characteristics of the Included Systematic Reviews

Included Studies	No. of Studies (Sample Size)	Acupuncture Intervention	Control Intervention	Details of Acupuncture	Outcomes	Risk Assessment Tools	Subgroup/ Sensitivity Analysis	Publication Bias	Adverse Effects (No. of Cases)
Zhong 2023 37619716	11 (623)	SA + control intervention	CT	NR	Effective rates /HAMD/SDS	Cochrane risk of bias tool	Yes/Yes	Yes	Dry mouth (n=10)/ nausea (n=8)/ drowsiness (n=10)/ increased sweating (n=15)/ headache (n=8)/ sexual dysfunction (n=20)
Chen 2022	22 (1794)	A + control intervention	Conventional drug therapy	Treatment course	HAMD/NIHSS	Cochrane risk of bias tool	Yes/Yes	Yes	Nausea (n=3)/ Gastrointestinal reaction (n=1)/ Local skin redness (n=1)/ Local pain (n=1)/ Control group of 13 cases (dizziness (n=3)/Nausea (n=3)/ Gastrointestinal reaction (n=5)/ Local skin Redness (n=1)/ Local pain (n=1)
Zhang 2021 39199166	13 (904)	MA/EA +control intervention	Conventional drug therapy	NR	Effective rates /HAMD/NIHSS /Barthel index	Cochrane risk of bias tool	Yes/Yes	Yes	Physical fatigue (n=2)/ fainting during acupuncture (n=1)/ nausea, dry mouth and constipation (n=5)/ rash (n=3)/dizziness (n=1)
Wang 2021 33522192	24 (1860)	A/EA +control intervention	Conventional drug therapy	NR	Effective rates/ HAMD/ADL/TESS	Cochrane risk of bias tool	Yes/No	No	NR
Liu 2021 33794857	17 (1402)	A/EA	Physical rehabilitation/Psychological counselling/ Conventional drug therapy/ Non-acupoint acupuncture	Acupoint selection	Ham-D17/Ham-D24 /Ham-d	Cochrane risk of bias tool	Yes/Yes	No	Mild and disappeared without medical or specific intervention

(*Continued*)

Table 2 (Continued).

Included Studies	No. of Studies (Sample Size)	Acupuncture Intervention	Control Intervention	Details of Acupuncture	Outcomes	Risk Assessment Tools	Subgroup/ Sensitivity Analysis	Publication Bias	Adverse Effects (No. of Cases)
Zhang 2021	14 (1120)	A/WA	Conventional drug therapy	NR	Effective rates/ HAMD/ HAMD-17/HAMD-21/HAMD-24 /Barthel index/ NIHSS/	Cochrane risk of bias tool	Yes/Yes	Yes	Physical fatigue (n=2) / fainting during acupuncture (n=1) nausea/ dry mouth and constipation (n=5)/ rash (n=3)/dizziness (n=1)
Yin 2021	15 (1169)	A/EA +control intervention	Routine psychological care/ Conventional drug therapy/ moxibustion	NR	HAMD/SDS	Cochrane risk of bias tool	Yes/No	Yes	NR
Zhang 2019 31145349	7 (414)	A+ control intervention	Conventional drug therapy/ non-acupoint acupuncture	Acupuncture point/ Duration/ Frequency/ Effective rate	HRSD	Cochrane risk of bias tool	Yes/No	Yes	Subcutaneous continuous pain/dizziness/nausea/ subcutaneous hematoma/ numbness/palpitation
Zhou 2018	15 (1096)	A/EA/SA/WA	Conventional drug therapy	NR	HAMD/NIHSS/ MESSS	Cochrane risk of bias tool	Yes/ Yes	Yes	NR
Zhang 2012 22594095	15 (1096)	A/EA	Conventional drug therapy	NR	HAMD		No/No	No	Gastrointestinal symptoms/ headache/insomnia/anxiety/ sexual dysfunction

Abbreviations: SA, scalp acupuncture; A, acupuncture; MA, manual acupuncture; EA, electroacupuncture; WA, warm acupuncture; NR, Not reported; HAMD/ HRSD, Hamilton Depression Scale/ Hamilton Rating Scale for Depression; SDS, Self-Rating Depression Scale; NIHSS, National Institute of Health stroke scale; ADL, Activity of Daily Living; TESS, Treatment Emergent Symptom Scale; MESSS, the modified Edinburgh Scandinavian stroke scale.

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Quality of the Included SRs

Methodological Quality

An evaluation using the Amstar 2 assessment tool of 10 systematic reviews (SRs) revealed that one SR was classified as low quality,[13] while the remaining nine were deemed very low quality. All included SRs encompassed the PICO elements —participants, interventions, comparisons, and outcomes—and employed comprehensive literature search strategies, providing detailed descriptions of the fundamental characteristics of each randomized controlled trial (RCT). Nonetheless, all 10 SRs incorporated RCTs without justifying the selection of this study design. Five SRs provided a list of excluded studies with justifications.[13,19,35–37] Three SRs pre-registered their protocols.[13,19,40] Nine SRs explicitly stated that literature screening and data extraction were conducted independently by two individuals.[13,19,35–41] All 10 SRs utilized the Cochrane risk of bias tool to assess potential bias in included randomized controlled trials (RCTs). Of the 10 SRs, seven employed appropriate statistical methods for synthesis.[13,19,36,38–40,42] All meta-analyses considered the potential impact of bias risk in RCTs on overall effects. Five SRs evaluated publication bias[13,35,36,38,42] and discussed its likelihood and influence on outcomes. Nine SRs accounted for the risk of bias in included studies when interpreting or discussing results.[13,19,35–41] In seven SRs, sources of heterogeneity were not investigated, nor was their impact on study results discussed.[19,35,37,38,40–42] Only three SRs reported funding sources for the included RCTs and declared no conflicts of interest.[13,19,36] A Kappa index of k=0.82 indicated strong agreement between the two evaluators (YS and ZFY). Detailed assessment results are presented in Table 3 and Figure 3.

Risk of Bias

In this overview, we did not assess ROBIS Phase 1, which aims to determine whether the research question aligns with the target problem. Phase 2 focuses on evaluating the level of bias risk during the process of conducting systematic reviews. Three SRs had lower bias risk regarding inclusion criteria,[13,19,40] while seven SRs had higher bias risk due to the lack of pre-registration protocols, making their objectives and inclusion/exclusion criteria only available after publication.[23–27,29,30] In terms of search and screening, three SRs showed lower bias risk,[19,40,42] whereas seven SRs exhibited higher bias risk because they failed to search clinical registration platforms or use methods beyond databases to identify relevant studies.[13,35–39,41] Nine SRs demonstrated low bias risk in data extraction and quality assessment,[13,19,35–41] but one SR's risk remained unclear due to the absence of information on personnel division, preventing an assessment of error minimization efforts.[42] Two SRs were rated as having low bias risk in data synthesis and presentation,[13,41] while five SRs faced high bias risk due to unaddressed heterogeneity, unstable outcomes, and the omission of adherence to predefined analytical methods in the original studies.[19,35,37,41,42] Three SRs' risk levels were indeterminate due to insufficient information.[36,38,39] Finally, overall bias risk assessments from Phase 2 questions evaluated the SRs at Phase 3. Five SRs were categorized as high-risk,[37–39,41,42] and five were considered low-risk.[13,19,35,36,40] The Kappa coefficient (k=0.8) indicates good agreement between the two reviewers (HYY and WRH). Specific evaluation details can be found in Table 4 and Figure 4.

Reporting Quality

In the 27 projects analyzed, 15 had a compliance rate exceeding 70%, indicating that these reports were relatively complete.[43] The deficiencies in the reports are as follows: Item 2 (Structured Abstract: 3/10, 30%), Item 7 (Protocol and Registration: 2/10, 20%), Item 14 (Reporting Bias: 4/10, 40%), Item 15 (Method for Assessing Evidence Quality: 2/10, 20%), Item 21 (Risk of Bias Across Studies: 4/10, 40%), Item 22 (Results of Evidence Quality Assessment: 2/10, 20%), Item 24 (Other Information: 3/10, 30%), Item 25 (Funding: 3/10, 30%), Item 26 (Conflict of Interest: 3/10, 30%), and Item 27 (Access to Information: 2/10, 20%). Only two SRs[13,19] included protocols, while most did not provide complete electronic search strategies for one or more databases. Six SRs[13,19,37,39,40,42] (60%) did not assess the risk of bias across studies nor conducted additional analyses. Eight SRs[35–42] failed to describe the methods used to evaluate the quality of evidence for each outcome, nor presented the results of assessing the quality of evidence for each outcome indicator. Additionally, only three SRs[13,19,36] (30%) fully reported sources of funding, other support, or potential conflicts of interest. Overall, four reports (40%) had an integrity exceeding 70%. There was good agreement between the two reviewers (HYY and ZFY), with a kappa coefficient of 0.89. The PRISMA 2020 results for each SR are shown in Figure 3, and detailed information on PRISMA 2020 is provided in Figure 5.

Table 3 AMSTAR 2 for methodological quality of the included SRs

Included Studies	AMSTAR 2																Compliance	Overall Quality
	1	2*	3	4*	5	6	7*	8	9*	10	11*	12	13*	14	15*	16		
Zhong 2023	Y	Y	N	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	14 (87.5)	Low
Chen 2022	Y	N	N	PY	Y	Y	Y	Y	Y	N	N	Y	Y	N	Y	N	9 (56.25)	Critically low
Zhang 2021	Y	N	N	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	13 (81.25)	Critically low
Wang 2021	Y	N	N	PY	Y	Y	Y	Y	Y	N	N	Y	Y	N	N	N	8 (50)	Critically low
Liu 2021	Y	Y	N	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	11 (68.75)	Critically low
Zhang 2021	Y	N	N	PY	Y	Y	PY	Y	Y	N	Y	Y	Y	N	Y	N	9 (56.25)	Critically low
Yin 2021	Y	N	N	PY	Y	Y	PY	Y	Y	N	Y	Y	Y	Y	N	N	9 (56.25)	Critically low
Zhang 2019	Y	Y	N	Y	Y	Y	N	Y	Y	N	Y	Y	Y	N	N	N	10 (62.5)	Critically low
Zhou 2018	Y	N	N	PY	Y	Y	N	Y	Y	N	N	Y	Y	N	N	N	7 (43.75)	Critically low
Zhang 2012	Y	N	N	PY	N	N	N	Y	Y	N	Y	Y	N	N	Y	N	6 (37.5)	Critically low
Compliance	10 (100)	3 (30)	0 (0)	1 (10)	9 (90)	9 (90)	6 (60)	10 (100)	10 (100)	3 (30)	7 (70)	10 (100)	9 (90)	3 (30)	5 (50)	3 (30)		

Note: *critical items of AMSTAR-2.
Abbreviations: Y, yes; PY, partial yes; N, no.

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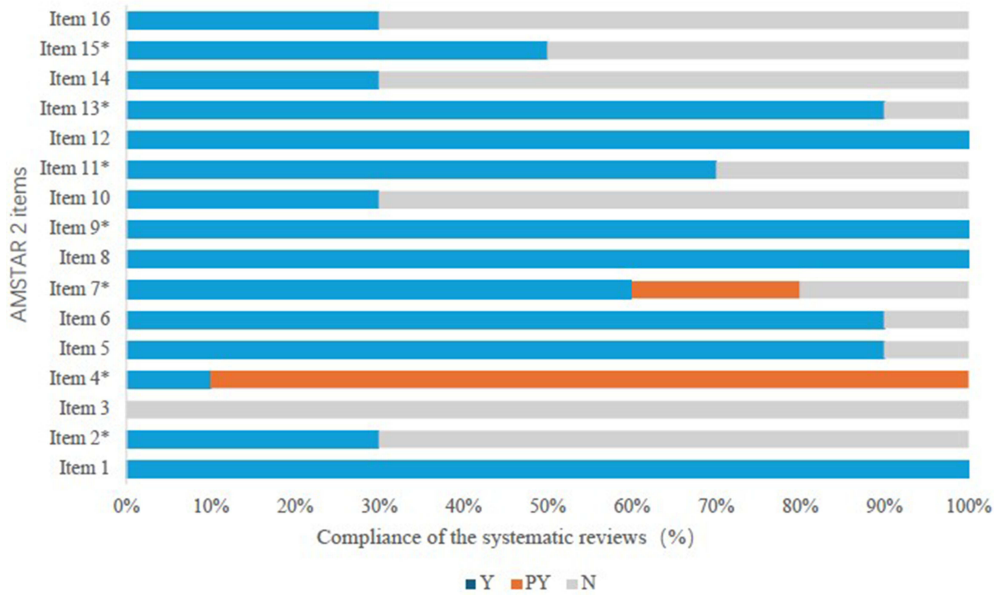

Figure 3 Graphical presentation of AMSTAR 2. *: critical items of AMSTAR 2.
Abbreviations: Y, yes; PY, partial yes; N, no; AMSTAR 2, A Measurement Tool to Assess Systematic Reviews 2.

Effectiveness of Acupuncture for PSD

The detailed results of the included systematic reviews (SRs) are presented in Table 5.

Total Effective Rate

Acupuncture combined with CT compared to simple CT

Table 4 Risk of Bias of the Included Systematic Reviews Assessed by Risk of Bias in Systematic Reviews

Review	Phase 2				Phase 3
	1. Study Eligibility Criteria	2. Identification and Selection of Studies	3. Data Collection and Study Appraisal	4. Synthesis and Findings	Risk of Bias in the Review
Zhong 2023 37619716	L	H	L	L	L
Chen 2022	H	H	L	H	L
Zhang 2021 39199166	H	H	L	U	L
Wang 2021 33522192	H	H	L	H	H
Liu 2021 33794857	L	L	L	H	L
Zhang 2021	H	H	L	U	H
Yin 2021	H	H	L	U	H
Zhang 2019 31145349	L	L	L	H	L
Zhou 2018	H	H	L	L	H
Zhang 2012 22594095	H	L	U	H	H

Abbreviations: L, low risk; H, high risk; U, unclear risk.

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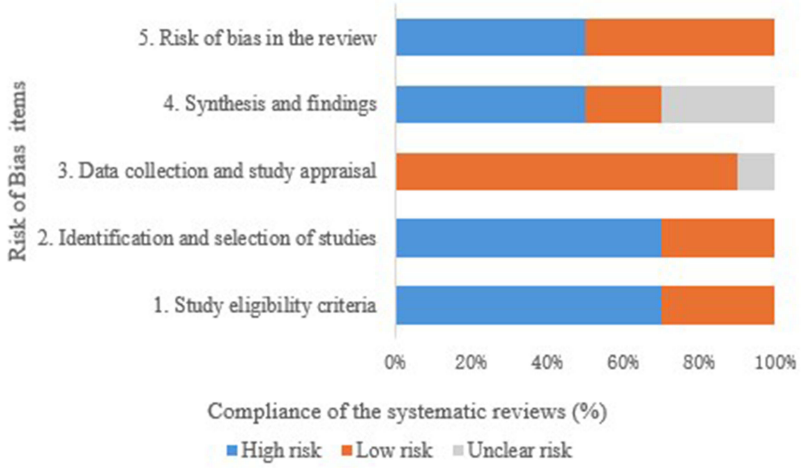

Figure 4 Graphical presentation of ROBIS.

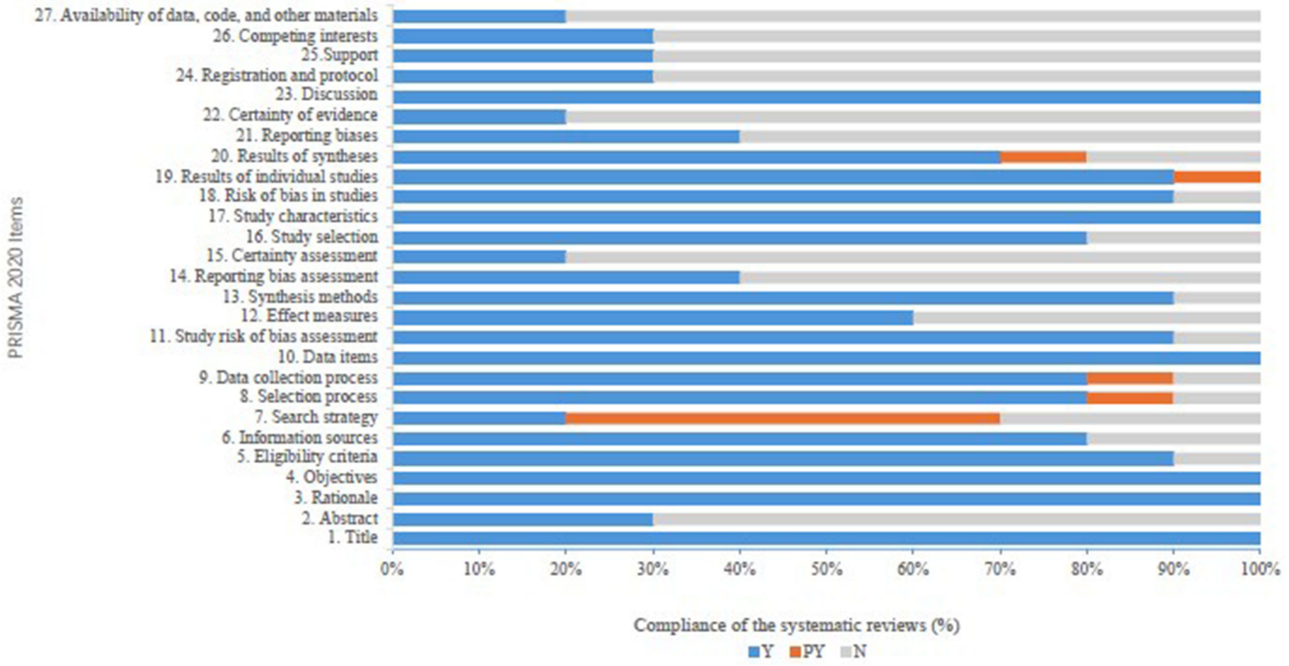

Figure 5 Graphical presentation of PRISMA 2020.
Abbreviations: Y, yes; PY, partial yes; N, no; PRISMA-A, Preferred Reporting Items for Systematic Reviews and Meta-analyses 2020.

An SR[13] reported the efficacy data of acupuncture combined with CT in treating PSD, showing that SA combined with CT effectively improved the treatment efficacy of PSD, with an odds ratio (OR) of 2.44 (95% CI: 1.61, 3.70). There was no significant heterogeneity (P = 0.63, I^2 = 0%).

Acupuncture combined with antidepressant medication compared to simple antidepressant medication

Three systematic reviews (SRs)[35–37] (each including 7–24 RCTs) reported that the combination therapy of acupuncture and medication was more effective than medication alone (RR=1.24, 95% CI: 1.19–1.29, Z=10.07, P < 0.00001; RR=1.33, 95% CI: 1.19–1.49, P < 0.001; RR=1.16, 95% CI: 1.08–1.26; RR=1.16, 95% CI: 1.08–1.24, P < 0.0001). One SR[40] found no statistically significant difference in effectiveness between the acupuncture-medication group and the medication-only group (RR=1.07, 95% CI: 0.98–1.17, P=0.11), but there was a significant difference between the acupuncture-only group and the medication group (Z=3.78 and P=0.002). Another SR[42] found that the cure rate and

Table 5 Results of Included Systematic Reviews

Included Studies	Outcomes	Number of RCTs(Participants)	Effect Estimate (95% CI), P-value
Zhong 2023	Effective rates	8(328/323)	OR=2.44(1.61, 3.70), p< 0.0001
37619716	HAMD	7(427/407)	MD=3.79 (−8.51, 0.92), p < 0.00001
	SDS	3(139/135)	MD=−8.72 (−9.71, −7.73), p = 0.005
Chen 2022	Effective rates	22(903/891)	RR=1.24,(1.19, 1.29), P<0.00001
	HAMD	22(903/891)	MD=−4.15(−5.02,-3.28), P<0.00001
	NIHSS	10(447/435)	MD=−2.51(−4.07,-0.95), P<0.00001
Zhang 2021	Effective rates	6(186/183)	RR=1.33(1.19–1.49), P < 0.001
39199166	HAMD	13(456/448)	MD=−3.60(−4.25, −2.95), P < 0.001
	NIHSS	4(197/192)	MD=−2.39(−3.37, −1.41), P < 0.001
	BI	3(145/142)	MD=8.10(5.25–10.94), P < 0.001
Wang 2021	Effective rates	12(443/439)	RR=1.15(1.10, 1.22), P < 0.00001
33522192	HAMD	19(213/211)	MD=−4.88(−6.68, −3.08), P < 0.00001
	ADL	7 (265/263)	MD=10.32(3.92, 16.72), P < 0.00001
	TESS	4 (139/137)	MD=−5.09(−8.32, −1.85), P < 0.00001
Liu 2021	Ham-D17	3(126/126)	MD=−5.08(−6.48, −3.67), P < 0.00001
33794857		5(130/127)	MD=−0.43(−1.61, 0.75), P =0.47
	Ham-D24	2(63/60)	MD=−9.72(−14.54, −4.91), P < 0.0001
		2(60/60)	MD=−3.09(−10.81, 4.63), P =0.43
	Ham-d	2(79/78)	MD=−2.72(−3.61, −1.82), P < 0.00001
		4(225/269)	MD=−1.55(−4.36, 1.26), P =0.28
Zhang 2021	HAMD	11(356/349)	MD=−0.58(−0.74, −0.43), P < 0.00001
		3(108/107)	MD=−0.76(−1.18, −0.33), P =0.0005
	HAMD	12(429/368)	RR=1.15(1.09, 1.21), P < 0.00001
	NIHSS	6(266/264)	SMD=−2.27(−4.05, −0.48), P < 0.00001
	BI	9(383/380)	SMD=0.71(0.40, 1.02), P < 0.00001
Yin 2021	Immediate effect of acupuncture combined with psychotherapy intervention	15(731/728)	MD=−4.01(−5.28, −2.75), P < 0.00001
	Long-term effect of acupuncture combined with psychotherapy intervention	2	WMD=−2.61(−3.64, −1.57), P=0.03
Zhang 2019	HRSD	7(260/254)	RR=1.16(1.08, 1.24), P < 0.0001
31145349			
Zhou 2018	HAMD	4(122/116) Simple acupuncture	SMD=−0.45(−0.71, −0.19), P=0.0007
		2(58/54) Electroacupuncture	SMD=−1.07(−1.47, −0.68), P < 0.00001
		4(122/120) Simple acupuncture	SMD=−0.52(−0.77, −0.26), P < 0.0001
	5-HT index	4(98/94)	SMD=−1.60(1.27, 1.93), P < 0.00001
	NIHSS	2(50/50)	SMD=0.14(−0.25, 0.54), P=0.48
Zhang 2012	Effective rates	15(553/543)	OR=1.48(1.11, 1.97), P=0.008
22594095			

Abbreviations: CI, confidence interval; HAMD/ HRSD, Hamilton Depression Scale/ Hamilton Rating Scale for Depression; SDS, Self-Rating Depression Scale; NIHSS, National Institute of Health stroke scale; ADL, Activity of Daily Living; TESS, Treatment Emergent Symptom Scale; MESSS, the modified Edinburgh Scandinavian stroke scale; MD, mean difference; WMD, weighted mean difference; SMD, standardized mean difference; RR, risk ratio; OR, odds ratio.

marked effective rate of the acupuncture group compared to the western medication group were statistically significant (OR=1.48, 95% CI: 1.10–1.97; OR=1.39, 95% CI: 1.08–1.80). However, there was no statistical significance in the effectiveness between the acupuncture group and the western medication group (OR=0.83, 95% CI: 0.63–1.09, Z=1.34, P=0.18).

Acupuncture combined with psychotherapy compared to simple psychotherapy.

A systematic review[39] indicated that acupuncture combined with psychotherapy intervention for PSD had both immediate and long-term effects in reducing the severity of PSD (WMD=−4.01, 95% CI: −5.28, −2.75, P < 0.00001) and depression scores (WMD= −2.61, 95% CI: −3.64, −1.57, P=0.03) compared to psychotherapy alone, but there was a high level of heterogeneity.

HAMD

Acupuncture combined with CT compared to simple CT

One SR[13] indicated that the combination of SA and CT did not lead to a decrease in HAMD scores in PSD patients, with a mean difference (MD) of −3.79 (95% CI: −8.51, 0.92), and there was significant heterogeneity (p < 0.00001, I^2 =99%).

Acupuncture combined with antidepressant medication compared to simple antidepressant medication

Three SRs[19,36,37] showed that compared to the pure Western medicine group, the acupuncture plus Western medicine group resulted in a significant reduction in HAMD scores (MD: −3.60, 95% CI: −4.25 to −2.95, P < 0.001; heterogeneity: I^2 = 43%, P = 0.05; WMD = −3.42, 95% CI: −4.55, −2.30; MD = −5.08, 95% CI: −6.48, 3.67, I^2 = 0%).

Acupuncture compared to antidepressant western medicine

A single SR[41] indicated that acupuncture alone was superior to medication in improving depression status in PSD patients (SMD = −0.45, 95% CI: −0.71, −0.19), with P = 0.21 > 0.1 and I^2 = 34%. Acupuncture combined with Chinese herbal medicine was also found to be better than Western medicine in alleviating depression in PSD patients (SMD = −0.52, 95% CI: −0.77, −0.26; Z = 3.95, P < 0.0001). Another SR[38] suggested that acupuncture treatment for PSD lasting more than 4 weeks or less than or equal to 8 weeks resulted in milder depression levels compared to Western medicine, and recovery was better when the course was shorter than 4 weeks (SMD = −1.29, 95% CI: −1.56, −1.03).

Acupuncture compared to sham acupuncture.

One SR[19] compared the effects of acupuncture and sham acupuncture on HAMD scores and found that acupuncture significantly reduced HAMD scores (MD = −9.72, 95% CI: −14.54 to −4.91, I^2 = 65%).

NIHSS

Two SRs[35,36] indicate that the acupuncture-medicine combination group has a clinically superior effect in terms of NIHSS scores compared to the pure Western medicine group (MD = −2.72, 95% CI: −3.70, −1.75, Z = 5.47, P ≤ 0.00001; MD: −2.39, 95% CI: −3.37, −1.41, P < 0.001, heterogeneity: I^2 = 64%, P = 0.04). However, one SR[41] found no significant difference between acupuncture treatment and antidepressant drugs in improving neurological function in PSD patients (SMD = 0.14, 95% CI: −0.25, 0.54), Z = 0.71, P = 0.48).

Self-Rating Depression Scale

One SR[13] indicates that the combination of SA and CT can effectively reduce the SDS score in PSD patients, with an MD of −8.72, 95% CI: −9.71, −7.73.

Barthel Index Score

A single SR[36] shows that acupuncture combined with antidepressants significantly improves Barthel index scores (MD = 8.10, 95% CI: 5.25–10.94; P < 0.001; heterogeneity: I^2 = 29%, P = 0.25). A systematic review[38] evaluated the activities of daily living in patients with post-stroke depression after treatment and found that acupuncture was superior to Western medicine in reducing Barthel Index scores (SMD = 0.71, 95% CI: 0.40, 1.02).

5-HT

A SR[41] showed that acupuncture is more effective than antidepressants in inhibiting the reuptake of 5-HT in patient serum (SMD = 1.60, 95% CI: 1.27, 1.93, Z = 9.48, P < 0.0001).

Evidence Quality of Included SRs

In 34 evidence quality outcomes, four were rated as “moderate” quality (11.76%), ten as “low” quality (29.41%), and twenty as “very low” quality (58.82%). Among the downgrading factors, risk of bias (88.23%) and publication bias (85.29%) were most common, followed by imprecision (32.35%), inconsistency (14.70%), and indirectness (0.00%). The Kappa index (k = 0.80) indicates good agreement between two reviewers (WRH and HYY). Detailed summaries are shown in Table 6.

Table 6 Evidence Quality of Included SRs Assessed by the Grading of Recommendations, Assessment, Development and Evaluations

Included Studies	Outcomes	Number of RCTs(Participants)	Certainty Assessment					Quality of Evidence
			Risk of bias	Inconsistency	Indirectness	Imprecision	Publication Bias	
Zhong 2023 37619716	Effective rates	8(328/323)	−1	0	0	−1	−1	Very low
	HAMD	7(427/407)	−1	+1	0	0	0	Moderate
	SDS	3(139/135)	−1	−1	0	−1	−1	Very low
Chen 2022	Effective rates	22(903/891)	0	0	0	0	−1	Moderate
	HAMD	22(903/891)	0	+1	0	0	−1	Moderate
	NIHSS	10(447/435)	0	+1	0	0	−1	Moderate
Zhang 2021 39199166	Effective rates	6(186/183)	−1	0	0	−1	−1	Very low
	HAMD	13(456/448)	−1	0	0	0	−1	Low
	NIHSS	4(197/192)	−1	−1	0	−1	−1	Very low
	BI	3(145/142)	−1	0	0	−1	−1	Very low
Wang 2021 33522192	Effective rates	12(443/439)	−1	−1	0	0	−1	Very low
	HAMD	19(213/211)	−1	+1	0	−1	−1	Very low
	ADL	7	−1	+1	0	−1	−1	Very low
	TESS	4	−1	+1	0	−1	−1	Very low
Liu 2021 33794857	Ham-D17	3(126/126)	−1	0	0	−1	−1	Very low
		5(130/127)	−1	+1	0	−1	0	Low
	Ham-D24	2(63/60)	−1	−1	0	−1	−1	Very low
		2(60/60)	−1	−1	0	−1	0	Very low
	Ham-d	2(79/78)	−1	0	0	−1	−1	Very low
		4(225/269)	−1	+1	0	−1	−1	Very low
Zhang 2021	HAMD	11(356/349)	−1	+1	0	−1	−1	Very low
		3(108/107)	−1	+1	0	−1	−1	Very low
	HAMD	12(429/368)	−1	+1	0	0	−1	Low
	NIHSS	6(266/264)	−1	+1	0	0	−1	Low
	BI	9(383/380)	−1	+1	0	0	−1	Low
Yin 2021	Immediate effect of acupuncture combined with psychotherapy intervention	15(731/728)	−1	+1	0	0	−1	Low
	Long-term effect of acupuncture combined with psychotherapy intervention	15 (585/584)	−1	0	0	−1	0	Low
Zhang 2019 31145349	HRSD	7(260/254)	0	0	0	−1	−1	Low
Zhou 2018	HAMD	4(122/116) Simple acupuncture	−1	+1	0	−1	−1	Very low
		2(58/54) Electroacupuncture	−1	+1	0	−1	−1	Very low
		4(122/120) Simple acupuncture	−1	0	0	−1	−1	Very low
	5-HT index	4(98/94)	−1	0	0	−1	−1	Very low
	NIHSS	2(50/50)	−1	+1	0	−1	0	Low
Zhang 2012 22594095	Effective rates	15(553/543)	−1	+1	0	0	−1	Low

Abbreviations: HAMD/ HRSD, Hamilton Depression Scale/ Hamilton Rating Scale for Depression; SDS, Self-Rating Depression Scale; NIHSS, National Institute of Health stroke scale; ADL, Activity of Daily Living; TESS, Treatment Emergent Symptom Scale; MESSS, the modified Edinburgh Scandinavian stroke scale.

Safety of Acupuncture for PSD

Regarding the safety of acupuncture treatment for PSD, seven out of ten SRs[13,19,35,36,38,40,42] mentioned adverse events, but serious adverse events were rare. Reported acupuncture-related adverse events typically included minor bruising,

dizziness, nausea, sweating, local skin redness, and pain, which resolved without medical or specific intervention. One SR[37] found that acupuncture plus western medication resulted in a statistically significant reduction in TESS scores compared to western medication alone (WMD = −5.09, 95% CI: −8.32, −1.85). All these SRs concluded that not only is the incidence and severity of adverse events from acupuncture lower than that of drugs, but also the rate of adverse reactions from acupuncture combined with drug therapy is lower than that from antidepressant drug therapy alone. This suggests that acupuncture can help mitigate some of the side effects associated with antidepressants, and these side effects tend to resolve within a short period of time. Therefore, acupuncture is considered a safe intervention for PSD, and acupuncture combined with drug therapy is more widely accepted by patients, with better compliance.

Discussion

In this study, we aim to critically appraise and synthesize the clinical evidence for acupuncture as an adjunctive therapy for post-stroke depression (PSD). We conducted a comprehensive evaluation of the existing systematic reviews/meta-analyses (SR/MA) to assess the efficacy and safety of acupuncture combined with conventional treatments. Our analysis focused on the methodological quality, publication bias, and evidence quality while specifically examining clinical application patterns of acupuncture interventions. The objective was to identify sources of inconsistency and derive clinically actionable insights. Despite promising potential, our findings suggest caution due to generally low evidence quality. This synthesis provides both methodological guidance and preliminary clinical references for future PSD management.

Acupuncture protocols for PSD consistently featured core acupoints across systematic reviews: Baihui (GV20; 80% of SRs), Yintang (EX-HN3; 70%), Neiguan (PC6; 60%), and Sishencong (EX-HN1; 50%), with characteristic combinations of GV20+EX-HN3 for mood regulation and PC6+Shenmen (HT7) for tranquilizing effects. Manual acupuncture (90% of SRs) predominantly employed the mild reinforcing-reducing method, while electroacupuncture (40% of SRs) utilized variable frequencies (2–100 Hz; unstandardized). Treatment regimens typically involved 5 sessions weekly (range: 3–7) over 4–6 weeks (range: 2–8), with 20–30 minutes per session. Notably, 90% of primary studies positioned acupuncture as an adjunct to conventional therapies, primarily antidepressants (SSRIs/TCAs) or psychotherapy. The commonly used acupoints for treating post-stroke depression (PSD) are detailed in Table 7.

Table 7 Most Frequently Used Acupoints for Post-Stroke Depression in Systematic Reviews

Acupoint	Location	Meridian	Indications	Manipulation Technique	Frequency (%)
GV20 (百会)	On the vertex, 7 cun above the posterior hairline, at the midpoint of the line connecting the apexes of both ears	Governor Vessel	Mental disorders, headache, vertigo	Subcutaneous insertion 0.5–0.8 cun with even reinforcing-reducing method	78.3
PC6 (内关)	2 cun above the transverse crease of the wrist, between the tendons of palmaris longus and flexor carpi radialis	Pericardium	Chest stuffiness, palpitations, gastric disorders	Perpendicular insertion 0.5–1 cun with reducing method	65.2
LR3 (太冲)	On the dorsum of the foot, in the depression anterior to the junction of the 1st and 2nd metatarsal bones	Liver	Headache, dizziness, mental disorders	Oblique insertion 0.5–1 cun with reducing method	58.7
HT7 (神门)	At the ulnar end of the transverse crease of the wrist, in the depression on the radial side of the tendon of flexor carpi ulnaris	Heart	Insomnia, palpitations, poor memory	Perpendicular insertion 0.3–0.5 cun with even method	52.1
ST36 (足三里)	3 cun below ST35, one finger-breadth lateral to the anterior crest of the tibia	Stomach	Fatigue, gastrointestinal disorders	Perpendicular insertion 1–1.5 cun with reinforcing method	47.8

This synthesis of systematic reviews (SRs) spanning a decade provides preliminary clinical patterns but fails to yield definitive conclusions due to methodological limitations. The quality of each SR is gauged by AMSTAR 2, ROBIS, and PRISMA 2020 scores, with evidence strength guided by GRADE. Our analysis encompasses three primary comparisons: acupuncture combined with Western medication versus Western medication alone, acupuncture combined with psychotherapy versus psychotherapy alone, and acupuncture alone versus Western medication alone. Three SRs[35–37] report on the comparative efficacy of acupuncture plus Western medication versus Western medication alone for PSD. Chen et al's study[35] presents moderate-quality evidence suggesting that the combination therapy is more effective in improving HAMD and NIHSS scores than Western medication alone. This aligns with observed clinical patterns where GV20/PC6-based protocols combined with SSRIs showed consistent benefit. However, this SR has high ROBIS bias risk and low AMSTAR 2 quality. According to GRADE, such evidence is considered "moderate", implying that further research could significantly impact our confidence in the effect estimates and potentially alter them.[33] While the evidence holds some merit, it necessitates cautious interpretation and rigorous validation through additional studies. Notably, the systematic review in question demonstrated discordant quality assessments, receiving a high-risk rating on the ROBIS bias evaluation while scoring in the extremely low-quality range per AMSTAR 2 criteria. In summary, the conclusions drawn by Chen et al should be approached with caution, and the efficacy of acupuncture for PSD requires confirmation through higher-quality SRs.

The preponderance of systematic reviews (SRs) tout acupuncture's efficacy, yet only a minority suggest no significant difference in response rates between acupuncture combined with Western medication and Western medication alone.[40] Most SRs scored poorly on AMSTAR 2 items 2,3,4,7,10,15,16. Crucially, none adequately reported STRICTA items for acupuncture standardization. Additionally, several SRs are flagged as high risk across most domains in the Robis tool.[35–37,39,41,42] Moderate-quality evidence suggests combination therapy surpasses monotherapy in total effectiveness rates and HAMD/NIHSS reduction. The NIHSS improvements are clinically meaningful, potentially linked to frequent use of scalp acupuncture over motor cortex areas. HAMD is a widely used clinical scale for assessing the severity of depression, while NIHSS is commonly applied to evaluate neurological deficits in stroke patients. The combination of acupuncture and medication demonstrates a clear advantage in improving HAMD and NIHSS scores in PSD patients. Nonetheless, the interpretation of evidence for acupuncture in treating PSD must be approached with caution due to inconsistencies in results, potential biases, and overall low quality.

Systematic reviews (SRs) often exhibit reporting deficiencies in methodology and quality, introducing a risk of bias that may underlie the variability in research outcomes. AMSTAR 2 evaluations reveal common flaws across 10 SRs, including the lack of pre-specified protocols, unclear justifications for study selection, missing details on study exclusion, and issues related to publication bias and conflicts of interest. These gaps directly impede clinical application—without knowing excluded studies, we cannot refine acupoint selection logic. The Robis tool assesses three SRs as low risk, particularly for transparency in study selection and bias risk assessment. PRISMA 2020 findings highlight the most significant reporting gaps in protocol development and registration, inter-study bias risk evaluation, methods and outcomes of evidence quality assessment, funding transparency, and conflict of interest disclosure. According to GRADE criteria, the quality of evidence ranges from "moderate" to "very low", frequently downgraded due to high bias risk and statistical heterogeneity. While quantitative assessment of primary study overlap was precluded by inconsistent reporting in SRs, we identified 37 RCTs recurring across ≥2 SRs (notably trials by Zhang et al 2018 and Li et al 2020 appearing in 6/10 SRs). This redundancy may amplify bias in overall evidence interpretation.

Despite methodological limitations, three consistent patterns emerge from the evidence: (1) Adjunctive superiority: Acupuncture combined with Western medication (WM) demonstrated significant advantages over WM alone in 8/10 systematic reviews (HAMD improvement Δ3-8 points); (2) Point selection logic: Acupoints clustered into functional categories—"spirit-regulating" (GV20/EX-HN3) and "liver-harmonizing" (LR3/PC6) groups; (3) Dose-response relationship: Protocols with ≥20 sessions yielded larger effect sizes (SMD 0.41 vs 0.29). These patterns suggest an initial clinical protocol: GV20+EX-HN3+PC6+LR3 stimulation 5 times/week for 4 weeks alongside SSRIs, while researchers should prioritize standardizing electroacupuncture parameters and TCM syndrome differentiation.

To address evidence quality concerns, future studies must: strictly implement AMSTAR 2/PRISMA/STRICTA guidelines; preregister protocols with full conflict disclosure; report acupuncture details using TCM rationale (eg,

"PC6 selected for liver qi stagnation"); and conduct subgroup analyses comparing point combinations. Although acupuncture appears safe and effective for improving HAMD/NIHSS/SDS scores (34.9% symptom reduction in combination groups vs 22.7% with WM alone), regional bias from China-centric studies[44,45] necessitates validation in non-Asian populations. Critical standardization priorities include needle depth/manipulation (eg, GV20 insertion depth varied 0.5–1.5 cun) and assessment of long-term effects (absent in all SRs).

This overview confirms acupuncture's potential as a standardized adjunct therapy when: (a) combined with antidepressants, (b) using core acupoints (GV20/PC6/LR3), and (c) applied ≥5 times/week for 4 weeks. The 12.2% added benefit over conventional therapy, while derived from low-quality evidence, indicates clinically meaningful value for treatment-resistant cases. Limitations include restricted generalizability from few SRs, unexplored clinical heterogeneity in acupuncture protocols, and inability to perform dose-response meta-analysis due to inconsistent reporting. Future high-quality systematic reviews must transparently document clinical parameters to transform observed patterns into evidence-based protocols.

Given the aforementioned quality issues, it is strongly recommended that future researchers adhere strictly to the guidelines of AMSTAR 2, ROBIS, PRISMA 2020, and GRADE when conducting systematic reviews. Emphasis should be placed on preregistering study protocols on platforms such as Cochrane Library or PROSPERO to mitigate post-decision biases. Comprehensive literature searches must extend beyond major biomedical databases to include gray literature. It is advisable to meticulously document electronic search strategies for one or more databases and provide a complete list of excluded studies along with justifications. If sufficient randomized controlled trial data are available, funnel plots or Egger regression should be employed to assess publication bias; if not, reasons for this omission must be articulated. Additionally, the sources of funding and the roles of funders must be transparently disclosed. Enhancing evidence quality hinges on conducting numerous rigorous randomized controlled trials to validate the efficacy of acupuncture therapy for PSD. In cases of significant heterogeneity, sub-group analysis or meta-regression should be performed.

Despite the limitations of the 10 systematic reviews (SRs) included, acupuncture may remain a safe and effective treatment for PSD for clinicians and patients, particularly when combined with Western medication or psychotherapy. Its performance in improving HAMD, NIHSS, and SDS scores might surpass that of monotherapies. However, all included SRs originate from China with Asian populations, potentially introducing regional bias.[44,45] Future research should investigate the generalizability of these findings to other regions. Given the variability of antidepressants in clinical trials for PSD, subsequent SRs should employ subgroup analysis to evaluate the efficacy of acupuncture in conjunction with different antidepressants, rather than relying solely on overall assessments. The interventions lack standardized criteria for needle depth, technique, and stimulation intensity, and there are variations in treatment duration and types and doses of antidepressants. Moreover, existing studies only assess outcomes at the end of treatment without follow-up data, leaving the long-term effects of acupuncture combined with antidepressants for PSD unclear.

Our research overview has some limitations. First, the limited number of included systematic reviews (SRs) might restrict the generalizability of our findings. Increasing the number of high-quality SRs would enhance the reliability of our results. Second, there is heterogeneity among the included SRs. However, since all quality assessments were conducted by at least two reviewers and the Kappa scores indicate a high level of agreement between them, our results are unlikely to be significantly biased. Finally, as most of the included SRs have issues with quality and bias, we cannot draw definitive conclusions regarding the efficacy of acupuncture in treating PSD. Although the use of tools such as AMSTAR 2, ROBIS, PRISMA 2020, and GRADE is subject to evaluator subjectivity, with higher inter-evaluator credibility, the risk of potential bias remains not entirely negligible.

Conclusion

This overview highlights that acupuncture as an adjuvant therapy, particularly when used in combination with antidepressant medication or psychotherapy, shows potential for improving post-stroke depression outcomes such as mood and neurological function. However, the currently available systematic reviews are mostly of low methodological quality, with significant risk of bias and variability in reporting. While acupuncture appears to be a relatively safe intervention, its clinical efficacy remains uncertain due to the poor quality of evidence. These findings underscore the urgent need for more rigorous, well-designed systematic reviews and randomized trials. A more robust evidence base is essential to inform clinical decision-making and support the integration of acupuncture into PSD treatment guidelines.

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Disclosure

The authors declare no competing financial interests or personal relationships that could have influenced the work reported in this paper.

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