

Systematic reviews and meta-analysis of acupuncture for post-stroke dysphagia: an updated overview of the evidence

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ABSTRACT

Introduction Dysphagia is a common post-stroke complication. Acupuncture is a widely used effective treatment for post-stroke dysphagia in China. Based on our previously published overview in 2019, this study aimed to provide an update on the current evidence regarding acupuncture for post-stroke dysphagia. Specifically, this study aimed to assess the quality of systematic reviews (SRs) and meta-analyses (MAs) published in the last 5 years using the new Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 (PRISMA 2020) tool to provide updated evidence for clinical decision-making. **Methods** The following databases were searched: China National Knowledge Infrastructure, Wanfang database, Chinese Scientific Journal Database, SinoMed, PubMed, Embase and Cochrane Library from January 1, 2019 to June 30, 2025. Two researchers independently performed data extraction. A Measurement Tool to Assess Systematic Reviews 2 (AMSTAR 2) and PRISMA 2020 were used to evaluate the methodological and reporting quality of the included SRs/MA, respectively. **Results** Eight SRs/MA met the inclusion criteria. Additionally, one article applied the Grading of Recommendations Assessment, Development Evaluation system. Most of the evidence was of very low quality, with the primary factors for downgrading being inconsistency and publication bias. Evaluation using AMSTAR 2 indicated that there were no high-quality SRs/MA and that all studies were of critically low quality. Quality issues included failure to provide a list of excluded studies and justify their exclusion. Moreover, not all studies were randomized controlled trials (RCTs) with a low risk of bias (RoB). Additionally, if the studies were RCTs with moderate or high risk of bias, the review did not provide a discussion of the likely impact of the RoB on the results. **Conclusion** Acupuncture combined with rehabilitation may improve post-stroke dysphagia symptoms. However, the methodological quality of SRs/MA remains very low and has not improved over the last 5 years. Studies should be designed in line with the AMSTAR 2 and PRISMA 2020 to provide reliable, high-quality evidence for supporting clinical practice.

KEYWORDS

acupuncture, post-stroke dysphagia, systematic review, meta-analysis, AMSTAR 2, PRISMA, overview

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1. Introduction

Dysphagia is the most significant post-stroke complication worldwide, occurring in as many as 78% of patients experience a stroke.¹ Moreover, dysphagia may result in pneumonia complications, malnutrition, and even death.^{2,3} As a traditional Chinese therapy, acupuncture has a long history in clinical practice;⁴ moreover, it has demonstrated unique efficacy in the treatment of post-stroke dysphagia. Specifically, it has been shown to improve swallowing function,⁵ have long-term effectiveness,^{6,7} and improve communication ability.⁸

In 2019, we conducted an overview of the methodological and reporting qualities of 31 published systematic reviews (SRs) related to acupuncture treatment of post-stroke dysphagia.⁹ These SRs demonstrated poor reporting quality and critically low methodological quality. In 2020, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria were updated, and many items expanded and refined.¹⁰ Since new relevant SRs published in the past 5 years;^{11–18} there was a need to assess the quality of these SRs using the new PRISMA 2020 tool as an update to the original

overview. The original overview included all meta-analyses (MAs) related to acupuncture, with the control groups being sham acupuncture, medication, conventional treatment, Western medicine, or rehabilitation training. The present overview did not consider herbal medicine as an intervention. Altogether, this study aimed to systematically evaluate and summarize the current evidence regarding acupuncture treatment for post-stroke dysphagia in order to provide an updated evidence base for clinical decision-making and guide future research.

2. Methods

2.1. Literature search

Databases searched included: the China National Knowledge Infrastructure, Wanfang database, Chinese Scientific Journal Database (VIP), SinoMed, PubMed, Embase, Cochrane Library for SRs/MA on acupuncture treatment of post-dysphagia stroke from January 1, 2019 to June 30, 2025. We used the MeSH term “stroke” for queries according to PubMed. The search strategies and websites are listed in Appendix 1. The studies obtained were subsequently added to the initial overview of the studies.⁹

2.2. Inclusion and exclusion criteria

The inclusion and exclusion criteria were as follows:

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(I) Study participants included patients with post-stroke dysphagia complications.

(II) Interventions included acupuncture/electroacupuncture alone or in combination with other treatments (swallowing rehabilitation training, swallowing function training, rehabilitation, swallowing training, or basic treatment in internal medicine). Studies were excluded if they included Chinese herbal medicine, neuromuscular electrical stimulation (NES), catheter balloon dilation/balloon dilation, blood-letting acupuncture, acupressure points, or repetitive transcranial magnetic stimulation as interventions.

(III) Participants receiving acupuncture treatment were excluded from the control group.

(IV) Outcome indicators included clinical response rate, overall response rate, recovery rate, water swallowing test (WST), video fluoroscopic swallowing study (VFSS), Fujishima dysphagia scale (FDS), standardized swallowing assessment (SSA), swallowing quality-of-life questionnaire (SWOL-QOL), Ichiro Fujishima rating scale (IFRS), incidence of aspiration pneumonia (IAP), National Institutes of Health Stroke Scale (NIHSS), repetitive saliva swallowing test (RSST), modified water swallowing test (MWST), fiberoptic endoscopic evaluation of swallowing (FEES), modified Barthel Index (MBI), modified drinking test, dysphagia severity scale, geniohyoid muscle movement time and displacement and adverse events.

(V) Study designs included SRs/MA of randomized controlled trials (RCTs).

(VI) SRs/MA of RCTs included in the previous overview⁹ were excluded.

2.3. Literature screening and data extraction

2.3.1. Literature screening

All titles were imported into NoteExpress (version 4.0, Beijing Aegean Technology, Beijing, China). Two researchers (LY and ZYT) identified SRs/MA newly published between January 1, 2019 and June 30, 2025. After removing duplicates, literature screening was conducted independently by two researchers (LY and ZYT) based on the inclusion and exclusion criteria. A third researcher (NR) performed title and abstract screening, followed by full-text screening to identify relevant articles. Disagreements were resolved through discussion between the authors or consultation with a third party (NR).

2.3.2. Data extraction

Two researchers independently performed data extraction using a pre-designed Excel extraction sheet. The extracted data included information regarding the research team, number of included RCTs, number of patients/cases, interventions (treatment and control groups), outcomes, methodological quality assessment tools, use of Grading of Recommendations Assessment Development and Evaluation (GRADE), and name of disease. Disagreements were resolved through discussion between the authors or consultation with a third party (NR).

2.4. Quality evaluation

2.4.1. Methodological quality assessment

The methodological quality of included studies was evaluated using A Measurement Tool to Assess Systematic Reviews 2 (AMSTAR 2). The AMSTAR 2 is a 16-item scale, with “Yes,” “No,” and “Partially Yes” as the possible responses for each item. We selected seven key items (items 2, 4, 7, 9, 11, 13, and 15) to evaluate. Methodological quality was rated as high if there was no or only one non-critical weakness, medium if there was more than one non-critical weakness, low if there was one critical flaw with or without non-critical weaknesses, and critically low if there was more than one critical flaw with or without non-critical weaknesses.¹⁹

2.4.2. Reporting quality assessment

PRISMA 2020, which comprises main (27 items) and abstract (12 items)

checklists,¹⁰ was used to assess the reporting quality of the included SRs.

3. Results

3.1. Literature search

The database search yielded 679 articles, with 518 articles remaining after removing duplicates. A total of 43 articles were included after title/abstract screening. Among these, the intervention measures in the treatment group did not meet the inclusion criteria (including blood-letting acupuncture, repetitive transcranial magnetic stimulation, Chinese herbal medicine) in 5 studies, the intervention measures in the control group did not meet the inclusion criteria (including acupuncture treatment, Chinese herbal medicine) in 9 studies, and neither of them met the inclusion criteria (including NES, catheter balloon dilation/balloon dilation), in 5 studies, all of which were excluded. Three articles did not display the necessary critical data in their tables. Following data verification, inconsistencies were identified between a journal article and a doctoral dissertation by the same author. After removing those which did not meet the standards for inclusion, 8 articles remained. Finally, 8 SRs/MA were included in the present overview (Figure 1).

3.2. Basic characteristics of the included articles

Among the 8 included articles, all were journal articles.^{11–18} All SRs/MA were conducted on post-stroke dysphagia, with only two being limited to pseudobulbar palsy.^{12,13} The original studies included were all RCTs. Additionally, the interventions performed included acupuncture, “Tong Guan Li Qiao” acupuncture, electroacupuncture, nape acupuncture, and tongue three-needle acupuncture. The main control intervention was swallowing rehabilitation training. Most of the studies concluded that acupuncture combined with rehabilitation training is more effective than rehabilitation training alone in the treatment of post-stroke dysphagia. Table 1 presents full details regarding the included studies.

3.3. Evaluation of the quality of outcomes and evidence

The SRs/MA included a total of 19 outcomes. By counting the frequency of these outcomes, it was observed that VFSS and SSA were cited more than five times in the 8 SRs/MA. VFSS or fiberoptic endoscopic examination of swallowing and the SSA were found to be “gold standard” assessments.¹³

One of the 8 SRs/MA applied the GRADE system for evidence assessment.¹³ Regarding the meta-analysis conducted by Tang et al., limitations, inconsistency, and publication bias led to a downgrade of the evidence quality. The evaluation result of the limitation for the effectiveness was serious, because the performance and detection biases were graded as unclear risk of bias (RoB). Due to imprecision, inconsistency, indirectness, and publication bias, the quality of evidence supporting VFSS was downgraded to very low. Limitations, inconsistency, and publication bias led to a downgrade of the evidence quality for SSA, and the evaluation result of SSA was very low. The results are summarized in Table 2.

3.4. Quality assessment

3.4.1. Methodological quality assessment

Among the 8 included SRs/MA, all had a critically low methodological quality rating, and none had high or medium methodological quality rating. According to the specific content of items in AMSTAR 2 (Appendix 2), regarding the key item 2, two articles^{12,13} established a plan for reviewing the methodology, including an MA protocol as well as an investigation of the sources of heterogeneity and reasons for bias. The remaining articles did not establish a review methodology. For item 4, one article¹² used a comprehensive search strategy that included grey literature, while the remaining articles applied queried appropriate databases and described the keywords and search strategies. For item 7, no article provided a list of the excluded studies or justified their exclusion. For item 9, all the articles included RCTs. For item 11,

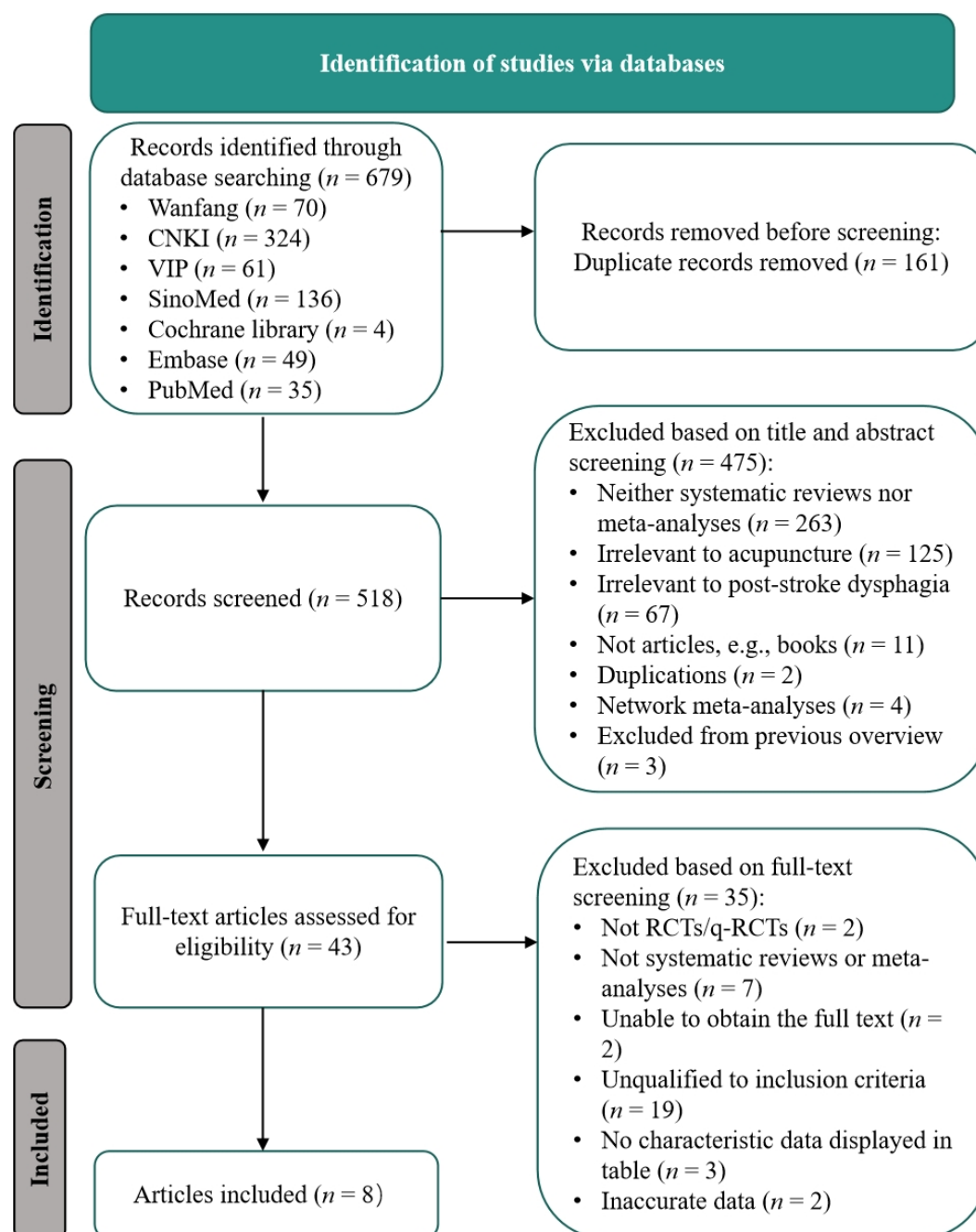


Figure 1 Flow chart of study selection

Notes: CNKI: China National Knowledge Infrastructure; RCTs: randomized controlled trials; VIP: Chinese Scientific Journal Database.

all the included articles performed MAs while three articles^{11,14,15} did not investigate the causes of heterogeneity. The remaining articles applied appropriate methods to obtain the results. For item 13, no papers reported a low RoB. For item 15, two articles^{12,13} did not perform graphical assessment for publication bias. Regarding item 14, Liang et al.¹¹ assessed heterogeneity and its impact on the results; however, a subgroup analysis for studies with high heterogeneity was not performed. Accordingly, further analysis is warranted to verify the accuracy of these results. Regarding item 15, Wang et al.¹² did not assess the outcome of publication bias; however, the study included <10 articles (Figure 2 and Appendix 3).

3.4.2. Evaluation of the quality of reporting

No SR/MA reported all 27 items of the PRISMA 2020 checklist, six

SRs/MA^{11,13-16,18} (75%) reported 51%–54% of items of the PRISMA, and two SRs/MA^{12,17} (25%) reported 56%–59% of items of the PRISMA (Figure 3). No SR/MA reported all 12 items of the PRISMA 2020 abstract checklist, four SRs/MA^{12,13,15,17} (50%) reported 42%–50% of items, four SRs/MA^{11,14,16,18} (50%) reported 58%–67% items (Figure 4). All SRs/MA were evaluated using PRISMA 2020. In the main checklist, items 3, 4, 6, 8, 9, 12, 13a, 13d, 17, 19, 20b, 23b, and 23d were all reported on in the 8 included SRs/MA. Item 3 describes the rationale for the review in the context of existing knowledge. Item 4 provides an explicit statement of the objective(s) or question(s) the review addresses. Item 6 specifies all databases, registers, websites, organizations, reference lists and other sources searched or consulted to identify studies, specifies the date when each source was last searched or consulted. Item 8 specifies the methods used to decide whether a study met the inclusion criteria of

Table 1 Basic characteristics of systematic review and meta-analysis of acupuncture for dysphagia after stroke

Authors	Sample size/ cases	Intervention		Outcomes	Methodological quality assessment tools	Whether or not to conduct a GRADE evaluation	Disease
		Treatment group	Control group				
Liang HH 2024 ¹¹	1308/14	“Tong Guan Li Qiao” acupuncture/“Tong Guan Li Qiao” acupuncture combined with other treatments	Rehabilitation/rehabili- tation combined with swallowing therapy apparatus	1, 6, 7, 8, 15	Cochrane Handbook	No	Cerebral apoplexy
Wang P 2022 ¹²	637/7	Acupuncture with or without rehabilitation	Rehabilitation treatment without acupuncture	4, 7, 8, 11, 12, 13	Cochrane risk of bias tool	No	Pseudobulbar paralysis
Tang YH 2022 ¹³	1069/11	Nape acupuncture combined with rehabilitation training	Rehabilitation alone	4, 5, 7, 8, 12, 14, 16, 17, 18	Cochrane Handbook, Jade scale	Yes	Post-stroke/ pseudobulbar palsy
Huang J 2020 ¹⁴	1216/16	EA combined with SRT	SRT alone	4, 5, 7, 9, 10, 19	Cochrane risk of bias tool	No	Post-stroke
Geng JJ 2021 ¹⁵	1352/18	EA combined with swallowing function training	Swallowing function training	1, 4, 5, 6, 19	Cochrane risk of bias tool	No	Stroke
Hu SY 2021 ¹⁶	671/9	Tongue three-needle/ tongue three-needle with complementary therapies	Therapies other than tongue three-needle	2, 3, 4, 5	Cochrane Handbook 5.1	No	Stroke
Wang J 2021 ¹⁷	954/14	Acupuncture and rehabilitation training combined with conventional rehabilitation	Conventional rehabilitation	1, 2, 4, 7	Cochrane Handbook 5.1	No	Cerebral apoplexy
Wang H 2019 ¹⁸	921/12	Acupuncture combined with swallowing training	Swallowing training	1, 4, 5, 6, 7, 8	Cochrane Reviewer’s Handbook 5.1	No	Stroke

Notes: EA: electroacupuncture; GRADE: Grading of Recommendations Assessment Development and Evaluation; PSD: post-stroke dysphagia; SRT: swallowing rehabilitation training. 1. clinical response rate; 2. overall response rate; 3. recovery rate; 4. water swallowing test; 5. video fluoroscopic swallowing study; 6. Fujishima dysphagia scale; 7. standardized swallowing assessment; 8. swallowing quality-of-life questionnaire; 9. Ichiro Fujishima rating scale; 10. incidence of aspiration pneumonia; 11. National Institutes of Health Stroke Scale; 12. repetitive saliva swallowing test; 13. modified water swallowing test; 14. fiberoptic endoscopic evaluation of swallowing; 15. Modified Barthel Index; 16. modified drinking test; 17. dysphagia severity scale; 18. geniohyoid muscle movement time and displacement; 19. adverse events.

Table 2 Grading of Recommendations Assessment Development and Evaluation results

Authors	Outcomes	Intervention group/ Control group	Number of studies (sample size)	limitations	Inconsistency	Indirectness	Imprecision	Publication bias	Grading
Tang YH 2022 ¹³	Effectiveness	Nape acupuncture + rehabilitation/rehabilitation	11 (1069)	Serious	Not serious	Not serious	Not serious	Not serious	Moderate
	VFSS	Nape acupuncture + rehabilitation/Rehabilitation	4 (332)	Not serious	Serious	Serious	Serious	Serious	Very low
	SSA	Nape acupuncture + rehabilitation/rehabilitation	11 (797)	Serious	Serious	Not serious	Not serious	Serious	Very low

Notes: VFSS: video fluoroscopic swallowing study; SSA: swallowing severity scale.

the review; item 9 specifies the methods used to collect data from reports. Item 12 specifies for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results. Item 13a describes the processes used to decide which studies were eligible for each synthesis; item 13d describes any methods used to synthesize results and provide a rationale for the choice(s). Item 17 cites each included study and presents its characteristics. Item 19 presents for all outcomes of each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots. Item 20b presents the results of all statistical syntheses conducted if a meta-analysis was done and also presents for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. when comparing groups, it also describes the direction of the effect. Item 23b discusses any limitations of the evidence included in the

review; Item 23d discusses the implications of the results for practice, policy, and future research. Finally, regarding items 7, 10b, 13b, 13c 16b, 20a, 24b, and 24c 0% reported on the 8 included SRs/MA. In the abstract checklist, items 2, 6, 8 and 10 100% reported on the 8 included SRs/MA. Item 2 provides an explicit statement of the main objective(s) or question(s) the review addresses. Item 6 specifies the methods used to present and synthesis results. Item 8 presents results for main outcomes, preferably indicating the number of included studies and participants for each. Item 10 provides a general interpretation of the results and important implications. Finally, as for items 3, 7, 11, and 12, 0% reported on the 8 included SRs/MA (Appendices 4 and 5).

4. Discussion

Dysphagia is a common post-stroke complication, occurring in 55% of all

	Item 1	Item 2*	Item 3	Item 4*	Item 5	Item 6	Item 7*	Item 8	Item 9*	Item 10	Item 11*	Item 12	Item 13*	Item 14	Item 15*	Item 16	M Q A
Liang HH 2024 ¹¹																	C L
Wang P 2022 ¹²																	C L
Tang YH 2022 ¹³																	C L
Huang J 2020 ¹⁴																	C L
Geng JJ 2021 ¹⁵																	C L
Hu SY 2021 ¹⁶																	C L
Wang J 2021 ¹⁷																	C L
Wang H 2019 ¹⁸																	C L

Figure 2 SRs/MA methodological quality evaluation of acupuncture for dysphagia after stroke

Notes: CL: critically low; MA: meta-analysis; MQA: methodological quality assessment; SRs: systematic reviews. * For key entries, the green color indicates “Yes,” the yellow color indicates “Partially Yes,” and the red color indicates “No.”

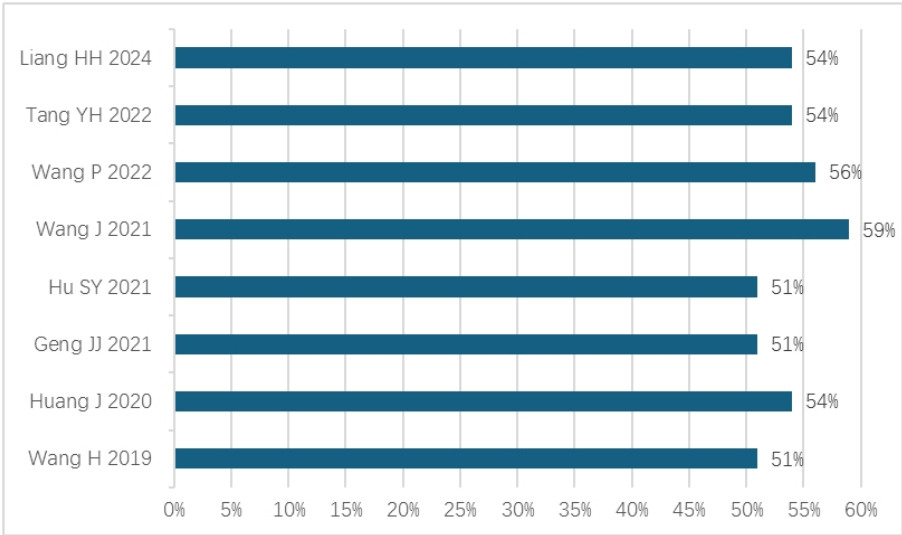


Figure 3 The percentage “Yes” for each identified SRs/MA assessed by PRISMA 2020 (Checklist)

Notes: SRs: systematic reviews; MA: meta-analysis; PRISMA 2020: Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020.

hospital-admitted acute stroke survivors.²⁰ Acupuncture is a cost-effective treatment²¹ for clinical symptoms of post-stroke dysphagia which reduces complications of aspiration pneumonia and malnutrition.²² However, strong, high-quality evidence is needed to inform clinical guidelines.²³ Because,

SRs/MA are considered the “gold standard” for evaluating clinical efficacy and developing guidelines, they should perform proper and effective quality evaluations. Acupuncture combined with rehabilitation has been suggested to effectively improve swallowing function in patients with post-stroke dyspha-

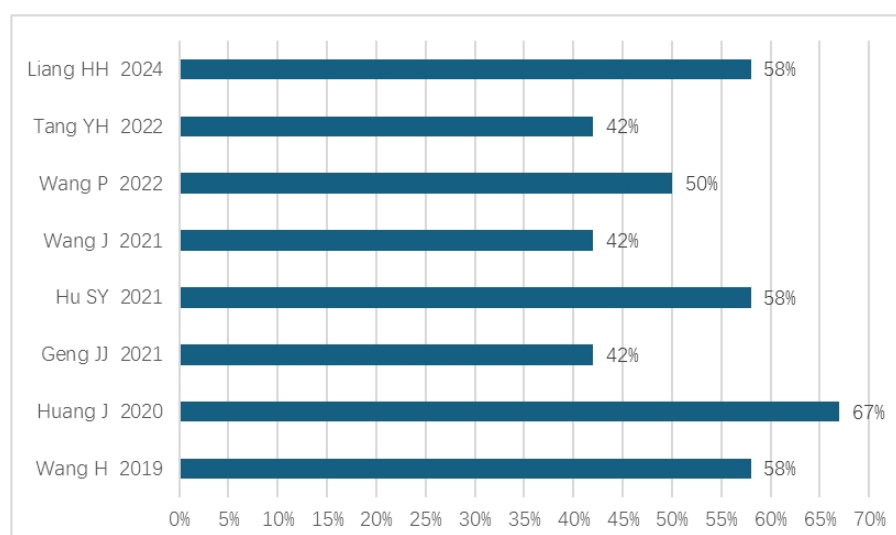


Figure 4 The percentage “Yes” for each identified SRs/MA assessed by PRISMA2020 (Abstracts Checklist)

Notes: SRs: systematic reviews; MA: meta-analysis; PRISMA 2020: Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020.

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4.1. Summary of main findings

GRADE evaluation indicated that the evidence was critically low in quality. The primary factors for downgrading evidence were limitations, inconsistency, and publication bias, indicating the need for future improvements. However, GRADE evaluations were not performed by all included SRs/MA. Based on the AMSTAR 2, all studies had critically low methodological quality. This can be attributed to the fact that none of the studies provided a list of excluded studies or justified their exclusion (item 7). Therefore, it is important for authors to mention each excluded study during the screening stage and the reasons for its exclusion. Additionally, the absence of key item 13 (assessment of RoB in the individual study) results in the assessment of an SR/MA as having critically low methodological quality. Moreover, not all studies included low RoB RCTs, and if RCTs had moderate or high RoB, not all were included. The review provided a discussion of the likely impact of RoB on the results. Therefore, review authors should fully account for RoB in individual studies when interpreting the results of the review. The absence of two key items (7 and 13) led to the critically low quality of evidence. Regarding non-critical items, no SRs/MA described the reasons for choosing RCTs as their study design, which should be provided for all study types included. Taken together, the absence of two key items (7 and 13) for most of the SRs/MA led to critically low methodological quality.

Regarding the PRISMA2020 evaluation, the SRs/MA had reporting issues related to items 7, 10b, 13b, 13c 16b, 20a, 24b, and 24c. Items 7 and 10b indicated failure to report all the data shown. Item 7 indicated failure to provide all database search strategies. Item 10b indicated an inability to provide all the other extracted variables (i.e., the SRs/MA did not perform preprocessing prior to data merging, including the processing of missing merged effect sizes and data conversion). For item 13b, there were missing summary statistics or data conversions. For item 13c, not all SRs/MA describe the methods used to tabulate or visually display results of individual studies and syntheses. Item 16b indicated the lack of provision of excluded articles. For item 20a, for each synthesis, not all SRs/MA briefly summarize the characteristics and RoB among contributing studies. For item 24b, there was no indication whether a review protocol was prepared or where it could be accessed. Item 24c relates to the lack of an explanation about any changes made after study registration or to the study protocol. In the abstract checklist, items 3, 7, 11, and 12 were answered “No”. The abstract section did not provide detailed descriptions of the inclusion and exclusion criteria for the systematic review, and the results section did not give the total number of included studies and participants, a

summary of relevant characteristics of studies, the main source of funding, register name or number. Future SRs/MA should fully describe all the details identified in PRISMA2020, including all search strategies, and perform pre-processing prior to data merging. Additionally, all articles should indicate where the review protocol can be accessed, provide a list of all excluded articles, explain any changes made to the registration or protocol, and incorporate methods for studying the RoB.

4.2. Comparison with previous systematic reviews

The present overview had stricter exclusion criteria than our initial overview in 2019.⁹ For example, we excluded studies if the treatment groups also involved combined herbal treatment, other Chinese medicine, NES, catheter balloon dilation/balloon dilation, blood-letting puncture, acupuncture points, or repetitive transcranial magnetic stimulation. Additionally, the control group did not receive acupuncture treatment. Regarding AMSTAR 2, there were four “Yes” responses for items 2, 4, and 7 in the 2019 overview. Contrastingly, in the present overview, there were two “Yes” responses for item 2, only one “Yes” response for item 4, and none for item 7. Compared with PRISMA 2009, PRISMA 2020 categorizes the items in more detail and comprises many new items. In the initial overview, none of the PRISMA items had a “No” response; however, eight items had a “No” response in the present overview. Given the more detailed classification and rigorous evaluation, the evidence quality remained low even if the present overview included more studies published within the last 5 years.

4.3. Implications for clinical practice and future research

Due to severe publication bias resulting in extremely low-quality evidence, acupuncture cannot be considered a first-choice stand-alone treatment; however, it can be considered as a potential “add-on” intervention. Only one article used the GRADE tool, which cannot fully demonstrate the downgrading factors. Subsequent researchers should incorporate the GRADE tool into the evaluation system.

4.4. Strengths and limitations

Although a comprehensive database search was conducted, some grey literature may have been missed, which could have underestimated the risk of publication bias. Only one article applied the GRADE system, which impeded judgement of the reliability of their conclusions. It is important to ensure good methodological quality of SRs given that poor quality leads to article rejection by journals. Another limitation is the absence of a clinical hetero-

geneity analysis. SRs/MA include various acupuncture techniques (EA, nape acupuncture, etc.) and control interventions (rehabilitation training etc.). Accordingly, between-technique operational differences and their effect on evidence consistency may result in bias in the evaluation of efficacy.

The strength of this study lies in its use of PRISMA 2020 and AMSTAR 2 to standardize the reporting completeness of the SRs and assess their methodological quality.

5. Conclusion

In summary, this study provides evidence supporting the use of acupuncture in the treatment of post-stroke dysphagia; however, the quality of SRs/MA is generally critically low, and trial quality needs to be improved in order to inform clinical guidelines. In the future, acupuncture clinicians should carefully and rationally consider this evidence when making clinical decisions.

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Author Contribution Statement

Lan Yuan: Data curation, formal analysis, methodology, software, and writing – original draft. **Zi-yu Tian:** Methodology, data curation, and writing – review and editing. **Xiao-yi Hu:** Data curation, validation, and writing – review and editing. **Bing Liu:** Conceptualization, funding acquisition, and writing – review and editing. **Nicola Robinson:** Conceptualization, writing – original draft, supervision, funding acquisition, project administration, and writing – review and editing.

Declaration of Competing Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. Prof. Nicola Robinson is the Editor-in-Chief of *Evidence-Based Chinese Medicine and Technology Assessment*, and she was not involved in the peer review process or any decisions regarding this article.

Electronic Supplementary Material

The online version contains supplementary material available at <https://doi.org/10.26599/eCMTA.2025.9570013>.

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