SYSTEMATIC REVIEW

Evidence-based evaluation for stroke guidelines mentioning traditional and complementary medicine rehabilitation

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Abstract

Background Traditional and complementary medicine (T&CM) is often sought as an significant alternative intervention in stroke prevention and rehabilitation, and is recommended in several guidelines. However, little is known about the quality and consistency of T&CM rehabilitation recommendations for stroke in the guidelines.

Methods We systematically searched PubMed, Embase, CNKI, WOS, CBM, Duxiu, Wanfang, VIP, GIN, NICE, NGC, SIGN, BGS, NCCN, WHO guidelines, Google Scholar, MedSci, and Medilive from January 1990 to April 2024 for stroke rehabilitation guidelines that include T&CM recommendations. Our search strategy used search terms related to stroke, complementary and alternative therapy, and CPGs. Four independent reviewers used the Appraisal of Guidelines for Research and Evaluation II (AGREE II) instrument to evaluate the quality of the included guidelines. We summarized and analyzed the T&CM post-stroke rehabilitation recommendations.

Results Nineteen guidelines were included, of which nine were recommended for use according to the AGREE II scores. The highest scores were achieved in the domains of clarity of scope and purpose (90.50%±9.99%), while the lowest scores were achieved for applicability (45.56%±26.37%). Guidelines commonly recommended acupuncture to improve post-stroke spasticity and dysphagia. However, guidelines recommended against the addition of acupuncture to improve activities of daily living. Additionally, there was still controversy regarding the improvement of upper extremity motor function with acupuncture and specific recommendations for post-stroke cognitive impairment were scarce.

Conclusions The quality of stroke rehabilitation guidelines is acceptable, though improvements are needed in some domains, particularly applicability. The recommended guidelines show a high degree of agreement in recommending acupuncture to improve dysphagia after stroke, but recommendations in the areas of upper extremity motor dysfunction and cognitive impairment after stroke need to be further addressed. However, the strength of these recommendations is typically conditional and the level of evidence still needs to be further improved.

Keywords Guidelines, Stroke, Traditional and complementary medicine, Rehabilitation

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Background

Stroke, as the leading cause of death and long-term disability, has become a significant public health problem [1]. In the past few decades, stroke-related deaths have increased by 43.3%, and disability-adjusted life years (DALYs) due to stroke have increased by 32.4% [2]. The Global Burden of Disease study indicates that indirect costs of stroke, including household productivity loss, account for 50%—60% of the total economic burden in low- and middle- income countries, compared to 30%—40% in high-income countries [2]. According to current statistics, the cost of rehabilitation treatment for stroke patients in China accounted for the highest proportion of total hospitalization expenses from 2018 to 2021, exceeding 30% of all costs and imposing a substantial economic burden on the health system and patients' families [3]. Effective rehabilitation strategies could accelerate the improvement of patients' dysfunction, thereby reducing the length of hospitalization and the cost of treatment.

The incidence of different degrees of sequelae in the survivors of stroke can be as high as 70%–80% [4]. Although modern rehabilitation methods, such as noninvasive brain stimulation and virtual reality, can be effective in improving different functional impairments after stroke [5–7], because of the unbalanced development of global rehabilitation services, the rehabilitation facilities and service capabilities of hospitals and communities in many regions are limited and cannot adequately meet the health needs of patients, especially in low-income and middle-income countries [8]. The World Health Organization (WHO) indicates that traditional and complementary medicine (T&CM), such as acupuncture, is a critical component of primary healthcare and has essential applications in the rehabilitation and management of lifestyle-related chronic diseases [9].

Evidence-based, high-quality clinical practice guidelines (CPGs) help guide healthcare professionals in their clinical practice and provide scientific and effective T&CM rehabilitation interventions for stroke patients [10]. Although several organizations from different countries/regions have published CPGs for stroke, the quality, main recommendations, strength, and direction of recommendations of the existing stroke guidelines involving T&CM rehabilitation are still unknown. Ya et al. systematically evaluated the methodological quality of traditional Chinese medicine guidelines for ischemic stroke management. However, their analysis was confined to ischemic stroke subtypes and exclusively included Chinese guidelines, resulting in conclusions that fail to represent the comprehensive global application of T&CM in stroke rehabilitation. Furthermore, the study omitted critical comparative analyses with international guideline frameworks (e.g., WHO) regarding T&CM

recommendations [11]. Consequently, the primary aims of this review were to assess the quality of CPGs that meet the inclusion criteria with the Appraisal of Guidelines for Research and Evaluation (AGREE II) instrument, and evidence mapping was adopted to present the recommendations and their consistency on the use of T&CM in Chinese and international CPGs, to provide a key decision-making basis for the subsequent development of high-quality stroke T&CM rehabilitation guidelines and the modernization of traditional medicine.

Methods

We followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) reporting guidelines [12].

Search strategy

We comprehensively searched PubMed, Excerpta Medica Database (Embase), China National Knowledge Infrastructure, Web of Science, China Biology Medicine, Duxiu, Wanfang, VIP, Guidelines International Network, National Institute for Health and Care Excellence, National Guideline Clearinghouse, Scottish Intercollegiate Guidelines Network, British Geriatrics Society, American Geriatrics Society, National Comprehensive Cancer Network), World Health Organization guidelines, Google Scholar, MedSci, and Medilive from January 1990 to April 2024. Our search strategy used search terms related to (1) stroke, (2) complementary and alternative therapy, and (3) CPGs (Supplement 1), without restrictions on publication language or status.

Inclusion criteria

CPGs were included if they (1) were developed by national academic associations or professional organizations; (2) represented expert consensus or evidence-based CPGs for stroke rehabilitation, diagnosis, treatment, or management; (3) included recommendations related to T&CM rehabilitation; (4) were the newest version; (5) were for adult rehabilitation ($\geq$ 18 years old); and (5) available in Chinese/English language. There was no restriction on the strength of recommendations.

Screening, data extraction, quality assessment, and recommendation synthesis

Two researchers independently conducted a title, abstract, and full-text examination. For disagreements, a third researcher was consulted to reach a consensus. Rayyan and EndNote X9 were used to add annotations to indicate specific disagreements between the two researchers (e.g., differences in understanding of the predefined inclusion criteria) and to document the rationale for the eventual inclusion or exclusion of a

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particular piece of literature. Two researchers independently performed data extraction. The extracted information included guideline title, year of publication, country, developing organization, target population, and evidence grading system. The information mentioned above was screened, extracted, and managed using Rayyan, End-Note X9, and Microsoft Excel 2016. Guidelines for inclusion after the full-text screening were independently assessed by four researchers using the AGREE II tool [13–15]. AGREE II comprises six areas—scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence—divided into 23 items. Each item is rated from 1 (strongly disagree) to 7 (strongly agree). If the criteria are not fully met, the reviewers may provide a score of 2 to 6, depending on the situation. The scaled domain score was calculated as (Obtained score − Minimum possible score)/(Maximum possible score − Minimum possible score). The overall quality of each guideline was evaluated using a threshold of 60% for the mean score of each domain, with more domains with a mean score > 60% indicating higher quality [16, 17]. And each CPG was classified as "recommended" (total score ≥ 70%),

"recommended with modifications" (total score between 50 and 70%) or "not recommended" (total score ≤ 50%). We used SPSS 26.0 calculated the intraclass correlation coefficients (ICCs) to test the consistency of the evaluation results of the four reviewers [18]. We classified the recommendations as: 'should be used' when there was a strong recommendation that the intervention/criteria should be applied; 'may be used' when the recommendation was not strong or the CPGs authors used the terms 'may/might be used' or 'can/could be used'; 'should not be used' when there was a clear recommendation to not use the intervention/criteria; and 'uncertain recommendation' when the recommendation was not clear.

Results

Literature search and guideline selection

The systematic search retrieved 6,093 records, and 425 duplicate articles were removed. We screened 29 articles in full against the inclusion criteria and included a total of 19 stroke rehabilitation and management CPGs (Fig. 1) [19–37].
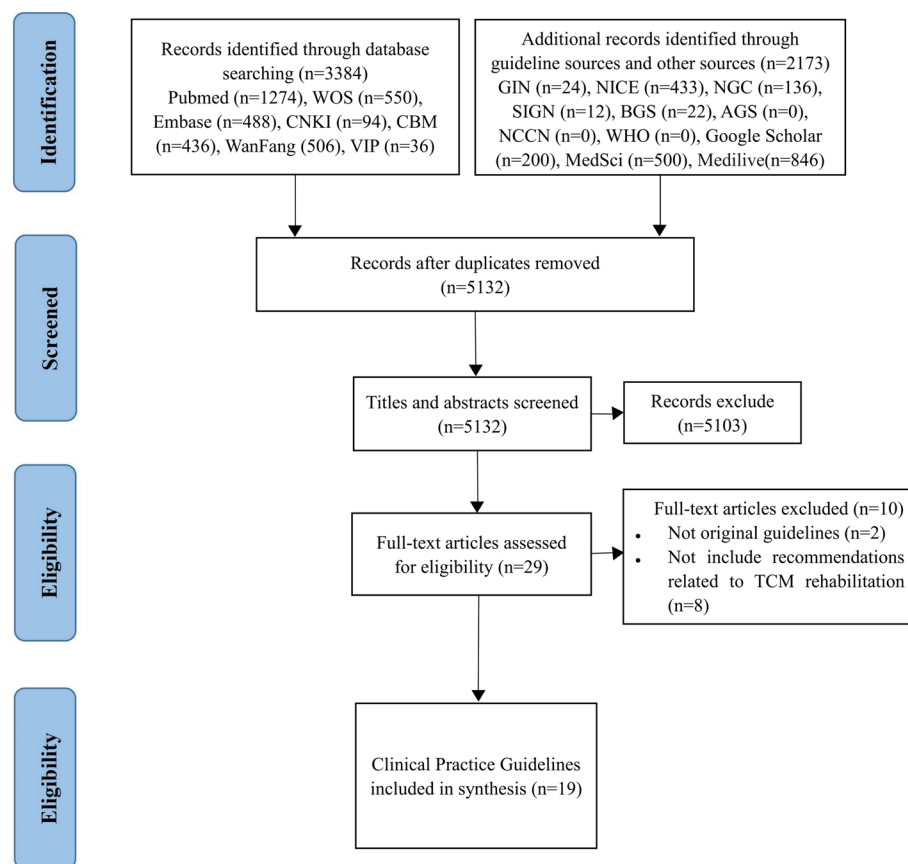

Fig. 1 Flowchart of the selection process for clinical practice guidelines

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Guideline characteristics

Most of the included CPGs were published within the last 10 years (2011–2022). Most were from China ($n=12$), followed by the United States ($n=2$), Brazil ($n=2$), Australia ($n=2$), and Canada ($n=1$). Eighteen CPGs used an evidence-grading system when making recommendations (18/20, 90%) (eTable 1 in Supplement 2 summarizes the general characteristics of the 19 CPGs).

Appraisal of CPGs: quality and inter-rater agreement

The bar chart and stacked polar chart show the six domain scores and the sum of the total AGREE II scores of each eligible CPG (Figs. 2 and 3). Overall, the quality of the guidelines was highly variable, and the range of scores was wide. Of the 19 stroke CPGs mentioning T&CM, ten (52.63%) were appraised as "recommended", two (10.53%) as "recommended with modifications", and seven (36.84%) as "not recommended". The mean domain score of the guidelines ranged from 38.63% ± 33.27% to 95.08% ± 5.34%, and most CPGs reached a mean domain score of 60%. The "scope and purpose" domain received the highest mean score (90.50% ± 9.99%) across all the domains among the 19 CPGs, which required a clear description of the overall aim of the guideline, specific health questions, and target population of the guidelines, with five CPGs reaching 100.00% in this domain. It was followed by the "clarity of presentation" domain (88.67% ± 11.45%), where 17 CPGs (89.47%) scored > 80%, indicating reasonable clarity of recommendations and easier identification of key recommendations. The domain with the lowest average score was "applicability" (45.56% ± 26.37%). A total of 13 CPGs (68%) scored less than 60% in this domain, as the studies poorly reported the likely barriers and facilitators to implementation, strategies to improve uptake, and resource implications of applying the guideline. The remaining domains, including "stakeholder involvement" (60.51% ± 26.26%), "rigor of development" (54.08% ± 29.66%), and "editorial independence" (59.76% ± 39.72%), had relatively low mean scores and high variability. Within the domain of "stakeholder involvement," two items (development group members that included experts in multi-disciplinary and targeted explicit users) scored relatively high. However, few CPGs considered patient views and preferences in the recommendation formation process. In the "rigor of development" domain, five items (using systematic methods to search for evidence, a clear description of the criteria for selecting the evidence, and the methodology for formulating the recommendations, external review, and updating the CPGs) scored relatively low. Within the domain of "editorial independence," the CPG developed by the Chinese Stroke Association scored 0.00% in this domain, suggesting that the guideline ignored the influence of the funder and that of the competing interests of the guideline development group's members (eTable 2 in Supplement 2 shows the quality assessment using the AGREE-II tool for the 19 guidelines selected). Inter-rater agreement was "good" for two domains and "excellent" for four domains of AGREE II score between the four evaluators (eTable 3 in Supplement 2).
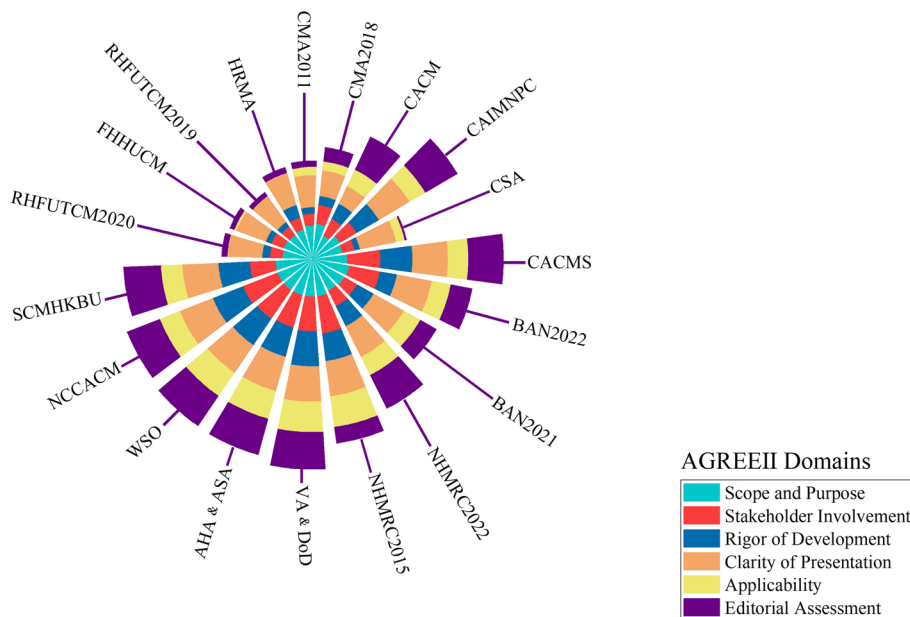

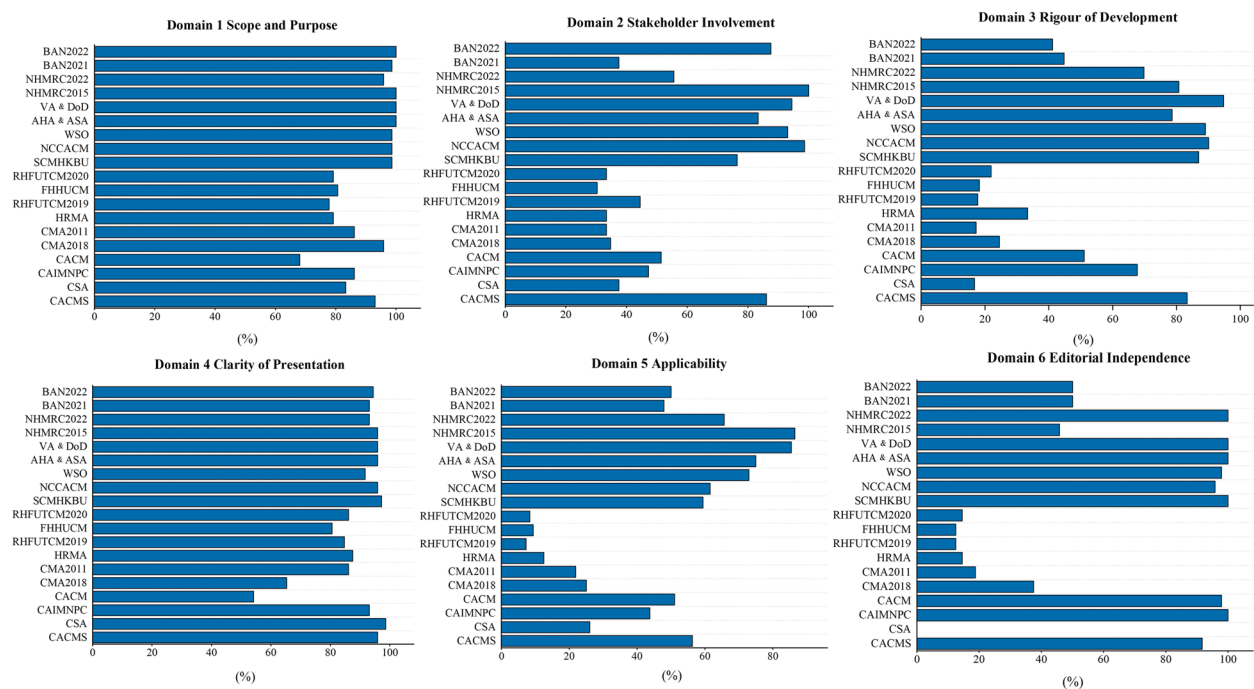**Fig. 2** Total AGREE II scores by domain across 19 guideline

Fig. 3 Quality of the included guidelines across the six domains of the AGREE II instrument

T&CM rehabilitation recommendations in the recommended CPGs

The recommendations from the endorsed CPGs are summarized in Table 1. The persistent reliance on observational studies and anecdotal evidence in T&CM research, combined with a critical shortage of clinical evidence meeting international standards (e.g., CONSORT for trials, PRISMA for reviews), has created a translational gap in evidence hierarchies. This methodological divide directly contributes to the limited integration of T&CM recommendations into international guidelines. Among the ten recommended guidelines, we found a high degree of concordance regarding the use of acupuncture to improve post-stroke dysphagia, which received a weak recommendation from most guidelines. The guidelines also consistently endorsed tai chi to improve balance, tuina to improve spasticity, and fuming-washing to address shoulder-hand syndrome. One CPG (BAN2022) strongly recommended the use of acupuncture or electroacupuncture to enhance post-stroke spasticity, while two CPGs (CACMS and SCMHKBU) weakly suggested that the use of tuina for the same purpose. Additionally, one CPG (CACMS) strongly recommended the use of Xing Nao Jing Injection to improve neurological deficits in patients during the acute phase of cerebral infarction. Consistent weak recommendations across the CPGs (CACMS, NCCACM, and SCMHKBU) indicate that acupuncture can be used to improve post-stroke dysphagia,

suggested needling at GV26, GB20, EX-HN12, EX-HN13, and CV23 for four weeks. The use of tai chi to improve balance (WSO and AHA &ASA) and to address anxiety and depression (VA &DoD) can be considered in the later stages of stroke. Fuming-washing therapy (CACMS and SCMHKBU) and acupuncture at the LI15, TE14, SI9, Jianqian, Ashi-point, TE2, TE4, and SI4 (SCMHKBU) can improve post-stroke shoulder-hand syndrome. One CPG (NCCACM) weakly suggested considering blood-activating injections and Xing Nao Jing injections to improve neurological deficits and impaired consciousness during the acute phase of cerebral infarction. Additionally, two CPGs (NHMRC2022 and AHA &ASA) weakly advised against the addition of acupuncture to improve the activities of daily living (ADL).

Discussion
Summary of the main results

This review assessed 19 national and international stroke clinical practice guidelines (CPGs) concerning T&CM rehabilitation, which extracted recommendations on post-stroke dysfunction. The AGREE II results showed that the guidelines did not exhibit improvement over the years and received relatively low scores in the domains of applicability and rigor of development. Additionally, they overlooked the vital role of patients in forming recommendations. From the nine recommended CPGs, we concluded that guidelines show a high degree

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Table 1 Recommendations on traditional and complementary medicine rehabilitation for stroke patients

Recommendation item	CACMS	NCCACM	SCMHKBU	VA&DoD	NHMRC2015	NHMRC2022	WSO	AHA&ASA	BAN2022
Acupuncture	Post-stroke dysphagia Acupuncture Grading of recommendation: selective recommendation, level of evidence: IIa	Post-stroke dysphagia Combination of acupuncture based on swallowing training for four weeks Acupoints: GV26, GB20, EX-HN12, EX-HN13, and CV23 Grading of recommendation: Weak recommendation, level of evidence: C	Post-stroke dysphagia Acupuncture Grading of recommendation: B, level of evidence: IIb Post-stroke shoulder-hand syndrome Acupuncture Acupoints: LI15, TE14, SI9, Jianqian, Ashi-point, TE2, TE4, SI4 Grading of recommendation: C, level of evidence: IV	-	Acupuncture Level of evidence: I	Activities of daily living Acupuncture Grading of recommendation: weak recommendation	Upper extremity motor function Acupuncture Level of evidence: B	Activities of daily living and upper extremity activity Acupuncture Grading of recommendation: III, level of evidence: A	Spasticity Acupuncture and electroacupuncture Grading of recommendation: IIa, level of evidence: A
Mind–body exercise	—	—	—	Post-stroke depression or anxiety Mind–body exercise (tai chi, yoga, and qigong) Grading of recommendation: weak recommendation	—	—	Balance Tai Chi (late) Level of evidence: B	Fall Tai Chi Grading of recommendation: IIb, level of evidence: B	—
Recommendation item	CACMS	NCCACM	SCMHKBU	VA&DoD	NHMRC	NHMRC	WSO	AHA&ASA	BAN
Tuina and Meridian massage	Post-stroke spasticity Tuina Grading of recommendation: selective recommendation, level of evidence: IIa	—	Post-stroke spasticity Meridian massage Grading of recommendation: C, level of evidence: IV	—	—	—	—	—	—
External treatment of traditional Chinese medicine	Post-stroke shoulder-hand syndrome Fuming-washing Grading of recommendation: selective recommendation, level of evidence: IIa	Post-stroke dysphagia Stimulation with herbal ice sticks or sprays Grading of recommendation: Weak recommendation, level of evidence: C	Post-stroke shoulder-hand syndrome Fuming-washing Grading of recommendation: C, level of evidence: IV	—	—	—	—	—	—

Table 1 (continued)

Recommendation item	CACMS	NCCACM	SCMHKBU	VA&DoD	NHMRC$_{2015}$	NHMRC$_{2022}$	WSO	AHA&ASA	BAN$_{2022}$
Traditional Chinese medicine injection	Neurological deficits in patients with the acute phase of cerebral infarction Xing Nao Jing Injection Grading of recommendation: recommended, level of evidence: Ia	Neurological deficits in patients with ischemic stroke in the acute stage Dengzhanxixin injection, Shenxiong glucose injection, injections made from Salviae Miltiorrhizae Radix Et Rhizoma, and injections made from Ginkgo Folium on the basis of conventional treatments Grading of recommendation: Weak recommendation, level of evidence: C Coma in patients with acute cerebral hemorrhage combined with impaired consciousness Xing Nao Jing injection Grading of recommendation: Weak recommendation, level of evidence: C Post-stroke depression Chaihushugan powder, Xiaoyao powder, Shuganjieyu decoction, and Shuganjieyu capsules on the basis of antidepressant Grading of recommendation: Weak recommendation, level of evidence: C	—	—	—	—	—	—	—

Color coding: Green, 'should be used'; Blue, 'may be used'; Red, 'should not be used'; Yellow, 'uncertain recommendation'. 'Should be used' indicates a strong recommendation for the intervention/criteria to be applied; 'may be used' indicates a weaker recommendation, often using terms such as 'may/might be used' or 'can/could be used'; 'should not be used' indicates a clear recommendation against using the intervention/criteria; and 'uncertain recommendation' indicates that the recommendation is not clear

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of agreement in recommending acupuncture to improve dysphagia after stroke, but recommendations in the areas of upper extremity motor dysfunction and cognitive impairment after stroke need to be further addressed. However, the strength of these recommendations is typically conditional and the level of evidence still needs to be further improved.

Implications for future research and practice

According to the assessment results of the AGREE II instrument, the methodological quality of the CPGs was the lowest in the domain of applicability, with relatively low scores in the domains of rigor of development. The applicability domain was considered relevant to the implementation of the guidelines. It significantly impacted the quality of the CPGs [38]. Only six guidelines scored ≥ 60% in this domain, which consistently received lower scores in other systematic reviews [39]. Most stroke guidelines fail to systematically analyze potential facilitators and barriers that may influence the implementation of recommendations (e.g., patient adherence, healthcare system constraints, policy, and cultural differences) and do not clarify the required resources and costs (e.g., professional expertise, equipment, funding, time). We propose adopting multidimensional evidence-based support strategies during guideline development to help clinicians and policymakers implement recommendations more effectively. Primarily, identify barriers and facilitators: Conduct stakeholder consultations (structured questionnaires and focus group interviews) and Delphi expert consensus processes (First round: Generating a list of critical issues through open-ended expert input; Second round: Conducting priority scoring on identified issues and selecting the top five barriers through quantitative ranking; Third round: Developing solution proposals followed by anonymous voting to achieve consensus (> 80% agreement threshold)) to systematically map implementation challenges (e.g., resource allocation disparities) and enablers, followed by targeted intervention pathways. As an illustration, WHO Recommendations on Maternal and Newborn Care for a Positive Postnatal Experience identified through stakeholder research that transportation costs posed a barrier for women in low-income regions to complete the recommended number of antenatal visits. Consequently, "mobile community clinics" were incorporated into the guideline's appendix [40]. Subsequently, quantify resource requirements (human, time, financial, and costs), provide stratified recommendations (e.g., for high-, middle-, and low-income settings), and integrate health economic evidence (cost-effectiveness analyses and budget impact forecasts) to strengthen the

feasibility and cost-effectiveness clarity of recommendations. Australia Clinical Guidelines for Stroke Management Strongly recommend that all stroke patients should commence mobilisation (out-of-bed activity) within 48 h of stroke onset unless otherwise Contraindicated, and provide data on emergency department presentation and in-patient admission costs to demonstrate the cost-effectiveness of this recommendation [35]. The domain of rigor of development is a core section of developing high-quality CPGs [38, 41]. Current domestic clinical guidelines in China exhibit the following methodological limitations: incomplete systematic search strategies, ambiguous evidence selection criteria, insufficient application of evidence quality assessment, lack of multidisciplinary consensus mechanisms in recommendation formulation, inadequate safeguards for the independence of external review, and underdeveloped dynamic updating systems. The following quality control strategies should be implemented throughout the guideline development lifecycle to ensure guideline currency and evidentiary reliability. First and foremost, establish transparent and traceable evidence chains by documenting search protocols, inclusion/exclusion rationales, and evidence-to-recommendation linkages [42, 43]. Additionally, adhere rigorously to international standards, including PRISMA guidelines for systematic searches and the GRADE framework for evidence quality grading. Furthermore, maintain guideline currency through version control protocols (e.g., timestamped updates) and continuous evidence surveillance systems (e.g., automated PubMed alerts for new studies). Additionally, only 8/19 CPGs reported patient perspectives and preferences in Item 5 of the evaluation within the stakeholder involvement domain. Patient views and preferences are crucial in forming final recommendations and guiding clinicians in making the best decisions. For example, a discrete choice involving 103 stroke patients showed that male stroke survivors in the subacute phase of stroke recovery strongly preferred light- and moderate-intensity exercise and preferred shorter workout durations. Based on this result, adapting and developing tailored exercise programs such as a simplified version of tai chi for stroke survivors in clinical practice in the future could be effective in improving patient compliance and treatment outcomes [44]. This suggests that patient perspectives and preferences should be fully considered in future guideline development. A mixed-methods approach combining semi-structured interviews and e-surveys should be adopted to achieve in-depth identification of core patient needs, acceptability thresholds, and preferences toward T&CM interventions. Additionally, two to three patient advisors with basic health

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literacy should be embedded throughout the guideline revision process and empowered to conduct structured feasibility assessments of recommendation drafts through participatory voting mechanisms.

Recommendations regarding acupuncture show different directions and strengths of recommendation in different dysfunctions. Guideline BAN_{2022} strongly recommended the use of acupuncture to improve post-stroke spasticity. A very new systematic review that involves 88 RCTs with 6,431 patients in total has further confirmed that acupuncture possesses a reliable antispastic effect for stroke patients [45]. Acupuncture to improve dysphagia after stroke is an approach mentioned in most guidelines, but all are weakly recommended. This may be due to the fact that most studies on post-stroke dysphagia focus on short-term effects (≤ 3 months of follow-up), lack of health economics data such as cost-effectiveness ratios, and small sample sizes [46, 47]. A clinical study found that acupuncture did not produce significant results in improving upper extremity (UE) motor function in patients with chronic stroke symptoms, but gains in UE motor function observed in protocol-compliant subjects suggested acupuncture may help patients with chronic stroke symptoms [48]. Therefore, future high-quality and large-scale randomized controlled trials are still needed to provide sufficient evidence to support the efficacy of acupuncture in the treatment of UE motor function after stroke. Both guideline $NHMRC_{2022}$ and guideline AHA&ASA explicitly did not recommend the use of acupuncture to improve ADL. From the available evidence, acupuncture may have a beneficial effect on improving ADL in recovering stroke patients, but most of the included trials were of insufficient quality and size, and therefore there was insufficient evidence to draw any conclusions about its routine use [49]. In addition, a multicenter study involving 188 patients demonstrated that a conventional physical therapy regimen combined with acupuncture did not add any benefit for further improvement of ADL in patients with subacute stroke [50].

Given that traditional Chinese decoctions require syndrome differentiation and pose challenges in standardizing individualized dosing, which hinders large-scale promotion, so our recommendations focused primarily on Chinese patent medicines. Xing Nao Jing Injection was recommended to improve neurological deficits in patients during the acute phase of cerebral infarction in the CACMS [19], likely due to its protective effects on neural cells against oxidative stress-induced cell damage, along with its better safety and efficacy in clinical applications for stroke [51, 52]. However, with emerging evidence, the updated NCCACM guidelines indicated that the National Adverse Drug Reaction Monitoring Report highlights frequent adverse events/reactions associated with Xingnaojing Injection. The expert consensus panel unanimously endorsed its use under strict contraindication screening and thorough informed consent acquisition from patients (or guardians) regarding potential adverse effects [30]. Although Salvianolate injection and Ginkgolide injection demonstrate relatively high effect sizes in improving post-stroke neurological deficits (with large-sample studies supporting their blood-activating and stasis-resolving effects), the evidence remains low-grade due to substantial bias risks and significant heterogeneity [53, 54]. The combination of antidepressants with Chaihushugan powder/Xiaoyao powder significantly reduces HAMD (Hamilton Depression Rating Scale) scores after 8-week treatment, demonstrating efficacy in ameliorating post-stroke depressive symptoms [55]. CPGs consistently suggested using tai chi to improve balance, enabling clinicians to incorporate tai chi during the recovery and sequelae periods to reduce the risk of falls. The inconsistent recommendations in clinical guidelines regarding acupuncture's efficacy in improving upper limb motor function stem from two critical methodological deficiencies: (1) insufficient high-certainty evidence and (2) non-standardized evidence synthesis practices. This discordance underscores the urgent need for WHO-standardized evidence appraisal frameworks for T&CM and requires integration of neuroimaging-validated efficacy metrics and cross-cultural adaptation protocols. However, evidence for the effectiveness of Chinese herbal medicine decoction and moxibustion on different rehabilitation outcomes in stroke remains scarce, which warrants further research to enrich the evidence base for T&CM in stroke. Another finding of concern was that these recommendations rarely included a combination of T&CM rehabilitation and modern rehabilitation; thus, we need to collect further relevant and high-quality evidence in future studies to lay a foundation for the development of clinical evidence-based practice guidelines for integrating T&CM and Western medicine rehabilitation in treating stroke.

There were few specific recommendations for post-stroke cognitive impairment (PSCI). PSCI was one of the major complications after stroke with a prevalence of 32.2% within three months [56]. PSCI not only negatively affected patients' functional independence and quality of life, but was also associated with an increased risk of recurrent stroke, mortality, and progression to dementia [57, 58]. Although a large number of clinical trials have demonstrated the efficacy of acupuncture and tai chi in the treatment of post-stroke cognitive impairment, Guidelines lack recommendations for PSCI T&CM therapy. This may be because randomized controlled trials (RCTs) of T&CM therapies (e.g., acupuncture, tai chi, etc.) for post-stroke cognitive impairment

have a relatively small total literature in the field and are generally characterized by small sample sizes and lack of blinding [59, 60]. Therefore, future studies should adhere to the CONSORT and STRICTA guidelines to conduct international multicenter RCTs with large sample sizes. Adaptive trial designs should be employed to dynamically adjust intervention parameters while incorporating active placebo controls (e.g., sham acupuncture) and blinded outcome assessments to minimize bias. Concurrently, Delphi consensus methods should be applied to establish a core outcome set for PSCI, integrating digital tools and biomarkers to quantify therapeutic efficacy and enable long-term outcome tracking objectively.

The included guidelines used various evidence grading systems to categorize the quality of evidence and strength of recommendations, which may perplex and impede communication among CPG developers [61]. The Grades of Recommendation, Assessment, Development, and Evaluation (GRADE) is the most authoritative evidence grading system [62, 63]. To address heterogeneity challenges in evidence grading systems, we propose establishing cooperation between the GRADE Working Group and the WHO Traditional Medicine Department to construct an evaluation framework covering the three major T&CM specificity dimensions. Simultaneously, a T&CM Evidence Transformation Hub will be implemented, which will provide an online tool to convert different grading systems through API-integrated platforms automatically. Furthermore, we only included English and Chinese guidelines, which may limit the global dissemination of T&CM rehabilitation recommendations after stroke. To resolve linguistic barriers and cultural diversity challenges, we propose establishing a Global Traditional Medicine Guideline Database powered by AI-driven multilingual translation platforms. This system will enable real-time semantic alignment across languages and cross-cultural knowledge retrieval. Concurrently, in collaboration with the WHO Traditional Medicine Department, we will integrate T&CM stroke rehabilitation guidelines into the ICD-11 Traditional Medicine Module's Implementation Toolkit, embedding adaptive policy templates that automatically adjust to national healthcare priorities based on World Bank income classifications and cultural sensitivity indices.

Limitations
Our study has some limitations: (1) We only included English and Chinese guidelines, which may limit the global dissemination of T&CM rehabilitation recommendations after stroke. (2) To present the recommendations more clearly, we categorized them as "strong," "weak," and "not mentioned" based on the GRADE system criteria, which still did not eliminate the confusion caused by the heterogeneity of the evidence grading systems for decision-makers, clinicians, and some stakeholders in practice. (3) We only used AGREE II to assess the methodological quality of the CPGs without evaluating their reporting quality, which prevented us from further analyzing the correlation between the methodological quality and the reporting quality of the included CPGs.

Conclusions
The methodological quality of clinical practice guidelines for stroke rehabilitation varied significantly, but several consistent recommendations emerged. The recommended guidelines show a high degree of agreement in recommending acupuncture to improve dysphagia after stroke, but the recommendation strength is weak. And the recommendations in the areas of upper extremity motor dysfunction and cognitive impairment after stroke need to be further explored. Additionally, the benefits of acupuncture to improve activities of daily living (ADL) are not supported by scientific evidence, and clinicians should refrain from adding this intervention to ADL rehabilitation. In the future, more high-quality, large-scale randomized controlled trials are needed to increase the level of evidence for the T&CM rehabilitation approach, and guidelines development should focus on improving applicability, evidence retrieval, and appraisal methods, addressing patient preferences and values, and establishing evidence grading systems.

Abbreviations
T&CM	Traditional and complementary medicine
AGREE II	Appraisal of Guidelines for Research and Evaluation II
GRADE	The Grades of Recommendation, Assessment, Development, and Evaluation
DALYs	Disability-adjusted life years
WHO	World Health Organization
CPGs	Clinical practice guidelines
ADL	Activities of daily living
PSCI	Post-stroke cognitive impairment

Supplementary Information
The online version contains supplementary material available at https://doi.org/10.1186/s12906-025-04916-9.

Supplementary Material 1.

Supplementary Material 2.

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to all the data in the study and have approved the decision to submit this manuscript for publication.

Data availability

Data is provided within the manuscript or supplementary information files.

Declarations

Ethics approval and consent to participate

This study involved a systematic review of peer-reviewed literature only; it did not require ethics approval or consent to participate.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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