Evidence on acupuncture therapies is underused in clinical practice and health policy

Nenggui Xu and colleagues call for more effective evidence dissemination of and research into promising acupuncture therapies

Many doctors and patients worldwide now use acupuncture, a technique of traditional Chinese medicine that originated 2000 years ago.[1] While traditional Chinese medicine theory attributes the effect of acupuncture to the stimulation at specific body regions (acupoints) on the meridian channels (that is, paths through which the vital energy known as "qi" flows) to modulate body physiology, modern science has increasingly provided evidence on the biology of the effect of acupuncture.[2] This evidence shows that acupuncture works to stimulate reflexes that activate peripheral nerves, transmit sensory information from the spinal cord to the brain, then activate peripheral autonomic pathways, and eventually modulate physiology.[3-5]

Along with research into the underlying biology and increasingly wide clinical use of acupuncture, clinical research on acupuncture has also grown.[6] Since 1975, more than 10 000 randomised controlled trials on acupuncture have been published.[7 8] Given the rapid increase in the literature on acupuncture, evidence based practice and policy making require systematic reviews of the available randomised controlled trials.

In this analysis, we assess the number and quality of systematic reviews of acupuncture, explore the possible underuse of proven beneficial acupuncture therapies in clinical practice and health policy, identify the promising and under-researched areas, and propose strategies to implement effective acupuncture treatments and establish funding opportunities and research agendas for acupuncture therapies.

KEY MESSAGES

- A large number of systematic reviews of acupuncture exist which are overall methodologically rigorous
- Clinical practice and health policy underuse beneficial acupuncture therapies for which rigorous systematic reviews have documented high or moderate certainty evidence
- Acupuncture funding and research need to focus on conditions for which acupuncture therapies have had substantial beneficial effects but for which evidence is of low certainty
- A coordinated multistakeholder effort to generate acupuncture evidence and support its implementation will enable a more evidence based approach to practice and research

Systematic reviews of acupuncture

We identified 2471 systematic reviews of acupuncture therapies in the Web of Science between 2000 and 2020, with the number of systematic reviews increasing annually (fig 1). Published systematic reviews of randomised trials (1578, 63.9%) and observational studies (893, 36.1%) mainly focused on the following therapeutic areas: musculoskeletal and connective tissue diseases (865, 35.0%), neurological conditions (304, 12.3%), cancer (287, 11.6%), and cardiovascular diseases (235, 9.5%). The country of the first author listed in acupuncture systematic reviews was China (996, 40.3%), US (358, 14.5%), UK (316, 12.8%), South Korea (259, 10.5%), Australia (178, 7.2%), Canada (117, 4.7%), Germany (106, 4.3%), and elsewhere (141, 5.7%).

An overview of systematic reviews of acupuncture therapy compared acupuncture with no intervention, sham acupuncture (similar to placebo control for pharmacological interventions), and other conventional medical interventions (such as standard of care, psychotherapy, and rehabilitation) and found the main limitations of these systematic reviews included an absence of a list of excluded studies and no explanation of protocol modifications.[9] Medical evidence users including clinicians, patients, and policy makers often regard Cochrane systematic reviews to be the most reliable. When using AMSTAR 2 (A MeaSurement Tool to Assess systematic Reviews) to assess the methodological rigour of Cochrane systematic reviews of randomised controlled trials on acupuncture, important problems include failure to specify study design as an eligibility criterion (94%) and failure to adequately investigate and interpret publication bias (52%).[10-12]

Although earlier studies have used AMSTAR 2 to assess the methodological rigour of acupuncture systematic reviews and concluded that the quality was low, the criteria they used do not reflect the most serious problems in systematic reviews. Comprehensive searches, assessment of risk of bias, independent and duplicate screening and data extraction, and assessment of certainty of evidence are

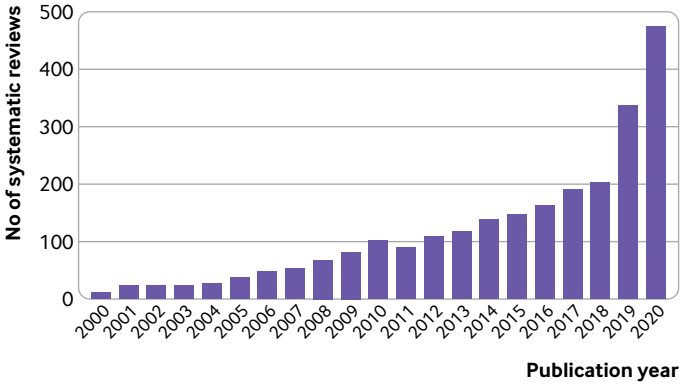

Fig 1 | Number of systematic reviews of acupuncture published between 2000 and 2020

some of the most important methodological considerations in systematic reviews. The limitations identified in systematic reviews of acupuncture therefore have little effect on the overall quality. For instance, the systematic reviews did not provide the list of primary studies excluded. Despite minor limitations, systematic reviews of acupuncture therapies are generally methodologically rigorous.

Evidence based acupuncture therapies are underused

A recent overview of acupuncture systematic reviews found that of 77 diseases investigated, acupuncture showed a moderate or large effect with moderate or high certainty evidence in eight diseases or conditions: improvement in functional communication of patients with post-stroke aphasia; relief of neck and shoulder pain; relief of myofascial pain; relief of fibromyalgia related pain; relief of non-specific lower back pain; increased lactation success rate within 24 hours of delivery; reduction in the severity of vascular dementia symptoms; and improvement of allergic rhinitis nasal symptoms.[9]

However, instead of endorsement in health policies and wide use in clinical practice, only a few healthcare systems incorporated acupuncture into clinical practice guidelines and national health coverage for these conditions.[13-15]

For example, acupuncture is underused in practice for treatment of post-stroke aphasia. The US National Aphasia Association estimated that 2 million people in the country and 250 000 people in the UK suffered from post-stroke aphasia in 2016.[16] Up to 38% of stroke patients suffer from aphasia.[17] Post-stroke aphasia affects patients' ability to express or understand language and disrupts their socialisation and work. Patients most often receive speech and language rehabilitation, neuromodulation, and pharmacological therapy (eg, bromocriptine, piracetam, and donepezil).[18] Of these three treatments, only language rehabilitation shows a clear benefit for post-stroke aphasia. Additional treatment methods are needed.[19]

A high quality systematic review, as assessed by AMSTAR 2, of eight trials including 481 patients that compared acupuncture to language rehabilitation found a large difference in improvement in the functional communication of post-stroke aphasia patients in favour of acupuncture (standardised mean difference 1.01, 95% confidence interval 0.81 to 1.2, moderate certainty).[20 21] This difference corresponds to an over 20% improvement (56 in an instrument from 0 to 250) on the Chinese functional communication scale. In the absence of an anchor based minimal important difference (the smallest difference that informed patients or proxies perceive as important, either beneficial or harmful, and can lead to a change in patient management) for the Chinese functional communication scale, we calculated the distribution based minimal important difference (0.5 standard deviations of the Chinese functional communication profile).[22] Even the lower boundary of the 95% confidence interval (44.8) exceeded the minimal important difference (28.0).[23]

A cumulative meta-analysis (fig 2) showed that by 2015, acupuncture had already demonstrated a likely improvement in functional communication in post-stroke aphasia patients (standardised mean difference 0.95, 95% confidence interval 0.74 to 1.17), corresponding to 52.5 of the Chinese functional communication profile scales (0–250), moderate certainty). The 95% confidence interval becomes narrower and the effect slightly larger when adding more randomised controlled trials after 2015. Thus, by 2015 compelling evidence had accumulated that acupuncture provided important improvement, relative to the best existing therapy, in functional communication in post-stroke aphasia. To date, however, only one Chinese clinical practice guideline has recommended acupuncture therapies for treatment of post-stroke aphasia.[24] In the US alone, 10 million patients with post-stroke aphasia could have benefited from acupuncture treatment.

Moreover, insurance does not cover some beneficial acupuncture therapies. Of the eight diseases and conditions identified earlier, the main national insurers in Western countries only cover pain related conditions.[14-16 25 26] In the US, at the end of 2020, Medicare started covering acupuncture treatment for chronic lower back pain.[14 25] In Australia, Medicare covers back pain and shoulder pain.[15] In UK, the National Institute for Health and Care Excellence provides limited recommendations, indicating that most fully informed patients would choose to use acupuncture as a treatment option for chronic tension-type headaches, migraines, and chronic pain. Nevertheless, no national insurance reimburses acupuncture treatment.[16 26]

Identified research opportunities are underfunded

Promising acupuncture therapies (large effect supported by low certainty evidence) represent potentially fruitful future clinical research targets, and thus require further investigation and research funding support. The overview of systematic reviews found that in 33 outcomes for 22 conditions, acupuncture showed a promising effect.[9] Existing funding and research endeavours in these areas have, however, increased little in the past decade.

Take three diseases or conditions in which acupuncture showed promising effects as an example.[9] Depressive disorders, migraine, and opioid use disorders are prevalent and associated with a high disease burden globally.[9] Depressive disorders affect more than 120 million people worldwide and cause functional impairment and social dysfunction, reduce the productivity of people who suffer from these conditions, and increase the risk of suicide and long term mortality.[27] Migraine affects about 1.04 billion people

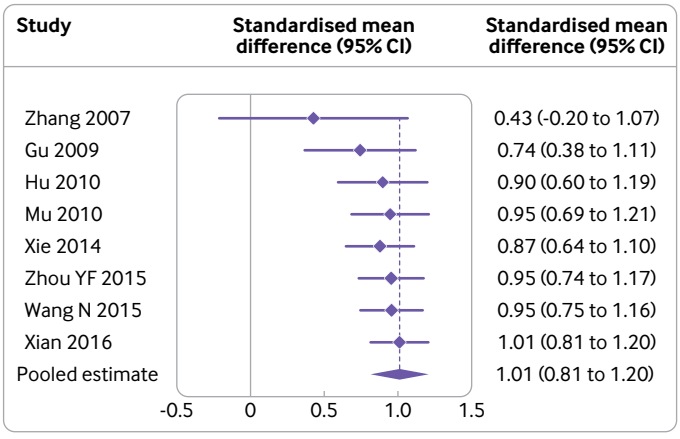

Fig 2 | Cumulative meta-analysis of the use of acupuncture compared with language rehabilitation for functional communication in patients with post-stroke aphasia

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and causes $5.6bn to $17.2bn (£4.2bn to £12.9bn) annual lost labour costs.[28] Opioid use disorders affect 40.5 million people globally and lead to 109 500 deaths annually.[29] A 2018 burden of disease study in the US reported that according to the ranking of years lived with disability, depressive disorders, migraine, and opioid use disorders ranked the second, fifth, and eighth most prevalent disease nationally.[30]

In the US—one of the most science and technology focused countries—we looked at the underuse of existing systematic reviews for funding opportunities. In the past decade, among all acupuncture projects funded by the National Institutes of Health, four targeted opioid use disorders, with $1.09m of funding, which accounted for only 3.1% of the National Institutes of Health acupuncture funding. Depressive disorders and migraine received no funding.[31] Even though acupuncture therapies have shown large effects supported by low certainty evidence for all three of these prevalent and high burden diseases, they received limited funding for further investigation.[9]

Clinical studies on acupuncture seldom cite evidence from existing systematic reviews in their rationale for conducting the study. Randomised controlled trials are a popular design in acupuncture research. A systematic survey identified that only 31 out of 584 randomised controlled trials on acupuncture published between 2015 and 2019 cited previous systematic reviews when describing the rationale for conducting the trial. This situation suggests low use of systematic reviews in primary research.[32]

Box 1: Summary recommendations to increase use of acupuncture systematic reviews

Incorporate acupuncture evidence into decision making within health systems
Given the many systematic review summarising acupuncture evidence identified in *The BMJ* acupuncture collection, international, regional, and national organisations and health systems should initiate, support, and develop more acupuncture evidence informed decision making.

Build a joint research production effort
Knowledge users, funding agencies, and researchers should set joint research agendas to accelerate the generation, updating, evaluation, and release of evidence to provide a basis for the application of acupuncture.

Digitise and disseminate evidence on acupuncture to facilitate access
A digitised repository should be created with evidence matrices that map systematic reviews of acupuncture and disseminate (eg, through social media, subscriptions, and emails) tailored messages derived from systematic reviews to help patients, clinicians, and policy makers access evidence on acupuncture.

Enable the use of existing evidence in health system decision making
Linkages and exchange between researchers, clinicians, and policy makers should be encouraged to help expand the use of existing acupuncture evidence, especially in areas in which acupuncture therapy shows moderate or large effects supported by moderate or high certainty evidence. The GRADE evidence to decision framework enables transparent and structured evidence informed health system decisions.

Align knowledge gaps and research with funding priorities
Researchers and granting agencies should focus on areas where acupuncture has shown large effects supported with low or very low certainty evidence (areas of high potential) and avoid research and funding in areas where moderate or high certainty evidence has proven the benefit of interventions.

Better use of systematic reviews is needed in decision making

With the widespread use of acupuncture therapies in clinical practice and rapid increase in research interest, it is vital to make use of the large existing body of evidence to inform clinical and policy decision making and establish funding and research agendas globally. We therefore propose the following recommendations to encourage the use of systematic reviews of acupuncture in research and healthcare decision making, which are summarised in box 1.

Incorporate acupuncture evidence into decision making within health systems

Many consider acupuncture part of complementary and alternative medicine, which is an area about which many knowledge users have doubts about the potential value in clinical practice and health policy.[33] In other areas of complementary and alternative medicine, however, evidence of effectiveness is limited, while in acupuncture, it is extensive.

The BMJ acupuncture collection is one of the global efforts to encourage the use of evidence to inform healthcare decision making at all levels. The collection has shown the large number of randomised controlled trials, systematic reviews, clinical practice guidelines, and health economic evidence on acupuncture in the medical literature, which reflects the change in the integration of acupuncture in mainstream medicine. Knowledge users traditionally perceive acupuncture as an intervention supported by low quality evidence. However, this impression inconsistent with the large body of evidence on acupuncture, a substantial portion of which provides moderate or high certainty evidence of net benefit, as mentioned earlier on post-stroke aphasia. In light of the findings from the collection, international, regional, and national organisations and health systems should initiate, support, and develop more evidence informed decision making on acupuncture.

Build a joint research production effort

Knowledge users, funding agencies, and researchers should set joint research agendas to accelerate the generation, updating, evaluation, and release of evidence to provide a basis for the application of acupuncture. For example, national policy makers can communicate with funding agencies and establish research funding based on policy needs and country priorities. Research organisations can then produce evidence that matches the decision needs of healthcare systems, obtain specific research findings, and directly disseminate these findings to policy makers.

Such a system can streamline the need-production-use process and bridge the gap between emerging evidence and decision making.

Digitise and disseminate evidence on acupuncture to facilitate access

Online digitised evidence matrices, created by a team of acupuncture researchers in collaboration with the Epistemonikos Foundation (https://www.epistemonikos.org/), is a good start for digitisation.[9] The team produced evidence matrices mapping systematic reviews of randomised controlled trials on acupuncture for 77 diseases, across 12 therapeutic areas, including 1402 trials and 138 995 patients. (For an example of the digitised matrices on acupuncture for non-specific lower back pain, see: https://www.epistemonikos.

org/matrixes/60654c866ec0d61dc0b9e0d4.) Patients, clinicians, and policy makers can easily access the body of evidence supporting healthcare decisions. Researchers can quickly identify systematic reviews and randomised controlled trials and determine knowledge gaps and the need for new systematic reviews.

Setting up additional dissemination efforts can also be helpful. For example, research institutions and medical organisations can identify clinical or policy audiences and create tailored messages derived from the systematic reviews, using social media, websites, subscription emails, newsletters, and conferences to distribute the latest research findings.[34]

Enable the use of existing evidence in health system decision making

In areas where acupuncture therapy has shown moderate or large effects supported by moderate or high certainty evidence, it validates its widespread use. Patients, clinicians, health policy makers, and health insurance companies should use the latest body of evidence to assist clinical or health system decisions-making.

For knowledge users, creating opportunities and encouraging the links and exchanges between researchers, clinicians, and policy makers will facilitate the use of existing acupuncture research evidence. Key stakeholders can engage in dialogue with researchers to discuss their views and experiences related to the evidence. Furthermore, researchers can provide a summary of findings or develop specific messages for policy makers to facilitate the use and application of the evidence on acupuncture.[35]

Healthcare decision making is complex, with stakeholders often taking into account many factors (eg, treatment effects, economic implications of an intervention, importance of the problem, and feasibility of application). When clear selection criteria are absent, decision-makers might overlook essential factors, assign more importance to less critical factors, or not use the best available evidence to inform their judgement. The health system and public health GRADE (Grading of Recommendations Assessment, Development and Evaluation) Evidence to Decision framework provides a transparent and structured framework to support evidence informed policies.[36 37] The Evidence to Decision framework ensures consideration of the best available evidence and all important factors. When making coverage decisions or producing clinical practice guidelines, decision makers should consider using the Evidence to Decision framework to integrate acupuncture evidence for health system decision making.

Align knowledge gaps and research with funding priorities

Areas where acupuncture therapies have shown large effects supported with low or very low certainty evidence are potentially fruitful targets for future clinical trials. Primary research needs to consider these areas when conducting future research.

Granting agencies should consider establishing targeted funding opportunities in high potential areas and avoid providing additional funding in areas where moderate or high certainty evidence has already proven interventions to be effective. As well as considering the prevalence and burden of disease, public and private research foundations can support the most promising acupuncture research areas (such as depressive disorders, migraine, opioid use disorders, and insomnia disorders) which can produce high quality evidence and support clinical and health system decision making.

Conclusion

With the wide use of acupuncture therapies in clinical practice and rapid increase in research interest, it is vital to use the large body of evidence that exists to inform clinical and policy decision making and establish funding and research agendas globally. Creating a climate of evidence informed decision making on acupuncture, building a multistakeholder coordinated effort to facilitate the generation and implementation of evidence, and using digitised repositories to facilitate knowledge users' access to information will enable a more evidence based approach to inform practice, policy, research agenda, and funding priorities for acupuncture therapies.

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