

Acupuncture – a national heritage of China to the world: international clinical research advances from the past decade

Baoyan Liu^{1,*}, Bo Chen^{2,3}, Yi Guo^{3,4}, Lixin Tian⁵

Abstract

Acupuncture originated in China and is an important component of traditional Chinese medicine. The elucidation of its anesthetic mechanisms, the medical needs of Western societies, as well as the proven therapeutic effects of this technique have made it the most widely used medical practice in the world. The concept of evidence-based medicine has been introduced in acupuncture research for technical improvement and the production of high-quality clinical evidence. Upon reviewing the acupuncture clinical research over the past 10 years, we found the gradually increasing range of diseases that it benefits, from pain management to neoplasms and genitourinary, digestive, and mental disorders. Acupuncture is included in a number of international guidelines for clinical practice. However, high-quality clinical evidence to support the efficacy and effectiveness of acupuncture is lacking as a result of multiple exceptional clinical trials conducted by Western researchers that have yielded antagonistic results. Future clinical research should focus on exploring objective evaluation methods for studying the therapeutic effects of acupuncture.

Keywords: Acupuncture, Clinical research, Review

1 Introduction

According to the World Health Organization (WHO) Traditional Medicine Strategy (2014–2023), traditional and complementary medicine practices vary greatly from country to country. Certain practices (sometimes called modalities) are viewed differently, depending on the culture, understanding, and accessibility to conventional medicine. One of the medical practices that have made significant progress is acupuncture. Although it had originally been a feature of traditional Chinese medicine (TCM), it is now recognized and used worldwide, as was shown by reports from 129 countries, 80% of which now recognize its use^[1]. In November 2010, acupuncture and moxibustion, both TCM modalities, were included in the United Nations Educational, Scientific and Cultural Organization (UNESCO) Representative List of the Intangible Cultural Heritage of Humanity^[2]. Moreover, in February 2017, a bronze acupuncture statue was erected in the lobby of the WHO, signifying the globalization of Chinese acupuncture^[3]. According to

the data of the World Federation of Acupuncture-Moxibustion Societies from 2015^[4], 45 countries have legislated acupuncture, 65 have recognized its legal status, 39 have included it in their medical insurance, and 31 have encouraged or permitted its use.

The scope, quantity, and quality of acupuncture clinical research have rapidly improved in recent years due to clinical epidemiology and evidence-based medicine (EBM). This has led to its development from empirical to EBM. Acupuncture has become the most mainstream traditional medicine in the world due to its safety and effectiveness. In the United States (US), 44 out of the 50 states have approved the licensing of acupuncture^[5]. According to the National Institutes of Health (NIH)^[6], 3 to 6 million Americans undergo acupuncture annually, including treatments such as the use of filiform needles, cupping, and massage. These treatments have been included in the US health insurance plans and have made them easily accessible. All well-known hospitals in the US provide acupuncture services with a wide range of applications. The experience of famous athletes, artists, actors, and international celebrities has also played a role in promoting acupuncture. Other Western countries use acupuncture as well. The official website of the British National Health System recommends acupuncture for headaches, migraines, back pain, arthritis, infertility, anxiety, asthma, among others^[7]. The Swedish National Health Service platform recommends it for chronic low back pain, shoulder pain, neck pain, tennis elbow, and labor pain management. The curative effect is the basis of worldwide acupuncture use.

The traditional use of acupuncture is for pain management. Several high-quality randomized controlled trials (RCTs) have shown that it has a therapeutic effect on chronic nonspecific neck pain^[8], knee joint pain^[9], and migraines^[10]. In recent years, it has been applied in emergency departments due to its analgesic effects on acute lumbar strains and ankle sprains^[11]. Also, there is evidence that acupuncture is effective in managing perioperative^[12] and postoperative pain^[13–14], as well

¹ China Academy of Chinese Medical Sciences, Beijing, China;

² School of Acupuncture-Moxibustion and Tuina, Tianjin University of Traditional Chinese Medicine, Tianjin, China; ³ National Clinical Research Center for Chinese Medicine Acupuncture and Moxibustion, Tianjin, China; ⁴ School of Traditional Chinese Medicine, Tianjin University of Traditional Chinese Medicine, Tianjin, China; ⁵ Graduate School, Tianjin University of Traditional Chinese Medicine, Tianjin, China

* Corresponding author. Baoyan Liu, China Academy of Chinese Medical Sciences, Beijing 100700, E-mail: liuby5505@139.com.

Copyright © 2021 Tianjin University of Traditional Chinese Medicine. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

Acupuncture and Herbal Medicine (2021) 1:2

Received 26 July 2021 / Accepted 08 October 2021

<http://dx.doi.org/10.1097/HM9.000000000000017>

as visceral pain, such as angina pectoris^[15]. Therefore, the range of acupuncture analgesia has been expanding.

In addition, acupuncture has been used in fields other than pain management, such as oncology, pediatrics, emergency medicine, and even war-related post-traumatic psychiatric disorders. It has also become popular in treating infantile colic and has shown effects on *in vitro* fertilization and veterinary care. In recent years, acupuncture treatment for non-painful conditions has been increasing, such as chemotherapy-induced nausea and vomiting^[16], peripheral neuropathy^[17-18], radiotherapy-induced dysphagia^[19], xerostomia^[20], hot flashes in breast cancer^[21], dyspnea from lung cancer^[22], cancer-related fatigue^[23] and other cancer-related symptoms, urinary incontinence^[24], postmenopausal dry eye syndrome^[25], and digestive system-related conditions such as postprandial distress syndrome^[26], and chronic severe functional constipation^[27]. Acupuncture clinical research has generated high-quality evidence in the treatment of these conditions.

In order to create a comprehensive analysis of the progress of acupuncture clinical research during the past decade (2011–2020), a literature review was conducted to retrieve all published acupuncture clinical studies, registered acupuncture trials, systematic reviews of acupuncture, and acupuncture-related guidelines. Previously published studies on clinical acupuncture were searched in PubMed, registered acupuncture trials were searched in ClinicalTrials.gov and website of Chinese Clinical Trial Registry (ChiCTR). Systematic reviews of acupuncture were searched in the Cochrane Library, and acupuncture-related guidelines were searched in the databases of Guidelines International Network (GIN), National Institute for Health and Care Excellence (NICE), National Guideline Clearinghouse (NGC), Agency for Healthcare Research and Quality (AHRQ), PubMed, Embase, Association for Management Education and Development (AMED), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Wanfang Database, Chinese National Knowledge Infrastructure (CNKI), VIP information, and Chinese Biomedical Database (CBM). The literature search covered the period from January 2011 to December 2020.

2 Publications of acupuncture clinical trials

2.1 Disease distribution based on physiological systems

A total of 1,398 articles were retrieved from the PubMed database for acupuncture clinical studies from 2011 to 2020. Among them, 1,386 were clinical trials (1,213 disease and 173 non-disease studies) and 12 were observational studies. Most of the clinical trials were RCTs ($n=1,223$), and others were non-RCTs ($n=163$). According to the WHO International Classification of Diseases (ICD-11), the proportions of the disease category were as follows: disorders of the musculoskeletal system and connective tissue (211/1,213, 17.39%); disorders of the nervous system (154/1,213, 12.70%); mental, behavioral, or neurodevelopmental disorders (140/1,213, 11.54%); disorders of the digestive system (123/1,213, 10.14%); disorders of the genitourinary system (105/1,213, 8.66%); pain (71/1,213, 5.85%); neoplasms (58/1,213, 4.78%); endocrine, nutritional, and metabolic diseases (54/1,213, 4.45%); diseases associated with pregnancy, childbirth, and the puerperium (54/1,213, 4.45%); disorders of the respiratory system (46/1,213, 3.79%);

sleep-wake disorders (44/1,213, 3.63%); signs, symptoms, and clinical findings (44/1,213, 3.63%); disorders of the circulatory system (31/1,213, 2.56%); skin diseases (23/1,213, 1.90%); injury, poisoning, and certain other consequences of external causes (12/1,213, 0.99%); disorders of the visual system (10/1,213, 0.82%); disorders of the ear and mastoid process (8/1,213, 0.66%); factors influencing health status and contact with health services (8/1,213, 0.66%); certain infectious or parasitic diseases (7/1,213, 0.58%); certain conditions originating in the perinatal period (4/1,213, 0.33%); disorders of the immune system (3/1,213, 0.25%), and conditions related to sexual health (3/1,213, 0.25%). These clinical trials covered a variety of disease categories, ranging from the traditional ailments that benefit from acupuncture to many others that are not conventionally managed with acupuncture.

2.2 Disease rankings of acupuncture clinical trials

The musculoskeletal system and connective tissue disorders were the top rankings in 2013, 2014, 2017 through 2020. In 2011, clinical trials on the diseases of the musculoskeletal system and connective tissue and the genitourinary system were equally prevalent, both of which are top rank. In 2012, diseases of the nervous system ranked first, in 2015, the digestive system, and in 2016 the musculoskeletal system and connective tissue disorders, as well as the nervous system. Although there were some alternations of the ranking each year, the disease types remained unchanged. In addition to the two traditional systems treated by acupuncture (musculoskeletal system and connective tissue and the nervous system), research on the digestive system, the genitourinary system, and mental, behavioral, and neurodevelopmental disorders was also maintained at a relatively stable rate (Figure 1 and Figure 2). As such, the above three systems seem to emerge as a popular area where acupuncture can take good effect, and with the increasing attention and research, more high-quality evidence may be generated regarding the use of acupuncture in treating related conditions.

2.3 Publications from the high-quality clinical trials

A total of seven acupuncture clinical trial articles have been published in the world's top medical journals in the past 10 years, five in the *Journal of the American Medical Association*^[14,24,28-30], one in the *New England Journal of Medicine*^[31], and one in the *British Medical Journal*^[32]. Over the past 15 years, there have been no related clinical studies published in *The Lancet* since the onset of acupuncture publication on knee osteoarthritis in 2005^[33]. China leads the world for publishing three of the above-mentioned studies. However, high-level research is still needed to compare acupuncture practices between China and the countries in which acupuncture is practiced^[1]. Upon analysis of disease types, the traditional use of acupuncture for pain management still ranked high. However, diseases of the genitourinary system, the respiratory system, and neoplasms also attracted significant attention. These studies provided high-quality evidence in favor of the therapeutic effects of acupuncture. However, the negative results in four of these trials were 57% and thus higher than the positive results, which indicated that the efficacy of acupuncture remained controversial.

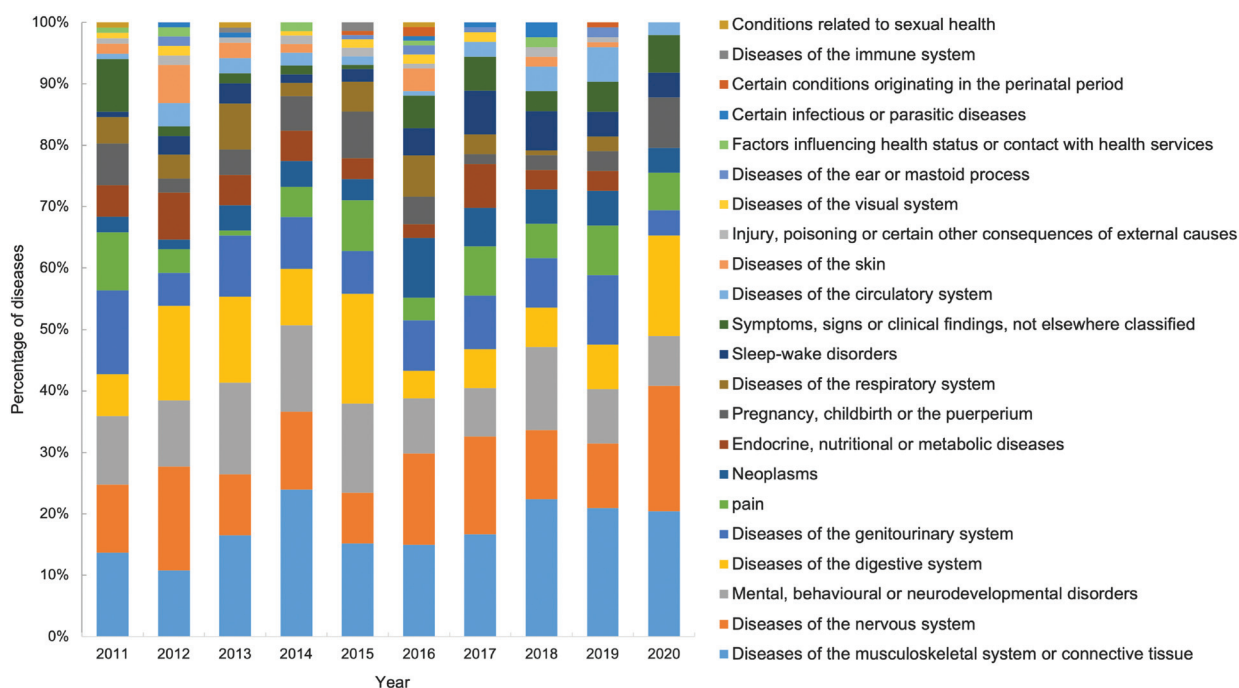


Figure 1. Disease distribution of acupuncture trials by each year from 2011 to 2020.

3 Registration of acupuncture clinical trials

3.1 Registration status

A total of 1,077 registered acupuncture trials were found from 2011 to 2020 in the ClinicalTrials.gov and ChiCTR, including 1,010 interventional and 67 observational studies. The number of involved interventions was as follows: 970 trials with acupuncture, 49 with moxibus-

tion, 42 with cupping, and 16 with bloodletting puncture. The number of trials stratified by continents was as follows: 588 in Asia, 198 in North America, 120 in Europe, 40 in South America, 16 in Africa, 5 in Oceania, and 110 in unidentified regions. The number of registered trials by year (2011–2020) were 59, 60, 68, 114, 120, 105, 113, 125, 144, and 169, respectively. During the 10 years, the number of registered acupuncture clinical trials

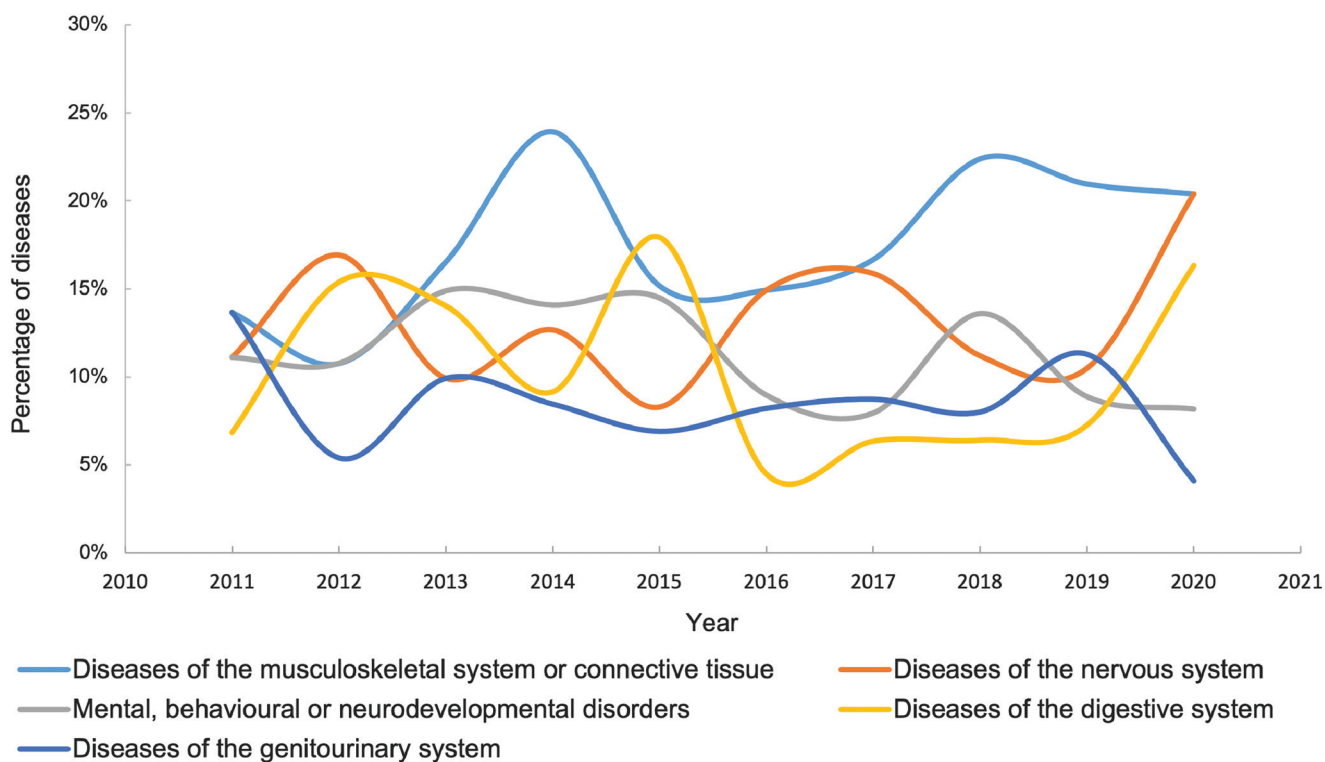


Figure 2. Annual trends of the top five diseases in acupuncture trials from 2011 to 2020.

showed an upward trend with each passing year, indicating that the awareness and transparency of acupuncture clinical trial registration had gradually increased. The completion rates of registered acupuncture clinical trials in the past 3 years (2018–2020) were 46.32%, 21.67%, and 21.67%, respectively, indicating that the majority are still ongoing. The completion rates from the previous 7 years (2011–2017) were 71.93%, 68.42%, 62.90%, 60.78%, 54.95%, 45.65%, and 31.31%, respectively. The cumulative percentage of trials with the status of suspended, terminated, withdrawn, and unknown, were 28.07%, 29.82%, 30.65%, 33.33%, 41.44%, 33.70%, 40.40%, 12.63%, 6.67%, 1.55%, in each year, from 2011 to 2020, which indicated that a considerable proportion of the registered clinical trials have not been completed or have not changed their status in the registries after completion.

According to the ICD-11, categories of disease systems among registration of acupuncture trials included the musculoskeletal system and connective tissue disorders (218), the nervous system (110), the genitourinary system (110), signs, symptoms, and clinical findings (94), the digestive system (84), mental, behavioral, and neurodevelopmental disorders (80), pain (67), neoplasms (58), the circulatory system (39) endocrine, nutritional, and metabolic diseases (38), pregnancy, childbirth and puerperium (34), sleep-wake disorders (31), the respiratory system (26), injury, poisoning and certain other consequences of external causes (18), the skin (17), the visual system (16), the immune system (14), certain conditions originating in the perinatal period (6), certain infectious or parasitic diseases (5), the blood and blood-forming organs (4), the ear and mastoid process (4), factors influencing health status or contact with health services (3), and conditions related to sexual health (1).

3.2 Disease rankings of registered acupuncture trials

The category of signs, symptoms, and clinical findings involved a variety of diseases. After excluding it, the top five diseases were those of the musculoskeletal system and connective tissue, the nervous system, the genitourinary system, the digestive system, and mental, behavioral, and neurodevelopmental disorders. Diseases of the musculoskeletal system and the connective tissue received the most attention every year, except in 2013 and 2015. In 2013, diseases of the genitourinary system were the most studied, but that has since declined in recent years. Diseases of the nervous system, digestive system, mental, behavioral, and neurodevelopmental disorders also received great attention, and their proportions were relatively balanced each year. These results were in accord with those of the published clinical trials.

4 Systematic reviews and clinical guidelines on acupuncture

4.1 Acupuncture-related systematic reviews

A total of 100 systematic reviews, found in the Cochrane Library, were published in the past 10 years, and their distributions per year were as follows: 6 in 2011, 8 in 2012, 13 in 2013, 10 in 2014, 15 in 2015, 12 in 2016, 7 in 2017, 12 in 2018, 9 in 2019, and 8 in 2020. During the 10 years, the number of systematic reviews grew steadily from 2011 to 2015 and reached a peak in 2015. However,

it declined gradually since 2015, with some fluctuations till 2020. The majority of the published systematic reviews were from China (23), the United Kingdom (20), and Australia (18), which altogether accounted for 61% of the total. The involved interventions and their proportions in descending order were as follows: acupuncture (52%), transcutaneous electrical nerve stimulation (14%), massage (12%), electrotherapy (8%), and acupressure (7%). According to the ICD-11, the top five conditions were pain (18%), diseases of the genitourinary system (15%), mental, behavioral, and neurodevelopmental disorders (13%), diseases of the musculoskeletal system or connective tissue (12%), and diseases of the nervous system (10%). Only 34% of these systematic reviews reported that acupuncture was effective, 50% indicated that it was either ineffective or equivalent to the placebo group, and 16% were uncertain. Currently, the level of clinical evidence regarding acupuncture is not strong, with 58% being low-level evidence^[34–38], 8% being moderate^[39–43], and 34% being insufficient^[44–46].

4.2 Acupuncture-related clinical guidelines

A total of 83 acupuncture-related guidelines were found by searching GIN, NICE, NGC, AHRQ, PubMed, Embase, AMED, CINAHL, WanFang, CNKI, VIP, and CBM databases, of which 21 were published before and 62 after the year 2010 (Table 1). There were altogether 22 institutions of the acupuncture-related guidelines in the last decade. The number of guidelines by each institution and their respective proportions were as follows: National Institute for Health Care Excellence (23, 40%), Colorado Division of Workers' Compensation (5, 9%), American College of Physicians (4, 7%), American Society of Clinical Oncology (3, 5%), American Academy of Otolaryngology-Head and Neck Surgery Foundation (2, 4%), Department of Defense Department of Veterans Affairs (2, 4%), National Guidance Centre (UK) (2, 4%), American College of Occupational and Environmental Medicine (2, 4%); 14 institutions published single guideline on acupuncture during the decade, including Pediatric Oncology Group of Ontario, Scottish Intercollegiate Guidelines Network, University of New South Wales, American College of Gastroenterology, Institute of Health Economics, The Endocrine Society, Canadian Chiropractic Guidelines Society, National Clinical Guideline Centre for Acute and Chronic Conditions, North American Spine Society, National guidance Union, Canadian Network for Mood and Anxiety Treatments, University of South Denmark, Ottawa Pane, and National Institute of Supplementary Medicine (University of West Sydney).

A total of 31 conditions were mentioned, with pain being the most common, followed by neoplasms, urinary system diseases, and mental disorders. Among the 31 conditions, acupuncture was recommended in 17 (55%), not recommended in 9 (29%), and recommended by some while other guidelines did not recommend in 5 (16%) conditions. The inconsistencies in the recommendations in the guidelines may cause doubt about the scientific nature, effectiveness, and safety of acupuncture.

5 Discussion

As a form of non-pharmacological therapy with minimal side effects, acupuncture has gained international popularity. Drug dependence caused by excessive use of

Table 1

Acupuncture recommendations of international clinical guidelines by disease type

Disease type	Year of publication	Country	Institution	Reference	Recommendation
Headaches	2012	Britain	National Guideline Centre	Headaches: diagnosis and management of headaches in young people and adults. Guideline for primary care management of headache in adults. Addendum to Clinical Guideline 150, Headaches in over 12s: diagnosis and management.	Recommended
	2012	Canada	Institute of Health Economics		Recommended
	2015	Britain	National Institute of Health Care Excellence (UK)		Recommended
Acute, subacute, and chronic low back pain	2014	Britain	National Institute of Health Care Excellence (UK)	Transcranial magnetic stimulation for treating and preventing migraine. Occipital nerve stimulation for intractable chronic migraine. Percutaneous closure of patent foramen ovale for recurrent migraine. Transcutaneous electrical stimulation of the supraorbital nerve for treating and preventing migraine. Transcutaneous stimulation of the cervical branch of the vagus nerve for cluster headache and migraine. Noninvasive treatments for acute, subacute, and chronic low back pain. Low back pain medical treatment guidelines. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. Non-rigid stabilization techniques for the treatment of low back pain. Peripheral nerve-field stimulation for chronic low back pain. Clinical practice guideline: allergic rhinitis.	Recommended
	2013	Britain	National Institute of Health Care Excellence (UK)		Highly recommended
	2010	Britain	National Institute of Health Care Excellence (UK)		Recommended
	2016	Britain	National Institute of Health Care Excellence (UK)		Recommended
	2016	Britain	National Institute of Health Care Excellence (UK)		Recommended
	2017	America	American College of Physicians		Recommended
Allergic rhinitis	2014	America	American Colorado Division of Workers' Compensation	Lower extremity injury medical treatment guidelines. Shoulder injury medical treatment guidelines. Cervical spine injury medical treatment guidelines. The treatment of neck pain-associated disorders and whiplash-associated disorders: a clinical practice guideline. National clinical guidelines for non-surgical treatment of patients with recent onset neck pain or cervical radiculopathy. Management of chronic pain. A national clinical guideline. Occupational medicine practice guidelines: evaluation and management of common health problems and functional recovery in workers. Low back pain and sciatica in over 16s: assessment and management. Low back pain and sciatica in over 16s: assessment and management. Percutaneous coblation of the intervertebral disc for low back pain and sciatica. Percutaneous electrothermal treatment of the intervertebral disc annulus for low back pain and sciatica. Percutaneous interlaminar endoscopic lumbar discectomy for sciatica. Percutaneous transforaminal endoscopic lumbar discectomy for sciatica. Clinical practice guidelines for the management of rotator cuff syndrome in the workplace.	Recommended
	2017	America	American College of Physicians		Recommended
	2010	Britain	National Institute of Health Care Excellence (UK)		Recommended
	2013	Britain	National Institute of Health Care Excellence (UK)		Recommended
	2015	America	American Academy of Otolaryngology – Head and Neck Surgery Foundation		Recommended
Lower extremity injury	2016	America	Colorado Division of Workers' Compensation	Lower extremity injury medical treatment guidelines. Shoulder injury medical treatment guidelines. Cervical spine injury medical treatment guidelines. The treatment of neck pain-associated disorders and whiplash-associated disorders: a clinical practice guideline. National clinical guidelines for non-surgical treatment of patients with recent onset neck pain or cervical radiculopathy. Management of chronic pain. A national clinical guideline. Occupational medicine practice guidelines: evaluation and management of common health problems and functional recovery in workers. Low back pain and sciatica in over 16s: assessment and management. Low back pain and sciatica in over 16s: assessment and management. Percutaneous coblation of the intervertebral disc for low back pain and sciatica. Percutaneous electrothermal treatment of the intervertebral disc annulus for low back pain and sciatica. Percutaneous interlaminar endoscopic lumbar discectomy for sciatica. Percutaneous transforaminal endoscopic lumbar discectomy for sciatica. Clinical practice guidelines for the management of rotator cuff syndrome in the workplace.	Not Recommended
	2015	America	Colorado Division of Workers' Compensation		Recommended
	2014	America	Colorado Division of Workers' Compensation		Recommended
	2016	Canada	Canadian Chiropractic Guideline Initiative		Recommended
Chronic pain	2017	Denmark	University of South Denmark (JNSD)	Lower extremity injury medical treatment guidelines. Shoulder injury medical treatment guidelines. Cervical spine injury medical treatment guidelines. The treatment of neck pain-associated disorders and whiplash-associated disorders: a clinical practice guideline. National clinical guidelines for non-surgical treatment of patients with recent onset neck pain or cervical radiculopathy. Management of chronic pain. A national clinical guideline. Occupational medicine practice guidelines: evaluation and management of common health problems and functional recovery in workers. Low back pain and sciatica in over 16s: assessment and management. Low back pain and sciatica in over 16s: assessment and management. Percutaneous coblation of the intervertebral disc for low back pain and sciatica. Percutaneous electrothermal treatment of the intervertebral disc annulus for low back pain and sciatica. Percutaneous interlaminar endoscopic lumbar discectomy for sciatica. Percutaneous transforaminal endoscopic lumbar discectomy for sciatica. Clinical practice guidelines for the management of rotator cuff syndrome in the workplace.	Not recommended
	2013	Scotland	Scottish Intercollegiate Guidelines Network		Recommended
Low back pain and sciatica	2016	America	American College of Occupational and Environmental Medicine	Lower extremity injury medical treatment guidelines. Shoulder injury medical treatment guidelines. Cervical spine injury medical treatment guidelines. The treatment of neck pain-associated disorders and whiplash-associated disorders: a clinical practice guideline. National clinical guidelines for non-surgical treatment of patients with recent onset neck pain or cervical radiculopathy. Management of chronic pain. A national clinical guideline. Occupational medicine practice guidelines: evaluation and management of common health problems and functional recovery in workers. Low back pain and sciatica in over 16s: assessment and management. Low back pain and sciatica in over 16s: assessment and management. Percutaneous coblation of the intervertebral disc for low back pain and sciatica. Percutaneous electrothermal treatment of the intervertebral disc annulus for low back pain and sciatica. Percutaneous interlaminar endoscopic lumbar discectomy for sciatica. Percutaneous transforaminal endoscopic lumbar discectomy for sciatica. Clinical practice guidelines for the management of rotator cuff syndrome in the workplace.	Recommended
	2016	Britain	National Guideline Centre		Not recommended
	2016	Britain	National Institute of Health Care Excellence (UK)		Not recommended
	2016	Britain	National Institute of Health Care Excellence (UK)		Recommended
	2016	Britain	National Institute of Health Care Excellence (UK)		Recommended
	2016	Britain	National Institute of Health Care Excellence (UK)		Recommended
Rotator cuff syndrome	2016	Britain	National Institute of Health Care Excellence (UK)	Lower extremity injury medical treatment guidelines. Shoulder injury medical treatment guidelines. Cervical spine injury medical treatment guidelines. The treatment of neck pain-associated disorders and whiplash-associated disorders: a clinical practice guideline. National clinical guidelines for non-surgical treatment of patients with recent onset neck pain or cervical radiculopathy. Management of chronic pain. A national clinical guideline. Occupational medicine practice guidelines: evaluation and management of common health problems and functional recovery in workers. Low back pain and sciatica in over 16s: assessment and management. Low back pain and sciatica in over 16s: assessment and management. Percutaneous coblation of the intervertebral disc for low back pain and sciatica. Percutaneous electrothermal treatment of the intervertebral disc annulus for low back pain and sciatica. Percutaneous interlaminar endoscopic lumbar discectomy for sciatica. Percutaneous transforaminal endoscopic lumbar discectomy for sciatica. Clinical practice guidelines for the management of rotator cuff syndrome in the workplace.	Recommended
	2016	Britain	National Institute of Health Care Excellence (UK)		Recommended
	2013	Australia	University of New South Wales		Recommended

(continued)

Table 1
(continued).

Disease type	Year of publication	Country	Institution	Reference	Recommendation
Gastroparesis (gastroparesis)	2013	America	American College of Gastroenterology	Clinical guideline: management of gastroparesis.	Recommended
Cancer-related fatigue	2014	America	American Society of Clinical Oncology	Screening, assessment, and management of fatigue in adult survivors of cancer: an American Society of Clinical Oncology clinical practice guideline adaptation.	Recommended
	2017	America	The American Cancer Society	Clinical practice guidelines on the evidence-based use of integrative therapies during and after breast cancer treatment.	Recommended
Nausea and vomiting	2018	America	American Society of Clinical Oncology	Integrative Therapies During and After Breast Cancer Treatment.	Recommended
	2013	Canada	Pediatric Oncology Group of Ontario	Guideline for the prevention of acute nausea and vomiting due to antineoplastic medication in pediatric cancer patients.	Recommended
	2018	America	American Society of Clinical Oncology	Integrative Therapies During and After Breast Cancer Treatment.	Recommended
	2013	America	American College of Thoracic Physicians	Complementary therapies and integrative medicine in lung cancer: Diagnosis and management of lung cancer.	Recommended
Stable ischemic heart disease	2012	America	American College of Physicians	Management of stable ischemic heart disease: summary of a clinical practice guideline.	Highly recommended
	2012	Canada	Association Society for Cardiovascular Angiography and Interventions Society of Thoracic Surgeons	2012 guideline for the diagnosis and management of patients with stable ischemic heart disease.	Not recommended
Low back disorders	2011	Britain	National Institute of Health Care Excellence, UK	Stable angina: management.	Not recommended
	2016	America	American College of Occupational and Environmental Medicine	Occupational medicine practice guidelines: evaluation and management of common health problems and functional recovery in workers.	Recommended
Tinnitus	2014	America	American Academy of Otolaryngology-Head and Neck Surgery Foundation	Clinical practice guideline: tinnitus.	Not recommended
Hip and knee osteoarthritis	2014	Canada	Department of Defense Department of Veterans Affairs	VADoD clinical practice guideline for the non-surgical management of hip and knee osteoarthritis.	Not recommended
Menopause	2014	Britain	National Institute of Health Care Excellence (UK)	Osteoarthritis: care and management.	Not recommended
	2015	America	The Endocrine Society	Treatment of symptoms of the menopause: an Endocrine Society clinical practice guideline.	Recommended
Major depressive disorder	2016	Canada	Department of Defense Department of Veterans Affairs	VADoD clinical practice guideline for the management of major depressive disorder.	Not recommended
	2016	Canada	Canadian Network for Mood and Anxiety Treatments	2016 Clinical Guidelines for the Management of Adults with Major Depressive Disorder.	Not recommended
Lower urinary tract symptoms in men	2010	America	National Clinical Guideline Centre for Acute and Chronic Conditions	Lower urinary tract symptoms in men: assessment and management.	Not recommended
Lumbar disc herniation	2010	Britain	National Institute of Health Care Excellence (UK)	Lower urinary tract symptoms in men: management.	Not recommended
	2012	America	North American Spine Society	Clinical guidelines for diagnosis and treatment of lumbar disc herniation with radiculopathy.	Not recommended
	2016	Britain	National Institute of Health Care Excellence (UK)	Percutaneous intradiscal radiofrequency treatment of the intervertebral disc nucleus for low back pain.	Recommended
Traumatic brain injury	2012	America	Colorado Division of Workers' Compensation	Traumatic brain injury medical treatment guidelines.	Recommended
Bedwetting in children	2014	Britain	National Institute of Health Care Excellence (UK)	Bedwetting in under 19s.	Recommended

(continued)

Table 1
(continued).

Disease type	Year of publication	Country	Institution	Reference	Recommendation
Caesarean section	2011	America	National guidance Union	Caesarean section.	Not recommended
	2011	Britain	National Institute of Health Care Excellence (UK)	Caesarean section.	Recommended
Eating disorders	2017	Britain	National Institute of Health Care Excellence (UK)	Eating disorders: recognition and treatment.	Not recommended
Intrapartum care	2014	Britain	National Institute of Health Care Excellence (UK)	Intrapartum care for healthy women and babies.	Not recommended
Jaundice in newborn babies	2010	Britain	National Institute of Health Care Excellence (UK)	Jaundice in newborn babies under 28 days.	Not recommended
Weight management before, during and after pregnancy	2010	Britain	National Institute of Health Care Excellence (UK)	Weight management before, during and after pregnancy.	Not recommended
Post-stroke rehabilitation	2012	Canada	Ottawa Pane	Ottawa panel evidence-based clinical practice guidelines for post-stroke rehabilitation.	Recommended
Anorexia nervosa	2015	Australia	National Institute of Supplementary Medicine, University of West Sydney	Practice guidelines for acupuncturists using acupuncture as an adjunctive treatment for anorexia nervosa.	Recommended
Cancer pain	2016	America	American Society of Clinical Oncology	Management of Chronic Pain in Survivors of Adult Cancers: American Society of Clinical Oncology Clinical Practice Guideline.	Recommended
	2018	America	American Society of Clinical Oncology	Integrative Therapies During and After Breast Cancer Treatment: ASCO Endorsement of the SIO Clinical Practice Guideline.	Recommended
Hot flashes	2017	America	The American Cancer Society	Clinical practice guidelines on the evidence-based use of integrative therapies during and after breast cancer treatment.	Recommended
	2018	America	American Society of Clinical Oncology	Integrative Therapies During and After Breast Cancer Treatment: ASCO Endorsement of the SIO Clinical Practice Guideline.	Recommended

ASCO: American Society of Clinical Oncology; SIO: Society for Integrative Oncology; VA/DoD: Veterans Health Administration and the US Department of Defense.

painkillers, side effects of treatments like surgery, radiotherapy, and chemotherapy, as well as the need for lifelong treatment and rehabilitation of multi-factorial chronic diseases, have prompted the international search for non-toxic, safe, and effective treatment methods. Acupuncture has become a reliable alternative. In the 1960s and 1970s, research on the mechanism of acupuncture anesthesia, as well as its clinical applications, established the principles for its worldwide use^[47].

Throughout the past decade, a clinical evaluation system suitable for the characteristics of acupuncture has been established. Clinical research has been developed, the advantages of acupuncture have been clarified, and high-quality evidence has emerged, recommended by multiple international clinical guidelines. However, there is still a need for more high-quality clinical evidence to support the advantages of acupuncture in order to enable its transition from empirical to EBM. Acupuncture is a complex intervention, and its effectiveness can be influenced by many factors. The clinical evidence of acupuncture is mostly derived from strictly controlled RCTs, focusing on evaluating the specific efficacy of acupuncture but ignoring the non-specific aspect in the diagnosis and treatment process, thus these trials cannot fully demonstrate the value of acupuncture. The core issue faced while demonstrating the value and increasing the influence of acupuncture is the designing of an effective method for the evaluation of its therapeutic effects that are in accord with the clinical characteristics of acupuncture. Carrying out clinical research based on reasonable use of real-world clinical data might be a solution to compensating for the limitations of the existing RCTs.

Although acupuncture has been accepted internationally as a therapeutic method, it has not yet received extensive attention from the academic community as a complete and systematic discipline. While acupuncture is being used more frequently in the world, the perfection of its theoretical system and the profound connotation of human science contained in it require further exploration. We believe that acupuncture will surely make a great contribution to the building of a healthy community for mankind.

Conflict of interest statement

Baoyan Liu and Yi Guo are editorial board members of this journal. None of the other authors declare any conflicts of interest.

Funding

None.

Author contributions

Baoyan Liu and Yi Guo conceived and designed the study. Bo Chen provided general guidance for the analysis and interpretation of the data. Lixin Tian designed the search strategy. Bo Chen and Lixin Tian drafted and revised the manuscript. All authors have read and approved the final manuscript.

Ethical approval of studies and informed consent

Not applicable.

Acknowledgments

We would like to thank Yong Chen, Xiyou Hu, and Yawen Tao for their support in literature retrieval.

References

- [1] World Health Organization. WHO Traditional Medicine Strategy: 2014-2023. Available from: <https://www.who.int/publications/item/9789241506096>. Accessed 23 April, 2021.
- [2] National Administration of Traditional Chinese Medicine. "Acupuncture and Moxibustion of Traditional Chinese Medicine" Were Included in the UNESCO Representative List of Intangible Cultural Heritage of Humanity. Available from: <http://www.satcm.gov.cn/bangongshi/gongzuodongtai/2018-03-25/5724.html>. Accessed 15 March, 2021.
- [3] Xinhua Daily Telegraph. President Xi Jinping Presented a Bronze Acupuncture Statue to the World Health Organization. Available from: http://www.xinhuanet.com/mrdx/2017-01/20/c_135998838.htm. Accessed 23 April, 2021.
- [4] Wang X, Liu B, Yang Y. The Overview of World Acupuncture Policies and Legislation. Beijing: China Press of Traditional Chinese Medicine; 2020. 5-6.
- [5] Xinhuanet. In the United States, 44 States Have Legislated Acupuncture, and the Number of Licensed Acupuncturists Has Been Over 40,000. Available from: http://www.xinhuanet.com/overseas/2017-01/15/c_129445239.htm. Accessed 10 March, 2021.
- [6] National Center for Complementary and Alternative Medicine. Acupuncture: In Depth. Available from: <http://nccam.nih.gov/health/acupuncture/introduction.htm#ususe>. Accessed 5 April, 2021.
- [7] MacPherson H, Vickers A, Bland JM, et al. Acupuncture for chronic pain and depression in primary care: a programme of research. *Programme Grants for Applied Research* 2017;5(3):1-342.
- [8] Cerezo-Téllez E, Torres-Lacomba M, Fuentes-Gallardo I, et al. Effectiveness of dry needling for chronic nonspecific neck pain: a randomized, single-blinded, clinical trial. *Pain* 2016;157(9):1905-1917.
- [9] Tu JF, Yang JW, Shi GX, et al. Efficacy of intensive acupuncture versus sham acupuncture in knee osteoarthritis: a randomized controlled trial. *Arthritis Rheumatol* 2021;73(3):448-458.
- [10] Zhao L, Chen J, Li Y, et al. The Long-term effect of acupuncture for migraine prophylaxis: a randomized clinical trial. *JAMA Intern Med* 2017;177(4):508-515.
- [11] Cohen MM, Smit V, Andrianopoulos N, et al. Acupuncture for analgesia in the emergency department: a multicentre, randomised, equivalence and non-inferiority trial. *Med J Aust* 2017;206(11):494-499.
- [12] Oates A, Benedict KA, Sun K, et al. Laser acupuncture reduces pain in pediatric kidney biopsies: a randomized controlled trial. *Pain* 2017;158(1):103-109.
- [13] Benson S, Hagen S, Hoffmann O, et al. Can a brief psychological expectancy intervention improve postoperative pain? A randomized, controlled trial in patients with breast cancer. *Pain* 2019;160(7):1562-1571.
- [14] Hershman DL, Unger JM, Greenlee H, et al. Effect of acupuncture vs sham acupuncture or waitlist control on joint pain related to aromatase inhibitors among women with early-stage breast cancer: a randomized clinical trial. *JAMA* 2018;320(2):167-176.
- [15] Zhao L, Li D, Zheng H, et al. Acupuncture as adjunctive therapy for chronic stable angina: a randomized clinical trial. *JAMA Intern Med* 2019;179(10):1388-1397.
- [16] Xie J, Chen LH, Ning ZY, et al. Effect of transcutaneous electrical acupoint stimulation combined with palonosetron on chemotherapy-induced nausea and vomiting: a single-blind, randomized, controlled trial. *Chin J Cancer* 2017;36(1):6.
- [17] Bao T, Seidman AD, Piulson L, et al. A phase IIA trial of acupuncture to reduce chemotherapy-induced peripheral neuropathy severity during neoadjuvant or adjuvant weekly paclitaxel chemotherapy in breast cancer patients. *Eur J Cancer* 2018;101:12-19.
- [18] Bao T, Patil S, Chen C, et al. Effect of acupuncture vs sham procedure on chemotherapy-induced peripheral neuropathy symptoms: a randomized clinical trial. *JAMA Netw Open* 2020;3(3):e200681.
- [19] Lu W, Wayne PM, Davis RB, et al. Acupuncture for chemoradiation therapy-related dysphagia in head and neck cancer: a pilot randomized sham-controlled trial. *Oncologist* 2016;21(12):1522-1529.

- [20] Garcia MK, Meng Z, Rosenthal DI, et al. Effect of true and sham acupuncture on radiation-induced xerostomia among patients with head and neck cancer: a randomized clinical trial. *JAMA Netw Open* 2019;2(12):e1916910.
- [21] Lesi G, Razzini G, Musti MA, et al. Acupuncture as an integrative approach for the treatment of hot flashes in women with breast cancer: a prospective multicenter randomized controlled trial (AcCliMaT). *J Clin Oncol* 2016;34(15):1795–1802.
- [22] Minchom A, Punwani R, Filshie J, et al. A randomised study comparing the effectiveness of acupuncture or morphine versus the combination for the relief of dyspnoea in patients with advanced non-small cell lung cancer and mesothelioma. *Eur J Cancer* 2016;61:102–110.
- [23] Mao H, Mao JJ, Guo M, et al. Effects of infrared laser moxibustion on cancer-related fatigue: a randomized, double-blind, placebo-controlled trial. *Cancer* 2016;122(23):3667–3672.
- [24] Liu Z, Liu Y, Xu H, et al. Effect of electroacupuncture on urinary leakage among women with stress urinary incontinence: a randomized clinical trial. *JAMA* 2017;317(24):2493–2501.
- [25] Liu Q, Liu J, Ren C, et al. Proteomic analysis of tears following acupuncture treatment for menopausal dry eye disease by two-dimensional nano-liquid chromatography coupled with tandem mass spectrometry. *Int J Nanomedicine* 2017;12:1663–1671.
- [26] Yang JW, Wang LQ, Zou X, et al. Effect of acupuncture for postprandial distress syndrome: a randomized clinical trial. *Ann Intern Med* 2020;172(12):777–785.
- [27] Liu Z, Yan S, Wu J, et al. Acupuncture for chronic severe functional constipation: a randomized trial. *Ann Intern Med* 2016;165(11):761–769.
- [28] Hinman RS, McCrory P, Pirotta M, et al. Acupuncture for chronic knee pain: a randomized clinical trial. *JAMA* 2014;312(13):1313–1322.
- [29] Wu XK, Stener-Victorin E, Kuang HY, et al. Effect of acupuncture and clomiphene in Chinese women with polycystic ovary syndrome: a randomized clinical trial. *JAMA* 2017;317(24):2502–2514.
- [30] Smith CA, de Lacey S, Chapman M, et al. Effect of acupuncture vs sham acupuncture on live births among women undergoing in vitro fertilization: a randomized clinical trial. *JAMA* 2018;319(19):1990–1998.
- [31] Wechsler ME, Kelley JM, Boyd IO, et al. Active albuterol or placebo, sham acupuncture, or no intervention in asthma. *N Engl J Med* 2011;365(2):119–126.
- [32] Xu S, Yu L, Luo X, et al. Manual acupuncture versus sham acupuncture and usual care for prophylaxis of episodic migraine without aura: multicentre, randomised clinical trial. *BMJ* 2020;368:m697.
- [33] Witt C, Brinkhaus B, Jena S, et al. Acupuncture in patients with osteoarthritis of the knee: a randomised trial. *Lancet* 2005;366(9480):136–143.
- [34] Teixeira LJ, Soares BG, Vieira VP, et al. Physical therapy for Bell's palsy (idiopathic facial paralysis). *Cochrane Database Syst Rev* 2011;(12):CD006283.
- [35] Zhu X, Hamilton KD, Mcnicol ED. Acupuncture for pain in endometriosis. *Cochrane Database Syst Rev* 2011;(9):CD007864.
- [36] Huang T, Shu X, Huang YS, et al. Complementary and miscellaneous interventions for nocturnal enuresis in children. *Cochrane Database Syst Rev* 2011;(12):CD005230.
- [37] Coyle ME, Smith CA, Peat B. Cephalic version by moxibustion for breech presentation. *Cochrane Database Syst Rev* 2012;(2):CD003928.
- [38] Kim TH, Lee MS, Kim KH, et al. Acupuncture for treating acute ankle sprains in adults. *Cochrane Database Syst Rev* 2014;(6):CD009065.
- [39] Deare JC, Zhen Z, Xue CC, et al. Acupuncture for treating fibromyalgia. *Cochrane Database Syst Rev* 2013;(5):CD007070.
- [40] Linde K, Allais G, Brinkhaus B, et al. Acupuncture for the prevention of tension-type headache. *Cochrane Database Syst Rev* 2016;4:CD007587.
- [41] Linde K, Allais G, Brinkhaus B, et al. Acupuncture for the prevention of episodic migraine. *Cochrane Database Syst Rev* 2016;(6):CD001218.
- [42] Franco JV, Turk T, Jung JH, et al. Non-pharmacological interventions for treating chronic prostatitis/chronic pelvic pain syndrome. *Cochrane Database Syst Rev* 2018;5:CD012551.
- [43] Lee A, Chan SK, Fan LT. Stimulation of the wrist acupuncture point PC6 for preventing postoperative nausea and vomiting. *Cochrane Database Syst Rev* 2015;(11):CD003281.
- [44] Dodin S, Blanchet C, Marc I, et al. Acupuncture for menopausal hot flashes. *Cochrane Database Syst Rev* 2013;(7):CD007410.
- [45] Moretto EN, Wee B, Wiffen PJ, et al. Interventions for treating persistent and intractable hiccups in adults. *Cochrane Database Syst Rev* 2013;(1):CD008768.
- [46] Cheuk DK, Wong V. Acupuncture for epilepsy. *Cochrane Database Syst Rev* 2014;(4):CD005062.
- [47] Jin L, Wu JS, Chen GB, et al. Unforgettable ups and downs of acupuncture anesthesia in China. *World Neurosurg* 2017;102:623–631.

How to cite this article: Liu BY, Chen B, Guo Y, Tian LX. Acupuncture – a national heritage of China to the world: international clinical research advances from the past decade. *Acupunct Herb Med.* 2021;1(2):65–73. doi: 10.1097/HM9.000000000000017