



## Research article

# Visual analysis of research hotspots and trends of external therapies in traditional Chinese medicine for depression

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## ARTICLE INFO

## Keywords:

CiteSpace

Antidepressant

External therapies in traditional Chinese medicine

Visual analysis

## ABSTRACT

**Objective:** Based on the visualization and analysis of the CiteSpace software, we aimed to explore the current research status and development trend of depression caused by external therapies in traditional Chinese medicine (TCM) and to provide a reference for further research in this field.

**Methods:** In the China National Knowledge Infrastructure, Wanfang, Web of Science, and PubMed databases, relevant articles on external therapies in TCM for depression were selected as the research objects, and CiteSpace performed the bibliometric analysis.

**Results:** In total, 1672 Chinese and 441 English articles were included after CiteSpace was used to remove duplicate articles and perform manual screening. The Chinese articles were analyzed, and the overall issuance showed an upward trend; the core author was Tu Ya, and the institution with the highest article production was Heilongjiang University of Traditional Chinese Medicine. The English articles were analyzed, and the overall issuance showed an upward trend; the core author was Macpherson, Hugh, and the institution with the highest article production was Guangzhou University of Traditional Chinese Medicine. China ranked first in terms of number and centrality of publications, followed by the United States. The keywords of Chinese and English articles were analyzed to conclude that the research trends in this field were an exploration of therapeutic mechanisms, acupoint application therapy, and assessment of sleep quality, and the research hotspots were the clinical application of external therapies in TCM and the types of underlying diseases.

**Conclusion:** This study comprehensively and objectively summarized the relevant literature on external therapies in TCM for depression. It highlights the direction for further exploration by revealing and analyzing the research hotspots and trends in this field.

## 1. Introduction

Depressive disorder refers to various causes of significant and persistent depression and is the main clinical feature of common

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<https://doi.org/10.1016/j.heliyon.2024.e36918>

Received 28 April 2024; Received in revised form 5 July 2024; Accepted 23 August 2024

Available online 28 August 2024

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psychological disorders. Recently, the prevalence of depression has sharply increased [1]. The prevalence of depression is relatively evenly distributed across age groups, with approximately 20 % of adults experiencing at least one depression episode during their lifetime. However, there are significant sex differences in the prevalence of depression relative to age, with certain hormonal changes associated with reproduction increasing the risk of depression in women. Thus, the prevalence of depression is higher in women than in men, and the lifetime prevalence of major depression is 1.7–2.7 times higher in women than in men [2,3]. Depression is significantly damaging and carries a high lifetime risk of chronic, recurrent illness. However, the proportion of patients receiving treatment for depression remains low in most parts of the world, and most patients do not receive systematic treatment [4,5].

External therapies in traditional Chinese medicine (TCM) play an important role in improving depressive states. External therapies in TCM generally refer to the application of herbs, techniques, or instruments to the skin on the surface of the body or from outside the body under the guidance of Chinese medicine theories, including needles, moxibustion, rubbing, massage, electroacupuncture, gua sha, and acupoint application. Significant evidence confirms the clinical efficacy of external therapies in TCM, and a meta-analysis of acupuncture in the treatment of depression found that acupuncture was clinically effective both as a monotherapy and as an adjunctive treatment and that it was clinically superior to the use of a selective serotonin reuptake inhibitor alone [6,7]. Acupoint catgut embedding therapy, which involves the placement of a protein thread in the acupoints to achieve a long period of stimulation of the acupoints to treat various diseases in clinics, is remarkable and widely used because of its long-term effects [8]. Auricular acupuncture points, tuina and cupping can alleviate patients' depression and anxiety transitions [9–12]. In the selection of the site of action, the external treatment method of Chinese medicine has rigorous experience in the selection of acupoints. For example, post-stroke depression is often accompanied by intestinal symptoms; thus, the selection of acupoints will be added to the points that have a therapeutic effect on intestinal disorders, such as the Gongsun (SP03) and Taibai (SP04) acupoints [13,14]. In clinical practice, external therapies in TCM contain treatments that are mostly used in combination [15]. Simultaneously, this method significantly improves clinical efficacy while ensuring safety [16–20].

Bibliometrics allows for the quantitative analysis of established literature and identification of key messages in relevant areas. External therapies in TCM include a large number of therapeutic tools, and to date, no researcher has conducted a complete bibliometric analysis in the field. Therefore, to help researchers quickly grasp the core content and research direction of this field, this paper

**Table 1**  
Search strategies.

Database	Search term
PubMed	#1 "depression" [Mesh] #2 depressive disorder [Title/Abstract] OR depressive position [Title/Abstract] #3 #1 OR #2 #4 "acupuncture" [Mesh] #5 "electric acupuncture" [Mesh] #6 "silver needle" [Mesh] #7 "tuina" [Mesh] #8 moxibustion[Title/Abstract] OR moxa [Title/Abstract] OR cupping therapy [Title/Abstract] OR cupping [Title/Abstract] OR gua sha[Title/Abstract] OR rub sha [Title/Abstract] OR scrapping therapy [Title/Abstract] OR auricular-plaster [Title/Abstract] OR auricular point sticking [Title/Abstract] OR auricular point pressing [Title/Abstract] OR ear acupoint [Title/Abstract] OR acupoint application[Title/Abstract] OR acupressure points[Title/Abstract] OR acupuncture point applying[Title/Abstract]OR external treatment[Title/Abstract] #9 #4 OR #5 OR #6 OR #7 OR #8 #10 #3 AND #9
Web of science	#1 TS=(depression OR depressive disorder OR depressive position) #2 TS= ("depression" OR "depression disorder") AND TS = (acupuncture OR electric acupuncture OR silver needle OR tuina OR moxibustion OR moxa OR cupping therapy OR cupping OR gua sha OR rub sha OR scrapping therapy OR auricular-plaster OR auricular point sticking OR auricular point pressing OR ear acupoint OR acupoint application OR acupressure points OR acupuncture point applying OR external treatment) #3#1 AND #2
CNKI	#1 (主题 = 抑郁 或者 题名 = 抑郁 或者 v_subject = 中英文扩展 (抑郁) 或者 title = 中英文扩展 (抑郁)) (模糊匹配) #2 (主题 = 抑郁症 或者 题名 = 抑郁症 或者 v_subject = 中英文扩展 (抑郁症) 或者 title = 中英文扩展 (抑郁症)) (模糊匹配) #3 (主题 = 抑郁状态 或者 题名 = 抑郁状态 或者 v_subject = 中英文扩展 (抑郁状态) 或者 title = 中英文扩展 (抑郁状态)) (模糊匹配) #4 (主题 = 郁证 或者 题名 = 郁证 或者 v_subject = 中英文扩展 (郁证) 或者 title = 中英文扩展 (郁证)) (模糊匹配) #5 #1 OR #2 OR #3 OR #4 #6 (主题 = 针刺 或者 题名 = 针刺 或者 v_subject = 中英文扩展 (针刺) 或者 title = 中英文扩展 (针刺)) (模糊匹配) #7 (主题 = 针灸 或者 题名 = 针灸 或者 v_subject = 中英文扩展 (针灸) 或者 title = 中英文扩展 (针灸)) (模糊匹配) #8 (主题 = 推拿 或者 题名 = 推拿 或者 v_subject = 中英文扩展 (推拿) 或者 title = 中英文扩展 (推拿)) (模糊匹配) #9 (主题 = 手法 或者 题名 = 手法 或者 v_subject = 中英文扩展 (手法) 或者 title = 中英文扩展 (手法)) (模糊匹配) #10 (主题 = 按摩 或者 题名 = 按摩 或者 v_subject = 中英文扩展 (按摩) 或者 title = 中英文扩展 (按摩)) (模糊匹配) #11 (主题 = 埋线 或者 题名 = 埋线 或者 v_subject = 中英文扩展 (埋线) 或者 title = 中英文扩展 (埋线)) (模糊匹配) #12 (主题 = 火罐 或者 题名 = 火罐 或者 v_subject = 中英文扩展 (火罐) 或者 title = 中英文扩展 (火罐)) (模糊匹配) #13 (主题 = 刮痧 或者 题名 = 刮痧 或者 v_subject = 中英文扩展 (刮痧) 或者 title = 中英文扩展 (刮痧)) (模糊匹配) #14 (主题 = 耳穴压豆 或者 题名 = 耳穴压豆 或者 v_subject = 中英文扩展 (耳穴压豆) 或者 title = 中英文扩展 (耳穴压豆)) (模糊匹配) #15 (主题 = 穴位贴敷 或者 题名 = 穴位贴敷 或者 v_subject = 中英文扩展 (穴位贴敷) 或者 title = 中英文扩展 (穴位贴敷)) (模糊匹配) #16 (主题 = 中医外治法 或者 题名 = 中医外治法 或者 v_subject = 中英文扩展 (中医外治法) 或者 title = 中英文扩展 (中医外治法)) (模糊匹配) #17 #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 #18 #5 AND #17
WanFang	主题:(抑郁 或 抑郁症 或 郁证 或 抑郁状态)and 主题:(针刺 或 针 或 艾灸 或 推拿 或 手法 或 按摩 或 埋线 或 火罐 或 刮痧 或 耳穴压豆 或 穴位贴敷 或 中医外治法)

summarizes and discusses the information related to external therapies in TCM for depression. CiteSpace [21,22], known as Citation Space, is a scientific software. CiteSpace analyzes critical information in the literature, such as authors, institutions, regions, and keywords; summarizes current research status and hotspots; predicts future research trends; and visually presents them. Visual analytics is a mode of analysis that comprehensively and intuitively presents research data in pictures and is widely used in various fields [23,24]. This study aimed to provide researchers with a quicker grasp of the basic body of knowledge and the current state of research on external therapies in TCM for depression through visualization and to point the way for future studies.

## 2. Materials and methods

### 2.1. Documentation sources

Computerized search databases included China National Knowledge Infrastructure (CNKI), Wanfang, PubMed, and Web of Science (WOS) in this review. Data on external TCM therapies for depression published between January 2004 and January 2024 were collected. The detailed search terms and strategies are presented in [Table 1](#).

### 2.2. Article screening criteria

#### 2.2.1. Inclusion criteria

The inclusion criteria were as follows: (i) articles relating to TCM external therapies for depression; (ii) journal articles; and (iii) articles with complete information, including publication date, authors, and keywords.

#### 2.2.2. Exclusion criteria

The exclusion criteria were as follows: (i) repeatedly published literature, (ii) literature with research subject headings unrelated to external therapies in TCM for depression, and (iii) conference papers, patents, news, advertisements, and popular science articles.

### 2.3. Data analysis

CiteSpace is a visual analytics tool that uses visual analytics, bibliometrics, and data mining algorithms to analyze and present potential knowledge and hotspots in research in the form of images [25]. The data of the CNKI and Wanfang databases were exported in “Refworks” format, and the two databases in “Refworks” format were imported into the built-in file format converter of the CiteSpace software. The two databases in “Refworks” format were imported into the built-in file format converter of the CiteSpace software and converted into download\_\*\*\*.txt format for use. The data from the WOS and PubMed databases were exported in the plain text format of WOS, and the checking and organizing function of the CiteSpace software was used to check and organize the articles of the two databases. The data were imported into CiteSpace, and the following parameters were set: time partition, 2004–2024; time slice (year per slice), “1”; and node types, author, institution, country, and keyword. In this way, a knowledge graph analysis of the author, institution, country, keyword, and other aspects of the articles was realized.

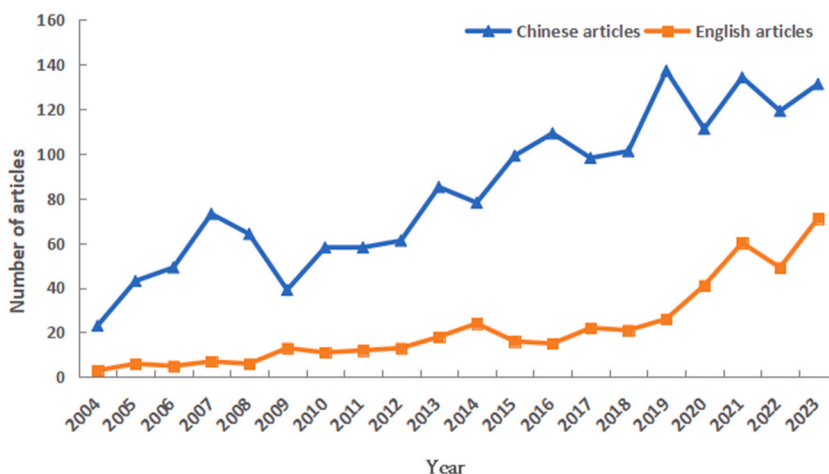


Fig. 1. Annual articles of TCM external therapies for depression.

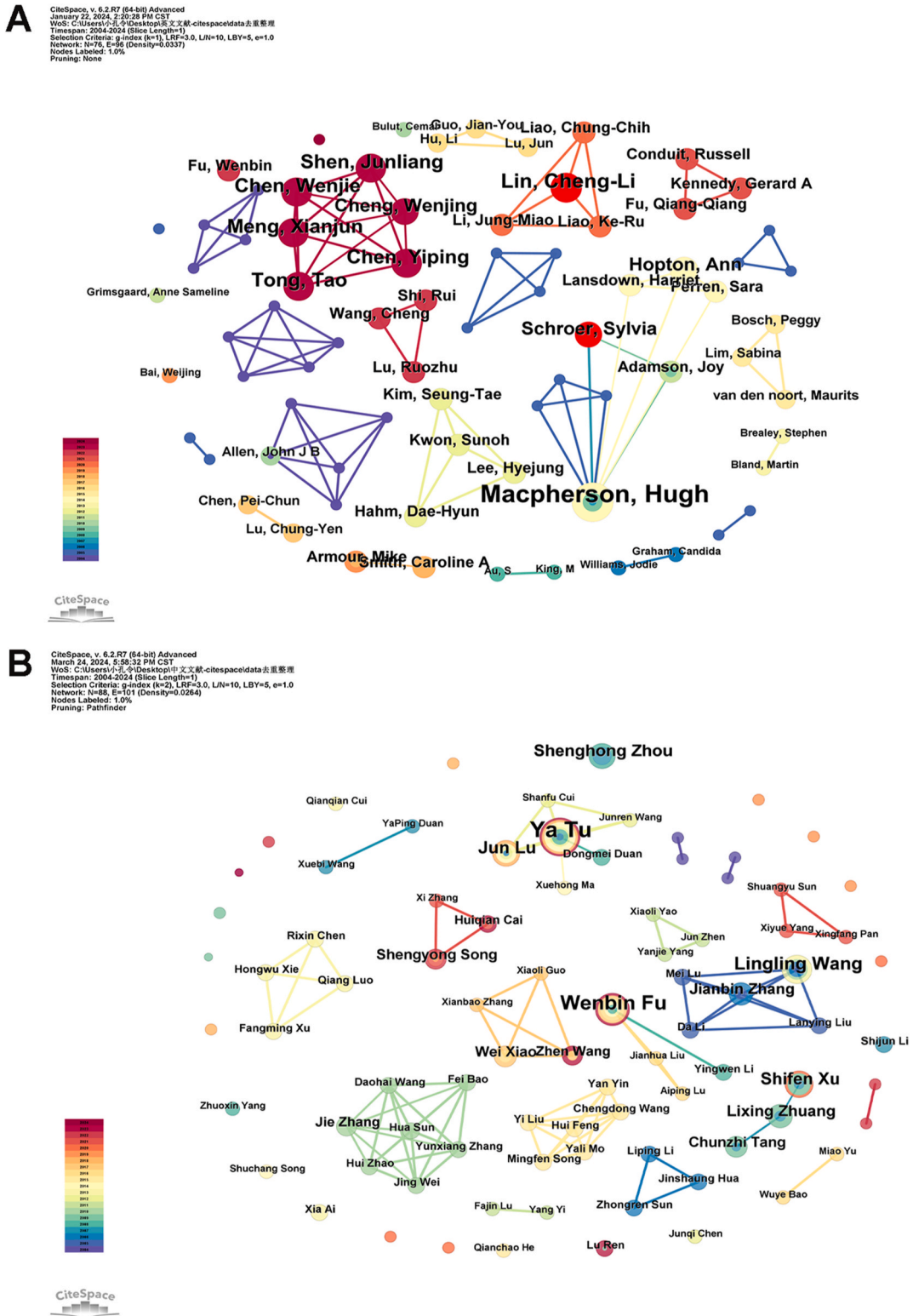


Fig. 2. A Network map of authors of English Literature; B Network map of authors of Chinese Literature.

### 3. Results

#### 3.1. Visual mapping of annual publication volume

The number of annual publications is an essential indicator for summarizing past research and predicting future research trends in the field. CiteSpace was used to eliminate duplicates and analyze the final 1672 Chinese and 441 English articles (Fig. 1).

#### 3.2. Visual mapping of author publication volume

Using CiteSpace to analyze the authors associated with the Chinese and English literature on external therapies in TCM for depression, we identified the most prolific and influential authors. Simultaneously, the analysis allows us to identify information about influential research groups and potential co-authors, thus helping researchers establish a network of collaborative relationships. In the author co-occurrence graph, the node size represents the number of author publications, and the connecting line reflects the strength of the cooperative relationship between authors [26]. The authors of the Chinese and English literature were analyzed using the CiteSpace software to generate an author collaboration network (Fig. 2A and B) and to list the top 10 authors in terms of the number of articles published (Table 2). In the network map of the authors of the English literature (Fig. 2A), the network temporal node was 53, the network temporal connectivity was 36, and the network density was 0.0261. In the network map of the authors of the Chinese literature (Fig. 2B), the network time node was 88, the network time connectivity was 101, and the network density was 0.0264.

#### 3.3. Visual mapping of institutional publication volume

Using CiteSpace for institutional analysis, we can identify the core research institutions in this field and understand cooperation among institutions. The size of the nodes in the network map of institutions represents the number of articles issued by the institutions, and the connecting lines reflect the strength of the inter-institutional cooperation relationship. The institutions of Chinese and English literature were analyzed using the CiteSpace software to generate an institution collaboration network (Fig. 3A and B) and to list the top 10 institutions in terms of the number of articles published (Table 3). In the network map of institutions of the English literature (Fig. 3A), the network temporal node was 60, the network temporal connectivity was 33, and the network density was 0.0186. In the network map of authors of the Chinese literature (Fig. 3B), the network temporal node was 61, the network temporal connectivity was 19, and the network density was 0.0104.

#### 3.4. Visual mapping of national and regional publication volumes

The centrality value represents the importance of the node in the network; the larger the centrality value, the stronger the role of the hub. Nodes with a centrality value  $\geq 0.1$  are essential nodes in this network. The English literature was analyzed using CiteSpace to map national and regional network collaborations (Fig. 4) and rank the number of publications and centrality (Table 4).

#### 3.5. Visual mapping of keyword networks

##### 3.5.1. Visual mapping of keyword co-occurrence

A higher frequency indicates a higher intensity of research in the field, and a higher centrality demonstrates a higher importance of research in the field [27]. CiteSpace was run to generate keyword co-occurrence maps (Fig. 5A and B) and rank the frequency of keywords (Table 5).

##### 3.5.2. Visual mapping of keyword clustering

Cite Space is used to cluster keywords by extracting keywords from the literature and naming the clusters. The Q value is the modularity value of the clustering, which reflects the modularity of the network; the more significant the value, the better the

**Table 2**  
The top 10 authors publishing articles.

No.	Chinese literature			English literature		
	n	Author	Year	n	Author	Year
1	41	Ya Tu	2005	24	Macpherson, Hugh	2005
2	36	Wenbin Fu	2005	17	Fu, Wenbin	2010
3	21	Jun Lu	2005	15	Smith, Caroline A	2010
4	20	Shifen Xu	2007	11	Lin, Cheng-Li	2019
5	19	Lingling Wang	2005	10	Wu, Qian	2017
6	15	Zhen Wang	2013	10	Hopton, Ann	2012
7	15	Wei Xiao	2010	10	Zhang, Wen-Jing	2009
8	15	jie Zhang	2006	10	Schroer, Sylvia	2007
9	14	Shenghong Zhou	2007	9	Liu, Jianhua	2010
10	13	Xingli Zhuang	2006	9	Meng, Xianjun	2021

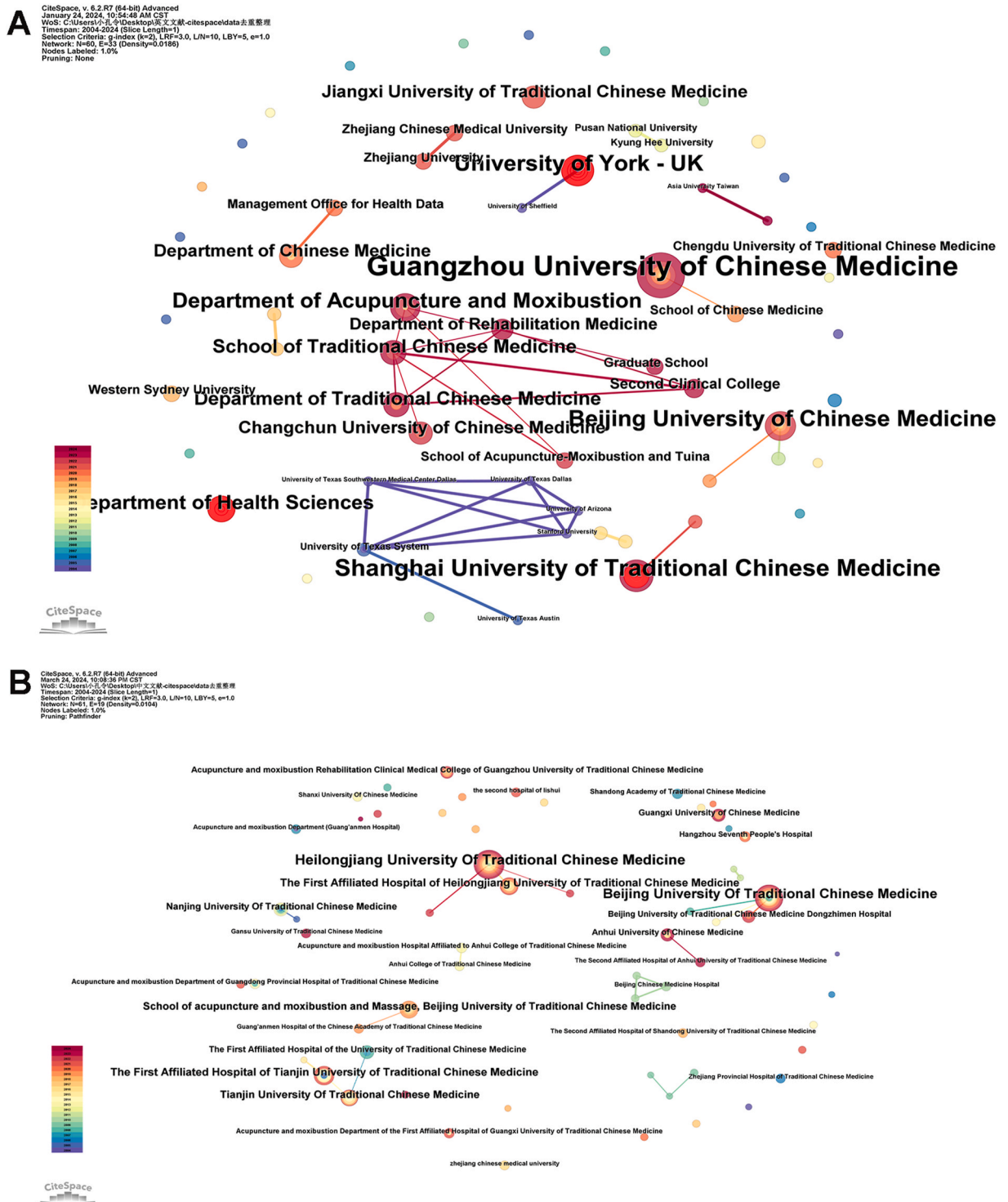


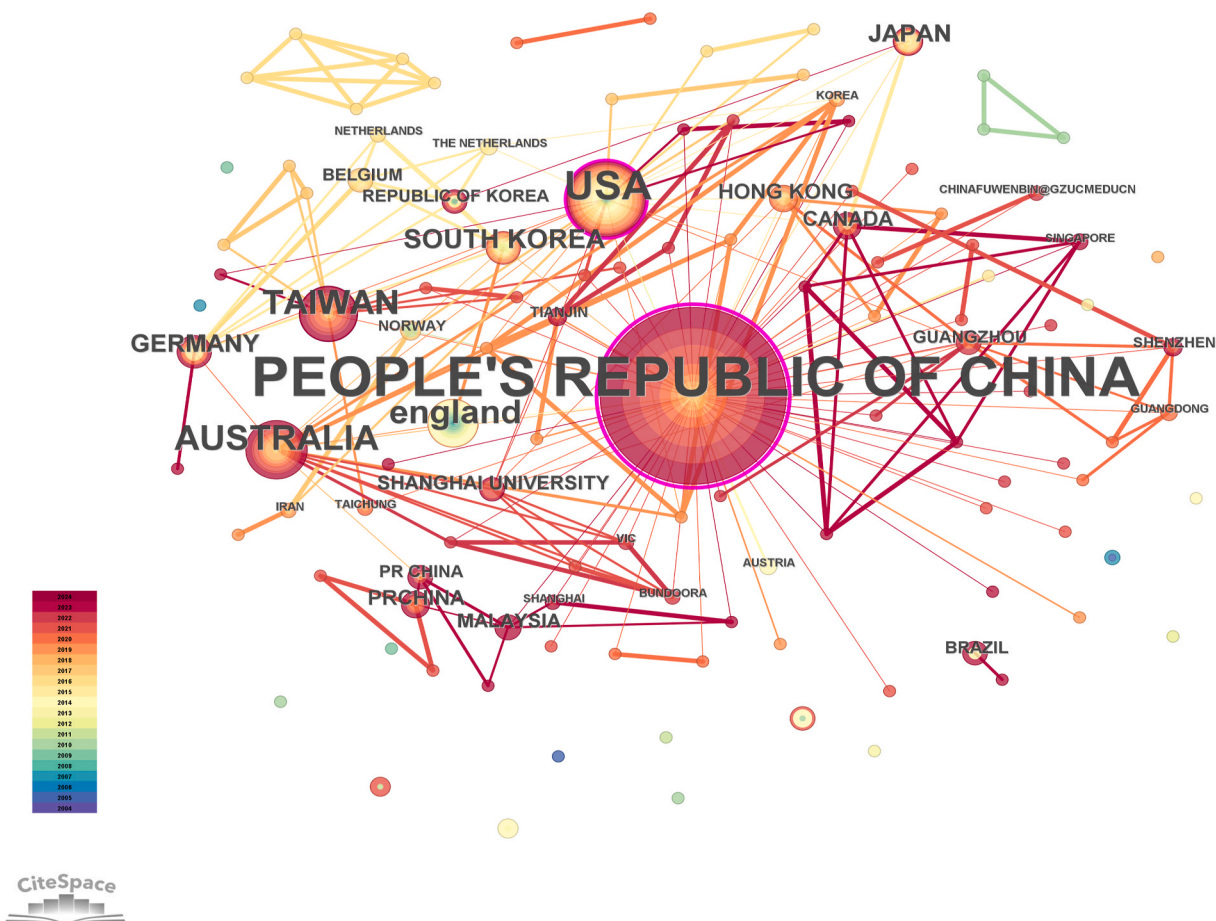
Fig. 3. A Network map of institutions of English Literature; B Network map of institutions of Chinese Literature.

clustering effect of the network.  $Q > 0.3$  implies that the clustering structure is substantial. The Silhouette clustering average contour value ( $S$ ) reflects the homogeneity of the network. The closer the value is to 1, the higher the homogeneity of the network.  $S > 0.5$  means the clustering is reasonable, and  $S > 0.7$  is convincing. In the English literature, the keyword clustering map (Fig. 6A) had the following values:  $Q = 0.7522$  and  $S = 0.9119$ . In the Chinese literature, the keyword clustering map (Fig. 6B) had the following values:  $Q = 0.8063$  and  $S = 0.0.9496$ . The results show that the clustering structure of this map is significant and that the clustering results are

**Table 3**  
The top 10 institutions publishing articles.

No.	Chinese literature		English literature	
	n	institution	n	institution
1	53	Heilongjiang University of Chinese Medicine	31	Guangzhou University of Chinese Medicine
2	49	Beijing University of Chinese Medicine	18	Beijing University of Chinese Medicine
3	34	Tianjin University of Traditional Chinese Medicine	17	Shanghai University of Traditional Chinese Medicine
4	27	Beijing University of Chinese Medicine, School of Acupuncture and Tuina	15	University of York - UK
5	26	The First Affiliated Hospital of Tianjin University of Traditional Chinese Medicine	13	Department of Acupuncture and Moxibustion
6	26	The First Hospital Affiliated to Heilongjiang University of Traditional Chinese Medicine	12	Department of Health Sciences
7	25	Guangzhou University of Chinese Medicine	11	China Medical University Taiwan
8	20	Guangdong Provincial Hospital of Traditional Chinese Medicine	10	Department of Traditional Chinese Medicine
9	17	The First Affiliated Hospital of the University of Chinese Medicine	10	Department of Chinese Medicine
10	17	Anhui University of Chinese Medicine	10	School of Acupuncture-Moxibustion and Tuina

CiteSpace, v. 6.2.R7 (64-bit) Advanced  
 February 11, 2024, 4:10:05 PM CST  
 WoS: C:\Users\小孔\Desktop\英文文献-citespaceldata去重整理  
 Timespan: 2004-2024 (Slice Length=1)  
 Selection Criteria: g-index (k=25), LRF=3.0, L/N=10, LB=5, e=1.0  
 Network: N=135, E=212 (Density=0.0234)  
 Largest 5 CCs: 101 (74%)  
 Nodes Labeled: 1.0%  
 Pruning: None



**Fig. 4.** A The top 10 countries and regions of Volume and centrality of publications.

**Table 4**  
The top 10 countries and regions of Volume and centrality of publications.

NO.	n	countries and territories	Year	Centrality	countries and territories	Year
1	262	PEOPLE'S REPUBLIC OF CHINA	2006	0.68	PEOPLE'S REPUBLIC OF CHINA	2006
2	50	USA	2004	0.16	USA	2004
3	28	AUSTRALIA	2005	0.07	TAIWAN	2015
4	25	TAIWAN	2015	0.07	MALAYSIA	2023
5	22	ENGLAND	2004	0.05	AUSTRALIA	2005

more credible.

Keyword timeline mapping can be used to analyze the changes produced by the development of each cluster over time and the connections between clusters. The horizontal axis represents the timeline, and the vertical axis represents the cluster ID. Keywords from the Chinese and English literature were clustered for timeline analysis using CiteSpace (Fig. 7A and B).

### 3.5.3. Visual mapping of keyword bursting

A bursty keyword is a word frequently mentioned and discussed during a certain period, which indicates that the research area affected by the keyword has become hot or highly concerned at that time. In our study, keywords with an intensity >2 significantly affected the development of the research field. The keywords of the Chinese and English literature were analyzed using the CiteSpace software to generate a visual mapping of keyword bursting (Fig. 8A and B).

## 4. Discussion

### 4.1. Research overview

#### 4.1.1. Analysis of annual publication volume

Based on CiteSpace, the Chinese and English literature on external therapies in TCM for depression were visualized and analyzed, and the output of articles in this field had shown an increasing trend in the past two decades. From 2004 to 2023, Chinese articles were divided into three phases: the first phase was from 2004 to 2007 where the rapid growth of Chinese article publication volume was observed; the second phase was from 2008 to 2017 where the overall publication volume of Chinese articles steadily increased; and the third phase was from 2018 to 2023 where the rapid growth of Chinese article publication volume was as high as 733, accounting for 43.8 % of the overall number of publications. Among them, a peak was reached in 2019 with 137 articles. The number of English articles steadily increased from 2004 to 2019. Notably, from 2019, the number of publications has rapidly increased to 247, accounting for 50.6 % of the total number of publications. Of these, 2023 had the highest number of publications, up to 71. This indicates that research in this field has gradually received extensive attention from society.

#### 4.1.2. Analysis of author publication volume

According to Price's law, the formula for determining core authors is  $M = 0.749 \times (N_{max})^{1/2}$ , where M equals at least the number of issued articles published by core authors and  $N_{max}$  denotes the number of published articles of the authors with the highest number of issued articles in the statistical period.

Among the authors of the English literature, Macpherson, Hugh had the highest number of publications, that is,  $N_{max} = 24$ . From the formula, M was  $\approx 3.67$  publications; thus, authors with four or more publications in the field are core authors, and there were 153 core authors. The publication volume of core authors accounted for 28.7 % of all authors' publication volume, which is <50 %; thus the core author group of external therapies in TCM has yet to be formed. Among the authors of the Chinese literature, Tu Ya has the highest number of publications (i.e.,  $N_{max} = 41$ ). From the formula, M was  $\approx 4.80$ ; thus, the authors with five or more publications in this field are the core authors, and there were 115 core authors. The publication volume of core authors accounted for 13.3 % of all authors' publication volume, which is <50 %; therefore, the core author group of external therapies in TCM is yet to be formed.

#### 4.1.3. Analysis of institutional publication volume

Among the institutions with English literature, Guangzhou University of Chinese Medicine had the highest output of 31 publications, followed by Beijing University of Chinese Medicine (18), Shanghai University of Traditional Chinese Medicine (17), University of York, UK (15), and the Department of Acupuncture and Moxibustion (13). There are collaborative relationships between the institutions involved in this area of research. The University of Texas System collaborated closely with other institutions. Among the institutions of Chinese literature, Heilongjiang University of Traditional Chinese Medicine had the highest output with 53 publications, followed by Beijing University of Chinese Medicine (49), Tianjin University of Traditional Chinese Medicine (34), Beijing University of Chinese Medicine, School of Acupuncture, and Tuina (27). The network maps a certain level of cooperation between organizations working in this area of research. The Heilongjiang University of Traditional Chinese Medicine and Beijing University of Traditional Chinese Medicine collaborated closely with other institutions.

#### 4.1.4. Analysis of national and regional publication volumes

In the analyses of countries and regions, we find that China ranks first in the number of publications (262), followed by the United





**Table 5**  
The top 10 frequency-ranking keywords.

No.	Chinese literature				English literature			
	Frequency	Centrality	Keyword	Year	Frequency	Centrality	Keyword	Year
1	769	0.58	acupuncture therapy	2004	43	0.37	disorder	2008
2	762	0.63	depressive disorder	2004	39	0.09	systematic review	2015
3	84	0.4	acupuncture and moxibustion therapy	2004	35	0.2	electroacupuncture	2007
4	70	0.28	auricular pressure point	2004	29	0.12	post-stroke depression	2013
5	63	0.18	acupressure massage	2004	28	0.14	quality of life	2005
6	62	0.34	cerebral stroke	2004	27	0.07	network meta-analysis	2010
7	57	0.26	anxiety	2005	23	0.05	therapy	2013
8	41	0.36	stroke	2004	22	0.55	anxiety	2005
9	36	0.29	clinical observation	2004	22	0.04	complementary	2006
10	35	0.27	quality of life	2013	21	0.09	randomized controlled trial	2012

networks should be established among countries.

#### 4.1.5. Analysis of keyword networks

Keywords allow us to understand the main research content of an article quickly. Keyword analysis can be used to identify important issues in a research field and to predict future research trends.

Analyzing the keywords, we can conclude that the high-frequency keywords in the Chinese literature are “acupuncture therapy,” “depression,” “acupuncture and moxibustion therapy,” “auricular pressure point,” and “acupoint massage.” The high-frequency keywords in the English literature are “disorder,” “systematic review,” “quality of life,” “electroacupuncture,” and “post-stroke depression.”

The cluster mapping of keywords was analyzed in the Chinese literature; #1 acupuncture and moxibustion therapy, #4 acupoint application, #5 acupoint massage, #7 auricular pressure point, and #8 burying seeds at acupuncture points refer to the applications of the external therapeutic methods of Chinese medicine. #3 Stroke indicates that the common underlying disease in this study is stroke, #6 auricular point describes the development of the acupoints, and #10 neurotransmitters refer to mechanistic studies in this area. These 13 clusters represent the 13 main research directions of the authors who published publications on external therapies in TCM for depression. For example, #12 acupuncture points are acupoint-centered studies in which the Baihui acupoint (DU20) plays an important role. #8 focused on post-stroke depression, in which moxibustion plays an important moderating role. In 2013, there were more studies on the quality of life in effective care. This indicates the rapid development of the Chinese healthcare industry driven by research on external therapies in TCM. The cluster mapping of keywords was analyzed in the English literature; #2 hormone levels, #3 glutamate, #6 inflammatory cytokines, #4 rat, #11 prophenoloxidase, and #12 immune response represent mechanistic studies in this area. #7 Post-stroke depression and #10 antenatal depression represent underlying disorders of depression. #1 Randomized controlled trials and #0 behavior represent relevant experimental studies in the field.

The keyword bursting mapping was analyzed in the Chinese literature. In the past 20 years, from 2004 to 2024, the pre-study period of this study focused on “acupuncture therapy,” “Baihui,” “menopause,” “fluoxetine,” and “psychotherapy.” In the middle period, it mainly focused on “electroacupuncture,” “psychological interventions,” “affective care,” and “moxibustion,” and in the later stage, it mainly focused on “Sleep Disorders,” “Auricular Pressure Points,” “Quality of Life,” “Acupuncture Points,” “data mining,” “neurotransmitters,” and “sleep quality.” Keyword bursting leads to the conclusion that the current research trend in this field focuses on mechanistic studies, assessment of sleep quality, and the application of acupoints in external therapies. The keyword bursting mapping was analyzed in the English literature. In the past 20 years, from 2004 to 2024, the pre-study period of this research mainly focused on “trial,” “complementary,” “alternative medicine,” “brain,” and “care.” The medium-term focus of this study was on “management,” “auricular acupuncture,” “randomized controlled trial,” “stroke,” and “mood” and “systematic review,” “traditional Chinese medicine,” “risk,” “cognitive function,” “mechanism,” “functional resonance,” “mechanism,” and “functional magnetic resonance imaging” by keyword emergence in the later period. Current research in this field focuses on mechanistic studies of depression treatment and functional magnetic resonance imaging (MRI). Functional MRI is primarily used to obtain visual evidence for the mechanisms involved in this field.

## 4.2. New trends

### (1) Exploration of therapeutic mechanisms

The field of external therapies in TCM for depression has shown remarkable vitality in the last two decades, and several studies have explored the mechanisms of external therapies in TCM for depression [28–31]. Chen et al. [32] summarized studies related to acupuncture treatment of mitochondrial balance in depression, taking the core link of mitochondrial balance in depression as the entry point, and concluded that acupuncture could achieve the purpose of alleviating depressive state by regulating mitochondrial balance. Controlling mitochondrial balance includes regulating mitochondrial autophagy and reducing mitochondrial oxidative stress. Acupuncture therapy can simultaneously regulate signaling pathways and critical proteins during the treatment of depression. Li et al. [33] demonstrated through animal studies that acupuncture attenuation of depressive-like behavior in rats might be related to the

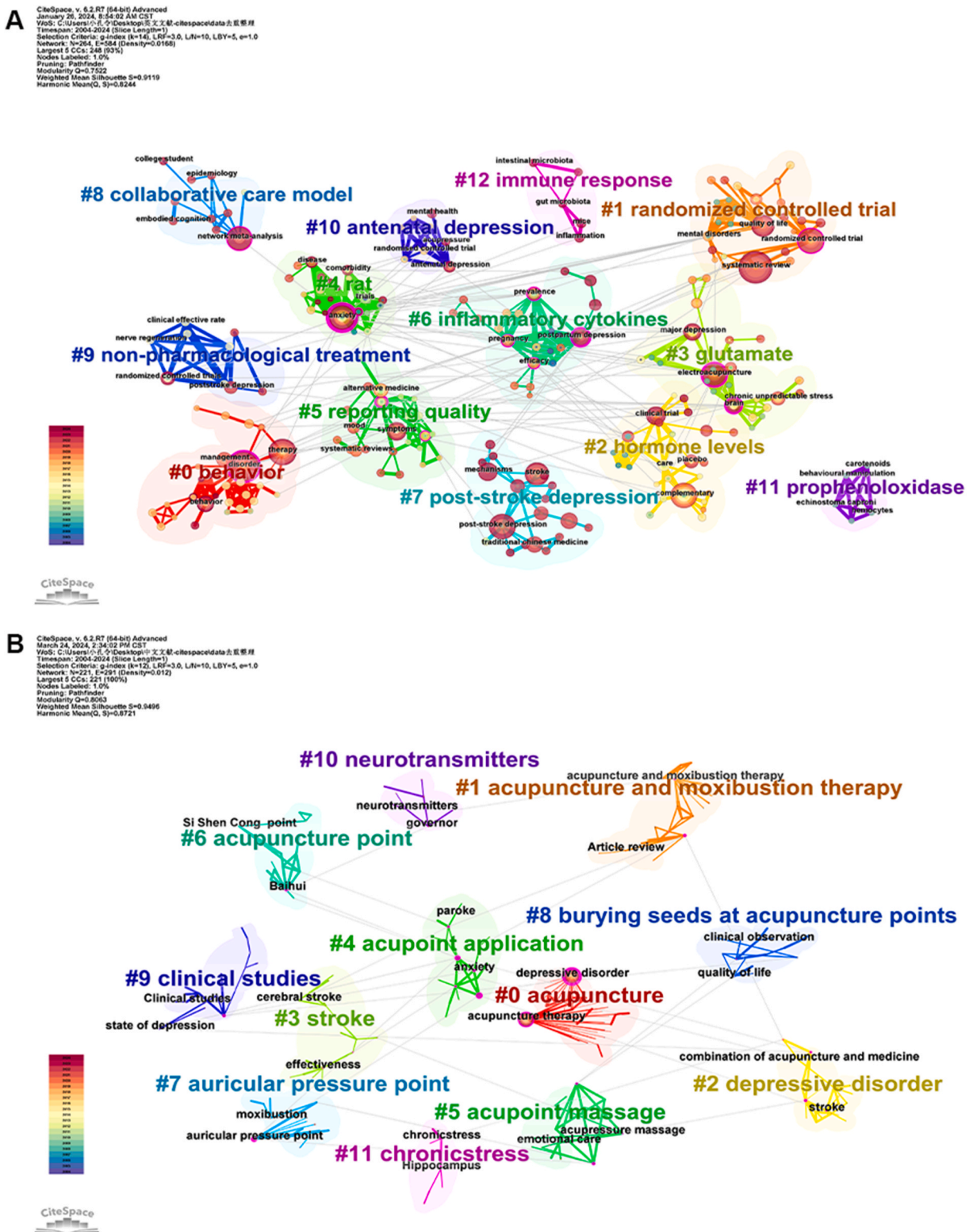


Fig. 6. A Keyword clustering mapping in English literature; B Keyword clustering mapping in Chinese literature.

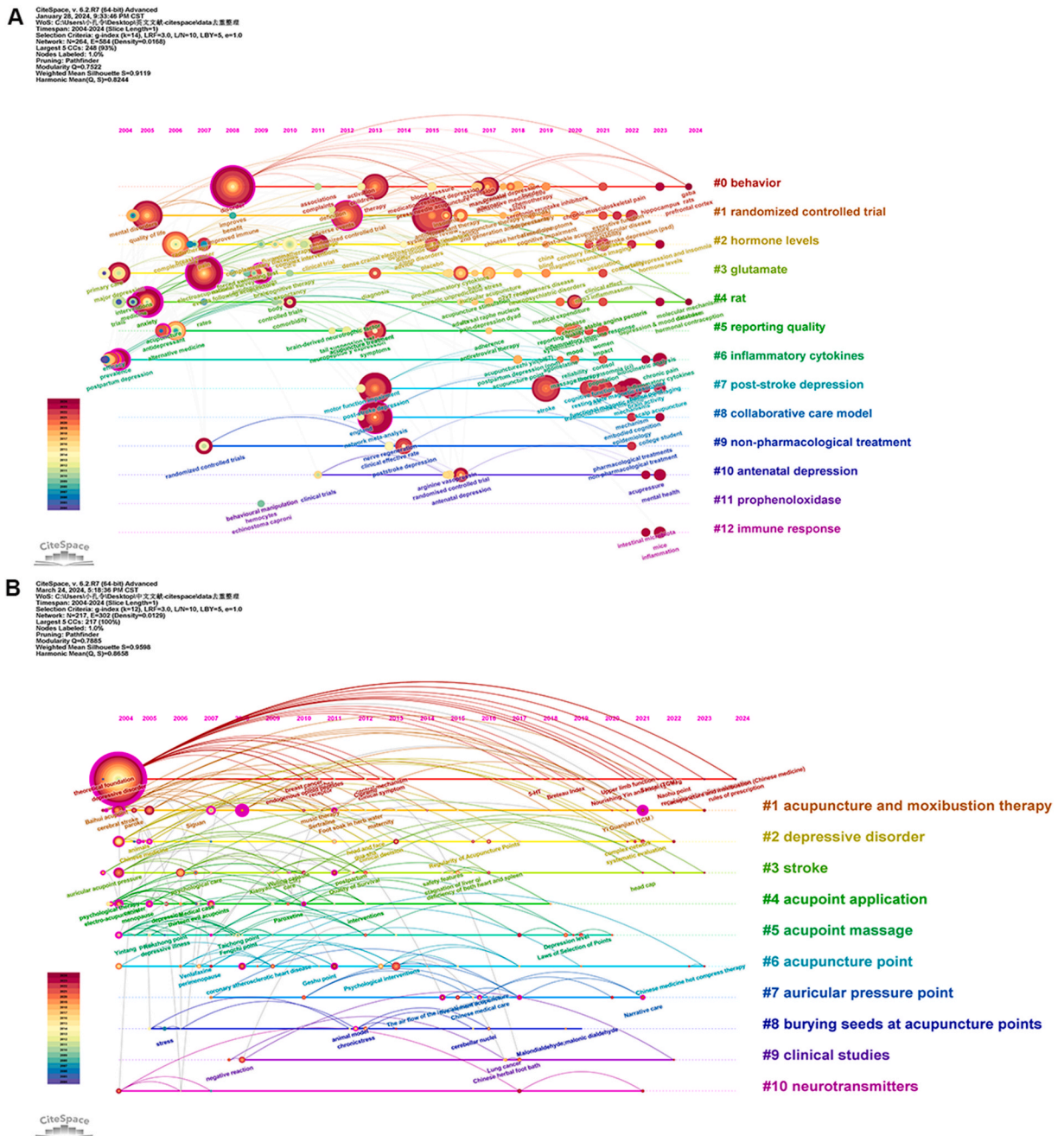
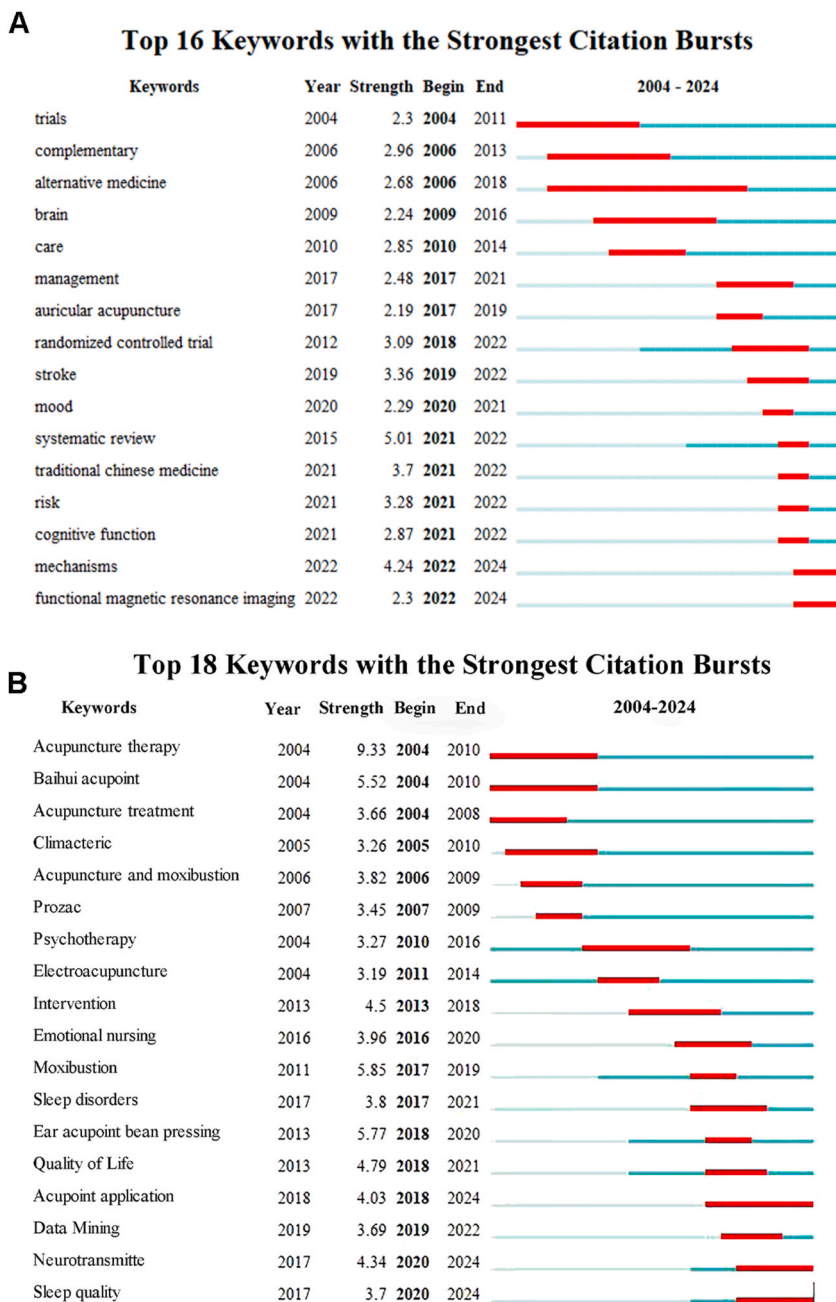


Fig. 7. A Keyword clustering timeline mapping in English literature; B Keyword clustering timeline mapping in Chinese literature.

alleviation of oxidative stress and the reduction of neuroinflammation. The hypothalamic–pituitary–adrenal (HPA) axis is regulated by neuroendocrine feedback. Through their clinical study, Ormsby et al. [34] concluded that the mechanism of acupuncture treatment for depression and improvement of anxiety might be the positive regulation of the HPA axis. Functional MRI is crucial for exploring therapeutic mechanisms in this field as comprehensive neuroimaging evidence. For example, in recent years, some scholars have used MRI [35] as a mediated means to study the central mechanism of acupuncture treatment for depression and the related brain effects and have analyzed in depth the significant changes in the brain regions during the treatment process with the application of functional MRI. Functional MRI was used as the final criterion to evaluate the efficacy of massage therapy for post-stroke depression [36]. To explore the structural and functional changes in the amygdala subregion of patients with postpartum depression before and after acupuncture, functional [37] MRI scans were performed in the resting state, and the results of the scans were used as the assessment criteria. Functional MRI can better present the changes in the central nervous system during the treatment process, thus enabling



**Fig. 8.** A Keyword Bursting mapping in English literature; B Keyword Bursting mapping in Chinese literature.

physicians to assess the clinical efficacy more accurately. Therefore, as a research focus in this field, therapeutic mechanisms have significant room for development.

#### (2) Acupoint application

Acupoint application therapy was first observed in the “Prescriptions of Fifty-two Diseases.” This therapy combines the theory of prescription drugs and the meridian theory of acupuncture to treat diseases through the absorption of drugs and the stimulating effect of acupuncture points. Acupoint application is an important component of external therapies used in TCM. Herbal ointments used for acupoint application are usually composed of essential oils of herbs, petroleum jelly, and glycerin by steam distillation [38,39]. In most cases, it is applied to acupuncture points and areas of intense pain. According to Chinese medicine concepts, when selecting medicines, physicians select more medicines that can guide other drugs to reach specific body parts and medications with a strong odor. This

treatment has significant clinical efficacy, simplicity, safety, and minimal toxic side effects. An analysis of the relevant literature revealed that acupoint application was often used in combination with other antidepressant treatments. In China, this method is widely accepted by patients and has definite clinical efficacy [40]. Although an increasing number of studies have focused on acupressure therapy for depression, limited literature is available in English databases. Therefore, international communication and cooperation should be strengthened to promote development in this field.

### (3) Assessment of sleep quality

According to Chinese medicine, evidence of depression is related to liver qi stagnation, which for a long time transforms fire to disturb the mind, leading to insomnia. Symptoms of insomnia are prevalent in individuals with depression, and the risk of depression in individuals with insomnia is twice as high in individuals with insomnia as in those without [41–43]. Insomnia is not only a factor in the onset and recurrence of depression but also a residual symptom after depression treatment. Through epidemiological investigations, Rosenstrom et al. [44] confirmed that sleep problems could cause emotional depression and irritability. “The Diagnostic and Statistical Manual of Mental Disorders, 5th Edition” and “International Classification of Sleep Disorders, 3rd Edition” consider insomnia disorders as comorbid with other mental disorders. Therefore, in recent years, the Pittsburgh Sleep Quality Index has become an important indicator when evaluating the clinical efficacy of depression. It is believed that sleep quality and related problems will become an essential part of future studies on the course of depression and guiding its treatment.

### 4.3. Hot topics

The research hotspots of external therapies in TCM for depression can be categorized into two areas: the clinical application of external therapies in TCM and the types of underlying diseases.

In the clinical treatment of depression, external therapies in Chinese medicine are mainly in the form of combined treatments, and the higher frequency of application is in acupuncture therapy, auricular pressure beans, and acupoint application. The Baihui point is vital for acupuncture [45,46]. In discussing the therapeutic mechanism of the Baihui acupoint, Mao et al. [47] confirmed that the Baihui acupoint could increase the expression of a brain-derived neurotrophic factor in the brain and restore hippocampal nerves through animal experimental studies. Duan et al. [46] confirmed that the antidepressant mechanism of Baihui acupoints regulated the expression of specific genes through animal experimental studies. Deng et al. [48] confirmed the mechanism of action by clinical efficacy observation, which is to induce changes in functional connectivity in the default mode network (DMN), and provided imaging evidence. The DMN plays an important role in self-referential activities, such as evaluating characteristics of external and internal cues. Therefore, in the selection of acupuncture points for acupuncture therapy, Baihui point is the hotspot for research.

In 1924, Bleuler demonstrated that patients with cerebrovascular damage often exhibited behavioral and psychological disorders. Robinson et al. [49] analyzed the literature on post-stroke depression and found that early antidepressant treatment of stroke enhanced physical and cognitive recovery and might increase survival 10 years after stroke. Clarke et al. confirmed through an epidemiologic survey that the prevalence of depression and anxiety was higher in groups with somatic illnesses than in the general population and that patients with stroke had a higher prevalence than the general population [50–52]. Kruif et al. confirmed through epidemiological investigations [53] that during the perimenopausal period in women, there was a decline in the function of the ovarian follicle, which further leads to fluctuations in the levels of estrogen and progesterone, making it more likely for women to experience depression at this stage of the life cycle than men. The severity of symptoms was higher than that in premenopausal women. In terms of therapeutic options [54], acupuncture therapy, as one of the external therapies in TCM, can alleviate the symptoms of depression and insomnia in women during the perimenopausal period and has satisfactory short- and medium-term clinical efficacy. Electroacupuncture is a type of electrical stimulation with strong somatosensory properties that exert antidepressant effects [55]. Dadi et al. confirmed through an epidemiological survey that pregnant women had a high probability of experiencing antenatal depression and approximately one-quarter of pregnant women experienced depression and anxiety during the antenatal period. Sociodemographic, obstetric, and psychological studies have found that psychological factors affect the physical health of pregnant women and that mental health problems or unfavorable marriages increase the risk of prenatal depression [56,57]. Therefore, identifying risk factors and actively intervening in treatment are currently popular research topics. In the treatment of prenatal depression, several pregnant women with depression consider the side effects of medications and the safety of the fetus, thus opting for non-pharmacological alternatives in their treatment. Acupuncture therapy has gradually become a significant option for the treatment of prenatal depression and is widely accepted by patients because of its safety and fewer side effects [58]. Ormsby et al. [59] confirmed through clinical efficacy observations that acupuncture could effectively improve patients' depression and anxiety during the prenatal period. Currently, in clinical application, external Chinese medicine treatment of prenatal depression has achieved good clinical results and high patient acceptance. However, studies on the underlying therapeutic mechanisms are lacking. Therefore, prenatal depression is the current research hotspot of depression, and future research related to the mechanism of external therapies in TCM for prenatal depression should be conducted to fill the gap in this field.

In summary, in terms of treatment methods, acupuncture, auricular pressure bean, and acupoint application therapy are the current research hotspots for treating depression using external Chinese medicine therapies. The Baihui acupoint plays a crucial role in acupuncture. These three treatments have been widely discussed as current research hotspots, proving higher acceptance and better results. Therefore, an appropriate combination of treatments can be considered in clinical practice to improve clinical efficacy. In terms of diseases treated, post-stroke depression, perimenopausal depression, and prenatal depression are the research hotspots of TCM external treatment for depression. Therefore, when dealing with these three conditions in the clinic, attention should be paid to

emotional care during the consultation to prevent depression.

## 5. Conclusions

This study comprehensively and objectively analyzes the Chinese and English literature on external therapies in TCM for depression. It profoundly explores and researches the annual publication volume, countries, institutions, authors, and keywords of the related literature in the past 20 years. Current research shows that the field has good development prospects, but the academic community still needs to strengthen cooperative relationships. Current research hotspots mainly focus on the clinical application of external treatment methods in Chinese medicine and types of primary diseases. Current cutting-edge research trends include exploring therapeutic mechanisms in this area, acupoint application therapy, and assessing sleep quality in the overall treatment of depression.

### 5.1. Strengths and limitations

The use of CiteSpace for literature visualization and analysis was a significant strength in this study. Discussing the findings helps uncover current research hotspots and trends in the field to guide research objectives and provide a reference for researchers, thus providing more reference information and a basis for future research. However, there is a limitation of this study; that is, this study counts the relevant studies up to the current time, but in the future, there will be newly published articles that will not be recorded in this study. Therefore, to address this issue, researchers must update and recapitulate their current status. Nonetheless, the bibliometric methodology used in this study effectively summarizes the field's current state and provides new informative insights into research hotspots and trends.

### Ethics approval and consent to participate

Not applicable.

### Data availability statement

Data included in article/supp. material/referenced in article.

### Consent for publication

Not applicable.

### Funding

There is no funding for this project.

### CRediT authorship contribution statement

**Lingzu Kong:** Writing – review & editing, Writing – original draft, Conceptualization. **Jinglin Hu:** Writing – review & editing, Writing – original draft, Methodology. **Ming Yue:** Writing – original draft, Investigation, Formal analysis. **Xiaoqi Xin:** Writing – original draft, Investigation, Formal analysis. **Fengbei Lin:** Writing – original draft, Investigation, Formal analysis. **Yinghua Hu:** Writing – original draft, Resources. **Xichen Wang:** Writing – original draft, Supervision.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Acknowledgments

An ethics statement is not applicable because this study is based exclusively on published literature.

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