



Review article

Research trends of acupressure from 2004 to 2024: A bibliometric and visualization analysis

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ABSTRACT

Background: Acupressure has proven efficacy in symptoms management, making it valuable in clinical practice and patient care. Given the rising number of increasing publications on acupressure, we aimed to analyze the literature from the past 20 years and provided current trends and hotspot for future research directions.

Methods: Publications on acupressure from January 1, 2004 through May 1, 2024 were retrieved from the Web of Science database. The extracted records underwent thorough analysis based on publication year, research area, journal, countries/regions, organization, authors, and keywords. The bibliometric analysis was conducted using Citespace and Microsoft Excel software.

Results: Of the 1,929 screened records, 770 publications were identified. The annual number of acupressure has gradually increased, with the 45 % of the total publication occurring from 2020 to 2024. Among countries and institutions, China (252 articles) and Hong Kong Polytechnic University (41 articles) have the highest number of publications. Notably, USA and Hong Kong Polytechnic University exhibits the highest centrality score in cooperative network among countries/regions and institutions. Chao Hsing Yeh from the Cizik School of Nursing, University of Texas Health Science Center, was the most prolific author with 22 papers. *Evidence-Based Comple Alt*, with 53 articles, is the journal with the most publications. According to the keyword, timeline diagram and prominence mapping analysis, we believe that “insomnia”, “labor”, “waist circumference”, “reliability” and “vagus nerve stimulation” related clusters may be new hotspots in the field of acupressure.

Conclusion: This study presents the research trajectory of acupressure over the past 20 years, providing a foundation for future research and highlighting the significant contributions of nursing researchers. By analyzing research trends and hotspot, nursing professionals can integrate acupressure more effectively into holistic patient care, improving quality of life, and contributing to traditional Chinese medicine.

Abbreviations: Hong Kong Polytechnic University, HKPU; Guangzhou Univ Chinese Medicine, GUCM; China Medical University, CUM; Complementary and alternative medicine, CAM; Traditional Chinese medicine, TCM.

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1. Introduction

Acupuncture, a cornerstone of complementary and alternative medicine (CAM), is globally acclaimed for its effectiveness and safety in promoting health [1]. Its integration into diverse clinical settings highlights its vital role in pain management, disease progression control, and life quality improvement, establishing it as an integral part of holistic health practices [2,3]. This widespread acceptance reflects the blending of CAM with modern medicine, especially in regions where both approaches are combined. Building on this foundation, acupressure has emerged as a significant non-invasive therapy [4]. Acupressure involves applying pressure to acupoints on the body's meridians using fingers or thumbs [5,6]. This practice aims to eliminate Qi stagnation, the root cause of various symptoms, and restores its natural flow, thereby alleviating symptoms. According to the WHO's standard acupoint nomenclature, there are 361 acupoints distributed across 12 major meridians [7]. As a non-invasive alternative, acupressure avoids adverse reactions associated with needling, such as pain, bleeding, or inflammation, making it a safer option compared to acupuncture [8]. In recent years, acupressure has garnered growing attention due to its low cost, minimal side effects, and user-friendly approach.

Auricular acupressure, a form of acupressure targeting specific ear points, is renowned for its efficacy in alleviating pain, anxiety, insomnia and other symptoms. This method is rooted in both auricular reflex zone theory and traditional Chinese medicine (TCM), leveraging the ear's rich nerve endings to modulate physiological functions. In TCM, the ear is viewed as a hub for the body's meridians, and auricular therapy is believed to balance Qi and blood flow, as well as Yin and Yang, thus supporting comprehensive health practices. Moreover, self-administered acupressure has gained increasing popularity as a user-friendly method that empowers individuals to take greater control of their health [6,9–11]. Based on the principles of meridian theory in TCM, individuals can learn to locate and stimulate specific acupoints on their body to regulate the flow of Qi and blood through the meridians. This practice, in turn, influences the function of related organs and overall health, providing an effective means to address common health issues such as stress, and pain. As such, those seeking non-pharmacological and non-invasive strategies for managing pain, reducing anxiety, and addressing various symptoms have seamlessly integrated these approaches into their daily routines [9–12]. This integration not only enhances personal well-being but also helps to reduce healthcare costs and minimize the risk of side effects associated with conventional treatments.

This gradual shift from a hospital- and physician-centric model, towards a patient-centered approach that emphasizes self-care and personalized health interventions reflects a broader trend in healthcare towards more convenient and individualized solutions. As acupressure gains popularity, systematically evaluating its expansion and impact is crucial. Bibliometrics, with its structured and statistical methods to analyze research trends, identifying seminal publications, and delineating key topics over time [13], provides a valuable framework for mapping the scholarly landscape and revealing potential gaps for future research. By applying bibliometric techniques, the study aims to perform a comprehensive bibliometric and visualization analysis of acupressure studies from 2004 to 2024, outlining the field's trajectory, identifying key contributors, influential studies, emerging trends, and hotspots. Such an analysis is poised to deepen our understanding of acupressure, guide future research, and enhance therapeutic practices and patient care.

2. Methods

2.1. Data sources and search strategy

Bibliographic data were sourced from the Web of Science (WoS) on May 1, 2024, to ensure consistency in article counts for daily updates. A targeted search strategy was: ((((((((((TS=(Acupressure)) OR TS=(Self-Acupressure)) OR TS=(Self-administered acupressure)) OR TS=(Auricular Point Sticking)) OR TS=(Auricular acupoint*)) OR TS=(Auricular acupressure)) OR TS=(Acupoint pressing)) OR TS=(Ear points' pressing)) OR TS=(Auriculotherapy)) OR TS=(Acupoint Massage)) OR TS=(Auricular point pressing))), covering January 1, 2004 to May 1, 2024. This study follows the Preliminary guideline for reporting bibliometric reviews of the biomedical literature (BIBLIO) [14].

2.2. Inclusion and exclusion criteria

The criteria for inclusion were: (1) Topics on acupressure; (2) English Language; (3) Document Types: only include original articles and reviews articles; (4) Time period: January 1, 2004 to May 1, 2024. The Exclusion criteria included: (1) Irrelevant full texts; (2) Duplicated publications; (3) Retracted publication. Two researchers independently conducted the searches, resolving discrepancies through discussion and consulting experts. And citation data of the chosen papers were saved in text format with "full records and references".

2.3. Bibliometric analysis

Bibliometric analysis were conducted using CiteSpace (V6.3.R1, Drexel University, Philadelphia, PA, USA) and Microsoft Excel (Microsoft Corp., WA, USA) to produce annual and citation co-citation count graphs, analyzing the global output and trends [15,16]. CiteSpace generated collaborative networks (countries/regions and institutions), co-cited references networks, and strongest burst keywords. Keyword clustering analysis revealed main topics, trends, and significant shifts in research topics. Parameters like time slicing, pruning, node types, term source and selection criteria from each slice, were configured for optimal results, as shown in the network diagram's upper-left corner. The network map consists of nodes, links, and colors. Nodes represent elements like countries/regions or institutions, and larger nodes indicate a higher number of papers or frequency of co-occurrence. Distinctly colored

annual rings around nodes indicate the year of occurrence, with a color legend for reference. A purple circle on a node indicates high centrality (node centrality >0.1), highlighting significant impact papers. Links between nodes symbolize co-occurrence in the same publication, with thinner links indicating less frequent co-occurrence. The color of links denotes the year of first appearance, with warmer colors signifying more recent years. Betweenness centrality of nodes in the network were calculates to identify critical junctures, with high centrality indicates nodes that play a crucial role in connecting different network parts, signaling important transitions or key articles.

3. Results

3.1. Annual publication and research fields

The flowchart for searching publications on acupressure is depicted in eFig. 1. A total of 770 publications related to the topic were retrieved after de-duplication. The observed fluctuating increasing trend in the annual acupressure publications from 2004 to 2024, as depicted in Fig. 1A, reflects the growing scientific interest. The rise from 15 papers in 2004 to 85 in 2023, despite slight annual fluctuations, indicates a significant expansion in research efforts. The acupressure-related publications, spanning 81 disciplines, highlight it's interdisciplinary scope, with *Integrative Complementary Medicine*, *Nursing*, and *General Internal Medicine* stand out as key areas, reflecting the integration of traditional and modern healthcare approaches. The top ten other fields are presented in eFig. 2.

3.2. Publication journals and countries/regions

The publications have been distributed across 250 different journals, with the top 10 journals account for 35.97 % (277 articles) of the total, highlighting their significant role in disseminating acupressure. *Evidence-Based Complementary and Alternative Medicine* has the highest number of publications, totaling 53 papers. *Complementary Therapies in Medicine*, ranked fourth in terms of publication volume with 33 articles, boasts the highest impact factor (3.6) among the top 10 journals. It also has an average citation rate of 8.82, indicating its influence and high-quality research. Rankings, citation statistics, and impact factors for other journals are detailed in Table 1.

A total of 44 countries/regions contributed to acupressure publications. Fig. 1B illustrates the distribution of the top 10 countries/regions in terms of publication volume. China leads with 252 papers, followed by USA with 134, and Taiwan with 105, collectively

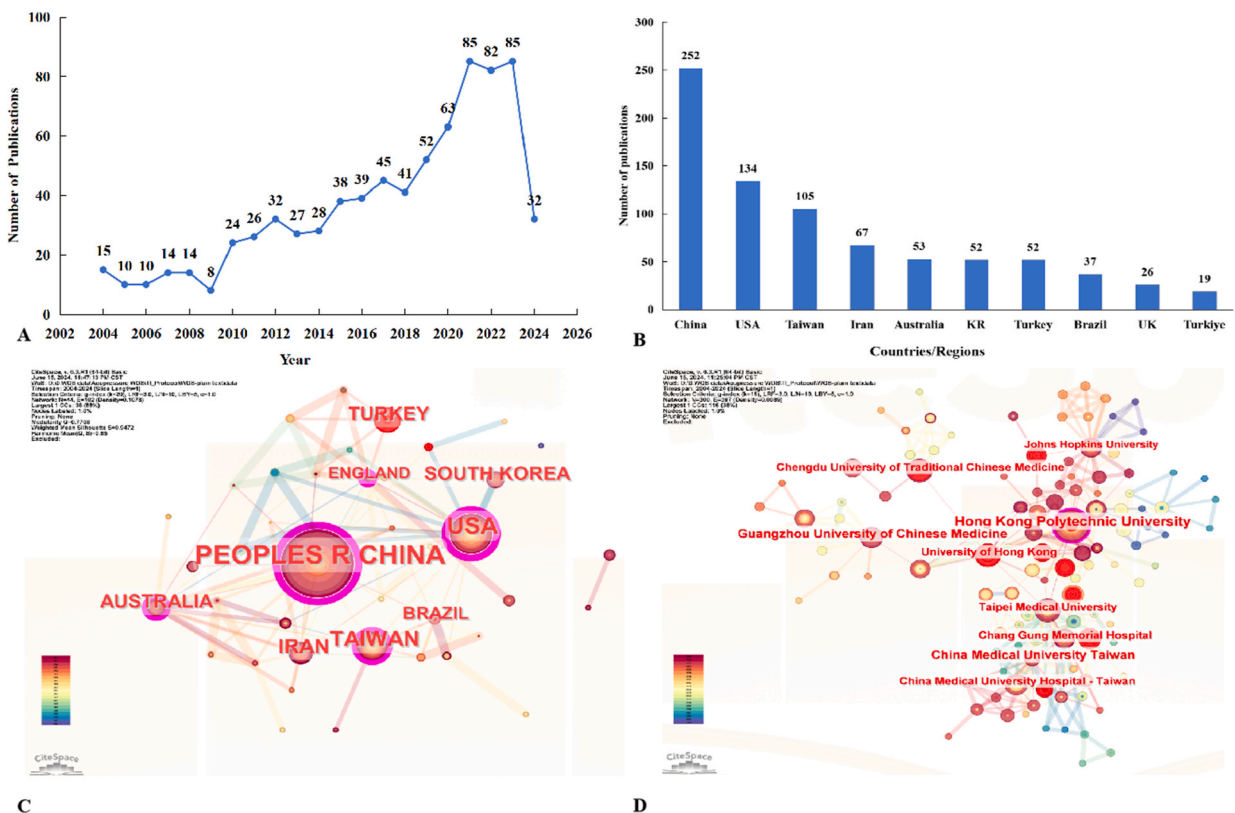


Fig. 1. (A) The number of publications and growth trends on acupressure. (B) The number of publications in top 10 countries or regions (KR, Republic of Korea). (C) The network of countries/regions' collaborations. (D). The network of institutions' collaborations.

Table 1
Top 10 journals with the highest frequency values for studies on acupressure.

Ranking	Journal	Frequency	% of 721	Country	Average citation	JIF	JCR
1	Evid-Based Compl Alt	53	6.88	USA	5.74	NA	NA
2	Journal of Alternative and Complementary Medicine	37	4.81	USA	7.32	2.3	Q2
3	Complementary Therapies in Clinical Practice	34	4.42	Netherlands	3.76	2.2	Q2
4	Complementary Therapies in Medicine	33	4.29	England	8.82	3.3	Q1
5	Medicine	28	3.64	USA	0.54	1.3	Q2
6	Trials	21	2.73	England	2.33	2.0	Q3
7	Holistic Nursing Practice	20	2.60	USA	3.10	1.3	Q3
8	Explore-the Journal of Science and Healing	18	2.34	USA	1.11	1.9	Q3
9	European Journal of Integrative Medicine	17	2.21	England	1.94	1.9	Q3
10	Alternative Therapies in Health And Medicine	16	2.08	USA	1.75	1.9	Q3

Abbreviations: Evidence-Based Complementary and Alternative Medicine, Evid-Based Compl Alt. Journal impact factors(JIF) are based on the latest Clarivate Analytics data available in 2024.

comprising 63.77 % of the total publications, indicating their prominent position in publication output and suggesting robust research strength and influence in this field. Fig. 1C depicts a cooperation network consisting of 44 country nodes and 102 links, revealing that research in this domain is primarily concentrated in a few countries. The strong connections between core nodes such as the USA, China, Australia, England, and Taiwan indicate frequent collaboration and communication within the field. Centrality values show that the USA and China holds the highest centrality (0.47 and 0.46), highlighting their pivotal role as a bridge connecting different national research teams. England (0.25), Australia (0.19) and Taiwan (0.12) also play key roles in fostering international collaborations. Details of the distribution of core countries/regions are presented in eTable 1.

3.3. Distributions of institutions and authors

Fig. 1D reveals a strong geographic concentration in institutions contributing to these publications., with five of the top 10 institutions in Taiwan. Other key contributors include institutions from South China, Hong Kong, South Korea, and Australia, reflecting a diverse but regionally concentrated research landscape. Notably, Hong Kong Polytechnic University (HKPU) leads with 41 publications, followed by Guangzhou University of Chinese Medicine (GUCM) and China Medical University (CMU). This regional concentration is further illustrated in Fig. 2A, which maps out a network of 300 institutional nodes and 397 links, showing robust institutions

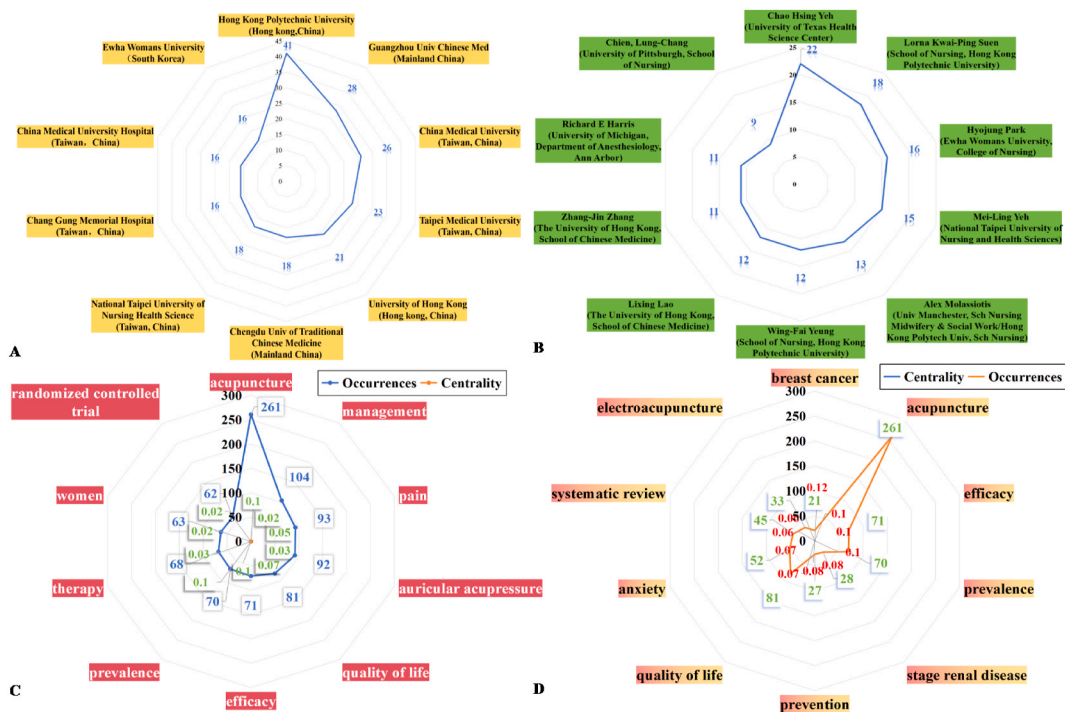


Fig. 2. (A) Top 10 institutions in terms of number of publications related to acupressure. (B) Top 10 author and their affiliates in terms of number of publications related to acupressure. (C) Top 10 keywords ranked by occurrences and corresponding centrality. (D) Top 10 keywords ranked by centrality and corresponding occurrences.

collaborations between in Hong Kong, China, Taiwan, and USA. Furthermore, the network reveals that HKPU holds the highest centrality score of 0.16, indicating its pivotal role in bridging diverse research teams worldwide. HKPU, University of Hong Kong, and GUCM form a tight collaboration network in acupuncture research, with HKPU as the central hub. While most collaborations are concentrated in Asia, there are some international collaborations, such as with Johns Hopkins University. Overall, both regional and international collaborations have advanced acupuncture research, with the rest of centrality values are below 0.10 (eTable 2).

On an individual level, these publication process involved 3,090 authors, with the top 5 contributors including Chao Hsing Yeh (22 papers), Lorna Kwai-Ping Suen (18 papers), Hyojung Park (16 papers), Mei-Ling Yeh (15 papers), and Alex Molassiotis (13 papers). The volume of publication among top 10 authors and their affiliates were shown in Fig. 2B. Notably, six of the top 10 authors are affiliated with nursing faculties at research universities worldwide, highlighting the critical academic contributions of nursing scholars to this field. However, despite these prolific contributions, the overall author network appears to remain fragmented with most collaborations occurring within smaller, localized groups.

3.4. Keywords and keyword clustering

Analyzing keyword, along with the distribution of keyword clustering, helps identify research frontiers and hotspots (Fig. 2C and D). The frequency of keywords such as “acupuncture,” “management,” “pain,” “auricular acupuncture,” and “quality of life” indicates these are the most focused areas within the field, signaling ongoing research interests and clinical potential. Keywords with centrality

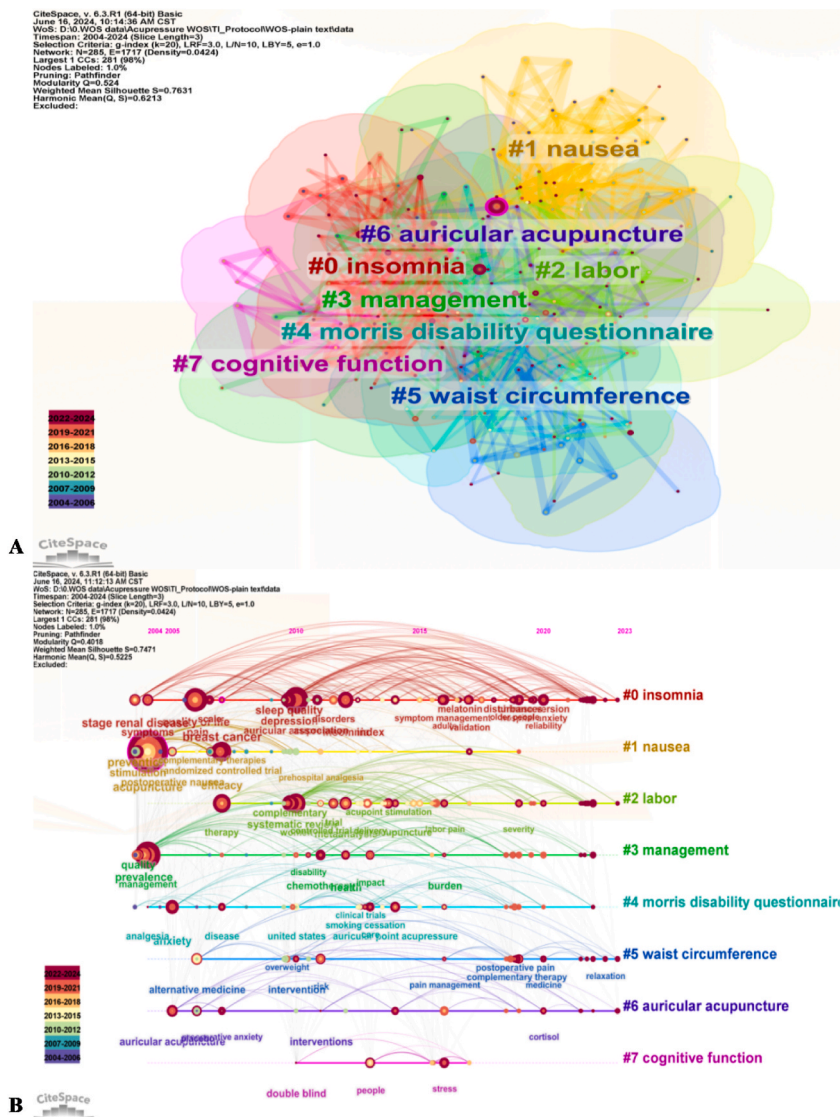


Fig. 3. (A) Keywords clusters of acupuncture. (B) Timeline diagram of keywords on topics of acupuncture.

equal to or greater than 0.10, such as “breast cancer,” “acupuncture,” “efficacy,” and “prevalence,” highlight concepts that are central, suggesting areas with potentially high impact on the field.

Keyword clustering analysis, based on the similarity of shared themes or concepts, groups keywords effectively, mapping the main research directions and focal points in the literature. This study identified eight significant clusters, with different colors representing different thematic clusters in the field of acupressure (Fig. 3A). **Cluster #0**, “insomnia,” comprises 64 keywords primarily associated with topics such as sleep quality, sleep disturbance/disorders, and insomnia. **Cluster #1**, termed “nausea,” consists of 50 keywords prominently linked with terms like postoperative nausea and vomiting, nausea, vomiting and ondansetron. Additionally, there are clusters specifically centered around: **Cluster #2**, centered around “labor” consisting of 47 keywords, which were mainly related to labor pain, labor duration, and major depressive disorder. **Cluster #3**, titled “management” consisting of 34 keywords, which were mainly related to multiple sclerosis, migraine, chronic pain, and cancer related fatigue. **Cluster #4**, focusing on “Morris disability questionnaire” includes 32 keywords related to morris disability questionnaire, auricular point acupressure, clinical trial, inflammatory cytokines, mechanisms. **Cluster #5** called “waist circumference” comprises 28 keywords related to waist circumference, obesity, weight reduction. **Cluster #6**, titled “auricular acupuncture,” includes 15 keywords related to auricular acupuncture, pre-operative anxiety, vital signs, brain stimulation, coronary angiography. Lastly, **Cluster #7**, named “cognitive function,” includes 11 keywords related to cognitive function, dementia, agitation, salivary cortisol. Each cluster’s modularity Q-value exceeds 0.3, and silhouette scores are above 0.7, confirming the statistical significance and reliability of the clustering results. The timeline diagram organizes keywords within each cluster chronologically, illustrating the structural dynamics and temporal evolution of research trends (Fig. 3B). Color-coded curves highlight co-citation links established in specific years, with larger nodes marked by significant citation metrics or notable citation surges. Additionally, the timeline diagram highlights the three most-cited papers annually, placed at the bottom, providing deeper insights into the developmental trajectory across the seven keyword clusters. Notably, clusters like “Insomnia”, “Labor”, and “waist circumference” continue to be ongoing research hotspots. Variations in acupressure, including auricular acupressure and self-administered acupressure, are characterized by distinct keyword clusters that highlight the primary research directions and areas of focus. Fig. 4A and B illustrate that auricular acupressure research primarily centers on conditions such as hip and knee arthroplasty, fatigue, brain stimulation, and chemotherapy-induced peripheral neuropathy. In contrast, studies on self-administered acupressure largely target family caregivers and address conditions such as sleep disturbances and allergic rhinitis, particularly hay fever. Additionally, smartphones have been identified as effective tools for disseminating information related to these topics (Fig. 4C and D).

Fig. 5A displays the top 12 keywords with the strongest citation bursts concerning acupressure. The significant increase in occurrences of these keywords during specific periods reflects the heightened focus and surge in activity on acupressure research topics. A red bar next to each keyword indicates the duration of the citation burst, with the start and end times and emergence strength noted.

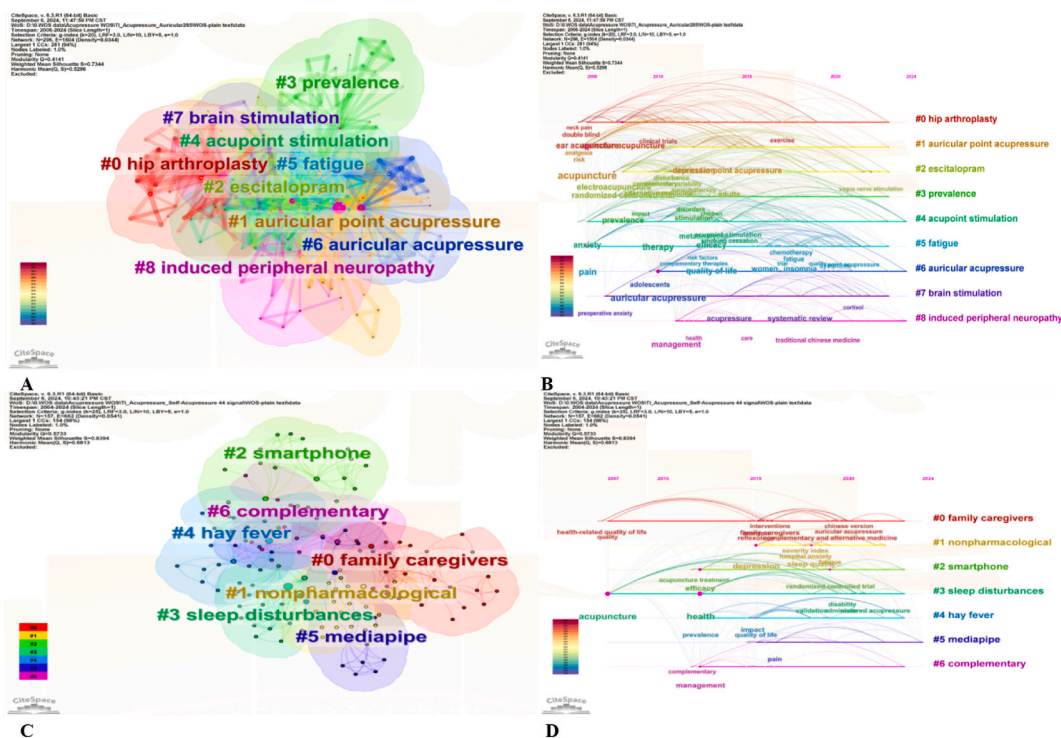


Fig. 4. (A) Keywords clusters of auricular acupressure. (B) Timeline diagram of keywords on topics of auricular acupressure. (C) Keywords clusters of self-administered acupressure. (D) Timeline diagram of keywords on topics of self-administered acupressure.

For example, “p6 acupressure” from 2004 to 2018 indicates sustained interest in research on the Neiguan (Pericardium 6—P6) point. Post-2020, “reliability” and “Vagus nerve stimulation” emerge as new keywords experiencing the strongest citation bursts. This signifies an increasing emphasis in the research community on the efficacy and reliability of acupressure, reflecting a broader trend towards rigorous scientific validation of traditional medical practices. Additionally, the focus on “vagus nerve stimulation” highlights the integration of traditional techniques with modern scientific advancements aims to enhance treatment outcomes, validate clinical applications, and explore innovative therapeutic combinations that address complex health issues.

3.5. Co-cited references analysis

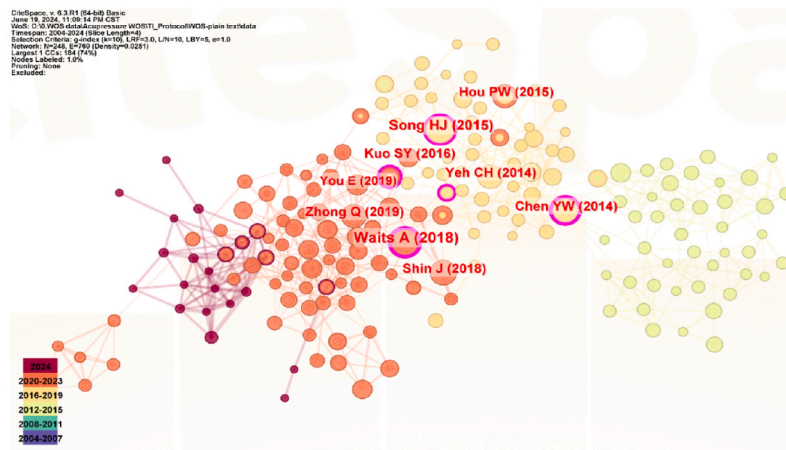
Co-citation references is a unique method used to identify pairs of references that are cited together in a single paper, thereby establishing a co-citation relationship. This approach reveals the knowledge network within a field, aids in identifying seminal references, and assessing the relationships between them. Co-citation references is crucial for understanding the foundation of specific disciplines, determining key directions, and identifying academic communities. It plays a significant role in uncovering the structure, dynamics, and cornerstones of research areas. Fig. 5B illustrates the network of co-cited references, where each node represents a publication, and the size of the node reflects its citation count. The links between nodes indicate the strength of co-citation, while the color of the nodes represents the year of citation. Among the top 10 references ranked by citation frequency, 7 papers discuss the efficacy of acupressure through systematic reviews or meta-analyses, 2 papers focus on clinical trials of acupressure, and 1 paper introduces “The History, Mechanism, and Clinical Application of Auricular Therapy in Traditional Chinese Medicine.” In contrast, among the top 10 references ranked by centrality, 5 papers discuss the efficacy of acupressure through systematic reviews or meta-analyses, 4 papers focus on clinical trials of acupressure, and the remaining 1 paper is the Cochrane Handbook for Systematic Reviews of Interventions.

Table 2 details the highly co-cited articles. Regardless of citation count or centrality ranking, Alexander Waits’ study on the acupressure effect on sleep quality ranks first. This systematic review, marked by a purple ring and a centrality score of 0.36, marking it

Top 12 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2004 - 2024
p6 acupressure	2004	4.93	2004	2018	
postoperative nausea	2005	4.38	2005	2012	
acupuncture	2004	4.06	2004	2009	
anesthesia	2004	4.04	2004	2012	
bispectral index	2004	3.53	2004	2012	
stimulation	2004	9.26	2007	2012	
alternative medicine	2006	8.1	2010	2015	
ondansetron	2010	3.47	2010	2012	
induction	2015	3.29	2015	2018	
traditional chinese medicine	2017	3.58	2017	2021	
reliability	2020	3.67	2020	2024	
vagus nerve stimulation	2022	3.27	2022	2024	

A



B

Fig. 5. (A) The top 12 keywords with the strongest citation bursts of acupressure from 2004 to 2024. (B) The Network map of co-cited references from the publications of acupressure.

as a significant study in this field and provides robust evidence for acupuncture's role in sleep disorder treatment. Even fragile populations, such as the elderly and dialysis patients, can benefit from acupressure. The study highlighted a high risk of bias due to the absence of blinding of patients and personnel, which remains a serious methodological challenge for acupressure trials and poses a main limitation to the presented results. An analysis of the diseases or symptoms targeted by acupressure, as presented in [Table 2](#), reveals that these key studies focus more on symptom management, such as sleep quality, pain, constipation, depression, anxiety, stress, and low back pain. Notably, there is a significant emphasis on various degrees of pain and pain caused by different diseases.

4. Discussion

This bibliometric analysis has delineated the research trajectory of acupressure from 2004 to 2024, identifying 770 publications and a robust increase in scholarly output. The findings indicate a substantial increase of publications, contributed by 3,363 authors from 1,038 institutions in 44 countries, published across 250 different journals. Significant contributions to acupressure have been made by nursing institutions and scholars such as Chao Hsing Yeh, Lorna Kwai-Ping Suen, and Hyojung Park. M.

Acupressure research has shown a fluctuating upward trend, indicating growing global interest in CAM worldwide, along with a rising demand for simpler, more convenient, cost-effective, and effective non-pharmacological treatments. During the study period, China emerged as the most prolific country, contributing 33 % of the publications. Although acupressure originated in China and is grounded in the meridian theory of TCM [5], its influence has been slightly overshadowed by the USA. This disparity can be attributed not only to the advanced equipment, expertise, international collaboration, and ample funding available in USA but also to the greater emphasis placed by U.S. researchers on improving patients' quality of life, which has enabled early and sustained focus on this field. Nonetheless, China remains a significant contributor, with half of the top 10 most institutions located in Taiwan.

Collaboration network involving institutions and countries is a key indicator of the research status in a specific field. The analysis of international collaboration showed close relationships, with frequent cooperation and exchanges among developed countries, forming a network centered around the USA, China, Australia, England, and Germany. At the institutional level, collaboration was extensive, with frequent opportunities for inter-institutional exchanges. Notably, acupressure research institutions formed a significant collaboration network centered on HKPU, facilitating communication across mainland China, Hong Kong, Macau, and Taiwan. Within this network, Hong Kong has strengthened exchanges with Taiwanese scholars and enhanced cooperation with mainland China and other countries, serving as a model for medical and cultural exchange. Furthermore, high-impact studies and key nodes within the research network were identified, highlighting the central role of nursing institutions and professionals in advancing acupressure research. This is crucial for promoting pain management, stress relief, and integrating acupressure into holistic patient care. The study indicates that while there are strong research and collaboration centers in specific regions, there is still potential to establish a more expansive and inclusive global network. Enhancing cooperation among underrepresented regions and institutions can further enrich the field, introduce new perspectives, and strengthen the global impact of acupressure research. Supported by a more inclusive network structure, this strategic expansion can foster broader knowledge dissemination and innovation in addressing various global health challenges.

The study highlights the influential role of prominent researchers and nursing scholars in shaping the field and what the significant areas of research are currently. Chao Hsing Yeh from the Cizik School of Nursing at the University of Texas Health Science Center has made significant contributions to understanding the therapeutic effects of auricular acupressure, particularly in pain management [17–20]. His primary research investigates the efficacy of acupressure in treating low back pain through clinical trials [18,20]. Additionally, Yeh extends his investigation to other significant areas affecting patient quality of life, such as pain and fatigue in cancer survivors, as well as disturbed sleep, which is a pervasive issue among various patients [19]. Moreover, he explores the anti-inflammatory effects of auricular acupressure and the underlying biological mechanisms [17,18], providing a comprehensive understanding of how this non-invasive technique can contribute to improving patient care and well-being. Lorna Kwai-Ping Suen, a researcher at the School of Nursing at Tung Wah College, specializes in the therapeutic applications of auricular acupressure. Her primary focus is to evaluate the efficacy of acupressure as a non-pharmacological intervention for insomnia, chronic low back pain, and knee osteoarthritis [21–23]. Through rigorous RCTs, she has provided substantial evidence supporting the use of self-administered acupressure as a TCM therapeutic approach. Hyojung Park, a distinguished researcher at Ewha Womans University's College of Nursing in South Korea, focuses on improving health outcomes across diverse populations, including children, adolescents, women, the elderly, and nursing staff [24–30]. Her work, supported by RCTs, has demonstrated the effects of auricular acupressure in managing conditions such as obesity, irritable bowel syndrome, and chemotherapy-related complications. Additionally, her research also addresses stress, anxiety, and sleep problems in various groups [27–30], including nurses, elders with hypertension, patients undergoing cardiac surgery and postmenopausal women, highlighting the versatility of auricular acupressure as a non-invasive therapeutic intervention. In the field of self-administered acupressure, Yeung Wing-Fai from Hong Kong Polytechnic University and his colleagues have made substantial contributions, with their work featuring prominently in at least eight pivotal clinical trials. Their research has been instrumental in shaping the discourse and enhancing the therapeutic potential of self-acupressure within the medical community [31,32].

By analyzing the co-occurrence frequency and clustering of keywords, it is evident that the leading research hotspots in the field of acupressure over the past 20 years include insomnia, nausea, labor, management, Morris Disability Questionnaire, waist circumference, auricular acupuncture, and cognitive function. Combining the keyword timeline and burst detection graphs, we identified notable emerging hotspots such as “insomnia”, “labor”, “waist circumference”, “reliability” and “vagus nerve stimulation”. Particularly, keywords “reliability” and “vagus nerve stimulation” have shown the highest burst intensity and longest duration in the past four years, indicating substantial potential in these areas. This information can guide research directions, particularly in assessing

Table 2

Top 10 co-cited references with the highest frequency and centrality of acupressure.

Rank	Citations	Reference Title	First Author (Publication Year)	Journal	Rank	Centrality	Reference Title	First Author (Publication Year)	Journal
1	24	Acupressure effect on sleep quality: A systematic review and meta-analysis	Alexander Waits,2018	Sleep Med Rev	1	0.36	Acupressure effect on sleep quality: A systematic review and meta-analysis	Alexander Waits,2018	Sleep Med Rev
2	22	Effect of self-acupressure for symptom management: a systematic review	Hyun Jin Song, 2015	Complement Ther Med	2	0.32	The effectiveness of acupressure on relieving pain: a systematic review	Ya-Wen Chen,2014	Pain Manag Nurs
3	17	Auricular acupressure relieves anxiety and fatigue, and reduces cortisol levels in post-caesarean section women: A single-blind, randomized controlled study	Shu-Yu Kuo,2016	Int J Nurs Stud	3	0.19	Investigation of 2 Types of Self-administered Acupressure for Persistent Cancer-Related Fatigue in Breast Cancer Survivors: A Randomized Clinical Trial	Suzanna M Zick,2016	JAMA Oncol
4	16	Effects of Auricular Acupressure on Constipation in Patients With Breast Cancer Receiving Chemotherapy: A Randomized Control Trial	Jeongran Shin,2018	West J Nurs Res	4	0.14	Effect of self-acupressure for symptom management: a systematic review	Hyun Jin Song, 2015	Complement Ther Med
5	15	Efficacy of auricular therapy for pain management: a systematic review and meta-analysis	Chao Hsing Yeh,2014	Evid Based Complement Alternat Med	5	0.11	Efficacy of Auricular Acupressure for Chronic Low Back Pain: A Systematic Review and Meta-Analysis of Randomized Controlled Trials	Li-Hua Yang, 2017	Evid Based Complement Alternat Med
6	15	The effectiveness of acupressure on relieving pain: a systematic review	Ya-Wen Chen,2014	Pain Manag Nurs	6	0.09	Pilot Randomized Controlled Trial of Auricular Point Acupressure to Manage Symptom Clusters of Pain, Fatigue, and Disturbed Sleep in Breast Cancer Patients	Chao Hsing Yeh,2016	Cancer Nurs
7	15	Effectiveness of Auricular Acupressure for Acute Postoperative Pain after Surgery: A Systematic Review and Meta-Analysis	Qin Zhong,2019	Chin J Integr Med	7	0.09	Effects of LI4 acupressure on labor pain in the first stage of labor	Azam Hamidzadeh,2012	J Midwifery Womens Health
8	15	The History, Mechanism, and Clinical Application of Auricular Therapy in Traditional Chinese Medicine	Pu-Wei Hou,2015	Evid Based Complement Alternat Med	8	0.09	Effects of ear and body acupressure on labor pain and duration of labor active phase: A randomized controlled trial	Zainab Alimoradi,2020	Complement Ther Med
9	13	Effects of Auricular Acupressure on Pain Management: A Systematic Review	Eunhea You,2019	Pain Manag Nurs	9	0.09	Cochrane Handbook for Systematic Reviews of Interventions	Higgins JPT, 2019	Cochrane
10	12	Clinical Evidence for Association of Acupuncture and Acupressure With Improved Cancer Pain: A Systematic Review and Meta-Analysis	Yihan He,2020	JAMA Oncol	10	0.07	An integrative review of acupressure interventions for older people: A focus on sleep quality, depression, anxiety, and agitation	Nant Thin Thin Hmwe,2019	Int J Geriatr Psychiatry

reliability and the application of vagus nerve stimulation, potentially leading to new scientific and clinical advancements.

In the field of insomnia, research on acupressure primarily focuses on specific populations, including elderly, postpartum women, college students, and hemodialysis patients. A specialized research team, consisting of scholars such as Yeung Wing-Fai and Lorna Kwai-Ping Suen, has dedicated their efforts to evaluating the clinical effectiveness of acupressure [31–34]. Their research priorities include, but are not limited to, exploring and assessing the efficacy of self-administered acupressure and electroacupuncture, as well as their combination with cognitive-behavioral therapy (CBT) for the treatment of insomnia. This team's studies provide valuable insights into the potential of these non-pharmacological interventions in improving sleep quality across various patient groups [31–34]. In the field of labor, research predominantly focuses on employing RCTs to explore the efficacy of auriculotherapy and body acupressure in managing pain, anxiety, and the rate of cesarean sections during childbirth [35–37]. These studies aim to provide robust evidence on the benefits of non-pharmacological interventions, potentially enhancing the childbirth experience. By investigating auriculotherapy and body acupressure, researchers seek to reduce labor pain, alleviate anxiety, and possibly lower the incidence of cesarean sections. Such outcomes are critical for improving maternal and neonatal health, and integrating these complementary therapies into standard obstetric care offers valuable alternative or adjunctive options for pain and anxiety management during labor.

Similarly, in the research domain defined by waist circumference, studies primarily focus on the therapeutic effects of auricular acupressure on obesity. Most research has concentrated on the efficacy of using different types of seeds, such as *Vaccaria* seeds, *Semen Vaccariae*, and *Sinapsis alba* seeds in auricular acupressure [38–40]. Findings suggest that different types of seeds may produce varying therapeutic outcomes. These studies contribute to the development of more targeted and effective interventions for weight management. The differentiation in therapeutic outcomes based on seed type highlights the need for further investigation to determine the most effective materials and methods for treating obesity.

Research on auricular acupuncture often combines with acupressure and predominantly targets analgesia, smoking cessation, and palliative care [41–43]. These studies aim to provide robust evidence on the synergistic effects of these interventions, exploring their potential to enhance patient outcomes in various clinical settings. In pain management, auricular acupuncture and acupressure have been investigated for their analgesic effects, complementing standard pain relief strategies. For smoking cessation, these techniques have been studied for their potential to reduce cravings and withdrawal symptoms, providing an alternative support mechanism for those seeking to quit smoking. Furthermore, in palliative care, the combination of auricular acupuncture and acupressure is being explored for its ability to alleviate symptoms and improve the quality of life for patients with chronic and terminal conditions. In recent years, self-administered acupressure has gained traction due to its convenience, cost-effectiveness, and the ability for individuals to perform it. Research trends indicate a growing interest in self-acupressure for self-care and adjunct therapy. Studies suggest that self-acupressure can effectively manage symptoms of various conditions, facilitating recovery and symptom relief. Based on our analysis of the WOS data, current research focuses on its potential to alleviate pain, fatigue, constipation, insomnia, allergic rhinitis, and stress-related symptoms (eTable 3), with many evaluating its efficacy in RCTs. Additionally, investigations are exploring the impact of self-acupressure on cardiovascular health, particularly its role in regulating the autonomic nervous system and managing hypertension. The field of self-acupressure research is evolving, with an emphasis on understanding its mechanisms of action and optimizing its therapeutic applications. The integration of acupressure with modern technology, particularly through the use of smartphones as a media pipe, offers a contemporary avenue for patients to access knowledge on self-administered acupressure [10,44,45]. This approach not only enhances the reach and impact of acupressure interventions but also aligns with the evolving landscape of digital health. Future studies may further examine the effectiveness of self-administered acupressure in chronic disease management, its integration with digital health platforms, and the development of evidence-based protocols. As the evidence base expands, the role of smartphones in facilitating self-care through acupressure is likely to become an integral component of holistic healthcare and self-care regimens, empowering individuals to take a more active role in their health management.

Rigorous investigation of acupressure's reliability through RCTs and meta-analyses has provided substantial evidence supporting its therapeutic efficacy [32,35,40]. These studies are pivotal for establishing standardized protocols and ensuring the reproducibility of results, which are essential for broader clinical adoption. Concurrently, the exploration of vagus nerve stimulation as a therapeutic modality, especially its application in the auricular region, emphasizes its potential in treating autonomic nervous system disorders [46,47]. This dual focus on reliability and innovative therapeutic applications reflects the evolving landscape of CAM, highlighting the importance of methodical research and clinical validation in advancing these fields.

This study has some limitations. Firstly, it excludes foot reflexology literature due to its distinct theoretical basis and techniques from acupressure. Foot reflexology focuses on the theory of foot reflex zones to achieve relaxation of foot muscles and connective tissues and is practiced in various cultural contexts. In contrast, acupressure is based on the TCM meridian theory and involves stimulating acupoints. Secondly, there is a potential bias in the data sources. The data were exclusively obtained from the WOS database, which may overlook literature from other databases. Additionally, the inherent limitations of the Citespace software parameters may introduce discrepancies between the analysis results. Currently, there is no technical solution to completely address this issue. Lastly, certain research trends may be significant only within specific geographic regions or research groups. For example, the high frequency of certain keywords may be related to the research interests or funding support in specific areas. Therefore, we encourage readers to maintain a critical perspective when interpreting the findings of this study and to carefully evaluate the accuracy and reliability of the results.

Future acupressure research should prioritize broadening the geographical scope of study participants to include diverse and underrepresented demographics. Such an inclusivity is pivotal for fostering a more comprehensive understanding of acupressure's efficacy across various cultural and ethnic backgrounds, thereby enhancing the generalizability of research outcomes. There is a pronounced necessity for the conduct of rigorous RCT that not only substantiate the therapeutic benefits of acupressure but also explore its potential synergy when integrated with conventional medical practices. The exploration of acupressure within the realm of

digital health is a burgeoning avenue that merits attention, with the potential to harness technological advancements to improve patient access and treatment compliance [10,44,45]. Furthermore, elucidating the biological mechanisms underlying acupressure's effectiveness is essential. This research could significantly strengthen the scientific foundation of the practice, leading to the development of standardized protocols for clinical application. By addressing these research gaps, the field of acupressure can advance towards becoming a more evidence-based and globally recognized component of healthcare.

5. Conclusion

This bibliometric analysis maps the intellectual landscape of acupressure research from 2004 to 2024, highlighting significant contributions of institutions and researchers from Hong Kong and Taiwan, and the pivotal role of nursing researchers. It highlights the necessity of enhancing academic collaboration and identifies new research hotspots such as insomnia, labor, waist circumference, reliability, vagus nerve stimulation. These insights provide a foundation for future research funding and policy decisions, aiming to align scientific inquiry with clinical needs and patient care practices. The findings support the integration of acupressure into holistic patient care, enhancing quality of life and contributing to CAM.

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Data availability statement

This data is not applicable.

Ethics statement

This study involved a bibliometric analysis of publications only, no potentially identifiable human images or data is presented in this study. This study was exempt from institutional ethics review board approval.

CRedit authorship contribution statement

Zhi-qiang Li: Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Mary Yue Jiang:** Methodology, Investigation, Data curation. **Xue-han Liu:** Writing – review & editing, Supervision. **Yi-qing Cai:** Writing – review & editing. **Chen-lu Wang:** Writing – review & editing. **Feng Cao:** Writing – review & editing. **Jian-ping Liu:** Writing – review & editing, Supervision, Funding acquisition.

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.

Appendix A. Supplementary data

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