



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

CHEN Shupeng^a, TANG Nana^{b*}, WANG Simeng^a, LIU Yinghua^b, ZHANG Zhiyong^a, CHEN Shiyu^a

a. School of Clinical Medicine, Jiangxi University of Chinese Medicine, Nanchang, Jiangxi 330004, China

b. Department of Cardiovascular Medicine, Affiliated Hospital of Jiangxi University of Chinese Medicine, Nanchang, Jiangxi 330006, China

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ABSTRACT

Objective To explore the current status and development trend of research on external therapies in traditional Chinese medicine (TCM) for insomnia over the past 10 years through bibliometrics and visual analysis, to provide references for further research on the topic.

Methods Literature relating to TCM external therapies for insomnia from January 1, 2012 to December 31, 2021 was retrieved from Chinese databases, including China National Knowledge Infrastructure (CNKI), Wanfang Database, China Science and Technology Journal Database (VIP), and from the Web of Science Core Collection (WOSCC) for English articles. CiteSpace, VOSviewer, Scimago Graphica, and NoteExpress software were used to analyze publication volumes of the papers and how they were distributed in different journals, as well as to visualize the data of the countries, authors, institutions, and keywords.

Results A total of 6 085 papers were obtained, of which 5 592 were from the Chinese databases and 493 were from the English database, with their publication volumes growing steadily year on year. Approximately 45 countries and regions were found to have published research on the topic. In terms of Chinese publications, the author with the most papers published was CHEN Yunfei from Yueyang Hospital of Integrated Traditional Chinese and Western Medicine, Shanghai University of Traditional Chinese Medicine. The closest collaboration was between LIU Chengyong from the Affiliated Hospital of Nanjing University of Chinese Medicine and YUE Zenghui from Hunan University of Chinese Medicine. In terms of English publications, the author with the most papers published was MAO Junj from Sloan-Kettering Cancer Research Center, USA, and LAO Lixing from the University of Hong Kong was his closest partner in collaboration. Heilongjiang University of Chinese Medicine was the institution with the most Chinese publications, and Shanghai University of Traditional Chinese Medicine was the one with the most English papers published. Studies on the topic were published in 386 Chinese journals and 205 English journals, respectively. Nowadays, the clinical application of TCM external treatments for insomnia, the selection of meridians and acupoints, therapies for insomnia and its related diseases are research hotspots. The combined use of different TCM external therapies is a trend in the treatment of insomnia and its concomitant diseases, especially in the fields of oncology, nursing, and psychiatric disorders. The exploration of mechanisms of TCM external therapies for insomnia is also a key direction for future research. In clinical practice, the commonly used external therapies for insomnia include acupuncture, ear-acupressure with beans, acupoint application, etc. The commonly

*Corresponding author: TANG Nana, E-mail: 1240181899@qq.com.

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selected acupoints are auricular points, Sishencong (EX-HN1), Shenmen (HT7), etc. The frequently studied meridians are Ren, Du, Qiao, etc. The insomnia concomitant diseases are depression, stroke, anxiety, etc.

Conclusion A wealth of research results have been accumulated in the treatment of insomnia by TCM external therapies, but authoritative research results are not so many. Therefore, institutions in different countries should strengthen communications and cooperation, and researchers should be encouraged to make innovations and breakthroughs on the basis of inherited TCM external therapies, so as to produce more valuable research results and improve TCM external therapies for providing better treatments for patients with sleep disorders.

1 Introduction

Insomnia is defined as a decrease in sleep duration, a disruption in sleep continuity, or poor quality in sleeping, often with symptoms such as mental disturbance and decreased physical energy [1]. Insomnia poses a huge challenge to the physical and mental health of people around the world, with approximately 30% of the world's population facing the disorder [2]. Currently, behavioral cognitive therapy is usually the first option for insomnia patients. However, in light of the facts that clinical treatments without medications are ineffective [3], and long-term use of sedative-hypnotic drugs is a problem with safety concerns, traditional Chinese medicine (TCM) external therapies are becoming increasingly prevalent among the public, due to its effectiveness and safety [4]. External therapy of Chinese medicine has been an option to treat insomnia for more than 2 000 years, with different external therapies bearing varied advantages while being supplementary to each other at the same time, as one TCM classic work, *Yellow Emperor's Inner Classics* (*Huang Di Nei Jing*, 《黄帝内经》), has suggested that, "moxibustion can easily do what acupuncture cannot do" [5]. Although, TCM external therapies have long been used for insomnia treatment, the bibliometric analyses on the topic are few, with only a handful of such analyses of acupuncture or tuina from the Web of Science Core Collection (WOSCC) [6, 7]. Therefore, a scientific and comprehensive analysis of the literature related to TCM external therapies for insomnia is of great significance for the development of insomnia research.

With the development of scientometrics and data visualization, various software and tools have been developed for research analysis, such as CiteSpace, Scimago Graphica, and VOSviewer, which are all capable of assisting in transforming a large amount of literature data into a scientific knowledge map [8, 9]. This is beneficial for researchers to better understand the knowledge structure of a field and explore new trends. This study aims to scientifically and straightforwardly analyze literature published over the past decade on TCM external therapies for insomnia retrieved from China National Knowledge Infrastructure (CNKI), Wanfang Database, China Science and Technology Journal Database (VIP), and

WOSCC to explore the current research hotspots and trends of the topic, and hopefully, providing references for future studies.

2 Data and methods

2.1 Data sources

The Chinese articles were sorted out from CNKI, Wanfang, and VIP databases. The retrieval time was from January 1, 2012 to December 31, 2021, and the retrieval scope was journals. Take CNKI as an example, Topic = ("Insomnia" OR "sleeplessness" OR "sleep disorder" OR "light sleep" OR "sleep quality") AND Topic = ("TCM external treatment" OR "acupuncture" OR "buried acupuncture" OR "warm acupuncture" OR "warm acupuncture therapy" OR "hand acupuncture" OR "electric acupuncture" OR "skin acupuncture" OR "trigeminal acupuncture" OR "fire acupuncture" OR "ear acupuncture" OR "buried thread" OR "tuina" OR "manipulation" OR "massage" OR "fire canning" OR "cupping" OR "flash canning" OR "walking canning" OR "gua sha" OR "ear acupuncture point pressure beans" OR "ear acupuncture point pressure pills" OR "ear acupuncture point pressure" OR "ear acupuncture point pressure beans" OR "ear acupuncture point pressure seeds" OR "magnetic beads pressure ear method" OR "Wangbuliuxing pressure" OR "acupuncture point pressure" OR "Chinese medicine pressure" OR "acupuncture point pressure").

English articles were sorted out from WOSCC, and the retrieval time was from January 1, 2012 to December 31, 2021. TI = ("early awakening" OR "insomnia" OR "sleeplessness" OR "sleep disorders") AND TS = ("acupuncture" OR "needle prick" OR "warm acupuncture" OR "electric acupuncture" OR "silver needle" OR "body needle" OR "abdominal needle" OR "massage" OR "manipulation" OR "tuina" OR "moxibustion" OR "moxa-wool" OR "moxa" OR "cupping therapy" OR "cupping" OR "cups" OR "gua sha" OR "rub sha" OR "scrapping therapy" OR "auricular-plaster" OR "auricular point sticking" OR "auricular point pressing" OR "auricular pressure" OR "ear acupoint" OR "acupoint application" OR "application therapy" OR "acupressure points" OR

“acupuncture point applying” OR “plastering on acupoint” OR “external treatment”).

2.2 Literature screening criteria

2.2.1 Inclusion criteria (i) Relating to TCM external therapies for insomnia; (ii) clinical research, animal research, literature research, and reviews; (iii) with complete information, including publication date, authors, keywords, etc.

2.2.2 Exclusion criteria (i) Conference papers, patents, news, advertisements, and popular science articles; (ii) papers published in more than one journal; (iii) papers which had already been retracted.

2.3 Data collection and conversion

The papers were uploaded to NoteExpress (3.6.0.9220) software for double checking their eligibility. First, the country to which a paper belongs was standardized, for example, “Northern Ireland, Wales, England, and Scotland” were unified as “the United Kingdom”. Papers of a subordinate institution were classified under the same categorization as those of the superordinate institutions. For instance, papers of authors from the College of Acupuncture, Moxibustion and Tuina of Shanghai University of Traditional Chinese Medicine fell into the categorization, i.e. its superordinate, Shanghai University of Traditional Chinese Medicine. Then, keywords that described different phases of a certain disease were grouped together under the same disease name, for example, hypertension stage 2 and hypertension stage 3 were both considered as hypertension.

2.4 Data analysis

VOSviewer (1.6.18), CiteSpace (5.8.R3), Pajek (5.16), and Scimago Graphica (1.0.26) were used for visual analysis of the data relating to the papers’ countries, authors, institutions, keywords, etc. NoteExpress (3.6.0.9220) and Excel (2019) were tools for econometric analysis of annual publications and journal volumes. The time span in Time Slicing was set from January 1, 2012 to December 31, 2021 for both Chinese and English articles, with slicing frequency set as one year per slice. Keywords and institutions were two categories selected respectively for co-occurrence analysis with the use of Node Types. The pruning mode was set to the default value. If the quality of the firstly visualized image was poor, the pruning mode can be set to path finder for simplifying the network and highlighting important structures, or for minimizing spanning tree to make the process simpler and get the results faster. Then, data obtained were employed for co-occurrence analysis, cluster analysis, and emergent

analysis to generate a knowledge map, make adjustment, and have the data ready for visual analysis. Figure 1 shows the workflow of the visualization process.

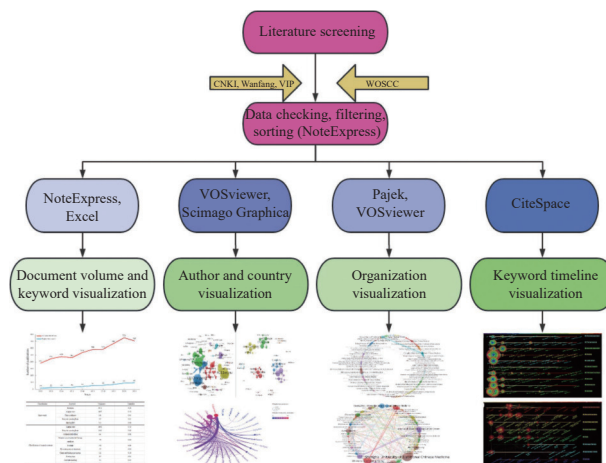


Figure 1 Visualization process of TCM external therapies for insomnia

3 Results

3.1 Analysis of annual articles

A total of 5 592 Chinese articles and 493 English articles were obtained for analysis (Figure 2). The annual publications volume is an important indicator for analyzing how a research field had developed in the past and would develop in the future. From the year of 2012 to 2021, the number of Chinese articles published grew steadily, with an average of 559.3 articles per year. Notably in 2020, there were 753 papers on the topic, the highest output among the ten years. It is also noteworthy that the number of Chinese papers published between 2018 and 2020 grew sharply, suggesting satisfactory outcomes were achieved with the external treatments such as acupuncture and moxibustion, ear acupressure with beans and massaging, concluded from a large number of meta analyses [10-12]. Meanwhile, the publication of English papers on the topic also rose steadily, with an average of 49.2 articles per year, of which 95 papers were published in 2021. The annual publications of both Chinese and English literature have increased steadily over the past decade, even though English publications still lack of robust growth.

3.2 Analysis of authors

Over the past decade, the Chinese papers included 9 384 authors, among whom 254 were core authors; and the English papers included 2 279 authors, of whom 106 were core authors.

3.2.1 Core authors of Chinese articles According to the Price Law [13], the formula to determine the core authors is $M = 0.749 * (N_{\max})^{1/2}$. M is equal to the number of papers, N_{\max} represents the number of papers of the most productive authors in the statistical period, and the authors who have published more than M papers are considered as core authors. With the data from the Chinese papers, we calculated $M = 3.35$, indicating authors who have published over four papers are core authors in the field. As a result, there are 254 core authors in terms of Chinese papers, with YUE Zenghui, CHEN Yunfei, LIU Chengyong, WANG Guilin, YANG Zhuoxin, GAO Xiyan, and WANG Zhengyan leading seven teams in long-term collaboration (Figure 3A). Of the seven authors above, CHEN Yunfei from Shanghai University of Traditional Chinese Medicine is the most productive author. And two teams with the highest collaboration intensity are the team of YUE Zenghui from Hunan University of Chinese Medicine and that of LIU Chengyong from Nanjing University of Chinese Medicine (Table 1). The focus of CHEN Yunfei's team was the clinical application of electroacupuncture and acupoints on perimenopausal insomnia, and they reported satisfactory efficacy of Beishuxue for

treating insomnia, a therapy worthy of further study [14]. YUE Zenghui's team focuses on acupuncture and electroacupuncture in animal experiments [15], and reported increase in melatonin after acupuncture treatment at Baihui (DU20) plus Shenmen (HT7) [16]. And they also revealed another interesting finding of improving insomnia rat modeling using P-Chlorophenylalanine (PCPA) [17]. LIU Chengyong's team was subjected to clinical research on acupuncture for insomnia, particularly with Tongdu Tiaoshen acupuncture therapy that works on the acupoints including Baihui (DU20), Yintang (DU29), Feishu (BL13), Xinshu (BL15), Ganshu (BL18), Pishu (BL20), and Shenshu (BL23), realizing excellent therapeutic effect [18]. LIU's team also found that Jiaotai Pill (交泰丸) combined with acupressure was effective in treating insomnia in the elderly [19]. Their prominent research focus was the clinical use of TCM external therapies.

3.2.2 Core authors of English articles Based on English paper-related data, it was calculated that $M = 3$. So, there are 106 core authors who have published English works. The teams led by MAO Junj, ZHAO Feiyi, CHUNG Kafai, and XU Shifen have long-term and close collaborations (Figure 3B). MAO Junj from Memorial Sloan-Kettering Cancer Center, USA, has published the most English papers in the field. LAO Lixing from the University of Hong Kong has the strongest linkage strength among authors (Table 2). MAO Junj's team mainly focused on acupuncture treatment for insomnia in tumor patients, and reported improved insomnia situation via treating acupuncture and cognitive behavioral therapy for insomnia (CBT-I), despite the fact that acupuncture was more effective in relieving pains [20, 21]. CHUNG Kafai's team placed their attention on insomnia treatment for patients with depression, and achieved pleasant outcomes with the acupressure therapy, but had some doubts toward acupuncture [22, 23]. The close collaborations among these core authors have driven the development of the field.

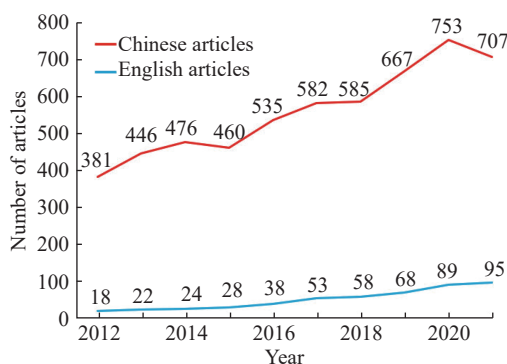


Figure 2 Annual articles of TCM external therapies for insomnia

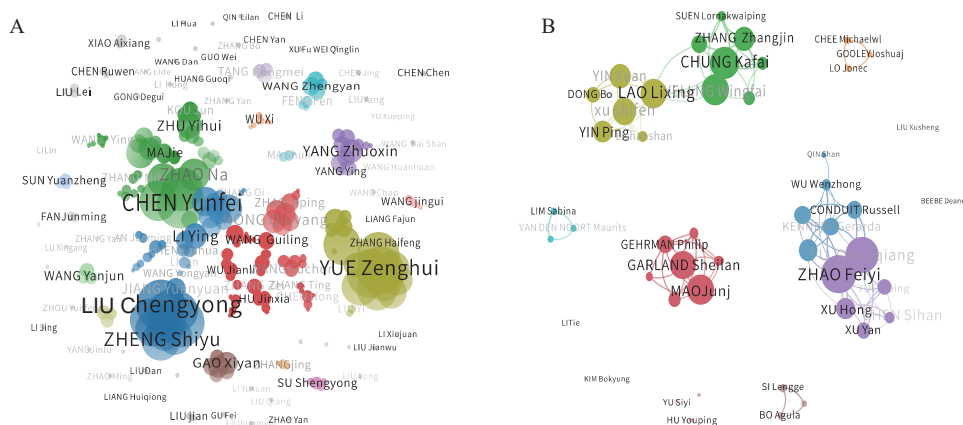


Figure 3 Core author collaboration network of TCM external therapies for insomnia

A, cooperation network of authors in Chinese articles. B, cooperation network of authors in English articles. Names in the figure are all core authors, with larger font indicating closer collaboration, and names highlighted by the same color representing they are in collaborating relationships.

Table 1 The top 10 core authors publishing articles of TCM external therapies for insomnia

No.	Chinese literature			English literature			
	Author	<i>n</i>	Total linkage strength	Author	<i>n</i>	Total cites	Total linkage strength
1	CHEN Yunfei	20	68	MAO Junj	16	191	50
2	XU Shifen	18	30	GARLAND Sheilan	13	119	46
3	XIE Chen	15	59	CHUNG Kafai	13	253	45
4	WU Wenzhong	14	69	YEUNG Wingfai	13	341	42
5	WANG Yan	14	26	LAO Lixing	11	18	56
6	LUO Benhua	14	22	ZHAO Feiyi	11	175	50
7	LIU Chengyong	13	70	XU Shifen	9	15	48
8	YUE Zenghui	13	70	FU Qiangqiang	9	157	47
9	YANG Wenjia	13	55	YIN Xuan	8	153	43
10	ZHU Yihui	13	39	ZHANG Zhangjin	8	193	32

Table 2 The top 10 journals publishing articles of TCM external therapies for insomnia

No.	Chinese literature		English literature		
	Journal	<i>n</i>	Journal	<i>n</i>	JCR
1	<i>Clinical Journal of Chinese Medicine</i>	133	<i>Evidence-based Complementary and Alternative Medicine</i>	36	Q3
2	<i>Inner Mongolia Journal of Traditional Chinese Medicine</i>	120	<i>Medicine</i>	33	Q3
3	<i>World Journal of Sleep Medicine</i>	117	<i>Sleep</i>	23	Q1
4	<i>Guangming Journal of Chinese Medicine</i>	106	<i>World Journal of Acupuncture-Moxibustion</i>	17	–
5	<i>World Latest Medicine Information</i>	87	<i>Sleep Medicine</i>	16	Q2
6	<i>Shanghai Journal of Acupuncture and Moxibustion</i>	86	<i>Journal of Sleep Research</i>	14	Q2
7	<i>Journal of Clinical Acupuncture and Moxibustion</i>	86	<i>Trials</i>	14	Q4
8	<i>Journal of Sichuan of Traditional Chinese Medicine</i>	83	<i>Journal of Acupuncture and Tuina Science</i>	13	–
9	<i>New Chinese Medicine</i>	78	<i>Complementary Therapies in Clinical Practice</i>	12	Q2
10	<i>Chinese Medicine Modern Distance Education of China</i>	68	<i>European Journal of Integrative Medicine</i>	9	Q4

3.3 Analysis of institutions

In the Chinese literature analysis, 3853 institutions involved in the work, among which Heilongjiang University of Traditional Chinese Medicine yielded the highest paper production (Figure 4A). Chengdu University of Traditional Chinese Medicine works closely with Sichuan Hospital of Integrative Medicine on this topic. In the English literature analysis, Shanghai University of Traditional Chinese Medicine published the most articles, and the papers of the University of Hong Kong were cited the most (Figure 4B). Shanghai University of Traditional Chinese Medicine has close collaboration with the University of Hong Kong, Austi Health, Royal Melbourne Institute of Technology University, etc. It is clearly seen that there are many institutions involved in Chinese literature publication, but cross-institutional cooperation is scarce. On the contrary, institutions tend to cooperate for publishing English papers. Therefore, cooperation between institutions is encouraged to exchange their outcomes and facilitate development of the field.

3.4 Analysis of journals

In the past 10 years, a total of 386 Chinese journals and 205 English journals have reported studies in the field, of which 108 journals have published more than 10 articles. In addition, 57.83% of the papers published in the 108 journals are in Chinese, and 29.63% of the journals are Chinese core journals. However, of the journals with the top 10 publication productions, only three are core journals. *Evidence-based Complementary and Alternative Medicine* is an English journal having published the most papers in the field with JCR in Q3 (Table 2).

3.5 Analysis of countries

Over the past decade, insomnia treatment with TCM external therapies has become popular worldwide. According to the papers in WOSCC, approximately 45 countries and regions participated the research in the field. In our study, VOSviewer, and Scimago Graphica mapping tools

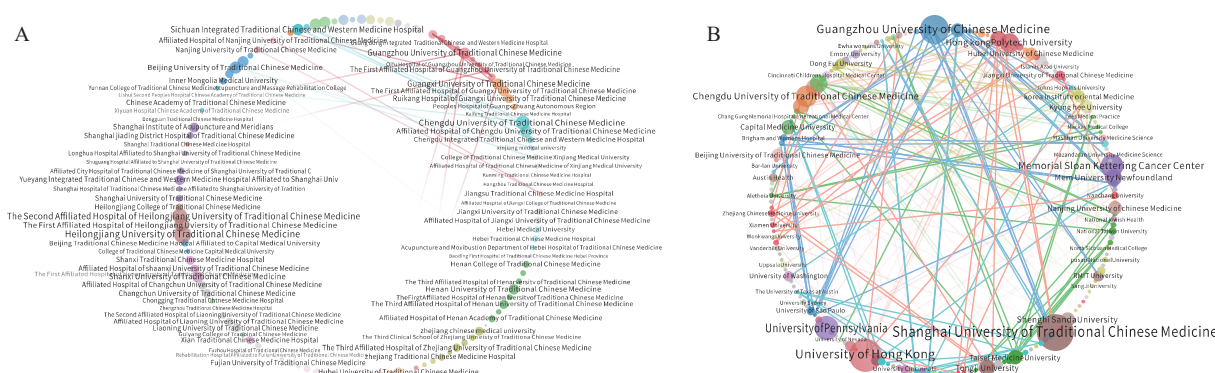


Figure 4 Institutional cooperation network of TCM external therapies for insomnia

A, institutional cooperation in Chinese articles. B, institutional cooperation in English articles. Different dots in the figure represent different institutions, with their size indicating the production amount of the institution. The line between the dots represents the cooperation between institutions, with more dark-colored line suggesting closer cooperation.

were applied for constructing the network of collaboration between countries (Figure 5). China, USA, South Korea, Australia, and Brazil have a relatively high production volumes. These countries are in leading position in terms of research in the field. Meanwhile, they also have close cooperation with other countries. USA has the most intensive cooperation with other countries, such as China and Canada, followed by Germany and China (with USA and Australia). The close cooperation between countries all over the world has promoted the development of research in the field.

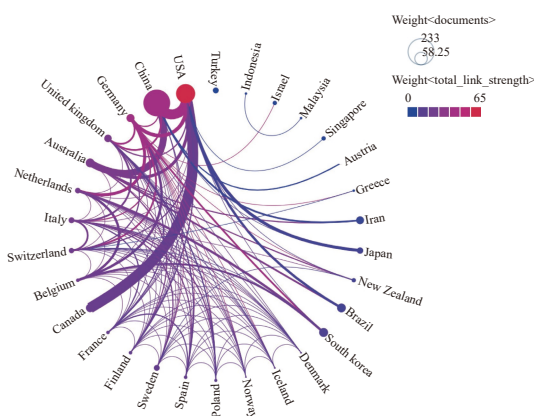


Figure 5 Collaboration network between countries on the research of TCM external therapies for insomnia (top 30 countries)

Each circle denotes for a country, with larger size suggesting more paper production. For example, the most papers published for a year over the past 10 years is 233 in China, and the average paper publication of the top 30 countries is 58.25. In addition, the color and thickness of the lines reveal cooperation intensity between countries.

3.6 Analysis of keywords involved in there search field

Keywords reflect main ideas and research scope. In order to clearly understand the research status and trend in this field, keywords classified statistics, keywords co-citation, keywords timeline, and keywords with citation bursts are visualized and analyzed.

3.6.1 Keywords involved in the papers All keywords were stored in an Excel file, and divided into five categories for analysis (Table 3). Acupuncture and insomnia are two keywords with the most frequency in the research field. Clinically, up to 17 TCM therapies could be applied for insomnia, with acupuncture, ear-acupressure with beans, tuina, electroacupuncture, etc., occupying the dominating positions. Six meridians were mentioned in the papers, among which Ren and Du meridians are considered to be the basis for balancing Yin and Yang. In addition, 29 acupoints were involved in insomnia treatment, with auricular points, Sishencong (EX-HN1), Shenmen (HT7), and Yongquan (KI1) usually playing an important role. Also, about 17 chronic diseases were found to normally co-exist with insomnia, notably depression, anxiety, stroke, hypertension, diabetes, etc.

3.6.2 Keywords co-citation analysis The basic principle of keyword co-occurrence analysis is to count the number of simultaneous occurrences of keywords in one paper, and reveal the affinity relationship with the topic through hierarchical clustering. As a consequence, as many as 4 605 keywords from Chinese literature and 1825 keywords from English literature were screened out and analyzed, and keyword co-linear graphs were generated by VOSviewer. The clustering was optimized using the Pajek (5.16), an analytical tool for handling a large amount of data [24]. In the Chinese literature, acupuncture, sleep quality, ear-acupressure with beans, and tuina are the hot topics in the research field (Figure 6A). In the English literature, electroacupuncture, depression, and cancer are the hot topics in the field (Figure 6B). The lines between clusters in the figures below suggest application of combined TCM external therapies in clinical settings.

3.6.3 Keywords timeline analysis The development of each cluster over time and the linkage between clusters can be analyzed with a keyword timeline graph. The horizontal axis represents the time line and the vertical axis

Table 3 Classification of keywords with high frequencies

Classification	Keyword	Frequency	Centrality
Basic keywords	Insomnia	2911	0.28
	Acupuncture	1667	0.18
	Clinical efficacy	595	0.05
	Ear-acupressure with bean	577	0.02
	Sleep quality	553	0.09
External treatment related keywords	Acupuncture	1692	0.18
	Ear-acupressure with bean	1100	0.08
	Acupoint application	197	0.08
	External use of traditional Chinese medicine	136	0.06
	Massage	130	0.06
	Electroacupuncture treatment	105	0.06
	Catgut embedding at acupoints	103	0.18
	Moxibustion	87	0.05
	Auricular needling	53	0.05
	Wuxing music	45	0.05
Main and collateral channels related keywords	Governor meridian	12	0.11
	Ren meridian	5	0.01
	Qiao meridian	5	0.01
	Bladder meridian	5	0.07
	Liver meridian	3	0.01
	Triple energizer meridian	2	0.01
Acupoint related keywords	Auricular points	88	0.05
	Sishencong (EX-HN1)	48	0.23
	Shenmen (HT7)	38	0.05
	Yongquan (KI1)	43	0.04
	Sanyinjiao (SP6)	39	0.10
	Baihui (DU20)	37	0.31
	Beishuxue	29	0.07
	Wuzangshu	21	0.03
	Zhaohai (KI6)	19	0.01
	Anmian	17	0.01
Basic diseases related keywords	Depression	119	0.11
	Stroke	113	0.07
	Anxiety disorders	78	0.09
	Perimenopause	70	0.05
	Hypertension	50	0.29
	Menopause	29	0.20
	Diabetes	27	0.10
	Breast cancer	21	0.09
	Cervical spondylosis	12	0.01
	Coronary heart disease	12	0.01

represents the keyword clusters. The keywords in Chinese literature were mainly divided into 10 clusters (Figure 7A). #0 Electroacupuncture, #2 acupoint application, #8 acupuncture, and #9 massage mainly refer to the development of TCM external therapies. #1 The menopause and #4 lung cancer are basic diseases in the research. #3 Nursing, #5 clinical research, and #6 TCM

syndrome type elicit clinical research on external treatments. #7 Acupoint describes the development of acupoints. These 10 clusters represent 10 main research directions of authors who had published Chinese papers on TCM external therapies for insomnia. For example, #0 is a study centered on electroacupuncture and is primarily a clinical study. #1 focuses on women's menopause

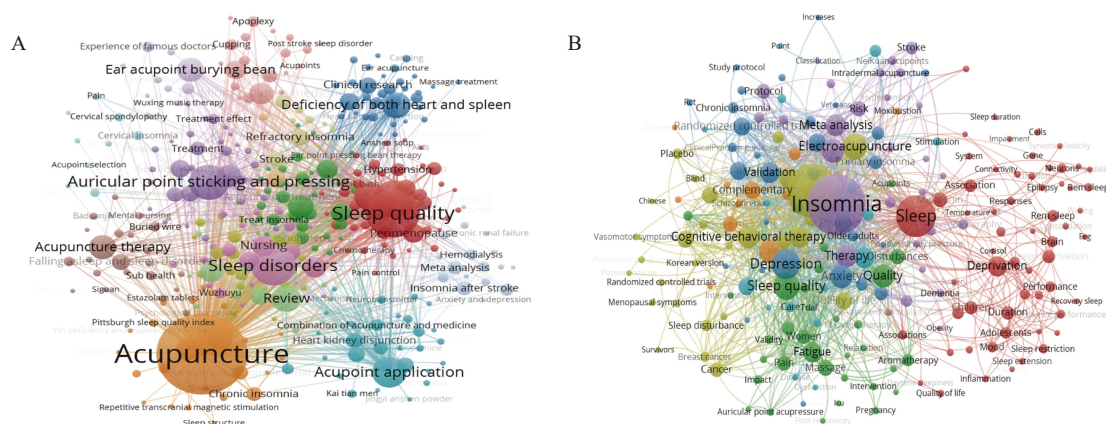


Figure 6 Co-occurring keywords of TCM external therapies for insomnia

A, the co-occurring keywords in Chinese literature. B, the co-occurring keywords in English literature. Each node stands for a keyword, with larger node representing higher frequency of the keyword. The lines suggest the keywords are associated. And nodes with the same color denote the same clustering.

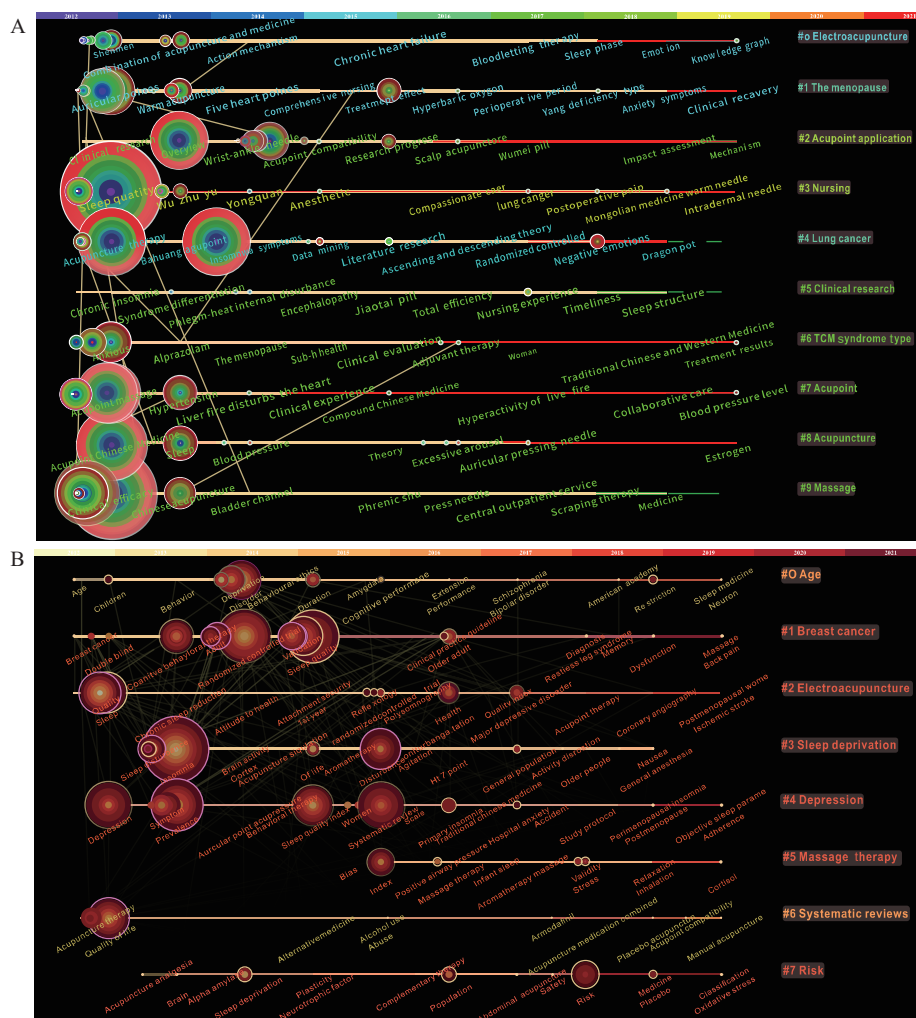


Figure 7 Keywords timeline of TCM external therapies for insomnia

A, the timeline of keywords in Chinese literature. B, the timeline of keywords in English literature. The horizontal coordinates represent different time points, and the vertical coordinates represent clustered keywords. Each node stands for a keyword, and the lines between nodes suggest that the two keywords are correlated.

and subhealth, with the acupoint Shenmen (HT7) playing an important regulatory role. The gradual increase in research on Chinese medical care, emotional care, and

clinical care in 2013 suggests rapid development of Chinese healthcare industry driven by TCM external therapy studies. Studies associated with breast cancer in the

field began to appear in 2014 and lung cancer in 2018, suggesting contribution to cancer research field by TCM external therapy studies.

Keywords from English articles were divided into eight clusters (Figure 7B). #0 Age and #7 risk are about risk factors and disease prognosis; #2 electroacupuncture and #5 massage therapy are about the usage of TCM external treatments; #1 breast cancer and #4 depression include underlying diseases, #3 sleep deprivation focuses on studies on mechanism; and #6 systematic reviews elicit clinical studies. We can conclude from the timeline graph below that the research on TCM external therapies for insomnia has risen to a new level, as suggested by multiple clusters. The lines between clusters indicate that clusters can impose influences upon each other. For instance, research on nursing is closely linked to clinical research on TCM external treatment, and different basic diseases adopt different TCM external therapies. Therefore, combining various topics together in one research is of great significance for the development of a particular research field.

3.6.4 Keywords with citation bursts Keywords with citation burst refer to words that are frequently mentioned and discussed by people during a certain period, suggesting research fields subjecting to the keywords have become hot spots or got much attention at that moment. In our study, we analyzed keywords from both Chinese and English literature with the use of CiteSpace software

to identify those with citation bursts, with higher citation bursts meaning more influential the keywords are. As a result, 27 keywords from Chinese literature and three from English literature were obtained and ranked in the order of emergency intensity. Then, the top 20 keywords were collected for analysis (Table 4). Keywords with strength > 2 bear significant influences on the development in the research field. From the top 20 keywords, 12 were identified with citation outburst in 2012, showing prompt development of research in the field during this period. It is worth mentioning that electroacupuncture was a word with great impacts at the time. Shenmen (HT7), Baihui (DU20), Anmian, Sishencong (EX-HN1), Sanyinjiao (SP6), Neiguan (PC6), Zhaohai (KI6), auricular points, and Beishuxue were hot topics in 2017, and TCM external therapies had a crucial influence in the nursing field.

4 Discussion

4.1 Research overview

In conclusion, our visual analysis of Chinese/English literature on TCM external therapies for insomnia demonstrated a gradual increase in publication production in the field over the past decade. This indicates that research in the field has become increasingly valued, and collaboration has been formed between authors from institutions at home and abroad to pursue breakthroughs.

Table 4 The top 20 keywords with citation bursts of TCM external therapies for insomnia

Keyword	Data source	Begin	Strength	End	Range (2012-2021)
Electroacupuncture	a	2012	6.40	2013	
Clinical treatment	a	2012	6.20	2013	
Catgut embedding at acupoints	a	2012	5.96	2015	
Shenmen (HT7)	a	2012	5.64	2015	
Baihui (DU20)	a	2012	4.10	2017	
Therapeutic effect	a	2012	3.76	2013	
Cervical spondylosis	a	2012	3.69	2017	
Medical cases	a	2012	3.59	2014	
Anmian	a	2012	3.33	2014	
Sishencong (EX-HN1)	a	2012	3.30	2014	
Sanyinjiao (SP6)	a	2012	3.16	2014	
Neiguan (PC6)	a	2012	3.12	2014	
Zhaohai (KI6)	a	2012	2.90	2014	
Auricular	a	2013	5.88	2014	
Double blind	b	2014	2.03	2015	
Beishuxue	b	2014	3.10	2018	
Nursing	a	2017	3.17	2019	
Wuzhuyu	a	2017	2.85	2018	
Eszopiclone	a	2019	2.95	2021	
Ziwuliuzhu	a	2019	2.80	2021	

In the table, a represents Chinese databases; b represents English databases.

According to the results of core author analysis, Chinese literature mainly wrote about clinical applications, and English literature about the mechanism of TCM external medicine for insomnia. The Chinese literature production is much more than that of English literature, indicating research on clinical application is still the priority in the field. However, explorations on treatment mechanisms enable the improvement of TCM external therapy application in clinical settings, hence mechanism research is worthy of attention as well. In terms of institutions contributed to the work of the field, Heilongjiang University of Chinese Medicine had published the most Chinese articles, and Chengdu University of Traditional Chinese Medicine engaged the most intensified cooperation with other institutions to carry out studies as well as publish Chinese papers; Shanghai University of Traditional Chinese Medicine published the most English articles, and the University of Hong Kong had the most intensified cooperation with other institutions. The number of institutions that had published Chinese literature was much higher than that having published English literature. However, institutions which had published English papers had worked more closely with other institutions than those which had published Chinese papers had. Therefore, academic cooperation and collaboration should be strengthened between institutions to facilitate the output of more research results. In terms of the type of journals in which the papers had published, we found that most journals were non-core and geographically sub-district journals, indicating that authoritative research results are insufficient, and researchers should work harder and more diligently to produce research results of higher quality, and think more innovatively to make breakthroughs in the research field. China has produced the highest number of articles with the most collaborations engaged with other countries such as USA, Australia, and Canada to make efforts in promoting the development of the research field. However, China, as one of the pioneers in the research field, still needs to enhance cooperation and collaboration with other countries worldwide in accelerating TCM external therapy for insomnia research, and hopefully addressing the sleep disorder problem that has loaded burden to people for a long time. Moreover, China should also learn traditional medicine of other countries and exchange ideas to provide better healthcare service for people worldwide.

4.2 Hot topics

The research hotspots of TCM external treatments for insomnia are divided into the following three areas: clinical application of external treatment, selection of meridians and acupoints, and coping with basic diseases.

(i) Clinical application of external treatments. Different external treatments have different advantages,

as suggested by *Yellow Emperor's Inner Classics* [5], a TCM classic. It says that “people living in eastern China, who often have heat within their body, normally choose to release the toxic heat by scraping their body with stone or bloodletting. However, people living in northern China who often have cold disorders usually choose moxibustion to disperse the cold in their bodies”. Therefore, when it comes to TCM treatment, it is essential to choose the treatment in accordance with patients' physical conditions, the environment they live in and the season when patients seek for medical advice. Study has shown that the main symptoms of insomnia are liver stagnation and heat, heart and spleen deficiency, heart and kidney disconnection, Qi deficiency and blood stasis, etc. [25]. In a randomized and controlled clinical trial, HE et al. [26] found that the clinical efficacy of acupuncture for insomnia following an acupoint selection based on syndrome differentiation approach was significantly better than conventional treatment, with marked decrease observed in serum norepinephrine and increase in 5-hydroxytryptamine (5-HT). Insomnia caused by unharmonized heart-kidney regulation is common in clinical practice. ZHAO et al. [27] found moxibustion of Yongquan (KI1) and Baihui (DU20) took effect in treating insomnia with disharmony between the heart and the kidney. Electroacupuncture is the hottest topic of research during the research period. Electroacupuncture controls different electrical waves that are used to regulate the pulsation of the needles and produce a specific stimulation in acupoints. Therefore, it is very important to choose appropriate external treatment for different insomnia patients. This paper has analyzed 10 major TCM external treatments (Table 3) and calls for further exploration in the field by scholars.

(ii) Selection of meridians and acupoints for the treatment of insomnia. *Compendium of Acupuncture and Moxibustion (Zhen Jiu Da Chen, 《针灸大成》)* [28], a classic work about acupuncture, suggests that “to know the running route of meridians is more important than to know the acupoints in clinical practice”. TCM recognizes that insomnia stems from a fundamental imbalance of energy, or Yin and Yang, and the meridians in the human body are major channels, especially Ren and Du meridians, to transport Yin and Yang. Therefore, many acupoints for treating insomnia should be selected in Ren and Du meridians, such as Baihui (DU20) and Yintang (DU29). LIU Chengyong's team particularly investigated Tongdu Tiaoshen acupuncture method, which was realized through the selection of the Governor's Vessel as the basis for regulating Yin and Yang [18]. LONG et al. [29] found that massaging on the bladder meridian could significantly improve sleep quality. The meridians and acupoints in the human body are the main targets of TCM external therapies. Shenmen (HT7), Baihui (DU20), Anmian, Sishencong (EX-HN1), Sanyinjiao (SP6), Neiguan (PC6), Zhaohai (KI6), auricular points, and Beishuxue are all hot

topics in the field. Each topic has its own specialty, such as Sanyinjiao (SP6), the location where the liver, spleen, and kidney meridians meet and play an important role in regulating emotions. DU et al. [30] showed that the efficacy of electroacupuncture at Sanyinjiao (SP6) combined with Shenmen (HT7) for insomnia in patients with anxiety and depression was significantly better than at Sanyinjiao (SP6) or Shenmen (HT7) alone. They also observed that serum norepinephrine levels were significantly lower by the combination of acupuncture and massage than by massage alone. It is worth mentioning that Anmian is a potent acupoint for the treatment of insomnia, an acupoint that many doctors prefer to use in their practice. YEUNG et al. [31] treated primary insomnia with electroacupuncture at Yintang (DU29), Baihui (DU20), Sishencong (EX-HN1), Shenmen (HT7), and Anmian, with marked efficacy in improving patients' quality of sleep. Acupoints on the head and face are usually treated by tuina, and those on the back usually by acupuncture. WANG et al. [32] reported that the treatment of acupoints such as Xinshu (BL15), Pishu (BL20), Ganshu (BL18), Shenshu (BL23), Sanyinjiao (SP6), and Zhaohai (KL6) with acupuncture, and Yintang (DU20), Shenting (DU24), Baihui (DU20), and Jingming (BL1) with tuina could have better therapeutic effects than that with the use of eszopiclone tablets alone. In short, different meridians and acupoints should be selected to treat different patients. Moreover, different treatments can be used sometimes for the same meridians and acupoints. Choosing the right external therapy to be align with patients' conditions is essential in TCM.

(iii) Coping with basic diseases. It is well known that insomnia is a risk factor for many chronic diseases, while healthy and sound sleep is the foundation for the improvement of basic chronic diseases. Literature at home and abroad published over the past decade shows about 17 insomnia concomitant basic diseases, among which depression, stroke, anxiety, perimenopause, hypertension, menopausal syndrome, diabetes, breast cancer, cervical spondylosis, and coronary heart disease deserve our attention. It was reported that satisfactory effects and safety were achieved in the treatment of insomnia of breast cancer patients by electroacupuncture combined with ear-acupressure with beans [33]. In addition, LIU Chengyong's team [34] revealed that acupuncture at Baihui (DU20), Yintang (DU29), Shenmen (HT7), and Sanyinjiao (SP6) acupoints significantly improved patients' sleep quality, anxiety, and depression symptoms, as well as lowered serum cortisol and elevated pentoxifylline. XU Shifen's team found that needling at Baihui (DU20), Shenting (DU24), Yintang (DU29), Anmian, Shenmen (HT7), and Sanyjiao (SP6) acupoints significantly improved the sleep quality of stroke patients [35]. A study on post-stroke insomnia of patients with hypertension showed that the clinical efficacy of refreshing brain

and lifting spirit with acupuncture combined with the Tiaoshen Qianyang method was significantly better than that of applying acupuncture alone [36]. Refreshing brain and lifting spirit with acupuncture approach was carried out at Neiguan (PC6), Shuigou (DU26), Sanyinjiao (SP6), Jiquan (HT1), and Chize (LU5) acupoints, and the Tiaoshen Qianyang acupuncture at Baihui (DU20) and Sishencong (EX-HN1) acupoints in a randomized and controlled clinical trial. MAO Jun's team [21, 37] found that acupuncture for insomnia in cancer patients was effective in improving their sleep quality and relieving pain associated with cancer, on the basis of which they came up with a new treatment called precision acupuncture. All in all, studies on insomnia concomitant basic diseases has seen some development over the past decade.

4.3 New trends

The last decade has seen the development of research on TCM external therapies for various diseases. The keywords timeline analysis shows that research on the TCM external therapies for insomnia concomitant diseases and the mechanisms are the main research directions in the future.

(i) Research on insomnia concomitant diseases. As many as 17 insomnia concomitant diseases were identified by analyzing keywords with high-frequency in the papers, whose time of appearance was organized to form a timeline. From the timeline, we can tell that clusters such as #4 lung cancer and #7 anxiety demonstrate the development trend of research on TCM external treatment for insomnia concomitant diseases. Insomnia concomitant diseases often include depression, anxiety, hypertension, diabetes, and cancer. These are all new challenges for people worldwide in the era, as the global population turn old. They require oral medications on regular basis, so finding non-medication and effective treatments to replace those oral medications is crucial for patients with insomnia concomitant diseases. In recent years, many studies have confirmed that the external treatments for insomnia and its concomitant disorders are safe and have satisfactory effects [38, 39]. Different external treatments have different advantages, so combination of different treatments provides more options for patients with insomnia concomitant diseases. For instance, MA et al. [38] chose acupuncture combined with acupoint needle burial treatment for insomnia patients accompanied by cervical spine injury. QIU [39] applied acupuncture combined with tuina, moxibustion, and dexzopiclone tablets to treat cervical spondylosis patients with severe insomnia, which significantly and safely improved patients' sleep quality. Acupuncture therapies such as refreshing brain and lifting spirit with acupuncture, Pinggan Qianyang acupuncture, Tongdu Tiaoshen acupuncture, and Ziwluzhu acupuncture have been widely for

the treatment of insomnia concomitant diseases. The Ziwuliuzhu acupuncture is a special therapy because it requires treating different acupoints at different time of the day. Reverse-spoon blood pressure is a disorder characterized by blood pressure normal at daytime but elevated at night, accompanied by sleep disturbances. According to a report of a randomized and controlled trial, auricular acupuncture at noon (Wushi, 11:00 - 13:00) and sunset (Youshi, 17:00 - 19:00) could effectively improve patients' sleep quality and regulate their blood pressure. Acupuncture is a popular therapy among the public for the treatment of insomnia concomitant diseases. Acupressure is another therapy by stimulating acupoints with herbs, such as the widely used Wuzhuyu (*Euodiae Fructus*), which works at the acupoints to adjust the balance between Yin and Yang. Therefore, TCM external treatments can provide a variety of solutions to insomnia concomitant diseases, which is worthy of further exploration.

(ii) Exploration of therapeutic mechanisms. TCM external treatment for insomnia shows a strong vitality in several aspects. There is global interest in research in this area. A number of studies have been conducted to confirm the relation between acupuncture effects on insomnia and brain activity regulation [15, 40, 41]. A study by YUE Zenghui's team [15] found that acupuncture therapy increased melatonin concentration in the pineal gland and the expression of pineal receptors in the supraoptic nucleus of the optic cross in insomnia rats. QIAO et al. [40] found that electroacupuncture at the Baihui (DU20), Shenmen (HT7), and Sanyinjiao (SP6) increased serum interleukin-1 β (IL-1 β), brain-derived nerve growth factors (BDNF), prostaglandin D2 (PGD2), and melatonin (MLT), but reduced corticosterone (CORT). YU et al. [41] found that warm acupuncture therapy could improve the sleep quality of PCPA insomnia rats by regulating their intestinal flora structure. The exploration on the mechanisms of TCM external treatments will further promote the advancement of particular techniques in the field.

5 Conclusion

TCM external treatment for insomnia has been promoted and developed in various countries and regions around the world. Currently, there is a steady increase in the output from the TCM external treatment for insomnia research. However, insufficient collaboration and cooperation between institutions and countries is a problem to be addressed. Although many research results have been accumulated, few of them are authoritative. Therefore, not only institutions at home and broad should work together on the subject to yield better research outcomes, but also researchers themselves ought to strive for innovation and breakthroughs based on the inherited TCM culture and knowledge to better serve for the globe healthcare industry. In our study, a total of 17

TCM external therapies, such as acupuncture therapy, ear-acupressure with beans, and acupuncture point paste, were identified for insomnia treatment. And also as many as six meridians such as Ren and Du, and 29 auricular points, such as Sishencong (EX-HN1) and Shenmen (HT7) were found to have effects on insomnia patients after treatment. At present, clinical application of TCM external therapies, selection of meridians and acupoints, and treatment of insomnia concomitant basic diseases are hot topics in the research field. And it is inferred that the combination of TCM external therapies for insomnia concomitant diseases and the treatment mechanisms are the research trends in the future.

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Competing interests

The authors declare no conflict of interest.

References

- [1] PALAGINI L, HERTENSTEIN E, RIEMANN D, et al. Sleep, insomnia and mental health. *Journal of Sleep Research*, 2022, 31(4): e13628.
- [2] PERLIS ML, POSNER D, RIEMANN D, et al. Insomnia. *The Lancet*, 2022, 400(10357): 1047-1060.
- [3] SUTTON EL. Insomnia. *Annals of Internal Medicine*, 2021, 174(3): C33-C48.
- [4] ZHUANG J, WU J, FAN L, et al. Observation on the clinical efficacy of traditional Chinese medicine non-drug therapy in the treatment of insomnia: a systematic review and meta-analysis based on computer artificial intelligence system. *Computational Intelligence and Neuroscience*, 2022, 2022: 1081713.
- [5] ZHANG ZC. *Huang Di Nei Jing*, 1st ed. Harbin: Heilongjiang Science and Technology Press, 2017.
- [6] PEI W, PENG R, GU Y, et al. Research trends of acupuncture therapy on insomnia in two decades (from 1999 to 2018): a bibliometric analysis. *BMC Complementary Medicine and Therapies*, 2019, 19(1): 225.
- [7] WANG J, CHEN Y, ZHAI X, et al. Visualizing research trends and identifying hotspots of traditional Chinese medicine (TCM) nursing technology for insomnia: a 18-years bibliometric analysis of web of science core collection. *Frontiers in Neurology*, 2022, 13: 816031.
- [8] CHEN C. Science mapping: a systematic review of the

- literature. *Journal of Data and Information Science*, 2017, 2(2): 1–40.
- [9] VAN ECK NJ, WALTMAN L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 2010, 84(2): 523–538.
 - [10] YANG CH, HE LX, QIAO L, et al. Meta-analysis of acupuncture treatment for senile insomnia. *Acta Chinese Medicine*, 2018, 33(236): 161–165.
 - [11] LIU F, YOU J, LI Q, et al. Acupuncture for chronic pain-related insomnia: a systematic review and meta-analysis. *Evidence-Based Complementary and Alternative Medicine*, 2019, 2019: 5381028.
 - [12] WU B, ZHANG XS. Systematic evaluation of therapeutic effect of massage combined with acupuncture on insomnia. *Electronic Journal of Clinical Medical Literature*, 2018, 5(80): 166–168.
 - [13] YAO X, XU CP, LI J, et al. Core author user base construction of a technical journal based on the Price law, the Pareto's law and the online submission system. *Acta Editologica*, 2017, 29(1): 64–66.
 - [14] XIE C, YANG WJ, BING XH, et al. Application of beishuxue in insomnia. *Lishizhen Medicine and Materia Medica Research*, 2016, 27(3): 672–674.
 - [15] WEI XR, WEI GW, ZHENG XN, et al. Effects of acupuncture with different combinations of meridian points on the expression of hypothalamic biological clock genes clock and bmal 1 in insomniac rats. *Acupuncture Research*, 2017, 5(42): 429–433.
 - [16] XIE LN, XIE ZG, GUO X, et al. Effects of acupuncture on melatonin content and its receptor gene expression in the ventral lateral preoptic area of hypothalamus in insomniac rats. *Chinese Journal of Information on Traditional Chinese Medicine*, 2018, 25(12): 40–44.
 - [17] WEI XR, ZHENG XN, PEI Y, et al. Exploration of a modified method of p-chlorophenylalanine suspension in the modeling of rat insomnia. *Journal of Hunan University of Chinese Medicine*, 2018, 38(9): 986–989.
 - [18] ZHAO YN, WU WZ, LIU CY, et al. Different acupuncture formulas for insomnia based on the theory of "toning and regulating the spirit": a randomized controlled study. *Chinese Acupuncture & Moxibustion*, 2020, 11(40): 1149–1153.
 - [19] QIN S, WU WZ, LIU CY, et al. Clinical efficacy and safety evaluation of Jiaotai Pill acupressure for the treatment of insomnia in the elderly with heart and kidney disorders. *China Journal of Traditional Chinese Medicine and Pharmacy*, 2021, 36(8): 5072–5075.
 - [20] GARLAND SN, XIE SX, DUHAMEL K, et al. Acupuncture versus cognitive behavioral therapy for insomnia in cancer survivors: a randomized clinical trial. *Journal of The National Cancer Institute*, 2019, 111(12): 1323–1331.
 - [21] APPLEBAUM AJ, BUDA K, HOYT MA, et al. Feasibility and acceptability of cognitive behavioral therapy for insomnia (CBT-I) or acupuncture for insomnia and related distress among cancer caregivers. *Palliative & Supportive Care*, 2020, 18(6): 644–647.
 - [22] CHUANG KF, YEUNG WF, YU YM, et al. Acupuncture for residual insomnia associated with major depressive disorder: a placebo- and sham-controlled, subject- and assessor-blind, randomized trial. *Journal of Clinical Psychiatry*, 2015, 76(6): e752–e760.
 - [23] YEUNG WF, HO FY, CHUANG KF, et al. Self-administered acupressure for insomnia disorder: a pilot randomized controlled trial. *Journal of Sleep Research*, 2018, 27(2): 220–231.
 - [24] YU Q, WANG Z, LI Z, et al. Hierarchical structure of depression knowledge network and co-word analysis of focus areas. *Frontiers in Psychology*, 2022, 13: 920920.
 - [25] LEI HT, OUYANG JF, DANG JJ, et al. Research progress of insomnia syndrome in traditional Chinese medicine. *Forum on Traditional Chinese Medicine*, 2020, 35(5): 64–67.
 - [26] HE T, WU WZ. Clinical study on "different treatment" of insomnia by acupuncture. *Shaanxi Journal of Traditional Chinese Medicine*, 2020, 41(12): 1806–1809.
 - [27] ZHAO YF, WANG BY, TAN LR, et al. Clinical observation of acupuncture at Ning Shen point combined with moxibustion in the treatment of insomnia of heart-kidney disorder type. *Heilongjiang Journal of Traditional Chinese Medicine*, 2018, 47(4): 82–84.
 - [28] YANG JZ. Zhen Jiu Da Cheng, 1st ed. Beijing: People's Health Publishing House, 2016.
 - [29] LONG JF, YE SL, CHEN JM. Effectiveness of acupuncture therapy combined with massage on the bladder meridian to improve insomnia in patients with chronic fatigue syndrome. *World Journal of Sleep Medicine*, 2021, 8(4): 622–623.
 - [30] DU L, SONG XJ, LI ZW, et al. Combined use of Shenmen (HT7) and Sanyinjiao (SP6) to improve the anxiety and depression in patients with insomnia: a randomized controlled trial. *Chinese Acupuncture & Moxibustion*, 2022, 42(1): 13–17.
 - [31] YEUNG WF, CHUNG KF, ZHANG SP, et al. Electroacupuncture for primary insomnia: a randomized controlled trial. *Sleep*, 2009, 32(8): 1039–1047.
 - [32] WANG DY, WANG JT, DONG X. Clinical observation on the degree of improvement of sleep quality of insomnia patients by acupuncture with tui na. *Journal of Clinical Acupuncture and Moxibustion*, 2013, 29(8): 5–7.
 - [33] ZHANG J, QIN Z, SO TH, et al. Electroacupuncture plus auricular acupressure for chemotherapy-associated insomnia in breast cancer patients: a pilot randomized controlled trial. *Integrative Cancer Therapies*, 2021, 20: 1543334239.
 - [34] LIU C, ZHAO Y, QIN S, et al. Randomized controlled trial of acupuncture for anxiety and depression in patients with chronic insomnia. *Annals of Translational Medicine*, 2021, 9(18): 1426.
 - [35] CAO Y, YIN X, SOTO-AGUILAR F, et al. Effect of acupuncture on insomnia following stroke: study protocol for a randomized controlled trial. *Trials*, 2016, 17(1): 546.
 - [36] ZHAO Q, WANG CT, CAO CC. Effect of Tiaoshen Qianyang acupuncture on blood pressure and sleep quality in patients with stroke-related sleep disorders complicated with hypertension. *Chinese Acupuncture & Moxibustion*, 2022, 42(2): 126–130.
 - [37] LIOU KT, BASER R, ROMERO S, et al. Personalized electroacupuncture versus auricular-acupuncture comparative effectiveness (PEACE): a protocol of a randomized controlled trial for chronic musculoskeletal pain in cancer survivors. *Medicine*, 2020, 99(21): e20085.
 - [38] MA R, FAN L. Efficacy of acupuncture and acupuncture point

- burial thread in treating cervical pain and insomnia in cervical spondylosis from heart and kidney theory. *World Journal of Sleep Medicine*, 2020, 7(5): 812-813.
- [39] QIU XL. Acupuncture treatment for 136 cases of neurogenic cervical spondylosis with severe sleep disorder. *World Chinese Medicine*, 2014, 9(8): 1083-1085.
- [40] QIAO LN, GAO QL, TAN LH, et al. Effect of electroacupuncture single points and acupoint combination on the content of interleukin-1 β , brain-derived nerve growth factor and other sleep-wake related factors in the serum of insomnia rats. *Acupuncture Research*, 2018, 43(10): 651-656.
- [41] YU H, YU H, SI L, et al. Influence of warm acupuncture on gut microbiota and metabolites in rats with insomnia induced by PCPA. *PLoS One*, 2022, 17(4): e267843.

中医外治法治疗失眠的研究热点及趋势的可视化分析

陈抒鹏^a, 唐娜娜^{b*}, 王思梦^a, 刘英华^b, 张志勇^a, 陈施宇^a

a. 江西中医药大学临床医学院, 江西 南昌 330004, 中国

b. 江西中医药大学附属医院心血管科, 江西 南昌 330006, 中国

【摘要】目的 通过文献计量学和可视化分析对中医外治法治疗失眠的相关文献进行梳理,展示该领域的研究进展、热点及发展趋势,为中医外治法治疗失眠的研究提供参考。**方法** 检索中文数据库中国知网、万方、维普和英文数据库 WOSCC 中关于中医外治法治疗失眠的相关文献,时间限定为 2012 年 1 月 1 日至 2021 年 12 月 31 日。运用 CiteSpace、VOSviewer、Scimago Graphica 及 NoteExpress 软件对发文量、期刊分布进行计量分析,并对国家、作者、机构、关键词进行可视化分析。**结果** 经过筛选最终纳入文献 6085 篇,包括中文文献 5592 篇、英文文献 493 篇,近十年发文量持续上升。45 个国家及地区发表相关文献。中文发文量最多的作者是上海中医药大学附属岳阳中西医结合医院的陈云飞,合作强度最高的是南京中医药大学附属医院的刘成勇和湖南中医药大学的岳增辉,英文发文量最多的作者是美国斯隆-凯特林癌症研究中心的 MAO Junj,合作最密切的作者是香港大学的 LAO Lixing。中文发文量最多的机构是黑龙江中医药大学,英文发文量最多的机构是上海中医药大学。该领域的研究报道发表在 386 种中文期刊和 205 种英文期刊。研究热点集中在外治法的临床应用、经络和穴位的选择、失眠共病的治疗等。多种外治法的联合使用是治疗失眠共病的主要趋势,尤其是在肿瘤、护理、精神疾病等领域,机制探索也是未来重点研究方向。临床中用于治疗失眠的常用外治法有针灸、耳穴压豆、穴位贴敷等,常选用的穴位是耳穴、四神聪、神门等,常被研究的经络是任脉、督脉、跷脉等,失眠常见的共病是抑郁症、中风、焦虑等。**结论** 中医外治法治疗失眠积累了丰富的研究成果,但权威性研究成果较少。国家间各个机构应加强交流与合作,研究者在继承传统外治法的基础上,应当勇于创新与突破,产出更多有价值的研究成果,促进中医外治法更好地服务失眠患者。

【关键词】 失眠; 中医外治法; 文献计量学; CiteSpace; 研究热点; 针灸; 耳穴; 穴位敷贴