

Visual Analysis of Literature Related to TCM Treatment of Low Back Pain based on Citespace

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Abstract: ***Objective:** To understand the research content and progress of low back pain and explore the development trend and hot spots in this field by combing and visualization analysis of the literature on the treatment of low back pain with traditional Chinese medicine. **Methods:** CNKI was used to search the literature, and CiteSpace software was used to visualize the authors, research institutions and keywords in the field. **Results:** A total of 748 literatures were included, and the number of published papers increased year by year, began to decline in 2018, and began to rise in 2022. Institutional cooperation took Beijing University of Chinese Medicine as the hub of institutional cooperation. The author cooperation team is mainly composed of Ni Lijun, Zhang Liguang and others. The high-frequency keywords include lumbar disc herniation, traditional Chinese medicine, low back pain, etc. There are 10 keyword clusters, including "pain" and so on. The words with high intermediate centrality were "lumbar disc herniation" and so on. There are 25 prominent words in the emergent analysis, and the emerging hot spots are "lumbar function", "Chinese medicine heat election Bao" and so on. **Conclusion:** The scope of institutional cooperation and authors' cooperation in this research field is limited. "Famous doctor's experience" and "brain edema" have become research hot spots since 2005 and 2007 respectively, while "hydropneumotaxis", "Zhang Zhongjing" and "macular edema" will become new research hot spots.*

Keywords: Low back pain, Traditional Chinese medicine treatment, CiteSpace, Visual analytics.

1. Introduction

Low back pain is a common musculoskeletal disease in daily life, which can be divided into specific low back pain and non-specific low back pain according to whether there is a specific cause. Specific low back pain means that the lower back pain comes from a specific pathophysiological mechanism, such as infection, osteoporosis, rheumatoid arthritis, fracture or tumor. Non-specific low back pain refers to symptoms of low back pain that have no clear cause. This article deals with non-specific low back pain. Low back pain is one of the common diseases plaguing human beings, with severe low back pain and limited activity as symptoms, some patients with lower extremity radiation pain, limited waist movement and other symptoms, significantly reducing the quality [1] of life of patients. The results of epidemiological survey show that about 84% of people have had the experience [2] of low back pain. At present, the modern medicine mainly adopts anti-inflammatory, analgesic and other symptomatic treatment for this disease, which can relieve the pain to a certain extent, but it is easy to repeat after stopping the drug, and there are drug toxicity and side effects [3] for a long time. In severe cases, surgical treatment is taken, but there is trauma. According to the clinical manifestations of low back pain, it can be classified into the categories of traditional Chinese medicine "low back pain", "arthralgia", "spasmosis" and "potence disease". Traditional Chinese medicine can be treated through syndrome differentiation, the combination of internal and external treatment of traditional Chinese medicine, the treatment of low back pain has certain advantages. In this study, CiteSpace was used to conduct knowledge graph analysis on the treatment of low back pain by traditional Chinese medicine, aiming to reveal the research hotspot, current situation and trend of traditional Chinese medicine treatment of low back pain, and provide reference for the clinical and scientific research of traditional Chinese medicine treatment of low back pain.

2. Data and Methods

2.1 Data Sources

China National Knowledge Network was retrieved from January 2000 to August 2024, AND the subject words were "low back pain" and "TCM treatment". Inclusion criteria: Chinese academic journals related to TCM treatment of low back pain. Exclusion criteria: 1) Duplicate literature; 2) author, The year and related incomplete literature.

2.2 Research Methods

Use Excel to draw the document trend chart in time order for the included literatures. Then the above bibliographies were exported and saved in appropriate format, and CiteSpace5.8.R3 was used for format conversion and visualization analysis was carried out according to different analysis objects. Specific parameters: Time Slicing: January 2000 to August 2024, izing is 1 year; Node Types analyze Author, Institution, Keyword in order; Purning: select Pathfinder; The rest are default Settings, and the clustering view uses the LLR algorithm.

3. Results

3.1 Statistics of the Number of Published Papers Over the Past Years

From 2000 to 2013, the number of published documents showed a gradual increase. From 2013 to 2018, the number of published papers fluctuated and reached a peak in 2016, when the number of published papers reached 60. The number of articles dropped sharply in 2018 and reached the lowest in 2022, with only 28 articles. In 2023, the number of articles increased significantly, reaching 53. In 2024, the number of articles dropped sharply again to 32. The results showed that

the number of literatures on the prevention and treatment of low back pain with traditional Chinese medicine showed a significant fluctuation decline from 2018 to 2024 (Figure 1).

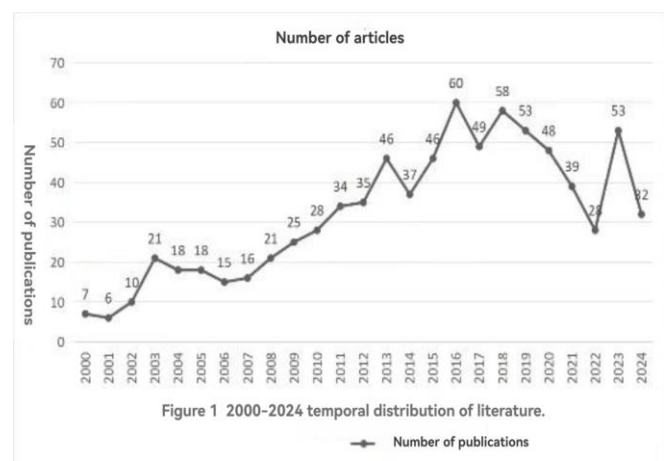


Figure 1: Number of published papers

3.2 Author Analysis

The top 10 authors have published 3 articles per capita, and core authors represented by Ni Lijun, Zhang Liguo and Yang Shaofeng have published the most articles (Table 1). As can be seen from the co-occurrence graph of authors, the author cooperation network in the research field of TCM treatment of low back pain has not formed extensive links, the structure is loose on the whole, and the cooperation between different teams is weak, but the advantage is that the cooperation within the team is close, such as Ma Puyuan, Li Aijun, Wang Baojun, Xu Yinghuai and Shi Hengjun, etc., there are more cooperation times. Among them, the researchers represented by Yang Shaofeng, Zhang Chenyang, Li Zhaoyong, Wu

Xiaonan and Nie Ying had the largest cooperation scale, and the research types were mainly clinical, basic and visual analysis. At the same time, the scattered independent nodes in the atlas indicate that some scholars conducted research independently, such as Zhang Yan, Zhou Jie, Feng Minshan, etc.; There are also some scholars who conduct research in pin-to-pair cooperation, such as Han Tingliang and Yin Peiyu, Wang Guanlin and Yang Lixue, etc. (Figure 2).

Table 1: Top 10 authors in the number of publications on TCM treatment of low back pain

Serial number	Author	Number of publications (articles)	Year
1	Ni Lijun	8	2013
2	Zhang Liguo	6	2014
3	Yang Shaofeng	4	2020
4	Zhang Chenyang	4	2020
5	Li Zhaoyong	4	2020
6	Zhou Jie	3	2011
7	Xu Yinghuai	3	2003
8	Shi Hengjun	3	2003
9	Zhang Hanping	3	2004
10	Nie Ying	3	2020



Figure 2: Author co-occurrence map of TCM treatment of low back pain

3.3 Institutional Analysis

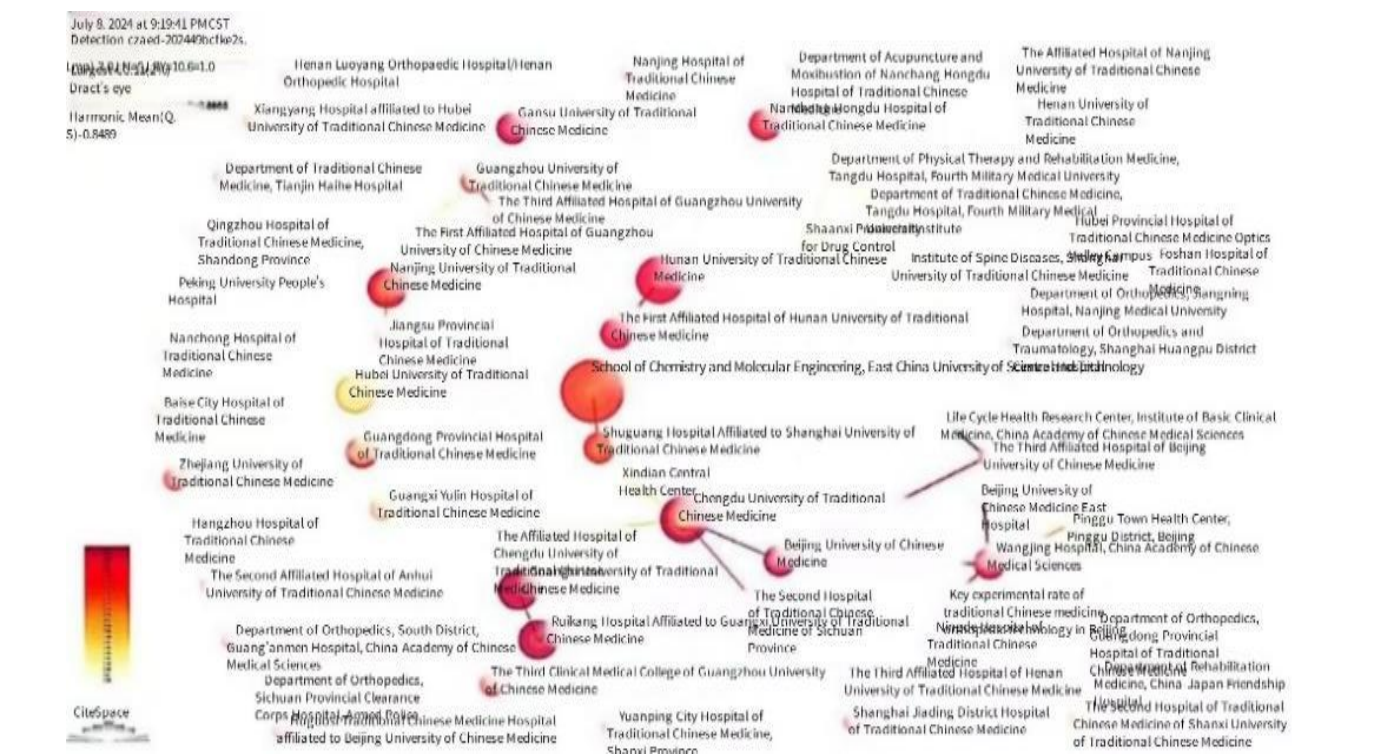


Figure 3: Institutional cooperation map

Institutional cooperation map (FIG. 3), among which 19 institutions have published more than or equal to 3 papers. The top 10 institutions were School of Chemical and Molecular Engineering of East China University of Science and Technology (8 papers), Chengdu University of Chinese Medicine (6 papers), Hunan University of Chinese Medicine (6 papers), Nanjing University of Chinese Medicine (5 papers), Guangxi University of Chinese Medicine (5 papers), Ruikang Hospital Affiliated to Guangxi University of Chinese Medicine (5 papers), Hubei University of Traditional Chinese Medicine (5 papers), and Wangjing Hospital of China Academy of Chinese Medicine (5 papers) (4), Beijing University of Chinese Medicine (4) and Shuguang Hospital affiliated to Shanghai University of Chinese Medicine (4).

3.4 Visual Analysis of Keywords

3.4.1 Keyword co-occurrence analysis

There are 352 keywords included in total, and 434 lines, as shown in Figure 4. The color from light to dark indicates the year from small to large, the larger the node indicates the higher the frequency of the keyword, and the thicker the line indicates the closer the keyword connection. A total of 27 keywords had frequencies > 10. There were 6 high-frequency keywords with intermediate centrality > 0.1, which were lumbar disc herniation (0.37), low back pain (0.36), traditional Chinese medicine (0.35), low back pain (0.33), traditional Chinese medicine fumigation (0.3) and external application of traditional Chinese medicine (0.23), as shown in Table 2.

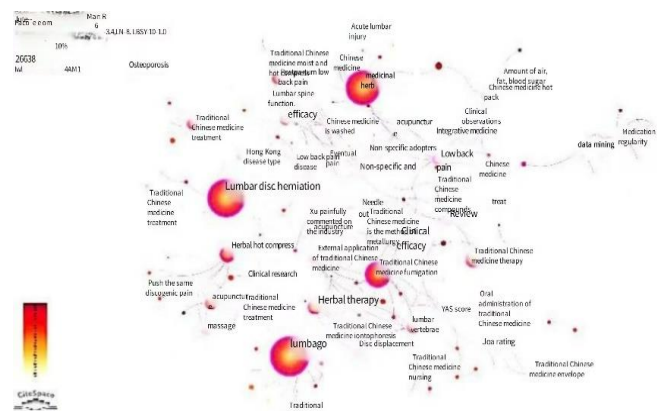


Figure 4: Keyword co-occurrence analysis

3.4.2 Keyword cluster analysis

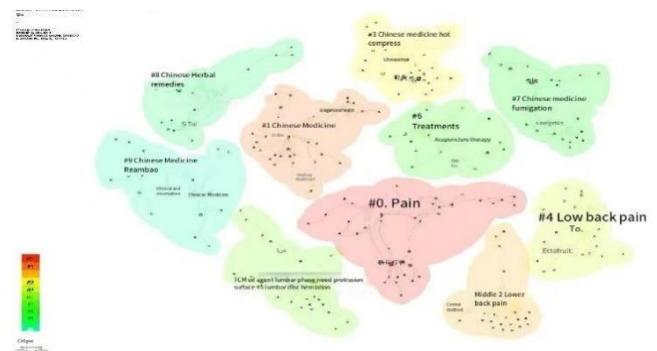


Figure 5: Keyword clustering from 2000 to 2024

Keywords are copolymerized into 10 categories, forming 10 clustering labels, as shown in Figure 5. The modular Q value is 0.84 (>0.3), which indicates that the community structure in

the cluster is significant and the clustering method is effective; The average contour value is 0.95 (>0.7), which indicates that the clustering is efficient and reasonable with high member consistency and convincing clustering results. Each color block represents a cluster, the nodes in the color block are in the cluster range, and the contour value of each cluster is >0.7, indicating that the research topics of each category are concentrated.

Table 2: Top 20 keywords of word frequency/intermediate centrality in TCM treatment of low back pain

Serial	keyword frequency (times)	year	Intermediation centrality number
1	Low back pain	197 2000	0.33
2	Lumbar disc herniation	161 2000	0.37
3	Chinese Medicine	70 2001	0.35
4	TCM fumigation	59 2004	0.3
5	TCM Therapy	25 2003	0.15
6	External application of	24 2000	0.23
Chinese medicine			
7	TCM hot compress	24 2000	0.17
8	Chinese Medicine therapy	23 2003	0.11
9	Low back pain	20 2006	0.36
10	Chinese Medicine packet	18 2011	0
11	Lower back pain after	17 2010	0.03
childbirth			
12	Chinese Medicine treatment	17 2001	0.14
13	Disc displacement	16 2003	0.03
14	Curative Effect	16 2011	0.04
15	Review	16 2000	0.11
16	Acupuncture	15 2009	0.01
17	Chinese Medicine Reaobao	15 2016	0.04
18	Lumbar Spine	15 2003	0.06
19	Clinical efficacy	14 2009	0.06
20	Data Mining	13 2020	0.09

3.4.3 Breakout analysis

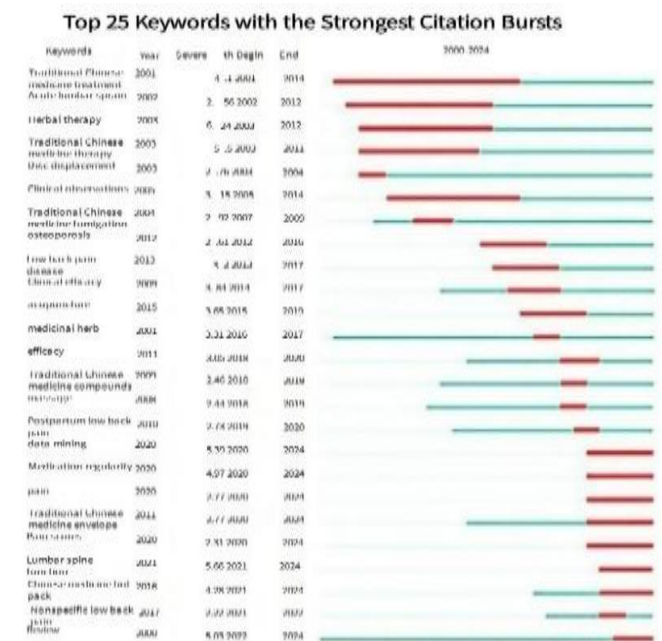


Figure 6: Keyword emergence from 2000 to 2024

Through the analysis of the keyword emergence in the research field of TCM treatment of low back pain, the top 25 studies on the use of TCM treatment of low back pain were detected. By observing the keyword emergence map (Figure 6), it can be found that the treatment mode with the highest emergence intensity is Chinese medicine therapy, reaching 6.24, indicating that the treatment mode of Chinese medicine

in the treatment of low back pain has been extensively studied by a large number of scholars since 2003, and is currently a research hotspot. Secondly, there are other treatment methods also have high outburst intensity, including traditional Chinese medicine fumigation, acupuncture therapy, massage, traditional Chinese medicine encapsulation and traditional Chinese medicine hot balm, which indicates that the external treatment of traditional Chinese medicine in the treatment of low back pain also has certain advantages.

4. Discussion

In recent years, with the continuous improvement of China's economic level, people's lifestyle and eating habits have undergone great changes, the pace of life has accelerated, and the pressure of family and work has doubled, resulting in people's sub-health and the incidence of disease has increased. As a common clinical disease, low back pain is mostly seen in the middle-aged and elderly groups, and there is an obvious trend [4] of younger people. On the pathogenesis of low back pain, the most common clinical diseases in addition to local diseases (trauma, sprain, strain, degeneration, inflammation, etc.), but also with age, gender, development, anatomical variation, physique, work position, work habits, skills and proficiency and external environment changes have a close relationship [5].

As a symptom and disease involved in traditional Chinese and Western medicine and many disciplines, it is obviously necessary to integrate traditional Chinese and Western medicine and cooperate with many disciplines. Western medicine treatment mainly focuses on anti-inflammatory analgesia, anti-osteoporosis and surgical treatment; While traditional Chinese medicine has the advantages of simple operation, low cost and no adverse reactions, which can relieve patients' pain, improve lumbar function and improve quality of life to a certain extent.

"Medical heart Wu · lumbago" said: "lumbago, kidney deficiency, its original also." It is believed that kidney deficiency is the root cause of low back pain. According to textbooks, it can be divided into wind-cold-dampness syndrome, damp-heat syndrome, blood-stasis syndrome, liver-kidney deficiency syndrome and so on. But specific to the clinical, each type of syndrome does not appear alone, but more cross. Its pathogenesis is not outside the "not general pain, not honor pain", more due to the meridian obstruction, waist house loss, the body qi disorders, the evolution of common between the deficiency standard, mainly to the deficiency, internal and external disorders and lingering [6] disease.

Due to the different understanding of the etiology and pathogenesis of low back pain and syndrome differentiation, the use of medicine and the choice of prescription are different, but they all have reliable clinical value. Judging from the literature, most doctors agree that the root cause of low back pain is kidney. The waist, the kidney is also the Guan, Tian Lao [7] that clinical various types of low back pain with kidney deficiency as the foundation, cold, wet, heat, blood stasis as the standard. Therefore, no matter what kind of low back pain is treated in the clinic, in addition to the dialectical medication, Tian Lao likes to use Qinge pill, which is

composed of salt euphoria and psoralen two flavors, and often has good results in the place of kidney safety. Professor [8] Yang Shaofeng advocated the treatment of low back pain with the thought of "Treatise on Febrile Disease", and had unique views. Starting from the whole concept of TCM, Professor Yang applied the thought of TCM syndrome differentiation and treatment, based on the deficiency of Shaoyin and Yang, and made Fuzi Decoction with added flavor to benefit liver and kidney, spleen and stomach on the basis of Fuzi Decoction in the Theory of Febrile Disease. Yang Lei et [9] al. From the point of view of six menstrual syndrome differentiation - Sun disease Yang deficiency syndrome, to regulate Yingwei - warm Cou Li - stop bi pain as a method, the use of glycyrrhein Fuzi decoction to treat lumbar disc herniation (sun disease Yang deficiency syndrome), although the short-term effective rate is lower than the control group, but 3 months after the effective rate of 85.19%, much higher than the control group, in improving patients with traditional Chinese medicine syndrome points, JOA score, Better than the control group, the differences were statistically significant ($P < 0.05$) in the improvement of pain, short-term can achieve the similar effect of Western medicine, and long-term efficacy lasting, no adverse reactions and side effects during the drug, drug safety. In the law of medication, Li Dongyuan "Orchid Room Secret" in the treatment of low back pain, one is to pay attention to tonifying the spleen and stomach, good at promoting vitality; Second, pay attention to treating pain from dampness, and be good at uplifting Yang and dehumidifying; Third, pay attention to the treatment of blood stasis, good at promoting blood circulation and removing blood stasis; The fourth is to pay attention to the decocting method, good at using wine into medicine [10].

As can be seen from the keyword highlight chart, TCM treatment has always been a research hotspot. Subsequently, traditional Chinese medicine fumigation, acupuncture therapy, massage, traditional Chinese medicine encapsulation and traditional Chinese medicine hot ambao and other external treatment methods also began to rise, which shows that the external treatment of traditional Chinese medicine in the treatment of low back pain also has certain advantages. Traditional Chinese medicine internal and external treatment of low back pain effect is often better than a single treatment means, clinical to take traditional Chinese medicine mainly, moxibustion, acupuncture, fumigation, traditional Chinese medicine external application as a supplement, to improve the effect, reduce the recurrence rate, reduce pain, improve the quality of life role [11]. Tang Zongyuan [12] believes that the clinical effect of the treatment of sun meridian type low back pain is good, can effectively improve the patient's low back muscle group mechanical index and symptoms of low back pain, improve their quality of life. Yu Debiao et [13] al. proved that cupping exercise therapy can effectively relieve the symptoms of acute non-specific low back pain and improve the function of waist movement and the ability of daily living through the randomized controlled experiment. Wang Junhua [14] et al. observed that Waining decoction with mulberry parasitic and Guji as the main drugs, combined with silver needle acupuncture had a significant effect on the treatment of chronic low back pain, which could reduce the pain degree of patients. Wang Sheng [15] et al. observed 30 cases of cold coagulation and blood stasis type low back pain treated by traditional Chinese medicine encapsulation, and

concluded that traditional Chinese medicine encapsulation was superior to control group in relieving patients' pain. And TCM encapsulation therapy is convenient, easy to master, avoid oral medication, less side effects, worthy of promotion. The traditional Chinese medicine encapsulation therapy comes from the traditional Chinese medicine scalding therapy in "Fifty-two disease Prescription", which has a long history.

CiteSpace is a software used in many fields, such as education, finance, party and government, information science, etc. Citespace is mainly used to explore the research hotspot and research direction of a phenomenon or problem, and can also be applied to the medical field. Through statistical analysis of published literature, cluster analysis, network analysis, multi-dimensional scale analysis and other methods, Citespace can be applied to the medical field. It can draw the knowledge graph of the development status of medical problems, which enables researchers to intuitively discover the information panorama of medical problems, and explore the future research direction and grasp the research hot [16] spots through the existing information.

5. Conclusion

The results of this study provide a statistical analysis on the treatment of low back pain by traditional Chinese medicine in the past 24 years, and visually show the research status and development trend in this field. In general, the literature on the treatment of low back pain with traditional Chinese medicine has decreased in the past 6 years, and there is a lack of effective and extensive communication and contact between study authors and research institutions. In the future, further cooperation is needed to promote literature research with greater impact.

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