Visual Analysis of Traditional Chinese Medicine for Rheumatoid Arthritis based on Citespace Bibliometric Method

Xuedong Pei[1, a], Rui Zhao[1], Haoling Zhang[2], Hailiang Chen[1], Haochi Ning[1],

Jing Pan[1], Yuhang Jiang[3], Zhijing Song[1, 4, b, *]

[1]Clinical College of Chinese Medicine, Gansu University of Chinese Medicine, Lanzhou 730000, China

[2]St Petersburg State University, St Petersburg 190000, Russia

[3]School of Public Health, Gansu University of Chinese Medicine, Lanzhou 730000, China

[4]Key Laboratory of Dunhuang Medicine, Ministry of Education, Lanzhou 730000, China

[a]pxdkey@163.com, [b, *]szj@gszy.edu.cn

Abstract

Objective: Based on the CiteSpace bibliometric method, this paper visualized and analyzed the knowledge graph of research literature on traditional Chinese medicine for rheumatoid arthritis in the past 30 years to explore its cooperation network, research status, hot spots, and trends. Methods: Core Chinese journal literature on TCM for rheumatoid arthritis from 1991-2021 was retrieved and collected from CNKI, Wanfang, and Vip databases, checked, screened, formatted, and exported using NoteExpress V software, descriptive statistical analysis was performed by Excel 2019, and CiteSpace.5.8.R3 software was applied to the included literature for Author and institution Co-occurrence analysis, Co-occurrence, clustering and emergent analysis of keywords were performed to generate visual graphs to explore the relevance of authors, institutions and keywords in this field of study. Results: A total of 3830 valid publications were included, and the number of publications showed that the number of publications on Chinese medicine for the prevention and treatment of rheumatoid arthritis showed an increasing trend year by year. The analysis of authors and institutions revealed the formation of a core team and institutions with Aiping Lv's team, Guangzhou University of Traditional Chinese Medicine, and it is First Affiliated Hospital. Keyword analysis suggests that the research direction is mainly in clinical efficacy, mechanism of action, and TCM therapy. Conclusion: TCM therapy is an important therapeutic tool for the treatment of RA, which is developing rapidly and is increasingly valued abroad and gradually internationalized. This study visualized the research directions of RA in recent years mainly focused on clinical manifestations and applications, mechanism of action, and TCM therapy using visual knowledge mapping.

Keywords

CiteSpace; Bibliometrics; Traditional Chinese Medicine; Rheumatoid Arthritis; Visual Analysis.

1. Introduction

Rheumatoid arthritis (RA) is a chronic, systemic autoimmune disease characterized by aggressive, symmetrical multi-articular synovitis and its clinical manifestations include joint stiffness, fever, swelling and pain, bone joint and cartilage destruction. The lesions often lead to joint destruction, joint deformity and functional loss, and even involve multiple systems,

seriously affecting the patients' self-care ability. Its pathogenic factors are complex and unclear. The global incidence of RA is about 0.4-1.3%, and the prevalence of RA in China is 0.2-0.4%, with more than 10 million patients, and the incidence ratio of male and female patients is about 1:5 [1]. Arthralgia belongs to the category of bi syndrome in Chinese medicine. "Arthralgia theory" in huangdi neijing systematically discusses the etiology and pathogenesis of arthralgia, and points out that "wind, cold, dampness, heat, blood stasis, deficiency, strength of constitution, climate and living environment are the important factors for the pathogenesis. Later medical books have further inherited and enriched the content of this disease. There appeared different ideas of treatment from the lung, spleen, kidney, sanjiao and other viscera and viscera, as well as from dampness, blood stasis, deficiency, latent evil and other pathogenic evil. The traditional synthetic anti-rheumatism drugs (DMARDs) commonly used in modern medicine are methotrexate, leflunomide, hydroxychloroquine and sulfasyridine. And biologic agents to be considered when patients are intolerant or have poor response to conventional DMARDs: etanercept, adamuzumab, infliximab, toftib, and ipsep. Although symptoms are alleviated and progression of the disease is delayed, adverse reactions such as nausea and vomiting, diarrhea, anemia, liver and kidney toxicity, teratogenicity, and increased risk of osteoporosis are common [6], and they are highly dependent on each other, causing considerable economic burden to patients and the country. CiteSpace software is a scientific knowledge map tool developed by Professor Chen Chaomei and other foreign Chinese, which can visually show the development trend and hot spots of a discipline or knowledge field in a certain period. In this paper, the visual knowledge graph of CiteSpace bibliometrics was used to visually display the research progress and hot trends of TCM in the prevention and treatment of RHEUMAToid arthritis in the past 30 years, in order to provide a new direction for the research frontier of TCM in the treatment of RA [9].

2. Objects and Methods

2.1. Inclusion and Exclusion Criteria

Inclusion criteria: From 1991 to 2021, the main content of the study was Chinese core journal literature on the treatment of rheumatoid arthritis with TRADITIONAL Chinese medicine; Types include basic research, clinical research, and review, etc. Exclusion criteria: literature not related to the topic; Duplicate literature; Master and erudite papers, conference papers, information, newspapers, etc.

2.2. Literature Search and Processing

Keywords: "Rheumatoid arthritis", "Chinese Literature", time "1991-01-01 -- 2021-10-01", literature category "Academic Journals, Core Journals", subject "Traditional Chinese medicine, Traditional Chinese Pharmacy, Integrated Traditional Chinese and Western Medicine"; A total of 2076 articles were retrieved. Wanfang qualification: Search subject "rheumatoid arthritis", "Chinese Literature" time "1991-2021", literature category "Academic journals, Peking University Core Journals", discipline "Chinese Medicine"; A total of 2156 literatures were retrieved. Wiper qualification: Advanced retrieval - title or keywords "rheumatoid arthritis", "1991-2021", "core journal of Peking University, CSCD journal" journal category, subject "in TCM, TCM, TCM recipe, combination of Chinese and western, the basic theory of TCM, TCM clinical basis, diagnostics of traditional Chinese medicine, internal medicine of traditional Chinese medicine, Chinese medicine and acupuncture and massage, learning" the retrieved 1077 articles The literature. A total of 5309 bibliographies were obtained from the three databases.

The bibliographic records of the three databases were exported to NoteExpress V in The format of NoteExpress for merger and re-duplication, and 3830 bibliographic records were obtained.

The bibliographic records were exported in refworks-Citespace format using the built-in bibliographic export function of NoteExpress V. Use Word2019 to which wanfang, Weipu error bibliogram information (" DS Beijing Wanfang Data Co., LTD. ", "DS Chongqing Weipu Information Co., LTD." to replace "DS CNKI") search and replace, will be selected after the bibliogram data in TXT format to save, named as "download_***", The built-in "Data" - "Import/Export" function of Citespace.5.6. R2 was used to convert refWorks format Data, and 3830 valid bibliograms were obtained. The error bibliography information after conversion was searched and replaced again, and then citespace.5.8.R3 was analyzed.

2.3. Set CiteSpace Software Parameters

Time Slicing parameter: the Time span is 1991 -- 2021, and the Years Per Slice is "5"; Text Processing parameter: Term Source select "Title" "Abstract" "Author Keywords" "Keywords Plus", Term Type default; Parameter of Node Types: Select author, institution and keyword respectively; Links parameter: default; Selection Criteria: Select Top N "50". Pruning parameters: the organization is not pruned. The author and key words are selected as "Pathfinder, Pruning networks, Pruning the merged network" to simplify the overall map. The rest are set by default.

2.4. Literature Analysis Method

Number and trend of studies: Descriptive statistical analysis was conducted on the included literatures by NoteExpress V and Excel2019, and bibliography-related studies on the treatment of rheumatoid arthritis by TRADITIONAL Chinese medicine from CNHI, Wanfang and VIP databases from 1991 to 2021 were imported into NoteExpress V, using its built-in "data analysis" function. Export the data to Excel2019 to draw a line chart, which can show the trend of the annual number of articles.

By analyzing the Co-occurrence, clustering and emergence of authors, institutions and keywords, the knowledge map and its evolution process can be revealed. Co-occurrence analysis of authors and institutions was conducted to explore the cooperative relationship between authors and institutions in this field. Keywords Co-occurrence, clustering and emergent analysis are carried out to explore the research frontiers and hot spots in this field in recent decades. In the atlas, nodes and their names represent the frequency of their occurrence, and the thickness of the line between nodes represents the closeness of their connection. The thickness of node rings is in direct proportion to the frequency of literature occurrence, and the color changes from dark to light, indicating the change of node time from early to recent. The purple appearance of some nodes' outer rings indicates intermediary centrality, which may lead to the emergence of emerging trends.

3. Conclusion

3.1. Year and Region Analysis

3.1.1. Annual Distribution

In the past 30 years, works of literature related to the treatment of rheumatoid arthritis by Traditional Chinese Medicine have been increasing year by year, which indicates the increasing enthusiasm of relevant scholars in this field.

3.1.2. Periodical Distribution

From 1991 to 2021, more than 300 journals in the research field of TCM treatment of rheumatoid arthritis included relevant research articles, and the top 5 journals with more than 50 articles were classified as follows: Journal of Traditional Chinese Medicine (186 articles), Shi Zhen Traditional Chinese Medicine and Traditional Chinese Medicine (157 articles), Liaoning Journal of Traditional Chinese Medicine (151 articles), Chinese Journal of Integrated

Traditional and Western Medicine (149 articles), And Central and Central China Journal of Medicine (147 articles).

In conclusion, on the whole traditional Chinese medicine in the treatment of rheumatoid arthritis research heat rising trend year by year, research institutions and collection of journals are mainly concentrated in the southern coastal area, this may be related to the south are relatively humid environment factors causing high incidence of disease, more developed economic level makes higher related disease diagnosis rate.

3.2. Cooperative Network Analysis

3.2.1. The Author Analysis

Co-occurrence analysis kinds of the literature showed that there were 775 nodes and 1879 links on the Chinese map. Lu Aiping was the author with the highest number of papers (67), among which there was a cooperative relationship among high-yield authors, and 5 core research teams were mainly formed, including Lu Aiping, Liu Jian, Jiang Quan, Chen Jifan, and Zhou Xueping. Lu Aiping's team focused on the methods of TCM syndrome classification, the biological basis of syndrome classification, the relationship between syndrome classification and drug efficacy, and the mechanism of TCM treatment of rheumatoid arthritis, but there was little cooperation among the research teams.

3.2.2. Institutional Analysis

By analyzing the visualization map of institutional cooperation networks in the literature, it is concluded that the visualization map contains a total of 812 research institutions, and there are 406 links between institutions, many of which have cooperative relationships. There are five core research institutions, namely Guangzhou University of Chinese Medicine and its First Affiliated Hospital, Nanjing University of Chinese Medicine, Chengdu University of Chinese Medicine, and Guanganmen Hospital of China Academy of Chinese Medicine. The total number of articles published by Guangzhou University of Chinese Medicine and its First Affiliated Hospital is 142, and they cooperate closely with each other. However, the cooperation between other research institutions is relatively weak, suggesting that domestic research institutions should attach importance to building information-sharing platforms or multi-center randomized controlled clinical trials to strengthen research cooperation and exchange.

3.3. Research Hotspot and Frontier Analysis

3.3.1. Keywords Co-occurrence and Cluster Analysis

Keywords analysis can help understand the core research content and key direction of the research field. By analyzing the co-occurrence map, it can be found that 366 nodes are formed, 648 links are formed, and 366 keywords are involved in this field. Keyword word frequency reflects the research hotspot in this field to some extent, the higher the word frequency, the larger the node. A key node refers to the node with high mediation centrality, which plays a key role in the network. The top 5 keywords in the co-occurrence network were "arthritis, rheumatoid, cytokine, rat, Tripterygium wilfordii". Mediation centricity top 5 keywords as "acupuncture, total effective rate, joint pain, cell apoptosis, treatment", eliminate literature search keywords "Chinese medicine", "Chinese medicine" and "rheumatoid arthritis" further comb, it can be seen that Chinese medicine treatment of RA research direction is mainly focused on the mechanism of theoretical research, clinical syndrome differentiation, treatment, and Traditional Chinese Medicine therapy, etc. In addition, the study of cytokines and the application of drugs and Traditional Chinese Medicine to promote the rehabilitation of RA patients has been a research hotspot in Chinese literature.

LLR calculation method was used to construct a clustering knowledge map for keywords, and 15 keyword clustering tags were obtained. They are: #0 joint swelling and pain, #1 anti-inflammatory, #2 cytokines, #3 arthritis, #4 clinical application, #5 treatment group, #6

Tripterygii wilfordii, #7 arthralgia syndrome, #8 medication rule, #9 Syndrome differentiation and treatment, #10 moxibustion, #11 rats, #12 acupuncture therapy, #13 death, #14 TCM syndrome. The size of the cluster number is negatively correlated with the cluster size, that is, the smaller the number is, the larger the cluster size is. The modular Q value of the cluster is 0.8909 (greater than 0.3), which indicates that the cluster is significantly effective. The contour value is the homogeneity index of cluster members. The average contour value S is 0.9732 (greater than 0.7), and the value of each cluster contour is greater than 0.70, indicating that the consistency of cluster members is high and the result is reliable. The analysis of the keyword cluster graph further confirms the above inference.

3.3.2. Keywords Cluster Time Line and Breakout Analysis

The timeline map clustered and distributed the keywords in the field of Traditional Chinese Medicine treatment RA in chronological order, presenting different differences in appearance time point, and period, which can show the change of research focus in this field. These 15 keyword clustering tags represent the main research directions, Through the analysis of the map, we found that the research focus in this field was mainly focused on "#0 joint swelling and pain, #1 anti-inflammatory, #2 cytokines, #3 arthritis, #4 clinical application, #5 treatment group, #6 Tripterygium wilfordii, #7 arthralgia syndrome, #8 medication rule, #9 Syndrome differentiation and treatment, #10 moxibustion, #11 rats, #12 acupuncture therapy, #13 It is suggested that the research on TCM treatment of RA mainly focuses on clinical manifestations and application, mechanism of action, TCM treatment and so on.

The analysis of the Burst Term of keywords can reveal the shift of research hotspots in different periods and judge the potential development trend and frontier research. "Begin" and "end" indicates the start time and end time of the mutation respectively. "Strength" is the strength of the keyword mutation. The higher the strength, the greater the influence. A total of 25 dash forward show, to dash forward show analysis of co-occurrence keywords, "pain in the joints" is regarded as the earliest time and emergent intensity is relatively large, dash forward show the strength of 14.95, "inflammatory factor" dash forward show appears and the latest strength is small, dash forward show the strength of 6.71, shows that joint swelling is rheumatoid arthritis since emergent therapeutic areas began to focus on. In addition, the analysis of all the emergence shows that in the first 10 years from 1991 to 2021, the research focus focused on the clinical efficacy of rheumatoid arthritis, and in the recent 10 years, the research focus gradually shifted to the direction of exploring its mechanism of action.

4. Discussion

Through the analysis of 3830 literatures on TCM treatment of RA in the database of CNKI, Wanfang and VIP in the past 30 years, it can be seen that the number of publications on TCM treatment of RA is increasing year by year, and the number of publications in this field is characterized by uneven geographical distribution: There are more in the southeast coastal area and less in the northwest, which may be related to the humid and hot climate conditions and diet in the southeast coastal area. Universities and affiliated hospitals accounted for the highest proportion of the number of published articles. There is less cooperation between institutions; There are author collaboration groups, but the scale of the collaboration groups is generally small. Some of the collaboration groups carry out clinical research and basic research in a single direction. There are few links between the collaboration groups, and there is a lack of in-depth and lasting research in a certain direction in this field. Studies have shown that RA is mainly characterized by cold-dampness obstruction and dampness and heat obstruction at the beginning, and mainly by phlegm and blood stasis obstruction and liver and kidney deficiency in the later stage, and the disease is characterized by deficiency of origin and reality [11]. In terms of geographical distribution, kidney qi deficiency and cold syndrome are more

common in northeast China, dampness-heat obstruction syndrome is dominant in North China and South China, and cold-dampness-dampness obstruction syndrome is most common in East China, central China, Southwest China and northwest China. Deficiency of spleen, kidney, liver and kidney is the majority in Hong Kong, Macao and Taiwan [12-14]. At the same time, meteorological factors (temperature, air pressure and humidity) also had varying degrees of influence on the distribution of RA. RA patients living in warm temperate zone were more than those living in middle temperate zone and subtropical zone (42.95%), and RA patients living in sub-humid zone were more than those living in humid zone and arid zone (57.62%). There were more RA patients living in low-altitude areas than in middle-altitude areas (90.15%) [15]. In addition, RA is also affected by risk factors such as genetics, eating habits and living environment [16-19]. This is consistent with the geographical distribution of institutions and journal publications in this study. In addition, the analysis of keyword Co-occurrence, clustering, emergence and time chart shows that the research focus in this field has gradually shifted from the study of the clinical efficacy of RA to the study of the mechanism of RA.

Based on CiteSpace literature metrology method about the Chinese literature in the field of Chinese medicine treatment of RA systematically comb, generally presents the research hotspots in the field of knowledge map, and the research trend, but as a result of the research data is mainly for nearly 30 years China hownet, ten thousand party, VIP database of Chinese core periodical literature, The retrieval and collection of relevant foreign literature has not been carried out, which has some shortcomings. In the future, updated literature analysis methods and visual analysis software will be combined to make up for them. It is hoped that this paper can provide some help to the practitioners in the field of RESEARCHING TCM treatment of RA to broaden their thinking.

Acknowledgments

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