

Research Progress of “Healthy in China” 2030 Strategy—Based on Citespace’s Visualized Knowledge Graph Analysis

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Abstract:

Since the 2016 Government of China reviewed and approved the "Healthy in China 2030" Planning Outline, "Healthy in China" has become a hot spot for theoretical research, and a large number of academic research results have emerged. Using the academic papers related to the “Healthy in China” strategy included in the CSSCI full-text database from 2016 to 2021 as the data source, the document visualization analysis software CiteSpace was used to construct the author's cooperative relationship network, the keyword co-occurrence network, and the hotspot knowledge timeline graph to refine the “Healthy in China” aspect. In order to grasp the overall context of relevant research on “Healthy in China” at this stage, and provide references for the future trend of relevant research on “Healthy in China”.

Keywords: “Healthy in China”; CiteSpace; visual analysis

I. INTRODUCTION

The "Healthy China 2030" Planning Outline (hereinafter referred to as the "Outline") issued by the Central Committee of the Communist Party of China and the State Council is formulated in accordance with the strategic deployment of the Fifth Plenary Session of the 18th Central Committee of the Communist Party of China to promote the construction of a healthy China and improve people's health. The "Outline" is the first medium and long-term strategic plan in the health field proposed at the national level since the founding of the People's Republic of China. The preparation and implementation of the "Outline" is a major measure to implement the spirit of the Fifth Plenary Session of the Eighteenth Central Committee of the Party and protect the health of the people, which is of great significance to comprehensively building a well-off society and accelerating the implementation of socialist modernization[1-3]. At the same time, this is also an important measure for China to actively participate in global health governance and fulfill its commitment of "2030 Agenda for Sustainable Development" to the United Nations. The report of the 19th National Congress of the Communist Party of China regards "Strategy for Implementing a Healthy China" as an important part of China's basic development strategy and clearly lists it as a key task of modernization[4]. Therefore, the Healthy China 2030 strategy has become the focus of attention from all walks of life and a hotspot of theoretical research. Since 2016, the

number of related documents has increased rapidly. A comprehensive review of the research results in the field of healthy China carries very important theoretical and practical significance[5].

CiteSpace is a citation visualization analysis software that focuses on analyzing the potential knowledge contained in scientific analysis, which is gradually developed in the context of scientometrics, data and information visualization. Since the structure, law and distribution of scientific knowledge can be presented through visual means, the visual graphs that can also be derived through such methods are referred to as "scientific knowledge graphs".

In recent years, domestic scholars have made a series of important new academic achievements in the research field of Healthy China. To grasp the research status of the domestic healthy China 2030 strategy from 2016 to 2021, we searched the academic papers included in the CNKI full-text database, statistically classified documents in this field based on the literature visual analysis software-CiteSpace, plotted visual knowledge graph, analyzed influential and representative documents, sorted out cutting-edge topics and research hotspots in this field[6-7], and provided references for scholars in their later explorative research on the Healthy China 2030 strategy.

II. RESEARCH METHODS AND DATA PROCESSING

2.1 Research methods

CiteSpace, visual analysis software for scientific quantification research that is developed by Professor Chen Chaomei of Drexel University in the United States under Java language applications, was used to analyze academic papers in related fields of healthy China, and a visual knowledge graph was plotted.

2.2 Data processing

The literature data all come from the CSSCI database in the China National Knowledge Infrastructure (CNKI). To more comprehensively retrieve the current healthy China related research since 2016, "Healthy China", "Healthy China 2030", "Healthy China Strategy", and "Healthy China 2030 Strategy" were used as the search terms to accurately retrieve academic papers included in the CSSCI database (as of May 2021). After removing irrelevant papers, a total of 193 related documents from 2016 to 2021 were retrieved. In the parameter setting, the time slicing was 2016-2021, and the Slice length=1 was set. Node Types were author and keywords in turn; Top50 was selected for node threshold; Pruning parameters were Pathfinder combined with Pruning sliced networks and Pruning the merged network.

III. STATISTICAL ANALYSIS OF RESEARCH LITERATURE ON HEALTHY CHINA 2030 STRATEGY

3.1 Statistical analysis of literature

193 relevant documents retrieved from 2016 to 2021 were statistically analyzed, with the results as follows:

(1) The statistical results in Figure 1 show that starting from 2016, the number of published academic papers on the Healthy China Strategy has fluctuated. From 2016 to 2018, the number of published academic papers increased rapidly, reaching a peak in 2018 and declining in 2019, but a certain number was retained, and a growth trend was shown in 2020, reaching a new peak. Therefore, the healthy China strategy has been a research hotspot for domestic researchers and scientific research teams in recent years.

(2) Based on the paper data, it is found that the change in the number of academic papers related to the Healthy China Strategy has relation to the promulgated policy. As can be seen from Figure 1, since August 2016, after the "Healthy China 2030 Planning Outline" was reviewed and approved by Government of china presided over by Chinese leader, the number of relevant academic papers published by domestic scholars has increased significantly. After the reports of the 19th National Congress of the Communist Party of China proposed the implementation of the Healthy China Strategy in China for the first time, and took the "Healthy China 2030 Planning Outline" as the action plan, the number of publications reached the maximum 55 in 2018. In July 2019, the "Opinions of the State Council on Implementing the Healthy China Action" ", "Healthy China Action (2019-2030)" were released at the same time, pushing the construction of a healthy China into the acceleration stage of the national health action, and the number of publications reached a new peak in 2020. Therefore, it is considered that the annual publication changes of academic papers related to the Healthy China Strategy concern the promulgation of policies and the important speeches of Chinese leader.

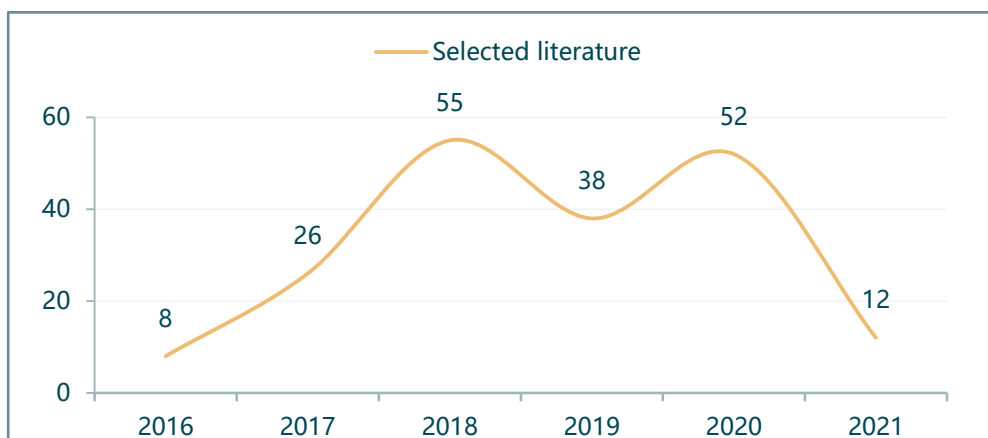


Figure 1 Annual statistics of CSSCI Healthy China 2030 strategy related publications

3.2 Statistical analysis of literature sources

The sources of the retrieved related literature are statistically analyzed, with the results shown as follows:

(1) According to the statistical results of the source categories of academic papers, it can be found that academic papers in healthy China strategy research cover a wide range of fields. As shown in Figure 2, the source journals are classified into 28 categories according to journal topic names. It can be seen that the healthy China strategy research involves wide research field. Where, publication of sports and education synthesis papers accounts for a relatively large proportion of 28% and 23% of the total categories respectively. It can be seen that the healthy China strategy has produced many academic results in the field of sports and education research.

(2) According to the statistical results of the source distribution of academic papers, it can be seen that the distribution of academic papers in healthy China strategy research is relatively concentrated, and 22% of academic papers are published in the 7 core journals, including "China Sport Science", "Journal of Physical Education", "Sports Culture Guide", "Journal of Beijing Sport University", "Journal of Shenyang Sport University", "Environmental Protection", "People's Tribune". "China Sport Science", "Journal of Beijing Sport University", "Journal of Physical Education", "Environmental Protection", as academic journals with great influence in the research directions of sports, environmental science and resource utilization, include 13% of these papers (Table 1). Therefore, from 2016 to 2021, healthy China strategy research produced a large number of innovative research results in the direction of sports, environmental science and resource utilization.

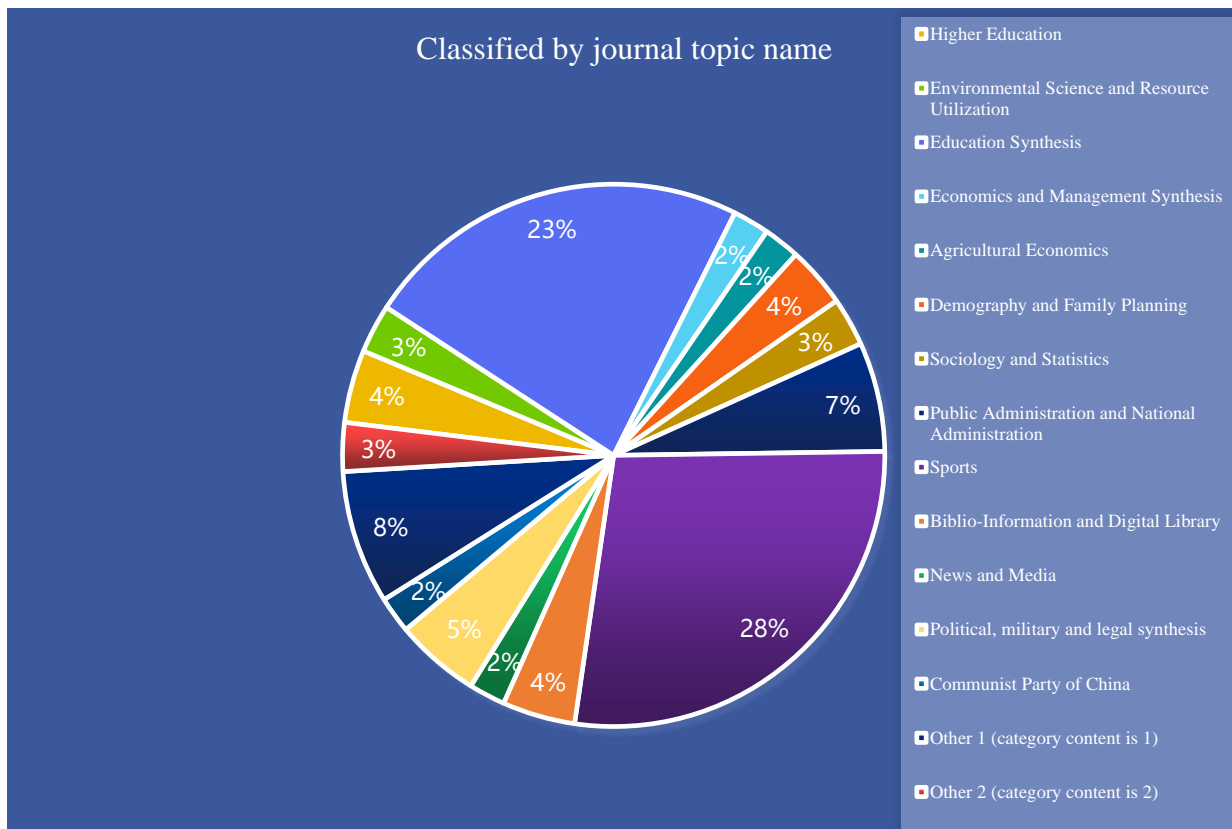


Figure 2 Classification of source journals related to CSSCI Healthy China 2030 Strategy (by journal name)

TABLE I Distribution of source journals related to CSSCI Healthy China 2030 Strategy

Journal source	Number of papers	Proportion in total journal papers
China Sport Science	5	4%
Journal of Physical Education	4	3%
Sports Culture Guide	4	3%
Journal of Beijing Sport University	4	3%
Journal of Shenyang Sport University	4	3%
Environmental Protection	4	3%
People's Tribune	4	3%

IV. CITESPACE KNOWLEDGE GRAPH ANALYSIS OF HEALTHY CHINA 2030 STRATEGY

After the multi-field alternate search and statistical analysis of related papers[8-9], to more intuitively summarize the development of the healthy China strategy research hotspots from 2016 to 2021, the imported Refworks format retrieval documents were first converted to CNKI format and visualized by CiteSpace software to construct knowledge clustering graph involving the Author, Keyword, Timeline View. The software clustering pruning was based on the Pathfinder algorithm that simplifies the network and highlights the knowledge structure.

4.1 Analysis of Author Collaboration Network

The scientific research cooperation network means research subjects work together for the common purpose of producing new scientific knowledge. In bibliometrics, the scientific research cooperation network is measured by co-publishing of papers. CiteSpace provides three-level scientific research cooperation network analysis, one of which is the author cooperation network.

The data of the retrieved related academic papers from 2016 to 2021 was subject to format transformation, and the author's cooperative relationship co-occurrence network analysis was performed using CiteSpace. The top 8 network cooperative groups in terms of group member were selected and displayed in the graph. The knowledge graph is shown in Figure 3.

The author cooperation network graph shows that a small number of authors cooperate closely, each author has a fixed partner, the number of cooperative participants is small and there is no large-scale cooperation. Where, Dai Qinquan and Zhang Dachao have published many papers on healthy China strategy, 6 and 4 respectively; Shi Bing and Qiu Jun are respectively related to the two research communities to varying degrees, indicating that Shi Bing and Qiu Jun are highly intermediary, with strong information control capabilities against bridge paths in different communities. However, large-scale cooperation among other authors lacks links. Research in related fields is carried out in small groups with a small number of members. There is no phenomenon that a large number of people form related scientific research teams, which is uncondusive to the progress of research related to the Healthy China Strategy.



Figure 3 Author cooperation network involved in academic papers related to the Healthy China Strategy

4.2 Analysis of research hot topics

Keywords are a highly refined summary of the research content of academic papers and are important indicators for statistical analysis of literature. To a certain extent, the analysis of high-frequency keywords

can reflect the direction of exploration in a certain research field and focus on hot topics in this field. In this study, the visualization software CiteSpace was used to perform Keyword co-occurrence analysis, and the design threshold TopN=50. That is, the top 50 core keywords with the highest frequency in each time slice are selected for the clustering analysis.

Table 2 and Figure 4 show the keyword co-occurrence frequency, centrality statistics, and keyword co-occurrence knowledge graphs of related papers. Seen from the keyword co-occurrence frequency, Healthy China 2030 and Healthy China Construction have the highest co-occurrence frequency, which constitute important structural nodes of the entire keyword co-occurrence knowledge graph. The top rankings also include national fitness, national health, general health, combination of sports and medicine, mass sports, etc. The centrality of a node is directly proportional to the "intermediary" role of the node in the entire network. Seen from the centrality of keywords, in addition to Healthy China 2030 and Healthy China Construction, the top central keywords also include: human community with a shared future, sports power, female, health industry, sports, etc., indicating that these fields have a high position and influence in the research of healthy China strategy[10-11], and play a role as a bridge in the entire network to promote research progress in this field.

TABLE II Keyword co-occurrence frequency and centrality statistics of related literature (top 16)

(a) Keyword co-occurrence frequency statistics			(b) Keyword centrality statistics		
Count	Centrality	Keywords	Count	Centrality	Keywords
149	1.33	Healthy China 2030	149	1.33	Healthy China 2030
20	0.25	Healthy China construction	20	0.25	Healthy China construction
17	0.01	national fitness	2	0.07	human community with a shared future
9	0.02	national health	3	0.06	sports power
9	0.01	general health	3	0.05	female
8	0.02	combination of sports and medicine	2	0.05	Health industry
7	0	mass sports	2	0.04	Sports and exercise
6	0	sports participation	2	0.03	Sports
6	0	right to health	9	0.02	national health
6	0	sports management	8	0.02	combination of sports and medicine
5	0	school sports	3	0.02	policy tools
4	0	Chinese leader	2	0.02	sports law
4	0	sports education	2	0.02	adolescent
4	0	sports industry	17	0.01	national fitness
3	0.06	sports power	9	0.01	general health
3	0.05	female	2	0.01	comprehensive promotion



Figure 4 Keyword co-occurrence knowledge graph of relevant papers on the Healthy China Strategy

4.3 Knowledge Evolution Analysis on Related Papers

Another visual view of CiteSpace, Timeline (timeline view), can clearly and intuitively present the evolution of hotspot knowledge in the research field from the time dimension. There are two important indicators for evaluating the clustering effect of knowledge graphs: Modularity Q (clustering module value) and Mean Silhouette (mean silhouette value). When the Q value is greater than 0.3, we believe that the clustering structure has high credibility; when Mean Silhouette > 0.7, we believe that the members have good closeness, and the clustering is successful. Figure 5 shows that the Q value of the keyword clustering knowledge graph = 0.6319 and Mean Silhouette = 0.9357. That is, the timeline clustering graph has high credibility and the member clustering has high closeness.

Figure 5 shows that the healthy China strategy keyword clustering includes 8 aspects: healthy China construction, general health, sports, combination of sports and medicine, national fitness, healthy environment, and physical education reform. Where, research topics such as healthy China construction, general health, sports, physical education reform have never stopped from 2016 to 2021, indicating that these topics have been continuously concerned by researchers and scholars [12-15]. The research of Healthy China Strategy on national fitness appeared in 2016, but only lasted for 3 years. For its reason, the term National Fitness first appeared in 1995, some research results have been achieved in this field so far, but research combining healthy China strategy and national fitness is still unable to go further in many aspects. There were a lot of related researches on healthy environment from 2017 to 2019, but then the study decreased significantly in number and gradually faded out of public vision. It can also be seen in Figure 5 that the research results on construction of a healthy China increases sharply in 2018, reaching 11, and then stabilizes, maintaining a frequency of 2 papers per year, indicating that research on the construction of a healthy China still belongs to hot areas of concern for researchers.

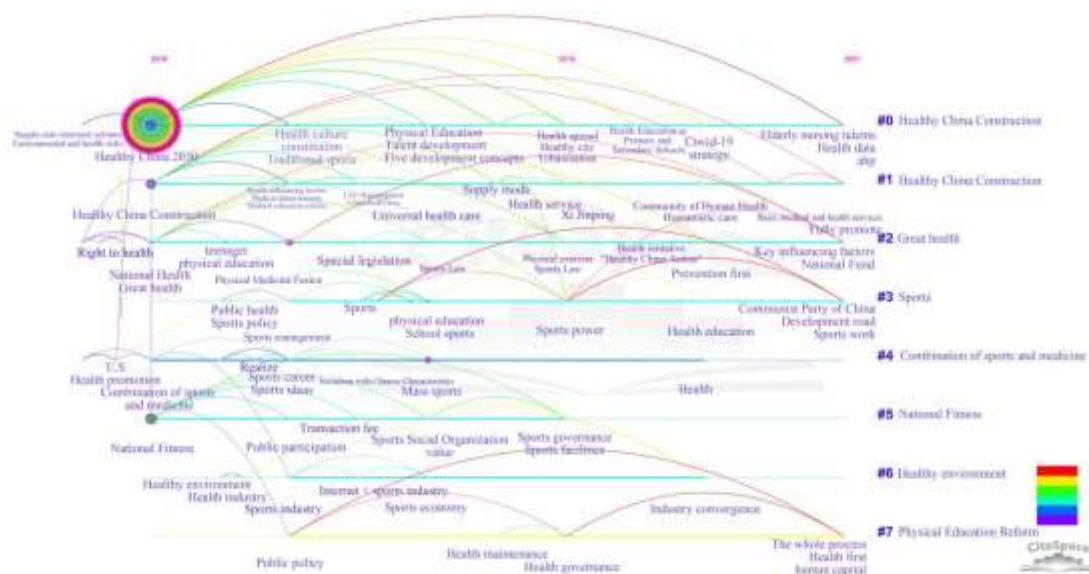


Figure 5 Research hotspot knowledge timeline graph of healthy China strategy research

V. CONCLUSIONS AND PROSPECTS

5.1 Conclusions

Using the academic papers of Healthy China 2030 strategy research included in CNKI's CSSCI database as the data source, the subject term search, statistics and analysis were performed on academic papers in related research fields from 2016 to 2021. Using the visual analysis function of CiteSpace software to select appropriate pruning methods and clustering thresholds, we constructed visually intuitive keyword co-occurrence network, research hotspot knowledge timeline graph and author co-occurrence network knowledge graph, investigated and analyzed hotspots in related research fields. The main conclusions are drawn as follows:

The academic papers on Healthy China Strategy cover a wide range of fields, and the publication of sports and education synthesis papers accounts for a relatively large proportion. The Healthy China Strategy has produced many academic results in the fields of sports and education research. The distribution of academic papers in healthy China strategy research is relatively concentrated. "China Sport Science", "Journal of Beijing Sport University", "Journal of Physical Education", "Environmental Protection", as academic journals with great influence in the research directions of sports, environmental science and resource utilization, include 13% of these papers, and a large number of innovative research results have emerged in sports, environmental science and resource utilization in the healthy China strategy research.

(1)The author cooperation network graph shows that a small number of authors cooperate closely, other authors lack links. Research in related fields is carried out in small groups with a small number of members. There is no phenomenon that a large number of people form related scientific research teams, which is un conducive to the progress of research related to the Healthy China Strategy.

(2) Seen from the keyword co-occurrence frequency, Healthy China 2030 and Healthy China Construction constitute important structural nodes of the entire keyword co-occurrence knowledge graph. In addition to Healthy China 2030 and Healthy China Construction, fields such as human community with a shared future, sports power, female, health industry, sports, etc., have a high position and influence in the research of healthy China strategy, which play a role as a bridge in the entire network to promote research progress in this field.

(3) Based on the research hotspot knowledge timeline graph, research topics such as healthy China construction, general health, sports, combination of sports and medicine, national fitness, healthy environment and physical education reform have been continuously concerned by researchers and scholars. Some research results have been achieved in national fitness so far, but research combining healthy China strategy and national fitness is still unable to go further in many aspects. Although general health has early appearance, the related study decreased significantly in number after 2018, indicating that research on general health gradually faded out of public vision. The research results on construction of a healthy China increased sharply in 2018, reaching 11, and then stabilized, maintaining a frequency of 2 papers per year, indicating that research on the construction of a healthy China still belongs to hot areas of concern for researchers.

5.2 Prospects

Based on the above statistical results of the research papers in the field of healthy China strategy, as well as CiteSpace's visual knowledge graph analysis of research hot topics and development trend clustering, it is believed that there is still room for discussion in the following aspects of healthy China strategy related research:

(1) Medical-related core publications lack the research of healthy China strategy. In future research, a certain degree of attention can be paid to the combination of sports and medicine or medical-related fields. Research in sports and education-related fields is hot, and there is still a lot of room for research and development in other fields. Research on healthy China strategy should permeate all research fields to further expand the research scope.

(2) In the follow-up research, all researchers and scholars should strengthen exchanges and cooperation. Through the channels of talent introduction, we should introduce research talents with high attainments or high intermediary in related research, or purposely send our team members to exchange and learn from the corresponding well-known scholars, thus enriching the research of healthy China strategy[16], and promoting the continuous innovation and development of healthy China strategy related research.

(3) Strengthen the application of research results in practice. According to the analysis and explanation of the research hotspot knowledge timeline graph, a large number of innovative academic

results have emerged in the research of healthy China strategy in various fields, but there are quite few successful cases of applying these mature theories to solve practical problems in various fields. Therefore, in the follow-up research on the combination of the healthy China strategy in various fields, we can further strengthen practice based on the original relatively mature theoretical results to solve the practical problems in this field and effectively implement the healthy China strategy.

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