

Hotspots and Evolution Analysis of Public Hospital Public Benefit Research Based on Citespace

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Abstract: To summarize the progress, research hotspots and research evolution trends of public hospital public welfare research in China, in order to provide a reference basis for subsequent research. Based on the database of China Knowledge Network, CiteSpace software was used to visualize and analyse the literature in the field of public hospital public welfare research from 2005 to 2022, and the knowledge maps such as keyword co-occurrence and keyword clustering were drawn out respectively, and the maps were interpreted and analysed. Hotspots of public benefit research include four aspects: connotation definition, reasons for dilution, measurement and assessment, and enhancement path. The development of public welfare-related research under multiple perspectives, such as high-quality development, refined management and epidemic normalization, will be a frontier topic in the future.

1. Introduction

Since the new healthcare reform, China's public hospitals have achieved rapid development, but at the same time, new problems such as scale expansion and sloppy management have emerged. The 14th Five-Year Plan period is a critical period for the high-quality development of China's medical and health services. To further optimise the effectiveness of public hospital resources input and medical output, the national level has repeatedly issued policies and documents related to the high-quality development of public hospitals, in order to promote public hospitals from high-speed development to high-quality development. Only with high-quality development can public hospitals enhance their public welfare service capacity and better address the contradiction between the growing medical and healthcare needs of the people and the unbalanced and insufficient development of health supply.

With the new crown epidemic under normal control, the operational status of public hospitals is facing unprecedented challenges, and it is crucial to maintain the public welfare of public hospitals during the epidemic. The background of the new crown epidemic has put forward new requirements for the reform and development of public hospitals. With the continuous introduction of important documents such as the 14th Five-Year Plan and the Outline of Vision 2035, China is still paying

attention to the issue about the public welfare of healthcare institutions, and the relevant research results from academia are also enriched. Based on this, this paper uses CiteSpace software to sort out the research content of domestic scholars on the public welfare of public hospitals in recent years, and analyze the research hotspots and research evolution respectively, to provide theoretical references for in-depth research on the public welfare of public hospitals.

2. Data Sources and Research Methodology

2.1. Data Sources and Processing

In this paper, we used the CNKI database as the search database, and used the advanced search function to conduct a preliminary search using "subject=public welfare, publication time=unlimited" as the search criteria. To ensure the quality of the data sources, only academic papers published in SCI journals, EI journals, Peking University Core, CSSCI and CSCD were selected, and 6573 papers were screened. In addition, to ensure the accuracy, representativeness and comprehensiveness of the selected literature, a further selection of topics and disciplines was conducted. Among them, only "public welfare, public hospitals, public welfare of hospitals, public hospital reform, new medical reform, compensation mechanism, and public medical institutions" were selected as the main theme, and "research on medical and health policies and laws and regulations, macroeconomic management and sustainable development, administration and national administration" was selected as the discipline, with a total of 305 documents. Finally, the literature on non-public hospitals was manually eliminated according to the title and abstracts of the literature, resulting in 300 valid articles with a search date of 15 October 2022.

2.2. Research Methodology

There are much software to visualize and analyse the massive literature, such as HistCite, RefViz, Gephi, etc. However, compared with other software, CiteSpace has better inclusiveness for the CNKI database and its visualisation function is more prominent [1]. Therefore, this paper adopts CiteSpace (version 6.1.R3), the visualization software developed by Dr. Chao-Mei Chen in the United States, as a research tool to conduct an econometric analysis of selected specific literature and explore the hotspots and frontier directions of research on public welfare of public hospital by mapping them. The literature was firstly exported in "Refworks" format, renamed and formatted, then the time range and time slices were set according to the year of publication, and finally keyword co-occurrence mapping and keyword clustering mapping were generated by selecting different nodes for analysis.

3. Analysis of Research Hotspots

3.1. High-Frequency Keyword Co-Occurrence and Statistical Analysis

To a certain extent, keywords can reflect the focus of an article. By extracting and analysing the high-frequency keywords in the field of public welfare of public hospitals, we can focus on the research hotspots in this field. "Keyword" was selected as the network node, and the keyword co-occurrence map was obtained, as shown in Figure 1. Table 1 shows the statistical results of high-frequency keywords. It can be seen that in addition to "public hospital" and "public welfare", other high-frequency keywords include "compensation mechanism", "reform" and "performance". By observing the size of different keywords and the thickness of connecting lines, we found that the hotspots of research on the public welfare of public hospitals mainly focus on the compensation

mechanism of public hospitals, performance evaluation of public welfare of public hospital and public hospital reform in the context of new medical reform.

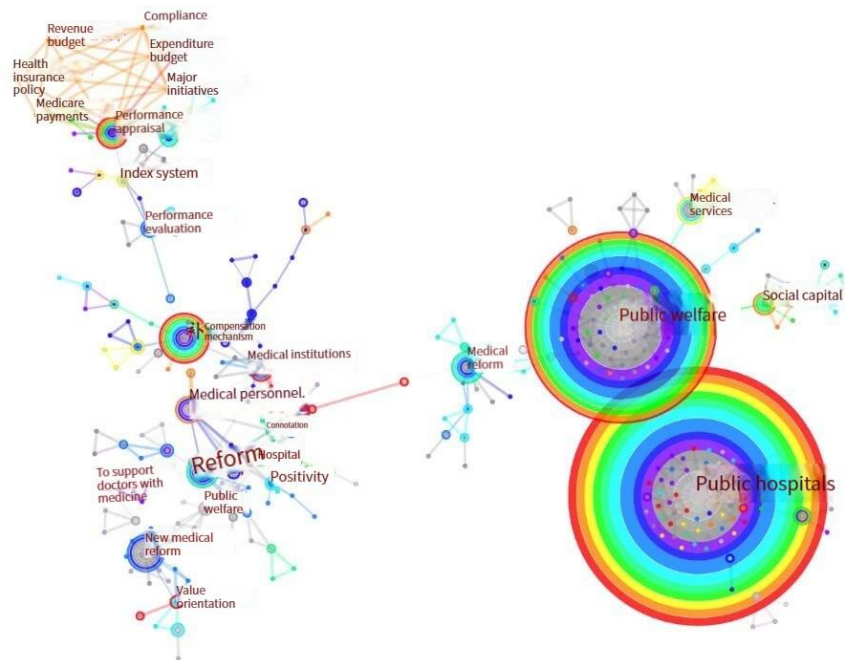


Figure 1: High-frequency keyword co-occurrence mapping for public welfare of public hospital

Table 1: High-frequency keyword statistics for public welfare of public hospital in 2005-2022

Serial number	Frequency	Centrality	Keywords	Year	Serial number	Frequency	Centrality	Keywords	Year
1	206	1.02	Public Hospitals	2007	11	6	0.04	Social capital	2011
2	142	0.96	Public Interest	2005	12	6	0.04	Motivation	2011
3	16	0.07	Compensation mechanisms	2010	13	5	0.03	Medical institutions	2010
4	15	0.17	New Health Care Reform	2007	14	5	0.03	Health Care Reform	2013
5	11	0.09	Reform	2008	15	5	0.04	Health reform	2014
6	9	0.05	Performance Appraisal	2012	16	5	0.01	Performance evaluation	2009
7	7	0.01	Medical Services	2009	17	5	0.02	Indicator system	2012
8	7	0.02	Xin-jin County	2014	18	4	0.01	Private Hospitals	2011
9	7	0.03	Medical staff	2008	19	4	0.01	Gaming	2014
10	7	0.04	Medical Reform	2009	20	4	0.00	Corporate Governance	2013

3.2. High-Frequency Keyword Clustering Analysis

Clustering analysis was conducted using the CiteSpace clustering function to generate a keyword clustering map, as shown in Figure 2. The top 10 clusters were selected in the figure, namely #0 public welfare, #1 public hospital, #2 The Xin-jin County, #3 hospital, #4 medical staff, #5 healthcare reform, #6 performance evaluation, #7 social capital, #8 performance assessment, and #9 healthcare services. According to the content of the clusters, the clusters with consistent expressions of keyword meanings were grouped into a hotspot, so the following hotspot themes could be

obtained: definition of the connotation of public welfare of public hospital, analysis of the causes of dilution, measurement and evaluation, and the path of improvement.

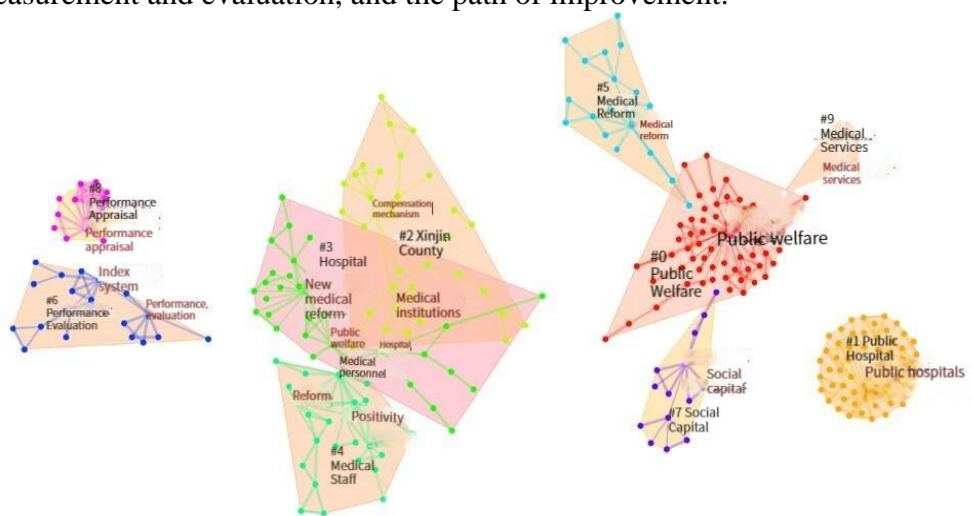


Figure 2: Cluster mapping of high-frequency keywords for public welfare of public hospital

4. Hot Topics in Public Welfare of Public Hospital Research and Review

4.1. A Study on the Definition of the Concept and Connotation of Public Welfare in Public Hospitals

The clarification of the concept and connotation of public welfare in public hospitals is conducive to deepening people's rational and practical knowledge of public welfare in public hospitals. At present, there are still many different views in the academic community on this issue and no agreement has been reached. Part of the connotation of public welfare is summarized in Table 2. Many scholars define the concept of public welfare in a qualitative way according to different perspectives. From the perspective of classification, Lei distinguishes the connotation of public welfare into "natural public welfare" and "derived public welfare", and further elaborates on the connotation of both respectively [2]. From the perspective of public management, Luo believes that the public welfare of public hospitals refers to the positive externalities brought about by medical products and services [3]. From the perspective of time development, Zhao et al. argue that people's understanding of public welfare in public hospital has gone through four stages, with different connotations at different stages [4].

Table 2: Defining connotations of the concept of public welfare from different disciplinary perspectives

Author	Disciplinary Perspectives	Defining the content
Li et al. [5]	The Economics of Wellbeing	The behavior and objectives of public hospitals are aligned with the will of the government and thus with the objective of maximizing social welfare
Tang et al. [6]	Health Policy Studies	The nature of providing equitable, accessible and appropriate health care services to all members of society, ensuring the quality and efficiency of health care services, and maximizing the health needs of the population.
Luo [3]	Public Administration	Positive externalities from medical products and services
Shi et al. [7]	Public Health Emergency Management	Public health functions to be undertaken by public hospitals for the prevention and control of outbreaks of infectious diseases

4.2. Analysis of the Reasons for the Dilution of Public Welfare in Public Hospitals

Some scholars have conducted in-depth analyses of the reasons for the dilution of public welfare in public hospitals. For example, Zhu analysed the reasons for the public welfare in public hospitals, starting from the operating mechanism of public hospitals and the characteristics of medical services [8]. Jiao et al. argued that the subjectivation of medical capital is the main factor limiting the return of public welfare in public hospitals, and the main cause of the subjectivation of medical capital is the imperfect compensation mechanism of the government, so they put forward relevant suggestions in terms of both diversion measures and compensation mechanisms [9]. Liu et al. analysed the performance of the dilution of public welfare, and then explored the reasons leading to the dilution of public welfare in public hospitals [10]. Zhan categorized the reasons for the fading of public interest in public hospitals into "internal barriers" and "external barriers", and discussed them separately [11]. Based on the principal-agent theory, Zhang et al. analysed the reasons for the fading of public welfare in public hospitals from the perspective of the principal-agent relationship between three different subjects [12].

4.3. A Study on the Measurement and Evaluation of Public Welfare in Public Hospitals

At present, the measurement and assessment of the public welfare of public hospitals are mostly quantitative, and the research can be subdivided into two parts:

(1) Research on the evaluation of public welfare in public hospitals. The public welfare of public hospitals needs scientific evaluation methods to better grasp the performance of their public welfare. In constructing the index system, most scholars have adopted the literature method and expert consultation method to screen and integrate relevant indicators. For example, Xiong et al. summarised a large amount of literature and used the expert consultation method to come up with eight primary indicators and 24 secondary indicators of the public welfare in public hospital evaluation index system [13]. In assigning weights to the indicators, more scholars, such as Jiao and Zheng, used AHP to determine the weights of indicators at all levels [14, 15]. In terms of specific application, Liu et al. conducted a randomised questionnaire survey of outpatients who had visited 16 public hospitals in Haikou to evaluate the public welfare of local public hospitals [16]. In addition, Deng et al. used the TOPSIS method to construct a public welfare evaluation system and analysed the effectiveness of the implementation of public welfare in the reform process of this pilot hospital [17]. Wang et al. used the data envelopment analysis method to measure and evaluate the level of public welfare of Beijing's tertiary public hospitals by calculating the efficiency values under each dimension according to the dimensions of secondary and primary indicators [18].

(2) Research on performance evaluation of public hospitals from the perspective of public welfare. Before constructing the indicator system, Li et al. formed a framework and indicator bank for the public hospital performance evaluation indicator system based on literature research and expert consultation method, and then further screened the indicators through three rounds of Delphi expert consultation [19]. Zhou et al. established a framework of a performance appraisal system based on literature research, symposiums and expert interviews, and applied historical data for validation, finally arriving at a performance appraisal system regarding one objective, four categories of departments, three major assessment modules, and two-level appraisal allocation of hospital and departments [20]. Based on lean theory, Nong et al. applied the process tracking method to dynamically evaluate the performance of 22 tertiary public hospitals in Beijing [21]. Wang et al. constructed a public hospital employee performance evaluation system based on ideas such as the balanced scorecard and the key performance indicator method and applied the evaluation system to assess the performance of hospital employees using the Kunshan First People's Hospital as an example [22].

4.4. A Study on the Path to Enhance the Public Welfare of Public Hospitals

The public interest cannot be maintained without the support of multiple parties, and research on the path to enhance the public welfare in public hospitals has been conducted from the following three perspectives.

(1) Maintaining the public welfare from the internal perspective of public hospitals. This research mainly focuses on aspects such as medical staff remuneration or performance systems. Based on stakeholder theory and through game analysis, Niu et al. argue that the remuneration of medical staff should not be measured by performance alone, but should be linked to their reputation and earnings [23]. In addition, public hospitals should further optimise their internal management practices and achieve management transformation. For example, Chen et al. proposed that public hospitals should achieve "three transformations", from scale expansion to quality and efficiency, from crude management to refined management, and from focusing on material elements to talent and technology [24].

(2) Enhancing public welfare compensation from the government's perspective. Yao et al. argue that the government, as the agent of the public, should formulate norms on the implementation of social responsibility at the institutional level, establish a governmental regulatory mechanism, actively promote the implementation of social responsibility, and safeguard social justice and the public's health rights [25]. Jiang et al. regard "government-led" as the construction of investment guarantee mechanism and operation compensation mechanism, and believe that the policy path of financial investment in medical insurance, hospital service provision and medical insurance payment service is relatively clear at present. The key to ensuring the efficiency of the use of medical insurance funds is that the medical insurance payment system can purchase standardized and efficient diagnosis and treatment services, and give full play to the role of the price mechanism [26]. Based on the perspective of the whole life cycle of financial budget management, Wu et al. proposed that a clear and feasible contractual relationship between the government and hospitals and a dynamic compensation monitoring mechanism could be established in China through a comparative analysis of the financial mechanisms of compensation in Germany, France and China [27].

(3) Expanding the pathway of compensation for public benefit from a social perspective. In a market economy, it is difficult for hospitals to maintain their public benefit on their own, so it is necessary to establish a scientific and reasonable compensation mechanism [28]. Chen et al. argue that in order to increase the compensation for public welfare, in addition to the government's financial input, donations from enterprises, society and individuals can also be strongly encouraged [24]. Some scholars have also constructed different compensation models for analysis based on game theory. For example, Gao et al. constructed four different compensation models for public hospitals, starting from each stakeholder body in public hospitals, and finally proposed that public hospitals should develop corresponding compensation strategies according to their own goals and combining different interest bodies [29].

5. Research Trends and Frontier Perspectives

In order to get a more intuitive picture of the dynamic evolution of public hospital public interest research hotspots from 2005-2022, research in the area of public welfare of public hospital can be divided into three development phases: 2005-2015, 2016-2019, and 2020-2022.

From 2005 to 2015, public welfare in public hospital was in the initial and rapid development stage, and the research in this stage focused on: (1) Seeking the return path of public welfare in public hospital in the context of the new medical reform. Since 2003, China has been calling for a new medical system reform, and the medical system reform has also promoted the development of

research in public welfare of public hospital, and the return of public welfare is a hotspot and a difficult point in deepening medical reform at present. (2) Performance assessment of public hospital's public welfare. After the construction of the index system, more scholars use the Delphi method and hierarchical analysis to assign weights, so as to make a scientific and reasonable evaluation of the public welfare performance in public hospitals. (3) Exploration of the compensation mechanism of public hospitals. Improving the compensation mechanism of public hospitals is an important part of China's medical system reform and an important cornerstone for ensuring the public welfare of public hospitals in China, and a reasonable compensation mechanism can stimulate the return of public welfare of public hospitals in China to a certain extent.

From 2016-2019, when the development of public welfare in public hospital realization path tends to mature, this stage, in addition to research on compensation mechanisms, performance evaluation and other aspects, also focuses on (1) Thinking about the definition of the connotation of public welfare in China's public hospitals. As a concept, public welfare in public hospital has different forms of expression, which in turn affects people's specific perception of it [30]. The definition of the concept of public welfare in public hospitals varies in different contexts. (2) Analysis of public hospitals' introduction of social capital to achieve external cooperation models. When there is a serious shortage of health resources, it becomes necessary to introduce social capital to compensate public hospitals [31]. At present, there are many applications of the PPP model in practice, but the specific extended service model, as well as the problems and risks associated with external cooperation, need to be analysed in depth.

From 2020-2022, with the outbreak of the new crown epidemic at the end of 2019, China's healthcare industry ushered in a huge challenge, and the trends of this phase and future research are summarised as follows: (1) Compensation mechanisms were further improved. Public hospitals have been affected by the abolition of drug and consumables mark-ups and epidemic prevention and control, resulting in a decline in medical business revenue and an increase in operating costs [24]. Under the new situation, measures need to be taken to broaden compensation channels, improve the medical insurance settlement and payment model, and reasonably adjust the prices of medical services. (2) Under the epidemic, the improvement of public welfare of public hospitals should be combined with the optimization of operation mode. Many hospitals are facing various operational management problems such as resource allocation and cost control brought about by the prevention and control of the New crown epidemic. How to maintain public welfare and improve the level of internal refinement of hospital operational management is one of the future directions of optimization [32]. (3) Research on public welfare in the context of high-quality development. Due to the deepening of the reform of the medical and health system, the development of public hospitals has become a higher quality requirement, and the corresponding modern management system needs to be improved [33]. Public hospitals need to reform their internal management, making it more refined, informative and scientific, in order to better ensure public welfare.

6. Conclusions

This paper uses CiteSpace software to sort out and analyse the literature on public welfare of public hospital research, describe the research hotspots and research evolution trends in this research field, review the research hotspots, and finally reach the following conclusions: (1) From the analysis of research hotspots, qualitative descriptions, such as the connotation of public hospitals, the reasons for dilution and improvement strategies, are mostly used, while quantitative research accounts for a relatively small number of studies. (2) In terms of research trends, future research hotspots on public welfare of public hospital can be developed from the perspectives of high-quality development, refined management and epidemic normalization.

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