

Development and trend of contract service research of family doctors in China in recent ten years --Visual analysis based on city space

Jiahui Liang¹, Xusheng Zhang^{2,a,*}, Lifan Yang¹, Peilin Huang¹

¹Labor and Social Security, Guangdong Medical University, Dongguan, Guangdong, China

²Humanity and Management College, Guangdong Medical University, Dongguan, Guangdong, China

^azhangxusheng@gdmu.edu.cn

*Corresponding author: Xusheng Zhang

Abstract: The contracted service of family doctors is a key task in an important stage of deepening the comprehensive reform of grass-roots health and promoting graded diagnosis and treatment. By analyzing the relevant papers on the contract services of family doctors included in CNKI from 2011 to 2020, this study uses CiteSpace software to carry out visual analysis from the aspects of time, author, and keywords, and sort out the evolution trend of its research through the obtained knowledge map. It is found that many authors and institutions with high academic influence have issued documents on the research of Family doctor contract service in China, and the number of documents has shown an increasing trend on the whole. However, more academic research is still superficial and not deep enough. Future research should strengthen the close cooperation between authors and cross-regional institutions.

Keywords: Contracted services of family doctors, Visual analysis, CiteSpace

The "family doctor" is the primary provider of home medical services. On June 6, 2016, seven departments including the medical reform office of the State Council and the national health and Family Planning Commission jointly issued the guiding opinions on promoting the contracted services of family doctors, which clearly pointed out that "family doctors are the first responsible person for providing contracted services for the masses." In recent years, under the active guidance of general practitioners, the family doctor system has gradually realized reform and development. As one of the key hot words of the current medical reform, the research in this field has also developed rapidly. Sign due to the family doctor service pilot is still relatively early, and studies in this field are also a lack of comb. Therefore, based on CiteSpace software, this paper made a visual analysis of the hot spots and development trends of family doctor contract service research in recent ten years in China, and deeply analyzed the development process and problems of current contract service, it provides a reference for the further in-depth research and development of Family doctor contract service

1. Methods and Data Sources

1.1. Method Introduction

In this paper, the scientific knowledge map tool, CiteSpace software, is used to carry out visual analysis on the research literature of Family doctor contract service in the form of a knowledge map. CiteSpace is a software used to discover and display the new trends and trends of scientific development in scientific literature. At present, it has become a widely used knowledge mapping tool.

1.2. Data Sources

The source of this paper is the academic journal library of China Knowledge Network (CNKI). Taking "Family doctor contract service", "family doctor signing" and "Family doctor contract service mode" as the search subject words, this paper selects the publication time as 2011-2020, and excludes irrelevant documents such as news reports, recommended relevant books, conference articles and the lack of authors. Finally, 798 pieces of data including the author, keywords, and abstract of the article are obtained, which are exported to the RefWorks format file. CiteSpace software is used to visually

analyze them through a knowledge map, which is used as literature research data.

2. Results and Discussion

2.1. Time Context Analysis

Figure 1 shows the annual distribution of relevant academic literature retrieved by CNKI. From 2011 to 2015, the number of published articles in this period showed an extremely slow growth rate. At that time, family doctor service was not widely known, and only carried out pilot work in several major cities. From 2016 to 2019, the number of articles published in this stage has increased rapidly with a large growth rate, which is undoubtedly promoted by the successive release of various relevant national policies. By 2020, there has been a slight decrease in the number of publications, but the family doctor contract service is still a popular research state.



Figure 1: Annual distribution of academic literature.

2.2. Author Collaboration Network

The author is the main part of scientific research. Through CiteSpace software, we can visually analyze the research of Chinese Family doctor contract service and explore the core authors in this field. In CiteSpace, take "author" as the network node, select "Pathfinder" and "practicing sliced networks" in-network tailoring. Run CiteSpace and we will get an Author cooperation network with 326 nodes and 542 connections, the network density is 0.0102. After the network is generated, the author's cooperation will form several natural clusters. The author's cooperation within the cluster is close, and the author's cooperation between various classes is less.

The author's cooperation network is shown in Figure 2, in which each structural grid represents a cluster, and the more obvious two structural grids are shown in Figure 3. The size of their nodes indicates the number of documents issued by authors, the connection between them represents the interaction and cooperation between authors, and the color of the connection represents the year of the first cooperation between authors. The thicker the connection is, the higher the intensity of their cooperation, which indicates that there is a certain cooperative relationship between the authors in the two clusters. It can be seen from Figure 2 that the number of clusters in the author collaboration network is small and scattered, indicating that there is almost no cooperation and communication between the author groups, and authors in this field have not yet formed a clear cooperative position. Among the two main author cooperation networks in Figure 3, the most closely studied authors are the author cooperation networks dominated by Zhang Yimin, Huang Jiaoling, and Liang Hong, and their cooperation is more frequent.

From Table 1, it can be seen from the organization to which the author belongs that the researchers' network takes the same organization as the main body of the relationship, and there is little cooperation between the institutions. At the same time, among the nine important research authors in Table 1, the issuing institution is mainly the school of public health in the medical college, indicating that the topic is still relatively focused on the field of public health research. As can be seen from the research content of the core authors with the largest number of publications, the author cooperation network led by Zhang Yimin mainly focuses on the implementation, construction, development, and satisfaction of the Family doctor contract service in Shanghai, focusing on the initial research of the Family doctor contract service.

Table 1: Important Research Authors of Contracted Services of Chinese Family Doctors in the Recent 10 Years.

	AUTHOR	FREQUENCY	AUTHOR UNIT
1	Zhang Yimin	17	Shanghai Pudong Institute of health development
2	Liang Hong	17	Shanghai Pudong Institute of health development
3	Huang Jiaoling	15	School of public health, medical college, Shanghai Jiaotong University
4	Jiang Ping	11	Shanghai Changning District Health and Family Planning Commission
5	Chen Jiaying	9	School of medical administration, Nanjing Medical University
6	Sun Huajun	8	School of public health, Tianjin Medical University
7	Yin Wenqiang	8	School of public health and management, Weifang Medical College
8	Huang Xiaoguang	7	School of public health, Nanjing Medical University
9	Liu Shanshan	7	Shanghai Pudong Institute of health development

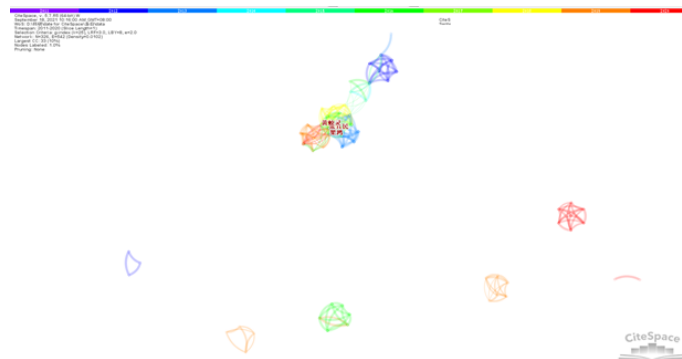


Figure 2: Family doctor contract service Author Cooperation Network.

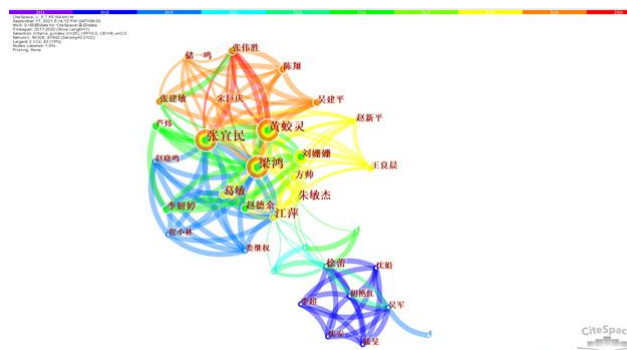


Figure 3: Cooperation Network of Two Main Authors of Family doctor contract service.

2.3. Main Research Contents and Research Directions

2.3.1. Literature Analysis of Key Nodes

Run CiteSpace to cluster the keywords and generate the keyword collinear knowledge map, as shown in Figure 3. The results show that taking 2011-2020 as the time slice, the top 5 nodes on the slice are selected. N represents 352 nodes in the graph, E represents 1331 relationships between nodes, the network density is 0.0215, the Q value is 0.417 (> 0.3 means obvious clustering structure), and the S value is 0.7322 (> 0.7 means convincing clustering). It can be seen from the analyzed data that the obtained collinear knowledge graph of keywords has a significant and convincing structure.

In the analysis results of CiteSpace, the keywords with high centrality and frequency are the topics of common interest to researchers in a certain period, that is, research hotspots. The theme of the literature search is "contracted services of family doctors". As can be seen from Figure 4, the top few in the research literature with the highest frequency are "contracted services" and "contracted services of

family doctors", followed by "community health services", "graded diagnosis and treatment", "hypertension" and "general practitioners".

Through the keyword clustering map and related literature, it is concluded that the hot areas of the subject literature of Family doctor contract service mainly include the following aspects: first, the discussion of the Family doctor contract service model; the second is the research on the existing problems in its development; third, the related research of their satisfaction; the fourth is the analysis of the influencing factors of its utilization.

(1) Study on the contract service model of family doctors

The operation of family doctor contract service mainly depends on the cooperation between the government, relevant health institutions, and service objects. In order to better promote the rapid development of Family doctor contract service, each region constantly explores the service mode with its own characteristics and has achieved certain results..

For example, the "12345" Family doctor contract service model created by Yuzhong District of Chongqing mainly focuses on the summary and analysis of the contract services of family doctor studios around "one grid system, two coordination mechanisms, three types of publicity linkage, four common management paths and five connotation lists" [2]. A grid system refers to the contracted service management system formed by the integration of streets, community neighborhood committees, community health service centers, municipal hospitals, and social organizations. The two coordination mechanisms refer to the simultaneous operation of a joint meeting system and interactive sharing mechanism to integrate community resources and strengthen community management. Three types of publicity linkage refer to the linkage of new media, pension institutions, and municipal hospitals to increase the publicity of contracted services. The four co-management paths refer to the four paths of community collaborative service path, family doctor team service path, management target range path, and volume efficiency assessment index path to jointly manage the contracted services. The list of five connotations increases the sense of participation of the contracted residents and makes the residents better understand the contracted services and their physical conditions.

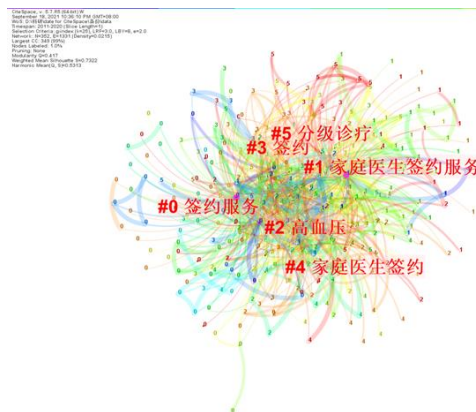


Figure 4: Hot Spot View of Family doctor contract service Research.

Xiamen city has created a "three-division co-management" family doctor contract service model, which focuses on serving patients with chronic diseases and establishes a comprehensive medical system based on general practitioners, health managers in grass-roots medical and health institutions, and specialists in tertiary hospitals[3]." Three divisions jointly manage", that is, the three divisions jointly manage, general practitioners are responsible for the implementation, execution, and testing; health managers are responsible for the health education of the contracted residents, and hospital specialists are responsible for diagnosis and treatment. This service model can enable patients with chronic diseases to be finely managed, and can more effectively prevent, control, and treat chronic diseases.

The contract services mode implemented by all localities can be well combined with the situation of the local region to formulate a model in line with the local situation, so that residents can enjoy better and better contract services, effectively improve their contract signing rate and promote the development of Family doctor contract service.

(2) Study on the problems existing in the development of family doctor contract service

Understanding the problems of Family doctor contract service is a necessary step to promote its

further development. Referring to the development status of Family doctor contract service in some areas in recent years, from the perspective of the public, there are mainly the following problems: first, residents do not know much about Family doctor contract service; second, the allocation of health resources in grass-roots hospitals is insufficient, and the medical needs of residents can not be met[4]; third, the contracted service policy cannot be implemented in place; fourth, although the signing rate has been improved to a certain extent, the quality of performance is not high; fifth, residents have low recognition of the contracted services and will conflict with them[5].

From the perspective of policy implementation, there are the following problems: first, the family doctor team does not have a perfect inspection policy, resulting in inadequate supervision of family doctors; second, the grass-roots community urgently needs a family doctor team, and there is a shortage of high-level general practitioners; third, the integration of social resources in grass-roots hospitals is not strong, and the information level lags; fourth, the performance evaluation mechanism is not perfect, the salary of contracted doctors is low, and the welfare is insufficient compared with other doctors[6].

From the above situation, it can be concluded that there are still many problems in the contract services of family doctors, and it still needs a long time to practice, improve and improve, to create a contract service in line with China's national conditions and current situation.

(3) Investigation on the satisfaction of family doctors' contracted services

To improve the contracted services of family doctors, we need to understand the satisfaction of the contracted residents in the contracted services. Some scholars have analyzed the satisfaction of residents in their area. For example, Han Xue investigated the residents in Shuangqiao District, Chengde City in 2021. The data show that the contracted residents are more satisfied with all parts of the contracted services, and the satisfaction is more than 3 points (full score of 5 points), indicating that the overall satisfaction of the contracted services of family doctors is high. However, the lowest satisfaction is the types of medical equipment and drugs. From the returned questionnaire, it is not difficult to find that most of the contracted residents are older, and only a small part of them are young people. The main reason is that the key service objects of the contracted services are the elderly and patients with chronic diseases, and young people do not pay much attention to their health status. The services provided in the service include free blood pressure, blood glucose, or free physical examination, For the elderly, it is still attractive. From the scholar Zhu Chang's satisfaction with the contracted services of Nanjing residents in 2019, it is also the low satisfaction with the types of drugs and the upgrading of medical devices. It can be seen that these two aspects have not been well improved in recent years. Medical drugs and devices play a key role in treatment, which will lead to the low quality of grass-roots health treatment services. The improvement of these two items will not only help to improve the satisfaction of contracted services but also further promote the development of first diagnosis and graded diagnosis and treatment at the grassroots level.

Through the above analysis, it can be concluded that residents are generally satisfied with the contracted services, but there will be different satisfaction with some aspects of the contracted services in different regions. This shows that there is still a gap in the previous family doctor services in various regions. The deficiencies should be improved and further improved, to obtain the contracted services of family doctors in all regions of the country and better serve people.

(4) Analysis of influencing factors on the utilization of contracted services of family doctors

According to the survey results of scholar Deng Yuhua, the utilization rate of contracted services of family doctors in China is 6.9%. From the perspective of regional distribution, the service utilization rate is relatively high in the eastern and central regions, while the western region is the region with the lowest service utilization rate. Moreover, the utilization level of contracted services of family doctors also increased significantly with the increase of age; the higher the education level of residents, the utilization rate did not increase with the growth of knowledge; the utilization rate of men is much higher than that of women; the utilization rate of residents with good economic conditions is significantly higher than that of residents with poor economic conditions; the registered residence service of residents is better than the non-registered residence residents.

Comprehensive analysis shows that the factors that affect the utilization of Family doctor contract service are age, gender, education, contract awareness, registered residence, and economic status. The reason may be that older people will pay more and more attention to their physical health and increase the demand for medical services; residents with high education pay more attention to their physical health and are more likely to go to large hospitals for treatment; men will pay more attention to the

changes of national policies than women; the economic situation affects the utilization rate of contracted services of family doctors between regions, and also affects the utilization rate of residents. The popularization rate of contracted services of family doctors will be higher in regions with good economic development, and the utilization rate will be relatively affected by it, while residents with poor economic conditions will spend more time on making money; when they have a minor illness, they will be more willing to take medicine at home rather than go to the hospital for treatment; the floating population will also pay less attention to medical policies.

2.3.2. Keyword Emergence and Research Frontier Analysis

Through the keyword emergence of the selected literature, this paper can intuitively understand the dynamic development process of keywords over time, to objectively show the research frontier in this field. Figure 5 shows the results of sudden analysis of keywords of contracted services of family doctors from 2011 to 2020 using CiteSpace.

In the first stage (2011-2015), community health service, health service, service model, and family doctor system are the main keywords of this stage. The guiding opinions of the State Council on the establishment of the general practitioner system in 2011 pointed out that it is necessary to fully understand the significance and importance of establishing the general practitioner system. The establishment of the general practitioner system is an objective requirement to further improve the quality of grass-roots medical and health services and a major measure to further promote the reform of the medical and health service model. From this, we can know the relationship between the general practitioner system and health services. One of the goals of the emergence of the general practitioner system is to further standardize the level of residents' medical treatment by improving family medical services and gradually form a grass-roots first diagnosis and hierarchical diagnosis and treatment model[10]. At this stage, there appeared many researches on community health service and health service demand. The reason is that the key to establishing a grass-roots medical system of first diagnosis and hierarchical diagnosis and treatment is the development of community health institutions. In addition, the emergence of the general practitioner system also makes scholars start to study the family doctor system and promote the establishment of a hierarchical diagnosis and treatment system.

In the second stage (after 2016), primary medical and health institutions, general practitioners, family doctor team, signing rate, two-way referral, community family doctors, countermeasures and current situation have become the keywords of this stage. In 2016, the Guidance on Promoting the Contracted Service of Family Doctors was issued, which has attracted great attention from society. There are two reasons for promoting Family doctor contract service. First, hospitals can not meet the long-term and sustainable medical needs brought by population aging, urbanization, and chronic patients. Second, when choosing treatment methods, residents are more inclined to go to large hospitals for treatment. These circumstances make it impossible to improve the medical environment and balance medical resources. The emergence of contracted services can improve the above problems, better protect the health problems of grass-roots people, implement the responsibility to grass-roots medical and health institutions, and promote the development of graded diagnosis and treatment. Since 2016, a new development has been made in deepening the reform of the medical and health system. In recent years, scholars have made a series of studies mainly around the issues related to the contract services of family doctors. They began to pay attention to the signing and development status of family doctors, and think about how to make family doctors get more comprehensive coverage and development in China.

Top 15 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2011 - 2020
社区卫生服务	2011	5.05	2011	2014	
家庭医生制	2011	1.9	2011	2014	
社区卫生	2011	3.16	2012	2016	
服务模式	2011	2.59	2013	2015	
家庭医生制度	2011	1.75	2014	2015	
基层医疗卫生机构	2011	2.92	2016	2017	
全科医生	2011	2.34	2016	2017	
家庭医生团队	2011	2.04	2016	2017	
医师	2011	1.86	2016	2018	
家庭医生	2011	1.86	2016	2018	
签约率	2011	2.2	2017	2018	
双向转诊	2011	2.15	2017	2018	
社区家庭医生	2011	1.79	2017	2018	
对策	2011	2.09	2018	2020	
现状	2011	1.88	2018	2020	

Figure 5: Keywords of Family doctor contract service.

3. Conclusion and Prospect

Family doctor contract service is the key task of deepening the reform of the medical and health system in 2017. Although the contract services have been carried out in China for a short time, the direction is correct and in line with China's basic national conditions. All regions are also increasing the publicity of contract services and rapidly expanding their popularity, so as to solve the current medical problems in China. Based on the CiteSpace software, a total of 798 documents screened from CNKI are analyzed, and the results are as follows.

In terms of the time frame of the research on the contracted services of family doctors, it was clearly pointed out for the first time in 2011 that the general practitioner system should be established, and scholars began to carry out the research on family doctors gradually in the same period. Later, with the continuous reform of the national medical cause, family doctors were paid attention to, and the guidance on promoting the contracted services of family doctors was officially issued in 2016. Since then, the number of documents has increased exponentially.

On the family doctor contract service research author cooperation network, from its knowledge map, it can be found that there are still few cooperation and exchanges between authors. Most of the authors who cooperate with each other come from the same institution, and their cooperative research is relatively close.

In the research hotspot of family doctor contract service, it is mainly reflected in the discussion of family doctor contract service mode; research on the problems existing in its development; research on their satisfaction; and the analysis of the influencing factors of its utilization.

Finally, on the research frontier of the topic of family doctor contract service, we can know that the family doctor contract service in China has experienced two stages since 2011. From 2011 to 2015, the emergence of the general practitioner system made family doctors show signs. Since 2016, the proposal of family doctor contract service has attracted more and more attention, which has become the research focus of medical reform in recent years.

In recent years, there is a lack of cross-regional cooperation between researchers, but there is still a lack of cross-regional cooperation between researchers, and there is also a lack of comprehensive research services for families. To make the contracted services of family doctors develop better, more scholars need to conduct deeper research.

References

- [1] Cao Hong; Gong Jianmei; Wang ZG. Analysis of research status of medical association in China based on Citespace [J]. *Future and Development*, 2018, (11) : 4-8.
- [2] Zhong Yu, Liu Luxia. Research on grid family doctor contract service model under medical and prevention integration [J]. *Chinese Journal of General Medicine*. 201, 24(19) : 2412-2417.
- [3] Lu Yun, Jing Rize, Wang Demeng, et al. Analysis of incentive mechanism of family doctor's contract service -- Based on "three teachers co-management" model in Xiamen city [J]. *Chinese Journal of General Medicine*. 201, 24(16) : 1995-2002.
- [4] Zhu Guiyin, Chen Jun, Wang Chenhuan, et al. Development status and Countermeasures of family doctor contract service in Wenzhou [J]. *Chinese community physicians*. 2019, 35(30) : 186-188.
- [5] Tian Yongfeng, Teng Yuxin, Wang Wei, et al. Survey on signing rate, satisfaction and demand for TCM services of residents in a district of Beijing in 2020 [J]. *World Journal of Integrated Chinese and Western Medicine*, 201, 16(5): 953-956.
- [6] Zhang Miao, Guo Ziwei, Zhang Hao, et al. Current status and countermeasures of family doctor contract service mechanism from the perspective of Health China [J]. *Chinese modern distance education of traditional Chinese medicine*. 2020, 18(07) : 163-165.
- [7] Han Xue, Li Jun, Wang Yiwei. Investigation on the current situation of contracted services of family doctors and residents' satisfaction in Shuangqiao District, Chengde City [J] *Medical information*, 2021, 34 (10): 142-144.
- [8] Zhu Change, Zhou Dandan, Sheng Mengfei, et al. Survey on satisfaction and status of signing service of family doctors in Nanjing [J]. *Chinese journal of medicine and society*, 2019, 32(11): 97-101.
- [9] Deng Yuhua. Analysis on the status and influencing factors of family doctor contract service utilization in China: Based on the survey of 31 provinces and cities in China [J]. *China Health Policy Research*, 2020 13 (9) : 47-54.
- [10] Wei Wei, Zhang Shangwu, Xiong Juyang. Discussion on the mechanism of building family medical contract service system in China [J]. *Chinese journal of general practice*, 2016, 19 (10) : 1129-1132.