

Quantitative Analysis of the Medical and Health Sector in the Shaanxi-Gansu-Ningxia Border Region Based on CiteSpace

Yetong Fu¹, Jing Ouyang^{2,*}

¹School of Public Health, Shaanxi University of Chinese Medicine, Xianyang 712046, Shaanxi, China

²School of Humanities and Management, Shaanxi University of Chinese Medicine, Xianyang 712046, Shaanxi, China

*Correspondence Author

Abstract: *This paper selects 119 relevant literature on the medical and health sector in the Shaanxi-Gansu-Ningxia Border Region from 1995 to 2024 in the China National Knowledge Infrastructure (CNKI). It employs Citespace software and literature analysis methods for a quantitative study. The results indicate that the volume of publications in this field is increasing but growing slowly, with insufficient collaboration among research institutions and a regional clustering effect. Under challenging conditions, the Border Region established a medical system that included the rational allocation of resources, the cultivation of diverse talents, the formulation of stratified medical insurance policies, the promotion of the integration of traditional Chinese and Western medicine, and the implementation of health epidemic prevention and maternal and child health care. Its developmental experiences provide significant insights for contemporary health system construction, policy development, and cultural construction, offering historical references and thought expansion for the development of modern medical and health services.*

Keywords: Shaanxi-Gansu-Ningxia, Medical and Health Sector, Quantitative Analysis, CiteSpace.

1. Introduction

In the ongoing process of contemporary China's development, a series of significant decisions and deployments have guided progress across various fields. The Yan'an Spirit, as an invaluable spiritual treasure, has demonstrated unique significance at different stages of China's development, encompassing concepts such as hard work, self-reliance, and serving the people[1], which have had a notable impact at various critical junctures. The Central Military Commission's Political Work Conference held in Yan'an in June 2024 highlighted President Xi Jinping's emphasis on the Shaanxi-Gansu-Ningxia Border Region, underscoring the continued relevance of the Yan'an Spirit in the new era. On January 3, 2025, the General Office of the State Council issued the Opinions on Comprehensively Deepening the Reform of Drug and Medical Device Supervision to Promote High-Quality Development of the Pharmaceutical Industry, which, based on Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, implements key points from the 20th National Congress of the Communist Party of China and subsequent plenary sessions. Through multiple targeted measures, it focuses on key aspects of the pharmaceutical industry, increasing support for traditional Chinese medicine research and innovation while strengthening supervision to ensure industry compliance, laying a solid foundation for the high-quality development of current medical and health services.

The Shaanxi-Gansu-Ningxia Border Region (hereinafter referred to as the "Border Region"), established on September 6, 1937, and dissolved in January 1950[2], is located in northern Shaanxi, eastern Gansu, and southeastern Ningxia. During this period, democratic politics gradually flourished, and public economic growth was steady. The development achievements in the medical and health sector of the Border Region were particularly remarkable. Facing severe realities, including a harsh external environment, weak medical

infrastructure, and severe shortages of medical supplies, medical and health practitioners persevered in their posts, relying on firm beliefs and sustained efforts to serve the military and civilians in the Border Region. They set safeguarding the health of the military and civilians as their core goal, systematically advancing medical treatment, preventive care, and other services. Concurrently, they constructed a medical and health system tailored to the actual conditions of the Border Region, cultivated numerous healthcare professionals, systematically carried out health epidemic prevention, women's and children's health care, and effectively improved the living conditions of the Border Region's populace. Delving into the developmental trajectory of the medical and health sector in the Shaanxi-Gansu-Ningxia Border Region not only aids in understanding the Party's continuous efforts in safeguarding people's livelihoods during the revolutionary period but also provides historical references for advancing contemporary medical and health services, helping to forge new development paths.

2. Research Methods

2.1 Data Collection

The China National Knowledge Infrastructure (CNKI) database was selected, using keywords such as "Shaanxi-Gansu-Ningxia medical and health services," "Shaanxi-Gansu-Ningxia health services," and "Shaanxi-Gansu-Ningxia medical and health services" to retrieve relevant academic papers from the past thirty years, with a time frame limited from January 1, 1995, to December 31, 2024. The search encompassed various types of literature, including journal articles and theses, collecting 155 papers. After applying inclusion and exclusion criteria, excluding papers without authors, institutions, or those with low relevance to the topic, and using Citespace software for deduplication, 119 valid papers were included.

2.2 Research Tools and Methods

This study used Citespace software to create scientific knowledge maps. By importing the 119 valid papers related to the medical and health sector in the Shaanxi - Gansu - Ningxia Border Region from 1995 to 2024, which were collected from CNKI, into Citespace software, its built - in algorithms and functions were used to visually analyze information such as the number of publications, research institutions, authors, and keywords. Subsequently, literature analysis methods were adopted to (sort out the developmental stages and existing achievements of the medical and health sector in the Shaanxi - Gansu - Ningxia Border Region, including academic monographs and journal articles, and summarize and analyze its developmental context.

3. Research Results

3.1 Analysis of Publication Volume

From 1995 to 2024, the research publication volume on the medical and health sector in the Shaanxi-Gansu-Ningxia Border Region showed an overall upward trend but with relatively slow growth. The number of publications was low and grew slowly from 1995 to 2000. Between 2000 and 2010, the publication volume increased gradually, showing an overall upward trend. After 2010, the publication volume increased at a slightly faster rate, but the amplitude remained relatively small.

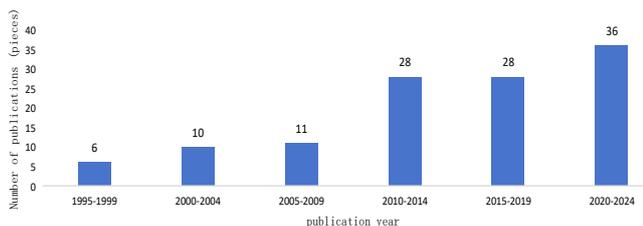


Figure 1: Publication Volume of Research on the Medical and Health Sector in the Shaanxi-Gansu-Ningxia Border Region from 1995 to 2024

3.2 Visual Analysis of Research Institutions

Table 1: Research Institutions with ≥5 Publications on the Medical and Health Sector in the Shaanxi-Gansu-Ningxia Border Region

Research Institution	Number of Publications (Papers)
Yan'an University	18
Northwest University	8
Shaanxi Normal University	8
Lanzhou University	8
Jilin University	7
Gansu Provincial Medical Information Institute	5
Northwest Normal University	5

In terms of research institutions (Table 1), Yan'an University had the highest publication volume, with 18 papers, occupying a significant position in this field. Northwest University, Shaanxi Normal University, and Lanzhou University also had relatively high publication volumes, each with 8 papers. Jilin University, Gansu Provincial Medical Information Institute, and Northwest Normal University had publication volumes of ≥5 papers. However, the overall network density was low, showing a relatively concentrated

geographical pattern of cooperation (Figure 2). In the core author map (Figure 3), there were few connections among many authors, indicating relatively infrequent cooperation among authors from different institutions to some extent but also reflecting broad potential for future cooperation.

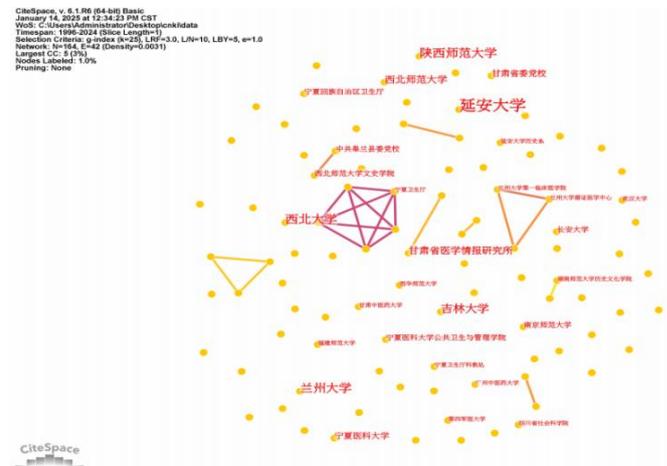


Figure 2: Map of Research Institutions Related to the Medical and Health Sector in the Shaanxi-Gansu-Ningxia Border Region

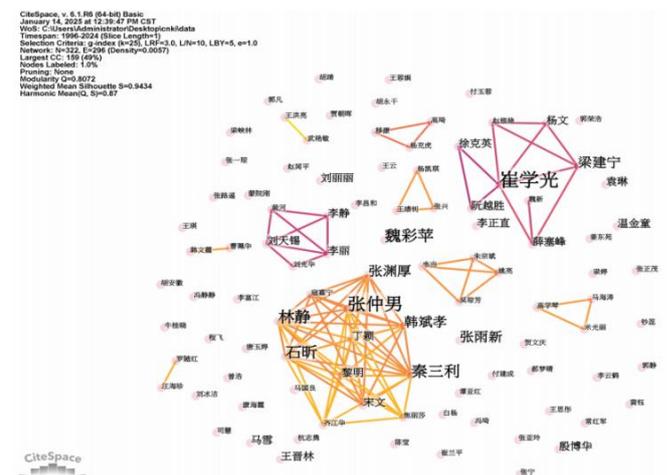


Figure 3: Map of Core Authors Related to the Medical and Health Sector in the Shaanxi-Gansu-Ningxia Border Region

3.3 Analysis of High-Frequency Keywords

3.3.1 Co-occurrence and Cluster Analysis of Keywords

The keyword co-occurrence map showed that terms such as “Anti-Japanese War period,” “Yan’an period,” “medical and health services,” and “medical and health care” appeared frequently and were closely connected with numerous other keywords, reflecting their important status in the research and the associations between different research themes. Additionally, “Anti-Japanese War period” was closely linked with “medical and health care,” indicating that the construction and development of the medical and health sector in the Shaanxi-Gansu-Ningxia Border Region during this special historical period revolved around the needs of the war effort. “Traditional Chinese Medicine” and “Integration of Traditional Chinese and Western Medicine” echoed each other, reflecting the Border Region’s exploration of integrating traditional and modern medicine in medical practice.

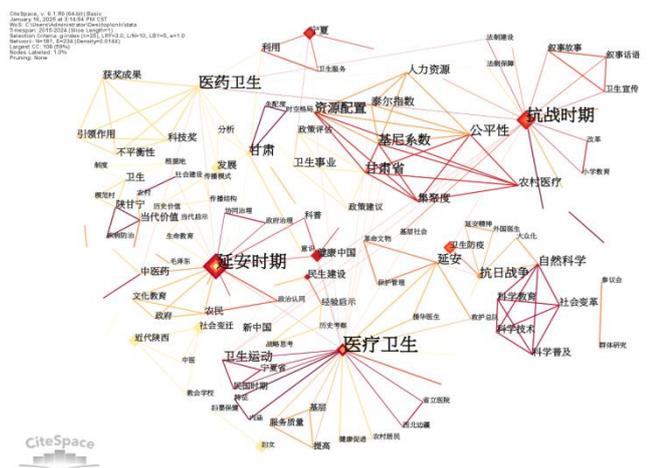


Figure 4: Keyword Co-occurrence Map of the Medical and Health Sector in the Shaanxi-Gansu-Ningxia Border Region

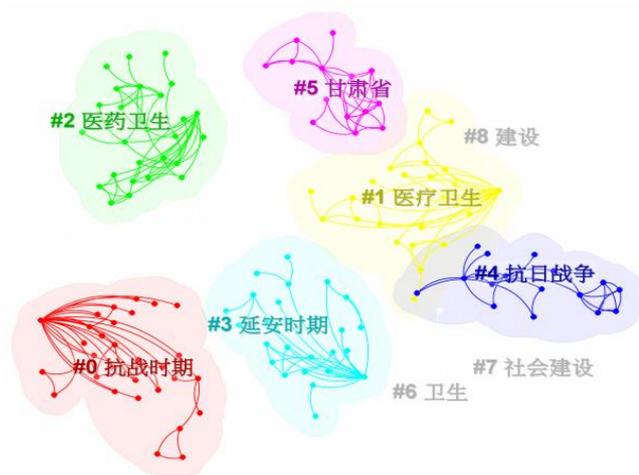


Figure 5: Keyword Cluster Map of the Medical and Health Sector in the Shaanxi-Gansu-Ningxia Border Region

3.3.2 Analysis of Keyword Timeline Map

In the keyword timeline map (Figure 6), the focus of keywords varied across different periods. In the early stages, terms related to historical periods, such as “Anti-Japanese War period” and “Yan’an period,” were prominent, reflecting the research’s focus on special historical stages, often revolving around the basic historical facts of the medical and health sector in the Border Region during the Anti-Japanese War context, such as the establishment of medical institutions and the preparation of medical supplies. Over time, keywords such as “Healthy China,” “Traditional Chinese Medicine,” and “Human Resources” emerged, indicating a shift in research perspective from mere historical description to incorporating contemporary development needs and focusing on institutional analysis and social and Party history research. The appearance of “Healthy China” reflected researchers’ consideration of the Border Region’s medical and health sector development experiences’ implications for contemporary national health strategies. The focus on “Human Resources” reflected discussions on the Border Region’s medical talent cultivation, team-building mechanisms, and their implications for modern medical talent development.

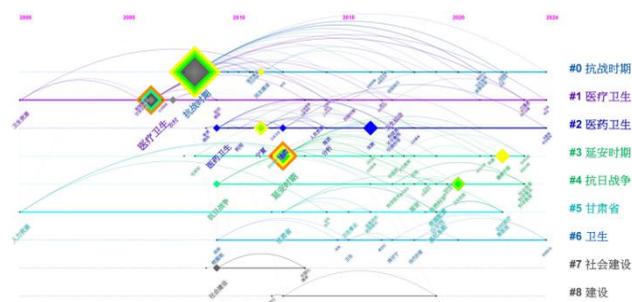


Figure 6: Keyword Timeline Map of the Medical and Health Sector in the Shaanxi-Gansu-Ningxia Border Region

4. Discussion

Based on the analysis using Citespace software, the current research status of the medical and health sector in the Shaanxi-Gansu-Ningxia Border Region exhibits the following characteristics:

(1) **Slow Growth in Publication Volume:** The research publication volume on the medical and health sector in the Shaanxi-Gansu-Ningxia Border Region shows an upward trend but with slow growth, indicating that although the field is gradually receiving attention, its popularity is increasing slowly. The reasons may include: On the one hand, difficulty in accessing materials; the Border Region dates back a long time, and many first-hand medical archives and records are scattered or damaged, limiting in-depth exploration due to the scarcity of research materials. On the other hand, the field involves multidisciplinary knowledge, including medicine, history, and sociology, and there are few researchers who can simultaneously master these disciplines, making it difficult for interdisciplinary research to be widely and deeply conducted.

(2) **Inadequate Cooperation Among Research Institutions:** Cooperation among research institutions in this field is insufficient, with low network density and no large-scale, tightly-knit cooperation network formed, exhibiting a geographical clustering effect. The reasons may include: First, different regional research institutions are far apart, making face-to-face exchanges costly and reducing the timeliness and depth of cooperation. Second, medically-oriented institutions focus on clinical practice exploration, while history and social science institutions emphasize historical data sorting, lacking a common discourse system and integration channels, making collaborative innovation difficult.

(3) **Gradual Expansion of Research Perspectives:** High-frequency keywords indicate that research on the Border Region mainly revolves around special historical periods such as the Anti-Japanese War. Early research mostly focused on historical event descriptions. As research progressed, the perspective shifted towards institutional analysis and social history research. The emergence of keywords such as “Healthy China” and “Traditional Chinese Medicine” reflects the importance of exploring the implications of historical experiences for contemporary medical development.

5. Conclusions and Implications

5.1 Summary of Research Conclusions

This study employed Citespace software and literature analysis methods to conduct a quantitative analysis of 119 papers related to the medical and health sector in the Shaanxi-Gansu-Ningxia Border Region from 1995 to 2024 in CNKI, examining aspects such as publication volume, research institutions, and perspectives. Furthermore, domestic scholars have also achieved fruitful research results on the medical and health sector in the Shaanxi-Gansu-Ningxia Border Region. Wang Tiandan conducted a macroscopic examination of medical work in the Border Region during the Anti-Japanese War period[3], emphasizing the significant achievements of the Border Region government in formulating medical systems, establishing medical work organizations, and conducting mass health campaigns, highlighting the important role of medical work in safeguarding the health of the military and civilians and supporting the victory of the Anti-Japanese War[4]. Lu Xiqian and Li Zhongquan, in their History of Medical and Health Services in the Shaanxi-Gansu-Ningxia Border Region, systematically elaborated on the development of the medical and health sector in the Border Region from its inception to 1949, covering aspects such as the establishment of medical institutions, the building of medical teams, and the improvement of medical and health regulations[5], especially the biographies recorded in the second volume, laying a solid foundation for subsequent research. Zhao Shiyan, in Glorious Chapters of White-Coated Warriors - Recollections of Yan'an Central Hospital, focused on Yan'an Central Hospital, detailing its establishment background, development status, and important contributions in medical treatment, showcasing the perseverance and dedication of medical staff in harsh conditions [6]. The Border Region achieved remarkable results in health system construction, policy formulation, and cultural development under harsh conditions, laying a foundation for the health of the Border Region's populace and providing valuable experiences for the development of contemporary medical and health services.

5.2 Implications of Historical Experiences for Contemporary Medical and Health Development

5.2.1 Strengthen Information Technology Empowerment for Resource Allocation, Deepen Grassroots Cooperation to Assist in Talent Cultivation

In terms of health system construction, the Shaanxi-Gansu-Ningxia Border Region established a medical system tailored to wartime needs and actual conditions in the Border Region. It formed a dynamic adjustment mechanism with dual orientations of "strategy-livelihood" in resource allocation, establishing a priority allocation system for medicines and equipment through quantitative analysis of population distribution, military layout, and epidemiological data. In talent cultivation, it constructed a gradient model of "grassroots rapid training-advanced in-depth study," rapidly expanding the grassroots health worker team through modular training [7] while achieving medical knowledge transfer and technological localization through overseas study programs.

This not only ensured wartime medical supply but also initiated a special paradigm for public health system construction under resource constraints. Currently, China still faces imbalances in medical resource allocation, with relatively scarce medical resources in remote and grassroots areas. Therefore, modern information technologies, such as big data analysis and geographic information systems, should be utilized to accurately assess medical needs in various regions and formulate scientific resource allocation plans. Regional medical resource coordination should be strengthened by establishing regional medical resource-sharing platforms to promote the rational flow of medical equipment, medicines, and other resources. Meanwhile, drawing on the talent cultivation model of the Border Region, cooperation between colleges and grassroots medical institutions should be strengthened. The proportion of practical teaching should be increased, and grassroots-applicable talents should be cultivated directionally. International exchange and cooperation programs should be established, and outstanding talents should be selected to study advanced medical technologies and management experiences abroad, so as to enhance their international perspectives and innovation capabilities and optimize the structure of medical and health talents. Investment in grassroots medical and health institutions should be increased, infrastructure should be improved, grassroots medical service capabilities should be enhanced, a hierarchical diagnosis and treatment system should be established to guide patients to seek medical care rationally, improve the utilization efficiency of medical resources, and form an orderly medical-seeking pattern.

5.2.2 Improve Medical Insurance Regulations to Strengthen Medical Security, Deepen Integration of Traditional Chinese and Western Medicine to Optimize Medical Levels

During the construction of health policies in the Shaanxi-Gansu-Ningxia Border Region, the government achieved structural optimization of the healthcare system through institutional innovation. Firstly, based on the social attribute differences of service recipients, a stratified medical security system was established: full supply system for military wounded and sick soldiers, fixed subsidy system for government staff, and mutual-aid cooperative medical care for the general public. This differentiated supply mechanism significantly enhanced the accessibility and equity of medical resources. Meanwhile, the coordinated development of traditional Chinese and Western medicine was elevated to a strategic level. Policy frameworks were established through documents such as the Organizational Regulations of the Health Commission of the Shaanxi-Gansu-Ningxia Border Region. While introducing modern Western medical diagnostic and treatment technologies, systematic surveys of traditional Chinese herbal medicine resources and improvements in processing methods were conducted. Academic platforms such as the Shaanxi-Gansu-Ningxia Border Region Traditional Chinese and Western Medicine Research Association were established, creating a comprehensive policy support system covering talent cultivation, clinical collaboration, and scientific research. This not only alleviated the wartime shortage of medicines but also, through the mutual learning mechanism between traditional Chinese and Western medicine, forged an

integration path of “scientific modernization of traditional Chinese medicine and localization of Western medicine.” As Wen Jintong [8] pointed out, this practical and innovative health governance model inherited the localized advantages of traditional medicine while absorbing the technological rationality of modern medicine. Its “prevention-oriented, prevention-and-treatment-combined” concept and hierarchical medical treatment framework provided an important paradigm reference for the construction of New China’s healthcare system. Building on historical experiences, China’s current medical security system still requires deepened innovation in the following dimensions: (1) Continuing the stratified governance mindset, establishing a precise security mechanism linked to multidimensional parameters such as income levels, disease spectra, and regional disparities, and improving policy adaptability through dynamic adjustments to reimbursement ratios and expanded coverage of critical illness insurance for various diseases. (2) Strengthening the institutionalized construction of collaboration between traditional Chinese and Western medicine. Drawing on the experience of the Border Region’s medicine research association, establishing special research funds to support the development of joint diagnostic and treatment technologies and creating a full-chain policy system covering talent cultivation (e.g., interdisciplinary programs combining traditional Chinese and Western medicine), service integration (multidisciplinary joint clinics), and quality assessment (efficacy standards for integrated traditional Chinese and Western medicine). (3) Upgrading the intelligent supervision system for medical insurance funds, utilizing blockchain technology for end-to-end traceability of medical data, and optimizing fund allocation through AI actuarial models to ensure sustainable system operation. Finally, it is essential to improve the legal ecosystem of healthcare by translating the Border Region’s “prevention-and-treatment-combined” concept into legislation for family doctor contract services, establishing a hierarchical mediation mechanism for medical disputes, and forming a new health governance landscape that integrates historical experiences with modern governance techniques.

5.2.3 Broadening Health Science Popularization to Enhance Literacy and Promoting the Border Region Spirit to Improve Medical Ethics

The health culture construction in the Shaanxi-Gansu-Ningxia Border Region exhibited systematic institutional innovation, with its historical experiences still offering enlightening value for contemporary public health governance. In constructing the epidemic prevention system, the Border Region regime achieved a transformation in health concepts through dual pathways: scientifically, it disseminated germ theory and disinfection techniques through media such as health columns and mobile propaganda teams, establishing a modern medical cognitive framework of “disease-pathogen-prevention and treatment technologies”; Socially, it incorporated the anti-witchcraft movement into the health governance agenda, eliminating the cultural breeding ground for witch doctor superstitions and shifting epidemic prevention practices from empirical responses to scientific prevention and control [9]. This governance logic of “breaking and establishing” successfully shaped a collaborative mechanism of “state leadership-professional intervention-public participation,”

providing a paradigm reference for integrating modern public health systems into traditional societies. The development of China’s current health sector should also: (1) Strengthen the systematic dissemination of health knowledge, forming a three-dimensional science popularization network through new media matrices, community health classrooms, and school curricula, with a focus on enhancing public literacy in chronic disease prevention, infectious disease awareness, and other key areas. (2) Improve health information governance mechanisms by establishing a scientific and authoritative rumor-debunking platform, strictly regulating the production of health science popularization content, and setting medical review nodes in algorithmic recommendation processes to resist the spread of pseudoscience. (3) Inherit the values of Border Region medical workers, integrating the core ethics of “serving the people’s health” into modern medical ethics construction, enhancing empathy among medical professionals through clinical narrative medicine training, and reconstructing doctor-patient trust within the hierarchical medical treatment system. This value connection between historical experiences and contemporary practices essentially embodies the dialectical unity of scientific rationality and humanistic care in public health governance.

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