

CHAPTER 9

BIBLIOGRAPHIC ANALYSIS OF SCIENTIFIC LITERATURE ON HEALTH KNOWLEDGE MANAGEMENT

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ABSTRACT

This study utilized a scientometric approach to examine the landscape of health knowledge management (HKM), employing co-occurrence analysis to map thematic developments from 1990 to 2023. The data were retrieved from Web of Science and PubMed, and subsequently analyzed using vosviewer and Excel 2019 to identify key patterns and collaborations. The findings indicated that the United States was a leader in research output, with Wright A and Sittig DF being particularly influential contributors. The co-occurrence map was comprised of four primary clusters:

(1) the impact of the Coronavirus 2019 (COVID-19) on health information management, (2) strategies to enhance healthcare performance and systems, (3) electronic medical records and related challenges, and (4) advancements in big data, Internet technologies, and foundational research. These clusters underscored pivotal domains that influenced НКМ, accentuating the significance of effective knowledge management methodologies, particularly in the context of technological and global health transformations. The study emphasized the necessity of strategic resource allocation, investment in technological infrastructure, and international collaboration to enhance healthcare outcomes through effective knowledge dissemination and management.

KEYWORDS: co-occurrence, health knowledge management, bibliographic analysis, data science, research trends, data visualization

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1 INTRODUCTION

In recent years, knowledge management has gained significant attention across various sectors and organizational sizes. Its presence has been observed in small niche businesses, international firms, research institutes, and universities. Hansen and his colleagues, however, posit that knowledge management is not a recent development. The most prominent illustrations of this phenomenon include the proprietors of family-run businesses who have transferred their commercial acumen to their offspring, master craftsmen who have meticulously imparted

their trades to apprentices, and workers who have engaged in the exchange of ideas and expertise within the workplace (Hansen et al., 2005). It is, in essence, a substantial expanse of “comprising creation, acquisition, collation, sharing, use, reuse, and capitalization of knowledge in an organization” (Pandey, 2016, p. 1). A significant number of scholars have endeavored to characterize this phenomenon, delineate its dimensional parameters, and propose models and frameworks for its comprehension. According to Bennett and Gabriel (1999), the concept pertains to the capture, storage, dissemination, and utilization of knowledge. Additionally, Islam et al. (2011, p. 382) defined the concept as “process of creating, acquiring, capturing, manipulating, storing, disseminating and re-using knowledge both tangible and intangible knowledge assets available in implicit and explicit knowledge.” According to Ogunbanwo et al. (2019), this approach is conducive to enhancing performance and fostering innovation in tertiary institutions. In essence, knowledge management can be defined as a process that assists enterprises in identifying, selecting, arranging, extending, and transferring important information and specialist knowledge (Hron, 2006).

As would be anticipated, knowledge management—defined as the acquisition, storage, and dissemination of knowledge—emerges as a pivotal managerial priority within any given organization (Beiryaei & Jamporazmay, 2010). This phenomenon has garnered considerable attention within the domains of health and medical science as well. This is predicated on the continuous growth of medical information, the fact that its utilization can significantly affect treatment and health outcomes, and the fact that it remains severely underutilized when needed (Abidi, 2007). Knowledge management in health can therefore benefit this area of science by helping to cope with the expansion of knowledge. The management of health-related knowledge is pivotal in determining how healthcare systems address the inundation of medical information, facilitating its effective reception, processing, and dissemination. This capacity enables healthcare systems to overcome the deluge of medical and health information (Candy, 2010) and to “promote and provide optimal, timely, effective, and pragmatic healthcare knowledge to healthcare professionals (and even to patients and individuals) where and when they need it to help them make high-quality, well-informed, and cost-effective patient care decisions” (Abidi, 2007, p. 2). The effective

management of health knowledge is of paramount importance, as it can ensure the quality of healthcare services provided by the health sector. Additionally, this approach would enhance individual decision-making processes, as the decision-making process itself is significantly influenced by knowledge (Morr & Subercaze, 2010).

In summary, a substantial body of literature exists, comprising numerous academic contributions that offer comprehensive overviews of various aspects of health knowledge management. Consequently, the substantial body of articulated accomplishments in this theme renders the analysis of research on the accomplished contributions beneficial in general. Such analysis enables researchers and academia to identify fundamental influences and obtain a well-structured overview of the characteristics and any developments in this research area. Bibliometric analysis is a research method employed to study trends in academic research. It involves the analysis of published scholarly works from databases such as Scopus or Web of Science. This approach offers insights into the global research landscape in a particular field, based on publication outputs (Alsharif et al., 2020). It has emerged as a significant methodology for analyzing dedicated research in a research field, providing academics with the following capabilities: (1) obtaining a comprehensive perspective, (2) identifying knowledge gaps; (3) generating novel research ideas, and (4) articulating their planned contributions to the area (Donthu et al., 2021). The objective of this study is to provide a comprehensive overview of the extant literature on health knowledge management. A bibliometric analysis of the field will be conducted to map out the existing perspectives and visualize the contributions made. This approach will facilitate a more profound comprehension of the state of the art and identify areas for future research.

2 METHODOLOGY

This study employs a cross-sectional descriptive method with a scientometric approach. Furthermore, data science principles play a crucial role in managing and analyzing the extensive bibliographic data collected from Web of Science and PubMed. The process entails a series of data science techniques, including data

cleaning, normalization, and structured processing. These techniques are imperative for guaranteeing the accuracy and consistency of the data. These techniques enable the efficient management of large datasets, facilitating the extraction of meaningful insights and patterns from thousands of research documents. This study employs a co-occurrence method to extract information from citation databases. Initially, it identifies relationships and patterns within the processed data. In the subsequent stage, the relationships are visualized using the vosviewer tool. The co-occurrence method can be regarded as both a form of content analysis and, to a certain extent, a data mining technique. The utilization of data visualization tools, such as vosviewer, serves to illustrate fundamental data science practices, including network analysis and graphical representation of intricate information. These tools facilitate the generation of co-occurrence maps and clusters, thereby elucidating thematic relationships and collaborative networks within the domain of health knowledge management. Integrating data science methodologies enhances the robustness and depth of the bibliometric analysis, ensuring a systematic approach to mapping research trends and providing actionable insights into the evolving landscape of health knowledge management.

2.1 Data collection

The data for this study were retrieved from the Web of Science and PubMed databases on February 10, 2024. To ensure comprehensive coverage within the field, the study conducted searches using the following strategy: *(((((Health knowledge management [Title/Abstract]) OR (Health km [Title/Abstract])) OR (*knowledge management [Title/Abstract])) OR (knowledge management [Title/Abstract])) AND (Health [Title/Abstract]))*. Subsequently, a time span limitation was applied to the results, ranging from 1990 to 2023. This resulted in a total of 1,444 papers being reviewed. The data were stored in plain text format, and all files were aggregated into a single file.

2.2 Data analysis

The Web of Science analysis section was employed for the analysis, and Excel version 2019 software was subsequently utilized to create tables. The voviewer 1.6 software was utilized to generate science maps and co-occurrence maps, as well as to identify scientific clusters and newly formed co-occurrence clusters. In this visualization, the size of the circles is indicative of the weight, based on the co-occurrence of subjects, with a maximum length of 30. The data normalization method employed for network visualization was the minimum strength and association strength. During the course of the data review process, extraneous data were eliminated. It is imperative to acknowledge that the analyzed samples were scientific documents, including research articles, reviews, and books. Consequently, this study does not encompass ethical considerations.

3 RESULTS

A systematic analysis of the collected data was conducted using voviewer 1.6 and Excel software to identify key trends and insights in the domain of health knowledge management. The subsequent sections offer a thorough examination of the data, emphasizing notable findings and identifying recurring patterns. The period of greatest document production in the domain of health knowledge management was observed in 2022. The data indicate a consistent upward trend in scientific output from 1990, with a particularly significant surge between 2017 and 2022. This substantial increase underscores the growing recognition and importance of this field during these years. The health care sciences services subfield has demonstrated a leading role in scientific production, with a cumulative total of 277 records. It is noteworthy that the nascent field of medical informatics is positioned fourth, contributing 12% of the total scientific output. This underscores the mounting significance of knowledge management within the healthcare sector (Table 1).

Table 1. Research fields that have had the most scientific production in this field.

Research areas	Record count
Health care sciences services	277
Business economics	276
Computer science	264
Medical informatics	203
Information science library science	196
Engineering	160
Public environmental occupational health	164
Operations research management science	62
General internal medicine	61
Environmental sciences ecology	59

Wright A and Sittig DF have been identified as the most prolific authors in the field of health knowledge management from 1990 to 2024. The co-authorship network within this field has been revealed to consist of two distinct clusters. The first cluster consists of five authors centered around Wright D, while the second cluster comprises three authors centered around Middleton. This co-authorship map underscores the collaborative nature of research within this field. This study analyzes the scientific production in health knowledge management across various countries. The United States has accumulated an impressive number of records, with a total of 336, reflecting its leading role in the field. England follows with 158 records, and Canada is third with 112 records, both showing strong engagement. Other countries that have contributed significantly to this field include Australia, with 81 records, and Italy, with 89 records. Significant contributions have also been demonstrated by countries such as China (97 records) and Spain (91 records), suggesting a growing interest in health knowledge management. Among the countries exhibiting

lower outputs, Colombia has the fewest number of records at 20, while Iran, with 57 records, is notable for its contributions relative to its size and resources.

Figure 1 presents a scientometric map that illustrates international collaboration in the field of health knowledge management. The map is based on publication years and uses clustering to demonstrate the international collaborative efforts in this field. The map indicates that the United States and Canada have been consistently active contributors, demonstrating a long-standing tradition of producing scientific literature in this area. It is noteworthy that Iran and India have exhibited a marked increase in research output following 2019, underscoring their escalating engagement in health knowledge management research. This increase signifies a heightened global interest in the field, with these countries assuming a leading role in research initiatives.

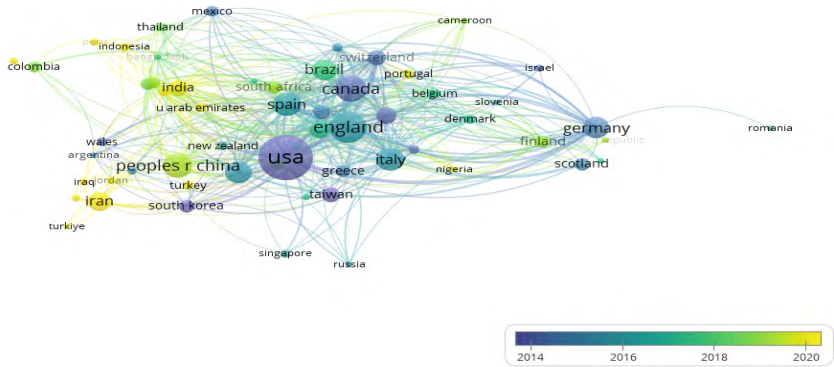


Figure 2. Scientometric map of cooperation between countries.

Figure 2 illustrates the prominent institutions contributing to research in health knowledge management. The scientometric map clearly demonstrates that Harvard University, the University of Toronto, and the World Health Organization (WHO) are at the forefront of significant research activities in this field. These institutions are recognized for their substantial contributions and leadership in advancing health knowledge management.

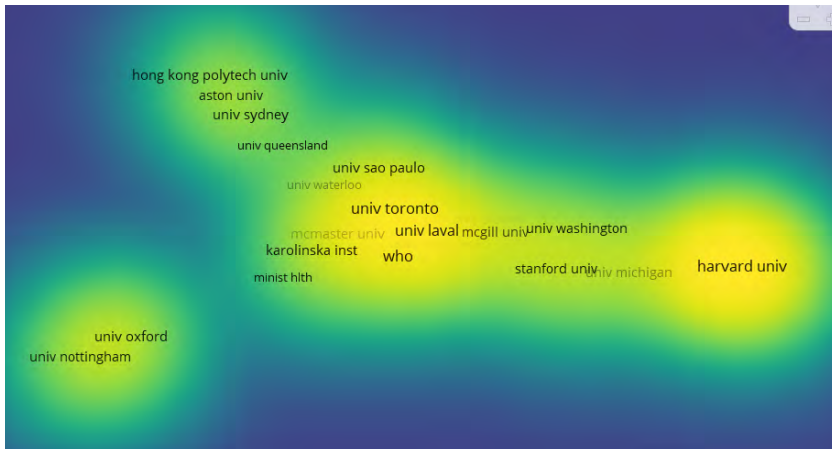


Figure 3. Institutions producing scientific records.

Subsequent findings demonstrate the distribution of research funding among prominent organizations in the domain of health knowledge management. The United States Department of Health and Human Services is at the forefront, with 56 documented allocations, signifying a pronounced dedication to promoting research in this domain. The Human Services sector has demonstrated notable support, with 45 recorded funds. It is noteworthy that the National Institutes of Health (NIH) in the United States plays a pivotal role in this regard, as evidenced by the 27 recorded funds, which underscore its crucial position in fostering innovation and research. The National Library of Medicine (NLM) of the National Institutes of Health (NIH) received 26 funds, underscoring its pivotal role in knowledge dissemination. On an international level, the National Natural Science Foundation of China (NSFC) has 23 recorded funds, thereby demonstrating China’s active involvement in global health research. The Canadian Institutes of Health Research (CIHR) and the European Union (EU) have also made notable contributions, with 20 and 18 funds, respectively. The UK Research and Innovation (UKRI), the Spanish Government, the Agency for Healthcare Research and Quality (AHRQ), and the National Institutes of Health Research (NIHR) have provided substantial support, with each contributing between 10 and 13 funds (Table 2).

Table 2. Institutions that have provided the most research funds in this field.

Institutions	Record count
United States Department of Health and Human Services	56
Human Services	45
National Institutes of Health (NIH) USA	27
NIH National Library of Medicine (NLM)	26
National Natural Science Foundation of China (NSFC)	23
Canadian Institutes of Health Research (CIHR)	20
European Union (EU)	18
UK Research and Innovation (UKRI)	10–13
Spanish Government	
Agency for Healthcare Research and Quality (AHRQ)	
National Institutes of Health Research (NIHR)	

Figure 3 presents a scientific map illustrating the co-occurrences within the field, categorized by year. The map employs a color-coding system to differentiate between distinct time periods: purple signifies co-occurrences from 2015 and earlier, while yellow indicates the most recent occurrences. The map underscores several subjects that have gained prominence in recent years (from 2019 onwards), including big data, social media, innovation, and leadership, thereby emphasizing their growing significance in health knowledge management. Furthermore, since 2017, there has been an escalating focus on clinical decision-making and electronic health records, signifying an evolution in the emphasis on leveraging data and technology to optimize healthcare outcomes.

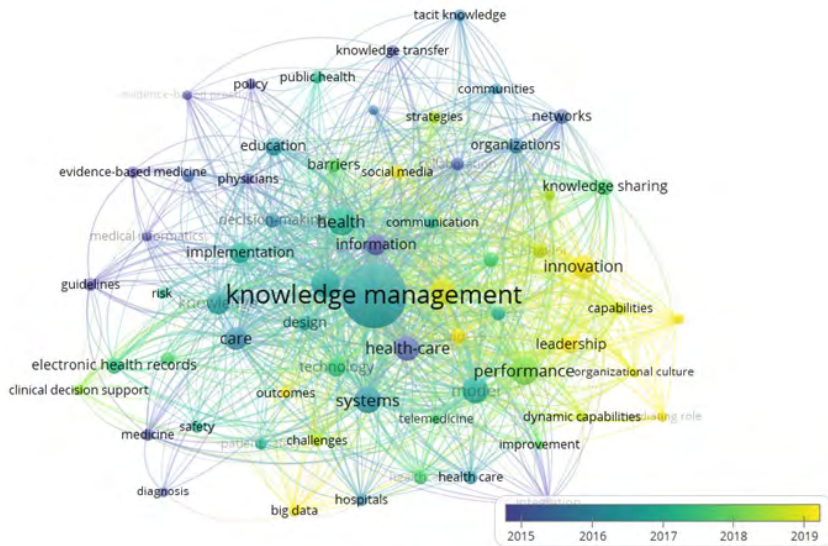
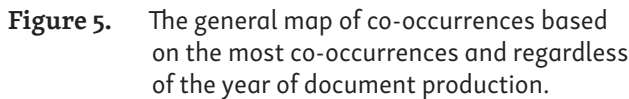


Figure 4. Scientometric map (general) of co-occurrences in the field of health knowledge management.

As illustrated in Figure 4, the general map of co-occurrences is presented, based on the most frequent co-occurrences, without consideration of the year. The map is divided into four distinct clusters, each represented by a different color. These colors highlight various words and phrases that are directly related to specific areas within the field of health knowledge management. The green cluster centers on the repercussions of the Coronavirus disease 2019 (COVID-19) on health knowledge management, accentuating the pivotal function of knowledge mobilization in addressing health crises. This cluster reflects how the pandemic has influenced the management and utilization of health information in emergency situations.



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in domains such as big data, the Internet, fundamental research, and technological development. This development signifies the advancement of knowledge and technology in the health sector, illustrating the integration of innovative tools and data analytics in health research. The map offers a comprehensive representation of the multifaceted subjects related to knowledge management in health, illustrating the interconnection and contribution of diverse domains to the field’s overarching understanding. As illustrated in Figure 5, the initial cluster of the scientific map of co-occurrences in the domain of health knowledge management is represented. This cluster encompasses 19 pivotal items that play a substantial role in this domain. Among the most salient of these developments are the concepts of “big data,” “electronic health records,” and “patient safety,” which have become pivotal components in the contemporary healthcare landscape.

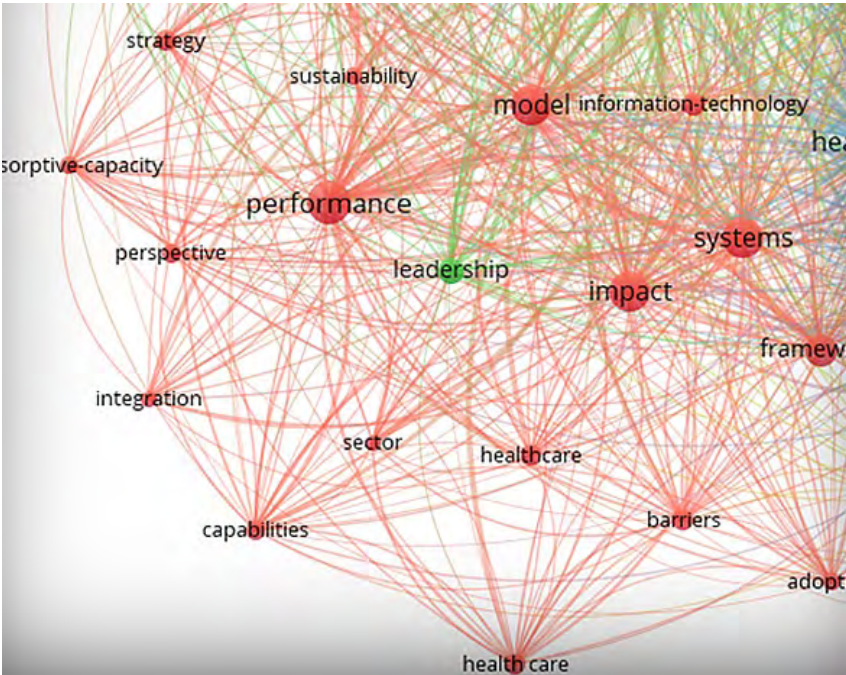


Figure 6. The first cluster of the scientometric map of co-occurrences in the field of health knowledge management.

As illustrated in Figure 6, the second cluster in the scientific map of co-occurrences in health knowledge management is presented. This cluster encompasses 19 pivotal elements, with a concentration on critical domains such as performance, dynamic capabilities, healthcare, information technology, and knowledge sharing.

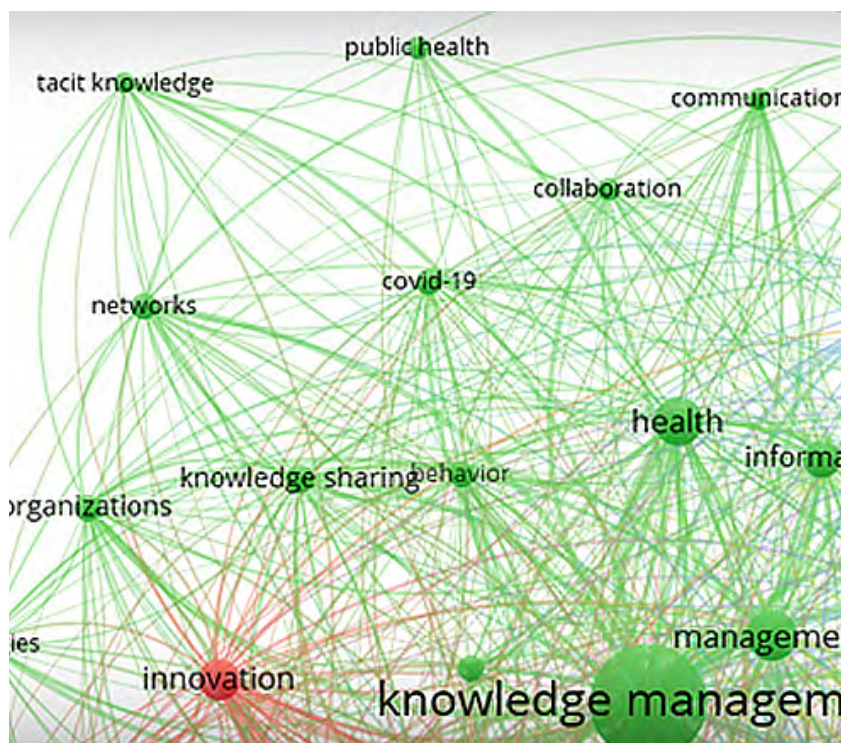


Figure 7. The second cluster of the scientometric map of co-occurrences in the field of health knowledge management.

As illustrated in Figure 7, the third cluster in the domain of health knowledge management comprises 13 items. This cluster places significant emphasis on decision-making, education, evidence-based medicine, and knowledge translation, underscoring the significance of informed decision-making and the dissemination of knowledge in healthcare.

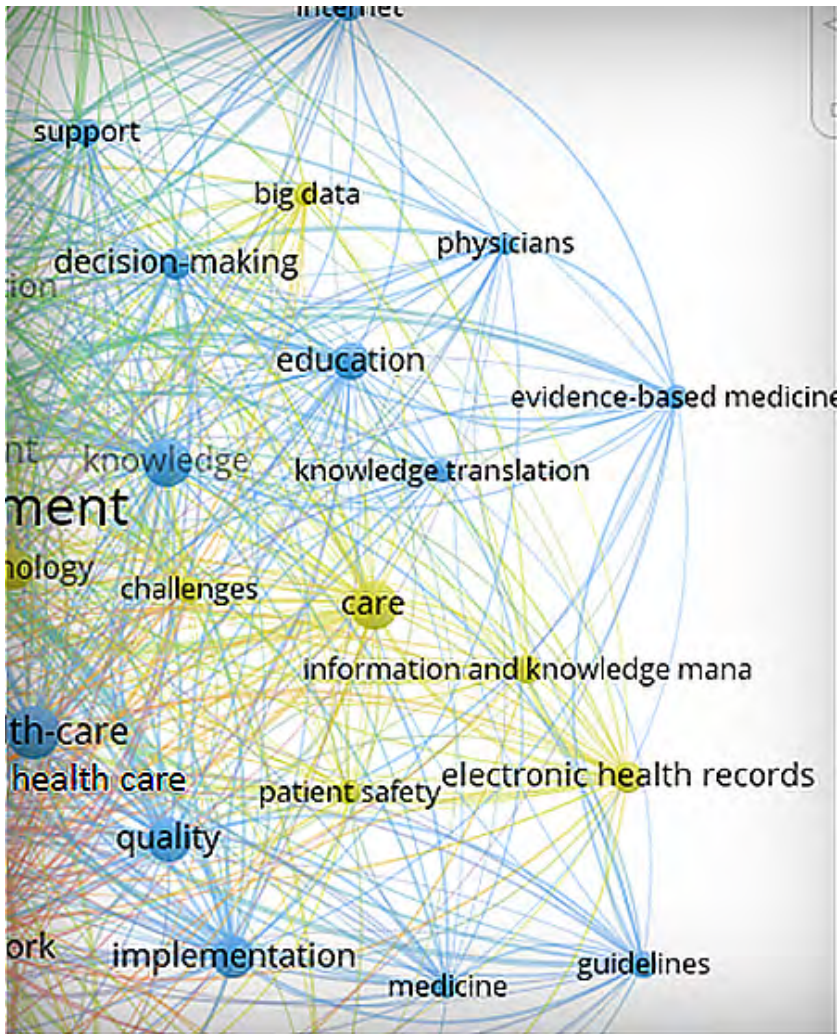


Figure 8. The third cluster of the scientometric map of co-occurrences in the field of health knowledge management.

Figure 8 illustrates the fourth and final co-occurrence cluster in the domain of health knowledge management. This cluster, which is comprised of nine items, focuses on topics such as big

data, electronic health records, and hospitals. It emphasizes the role of data and technology in modern healthcare systems.



Figure 9. The fourth cluster of the scientometric map of co-occurrences in the field of health knowledge management.

4 DISCUSSION

The bibliographic analysis conducted in this study illuminates various aspects of research in health knowledge management, offering valuable insights into the current state of the field and its implications for healthcare practice and policy. The analysis yielded several noteworthy trends in research output, including the preeminence of certain subfields within health knowledge management and the contributions of specific authors, institutions, and countries. Understanding these trends can inform future research priorities (Drysdale et al., 2013) and collaborations, helping to advance knowledge and innovation in healthcare. The present findings are consistent with those of previous research studies (Amri & Abed, 2023; Ibeh et al., 2024; Khang et al., 2024; Okolo et al., 2024; Ravikumar et al., 2023), which have also

identified emerging topics such as big data, social media, innovation, and leadership as key areas of focus within health knowledge management. These trends underscore the evolving nature of healthcare delivery and the increasing importance of leveraging technology and data-driven approaches to improve patient care and organizational efficiency. Bendowska and Baum's (2023) research demonstrated that medical care cooperation can result in several notable benefits, including enhanced patient safety, reduced hospitalization rates, and a decline in medical errors. Additionally, these findings suggest that such cooperation can also lead to improved patient access to medical services. The collaboration network that was revealed by the analysis highlights the importance of global cooperation in advancing research and addressing complex healthcare challenges. The United States, Canada, Iran, and India have emerged as key contributors to the field, indicating a growing interest and investment in health knowledge management across diverse geographic regions.

The findings of this study have practical implications for healthcare practice and policy. By identifying knowledge gaps and areas of research focus, healthcare organizations and policymakers can better allocate resources and prioritize initiatives aimed at enhancing knowledge management practices. This encompasses investments in information technologies, cultivation of a culture of knowledge sharing and collaboration, and formulation of strategies to effectively utilize health data for decision-making and quality improvement. While the analysis provides valuable insights into the current landscape of health knowledge management, several challenges and opportunities for future research warrant consideration. These objectives may encompass addressing issues related to data privacy and security, enhancing interdisciplinary collaboration between healthcare and information science disciplines, and exploring innovative approaches to knowledge dissemination and implementation in real-world healthcare settings. It is imperative to acknowledge the limitations of this study, including the reliance on bibliometric data, which may not fully capture the scope of research activities in health knowledge management. Furthermore, the analysis may be subject to biases inherent in the selection and interpretation of data, albeit unintentionally. Future research endeavors could augment bibliometric analysis with qualitative methodologies to facilitate a more comprehensive understanding

of the factors that influence research trends and outcomes in this domain.

5 CONCLUSION

In summary, this bibliographic analysis offers valuable insights into research trends in health knowledge management. The findings of this study underscore the significance of implementing effective knowledge management strategies, particularly in the context of technological advancements and global collaboration. Practical implications of this paradigm shift include the need for prioritizing resources, investing in information technologies, and fostering collaboration to improve healthcare outcomes. While this study offers valuable insights, future research should address its limitations and explore complementary methodologies. This analysis contributes to the understanding of health knowledge management and informs future research and practice in healthcare.

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Conflict of interest

The authors declare that there are no conflicts of interest related to this research.

Contribution statement

Conceptualization: Hossein Ghalavand

Methodology: Reza Varmazyar, Saied Shirshahi

Data Curation: Saied Shirshahi

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Supervision: Hossein Ghalavand

Statement of data consent

The bibliographic data used in this study, including data from Web of Science and PubMed, have been processed and analyzed as described in the methodology. The datasets generated during this research are available upon request and can be provided to interested researchers for further review.

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