

Convergence in the Health Information Management and Interdisciplinary Identification

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Received: 29 April 2024

Reviewed: 14 July 2024

Accepted: 31 December 2024

Abstract

This research is essential to identify and evaluate scientific products, compare the scientific map to convergence, and identify interdisciplinary fields in health Information management to make decisions and policies. This research is applied, and in terms of approach, it is a scientometric research type, and based on data collection, it is a descriptive research type. The statistical population of the current research is all the articles published by researchers from around the world from 2021 to 2023 in the "Web of Science" database. Many scientometric software programs have been used to analyze data and draw a scientific map. The findings show that the most productive fields of health Information management in the world are the fields of management, mental health, care, health care, information, health, and COVID-19. The findings show emerging topics that have a short history and high frequency and include the following topics: Health literacy, digital health, health education, medical informatics, machine learning, Artificial intelligence, Telemedicine, and information management. The comparison of scientific products shows that many emerging and interdisciplinary fields in health information management are being formed.

Keywords: Convergence, Interdisciplinary, Health Information Management.

Introduction

Health information management involves collecting, storing, preserving, transferring, and the optimal use of medical and health information, which provides accurate and reliable medical information of patients, management of medical records, data privacy, and the use of new technologies to improve information systems in the field of health. Health information management is fundamental to the effective functioning of health systems. This process ensures the accuracy, accessibility, and security of patient data, supports high-quality care, facilitates compliance with legal and regulatory requirements, and contributes to the overall efficiency and effectiveness of health service delivery. As the healthcare industry continues to evolve, the importance of health information management (HIM) will increase, and this area will become one of the main pillars of modern healthcare.

With effective HIM, patient records can be shared between healthcare providers and other

settings, which is especially important for patients requiring multidisciplinary care or chronic disease management. Also, the correct management of health information helps to reduce medical errors, because it provides comprehensive and accurate information on patient data such as allergies, drug records, and previous treatments to health professionals. By improving the efficiency of information management, HIM can reduce healthcare costs. Help through better resource management, reduced test duplication, and more accurate billing. On the other hand, HIM offers a unique combination of health knowledge and IT skills, allowing professionals and researchers to work at the intersection of these two critical fields. With the rapid transformation of data and digital information in healthcare, and due to the increasing use of mobile technology by a mobile population, there has been greater emphasis in recent years on information governance in healthcare. The digital health transformation requires the HIM profession to build upon its core skill set and redefine its role in healthcare. In a rapidly changing healthcare system, the HIM profession must establish itself as an essential and executive set of functions and skills to remain relevant in healthcare organizations as a set of executive-level functions and competencies (Fenton, Low, Abrams & Butler-Henderson, 2017).

Health information management is recognized as an interdisciplinary field due to the need to understand medical principles and information technology techniques simultaneously. This integration of knowledge helps professionals provide solutions to improve health data collection, storage, and analysis. Scientometrics is a method and tool for analyzing scientific publications, citations, research collaborations, and other indicators related to the production of knowledge, and scientometrics in HIM as an interdisciplinary study is of particular importance because it improves the efficiency and effectiveness of health systems. It helps by identifying research trends and gaps in this field. It identifies new and emerging trends in the field of HIM. Through scientometrics, it is possible to evaluate the influence and validity of published articles and research. This analysis will help managers and policymakers identify essential and impactful research and use it to improve health systems, show how HIM research converges with other disciplines, and help foster interdisciplinary approaches. Data analysis and its results also help to manage specific patients, promote public health, and detect medical fraud (Gu, Li, Li & Liang, 2017).

The drawing of the scientific and social structure of this discipline, which is a scientific field, provides valuable information about the position of each sub-fields in the body of that science, which in a way expresses its power, is very valuable and amenable to careful scientometric examination. HIM is information management applied to health and health care. Analyzing and protecting digital and traditional medical information is vital to providing quality patient care. With the widespread computerization of health records, traditional (paper-based) records are being replaced with electronic health records (EHRs). The tools of health informatics and health information technology are continually improving to bring greater efficiency to information management in the healthcare sector. Health information management professionals plan information systems, develop health policy, and identify current and future information needs. In addition, they may apply the science of informatics to the collection, storage, analysis, use, and transmission of information to meet legal, professional, ethical, and administrative records-keeping requirements of health care delivery. This research is important to identify and evaluate scientific products to compare the scientific map to converge and identify interdisciplinary fields in health Information management to make decisions and policies.

The main objectives of this research are:

1. Identification of the Co-occurrence network of health information management
2. Determine and identify subject areas and emerging areas of health information management
3. Intermediate research areas in health information management research based on the betweenness centrality Indicator
4. Research poles in the interdisciplinary research of health information management in terms of degree centrality
5. Health information management research areas in terms of Closeness centrality
6. The research field of health information management is based on the centrality of eigenvectors

Literature Review

Many studies have been conducted in this field. Tengilimoğlu, Orhan, Şenel Tekin & Younis (2024) analyzed the HIM literature and document analysis and the citation process of HIM in 630 selected academic journals, considering the need for sustainable information management in health and considering the scientific documentation of the last 40 years. Web of Science Core Collection (WoSCC) database survey using the keyword "health information management" using R-based software Bibliometrix (version 4.0; K-Synth Srl), Python (version 3.12.1; Soft Foundation (Python) and Microsoft® Excel® 2016, and explained the critical and meaningful topics of this field to the stakeholders. In research by Timakum, Xie, and Song (2024), they used bibliometric and data mining methods to report on the prospects for electronic mental health research and the use of information technology for mental health treatments. The e-mental health research data was obtained from 3663 bibliographic records from the Web of Science (WoS) and 3172 full-text articles from PubMed Central (PMC) and consisted of 16 clusters, such as e-health, diseases, information technology, and self-management. It concludes that electronic mind-related publications were related to various research fields such as nursing, psychology, medical informatics, computer science, telecommunications, and healthcare innovation and the trend of electronic mental health research is constantly increasing.

Gonçalves, Pereira, and Akkari (2023) discuss guiding the discussion about software architectures for eHealth systems and their multifaceted aspects in the health context to improve organizational and social outcomes. This article was an exploratory and descriptive study with a quantitative approach based on secondary ISI Web of Science data. Bibliometric indexes showed 127 different articles in 97 sources, with 16.92 citations per article and a collaboration index of 4.18, with scientific productivity higher than in Europe and North America. Guo (2023) seeks to provide an overview of evidence-based knowledge, identify existing knowledge gaps related to IC, and identify areas needing further research, with data retrieved from 2010 to 2020 based on the Web of Science Core Collection. And states that the global field of IC has expanded in the last 10 years and has achieved significant results. Developed countries pay more attention to IC development than developing countries, and minimal collaboration occurs between authors and institutions.

Burtis, Howell, and Taylor (2021) collected citations from articles published in five healthcare management journals from 2018 to 2016. The literature on HCM has expanded in the decade between this study and the original, with cumulative citations increasing by 76.6% and the number of cited journal titles rising by 69.6%. The databases with the most complete

coverage of Zones 1 and 2 were Scopus, Web of Science Core Collection, and PubMed, and the most highly cited sources were journals. Research by Mahdavi, Ebrahimi, Mehr Ta, and Mashoufi (2020) concluded that the health information management system has a practical role in health information and should be considered. Higman et al (2019) express that low-income and middle-income countries (LMIC) use EA to combine management components with disease tracking and surveillance of health care services. Articles in this review referenced EA and were peer-reviewed or gray literature reports published in English from 2010 to 2016. They were identified using PubMed, Scopus, Web of Science, and Google Scholar. While examining this EA approach in different countries, it states that fourteen articles describe the use of EA in LMICs. It also states that the EA approach to designing and implementing national HIS in health centers and communities can foster better decision-making that leads to improved patient care and achievement of national goals. The articles focused more on processes than outcomes because the countries involved are implementing them.

In this research, Ramezani (2013) concluded that the scientific fields with a stronger conceptual connection are placed next to each other, and the weaker ones are at a further distance. In their research, Rafols, Porte and Leydesdorff (2010) concluded that biomedical sciences, clinical medicine, chemistry, material science, and cognitive science are five active fields. Also, by citing examples, he has discussed how different fields are connected and dependent on each other. (The connection between medicine and engineering is through biomedical and nuclear medicine.

In their research, Porter and Rafols (2009) found significant changes in the way research was conducted during the years 1975-2005. The distribution of citations of articles in different fields also points to this point. In all studied fields except mathematics, single-author research has reached less than 10%. To specify the areas and interdisciplinary research, the following points have been taken into consideration: the number of disciplines (diversity), the distribution of citations among different disciplines (balance), and the degree of similarities and differences between disciplines. Noyons (1999) concluded that by drawing a scientific map, it is possible to identify saturated, stopped, and emerging scientific fields in each of the scientific fields. A literature review indicates that in the field related to the scientific network of Health Information Management, extensive studies have been conducted in various subject areas, particularly in specific topics outside of Iran, and this trend is growing. This reflects the importance of this technique and the attention it receives in the current era for identifying active and emerging interdisciplinary fields. However, despite exploring and analyzing numerous topics, it is essential to accurately identify and map the domains of Health Information Management to reveal new multidisciplinary areas.

Materials and Methods

This research is a scientometrics research. The statistical population of the present study is all the documents published by the world's researchers in the field of health information management in the Web of Science database from 2021 to 2023. All this research data was directly extracted from the Web of Science, which includes 17602 Articles. The following search strategy was used in the advanced search section of Web of Science to extract data according to the time and place of the research.

TS= (Health Information Management) AND PY= (2021-2023)

The recovered records were drawn using VOSviewer and Ucinet software to draw the

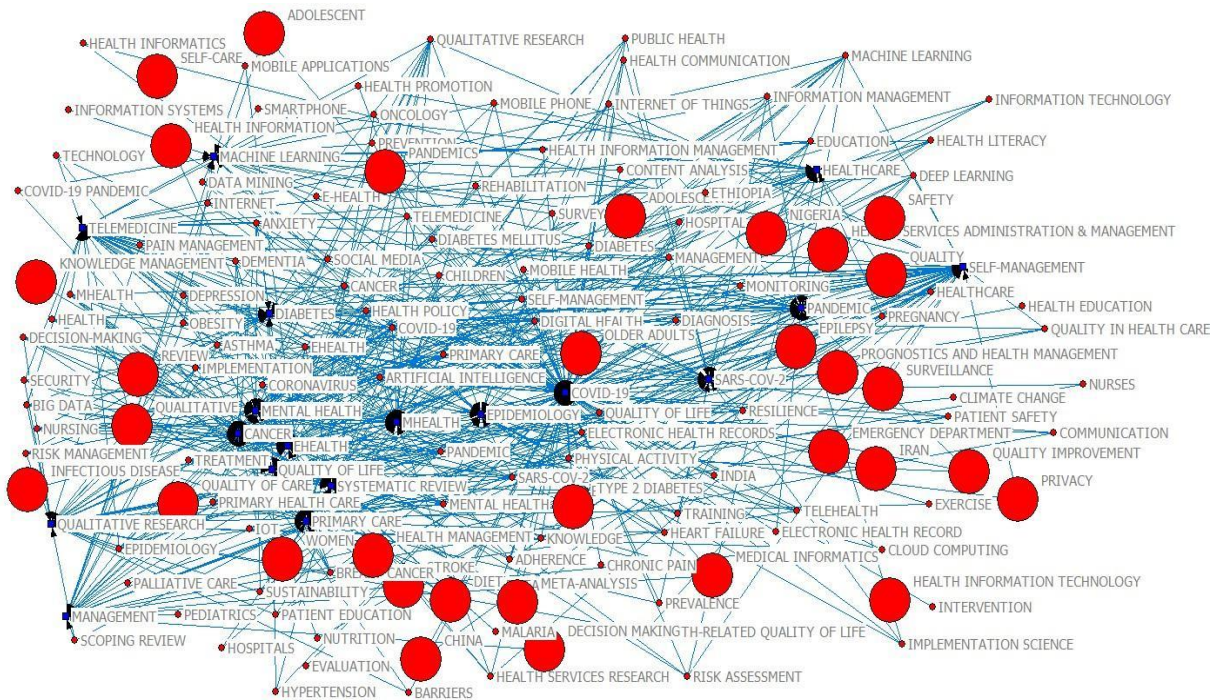


Figure 5: The health information management research areas in terms of Closeness centrality

How is the health information management research field based on the centrality of eigenvectors?

Figure 6 marks nodes with high eigenvector centrality. These include COVID-19, primary care, self-management, digital health, the Internet of Things, Telemedicine, health policy, and the pandemic. Considering that these topics have been used in the network with essential issues, they will grow in future research and potentially be used as emerging topics.

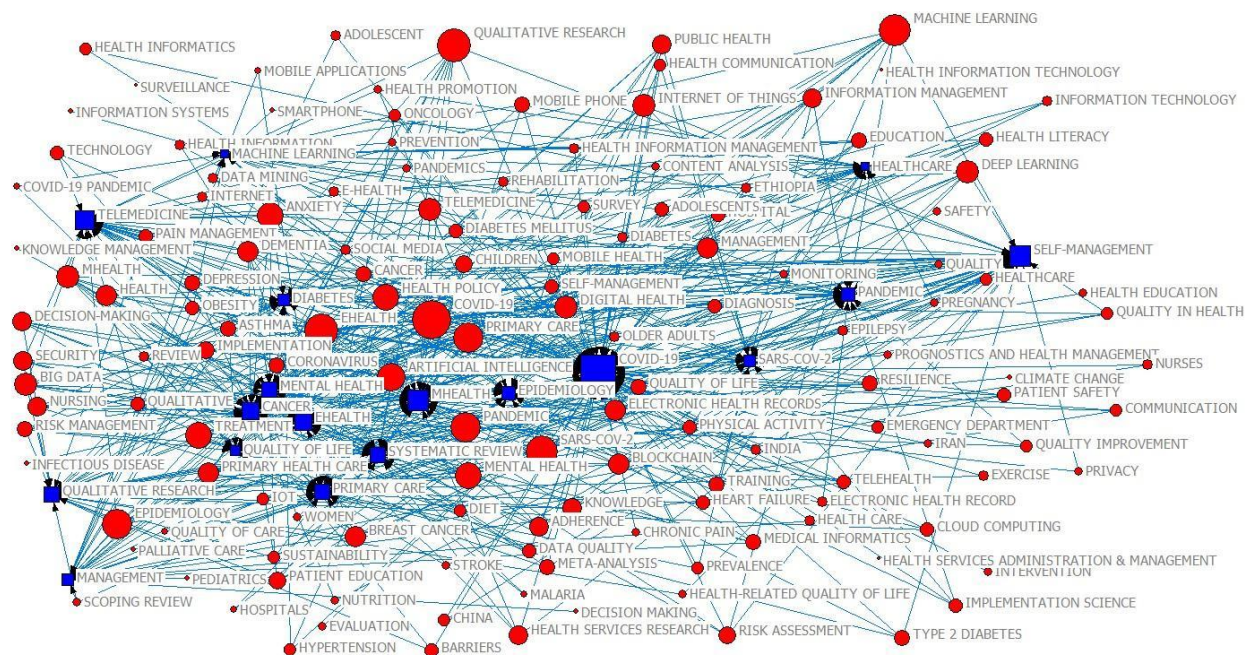


Figure 6: The research area of health information management based on the centrality of eigenvectors

Discussion

Recent advancements in health information management have significantly enhanced our understanding of its dynamics and critical importance. Research in this area spans a range of complex topics such as management, mental health, healthcare, and health information. These topics represent the most frequently used terms in the global network, highlighting their relevance. The most productive areas within health information management are public health, health literacy, digital health, health education, management, medical informatics, machine learning, and information management. Emerging research trends, particularly from 2021-2023, include 17602 Articles on high-frequency topics like health literacy, digital health, health education, medical informatics, machine learning, artificial intelligence, telemedicine, and information management, which align with previous findings (Mahdavi et al, 2020). Nodes with high centrality, indicating significant influence and connectivity, often intersect with interdisciplinary fields in health information management. Artificial intelligence, telemedicine, and machine learning are key interdisciplinary areas contributing to this field. The research also highlights that management, mental health, care, healthcare, information, health, and COVID-19 are among the most productive fields globally. A review of scientific output over the past years shows consistency in active research areas, with minor variations. Noyons' (1999) research suggests that creating scientific maps can help identify saturated, halted, and emerging scientific fields within health information management.

Similarly, Ramezani (2013) found that closely related scientific disciplines tend to be situated near each other. Porter and Rafoles' (2009) studies have documented significant changes in research methodologies over the years. Ruffols and Porter (2020) have also explored the interdependence and relationships between different research areas. The findings from recent studies align with those of Tengilimoğlu et al (2024) and Burtis et al. (2021), suggesting continuity and evolution in the research themes within health information management. Keyword and trend analyses reveal the prominence of COVID-19, health information management, and medical informatics, underscoring their long-term significance. These analyses assist researchers and policymakers in identifying focal areas within health information management. Emerging themes like digital health, artificial intelligence, health education, patient safety, and data quality are poised to shape the future of this field. The dynamic and evolving nature of health information management necessitates that researchers remain adaptable and forward-thinking in their studies. Recent trends point towards the increasing prevalence of personalized healthcare, emphasizing the utility of structured information in guiding research processes and addressing key issues. The depth and breadth of health information management research have expanded, providing critical insights into its fundamental role within the healthcare industry. Current studies address multifaceted issues such as patient data management, technology adoption, and policy development, highlighting the shift towards a personalized healthcare model as a significant trend in this field (Tengilimoğlu et al, 2024).

Conclusion

The results show that the most productive fields of health information management are those of information management and health management. The results show that there is not much difference in the subject areas, and they are moving in almost the same direction, and the production trend is growing. Nodes with a high degree of centrality have the most influence

and connection with the interdisciplinary fields of health information management, including those identified: artificial intelligence, telemedicine, and machine learning. From the Analysis of scientific articles, many emerging and interdisciplinary fields in health information management are being formed. From the analysis of scientific articles, it can be concluded that this field is one of the growing fields and is relatively good at interdisciplinary research. By identifying interdisciplinary areas in this research, scientific policy should be made to preserve and strengthen these areas.

Declaration of conflicting interests

Declaration of competing interest: None declared.

Funding

The author has no relevant financial or non-financial interests to disclose, and this article has not received any financial assistance.

Acknowledgments

I want to thank the editorial team and anonymous reviewers for the helpful suggestions.

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