

Research on Public Health Information Acquisition Based on Bibliometrics and Visual Analysis

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Abstract: In the context of Healthy China, there is a growing demand for health information among the general public. To identify current research hotspots and trends in acquiring public health information, this study utilizes VOSviewer software to perform bibliometric and visual analysis on relevant literature collected from the CNKI database, combined with content analysis. It is concluded that current research in China focuses on health information demand, access behavior, influencing factors, and network-based access. The main subjects of study include the elderly, college students, and chronic patients. Empirical research and grounded theory are commonly utilized as research methods. Future research can further subdivide objects, personalized dissemination, quality assessment and credibility of health information, and continuously enrich the research methods.

Keywords: health information; information acquisition; information seeking; visualization; VOSviewer

1. Introduction

In the context of Healthy China, especially since the COVID-19 epidemic, the public has an increasing demand for health information. With the development of information technology, the quantity and scale of health information increase greatly. How to obtain health information quickly and effectively and meet health needs has become the focus of attention. In recent years, a series of investigations and studies have been carried out in China on public health information demand and health information acquisition behavior. On the whole, systematic review and summary of public health information acquisition are still lacking, and no scholars have systematically analyzed and summarized existing research results. By using VOSviewer software, this paper makes a quantitative and visual analysis of the relevant literature collected in the CNKI database, sorts out the current research content and hot spots of public health information acquisition, presents the research status and development trend, summarizes the main research methods, and finds the existing problems and shortcomings. It provides reference for future related research, improving citizens' health information literacy and promoting healthy China.

2. Data sources and research methods

2.1 Data Sources

In this paper, China National Knowledge Network (CNKI) is selected as the data source, and the retrieval time is December 4, 2023. The search strategy is as follows: Subject = (health information + medical information + disease information) and title = (retrieval + search + seek + acquisition + query), 545 Chinese literatures were retrieved, including 376 academic journals, 136 academic theses and 7 conference literatures. There were 20 other results, and 473 valid papers were obtained after correlation screening.

2.2 Research Method

With the help of CNKI database document statistics function and excel software, the number of relevant documents, publication time, citation frequency, institutions and other aspects were counted. The author and keyword co-occurrence analysis was carried out with VOSviewer software. Through keyword co-occurrence visualization map and time sequence map, combined with the original text reading, the topic clustering, research hotspot, research context and trend evolution of domestic public

health information acquisition research were displayed.

3. Basic information of the research

3.1 Literature quantity and time distribution

Figure 1 shows the number of literatures on public health information acquisition from 1990 to now, with an overall upward trend. Before 2010 was the initial stage, the number of published papers was limited and the growth was slow; The period from 2011 to 2022 is the rapid growth stage, with the first small peak in 2016, and then rapid growth, reaching two peaks in 2020 and 2022. In 2016, the CPC Central Committee and The State Council issued the Outline of the Healthy China 2030 Plan [1]. In 2019, The State Council issued the Healthy China Action Organization Implementation and Evaluation Plan. In this context, health information related research has been flourishing. The outbreak of COVID-19 at the end of 2019 has also contributed to a rapid increase in research.

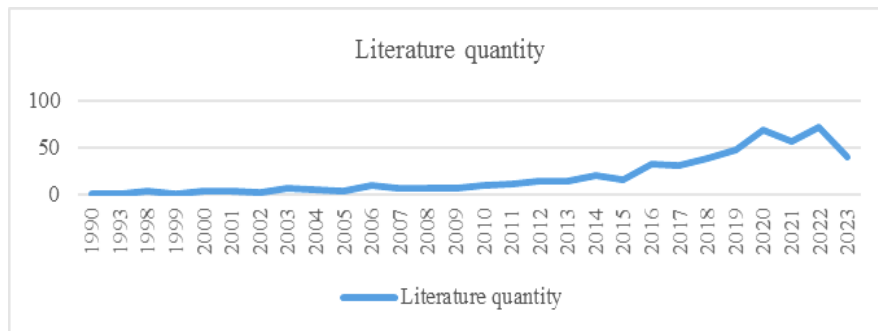


Figure 1. Number of literatures on public health information acquisition

3.2 Analysis of authors and institutions

The VOSviewer software was utilized to visualize the co-occurrence relationships among 473 retrieved literary works. Of the 989 authors included in the analysis, 35 individuals had published at least three relevant works. Notably, Zhu Qinghua from Nanjing University stands at the top with 10 publications, followed by Zhao Yuxiang from Nanjing University of Science and Technology with 9, and Song Xiaokang from Nanjing University and Xuzhou Medical University with 7. This cluster of highly productive authors is primarily affiliated with institutions in Nanjing. The observed patterns of collaboration among the authors primarily revolve around shared disciplines, subjects, mentor-student relationships. Interdisciplinary and cross-regional collaborations appear to be less frequent. In terms of institutional contributions, Wuhan University leads with 33 top-ranked publications, followed closely by Nanjing University and Jilin University, each with 25.

3.3 Analysis of highly cited literature

Table 1 Top 5 highly cited literature on health information acquisition research in China.

| NO. | Topic | publication | citations |
|-----|---|--|-----------|
| 1 | A Review of the Studies on Health Information Seeking Behavior Overseas | Library and Information Service 2012,56 (19) | 197 |
| 2 | Universities Students Online Health Information Seeking Behavior Patterns and Influencing Factors | Information and Documentation Services 2014, (04) | 186 |
| 3 | A Cluster analysis of college students' health information acquisition channels: active seeking and accidental exposure | Chinese Journal of Journalism & Communication 2015,37 (05) | 121 |
| 4 | An Experiment Study on Older Adults' Online Health Information Seeking Behavior | Library and Information Service 2014,58 (12) | 97 |
| 5 | Exploring the Health Information Seeking Behavior of Older Adults in Urban China: A Phenomenological Study | Journal of the China Society for Scientific and Technical Information 2019,38 (12) | 96 |

Table 1 presents the top 5 highly cited literature on health information acquisition research in China. Notably, the most frequently cited literature was published in 2012, suggesting that domestic research in this area commenced relatively later. Furthermore, it appears that domestic research has drawn

significant inspiration from relevant foreign studies. The primary focus of these studies has been on specific groups such as the elderly, along with the influencing factors and online health information acquisition.

4. Keyword co-occurrence and topic analysis

Based on the frequency and co-occurrence of keywords, the research content in the field can be grasped as a whole. Using VOSviewer software, 473 literatures were analyzed for keyword co-occurrence. The keywords with the same or similar meanings were merged, the meaningless keywords were deleted, and the keywords that appeared more than 4 times were screened, and 53 high-frequency keywords were obtained. The co-occurrence analysis and topic clustering were carried out for these 53 high-frequency keywords. As shown in Figure 2, the research in this field is mainly clustered into 7 topics. Based on the 7 topics and the co-occurrence frequency of keywords, combined with the original text, it is found that the current research on health information acquisition mainly includes the following aspects.

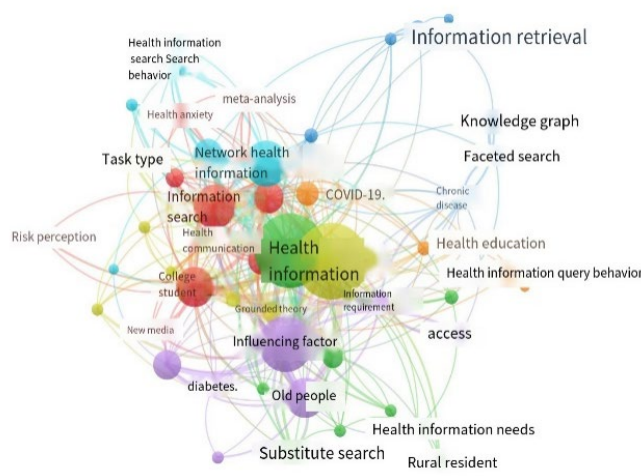


Figure 2. Co-occurrence of keywords in health information acquisition research

4.1 Research on health information needs

Health information acquisition is not an isolated information acquisition action, but an information acquisition process that integrates health information needs, health information exposure strategies, and health information utility [2]. Health information needs are the motivation for health information acquisition, so many scholars have studied public health information needs. At present, domestic research on health information demand mainly includes health information demand motivation, demand content, and influence factors of demand.

Most researchers will carry out research on health information needs for different groups of people or patients with different diseases. Common research objects include college students, the elderly, rural residents, and patients with chronic diseases; there are also studies conducted on residents in different regions. This kind of research is mainly through research, interviews and other forms of obtaining the research object in different situations on different health information content, information access channels, etc., to analyse the obstacles to access, the influence of the demand factors and so on. The study shows that the content of health information demand mainly includes preventive health care information, disease treatment information, healthy life information, and medical resource information. Health information needs are affected by various factors such as age, health status, lifestyle, social environment, education level, information dissemination channels, policies and regulations. In recent years, more and more scholars have paid attention to the relationship between health information demand and health information acquisition behaviour, and studies have shown that health information demand can have a significant impact on health information acquisition behaviour.

4.2 Research on health information acquisition behaviour

Information acquisition is an information exchange activity in which everyone participates, and it

can be either goal-specific or non-purposeful, active or passive [3]. With the increasing diversification of information dissemination channels, research on health information acquisition behaviours also needs to consider the three aspects of active acquisition, passive acquisition, and information avoidance.

4.2.1 Active acquisition of health Information

In daily life, people will adopt certain behaviours to satisfy their health information needs, such as actively reading newspapers and books, logging on health websites, using search engines, or actively consulting friends, relatives and doctors to obtain the health information they care about. This kind of proactive health information acquisition behaviour is called active health information acquisition under the premise of clear information needs and purposes. Through literature research, the research on active acquisition of health information mainly includes the following aspects:

(1) Based on the perspective of information behavior, the research is conducted from the perspectives of motivation, pattern, characteristics, theoretical model, influencing factors, measurement methods, etc. The influencing factors have received more attention. (2) From the perspective of information retrieval, it focuses on the selection of retrieval tools, the construction of retrieval methods, and the retrieval process. Health information retrieval behavior based on search engine and search index has also received attention. As research evolves, information retrieval technology increasingly finds application in health information acquisition studies. (3) Alternative Search. Due to the limitation of some reasons, some users cannot complete the search behaviour of health information by themselves, therefore, alternative search for health information has been paid attention by scholars. It mainly involves research on alternative searcher characteristics, alternative search intention, alternative search behaviour patterns, and influencing factors.

4.2.2 Passive acquisition of health information

Health information passive acquisition behaviour refers to health information acquired without the intention of information acquisition, such as reading newspapers, browsing web pages when stumbling upon a piece of health information, or suddenly talking about health topics when chatting with friends [4]. With the popularity of mobile Internet and new media, social media, etc., people are surrounded by information anytime and anywhere, and passive exposure to information has become the norm. Relevant studies have found that new media platforms and mobile Internet are the main ways of information eventuality nowadays [5]. Information quality, information literacy, interactive atmosphere and technicality of the platform are the main factors affecting passive access to online health information.[6].The study of health information passive acquisition behaviour provides more perspectives for deepening the study of health information acquisition behaviour.

4.2.3 Avoidance of health information

With the gradual deepening of the understanding of health information acquisition behaviour and the emergence of information overload and other problems in the all-media era, some scholars have begun to pay attention to users' health information avoidance behaviour, i.e. people's deliberate avoidance of health information. Relevant research mainly involves the causes, processes, influencing factors, and solutions of health information avoidance.

4.3 Health information acquisition pathways

The research includes the health information acquisition pathways of different populations, the respective characteristics of different pathways, and the factors affecting the choice of different pathways. In general, the public health information acquisition pathway has experienced the process of mass media, Internet, and mobile Internet. Early urban and rural residents' access to health knowledge was dominated by television, radio, and newspapers [7]. With the rapid development of the Internet, computer networks and mobile phone mobile networks have become the main acquisition routes, mainly including search engines, social platforms, public portals, professional health websites, and professional database websites [8]. Traditional channels such as television, newspapers and magazines, relatives and friends, and doctors still occupy an important position in the process of public health information acquisition. At the same time, the choice of health information acquisition is influenced by a variety of factors, mainly including the public's own factors and access factors. The public's age, gender, marital status, education level, occupation, medical education background, geographical location, demand characteristics, and health status are the main factors affecting their choice of health access. The professionalism, accessibility, convenience, information quality, information satisfaction,

and convenience of the access route itself also affect the public's choice [9-10]. In addition, schools, governments, hospitals, communities, libraries and other health information providers, according to the different needs of the situation, the flexible use of a variety of means of communication, the implementation of diversified health communication strategy is also one of the directions that scholars are concerned about.

4.4 Research methods of health information acquisition

After researching the relevant literature, it was found that the research method of health information access is mainly empirical research, i.e., collecting research data in the form of questionnaires, putting forward hypotheses and constructing models in combination with relevant theories, and then confirming or falsifying research hypotheses through statistical methods. With the depth of research, scholars have come to realise that social science research cannot rely solely on observation or experimentation for inference, but should rely on the researcher's own internalised experience to understand the mental world of the research subject in a particular context [11]. Therefore, in-depth interviews and grounded theory have been widely used in related research. With the arrival of the big data era, the data available for research has increased dramatically, and data-driven research methods such as social network analysis, meta-analysis, log mining, and visual analysis based on knowledge graphs have become popular, and the idea of the research is to use the existing conditions of data access as a starting point to carry out the research, and then to form research theories or related conclusions through the analysis and generalisation of the results. Compared with the discussion of causality in empirical research, data-based research pays more attention to the mining and utilisation of data. In actual research, the joint use of multiple research methods is also more common, such as the combination of quantitative and qualitative, the combination of questionnaires and in-depth interviews, the combination of experiments and questionnaires, and so on.

5. Research hot spots and trends

Utilizing VOSviewer software, a time sequence diagram was constructed for 53 high-frequency keywords, depicted in Figure 3. Nodes' sizes reflect keyword occurrence frequency; yellow hues indicate later average occurrence years, while purple hues signify earlier ones.

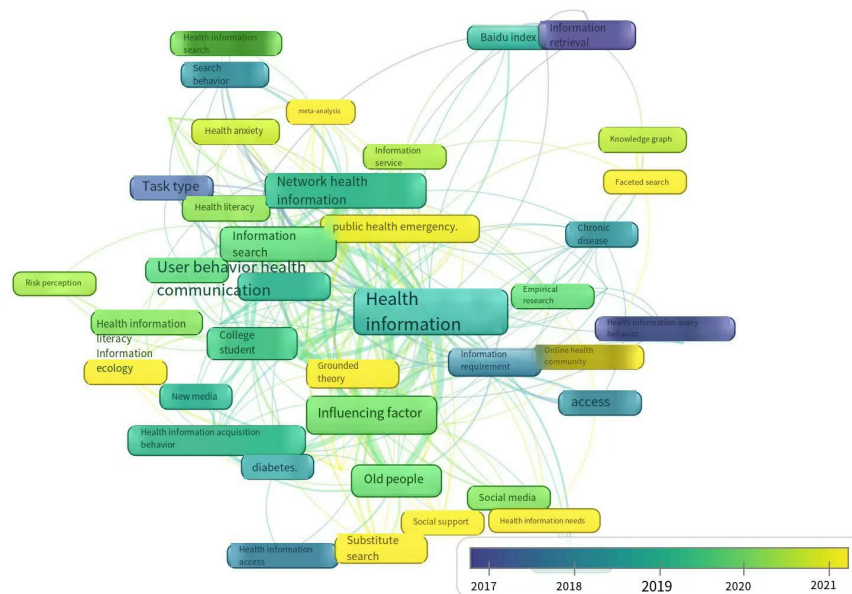


Figure 3 Time sequence diagram of keywords in health information acquisition research

As can be seen from Figure 3, the early keywords mainly focus on information retrieval, ontology, search engine, network, etc., indicating that the early research is mainly from the point of view of information retrieval technology, research on health information retrieval methods and technology, design and construction of medical information retrieval system, etc.; with the depth of the research as well as the national emphasis on health information, the research themes and hotspots on the

chronological chart are also more and more research, the research is mainly focus on information needs, health information search influencing factors, health information access for college students, the elderly, chronic disease patients, access, new media, social media, access to online health information, health education, etc.; after the new crown epidemic at the end of 2019, health information access under public health emergencies began to receive attention from scholars. Over time, some major research themes continue to be studied and new ones are being explored. In recent years, the keywords of research have focused on online health information search behaviour, online health communities, mental health, structural equation modelling, rootedness theory, information ecology, faceted search, meta-analysis, social support, and alternative search.

6. Conclusion

Overall, health information access research in China has achieved certain research results under the impetus of national policy and practice development. Based on the previous analyses, future health information access research can focus on the following aspects:

6.1 Subdividing research objects

At present, the research objects of health information access are diversified, but they are still mainly the elderly, college students and patients with chronic diseases. In the future, the research object can be further subdivided, such as from age (e.g., young, middle-aged, old), gender, occupation, education level and other multi-dimensions; in addition, disadvantaged groups such as disabled people, people at high risk of disease, and marginalised groups, etc., also need to be further researched.

6.2 Personalised health information dissemination

In the era of information explosion, people prefer to quickly obtain targeted information rather than being surrounded by useless information. Personalised health information dissemination analyses information about an individual's health status, lifestyle, preferences and needs through technologies such as Big Data and Artificial Intelligence to provide them with personalised health advice and information to help them make smarter health decisions, reduce health risks and improve quality of life. In order to achieve personalised health information dissemination and access, cross-disciplinary collaboration and integration is required, including knowledge and methods from a wide range of fields such as medicine, psychology, communication, computer science, and information science. Future research could further explore how to integrate these knowledge and technologies to provide more accurate, effective and sustainable personalised health information services.

6.3 Research on quality assessment and credibility of health information

In the process of health information acquisition, people often have doubts about the accuracy and reliability of health information. Therefore, it is of great significance to carry out research on the quality assessment and credibility of health information. By establishing scientific and objective evaluation indexes and methods, it can help users identify reliable and unreliable health information, thus improving their information trust and use.

6.4 Enrichment and Improvement of Research Methods

From the current research, positivist and hermeneutic research based on questionnaires, experiments and interviews still occupy the main position. With the development of information technology and big data, the fourth paradigm based on data-intensive research activities is the mainstream mode of future research [12]. Research on health information access also needs to adapt to the new research environment and research paradigm, and conduct relevant research based on big data, cloud computing, artificial intelligence, machine learning and other technologies.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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