

A Systematic Review of Empirical Research on Online Health Information Help-Seeking Behavior: Knowledge Framework, Influencing Factors, and Frontier Analysis Postprint

Authors: Zhang Min, Liu Xuerui, Zhang Yan

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Abstract

[Purpose/Significance] Empirical research on users' online health information help-seeking behavior constitutes an important component of user online health information behavior research, and in-depth analysis of this topic can promote innovation in applications and models of online health information services. [Method/Process] Using CNKI and Web of Science as data sources to obtain representative research literature, and employing systematic review methodology to synthesize domestic and foreign empirical research on users' online health information help-seeking behavior. [Results/Conclusions] Existing research has initially established a knowledge system framework, yet certain research gaps remain. Influencing factors primarily encompass four categories: internal factors (help-seeking matters, help-seeker factors), external factors (information environment, social environment, helper factors), mediating factors (help-seeking needs, cognitive factors), and moderating factors (demographic factors). Emphasizing research foundations, exploring influencing factors, focusing on outcome variables, and promoting data-driven approaches will be key directions for future research.

Full Text

Preamble

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Zhang Min¹, Liu Xuerui¹, Zhang Yan²

¹School of Information Management, Wuhan University, Wuhan 430072

²School of Public Policy and Management, University of Chinese Academy of Sciences, Beijing 100049

Abstract

[Purpose/Significance] Empirical research on users' online health information help-seeking behavior constitutes an important component of user online health information behavior studies. In-depth analysis of this topic can drive application innovation and model innovation in online health information services. **[Method/Process]** This study employs CNKI and Web of Science as data sources to obtain representative research literature and uses systematic review methodology to examine domestic and international empirical research on users' online health information help-seeking behavior. **[Result/Conclusion]** Existing research has initially formed a knowledge system framework, though several research gaps remain. Influencing factors mainly comprise four components: internal factors (help-seeking issues, help-seeker characteristics), external factors (information environment, social environment, helper characteristics), mediating factors (help-seeking needs, cognitive factors), and moderating factors (demographic factors). Future research hotspots and priorities will include strengthening research foundations, mining influencing factors, focusing on outcome variables, and promoting data-driven approaches.

Keywords: online health information; help-seeking behaviour; systematic review

2. Research Methods and Data Acquisition

2.1 Research Method Overview

Literature reviews are primarily divided into narrative reviews and systematic reviews. Given that narrative reviews suffer from overly broad scopes and susceptibility to bias in literature selection, systematic reviews—which focus on specific issues, unbiasedly integrate various independent studies, provide critical evaluation, and identify consistent conclusions and research gaps—have gained widespread application. This study adopts systematic review methodology, aiming to retrieve comprehensive and unbiased publicly available literature and working papers while obtaining scientifically objective results through secondary literature research. We selected authoritative domestic and international data sources, continuously mining relevant keywords and examining citation patterns and scholars' academic reputations to supplement literature. Additionally, we established comprehensive sample selection criteria by comprehensively considering thematic relevance, empirical research type, journal quality, author credentials, and citation rates to filter and screen retrieved research samples, thereby effectively avoiding research result bias caused by the inclusion of low-quality literature.

2.2 Data Collection and Preprocessing

To obtain relevant, comprehensive, and authoritative research findings on online health information help-seeking behavior, this study strictly followed systematic review procedures to complete literature investigation, collection, screening, supplementation, and organization.

2.2.1 Literature Pre-survey For data sources, we comprehensively considered factors such as academic information resource coverage, dynamic update speed, and paper download availability, selecting CNKI and Web of Science as primary sources. The former hosts the world's largest full-text database of Chinese academic journals and the most comprehensive database of Chinese excellent doctoral and master's theses, while the latter represents the world's largest comprehensive academic information resource database. Preliminary searches in these two databases revealed that direct research on online health information help-seeking was scarce, with most being descriptive non-empirical literature. This outcome likely stems from online health information help-seeking being an emerging research area lacking clear definition, resulting in substantial variation in definitions and expressions across literature. Consequently, this study identified keywords through extensive literature reading, including both directly and indirectly related terms.

2.2.2 Literature Retrieval This study used combinations of online health (including online medical, health information, internet healthcare, etc.) and help-seeking (including seeking, consulting, interaction, Q&A, etc.) as keywords to search journal, master's thesis, and doctoral dissertation databases in CNKI. Additionally, combinations of online health (including online medical, e-health, m-health, online health community, etc.) and help-seeking (including help, seeking, consulting, etc.) were used as keywords in Web of Science with English language limitation. Publication time was unrestricted, with retrieval operations concluding on December 31, 2017. Based on retrieval results, titles and abstracts were read to filter literature.

2.2.3 Literature Screening and Supplementation After preliminary retrieval, screening, downloading, deduplication, and classification by literature type and level, a literature information list was formed totaling 79 papers, including 41 Chinese samples and 38 English samples, with the earliest research being M.L. Ybarra and M. Suman's 2006 study. To reduce literature bias, papers were first browsed in full to remove non-empirical literature with low thematic relevance, followed by sample cleaning based on journal quality, paper rigor, and publication time. Chinese samples prioritized CSSCI-indexed literature, comprehensively considering journal impact factors, citation rates, and author research levels. English samples prioritized SCI and SSCI-indexed literature, mainly considering journal impact factors and removing some older or less rigorous papers. Furthermore, considering that existing keywords could not cover all relevant literature, new keywords discovered during paper reading were

used to repeat the retrieval process to supplement samples, and relevant papers were selected based on citation and reference patterns of obtained literature. Through these steps, 40 papers were finally determined as the research sample.

3. Knowledge System Analysis

3.1 Research Method Analysis

Regarding data acquisition methods, statistics from the 40 research samples (see Table 1) show that questionnaire surveys were most commonly used, with web crawler software also widely employed. Experimental methods, interview methods, and mixed research methods integrating multiple data types were also applied. Notably, using report data published by authoritative organizations (such as Pew) or governments to study online health information help-seeking intentions and behaviors was relatively common in foreign scholars' research. Regarding data processing methods, many studies used SPSS for regression analysis, SmartPLS and AMOS for correlation analysis, while text analysis generally employed NVivo qualitative analysis software.

In terms of research group selection, foreign research was more detailed and systematic, analyzing not only different regions, occupations, immigrants, and age groups but also focusing particularly on specific disease patients or specific disease virtual communities. For example, K.A. Peddie and R.J. Kelly-Campbell selected hearing-impaired individuals in New Zealand aged 44-84 (average age 70) as research subjects, while B. Crook and B. Love investigated online help-seeking behavior in adult cancer health communities. In addition to in-depth research on patient help-seeking behavior, some scholars also focused on health information needs of caregivers. Domestic scholars' research groups were relatively homogeneous, mainly focusing on college students, regional residents, and users of comprehensive online health communities or Q&A platforms.

3.2 Theoretical Background Analysis

Online health information help-seeking behavior research is primarily divided into empirical and descriptive studies. All articles selected in this paper employ empirical research methods, which often require basing research models on one or several theories to identify influencing factors as antecedent variables. Major foundational theories incorporated into online health information help-seeking behavior research are shown in Table 2 :

3.2.1 Privacy Calculus Theory Privacy calculus theory, derived from utility theory, posits that users make decisions by weighing privacy leakage risks against service adoption benefits. Expected benefit and perceived risk factors influence users' information disclosure behavior on platforms. Scholars typically incorporate benefit, risk, and related important variables or dimensions into models. Zhang Xing et al. integrated planned behavior theory in their research,

using perceived cost (privacy concern) and perceived benefit (personalized service) for cost-benefit analysis.

3.2.2 Health Belief Model (HBM) Since the 1950s, social psychologists represented by G. Hochbaum have used HBM to explain individual preventive health behaviors. I.M. Rosenstock summarized that HBM mainly includes perceived disease susceptibility, perceived disease severity, perceived action benefits, perceived action barriers, and cues to action. HBM continues to evolve, with J. Mou et al. integrating it with extended valence theory to propose a theoretical model.

3.2.3 Risk Perception Attitude Framework (RPA) R.N. Rimal and K. Real proposed RPA in 2003, explaining how perceived risk and self-efficacy influence behavior. Their research suggests that high risk motivates information-seeking in individuals with high self-efficacy (responsive group) rather than those with low self-efficacy (avoidant group). Perceived risk triggers health concerns, and avoidant individuals who doubt their ability to effectively respond are less inclined to seek online health information.

3.2.4 Comprehensive Model of Information Seeking (CMIS) Building on uses and gratifications theory and the health belief model, J.D. Johnson and H.A. Meischke proposed CMIS in 1993, suggesting that health information-seeking behavior is influenced by two aspects: health-related factors (including direct experience [disease experience extent], individual characteristics [disease concern level], beliefs [self-efficacy], and demographic factors) and information carrier factors (divided into characteristics [information credibility] and information source utility [information usefulness]). This theory applies not only to patients themselves but also to caregivers, as H. Kim et al.'s research suggests.

3.2.5 Other Theories Ye Cunhui built a model from doctor-patient perspectives based on information asymmetry theory, using signal theory for the doctor perspective and customer perception theory for the patient perspective. Scholars including A.M. Walsh et al. employed risk-benefit balance theory, particularly emphasizing the perceived risk dimension. X. Guo et al. used a two-factor model to verify the effects of inhibiting factors (technology anxiety, resistance to change) and facilitating factors (perceived usefulness, perceived ease of use) on Chinese elderly's use of online health services.

3.3 Research Framework Analysis

The main approach of empirical research on users' online health information help-seeking behavior is: first, determine research questions based on target groups; conduct research based on existing theoretical backgrounds and addressing limitations of previous empirical studies; select appropriate data acquisition

methods to collect user psychological and behavioral data; organize and analyze to explore main influencing factors and behavioral mechanisms of users' online health information help-seeking intentions. Through content analysis and systematic analysis, we initially constructed the knowledge system of current empirical research on online health information help-seeking, as shown in Figure 1 [Figure 1: see original paper].

According to field theory and A. Bandura's social cognitive theory, individual behavior is simultaneously influenced by the individual and their environment. Social psychologists T.A. Wills and B.A. DePaulo also believe help-seeking behavior is influenced by both individual and situational factors at multiple levels. Scholar A. Nadler proposed that help-seeking behavior includes three core elements: help-seeking need, help-seeker, and potential helper. Online health information help-seeking intentions and behaviors result from cognitive reactions formed under the influence of internal and external factors. As shown in Figure 2 [Figure 2: see original paper], this paper categorizes numerous influencing factors explored in empirical research into independent variables, mediating variables, and moderating variables. Independent variables can be organized into two types: internal factors (summarized as help-seeking issues and help-seeker characteristics) that affect help-seeking needs and user cognition, and external factors (summarized as social environment, helper characteristics, and information environment) that jointly influence user cognition. Mediating variables are help-seeking needs and cognitive factors, while moderating variables are demographic factors.

4. Influencing Factors Analysis

4.1 Internal Factors Analysis

4.1.1 Help-Seeking Issues The emergence of online health information help-seeking needs and motivations stems from help-seeking issues, generally depending on help-seekers' health status and treatment stage. Health status, disease severity, disease sensitivity are incorporated into research. When health status is poor or disease is suspected, needs arise. M.L. Ybarra and M. Suman's research shows that individuals prioritize online help-seeking when encountering serious problems, needing quick answers, or facing sensitive issues. Patients at different treatment stages, such as those in treatment or recovery periods, also generate online help-seeking needs to supplement offline diagnosis and rehabilitation information.

4.1.2 Help-Seeker Characteristics Online health information help-seeking behavior occurrence is closely related to help-seeker self-efficacy, medical experience habits, personal medical resources, health literacy, and information literacy (see Table 3). Individuals with good medical resources prefer offline channels, and their offline medical habits lead to neglect of online help-seeking advantages. Users asking health questions online lack strong medical knowledge but possess good information literacy. Research finds that anxiety is an important barrier

to online help-seeking, such as technology anxiety, which is more pronounced in elderly groups.

4.2 External Factors Analysis

4.2.1 Social Environment Social influence theory and previous research have found that social factors such as subjective norms, social identity, and group norms significantly affect personal intentions, and their significant impact on online health information help-seeking has been verified by numerous studies (see Table 4). Critical mass reflects social demonstration effects and conformity effects, which have also received research attention.

4.2.2 Helper Characteristics Scholars have found that having appropriate helpers is an important prerequisite for help-seeking behavior, manifested in two aspects: capability (professional competence, relevant experience) and willingness to help. Capability characteristics are mainly reflected through online reputation, doctor qualifications, trust, and online effort (see Table 5). Online effort mainly includes doctors' online contributions, online time, and patient numbers. Research finds that among online reputation indicators, thank-you letter numbers have the greatest impact on patient doctor selection, while doctor title has no significant impact. Regarding willingness to help, J. Mou et al. found that besides capability, helpers' benevolence and integrity affect help-seeker trust.

4.2.3 Information Environment As online information behavior, online health information help-seeking is significantly influenced by information quality and information system quality. As one of four information quality dimensions, expression quality (comprehensibility, expression accuracy, readability) overlaps with other dimensions in online health help-seeking research. Therefore, this paper selects three dimensions for analysis: intrinsic quality (accuracy, credibility, objectivity), contextual quality (relevance, completeness, timeliness), and accessible quality (convenience, ease of use, availability). Platform quality factors include system quality factors (perceived usefulness, perceived ease of use) and information service environment factors (commercial nature, interactive environment), as shown in Table 6 .

4.3 Mediating Factors Analysis

4.3.1 Help-Seeking Demand According to uses and gratifications theory and sense-making theory, users' online health information help-seeking behavior is motivated by certain needs, with help-seeking demand being the most basic internal driver. Difficulties of different characteristics and degrees stimulate varying levels of help-seeking needs, which affect help-seeking intentions and behaviors through online health help-seeking cognition. The main needs for online health information help-seeking are social support required by patients or caregivers: obtaining information support for disease diagnosis and

health maintenance, confirming and supplementing health information from traditional channels; and obtaining emotional support and sense of belonging. Online health communities or Q&A platforms serve as both instrumental and emotional communities, addressing both information support and emotional support needs.

4.3.2 Cognitive Factors Social cognitive theory suggests that human behavior is usually cognition-driven. Some scholars believe that psychological activities before help-seeking constitute a decision-making process, where various factors influence help-seeking decisions through internal representations. Perceived benefits and costs (utility theory), perceived barriers, perceived threats, perceived risks (risk-benefit balance theory), perceived value, and perceived behavioral control (planned behavior theory) all constitute major cognitive influencing factors of online health information help-seeking (see Table 7). Perceived benefits positively affect online health information help-seeking intentions, while perceived risks and costs significantly negatively affect them.

4.4 Moderating Factors Analysis

Besides the above factors, demographic factors such as gender, age, income level, disease type, and personality have been confirmed to affect online health information help-seeking intentions and behaviors. J. Chen et al. selected dimensions of the digital divide including age, immigration, household registration status, and economic status, showing that urban-to-urban migrants seek more help via the internet than rural-to-urban migrants. Research on moderating effects of demographic factors is most common, though some studies use self-efficacy and current health status as moderators. Wu Jiang and Li Shanshan's research confirmed that for online health community users of different genders, the effects of cognitive factors such as perceived value and perceived risk differ, while Che Xiaoling verified that age negatively moderates the effect of perceived usefulness.

5. Forward-looking Analysis

As mentioned above, given that domestic and international research on online health information help-seeking behavior is still developing and has not yet formed a mature research system, this study systematically reviews the latest research findings in this and related fields to identify several important research directions requiring special attention in future studies, as shown in Figure 3 [Figure 3: see original paper].

5.1 Emphasize Research Foundation

As an emerging product of "Internet + Healthcare," online health help-seeking involves many phenomena and issues requiring theoretical explanation and support. Current research questions mostly focus on user questioning, information

disclosure, and usage intentions and behaviors, with less specific focus on help-seeking behavior itself. Therefore, future research needs to emphasize foundational and targeted studies on help-seeking behavior.

5.1.1 Definition and Typology of Help-Seeking Future research needs to define the connotation of online health help-seeking and explore and verify its typology, such as separately studying medical consultation vs. peer mutual aid, explicit vs. implicit help-seeking. Explicit help-seeking refers to users who can independently, clearly, and accurately describe their needs, while implicit help-seeking refers to vaguely describing needs when symptoms are difficult to describe or disease information is withheld. Currently, few literature sources address these issues, requiring further in-depth consideration.

5.1.2 Strengthen Theoretical Support Existing research mostly employs classic information systems theories such as the technology acceptance model, adding some variables for verification, which has certain limitations in explanatory scope. In recent years, scholars have gradually introduced theoretical frameworks from health, communication, psychology, and economics fields, such as the health belief model, risk perception attitude framework, two-factor model, media dependency theory, and information asymmetry theory, which have good explanatory power. Future research should further enrich existing theories based on interdisciplinary perspectives to better explain help-seeking psychology and behavioral mechanisms from cross-disciplinary research viewpoints.

5.1.3 Scale Development and Empirical Research Existing research mostly adapts classic scales from information systems and other fields according to research questions and contexts. Scientific, systematic, and standardized scales applicable to the online health field are lacking and require attention, particularly regarding item screening, reliability and validity analysis, and measurement.

5.2 Promote Data-Driven Research

5.2.1 Improve Data Quality Existing research mostly uses questionnaires, experiments, and interviews from social sciences, inevitably incorporating subjective consciousness of researchers and participants. With advancing industry-academia collaboration, using practical data for research is an important means to compensate for current deficiencies in practical guidance, research timeliness, and data persuasiveness. Additionally, research using web-crawled user behavior data shows clear growth trends, and research integrating subjective and objective, qualitative and quantitative data sources has significant application potential, such as combining social network analysis for structural data with NeuroIS (including eye movement, EEG, facial muscle movement, etc.) for physiological data and other interdisciplinary method integrations.

5.2.2 Enrich Research Samples Existing research groups are relatively large and homogeneous, with conclusions not necessarily generalizable to other groups. There is also a lack of research on specific diseases, regions, cultures, and social roles. Online medical health services play a relatively prominent role for elderly and chronic disease patients. Future research could more specifically target particular patient groups (such as cancer patients, AIDS patients, pregnant women) and other vulnerable populations. With global aging trends intensifying, caregiver groups play increasingly important roles in the health industry, and their online health information behavior significantly influences health technology practice. Such research has received widespread attention from foreign scholars but remains lacking domestically.

5.2.3 Optimize Data Analysis Existing research mostly uses statistical software for linear regression analysis and structural equation modeling. Future research should attempt and promote new tools and methods, adopting data processing software from adjacent disciplines such as Mplus and HLM, which can simultaneously handle cross-sectional and longitudinal data, single-level and multi-level data, to facilitate more complex and in-depth analysis. Additionally, combining grounded analysis and sentiment analysis with existing statistical methods will make research conclusions more comprehensive and reliable.

5.3 Mining Influencing Factors

5.3.1 Enrich Exploratory Research and Broaden Research Dimensions First, focus should shift from the “platform” level to the “people” level, especially the help-seeker level. Existing literature has extensively studied help-seeker literacy and beliefs, perceived ease of use and usefulness, and information quality perception, with detailed categorization of help-seeking cognitive factors and information environments. However, some dimensions closely related to research contexts, such as help-seeking issues, help-seeker factors, and helper factors, lack clear variables, and mutual aid behavior research focuses more on helpers. In fact, almost all helping behaviors originate from active help-seeking, where help-seekers’ roles cannot be ignored. Currently, research on help-seeker personality, emotion, and social capital factors is lacking. Second, culture and privacy factors should be explored. Due to East-West cultural differences, users’ perceptions of social identity and privacy risks differ. Research has confirmed the significant impact of social norms in Chinese society with strong collectivism and emphasis on family and friend relationships. Influencing factors and mechanisms from foreign research may not adapt well to domestic practice needs, requiring further exploration and inclusion of Chinese-context social culture and privacy factors. Third, research should expand from online influencing factors to integrated omnichannel factors. Online factors such as online reputation, privacy, and personalization have been extensively studied, and social network media increasingly influence online decision-making. Since online and offline channels are not isolated, offline traditional factors significantly affect online trust and decision-making, with existing research showing omnichannel integration trends.

Studies find that users preferentially select geographically closer hospitals and doctors for online diagnosis, and offline reputation significantly influences online consultation behavior. Offline physicians' encouragement and support for online health information behavior significantly promote patients' online consultation intentions and behaviors.

5.3.2 Deepen Empirical Research and Explore Variable Relationships

Research on differential effects of different variables is an important direction. The effects of various categories can be ranked to explore which factors have greater impact on help-seeking behavior. Research can also examine effect differences within a category, such as exploring differences in online help-seeking intentions among various characteristic groups within help-seeker individual factors to target user groups, or exploring differences in impact between doctor qualifications and reputation within helper factors to propose reasonable countermeasures. Additionally, interactive effects between variables should be studied, incorporating research context as an influencing factor to explore interactions between contextual variables and various factors. Under different contexts, community types, diseases, and advertising competition environments, the intensity differences of influencing factors for online help-seeking of different disease types may vary significantly, which is important for online health communities to adopt differentiated operational management strategies for different disease areas. Research should also examine users' continuous help-seeking intentions under specific social contexts (such as emergencies or negative media reports), while description accuracy will affect helpers' understanding accuracy and response specificity, thereby influencing help-seekers' consultation experiences and continuous help-seeking behavior.

5.4 Focus on Outcome Variables

The purpose of related research is to guide industry in enhancing user help-seeking intentions and promoting continuous help-seeking. Positive help-seeking experiences promote continuous help-seeking, with help-seekers gradually becoming deep users, developing from help-seekers to disseminators and sharers. Future research should introduce subsequent outcome variables of help-seeking behavior. Additionally, some scholars have considered knowledge payment and consultation pricing issues based on help-seeking intention and behavior research. Payment research is an important manifestation of intellectual property protection, and pricing research is closely connected to industry practical problems deserving in-depth discussion. Negative help-seeking experiences reduce satisfaction and trust, inhibiting subsequent help-seeking intentions and causing discontinuance or termination. Attributions of negative experiences differentially affect subsequent help-seeking; for example, attributing to information timeliness issues may prevent online help-seeking in future emergencies while continuing for daily healthcare. Therefore, future research should focus on psychological attributions after negative experiences and discontinuance behavior.

Conclusion

This study used CNKI and Web of Science databases as sources to systematically review literature on online health information help-seeking behavior using content analysis. The study reveals that online health information help-seeking behavior is a complex dynamic process, with help-seeking intentions and behaviors resulting from internal and external factors acting on individual decision-making through internal representations. Based on this framework, we organized influencing factors of online health information help-seeking behavior and analyzed current research frontiers. By strengthening research foundations, further mining influencing factors, and exploring outcome variables, future research will form a more comprehensive and detailed all-around research system driven by data.

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Author Contributions

Zhang Min: Determined research topic, developed research plan, and wrote the paper.

Liu Xuerui: Conducted literature investigation, data analysis, and paper writing.

Zhang Yan: Determined research topic, revised and polished the paper, and translated it into English.

Note: Figure translations are in progress. See original paper for figures.

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