

A Review of Research on Factors Influencing User Participation Behavior in Online Health Communities (Postprint)

Authors: Zhang Weiwei, Jiang Xue

Date: 2023-04-01T16:15:50+00:00

Abstract

[Purpose/Significance] Online health communities serve as vital platforms for individuals concerned with health issues to exchange experiences, knowledge, and emotions, while user participation constitutes the cornerstone of community development. A comprehensive review of the factors influencing user participation behavior can provide systematic reference for research in this domain. [Method/Process] From a comprehensive information ecosystem perspective, this study systematically reviews the principal achievements and current research status regarding the influencing factors and influencing mechanisms of user participation behavior across four dimensions: information user, information, information technology, and information environment. [Results/Conclusion] User participation behavior is comprehensively influenced by the multiple dimensions of information user, information, information technology, and information environment. The relevant research achievements are relatively abundant, and a relatively mature research topic has been established. Future research trends are discussed from perspectives including community type, user type, and sustained participation.

Full Text

Abstract

[Purpose/Significance] Online health communities (OHCs) are important platforms for individuals concerned about health issues to exchange experiences, knowledge, and emotions, and user participation is key to community development. A comprehensive review of the factors influencing user participation behavior can provide systematic reference for research in this area. [Method/Process] From the comprehensive perspective of information ecosystems, this paper systematically reviews the primary achievements and current

research status regarding the influencing factors and mechanisms of user participation behavior across four dimensions: information people, information, information technology, and information environment. **[Result/Conclusion]** User participation behavior is comprehensively influenced by all dimensions of information people, information, information technology, and information environment, with relatively abundant relevant achievements having formed mature research topics. Finally, this paper looks forward to future research trends from the perspectives of community types, user types, and continuous participation.

Keywords: online health communities; user participation behavior; information ecosystem; literature review

Online health communities (OHCs) are web-based interactive platforms where individuals concerned about health problems share health information, knowledge, emotions, and experiences with other community users. OHCs reduce the cost for patients seeking health information and medical assistance while providing hospitals with opportunities to expand their markets [1], and doctors even have the right to price online services [2]. Supported by policies such as the Healthy China Strategy and “Internet Plus Healthcare,” online health communities are developing vigorously with diverse types and distinctive features, broadly falling into two categories: first, P2D (patient-to-doctor) communities with doctor-patient interaction formats, such as Haodf.com, Xunyiwenyao, and WeDoctor; second, P2P (patient-to-patient) communities where patients communicate with each other, such as Sweet Home and Baidu’s smoking cessation forum. According to a survey report by Guanghua Bost Consulting, the Internet Plus Big Health industry represents a major future trend [3]. The rapid development of online health communities holds significant importance for innovating medical service models, improving healthcare environments, and enhancing public self-health management.

Some scholars have already reviewed and organized literature related to online health communities. For example, Zhao Dongxiang reviewed domestic research status on OHCs from three dimensions: information, users, and community [4]. Zhang Min et al. systematically reviewed empirical research on online health information seeking behavior from the perspectives of knowledge systems, influencing factors, and frontier analysis [5]. The aforementioned studies organized the main achievements of OHC research from perspectives such as domestic research status and user help-seeking behavior, which helps to initially understand relevant research trends, but lacks systematic interpretation of influencing factors and mechanisms of user participation behavior in OHCs both domestically and internationally. Notably, the healthy development of OHCs depends on users actively participating to create and share knowledge [6]. Deeply understanding the factors influencing user participation in OHCs helps grasp the patterns and psychological models of user participation behavior, enhances users’ continuous participation willingness, and has profound significance for standardizing community management and optimizing community functional services. In view of this, this paper aims to comprehensively review the influencing factors and

mechanisms of user participation behavior in OHCs from the comprehensive perspective of information ecosystems, examining four dimensions: information people, information, information technology, and information environment.

2 Literature Screening and Preliminary Statistical Analysis

This study primarily used Web of Science, EBSCO, Elsevier, Google Scholar, China National Knowledge Infrastructure (CNKI), and VIP Chinese Science and Technology Journals Database as retrieval sources. Following J. Webster et al.'s recommendations for literature reviews [7], we identified relevant research from citations of retrieved literature and source documents citing these papers to expand the scope of reviewed achievements. The main retrieval approaches were:

Subject retrieval in academic databases including CNKI, VIP, SpringerLink, and Elsevier ScienceDirect, with English search terms “(Online OR Virtual OR Digital) AND (‘health community’ OR ‘health forum’) AND User” and Chinese subject terms “在线健康社区” (online health community), “网络健康社区” (network health community), “虚拟健康社区” (virtual health community), or “在线医疗社区” (online medical community). We then manually screened literature by reading titles and abstracts; Citation identification, using initially screened literature as sources to identify relevant studies from their references; Backward search, using citation index databases such as Web of Science and CSSCI to retrieve source documents citing the above literature and selecting thematically relevant research. Additionally, literature quality and research type were screening criteria, with this paper focusing on original research and excluding review sources.

Ultimately, 73 papers were selected, including 24 Chinese and 49 English articles. To better understand the macro perspective of OHC user participation behavior research, we conducted preliminary statistical analysis of source literature, with results shown in [Figure 1: see original paper]. From the publication years, between 2004 and 2018, the number of published papers showed an overall upward trend, particularly accelerating since 2017. This indicates that OHCs are receiving increasing attention from scholars, with related research achievements continuously growing. To ensure topical relevance, this paper focuses more on research published in the last four years, including two latest studies from 2019.

Table 1 shows the main sources of research literature, listing only journals and conference proceedings with three or more papers. As shown in Table 1, research on OHC user participation behavior primarily involves information science, medical informatics, management, and other fields, reflecting its interdisciplinary nature. According to participation objects, participation modes, and scholars' naming conventions, participation behavior types are diverse. Table 2 lists some representative types of user participation behavior, including lurking behavior, help-seeking or searching behavior, information disclosure behavior, sharing behavior, contribution behavior, adoption behavior, and usage behavior, as well as social behavior, social support behavior, and patient doctor-selection behavior among users. Most scholars focus on ordinary users, with few studies addressing

professional users' participation behavior.

3 Comprehensive Influence Model of User Participation Behavior in Online Health Communities

OHC user participation behavior is influenced by comprehensive factors including users themselves and other users, information, platform technology, and the information environment, which interact to form an information ecosystem. As shown in [Figure 2: see original paper], users, as the main subjects of information exchange and sharing, are influenced by both individual factors and interactions among users. Information is the object users produce and consume, and its quality and privacy concerns affect user participation behavior. Information technology provides support and guarantee for users to participate in information sharing, and its usefulness, ease of use, and platform function and structure design all affect user participation experience. The information environment is the venue for user community activities, and user participation behavior is affected by economic, cultural, social, and other factors. Therefore, this paper comprehensively reviews the influencing factors of OHC user participation behavior from four dimensions: information people, information, information technology, and information environment.

3.1 Research on the Information People Dimension

Through literature review and analysis, we found that factors influencing user participation behavior in the information people dimension mainly come from two parts: first, the influence of individual user factors; second, the influence of user interaction behaviors, meaning participants' behaviors are simultaneously affected by other participants' interactions [44].

3.1.1 Influence of Individual Factors on User Participation Behavior

Individual factors' influence on ordinary users' participation behavior is mainly reflected in age, gender, personality, activity level, health status, personal goals, motivation, and perceived cost-benefit, while the influence on professional users is mainly reflected in motivation (see Table 3).

- (1) Numerous studies show that ordinary users' participation behavior is affected by many factors. Regarding age, middle-aged users' willingness to use mobile health services is negatively affected by resistance to change, while older adults are positively influenced by technology anxiety and self-actualization needs [22], and young people have greater concerns about Internet potential risks than older adults [26]. Regarding gender differences, males typically post more professional content, use more medical terminology, and are more central and influential in friendship networks than females; female users are more inclined to seek emotional support in health communities and express more negative emotions than male users, particularly anxiety and sadness [45]. Regarding personality, users with

high emotional stability are calmer in information search processes, make more accurate judgments about information quality, which facilitates information perception and adoption; conscientious users examine information search results more carefully and have higher requirements for information reliability and quality [10]. Regarding activity level, active participants better perceive community social support [46]. User participation in community activities requires good physical condition; otherwise, it hinders their contribution to the community [8]. When health status improves, their participation enthusiasm increases. For example, A. Smedberg found that members of an overweight community who lost more weight and became healthier were more active in community conversations [47]. Personal goals reflect people's internal needs, and pursuit of goals positively affects user behavior and health status [48], but when goals are achieved, users are likely to lurk in the community [8].

Motivation is the internal driving force that stimulates human behavior. Due to the special nature of OHCs, users ultimately join communities to improve health status [48], and the information and emotional support provided in communities benefit patients physically and mentally [27, 49]. Members with social-emotional motivation are more willing to provide support in communities, which relates to strong community belonging, connectedness, and perceived less stress, while information motivation relates to receiving support in communities [50]. For novice users, self-monitoring motivation is the main reason for habitual use of online fitness communities; social motivation and enjoyment motivation are more important for experienced users [25]. Knowledge sharing behavior can be divided into general and special knowledge sharing, with different motivations for these two behaviors. Altruism positively affects general knowledge sharing but negatively affects special knowledge sharing, while knowledge self-efficacy has significant positive effects on both general and special sharing [16]. J. E. Chung found that besides seeking information, users' strongest motivation is providing social support to other users [51], which aligns with Zhang Xing et al.'s [16] research conclusions, both affirming altruism's positive role in user participation.

Perceived cost and benefit represent users' trade-offs when participating in community activities. When perceived benefits outweigh costs, users actively participate in community activities to enhance their knowledge utility; otherwise, users only passively participate or even leave the community [52]. T. Zhao et al. believe perceived benefits come from reputation enhancement, self-worth, and sense of belonging, while costs mainly include execution costs and cognitive costs [6]. Z. Yan et al. more finely explored differences between general and special knowledge sharing. Self-worth, perceived social support, and reputation enhancement positively affect both sharing behaviors. Face negatively affects special knowledge sharing behavior but positively affects general knowledge sharing. Execution costs only negatively affect general knowledge sharing, while cognitive costs only negatively affect special knowledge sharing [17]. X. Zhang et al., based on status quo bias theory, believe sunk costs and health

service habits negatively affect perceived benefits; transition costs and privacy protection beliefs positively affect perceived costs [26]. Zhang Xing et al. believe emotional support and personalized services positively affect users' information disclosure attitudes, while perceived privacy costs hinder information disclosure [11].

- (2) Professional users' willingness to share information in health communities is mainly driven by knowledge self-efficacy, altruism, shared vision, and personal rewards. For example, T. C. Lin et al., based on social exchange theory, believe doctors participate in medical forums as knowledge contributors, with shared vision being the most important factor affecting their sharing attitudes, followed by knowledge sharing self-efficacy and altruism [19]. However, X. Zhang et al. believe that compared with ordinary users, altruism's effect on professionals is not significant because professionals have limited time and tend to give medical advice face-to-face to ensure safety and accuracy [18]. F. Liu et al. found that economic and reputation rewards are important internal factors motivating doctors to contribute in communities [34].

3.1.2 Influence of User Interaction Relationships on Participation Behavior Users in health communities do not exist in isolation. Behaviors such as posting, replying, commenting, and liking constitute interaction relationships among users. User participation behavior is influenced by other users' attitudes, concepts, and behaviors during continuous interaction processes. Different types of users have different interaction methods and mechanisms. Therefore, this section reviews the influence of user interaction relationships on participation behavior from three aspects: social preferences, community peer support, and patient doctor-selection behavior, with specific research content shown in Table 4 .

- (1) In community friend selection, homophily is one of the important factors users value. In other words, people prefer to maintain social relationships with similar others in virtual environments, including same gender, similar region, or same disease type [28, 31]. For example, D. Centola et al. found in a fitness program that active participants cared little about other users' health levels and exercise conditions (such as exercise preferences and experiences), but instead selected partners based on similarity in gender, age, and BMI (body mass index) [30]. Additionally, people with high social capital often have more social resources, making it easier to attract other users' attention and build connections. Social capital in communities is mainly reflected in friend quantity and activity level [28]. Wu et al., based on triadic closure theory, believe that friends of friends are more likely to establish friendships [31]. K. T. Durant et al. found that social preferences in health communities show gender differences: males prefer socializing in large, less intimate groups; female patients are more likely to establish highly intimate connections with other female patients

[53].

- (2) Support from community peers meets members' different needs and enhances user participation enthusiasm. Community member support mainly includes information support, emotional support, companionship [40], and social support [54]. Due to differences in health community types, users in different communities have varying demands and effects for different types of peer support. In obesity forums, stronger perceived information and emotional support increases users' enthusiasm for community activities [43]. In Baidu's AIDS forum, information support is most needed [39]; in OCD communities, emotional support behaviors appear most frequently [41]. In smoking cessation communities, peers' positive evaluation of NRT (nicotine replacement therapy) promotes users' NRT use and improves health status [29]. In Baidu's smoking cessation forum, social support has a strong positive effect on user participation enthusiasm; users who received replies after their first post have significantly longer retention and activity than those who did not [54]. Although information support and emotional support significantly affect user participation behavior, companionship is key to retaining members. Users with information needs often leave the community after obtaining desired information [40].
- (3) Doctor-patient interaction mainly occurs in P2D communities, benefiting both parties. For patients, information provided by medical professionals is considered authoritative and reliable. The presence of professionals to some extent indicates that information quality in the community is controlled, making patients more trusting and assured when adopting information [55]. For medical professionals, participating in OHCs enhances their sense of self-actualization, self-worth, satisfaction, and community consciousness [56]. However, interaction effects are affected by both parties' knowledge exchange volume, patients' trust in doctors, and patients' benefits, while patients' waiting time costs and doctors' coding costs negatively affect knowledge exchange effectiveness [57].

Typical P2D communities include Haodf.com, Xunyiwenyao, and WeDoctor. In such communities, patients can identify preferred doctors through hospital, department, and review information. Factors influencing patient doctor-selection have become a research hotspot. Through comprehensive analysis, influencing factors can be categorized into reputation (word-of-mouth) and service quality.

First, doctors' online reputation is a major concern for patients when making online appointments and consultations, significantly and positively affecting patient choice [37]. Besides doctors' own reputation, peers' reputation also affects patient choice behavior. H. Wu et al. found that doctors with above-average reputation among colleagues are more likely to receive treatment opportunities [1]. Y. Zhao et al. believe that appointment numbers of other doctors in the same department significantly and positively affect patient decisions, indicating mutual promotion of appointment numbers among doctors in the same department

[37].

Second, doctors' service quality positively affects patient satisfaction. H. Wu et al. believe price is an important factor measuring service quality and found through empirical research that average price and patient satisfaction follow a U-shaped relationship, peaking at about 330 RMB. When price is below 330 RMB, higher price means higher service quality and patient satisfaction; when price reaches this threshold, higher prices make patients feel unreasonable, reducing their satisfaction [2]. H. Yang et al. believe response speed (doctor's reply speed) and interaction frequency (number of interactions between doctor and patient) in the service process positively affect patient satisfaction [36]. X. Cao et al. found that disease knowledge increases the importance of service quality in patient choice [38].

3.2 Research on the Information Dimension

From the information dimension, information quality and privacy concerns significantly affect user participation behavior (see Table 5).

- (1) Obtaining medical and health-related information is the main reason users join OHCs, and the quality of obtained information becomes an important consideration for whether they remain in the community. High-quality information is significant for health-related decision-making, while sharing poor-quality information may harm users [58]. Therefore, how to judge information quality is particularly important for users. R. Lederman et al. use reference credibility, argument quality, verification, contributor literacy, and group consensus as five criteria for evaluating scientific and experiential information in health communities [59].

The information adoption model emphasizes the mediating role of perceived usefulness in information adoption [60]. Zhang Min et al., based on this model, measure information quality from three aspects: information accuracy, timeliness, and relevance [9]. Regarding information accuracy, easy-to-understand, extensive information provided by core users makes users more likely to stay in the community, while information from peripheral users is often unprofessional or even contains errors, making users question community information quality and choose to leave [42]. Regarding information relevance, users prefer to obtain professional advice and knowledge from doctors, such as understanding disease nature; when learning about treatment experiences and sharing feelings, they prefer communicating with peer patients [61]. Regarding information timeliness, H.-S. Kim et al. found that most health websites provide the latest information unavailable on other sites [62].

Information credibility also positively affects users' trust in the community, thereby influencing their information adoption willingness [20, 63]. Community managers can encourage users to provide high-quality information through economic rewards and reputation points [63]. Setting minimum word counts for information posting can improve information completeness [63], which helps users

evaluate information quality [64]. Additionally, patients pay great attention to information diversity, even more than information reliability [65]. Abundant resources contribute to community sustainable development [62].

- (2) Privacy risks perceived by users during information sharing create a self-protection mechanism, causing them to actively hide personal information, which is not conducive to information exchange among community users [12]. In other words, privacy concerns negatively affect users' information disclosure willingness [66]. This uncomfortable information disclosure is also an important reason for user lurking [8]. Understanding antecedents of privacy issues, including perceived vulnerability, perceived severity, self-efficacy, and response efficacy, can mitigate obstacles to personal health information disclosure [13]. Age and health status affect users' privacy concerns. Compared with older adults, young people, aware of online environment uncertainties, pay more attention to protecting personal privacy. People with poorer health are more willing to disclose their health privacy to obtain information and emotional support [14].

3.3 Research on the Information Technology Dimension

The functions and structure of OHCs are not perfect, and users encounter various problems when sharing information. Information overload, information contradiction, response delays, lack of key information, ethics and data protection, and adaptation to medical terminology may cause communication barriers and disconnections among users [67]. Solving these problems requires information technology support to better ensure safe and convenient information sharing in communities.

Based on existing literature, this paper reviews influencing factors and mechanisms of information technology on user participation behavior from aspects of technology acceptance, platform top-level design, and interactive function design, with main results shown in Table 6 .

Technology acceptance is commonly described using the Technology Acceptance Model (TAM) to explain its influence on user participation behavior. It focuses on two core variables: perceived usefulness and perceived ease of use affecting attitudes and behavioral intentions. Perceived usefulness refers to the degree to which a person believes using a particular system will enhance their work; perceived ease of use refers to the degree to which a person believes using a particular system requires no effort [68]. Research results show that perceived usefulness and perceived ease of use significantly and positively affect users' usage intention [9, 23, 24, 68].

Top-level design is significant for promoting deep application of health information platforms. The service-dominant logic, which values intangible resources represented by knowledge, has attracted many scholars' attention, promoting organic integration of social and technical systems in platforms. The cyber-physical system compensates for service-dominant logic's lack of technical de-

tails, emphasizing integration of intelligent terminals, human-computer interaction, and other new technologies to improve health information platform service functions. Based on this, Luan Shidong et al., grounded in the reality of Foshan's health information platform, incorporated service-dominant logic and cyber-physical system architecture into its top-level design [69].

Interactive function design is an important factor for achieving community sustainable development. Community infrastructure construction requires financial support, and how to attract external sponsorship to improve community functional structure is a question worth considering for OHC operators [62]. Information service quality affects users' participation decisions. Specifically, optimization can be made in the following aspects: establishing network information editing and review procedures to restrict the spread of bad and false health information; providing detailed condition description interfaces and one-on-one expert consultation to enhance information service accessibility; embedding instant voice chat modules to meet users' real-time chat needs; developing matching algorithms to help users find "similar" friends [70]; and developing specific request functions in online friend forms and collective community feedback in popular prompt forms [71]. Regarding ensuring user privacy security, developers should consider providing personal control options for participating in data sharing when designing programs to improve transparency of health information exchange processes and reduce consumers' privacy concerns [72], and explain to users in detail the purposes and advantages of health applications, emphasizing privacy data protection and establishing certain rules in this regard [27].

3.4 Research on the Information Environment Dimension

The information environment is the background and venue of the information ecosystem [73], encompassing comprehensive factors such as social, economic, and cultural elements. Existing research mainly proceeds from perspectives of social support, social capital, and professional capital, with relevant research achievements shown in Table 7 .

Social support is resource exchange between providers and recipients aimed at enhancing recipients' benefits [74]. Social support in OHCs mainly includes three types: information support, emotional support, and companionship [40]. Community users all need social support, but users from different countries and cultural backgrounds have different demands for different types of social support. Long-term participating American users in health communities tend to provide more information support, while Chinese users view communities as information sources and are less willing to actively share. Moreover, the frequency of companionship themes is higher in American communities than in Chinese communities [75], reflecting Chinese people's reserved and introverted character versus Americans' enthusiastic and open character, differences produced under the influence of different national cultures.

Social capital is widely used as an external environmental factor predicting user participation behavior. In health communities, social capital exchange is asymmetric. Information recipients only accept help after determining contributors' social capital, and in many cases, these recipients do not reciprocate [21]. Therefore, in this environment, promoting information sharing among community users and maintaining community vitality is particularly challenging. J. Zhao et al. found that trust, shared language, and network density, as three dimensions of social capital, affect community members' knowledge creation behavior [33]. In the social capital dimension, trust's positive effect on user participation behavior is very significant, receiving attention and confirmation from many researchers. For example, Chen Xing et al. believe that more social connections among users lead to higher trust, stronger knowledge sharing willingness, and especially for sensitive information, only high trust between parties can make knowledge sharing successful [15]. To some extent, trust directly affects members' continuous usage willingness [33, 76]. Gratitude and indebtedness emotions can moderate social capital's effect on people's willingness to reciprocate in virtual health communities [32]. For doctors, obtainable social influence is a type of social capital that motivates them to participate in communities and contribute knowledge [34].

Professional capital, as the name suggests, is a rare, special, and lasting resource owned by social professionals such as doctors, lawyers, and teachers. In health communities, doctors possess professional capital, enabling them to exchange for social returns (thank-you letters, virtual gifts, and votes) and economic returns (phone consultations and virtual gifts). Professional capital is divided into status capital and decision capital. Status capital comes from personal and social advantages, such as doctors' clinical levels, academic titles, and working in high-level hospitals; decision capital refers to doctors' expression ability, observation ability, judgment ability, inspiration, and professional ethics in different or even complex situations [35].

Additionally, socioeconomic factors affect users' health searching behavior. Lack of available resources caused by poverty, unemployment, or overpopulation affects personal health, thereby affecting health information consumption [77].

4 Conclusions and Recommendations

Based on information ecosystem theory, this paper comprehensively reviews influencing factors of OHC user participation behavior from four dimensions: information people, information, information technology, and information environment: From the information people dimension, user participation behavior is mainly affected by individual factors and user interaction relationships. Regarding individual factors, research on ordinary users is abundant, including gender, age, personality, motivation, health status, goals, perceived cost and benefit, etc. Research on professional users mainly focuses on participation motivation. The influence of user interaction relationships on participation behavior is mainly reflected in three aspects: social preferences, community peer

support, and patient doctor-selection behavior. From the information dimension, information quality and privacy concerns affect user participation behavior. Information quality includes relevance, accuracy, timeliness, credibility, and diversity, while factors such as age, health status, and perceived vulnerability affect privacy concerns, thereby influencing user information disclosure willingness. Regarding the information technology dimension, the Technology Acceptance Model is widely applied, with perceived usefulness and perceived ease of use being core indicators for evaluating platform technology. Additionally, researchers provide new ideas for community construction from aspects of top-level design, privacy security, and function improvement. From the information environment dimension, existing research emphasizes the role of environmental factors such as social and economic culture from perspectives of social capital and social support.

In summary, research on influencing factors of OHC user participation behavior is relatively comprehensive from the information ecosystem perspective, with both theoretical and empirical research, diverse research perspectives and methods, having formed a relatively complete and mature research topic. However, existing research still has some limitations: Most existing studies focus on one or several well-known health communities such as Haodf.com, WeDoctor, and Sweet Home, but do not distinguish community types (P2P or P2D communities). Future research could conduct in-depth comparative analysis of user participation behavior differences between these two community types. Researchers focus more on ordinary users' participation behavior, with fewer studies on professional user groups, mostly appearing in doctor-patient interaction contexts. China's aging problem is serious, with increasing demands for medical care, patient care, domestic services, health preservation, and other livelihood needs. Due to their specific professional identities and high professional backgrounds, professional users are important forces for community knowledge contribution and social service functions. There remains considerable research space in professional users' participation behavior patterns and knowledge supply and transfer characteristics. Current research mostly focuses on OHC users' initial participation, with relatively insufficient research on continuous participation. Improving health status is a long-term process, and both ordinary users' continuous health knowledge seeking and reuse and professional users' continuous knowledge contribution have important research value.

References

- [1] Wu H, Lu N. How your colleagues' reputation impact your patients' odds of posting experiences: evidence from an online health community[J]. *Electronic commerce research and applications*, 2016, 16: 7-17.
- [2] Wu H, Lu N. Service provision, pricing, and patient satisfaction in online health communities[J]. *International journal of medical informatics*, 2018, 110: 77-89.

- [3] Guanhua Bost. China National Health and Nutrition Big Data Report[R/OL]. [2019-06-13]. <https://cloud.tencent.com/developer/news/306935>.
- [4] Zhao Dongxiang. Review of domestic online health community research status[J]. Library and Information Service, 2018, 62(9): 134-142.
- [5] Zhang Min, Liu Xuerui, Zhang Yan. Systematic review of empirical research on online health information help-seeking behavior: knowledge system, influencing factors, and frontier analysis[J]. Library and Information Service, 2018, 62(15): 122-131.
- [6] Zhao T, Du R. Why people are willing to provide social support in online health communities: evidence from social exchange perspective[C]//Cham: Springer International Publishing, 2018: 119-129.
- [7] Webster J, Watson RT. Analyzing the past to prepare for the future: writing a literature review[J]. MIS quarterly, 2002, 26(2): xiii-xxiii.
- [8] Fullwood C, Chadwick D, Keep M, et al. Lurking toward empowerment: explaining propensity to engage with online health support groups and its association with positive outcomes[J]. Computers in human behavior, 2019, 90: 131-140.
- [9] Zhang Min, Liu Xuerui, Zhang Yan. Research on OHC users' diagnosis and treatment information help-seeking behavior: an integrated model based on planned behavior theory and privacy calculation[J]. Library and Information Service, 2016, 37(1): 48-53.
- [10] Zheng Ce, Kong Jun, Fu Shaoxiong. Platform perspective on youth health information searching behavior: personality trait differences[J]. Library and Information Service, 2017, 61(12): 77-86.
- [11] Zhang Xing, Chen Xing, Hou Delin. Research on influencing factors of online health information disclosure willingness[J]. Information Resource Management Journal, 2018, 8(3): 102-112.
- [12] Zhang Min, Ma Zhen, Zhang Yan. Research on formation path of users' subjective knowledge hiding behavior in OHCs[J]. Information Theory and Practice, 2018, 41(10): 111-117, 124.
- [13] Zhang X, Liu S, Chen X, et al. Health information privacy concerns, antecedents, and information disclosure intention in online health communities[J]. Information & management, 2018, 55(4): 482-493.
- [14] Kordzadeh N, Warren J, Seifi A. Antecedents of privacy concerns in online health communities[J]. Health informatics journal, 2016, 22(3): 594-607.
- [15] Chen Xing, Zhang Xing, Zeng Shuyun, et al. Research on influencing factors of knowledge sharing willingness in health Q&A communities[J]. Modern Information, 2017, 37(4): 62-71.

- [16] Zhang Xing, Wu You, Xia Huosong, et al. Research on influencing factors of knowledge sharing behavior in OHCs based on S-O-R model[J]. *Modern Information*, 2018, 38(8): 18-25.
- [17] Yan Z, Wang T, Chen Y, et al. Knowledge sharing in online health communities: a social exchange theory perspective[J]. *Information & management*, 2016, 53(5): 643-653.
- [18] Zhang X, Liu S, Deng Z, et al. Knowledge sharing motivations in online health communities: a comparative study of health professionals and normal users[J]. *Computers in human behavior*, 2017, 75: 797-810.
- [19] Lin TC, Lai MC, Yang SW. Factors influencing physicians' knowledge sharing on web medical forums[J]. *Health informatics journal*, 2016, 22(3): 594-607.
- [20] Tang Xuli, Zhang Bin, Zhang Yan. Research on OHC users' information adoption willingness: from health literacy and trust perspectives[J]. *Information Resource Management Journal*, 2018, 8(3): 102-112.
- [21] Fan H, Lederman R. Online health communities: how do community members build the trust required to adopt information and form close relationships[J]. *European journal of information systems*, 2018, 27(1): 62-89.
- [22] Deng Z, Mo X, Liu S. Comparison of the middle-aged and older users' adoption of mobile health services in China[J]. *International journal of medical informatics*, 2014, 83(3): 210-224.
- [23] Wang Wentao, Xie Yangqun, Liu Kunfeng. Research on virtual health community user usage intention based on grounded theory[J]. *Data Analysis and Knowledge Discovery*, 2017(3): 75-82.
- [24] Zhang Liyi, Li Huiran. Research on patient user usage of online medical Q&A from an interaction perspective[J]. *Journal of Information Resources Management*, 2016, 6(4): 34-42.
- [25] Stragier J, Vandenabeele M, Mechant P, et al. Understanding persistence in the use of online fitness communities: comparing novice and experienced users[J]. *Computers in human behavior*, 2016, 64: 34-42.
- [26] Zhang X, Guo X, Wu Y, et al. Exploring the inhibitors of online health service use intention: a status quo bias perspective[J]. *Information & management*, 2017, 54(8): 987-997.
- [27] Doğan Yiğit S?. Current and emerging mHealth technologies: adoption, implementation, and use[M]. Cham: Springer International Publishing, 2018.
- [28] Liu Xuan, Wang Linwei, Li Jia, et al. Research on influencing mechanism of user reply behavior in OHCs[J]. *Management Science*, 2017, 30(1): 62-72.
- [29] Pearson JL, Amato MS, Papandonatos GD, et al. Exposure to positive peer sentiment about nicotine replacement therapy in an online smoking cessation community is associated with NRT use[J]. *Addictive behaviors*, 2018, 87: 39-45.

- [30] Centola D, Van der Rijt A. Choosing your network: social preferences in an online health community[J]. *Social science & medicine*, 2015, 125: 19-31.
- [31] Wu Jiang, Li Shanshan, Zhou Lusha, et al. Research on dynamic evolution of user relationship networks in online medical communities based on stochastic actor-oriented models[J]. *Journal of Information Science*, 2017, 36(2): 213-220.
- [32] Mpinganjira M. Willingness to reciprocate in virtual health communities: the role of social capital, gratitude and indebtedness[J]. *Service business*, 2018, 13(2): 269-287.
- [33] Zhao J, Ha S, Widdows R. The influence of social capital on knowledge creation in online health communities[J]. *Information technology and management*, 2016, 17(4): 311-321.
- [34] Liu F, Guo X, Ju X, et al. Exploring the effects of different incentives on doctors' contribution behaviors in online health communities[C]//Cham: Springer International Publishing, 2018: 90-99.
- [35] Guo S, Guo X, Fang Y, et al. How doctors gain social and economic returns in online healthcare communities: a professional capital perspective[J]. *Journal of management information systems*, 2017, 34(2): 487-519.
- [36] Yang H, Guo X, Wu T. Exploring the influence of the online physician service delivery process on patient satisfaction[J]. *Decision support systems*, 2015, 78: 113-121.
- [37] Zhao Y, Li S, Wu J. Exploring the factors influencing patient usage behavior based on online health communities[C]//Cham: Springer International Publishing, 2018: 70-76.
- [38] Cao X, Liu Y, Zhu Z, et al. Online selection of a physician by patients: empirical study from elaboration likelihood perspective[J]. *Computers in human behavior*, 2017, 73: 403-412.
- [39] Wang Guohua, Liu Ju, Yang Tengfei, et al. Research on social support for AIDS in cyberspace: taking Baidu "HIV Forum" as an example[J]. *Intelligence Journal*, 2015, 34(11): 105-110.
- [40] Wang X, Zhao K, Street N. Social support and user engagement in online communities[J]. *Library & information science research*, 2017, 39(1): 63-68.
- [41] Bronstein J. An examination of social and informational support in online health communities[J]. *International journal of information management*, 2016, 36(5): 724-734.
- [42] Xing W, Goggins S, Introne J. Quantifying the effect of informational support on membership retention in online communities through large-scale data analytics[J]. *Computers in human behavior*, 2018, 86: 227-234.
- [43] Reifegerste D, Wasgien K, Hagen LM. Online social support for obese adults:

exploring the role of forum activity[J]. *International journal of medical informatics*, 2017, 101: 1-8.

[44] Zhang Ru. Evolutionary game analysis of virtual community user knowledge sharing behavior under trust levels[J]. *Modern Information*, 2014, 34(5): 161-165.

[45] Liu X, Sun M, Li J. Research on gender differences in online health communities[J]. *Computers in human behavior*, 2018, 86: 227-234.

[46] Taiminen H. How do online communities matter? Comparison between active and non-active participants in an online behavioral weight loss program[J]. *Computers in human behavior*, 2016, 63: 787-795.

[47] Smedberg Å. Weight control and conversations in an online health-community on overweight[C]//3rd kuala lumpur international conference on biomedical engineering 2006. Berlin: Springer, 2007: 668-671.

[48] Yang Hualong, Ju Xiaofeng. Impact of social support and personal goals on health status[J]. *Management Science*, 2017, 30(1): 53-61.

[49] Litchman ML, Rothwell E, Edelman LS. The diabetes online community: older adults supporting self-care through peer health[J]. *Patient education and counseling*, 2018, 101(3): 518-523.

[50] Welbourne JL, Blanchard AL, Wadsworth MB. Motivations in virtual health communities and their relationship to community, connectedness and stress[J]. *Computers in human behavior*, 2013, 29(1): 129-139.

[51] Chung JE. Social networking in online support groups for health: how online social networking benefits patients[J]. *Journal of health communication: international perspectives*, 2014, 19(6): 639-659.

[52] Hou Guisheng, Wang Pengmin, Yang Lei. Evolutionary game analysis of user knowledge transformation and sharing in OHCs[J]. *Information Science*, 2017, 35(7): 31-38.

[53] Durant KT, McCray AT, Safran C. Identifying gender-preferred communication styles within online cancer communities: a retrospective, longitudinal analysis[J]. *Plos one*, 2012: 7(11): e49169.

[54] Zhai Yujia, Zhang Xin, Wang Fang. User participation behavior in OHCs: taking “Baidu Smoking Cessation Forum” as an example[J]. *Library and Information Service*, 2017, 61(7): 75-83.

[55] Vennik FD, Adams SA, Faber MJ, et al. Expert and experiential knowledge in the same place: patients’ experiences with online communities connecting patients and health professionals[J]. *Patient education and counseling*, 2014, 95(2): 265-270.

[56] Atanasova S, Kamin T, Petrič G. Exploring the benefits and challenges of health professionals’ participation in online health communities: emergence of

- (dis)empowerment processes and outcomes[J]. *International journal of medical informatics*, 2017, 98: 13-21.
- [57] Fan Xiaoniu, Ai Shizhong. Empirical research on the impact of both parties' behavior in online medical communities on knowledge exchange effectiveness[J]. *Intelligence Journal*, 2016, 35(7): 173-178.
- [58] Mpinganjira M. Precursors of trust in virtual health communities: a hierarchical investigation[J]. *Information & management*, 2018, 55(6): 686-694.
- [59] Lederman R, Fan H, Smith S, et al. Who can you trust? Credibility assessment in online health forums[J]. *Health policy and technology*, 2014, 3(1): 13-25.
- [60] Deng Shengli, Guan Xian. Research on influencing factors of user health information acquisition intention based on Q&A platforms[J]. *Information Science*, 2016, 34(11): 53-59.
- [61] Goh JM, Yndurain E. The value of expert vs user generated information in online health communities[C]//Cham: Springer International Publishing, 2015: 86-95.
- [62] Kim H-S, Mroteka A. A functional and structural diagnosis of online health communities sustainability: a focus on resource richness and site design features[J]. *Computers in human behavior*, 2016, 63: 362-372.
- [63] Zhang Xing, Xia Huosong, Chen Xing, et al. Research on influencing factors of information credibility in OHCs[J]. *Library and Information Service*, 2015, 59(22): 88-96, 104.
- [64] Dutta-Bergman MJ. The impact of completeness and web use motivation on the credibility of e-health information[J]. *Journal of communication*, 2004, 54(2): 253-269.
- [65] Yan L, Tan Y, Peng J. Network dynamics: how can we find patients like us?[J]. *International journal of information management*, 2015, 26(3): 496-512.
- [66] Yin Hua, Zhang Chuanmei. Empirical research on influencing factors of network users' information provision willingness: taking online medical websites as an example[J]. *Science and Technology Management*, 2017, 19(3): 92-98.
- [67] Atanasova S, Kamin T, Petrič G. The benefits and challenges of online professional-patient interaction: comparing views between users and health professional moderators in an online health community[J]. *Computers in human behavior*, 2018, 83: 106-118.
- [68] Zhao Y, Ni Q, Zhou R. What factors influence the mobile health service adoption? A meta-analysis and the moderating role of age[J]. *International journal of information management*, 2018, 43: 342-350.
- [69] Luan Shidong, Dai Yishu, Yu Yan, et al. Research on top-level design of regional health information platforms in the digital era[J]. *Management Science*,

2017, 30(1): 15-30.

[70] Zhao Dongxiang. Research on OHC information service quality optimization: based on evolutionary game analysis[J]. Information Science, 2018, 36(8): 149-154.

[71] Kim H-S, Shyam Sundar S. Can online buddies and bandwagon cues enhance user participation in online health communities? An experimental study[J]. International journal of medical informatics, 2018, 119: 1-7.

[72] Esmaeilzadeh P, Mirzaei T. Comparison of consumers' perspectives on different health information exchange (HIE) mechanisms[J]. Computers in human behavior, 2014, 37: 319-333.

[73] Zhao Dan. Research on microblog public opinion communication in mobile environment based on information ecology theory[D]. Changchun: Jilin University, 2017.

[74] Shumaker SA, Brownell A. Toward a theory of social support: closing conceptual gaps[J]. The journal of social issues, 1984, 40(4): 11-36.

[75] Wang X, Zhu Y. Cross-cultural comparison of user engagement in online health communities[C]//ICSH 2018: Smart Health. Cham: Springer International Publishing, 2018: 96-104.

[76] Zhao J, Ha S, Widdows R. Building trusting relationships in online health communities[J]. Cyberpsychology, behavior and social networking, 2013, 16(9): 650-657.

[77] Nigam A, Johnson RA, Wang D, et al. Characterizing online health and wellness information consumption: a study[J]. Information fusion, 2019, 46: 33-43.

Author Contributions: Zhang Weiwei: Designed research framework, coordinated figures/tables/text, and revised full manuscript. Jiang Xue: Conducted literature review, data analysis, and drafted and revised manuscript.

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

Source: ChinaXiv — Machine translation. Verify with original.