Research article

Behavior patterns and influencing factors: Health information acquisition behavior of Chinese senior adults on WeChat

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A B S T R A C T

Due to the gradual adoption of WeChat by older adults in China and their interest in health information, Chinese older people started to acquire health information through WeChat. We explored the specific patterns and influencing factors of the elderly's health information acquisition behavior senior adults. The cross-sectional study collected self-reported data with survey (N = 336) in the southeast of China, Zhejiang province. The findings of this study extend the previous research by suggesting that elderly adults' health information acquisition behavior has three patterns (actively seeking, passively browsing, and long-term collecting). These findings contribute to a better understanding of digital literacy, three dimensions of health literacy and their relationship with three specific patterns of health acquisition behavior. This study also provides practical insights related to narrow the technological gap of the older adults, improve their e-Health literacy of the elderly, and purify the health information environment in the network.

1. Introduction

Population aging is a visible reality in most countries, which is a common problem faced by human society in the 21st century. With the policy framework of active aging [1], it is advised that older adults should hold the role of active social participation for wellbeing [2]. In the digital age and in the field of health information, the social participation of the elderly is manifested as their health information acquisition behavior on the Internet.

In China, older adults' online health information acquisition behavior is unique, which mainly reflected in the following aspects: Firstly, the development of smartphones and mobile Internet has led to an increase in the use of Internet by older people, with penetration increasing year by year [3]. Among them, WeChat plays an important role. WeChat is a free app launched by Tencent in 2011 to provide instant messaging services for smart terminals. It is one of the most proficient and frequent mobile apps used by senior adults. As of September 2018, it had 61 million users aged 55 to 70 in China (Tencent Research Institute).

Secondly, Chinese older people started to acquire and share health information through WeChat, which is the proper meaning of active digital social participation. However, as a kind of social media, WeChat itself has both benefits and risks. On the one hand, it promotes the spread of health information and permits individual decision-making and health self-management. On the other hand,

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because of economic interests or lack of control, the media makes the audience suffer from false health information [4,5]. Therefore, facing the technological risks in this media society, especially in the era of social media, Internet users need to develop digital literacy, information literacy, health literacy as well as certain health information behavior abilities [6].

At present, research on health information acquisition behavior mostly focuses on the purpose, motivation, information channel, information quality, effects, and factors affecting it [7–9]. However, little research has been conducted to the special group of older adults. Health promotion activities, such as health information acquisition, healthy lifestyles, and health behaviors, are especially important to the senior adults, who, due to aging, differ from the general population physically, cognitively, and psychologically [10]. Therefore, it is important to study the special health information acquisition behaviors of older adults. Meanwhile, most studies in the field have focused on active and intentional information seeking, overlooking unintentional and information scanning [11]. As the current social media context provides good opportunities for unintentional health information acquisition [12,13] which needs to be studied.

In view of the current research status and deficiencies of health information acquisition behavior, as well as the particularity of the Chinese elderly in the digital age. Therefore, this study aims to explore the health information acquisition behavior of Chinese older people on WeChat under the background of an aging society, information society. The innovation of this study is mainly reflected in the research on the special groups (Chinese older people), special media environment (WeChat platform) and their characteristics (the high interaction of users, and high requirements for users' literacy) lead to specific health information acquisition behavior. Therefore, the theoretical contributions of this study mainly include: firstly, it can enrich the research on special groups in the health information behavior theory; Secondly, it also can enrich the research of network health information acquisition behavior and its new type in the age of social media. For example, the interaction advantage of social media leads to the frequent health information browsing behaviors without intention, rather than the active search behavior of health information. At last, it can further enrich the theoretical research on electronic health literacy, health information behavior, digital divide and knowledge gap. It also has practical guiding significance in how to narrow the digital divide and knowledge gap of the senior adults and how to purify the health information environment of the senior management department.

2. Literature review

2.1. Health information acquisition behavior

Information behavior has been used to describe active information seeking, unintentional or passive acquisition of information, and information use [14]. Health information behavior is a derived concept of information behavior, which is a multidimensional concept, with the general characteristics of information behavior. One dimension of them, named health information seeking behavior (HISB), has received more and more considerable attention. Health information seeking is the purposive acquisition of information from selected information carriers to guide health-related decision making [15], while health information scanning, or passive exposure, is the information that is accessed accidently in the process of obtaining information [16]. Health information seeking is viewed as a purposeful goal-oriented activity rather than the result of passive exposure to information in one's environment.

The existing research on health information acquisition behavior mainly focuses more on active health information-seeking behavior. However, studies have found that information scanning is more common than information seeking in some areas, such as cancer-related prevention and screening information. For example, Shim, Kelly and Hornik [17] found that 80% of adults get cancer-related information through the information scanning behavior of media, while only 47% of them actively seek cancer information. Also, information scanning behavior is more strongly associated with health beliefs in colon cancer and heart disease than information-seeking behavior [18].

In social media platforms, health information is more likely to appear automatically in front of users and can be obtained easily. Therefore, it is not enough to only study active health information seeking behavior in the era of web 2.0. At the same time, the existing research on health information seeking behavior mainly includes the purpose, motivation, information approach, information quality, influencing factors of health information seeking behavior, but there are relatively few studies on health information acquisition behavior and influencing factors of senior adults.

2.2. e-Health literacy and health information acquisition behavior

It is becoming increasingly important as the internet becomes the major source of health information seeking [19]. E-Health literacy is defined as the ability to find, understand, and appraise health information from electronic resources and apply that knowledge to making a health-related decision [20]. Pourrazavi et al. [6] consider that e-Health literacy is one of the major barriers of senior adults to have e-Health information-seeking behaviors (e-HISB). The construct of e-Health literacy combines six forms of literacy, namely, traditional, information, media, health, scientific and computer [20]. Two context specific domains of e-Health literacy that are particularly noteworthy to measure among senior internet users include health and computer literacy [21].

Generational difference may result in variations in one's ability to employ technologies [22], to seek health information on the web and to show different level of digital health literacy. As for computer literacy or digital literacy, older people are often considered to be late adopters of technology [23]. The older people with high levels of digital literacy showed significantly increased health information behavior.

Health literacy is defined as the extent to which individuals attain, manage, understand health information and apply that information in health decision-making [24]. Nutbeam [25] proposed three types of health literacy, which were functional,

communicative/interactive, and critical health literacy. The first level of literacy (functional literacy) refers mainly to the basic skills in reading and writing in everyday situations. The second level of literacy (interactive literacy) refers to more advanced cognitive and literacy skills to obtain, understand, and apply information from various channels of communication. The third level of literacy (critical literacy) is the ability to critically analyze information to make decisions and gain better control over the situations.

Through the literature review above, we can conclude that health literacy and technical literacy might affect individuals' health information acquisition behavior in new media environment. In addition, we may go further study on relationship between the three dimensions of health literacy and health information behavior, which needs to be further explored.

2.3. Research questions or hypotheses

Researchers have proposed that the importance of information scanning behavior with little purpose should not be ignored [16]. Information scanning and information seeking should be distinguished as two modes of information acquisition [11,16]. Study shows that older adults acquire health information through both active and passive means [26], especially in passive ways [27]. Moreover, the particularity of social media makes it more convenient to come across health information for users. Thus, a mere focus on active information seeking might not reflect the full diversity dimension of health information behavior of senior adults. In this study, we explored specific patterns of health information acquisition behavior. The following research questions are proposed:

Q1. What are the specific patterns to acquire health information of Chinese senior adults on WeChat?

Based on the concept and dimensions of health literacy and e-Health literacy, the study proposes the following research hypothesis:

H1. digital literacy can significantly predict the health information acquisition behavior of senior adults on WeChat.

H2-1. Functional health information literacy can significantly predict the health information acquisition behavior of senior adults on WeChat.

H2-2. Interactive health information literacy can significantly predict the health information acquisition behavior of senior adults on WeChat.

H2-3. Critical health information literacy can significantly predict the health information acquisition behavior of senior adults on WeChat.

3. Methods

3.1. Participants

Based on China's retirement age policy, the senior adults in this study refer to the population over 60 years old for males and 55 years old for females. Considering that the senior adults using social media mainly living in urban areas and have high level of education [15,28], the main objects of this study are city community college students of senior adults.

This study follows the requirements of academic ethics and has been reviewed by the Academic Committee of the School of Media and Law, NingboTech University with the approval number of 20,180,901. This study collected self-reported data with a survey conducted in the southeast of China, Zhejiang province. 500 questionnaires were distributed through systematic sampling based on the student numbers in the college, then 336 valid questionnaires were returned. The effective recovery rate was 67.2%. In consideration of research ethics, the principle of voluntary and anonymity, as well as the non-commercial use of the research were emphasized in the introduction of the questionnaire survey.

3.2. Measures

There are 3 items for measuring the dependent variable, that is, health information acquisition behaviors (e.g, "I have got health information from the public account"), which are coded 1–4 from "frequent" to "never" according to the behavior level (mean = 3.24, SD = 2.13; Cronbach α = 0.67).

The three questions respectively correspond to three specific behaviors of senior adults in obtaining health information. First, active-seeking behavior, paying attention to health public accounts in WeChat; passive-browsing behavior, reading health information in WeChat; Third, long-term collection behavior, in order to obtain information quickly next time, namely, collection of health information in WeChat.

Interactive health information literacy was measured by asking the respondents whether they know how to find useful health information on three 4-point Likert scale items such as "In the past three months, I can use health information from WeChat to help myself" (mean = 4.17, SD = 2.90; Cronbach α = 0.87).

To measure functional health information literacy, we asked respondents whether they understand health information on two 4-point Likert scale items such as "The text of health messages from WeChat is difficult for me to understand" (mean = 5.27, SD = 3.16; Cronbach α = 0.93).

Critical health information literacy was measured by asking the respondents whether they can verify the quality of health information on three 4-point Likert scale items such as "I will verify whether the health information from WeChat is trustworthy" (mean = 4.54, SD = 2.92; Cronbach α = 0.87).

Digital literacy was measured by asking the respondents whether they can use new technology on three 4-point Likert scale items such as "I can figure out how to use WeChat by myself" (mean = 3.80, SD = 2.78; Cronbach α = 0.85).

3.3. Statistical analysis

Statistical analysis was performed using Microsoft Excel and IBM SPSS Statistics 23.0. A statistically significant difference was accepted with a p value less than 0.05. Descriptive statistics were performed with the calculation of the mean (M) and standard deviation (SD) for quantitative variables; percentages were calculated for qualitative variables. To evaluate independent variable associations, then, multiple linear regression analysis was performed and $p < 0.05$ on double sides was statistically significant.

4. Results

Sociodemographic characteristics of the study sample was in (see Table 1), and the specific characteristics of health information acquisition behavior for senior adults in China was in (see Table 2).

The study found that senior adults acquire health information in three ways: actively seeking (M = 2.12, SD = 0.84), passively browsing (M = 1.79, SD = 0.74), and long-term collecting (M = 2.16, SD = 0.81), among which random browsing behavior is more common, and 35.7% participants often acquire health information through random behavior.

Statistically, the regression model is significant with $F_{(8, 323)} = 14.590$, $P < 0.001$, $R^2 = 0.27$. Among the investigated predictors, digital literacy (β = 0.19, P < 0.01, interactive health literacy (β = 0.29, P < 0.01), functional health literacy (β = 0.20, P < 0.05)can significantly predict health information acquisition behavior (H1, H2-1, H2-2 were verified). Moreover, older women are more likely than men to engage in health information acquisition behavior (see Table 3).

As for active seeking behavior, the regression model is significant, $F_{(8, 323)} = 12.642$, $P < 0.001$, $R^2 = 0.24$. Among the investigated predictors, digital literacy (β = 0.20, P < 0.01), interactive health literacy (β = 0.18, P < 0.05), functional health literacy (β = 0.35, P < 0.001)and critical health literacy (β = −0.23, P < 0.05)can significantly predict health information acquisition behavior (see Table 4).

The regression model of passive browsing behavior is significant, $F_{(8, 323)} = 6.028$, $P < 0.001$, $R^2 = 0.13$. Among the investigated predictors, only interactive health literacy (β = 0.32, P < 0.001) can significantly predict health information acquisition behavior (see Table 4).

The regression model of long-term collecting behavior, $F_{(8, 323)} = 8.073$, $P < 0.001$, $R^2 = 0.17$. Among the investigated predictors, only interactive health literacy (β = 0.19, P < 0.005)can significantly predict health information acquisition behavior. Moreover, older women were more likely than men to engage in health information long-term collecting behavior (see Table 4).

5. Discussion

WeChat has become an important channel for the older people to access health information, given that the increase in the proportion of Chinese elderly people surfing the Internet is closely related to WeChat, and more and more elderly people are forwarding and sharing health information through WeChat. Therefore, the aims of this study were to explore health information acquisition behavior of Chinese older people on WeChat under the background of an aging society, information society. Our three main findings were as follows:

Firstly, senior adults in China obtain health information on WeChat mainly through active seeking, passive browsing, and long-

Table 1
Sociodemographic characteristics of the study sample (N = 336).

Demographics	N (%)
Gender	
male	125 (37.2)
female	211 (62.8)
Education	
Less than primary school	1 (0.3)
Primary school	2 (0.6)
Junior high school	46 (13.7)
High school/technical secondary school	108 (32.2)
Junior college or above	179 (53.3)
Monthly Income	
500–1000 (yuan)	1 (0.3)
1001–2000 (yuan)	5 (1.5)
2001–3000 (yuan)	27 (8.0)
3001–4000 (yuan)	78 (23.2)
4001–5000 (yuan)	78 (23.2)
Above 5000 (yuan)	147 (43.8)
Health status	
With chronic diseases	221 (65.7)
Without chronic diseases	115 (34.2)

Table 2
Patterns of health information acquisition behavior.

variable	mean (M)	standard deviation (SD)	often (%)	sometimes (%)	occasionally (%)	never (%)
1	2.12	0.84	22.3	55.7	12.8	9.2
2	1.79	0.74	35.7	49.4	12.2	2.7
3	2.16	0.81	21.1	50.6	22	6.3

Note: 1 means active tracking behavior, 2 means passive browsing behavior, 3 means long-term collecting behavior.

Table 3
Multiple linear regression predicting health information acquisition behavior.

Model	B	SEB	beita	P value
Gender-male	−.433	.213	−.098	.044*
Education level	−.131	.114	−.066	.253
income	.001	.080	.001	.989
Health status -healthy	.058	.216	.013	.787
Digital literacy	.148	.056	.192	.009**
Interactive HL	.215	.061	.291	.001**
Functional HL	.134	.063	.199	.034*
Critical HL	−.098	.076	−.134	.197

Note: *p < 0.05, **P < 0.01.

Table 4
Multiple linear regression predicting different patterns of health information acquisition behavior.

Model	beita			P value		
	Active seeking	passive browsing	long-term collecting	Active seeking	passive browsing	long-term collecting
Gender-male	−0.048	−.013	−.164	.336	.803	.002**
Education level	−.101	−.060	.009	.087	.343	.882
income	.074	.016	−.093	.212	.807	.137
Health status-healthy	.032	.042	−.041	.517	.425	.419
Digital literacy	.202	.105	.133	.007**	.183	.087
Interactive HL	.179	.324	.192	.034*	.000***	.030*
Functional HL	.351	−.109	.176	.000***	.283	.078
Critical HL	−.231	.038	−.092	.029*	.734	.403

Note: *p < 0.05, **P < 0.01, ***P < 0.001.

term collecting. The representative behaviors respectively were finding and following public accounts related to health, passively browsing information through forwarding between "friends" and storing information for easy and quickly reuse next time, among which passive browsing is the most common way, long-term collecting behavior has been paid attention to innovatively, which is also related to the collection function of WeChat itself.

Secondly, we found that senior adults with high digital literacy may have more active information acquisition behavior, especially active seeking behavior. Digital access and digital literacy were now being recognized as a social determinant of health [29]. People with low digital literacy are less capable of effectively utilizing technological devices or obtaining health information through internet [30].

Thirdly, health literacy was associated with self-efficacy in health, which in turn was related to health behavior intentions in the web [31]. Based on the three dimensions of health literacy, this study innovatively validated the relationship between interactive health literacy, functional health literacy, critical health literacy and health acquisition behavior. It revealed that interactive and functional health literacy have significant positive correlation with health information acquisition behavior, while critical health literacy has no significant correlation with health information acquisition behavior. That is, senior adults with certain ability of reading/writing and communication skills can promote their health information acquisition behavior on social media, whether they can critically analyze health information or not.

This study further validated the relationship between three dimensions of health literacy and three types of health acquisition behavior. We found that senior adults with high health literacy may have more active information seeking behavior. Which echoes other research, for example, one study shows higher levels of literacy were significantly associated with health information seeking behavior [32], while individuals with low health literacy tend to use less e-Health [33]. Another study also showed that health information literacy would affect the intention to seek health information [34]. This study revealed that interactive health literacy can significantly predict the passive browsing and long-term collecting behavior. Even if the senior adults had high levels of health literacy, they were often unsure about the quality of online information [35–37]. So, only the senior adults with higher critical health literacy, they were more likely to take the initiative to seek health information on WeChat and pay attention to some health public accounts.

The purpose of this study was to obtain initial insights into the health information acquisition behavior of Chinese older adults on social media. The study has both theoretical and practical significance. There are digital disparities in using the internet to find health information among generations. Acquire health information can be seen as the second digital divide (usage divide) of senior adults. Even if older people have crossed the first digital divide (access divide), they still face the second digital divide (usage divide), where they are always lack confidence in their ability to discriminate between low-quality and high-quality health information [38]. This study focused on the special groups (elderly people in China), special media environment (WeChat) and its characteristics (high interaction and high requirements for users' literacy) and explored the different patterns and influencing factors of health information acquisition behavior of Chinese older people on WeChat. It found that digital literacy and health information literacy, which in turn will affect health information acquisition behavior, This, to some extent, widens the relationship between the digital divide (access divide, usage divide) and knowledge gap. Which means e-Health literacy extends the digital divide to the realm of health information [39]. Overall, the findings contribute to the extent of prior literature in the field of health information behavior, gerontology, and new media in different ways.

This study also has some practical inspiration. Firstly, for senior adults themself, it is important to promote digital literacy and e-Health literacy in the new media era, which can improve individuals' ability to identify and acquire health information. In China, we may first encourage and create conditions for older people to have access to new technologies, so as to prevent them from being technological laggards forever. Then they also need more training to use new media effectively for health-related purposes. Education for the elderly is very important, which is reflected in how to guide them to use various ICT devices or how to use them better to retrieve online health information. This requires the joint efforts of many organizations and institutions in various ways such as through community, library and other platforms to help them improve their digital literacy, interactive health information literacy, functional health information literacy and critical health information literacy, so as to help them have better active health information seeking behavior, and improve their interactive health information literacy for passive browsing and long-term collecting behaviors. For society, the government and institutions should have the responsibility to provide high quality health information and fight against false health information, to purify the information environment of the whole cyberspace.

At last, there are also some limitations in this study, among which the biggest one is the inadequacy of the survey samples. The samples of this study were senior adults from city community colleges, whose levels of digital literacy were significantly higher than those of general urban older adults, not to mention rural senior adults [40]. For more and more older people using social media in China, the scope of respondents should be expanded in the future. The other limitation is that people may have different acquisition behaviors according to different types of health information, but this study only looked at health information in general and did not specify a specific type of health information, for example, nutrition information, healthcare information, misinformation, and so on. Thus, future studies may focus on a certain type of health information to explore different influencing factors for health information acquisition behavior. Future studies may also pay more attention to the interactivity of social media and focus more on the passive browsing behavior through network social relations.

6. Conclusions

Under the common background of population aging society, information society and risk society, it is of great significance to explore the senior adults' health information acquisition behavior and its influencing factors on social media platforms for health communication, informatics and gerontology scholars. This study empirically examines the relationship of digital literacy, health information literacy and health information acquisition behavior of Chinese senior adults on social media, which to some extent, widens the relationship between the digital divide (access divide, usage divide) and knowledge gap.

Declarations

Author contribution statement

All authors listed have significantly contributed to the development and the writing of this article.

Data availability statement

Data included in article/supp. material/referenced in article.

Additional information

No additional information is available for this paper.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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