



Effects of New Media Use on Health Behaviors: A Case Study in China

**Lifang Tang, Jie Wang*

School of Media and Design, Hangzhou Dianzi University, Hangzhou, China

***Corresponding Author:** Email: tlf@hdu.edu.cn

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Abstract

Background: Mass communication is one of the most important ways in health communication. The emergence of new media has changed the way people acquire health information and then their health behaviors. However, few studies have been conducted about complicated relations between media use and health behaviors under new media conditions and further systematic explanation is needed.

Methods: A hypothesis model for the influence of WeChat use on health behaviors was constructed to explore the internal influencing mechanism of new media use on health behaviors. An empirical analysis on the internal influencing mechanism of WeChat use on health behaviors was carried out with a survey data consist of 463 young active users on famous online social network sites in China from March to June 2019.

Results: New media use represented by WeChat has significant positive influence on health behaviors. Individuals who frequently use new media related to health have better health conditions than those who rarely use them. The improvement of health behaviors is mainly attributed to acquisition of health knowledge. Such effect is also mediated by the degree of individuals' trust in health knowledge.

Conclusion: This study not only discloses the influencing mechanism of new media use and health knowledge on health behaviors, but also confirms the value of new media in promoting public health communication and public health behaviors. Conclusions provide significant references in decision-making to develop effective guidance of public health.

Keywords: Media use; Health behaviors; Health knowledge; Public health

Introduction

Health is an eternal topic that concerns mankind. The world perceives the improvement of public health quality and health level as the prior strategy of social development. Universal health coverage is one of the 17 sustainable development projects in the "2030 Agenda for Sustainable Development" of the United Nations, which emphasizes the popularization of health knowledge, and

the promotion of physical and psychological health of the entire population. In the past 25 years, the total global population increased by approximately 2 billion and the average expected life expectancy of residents in different continents in 2019 reached 72.6 years, which was 13.1% higher than that in 1990 (1). Further academic studies on health issues find that the health



behaviors of mankind influence their health levels significantly (2). Therefore, exploring factors that influence health behaviors in the new media age and thereby get a way to improve public health is apparently a problem that is worth of deep reflections.

Media is the main platform and carrier of health communication. Media use influences health behaviors (3). Relevant studies begin to focus on Internet media, because of their unique role in changing human attitudes toward health and health behaviors and persuading the public to participate in health protection (4). The ability of rebuilding social identity is strengthened through an accurate analysis and point-to-point spreading of behavior and demands of the audience through new media use (5). As a representative new media, WeChat is superior to traditional media in terms of propagation force, influence, and coverage. It also becomes an important method for health communication (6). Although scholars have concluded through empirical analysis or qualitative speculation that media use can influence health behaviors of individuals, this complicated relation and its mechanisms remain understudied in the new media age.

In this study, we constructed a theoretical model of the influence of health-related WeChat use on individual health behaviors by taking the main user groups of WeChat as research subjects. Moreover, we proposed corresponding research hypotheses and analyze them by using a structural equation model (SEM). We explored the values of new media use in disseminating health knowledge and health behaviors, and provide effective intervention strategies to help relevant departments guide the public health.

Literature Review and Hypothesis Development

Internet has displayed its infinite power in health communication since its commercial use. Generally, online health communication is a scientific and art practice that spreads health-related information to the public by using the Internet technology and helps them develop positive health beliefs and health behaviors, which in turn

strengthen their health management (7). As a new media, Internet can spread information and knowledge related to health through various ways. It can make different target groups or individuals accept the provided health knowledge, enabling the promotion of public health (8). Related studies focus on the motivation, content, degree and influencing factors of different groups using Internet to obtain health knowledge, and the degree of people's trust in online health knowledge. WeChat has become the most representative online new media in China since its launch in 2011. This study investigates the problems related to health communication on new media in China by conducting a case study based on WeChat.

Academic studies generally believe that media use can influence the acquisition of health knowledge and individual health behaviors. The "Stanford Heart Disease Prevention Program" is widely accepted as the beginning of health communication studies, and its results show that people who receive abundant health knowledge from mass communication and those who make further contacts with media can easily change their health behaviors (9). Social media can intervene in individual health behaviors to some extent and they cover various disease prevention behaviors, such as physical fitness and exercises, anti-smoking behaviors, and AIDS prevention (10). Gough et al. conducted an experiment of health communication in social media and found that astonishing information can generate great information presentation, humor information can attract the attention of users, and education information can bring more forwards (11). Zhen Manning investigated the health literacy of some residents in Beijing and Hefei in China and found that health behavior is significantly and positively correlated with the frequent use of traditional media, such as newspapers and television (12). The audiences who use media related to health information more are likely to form positive health attitudes (13). To sum up, media use is conducive to effective health communication and it can persuade and improve individual health behaviors. Hence, we proposed the following hypotheses:

Hypothesis 1: Individuals who frequently use health-related functions of WeChat are more positive toward health behaviors than those who rarely use them.

Hypothesis 2: Individuals who frequently use health-related functions of WeChat possess more health knowledge than those who rarely use them.

Theories on behavioral changes, such as health belief model and theory of planning behavior, have proven the role of health knowledge in promoting health behaviors. After the popularization of Internet, scholars started to discuss the influence of health knowledge on health behaviors on social media. Health-related contents published by Facebook users focus on disease knowledge and relevant experiences. The applicability, interesting degree, and correlation of information can influence the health behaviors of the users (14). By taking African American adults as research subjects, Swenson et al. pointed out that the acquisition of AIDS knowledge on social media has influence on their sexual behaviors and health (15). Worsley argued that nutritional knowledge of individuals contributes to the formation of healthy diet habit, but this contribution is influenced by social environmental factors and individual temperament (16). Bergman also found that people who searched health and medical knowledge online have higher level of health behaviors than those who do not search for relevant knowledge (17). Therefore, media use can influence health knowledge and behaviors of people to some extent. Accordingly, we proposed the following hypotheses:

Hypothesis 3: Individuals who possess more health knowledge are more positive toward health behaviors than those with less relevant knowledge.

Hypothesis 4: WeChat use related to health exerts positive indirect effects on health behaviors through health knowledge.

Some studies also investigated the degree of trust in information on new media by using social media as the overall media form. The results show that people trust health knowledge on media when facing unimportant health problems, and frequent media use promotes health behaviors (18). The reliability of health information on new media is restricted by communication channels (19), and technological characteristics in dissemination of information affect individual's evaluation of information trust (20). A positive trust relationship may further assist an individual in obtaining positive emotions and health benefits (21). The degree of public's trust in health knowledge acquired from media can affect the relationship between media use and their health behaviors in this media society. On this basis, we proposed the following hypotheses:

Hypothesis 5: The degree of individual's trust in health knowledge on WeChat can adjust the relationship between WeChat Use and health behaviors.

Generally, studies on health knowledge and health behaviors focus on new media. Research on the new media, such as WeChat, is increasing day by day. However, the effects of new media use and health knowledge acquisition on health behaviors and internal influencing mechanism have been hardly studied, and thus further discussions are needed. The current study aims to explore the action mechanism of WeChat use on health knowledge and health behavior in the new media age.

Accordingly, a theoretical hypothesis model of the relationships among WeChat use, health knowledge, and health behaviors was constructed (Fig.1).

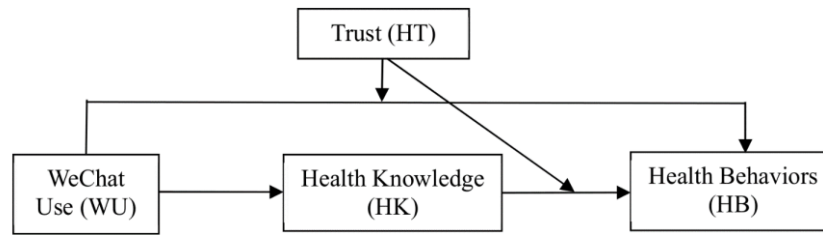


Fig. 1: Structure of the proposed theoretical analysis model

Methods

Data were acquired through questionnaire survey and processed by using SPSS 20.0 (Chicago, IL, USA) and AMOS17.0 to test the reliability and validity of the measurement scales of different variables and verify the proposed hypotheses in the model.

Data Collection

Data were acquired through conducting an online questionnaire survey. Given that this study targeted respondents with experiences in using new media, young active users on three Chinese famous online social websites of Sina MicroBlog, Tianya Community, and Baidu Tieba were chosen as research respondents. Questionnaires were sent and collected online on these three social websites from March to June, 2019. A total of 600 questionnaires were sent and 542 were collected. All collected questionnaires were checked in accordance with the integrity and quality standard of the answers, through which 79 invalid questionnaires were eliminated. Therefore, 463 valid questionnaires were remained, which basically met the relatively strict requirements of scholars on sample size (22).

Research Variables

On the basis of representative academic results in relevant fields, some variables were chosen: WeChat use (WU) related to health as the independent variable, health behaviors (HB) as the dependent variable, health knowledge (HK) as the mediated variable, and the degree of trust in health knowledge (HT) as the regulated variable. The independent variable (WU) refers to the use of WeChat for the purpose of maintaining health

or preventing and treating diseases. In previous studies, the operationalization of media use was measured using time, frequency, and content. For instance, Livingstone et al. measured Internet use of young users (23). Panek measured the usage time and frequency of social media by university students (24). With reference to the existing mature scale of Panek combined with our research background, WU was measured by using five-item scale about time, frequency, and content in the present study. These five items were “I frequently use WeChat everyday”, “I use WeChat longer than other applications in my phone”, “I read many articles related to health on WeChat everyday”, “I frequently subscribe to considerable health information on WeChat,” and “I frequently search for health information on WeChat.”

The dependent variable (HB) refers to the positive behaviors that individuals take to prevent diseases and maintain their health. Scholars designed and verified some HB scales and questionnaires, such as the *Health-Promoting Lifestyle Profile* which was formulated by Walker et al. (25) and the *Adolescent Health-Promoting Scale of Taiwan Version* by Chen (26). The current study referred to the existing mature scale of Chen Meiyuan and measured HB by using 16 items of 6 dimensions, namely, daily routine behavior, nutrition diet behavior, exercise behavior, hazard avoidance behavior, emotional management behavior and health responsibility behavior.

The mediated variable (HK) refers to individual cognition degree to different categories of health knowledge. The *Health Knowledge Scale* which by Vega et al. is the main scale that has been verified (27). Hsueh improved this *Health Knowledge Scale*

and verified it to evaluate two types of health knowledge in frequent contact of the public: diet and exercise (28). In the current study, the mature scale of Hsueh was applied to divide health knowledge on diet and exercise into 12 specific items.

The regulated variable (HT) belongs to *Information Source Attraction Cognitive Trust* (IACT). Scholars, including McAllister et al. (29) and Zhao et al. (30), developed mature scales of IACT. With references to the existing mature scale of Zhao et al., the current study formed two specific items of HT, namely, cognition degree and trust degree of health knowledge.

The respondents measured the questions in the online questionnaire survey by using the Likert's five-point method. After the initial questionnaire was determined, a pre-survey was performed to delete questions with low reliability. Finally, the

official questionnaire with 35 questions was formed.

Results

Validity and reliability test results of the variables

Table 1 shows the reliability and validity test results of the measurement model. The results showed that Cronbach's α of the scale was higher than 0.7, indicating good reliability. According to the fit indices of the model, χ^2/df of the three variables was between 1 and 3, and RMR and smaller than 0.05. The values of GFI, AGFI, NFI, IFI, and CFI were higher than the ideal level of 0.9; and the RMSEA value was lower than 0.08. These results proved that the confirmatory factor analysis of all variables was within the acceptable range, indicating a good structural validity.

Table 1: Reliability and validity analysis results of the model

<i>Variables</i>	<i>Cronbach's α</i>	<i>χ^2/df</i>	<i>RMR</i>	<i>GFI</i>	<i>AGFI</i>	<i>NFI</i>	<i>IFI</i>	<i>CFI</i>	<i>RMSEA</i>
WU	.871	2.588	0.029	0.929	0.959	0.925	0.926	0.943	0.068
HB	.804	2.354	0.034	0.965	0.918	0.922	0.948	0.904	0.043
HT	.918	2.747	0.039	0.946	0.954	0.974	0.974	0.927	0.051
HK	.883	2.671	0.045	0.987	0.961	0.992	0.954	0.956	0.073

Verification and results of the structural model

SEM analysis results of the influence of WeChat use on health behaviors

Direct and indirect influence of WeChat use on health behaviors were analyzed by using AMOS17.0 (Fig. 2). Table 2 shows the goodness of fit of the model after correction. The absolute fit index χ^2/df of the model was smaller than the strict standard of 3; GFI, AGFI, NFI, IFI, and CFI values were higher than the ideal level of 0.9; and RMSEA was lower than the ideal standard of 0.05. According to SEM analysis results and data fitting, the proposed theoretical model was proven reasonable and applicable to test the proposed hypotheses. Hypotheses were tested by using the

significance of path coefficient (Table 3). The path coefficient of WeChat use to health knowledge was 0.771, and the *P* value was lower than 0.001, reaching the significance level. Therefore, hypothesis 1 was supported: the more frequent WeChat use, the more health knowledge individuals obtain. The path coefficient of health knowledge to health behaviors was 0.096, and the *P* value was 0.003 (<0.05), reaching the significance level. Hence, hypothesis 2 was supported: the more health knowledge individuals obtain, the better their health conditions. The indirect effect of WeChat use on health behaviors through health knowledge was 0.771×0.696 , supporting the hypothesis 3.

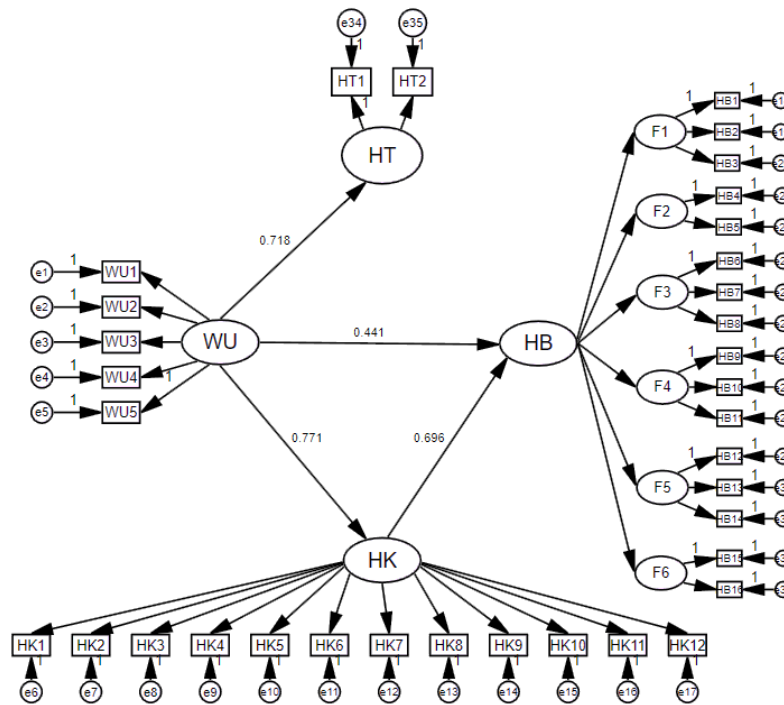


Fig.2: SEM analysis results

Table 2: Fit indices of the model

Statistical Value	χ^2 / df	GFI	AGFI	NFI	IFI	CFI	RMSEA
Standard or critical value	<3.00	>0.90	>0.90	>0.90	>0.90	>0.90	<0.05
Test result data	2.384	0.925	0.942	0.921	0.951	0.945	0.041
Model adaptation judgment	Y	Y	Y	Y	Y	Y	Y

The path coefficient of WeChat use to the degree of trust in health knowledge was 0.718, and the *P* value was smaller than 0.05, reaching the significance level. Therefore, hypothesis 4 was supported.

ed: individuals who use WeChat more frequently have higher degree of trust in health knowledge than those who rarely use the media. To sum up, hypothesis 1-4 were all supported.

Table 3: Regression analysis of path coefficient

		Estimate	S.E.	C.R.	P
HK	← WU	0.771	0.050	16.154	***
HB	← WU	0.441	0.031	15.182	***
HT	← WU	0.718	0.016	50.125	**
HB	← HK	0.696	0.022	2.973	**

Notes: ** significant at the 0.05 level, and *** significant at the 0.001 level

Mediating effect to the degree of trust in health knowledge

Given that the mediated variable “HK” and the independent variable “WU” are continuous variables, whether the interaction of these two variables

bles with other variables is significantly was determined by using hierarchical regression analysis (Table 4). According to the hierarchical regression analysis results, the regression coefficient of the interaction terms of HT and WU was 0.018. The standardized regression coefficient was

0.025, and the *P* value was 0.041, reaching the significance level. This finding reflected the positive mediating effect of HT on the relationship between WU and health behaviors. Thus, hypothesis 5 was supported.

Table 4: Regression analysis of the mediated variable to health behaviors

<i>Hierarchical regression analysis of the degree of trust to health behaviors:</i>						
Variables	Regression coefficient	Standard error	Standardized regression coefficient	T value	P value	Significant or not
WU*HT	0.018	0.008	0.025	2.005	0.041	**

Notes: ** significant at the 0.05 level, and the explained variable is HB

Generally, all five proposed hypotheses were proven by empirical studies, indicating that the proposed hypothesis model was relatively appropriate.

Discussions

According to the data analysis based on SEM, “WeChat use” related with health can cause positively affect “health knowledge” and “health behaviors,” and “health knowledge” of individuals can influence “health behaviors” significantly. Moreover, “the degree of trust in health knowledge” has positive mediating effect on the relationship between “WeChat use” and “health behaviors.” For example, Corbett and Mori demonstrated that media reports on health issues can influence ordinary public significantly. The more concentrated the reports of a disease, the higher the degree of public’s trust in relevant health knowledge (31).

Therefore, fully developed potentials of new media, especially WeChat, can promote population of public health knowledge and public health behaviors to some extent.

First, relevant departments need to focus on public demands: implementing refined dissemination of health information by using new media. In the age of new media centered at network communication, the primary thing is to have public de-

mands for information acquisition in terms of health knowledge to stimulate public attention, which in turn makes knowledge formation and memory ability prominent (32). Therefore, public demands become the primary concern in the communication of public health information. In various new media platforms, each audience can be the receiver and communicator of health information. New media communication is conducive to meet public demands for personalization and social interaction and establish a relation network for health information communication (33).

Second, the quality of public health knowledge needs to be improved: optimizing reliability of information by using new media. Compared with field education of health knowledge, professionalism and scientific value of online health information are core concerns during the acquisition and absorption of health information (34). To optimize the communication contents of health knowledge on new media, such as WeChat, professional teams with health backgrounds have to assure the authenticity and scientific value of online health knowledge. New media breaks space-time restraints, so it can organize a professional health operation team more quickly and more extensively than traditional media, and also acquire participation and support from various professional medical organizations. It also can

cater to public demands for health information. Mastery of mainstream direction during information promotion by using new media and positive optimization of existing information to improve matching degree between information and audience continuously.

Third, new media have to promote public health behaviors: popularizing the health management philosophy by using new media. Guiding the public to develop a health philosophy and form independent health management consciousness is an effective way to promote positive attitude toward health behaviors. According to the practices of health management philosophy of the public, setting up individual network health management system by using new media and improving individual use of health information library are beneficial to realize “point-to-point” guidance and intervention of health behaviors.

Media play an increasingly important role in health knowledge communication and intervention with its continuous development and updating. Media can improve health consciousness of the public and promote public health behaviors. Thus, these communication platforms are beneficial to national economic development and social stability.

Conclusion

To explore the influencing factors and mechanisms of individual health behaviors, this study constructs a model to study the relationship between new media use and health behaviors in context of the current media society. Corresponding research hypotheses are proposed and verified by conducting SEM analysis through empirical studies. According to the results of theoretical and empirical studies, some conclusions could be drawn: 1) the use of new media like WeChat has positive effects on individual health behaviors; 2) these positive effects mainly generate indirect influence through the mediated variable of health knowledge; and 3) the degree of individuals’ trust in online health knowledge can mediate these positive effects to some extent.

Accordingly, we believe that the fully development of potentials of new media, especially WeChat, can promote public communication of health information and public health behaviors to some extent. To verify the influence of media use on health behaviors, this study chooses young groups as research respondents for convenience. Future studies can also expand the scope of samples to gain further persuasive research conclusions.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interests.

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