

FEATURE ARTICLE

The Latest Research Progress on User Acceptance of Mobile Health Services in China and Other Countries

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Abstract

Along with social development and the improvement of living standards, individuals have begun focusing more on health and disease prevention. Therefore, the demand for health care services is also increasing. Thus, mobile health services have originated. Mobile Health (M-Health) has evolved as one of the most direct tools for public health management. There is enhanced research on the factors influencing users' acceptance and M-Health service use, which provide a basis to improve M-Health services. In this study, the latest research progress of M-Health service acceptance is reviewed, and the future development and direction of M-Health services are suggested.

Keywords: *M-Health; User acceptance, Influencing factors, Research progress*

Background and Significance

One of the key challenges faced by countries worldwide is the health care for the chronically ill due the trend of global aging. It poses huge challenges to national health care, public health services, and the social economy. Moreover, placing a greater burden on the human infrastructure simultaneously constitutes the backbone of the national healthcare system. China has large elderly population and the elderly experience different degrees of frailty which further increases the burden on the current family and public medical system (Fang et al., 2020; Statistics, 2020). In recent years, with the development of internet technology, mobile health services have provided novel opportunities for alleviating the pressure on medical systems. Mobile health technology, commonly known as M-Health, refers to the branch of medical and public health services through mobile devices such as mobile phones, patient monitoring equipment, personal digital assistants, and other wireless devices. It is a relatively novel development in the digital world (WHO, 2011). M-Health services provide more efficient and economical health care services to different groups of people especially middle-aged and elderly individuals, the disabled, and patients with chronic diseases to improve health prevention and medical treatment (Muralidharan et al., 2017). However, the acceptance of M-Health services varies according to age, sex, education level, place of residence, and health status (Bol et al.,

2018). Currently, the research on M-Health services primarily focuses on the following four aspects: the development status; the challenges of M-Health services system development and implementation; the system application effects; and the acceptance behavior (Wang et al., 2017). This article considered the above-mentioned four aspects and summarized the current research progress on the acceptance of M-Health service in China and other countries. Summary of recommendations are also made for the follow-up development and direction of M-Health services in the future.

The latest research progress on the acceptance of M-Health services in other countries

There is increasing research on user acceptance of M-Health, with the development of network information technology. Waligóra & Bujnowska-Fedak — (2019) conducted a randomized study on the factors affecting the acceptance of M-Health devices among Polish citizens. They evaluated the service attitude toward mobile phones and communication devices used in medical care through computer-assisted telephone interviews. The acceptance of the following M-Health services was measured: short message service reminders about medical appointments or medications, remote

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consultation, remote monitoring, mobile medical test result reports, online registration, and simple medical advice. Although the article concluded that mobile technology makes the healthcare system more efficient, cheaper, and feasible, M-Health is more attractive to young, highly educated, professional, and flexible individuals than their counterparts which are the elderly, retired, chronically ill, or disabled owing to the challenges to master and to adapt to M-Health service platforms and technologies.

Abbasi et al. (2020) conducted a 2-year study to investigate the attitude and the willingness of patients with asthma, diabetes, and multiple sclerosis (MS) toward M-Health services. Among the 222 participants, more than 93% of patients with diabetes and MS and 65% of patients with asthma were more willing to use M-Health services than to consult a doctor. Each 98%, 94%, and 49% of patients with MS, diabetes, and asthma feel comfortable doing health checks through M-Health. This study indicated a high acceptance and willingness to use M-Health services. However, the limitation is also obvious. The study only included patients with MS, diabetes, and asthma. These results may be helpful to developers of M-Health technology and researchers who design M-Health interventions for patients with such chronic diseases.

Yang et al. (2020) studied the effectiveness and user acceptance of M-Health services for adult patients undergoing chronic dialysis. They found that patient satisfaction and user acceptance were high, the use of health resources was reduced, and the cost of medical care services was less.

The latest research results on the acceptance of M-Health services in China

In recent years, more and more research has focused on the acceptance of M-Health services in China. Li et al. (2020) proposed a research model based on the Technology Acceptance Model (Tao et al., 2020) to predict consumers' acceptance behavior of M-Health services. A survey was conducted among 303 Chinese users, and several key conclusions were obtained: (1) Attitude, technical anxiety, and trust in using M-Health services are closely related to users' behavioral intentions when using M-Health services; (2) Usability, usefulness, and trust have greatly affected users' attitudes toward using M-Health services; (3) Perceived interactivity, perceived personalization, and privacy issues have a significant impact on users' perception of M-Health services. These conclusions suggest that we should consider user diversity. Depending on the individual needs, we should develop easy-to-use and user-friendly assistive technologies to improve the user's M-Health services acceptance.

Wang & Qi (2021) reviewed the influencing factors of user acceptance and the use of M-Health applications. They discovered that at the individual level, user behavior is affected by demographic characteristics and motivations. The demographic

characteristics include age, sex, education level, income level, medical insurance, region, ethnicity, language, and health status. Among these, the primary variables of motivation are health awareness and electronic health literacy. At the social level, social attributes, source credibility, and legal issues affect user behavior. And the source credibility primarily affects the user's acceptance and behavior the most. These are primarily manifested in three aspects: media promotion, professional recommendation, and medical institution support. At the application design level, the research results are relatively rich, including functions, ease of use and practicality, safety, and cost. First, the technology acceptance model is widely used (Tuman & Moyer, 2019) to study the factors that affect user behavior, among which perceived ease of use and practicality are the most common factors in the relevant literature. Second is the function in the focus of researchers' attention. Information quality is regarded as an important indicator. Core functions (such as reminders, notifications, incentives, follow-up, and goal setting), personalization, and gamification have also gained the attention of researchers. Furthermore, the importance of safety cannot be ignored. Finally, provisions to reduce costs while ensuring comprehensive functions, practicality, and safety are also one of the directions of follow-up research. Since user intentions and behaviors play a key role in the innovation and development of M-Health applications, they will surely be favored by more researchers in follow-up research. In the future, research may focus on influencing factors in different application scenarios.

Rui (2016), Yang (2015), and others investigated the influencing factors of Chinese users' willingness to use mobile medical services and wearable devices and found that fashion perception, pleasure motivation, habits, performance expectations, contributing factors, social influences, effort expectations, and prices value have a positive effect on users' willingness to use. Among these, the impact of effort expectations and price value on users' willingness to use hold less importance than the other variables. Finally, through the variance analysis of users' willingness to use different characteristics, it is found that users with different awareness, usage, sex, age, education, occupation, income, and ways of knowing do not have significant differences in their willingness to use mobile medical services. It is suggested that the needs of different users should be fully considered when developing mobile medical technology to ensure user data privacy, to focus on technology research and development, and product iteration, which can increase users' fashion perception of wearable devices of mobile medical service. The target users can focus on individuals with chronic diseases or sub-health when promoting wearable devices as the health of the population has a significant difference in willingness to use.

Jiang et al. (2018) conducted a survey of mobile medical service APP cognition and usage status among middle-aged and elderly individuals in Beijing and found that the overall awareness rate of

mobile medical service APP among middle-aged and elderly individuals was 58.3%, and the overall utilization rate was 14.2%. The education level, living status, frequency of surfing the Internet, and the authenticity of online medical information have significant effects on the use of mobile medical service APP in the elderly population. The higher the education level of middle-aged and elderly individuals, the higher the usage rate where middle-aged and elderly individuals living with their spouses have the highest usage rate of mobile medical service APP. Middle-aged and elderly individuals who frequently go online and trust online medical information have a higher usage rate. We should strengthen publicity and promotion, improve service levels, and standardize online medical and health information.

Mo & Deng (2015) conducted an empirical study on the acceptance behavior of M-Health services by middle-aged and elderly users in Wuhan. Through data processing and analysis, they found that the factors directly affect the adoption of M-Health services by middle-aged and elderly users include perceived usefulness and perceived ease of use. Subjective norms, perception of user resources, perception of ease of use. Perceived usefulness indirectly affects behavioral intentions, and perceives user resources, perceives physical conditions, and technical anxiety indirectly affects the adoption intentions of elderly users through perceived ease of use. Morey et al. (2019), Yang et al. (2006) pointed out that technology anxiety negatively affects the use of new technologies in a study assessing the influence of technology anxiety in the elderly on internet usage intentions. The tension and anxiety of the elderly regarding receiving a new technology and service will give the perception that the new technology and new service are not easy to use, which indirectly affects their adoption of the technology service.

Du' (2019) and others, conducting surveys on the public's willingness to use M-Health services, analyzed its development status and explored the factors that affect the willingness to use. Although 70.4% of the studied population had not used M-Health services, most of the participants in the survey believed that M-Health services are necessary. Sex has an impact on the willingness to use M-Health management services, and women have stronger behavioral willingness than men. Subjective norms, perceived usefulness, perceived ease of use, and asset specificity positively affect users' willingness, while uncertainty negatively affects users' willingness to adopt. The hypothesis that compatibility and subjective efficacy have a positive and significant impact on willingness to use is not supported.

Enlightenment

Develop an M-Health service technology acceptance assessment tool suitable for China's national conditions

It is critical to accurately assess the acceptance of M-Health services in China due to unique culture and national conditions. It

is possible to find groups with low acceptance promptly so that individualized intervention measures can be performed to improve the acceptance of such groups. It is recommended that researchers develop evaluation tools that are simple to operate, easy to comprehend, and highly reliable and valid according to Chinese culture, traditions, and national conditions.

Strengthening publicity and education of M-Health services

Although M-Health services have been proven to play a critical role for self-care, M-Health services are still underutilized. With the challenges encountered to expand M-Health services, current research recommended popularizing the application of M-Health services among individuals with high acceptance of M-Health services based on demographic characteristics to reduce the social burden of health services; strengthen publicity and promotion, and standardize network information, to improve the user acceptance of M-Health technology.

Speed up the research and development of M-Health service technology

Currently, the development M-Health service technology is in its infancy in China, and there are still many challenges, including complicated APP operations, heavy equipment, and high research and development costs. It is imperative to increase research and development efforts. When developing M-Health services-related technologies, technicians should focus on the characteristics of special groups such as the elderly, disabled, and patients with deficits such as visual and hearing impairment, cognitive impairment, learning disability, and even economic challenges. Simultaneously, adopt M-Health applications that are simpler and easier to implement and protect privacy.

Summary

In the future, M-Health services may play a critical role for self-care, and acceptance is a key factor influencing the actual use in various groups of individuals. Combined with the latest studies, from the perspective of demographic characteristics, the factors affecting the acceptance of M-Health services by users primarily include objective aspects such as age, sex, education level, place of residence, and health status. Young, highly educated, and professional individuals are more likely to receive and master M-Health services than those who are elderly, retired, chronically ill, or disabled. Secondly, the degree of media promotion, professional recommendation, and support from medical institutions affects the user's acceptance of M-Health services from a social perspective. Lastly, from a technical perspective, the ease of use, usefulness, perceived interactivity, perceived personalization, and privacy issues of the technologies used in M-Health services affect the users' acceptance.

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