

Using Two Mobile Apps to Improve Medication Adherence Among Patients With Coronary Heart Disease

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Purpose:

An important treatment modality for coronary heart disease (CHD) is taking cardio-protective medications (American Heart Association, 2017). However, poor adherence to cardio-protective medications is a global public health issue (Kolandaivelu, Leiden, O'Gara, & Bhatt, 2014), and is particularly so in China (Jiang, Hong, Yu, Zhang, Liu, & Huo, 2012). One proposed solution is to use mobile technology as tools to increase access to care and care delivery for patients (Shaw, Bonnet, Modarai, George, & Shahsahebi, 2015). Mobile technology, also known as "mHealth", is defined as the provision of health-related services via mobile devices (Park, 2016). China has 1.28 billion mobile phone users (China Daily, 2017), and 81% of the total Internet users in China access the Internet by using a mobile phone (China Internet Network Information Center, 2014). However, using mHealth to improve medication adherence among Chinese patients with CHD is in its infancy. The development of a mobile-technology-based medication-reminder program for individuals with cardiovascular disease may serve as a critically important way to improve medication adherence in China. From May 17, 2017 to July 18, 2018, a study was conducted to evaluate the feasibility of using mHealth to remind patients to take their medications. In this study, two mobile applications were used, "WeChat" and "BB Reminder". WeChat is used to send participants educational materials; BB Reminder is used to send participants medication-taking reminders.

Methods:

This study included an exploratory randomized controlled trial (RCT, N=50) and phone-call interviews (n=10). The RCT was conducted from May 17, 2017 to July 18, 2017 in West China Hospital, located in Chengdu, China. All participants were diagnosed with coronary heart disease (CHD). They received the same educational materials via WeChat. The educational materials were sent every five days. Participants in the experimental group (n=25) received daily medication-taking reminders. These reminders were sent through BB Reminder every day. The duration of the study was 30 days for each participant. The research team compared the effects of the mHealth intervention (n=25) and control condition (n=25) on the medication adherence scores, which were collected at baseline enrollment and days 15 and 30 post-baseline.

Results:

(1) This study demonstrated that using mHealth to provide health services and manage patient information is feasible in China among patients with coronary heart disease. Study results showed that 80% of participants were using WeChat daily and had used WeChat for more than a year before participating in the study. In addition, 72% of participants completed the study and were responsive over the 30-day study period.

(2) Medication adherence increased at 30-day follow-up in both groups compared to the baseline. At the 30-day follow-up, medication adherence improved better in the experimental group than the control group. However, this difference was not statistically significant ($p=.33$).

(3) This study found that participants in the experimental group were more likely to have a lower level of diastolic blood pressure during the study period. Whereas, participants in the experimental group were more likely to have higher levels of systolic blood pressure and heart rate.

Conclusion:

The feasibility of using mHealth in China to remind CHD patients to take their medications is high. A larger scale study should be done to evaluate the efficacy of using mHealth to improve health outcomes, including blood pressure and heart rate.

Title:

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Keywords:

China, Coronary heart disease and mHealth

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Abstract Summary:

The audience will have the opportunity to review an intervention study, in which an international research team used mobile apps to help patients improve their health.

Content Outline:

I. Introduction

A. An important way to treat coronary heart disease and prevent cardiovascular events is taking cardio-protective medication. However, poor adherence to cardio-protective medications is a public health issue in China

B. In China, patients initially receive prescriptions and medication-related knowledge in hospitals. After they leave hospital, there is no follow-up with patients regarding their medication-taking behaviors. This lack of care decreases patient's awareness of medication adherence.

C. Also, to seek medication-related knowledge, patients need to travel back to hospitals. This geographical barrier increases costs and inconvenience for patients.

Supporting point: in China over 80% of medical institutions are concentrated in cities, and high-qualified health care providers overwhelmingly reside in urban areas. Seeing a health care provider is a time consuming process for people living in rural areas. To reach qualified providers, many people from rural areas must take a bus for hours to urban areas. This need to travel to an urban area limits Chinese rural residents' access to quality medical care and may impact their health outcomes across the lifespan.

D. One proposed solution is to use mobile technologies (mHealth) as tools to increase access to care and care delivery for patients.

Supporting point #1: China has 1.28 billion mobile phone users, and 81% of the total Internet users in China access the Internet by using a mobile phone. We can see people using smart phones everywhere in cities, like Beijing and Shanghai.

Supporting point #2: Also, in remote areas like the northwestern Gansu Province, people are using smart phones too. It would be helpful to develop a mobile-technology-based medication-reminder program for individuals with cardiovascular disease.

II. Body

A. Main point #1: Before creating such a program, we conducted a systematic review on medication adherence among patients with coronary heart disease in China and we wrote a manuscript. In the systematic review, we found three core themes:

(1) **First**, patient and healthcare provider lack of knowledge is a barrier to medication adherence.

(2) **Second**, demographic, health, and medication characteristics can influence adherence.

(3) **Third**, interventions to improve medication adherence vary in methods, but education and reminders are the two core elements of these interventions.

B. Main point #2: Based on the findings from the systematic review, in June 2016, we developed a program of using two mobile apps to improve patients' medication adherence.

C. Main point #3: From May 2017 to July 2017, a pilot study was conducted in The West China Hospital. The pilot study included an exploratory randomized controlled trial and phone-call interviews.

(1) The pilot study found that:

a. mHealth intervention improved medication adherence total scores better over the 30-day period when compared to the control intervention.

b. Fifty patients enrolled, 72% of them completed the study and responded over time.

(2) The interviews found that:

All interviewees indicated the reminders improved their medication adherence.

III. Conclusion

A. The feasibility of using mHealth in China to remind CHD patients to take their medications is high.

B. mHealth intervention can improve medication adherence among patients with coronary heart disease.

C. A larger scale study should be done to evaluate the efficacy of using mHealth to improve health outcomes, including blood pressure and heart rate.

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Author Summary: Zhao Ni is a PhD student in nursing and global health doctoral certificate candidate at Duke University. He is highly committed to discovering ways to promote cardiovascular health across the world. Recently, he received an International Dissertation Research Travel Award to support his research on the implementation of mobile technology to improve health in patients with cardiovascular diseases.