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Original Research

Text message–based intervention to improve treatment adherence among rural patients with type 2 diabetes mellitus: a qualitative study

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ABSTRACT

Objectives: Adherence to treatment among most type 2 diabetes mellitus (T2DM) patients is relatively poor in rural China. The present study aimed to explore the perspectives of rural T2DM patients and health workers on a text message–based intervention (TMI) for increasing patients' adherence in rural China.
Study design: Qualitative study.
Methods: Six focus group discussions with T2DM patients, six with village doctors, and three with public health physicians were conducted in Xianning city during 2015. Semi-structured interview guides were employed to facilitate qualitative data collection. Audio recordings of the sessions were transcribed verbatim, and theme analysis was performed.
Results: Based on the participants' reports, T2DM patients had insufficient knowledge about diabetes and suboptimal adherence to treatment in rural China. Most of the participants had a positive attitude toward this novel TMI approach to improving patients' treatment adherence and knowledge. The perceived potential barriers to the utilization of TMI included poor eyesight and educational background and gradually losing interest during a long-term intervention. The suggestions for successfully implementing this strategy included family or social support, applicability of the text message content, adequate frequency and timing of sending the messages, and combining of messages with other educational formats.
Conclusion: A TMI is a promising option for improving T2DM patients' adherence to treatment in rural China. The findings of the present study can contribute knowledge to the application of TMI in similar settings.

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Introduction

Diabetes mellitus (DM) is currently the leading cause of chief vascular complications such as heart disease, blindness, and lower extremity amputation.[1,2] The International Diabetes Federation[3] estimated that the number of patients (aged 20–79 years) with diabetes was 109.6 million in 2015 and was projected to reach 150.7 million by 2040 in China, and this high prevalence was accompanied by approximately $51 billion in diabetes-related health costs in 2015. Type 2 diabetes mellitus (T2DM) is the most common type of diabetes, accounting for 90–95% of DM patients. A meta-analysis over a wide year range (2000–2014) estimated that the prevalence of T2DM in rural and urban areas in China was 8.2% and 11.4%, respectively.[4] Although its prevalence in rural areas in China is lower than that in urban areas, it is growing very fast. Between 2001 and 2006, there was a 4.5% increase in the number of residents with T2DM in rural areas whereas there was only a 3.7% increase in urban areas.[5] In addition, the risks of all-cause mortality and complication attributed to DM were higher in rural areas than in cities (rate $\text{ratio}_{\text{rural}}$ 2.17 vs rate $\text{ratio}_{\text{urban}}$ 1.83, $P < 0.05$).[6] The implementation of effective strategies for preventing and controlling the occurrence and progression of T2DM in China, especially in rural areas, is urgently needed.

Previous studies[7,8] have shown that poor adherence to treatment is the main hindrance to reducing the health costs and mortality due to T2DM, as poor adherence is strongly associated with an increased risk of diabetes-related hospitalizations and complications. Several studies[9,10] reported that the rates of adherence to treatment among T2DM patients in China ranged from approximately 45.4%–52%, which are inadequate for producing good outcomes. Treatment adherence is positively associated with health knowledge and financial and education levels,[7,11] suggesting that rural patients are more vulnerable to suboptimal adherence, as they have a lower level of health knowledge, lower income, and lower education level than their city counterparts.

To improve patients' medication adherence, various health promotion strategies have been conducted in recent decades. Traditional intervention formats, such as in-person or face-to-face counseling and group teaching, could improve adherence to treatment among T2DM patients. In Mainland China, these kinds of interventions on treatment adherence have also shown positive impacts among DM patients. For example, a pilot study[12] conducted in the city of Wuhan in central China suggested that the levels of knowledge and fasting blood glucose were improved among T2DM patients who received group teaching education conducted by medical professionals for approximately about 6 weeks. In Zheng's randomized controlled trials,[13] adherence was significantly improved among patients in the intervention group who received one-on-one individual education and a behavioral intervention conducted by healthcare experts compared with the control group who received usual care. However, these intervention formats have several limitations in their ability to be implemented in rural areas, such as the shortage of qualified trainer and funds, inconvenient transportation, and time constraints.[14] Innovative interventions using modern information technology, such as web-based education and text message–based intervention (TMI),[15,16] can circumvent some limitations of traditional formats because of their flexibility and cost-effectiveness, and they can also be serviced as not only a tool for delivering diabetes-related knowledge but also a reminder for taking medication or appointments. It has been reported that TMI could improve adherence to DM therapy and clinical outcomes in low-income areas.[15,17] For example, findings from a randomized controlled trial[17] demonstrated that TMI had better potential to improve treatment adherence than the control condition of usual care. Additionally, TMI to support diabetes education resulted in a more significant improvement in compliance among patients with T2DM than did face-to-face education programs.[18]

Two theoretical frameworks, the Health Belief Model (HBM)[19] and the Communication–Persuasion Model (CPM),[20] could explain the theory of this TMI strategy. In the HBM, Janz stated that participants' perceptions of disease, individual modifying factors, and cues to action may facilitate the development of healthy behaviors. The model of improvement for treatment adherence via text messages employs this theory to increase patients' knowledge about DM, correct their misperceptions, generate healthy actions, and improve adherence to treatment through delivered health messages. Although the HBM could help patients develop healthy behaviors, in the CPM, McGuire explained that if a new behavior was not reinforced, it would gradually be abandoned by individuals. Hence, in the strategy of improving treatment adherence via text messages, text message communication could be used as reinforcement to consolidate health behaviors and then keep optimal compliance in the long term.

In China, the high frequency of cell phones use (approximately 90% of rural residents using one)[21] provides an excellent opportunity for TMI to easily reach T2DM patients. Furthermore, the expenditure of delivering a message is only ¥0.1 RMB, and receiving messages is free in China. Thus, using TMI to improve adherence is potentially feasible because of its convenience and low cost compared with other strategies.[16]

Before successfully designing and implementing a TMI strategy, attaining a better understanding of key stakeholders' attitudes toward TMI and exploring the potential barriers that hinder the acceptance of TMI are critical. Thus, the aim of the current qualitative study was to investigate patients' knowledge about T2DM and their medical adherence, and the perceptions toward TMI among rural T2DM patients, village doctors (VDs), and public health physicians (PHPs) who are responsible for the health management of T2DM patients in rural China.

Methods

Study settings, sampling, and participants

This qualitative study was conducted in three counties of Xianning city in the southeast of Hubei province of China, from March–April 2015. By the end of 2015, the total population of Xianning city reached 2.5 million, and the gross domestic product per capital was approximately 41381.57 yuan ranking ninth among 17 cities in Hubei Province.