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Assessment of the content, usability, and benefits of the WeChat-based programme for dog bite victims in China
A prospective observation study

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Abstract

WeChat in China has been used for public health education and the prevention of diseases. This study introduced a WeChat-based program for rabies prevention and evaluated the users' satisfaction with the program using the technology acceptance model.

An online satisfaction questionnaire was used to survey 315 users who had followed the WeChat official account in China, and their satisfaction scores were assessed and analyzed.

The users were generally satisfied with the WeChat-based program as an educational and instructional tool with the mean satisfaction score for each item ranging from 3.9 to 4.6 out of a maximum of 5.0 and the total mean satisfaction score of 41.5 out of a maximum of 50.0 (SD = 4.3). Urban users showed more satisfaction than rural users (P = .03). Users who were satisfied also reported that they intended to recommend WeChat to others (P = .00).

Findings from the present study indicated that WeChat was considered a useful educational and instructional tool for dog-bite victims among young and urban population. This model of a WeChat-based program for rabies prevention should be expanded to other areas in China.

Abbreviations: TAM = technology acceptance Model, WCPRP = WeChat-based Program for Rabies Prevention; WSS = WeChat Satisfaction Scale.

Keywords: China, prevention, rabies, satisfaction, WeChat

1. Introduction

Rabies is a zoonotic disease caused by viruses of the genus Lyssavirus. It is a vaccine-preventable viral disease that occurs in more than 150 countries. Despite the overall steady decline of cases since a peak in 2007, the occurrence of cases in new areas and the trend of its spread have been apparent in China in recent years.[1] Rabies in China still remains a public health problem.[2] Improving rabies prevention and vaccination via the government and news organizations is essential, and medical institutions and doctors in human and veterinary medicine need to partner with the government to implement vaccination and surveillance efforts.[3] Chinese doctors urgently need to address the problems of raising public awareness of rabies, and of how to find a nearby rabies clinic as soon as possible for wound treatment, vaccination, and prevention.

In recent years, WeChat (Tencent Ltd, Shenzhen, China), the most popular mobile-based social media application in China with 1.12 billion registered users, has become deeply integrated into the routine life of Chinese people. Similar to Twitter, Facebook, and Skype, WeChat supports numerous services for activities of daily living, including instant messaging (text or voice) and mobile payments.[4] Further, WeChat has emerged as a health education tool for management of diseases such as cancer, chronic illnesses, and communicable diseases.[4,5] Given this context, a WeChat-based Program for Rabies Prevention (WCPRP) was developed by Chinese medical workers that was designed to disseminate knowledge related to rabies prevention, assist patients in seeking medical treatment, and authoritatively publish information on rabies prevention.

Satisfaction is an important and commonly used indicator of the quality of health care delivery. Satisfied users usually comply with health instructions provided, thereby promoting positive health outcomes.[4,6] However, very few studies have focused on

using WeChat to provide rabies education and assist dog-bite victims in China. In addition, little is known about the satisfaction of users with the information on rabies available on WeChat. In this study, our research integrated the perspective of the technology acceptance model (TAM) to examine satisfaction with a WeChat-based program. The objectives of this study were to develop and introduce a program for rabies prevention using the WeChat official account, and identify users' satisfaction and intention to use a WeChat-based educational program in China.

2. Methods

2.1. Development of the WeChat-based program for rabies prevention

The WCPRP was developed by the doctors and research team in Peking University People's Hospital based on clinical guidelines and health management policies in March 2016. The WCPRP consists of 3 modules with educational and instructional messages in Chinese: knowledge pervasion, immunoprophylaxis, and general information. In each module, there are certain first-class menus, and the users get related information if they tap the corresponding menu or type in keywords on the dialogue interface. An overview of the WCPRP is provided in Table 1. Each educational module can be selected by the user and may be repeated as needed. There are 2 special consultation functions in this program. One is that once the date of the first vaccination injection is typed in, the timing of and plans for the follow-up

injections can be calculated by the program. The other consultation function is that the users can find out where nearby vaccination clinics are located to expedite treatment. The location function of WeChat can acquire users' location information, match the nearest clinic, and provide a navigation route. We normally recommend that every dog-bite patient subscribe to the WeChat official account by scanning the QR code in our hospital.

2.2. Sampling, data collection, and outcome measurement

The TAM is a widely used explanatory model regarding users of new information technology and the related acceptance behavior of an application.[4] In this study, TAM was used to examine satisfaction with using a WeChat-based program. A descriptive quantitative online design was used in this study. The participants included a sample of dog-bite victims coming to the hospital from February 1, 2017 to February 1, 2018. We recommended that they subscribe to the WeChat official account via scanning QR code. The inclusion criteria were that the participants were over 18 years of age and had the ability to use WeChat properly. All of them used the programme at least 3 times before recruitment. All of them were dog-bite victims. The exclusion criteria included users who were diagnosed with psychosis or other medical or psychological conditions.

The satisfaction questionnaire was sent to 400 users through the WeChat platform. Based on a review of the literature,[4] the questionnaire content included users' demographic profile including gender, age, and educational attainment, and the WeChat Satisfaction Scale (WSS). Ten satisfaction items were

Table 1

An overview of the WeChat-based program for rabies prevention.

Sections	First degree menu	Responses or feedback from the program
Knowledge pervasion	Rabies	Rabies is an acute infectious disease of the central nervous system caused by the rabies virus. Its main clinical manifestations are mania, fear, fear of light and water, fear of wind, salivation, pharyngeal muscle spasm, progressive paralysis, etc. China is a high-risk area of rabies, which is in the top 3 fatalities of legal infectious diseases. Rabies mortality rate is almost 100%, and timely and standardized treatment after exposure can basically achieve 100% prevention.
	Exposure classification	Class I exposure: touching or feeding animals, licks on intact skin. Class II exposure: nibbling on uncovered skin or minor scratches or abrasions without bleeding. Class III exposure: single or multiple transdermal bites or scratches, licks on broken skin, and contamination of mucous membranes with saliva from licks.
	Key words	The users may type in some key words to get related information. For example, if you type in "Reinforcing injection," the system will respond as follows: If rabies vaccine has been injected, according to the last time of vaccination, there is no need to inject rabies vaccine in half a year, 2 injections of rabies vaccine (0, 3 d) in half a year to 1 yr, 3 injections of rabies vaccine (0, 3, 7 d) in 1 to 3 yr, and the whole course of immunization in more than 3 yr. Other key words include lactation period, adverse reactions, incubation period, tetanus, etc.
Immunoprophylaxis	Vaccination time	The date of the first injection can be typed in, and the time and plan of the follow-up injection can be calculated by the program. For example, you may type in "0706," and the program will respond with the injection time: first injection, July 06; second, July 09; third, July 13; fourth, July 20; fifth, August 03. OR "2-1-1" time: first and second injection, July 06; third, July 13; fourth, July 27.
	Principle of vaccination	The procedure of 5-injection vaccination is to inject 1 dose of rabies vaccine at day 0 (the day of first injection), and the remaining doses at days 3, 7, 14, and 28. The rabies vaccine, regardless of body weight and age, is administered at an average dose per injection. "2-1-1" injection: 2 doses of rabies vaccine are injected at day 0 (the day of injection) and 1 dose is injected at days 7 and 21 d, respectively.
	Outpatient clinic	When using this function, the system will locate your location information and send you the nearest vaccination clinic.
General information	Immunoglobulin	Class III and II exposures and Class II exposures whose wounds are located on the head and face should use passive immune preparations. The dosage of passive immune preparations should be calculated strictly according to body weight and injected in full quantity at one time. Rabies immunoglobulin is calculated at 20 units (20IU/kg) per kilogram of body weight.
	Emergency management	Immediately after injury, all bites and scratches should be washed thoroughly and alternately with diluted soap water (or other weak alkaline detergent) and flowing clear water under pressure for at least 15 min. Wounds with more bleeding should be compressed. The wounds should be treated as soon as possible in the rabies prevention clinic and vaccinated with rabies vaccine and passive immunization agents.

included in this scale based on previous literature. Questionnaire items are scored on a 5-point Likert scale ranging from 5 = strongly agree to 1 = strongly disagree with a total score ranging from 10 to 50. The higher the WSS score, the higher users' satisfaction.

The study was approved by the Institutional Review Board of the Peking University People's Hospital, and informed consent was obtained from all patients.

2.3. Statistical analysis

Data were collected and analyzed with SPSS 20.0 (IBM, Armonk, NY), satisfaction scores were compared across demographic categories. Student t test was used for statistical analysis and P values of $<.05$ were considered statistically significant.

3. Results

A total of 315 users (148 male and 167 female) with unique IP addresses completed the online survey. The total response rate was 78.8%. The users' ages ranged from 20 to 40 years. Most participants (221/315, 70.2%) had a bachelor's degree, 48.9% (154/315) were employed, and only 24.1% (76/315) of users were from rural areas of China. The substantial majority of users (92.1%; 290/315) reported an intention to recommend the program to others (Table 2).

The results showed that the participants were generally satisfied with using the WCPRP, with the mean satisfaction score for each item ranging from 3.9 to 4.6 and a total mean satisfaction score of 41.5 (SD = 4.3) (Table 3).

There were no significant differences between gender, age level, educational attainment, and occupation in terms of satisfaction scores (all Ps > .05). A significant difference was observed in the satisfaction scores by living area (P = .03): users in the cities had a

higher satisfaction score. In addition, users who were more likely to recommend the program to others also showed higher satisfaction levels with the WCPRP (P = .00) (Table 4).

4. Discussion

Utilizing information technology in health care, which involves providing disease-related information via telecommunication technologies, may become an important revolutionary approach

Table 3

Satisfaction scores with using the WeChat program for rabies prevention.

Items	Mean	SD
I am satisfied with the information provided by the WeChat-based program.	3.9	1.2
The information provided helped to enhance my knowledge of rabies.	4.0	1.1
I think the injection schedule made by the program is useful to me.	4.6	1.1
I prefer to get the injection schedule via WeChat rather than searching the Internet.	4.1	0.9
I like the function of finding the nearest rabies clinic in this program.	4.5	1.0
I took part in the online interaction frequently by sending messages to the account.	3.9	0.8
The information in the public account is easy to understand.	4.0	1.0
I think the WeChat program is easy to access.	4.2	0.9
I obtained both educational and instructional support from this program via WeChat.	4.1	0.9
WeChat is a good method to deliver online health instructions.	4.5	0.9
Total score	41.5	4.3

Maximum score on individual items = 5.0.
Maximum score on total scale = 50.0.

Table 2

Demographic characteristics of the participants (N = 315).

Demographic characteristics	n (%)
Gender	
Male	148 (47.0)
Female	167 (53.0)
Age (y)	
< 25	32 (10.2)
26–35	120 (38.1)
36–40	88 (27.9)
> 40	75 (23.8)
Educational attainment	
Below high school	16 (5.1)
High school	57 (18.1)
Bachelor's degree	221 (70.2)
Above bachelor's degree	21 (6.7)
Occupation	
Farmer	85 (27.0)
Worker	154 (48.9)
Student	44 (14.0)
Other	32 (10.2)
Living area	
Urban	239 (75.9)
Rural	76 (24.1)
Intention of recommendation	
Yes	290 (92.1)
No	25 (7.9)

Table 4

Satisfaction with the WeChat program by demographics.

Demographic characteristics	Mean	SD	P
Gender			
Male	41.0	4.1	.23
Female	41.2	4.3	
Age (y)			
< 25	41.3	4.6	.32
26–35	41.0	4.0	
36–40	41.0	4.2	
> 40	41.2	4.2	
Educational attainment			
Below high school	40.9	4.5	.25
High school	41.6	5.0	
Bachelor's degree	41.3	4.7	
Above bachelor's degree	41.5	4.0	
Occupation			
Farmer	41.0	4.9	.15
Worker	42.0	4.2	
Student	41.4	4.4	
Other	40.9	4.4	
Living area			
Urban	41.7	4.2	.03
Rural	40.0	4.3	
Intention of recommendation			
Yes	41.5	4.6	.00
No	39.8		

that can greatly affect Chinese health care delivery.[4,7] In this study, a WCPRP was developed and implemented. The program was developed by our doctors and research team who understood the necessity to support victims of dog bites with more need-specific education and instructions about rabies prevention. It was found that 92.1% of the users intended to recommend the program to others, and the total mean satisfaction score was 41.5, which indicated that users were satisfied with the WeChat education program. The WCPRP met their needs due to its convenient functional design, and since this program was built in the public WeChat account, it is a convenient channel to transmit information to specific users and interact with them.[8] The education modules and text messages on the WCPRP public account were developed to provide simple, easy-to-understand health information, which was a viable way to connect medical staff and victims to facilitate health instruction delivery and resource sharing.[9] One previous study reported a successful outcome based on intervention for patients with type 2 diabetes via WeChat,[10] and similar results were also found in a WeChat-based life review program for cancer patients.[11]

In this study, nearly 75% of those who completed this survey were urban dwelling and aged below 40 years, which indicated that WeChat is a useful tool for public health education for dog bites, and it was more popular and recognized among the young and urban population. We found that users' satisfaction was not related to gender, age levels, educational levels, or occupation, but users' satisfaction differed significantly with respect to where they are living. Users living in urban areas were more satisfied than those living in rural areas. Possible reasons for this difference may be that rural rabies clinics are relatively few or that public awareness of rabies is relatively low among people in rural areas. Also, lower incomes in rural areas could have limited their ability to take full advantage of the WCPRP, possibly due to the cost associated with Internet access.[4] Therefore, public awareness of rabies in high-risk populations living in rural areas needs to be improved.

In this study, participants who showed higher levels of satisfaction were more likely to intend to recommend the WeChat official account to others. In line with previous findings, when individuals are satisfied with the efficiency and capability of new technologies, they have a higher intention to use it.[12]

We believe that our study makes a significant contribution to the literature because it is one of the first programs of its kind to implement a dog bite and rabies information and prevention program using social media. It discusses a health promotion program that could easily be implemented using other social media platforms in other locations. Thus, it should be relevant to policymakers, clinicians, as well as researchers. However, there are some limitations to this study. First, the survey may not have been uniformly distributed among age groups and those living in urban and rural settings. There were 85 users who did not respond to this survey; among them 81 users were from rural area and 84 users were above 40 years. That means there is an uneven distribution of the sample population (rural vs urban = 39.2% vs 60.8%; age >40 vs age <40 = 39.8% vs 60.2%). Second, the study lacks a comparison cohort group, and further studies using randomization control cohort methods are needed. Third, this study analyzed only user satisfaction and their intention to recommend the program to others. It is important to examine other factors that might affect users' satisfaction, such as family support and health literacy.

5. Conclusions

Findings from the present study indicated that WeChat can be considered a useful educational and instructional tool for dog-bite victims among young and urban populations. This model of a WeChat-based program for rabies prevention should be expanded to other areas in China.

Author contributions

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