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**WeChat-based health education to improve health knowledge in three major infectious diseases among residents: a multicentre case-controlled protocol**

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**ABSTRACT**

**Introduction**  Health literacy (HL) in infectious diseases is inadequate in China. Since the first nationwide survey of HL conducted in China, great efforts have been made. However, the rate of HL in infectious diseases was 16.06% in 2017. In contrast, with an HL rate of 15.85% in 2008, no significant effect was observed over 10 years. With an increasing number of internet users, we aim to assess the effects of WeChat-based health education for the promotion of partial HL-health knowledge in infectious diseases.

**Methods and analysis**  A total of 2160 residents aged 15–69 years old will be enrolled in this study. The primary outcome measures will be the rate of health knowledge in infectious disease. The follow-up period is 3 years.

**Ethics and dissemination**  The study protocol was approved by the Research Ethics Committee of the First Affiliated Hospital, College of Medicine, Zhejiang University. The findings of this study will be submitted to a peer-reviewed journal.

**INTRODUCTION**

According to WHO, viral hepatitis causes 1.4 million deaths annually, being the second-leading killer infectious disease after tuberculosis, and nine times more people are infected with hepatitis than with HIV. Viral hepatitis B, tuberculosis and HIV/AIDS are three common infectious diseases in China. In 2008, national health literacy (HL) investigations were first conducted, and the rate of HL was 15.85% for infectious diseases in China. Although great efforts had been made, the rate of HL was 16.06% in 2017, reflecting a slight increase over ten years. In the era of the internet, an increasing number of residents are increasingly inclined to use social media to seek online health information. China has witnessed a dramatic increase in internet users who have ever used the internet in the last year. For instance, the percentage of internet users increased from 55.8% in 2013 to 55.8% in 2017.

In China, WeChat is the most popular mobile app that provides social media services, similar to Facebook in Western countries. Previous studies have determined the positive effect of WeChat-based health education. In our previous study, nearly half (40.6%) of internet users reported having sought health information via the internet. The proportion of internet users was higher than 32.9% in Vietnam; these individuals used the internet to obtain health information. In China, WeChat is the most popular app used in China, an individual may have a greater chance of being involved in WeChat-based health education.

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**Strengths and limitations of this study**

- This study is a multicentre case-controlled study to assess the effect of WeChat-based health education to improve health knowledge in three infectious diseases in China.
- A previous study has identified the positive effect of WeChat-based health education. As WeChat is the most popular app used in China, an individual may have a greater chance of being involved in WeChat-based health education.
- Health knowledge is reported by residents themselves, which could lead to bias due to overestimation or underestimation.

**Protocol**

**Health knowledge is reported by residents themselves, which could lead to bias due to overestimation or underestimation.**

**Study objectives**

We aim to assess the effects of WeChat-based health education for the promotion of health knowledge in infectious diseases. We hypothesise that WeChat-based health education could improve health knowledge in infectious diseases among residents in China.
METHODS AND ANALYSIS

Design
This study is designed as a prospective case–control study, with an allocation of 1:1.

Settings and participants
The study will be conducted in six districts in Zhejiang Province, China, from 1 January 2018 to 31 December 2020. The six districts are selected according to economic levels. Higher economic-level areas are Tongxiang and Dinghai, intermediate economic-level areas are Putuo and Putuoshan in Zhoushan, and lower economic-level areas are Nanxun and Tonglu. We aim to recruit adult residents in these six settings using probability proportional to size sampling. In addition, the distribution in sex and age of participants is shown in table 1 according to the National Bureau of Statistics 2017.11

Eligibility criteria
Residents have to fulfil all of the following criteria to be eligible for the study: age between 15 and 69 years; sign informed consent. The exclusion criteria are as follows: children and adolescents younger than 15 years; elderly adults older than 60 years; the presence of psychiatric diseases; and unwillingness to participate in the study.

Interventions
The intervention in the study is WeChat-based health education. Figure 1 shows an example, and table 2 is the translated version. There are two intervention groups. Group I will be given WeChat-based health education. Group II will be given traditional plus WeChat-based health education. The control group is only given traditional health education, such as clinic education and pamphlet education. A total of 2160 participants are randomly divided into groups I and II and the control group in six districts.

Study procedure
Oral and written information regarding the study will be first delivered to the participants and signed by them. Participants in groups I and II will receive WeChat-based health education once or twice monthly. The theme will rotate around hepatitis B, tuberculosis and HIV/AIDS. The effect will be assessed through a self-designed questionnaire in our previous study (table 3). To ensure quality, the questionnaire must be verified by the quality controller on the same day.

Follow-up
All the participants will report baseline rate of health knowledge in infectious disease and those after a 3-year intervention.

Outcome measures
The primary outcome is the rate of health knowledge in infectious disease in residents.

Sample size
The HL level of infectious disease was 17.12% in 2013 in China. To detect a 15% difference between groups while maintaining a power of 80% and a significance level of 5% and allowing for 10% of the residents will be lost to follow-up, a total of 2160 participants will be needed.

Data collection and statistical analysis
All the participants will be assigned a study number. After the collection of the completed paper questionnaire, data will be double entered into an Epidata V.3.1 software database by two staff members independently. Then, we will check the accuracy, consistency and logicality of the data.
Harms

As the study does not involve blood collection or drug treatment, there are no harms in this study.

The SPSS software V.22.0 is used for data processing and analysis. Descriptive statistics will be used to summarise baseline characteristics. Student’s t-test will be used to compare the mean values of continuous variables approximating a normal distribution. For non-normally distributed variables, the Mann-Whitney U test will be used. The \( \chi^2 \) test or Fisher’s exact test will be used, as appropriate, to compare percentages. The difference between study groups will be considered significant when the P value is below 0.05. All statistical hypothesis tests will be two tailed.

Harms

As the study does not involve blood collection or drug treatment, there are no harms in this study.

The Ethics Committee does not require auditing for this study.

Ethics and dissemination

All the participants have to sign written information regarding informed consent. The full protocol will be freely available due to open access publication. The findings of this study will be submitted to a peer-reviewed journal. The Strengthening the Reporting of Observational Studies in Epidemiology statement will be followed for this case-controlled study.

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Contributors

YQ conceptualised the study. YQ developed the first draft of the manuscript. YQ, HQ, MY, KX and JR contributed to the development of the study.
protocol and approved the final draft of the manuscript. YQ and JR are the guarantor.

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**Competing interests** None declared.

**Participant and public involvement** No participants or the public will be involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not required.

**Ethics approval** The Research Ethics Committee of the First Affiliated Hospital, College of Medicine, Zhejiang University (No: 2017-729).

**Provenance and peer review** Not commissioned; externally peer reviewed.

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**REFERENCES**

1 WHO: Geneva. Invest in eliminating hepatitis, 2020. Available: https://www.who.int/news-room/detail/28-07-2019-invest-in-eliminating-hepatitis

2 Yang S, Wu J, Ding C, et al. Epidemiological features of and changes in incidence of infectious diseases in China in the first decade after the SARS outbreak: an observational trend study. *Lancet Infect Dis* 2017;17:716–25.

3 Wang P, Mao QA, Tao MX, et al. Survey on the status of health literacy of Chinese residents in 2008. *Chinese J Health Education* 2010;26:243–6.

4 National Health Commission of the People’s Republic of China. Publication on the National health literacy in Chinese population in 2017, 2020. Available: http://www.nhc.gov.cn/wjw/zc/zj201809/e72299ab37974d809b7e16b793763ded.shtml

5 China Internet Network Information Center. The 33rd China statistical report on Internet development, 2013. Available: http://www.cnnic.net.cn/hlwzjy/hlwzxbg/hlwztbg/201403/P020140305346585959798.pdf

6 China Internet Network Information Center. The 41st China statistical report on Internet development, 2020. Available: http://www.cnnic.net.cn/hlwzjy/hlwzxbg/hlwztbg/201803/P020180305409870339136.pdf

7 Zhang D, Han MJ, Chen QF, et al. The effect of using WeChat platform for college students to carry out health education of knowledge of AIDS. *Chinese J AIDS & STD* 2016;22:550–2.

8 Chen CL, Shi CJ. Effect of WeChat health education model on nursing intervention of patients with thoracolumbar fracture treated with conservative therapy. *Chinese and Foreign Medical Research* 2019;17:173–6.

9 Qiu Y, Ren W, Liu Y, et al. Online health information in a rural residential population in Zhejiang Province, China: a cross-sectional study. *BMJ Open* 2019;9:e026202.

10 Nguyen HTL, Nakamura K, Seino K, et al. Association between a wider availability of health information and health care utilization in Vietnam: cross-sectional study. *J Med Internet Res* 2017;19:e405.

11 National Bureau of Statistics. National Bureau of statistics, 2017. Available: http://www.stats.gov.cn/tjsj/ndsj/2017/indexeh.htm