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Evaluation of telemedicine-based training for rural primary healthcare providers in China: A randomized controlled trial

Submission date
11/11/2022

Recruitment status
No longer recruiting

Registration date
23/11/2022

Overall study status
Completed

Last Edited
16/09/2024

Condition category
Other

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Digital technologies have the potential to address some challenges in providing high-quality and equitable healthcare services. In particular, telemedicine services can overcome geographical barriers and provide health service/training to residents/healthcare workers in remote and undeveloped areas. Previous studies have documented the poor quality of primary health care in rural areas of China. This study aims to assess whether a telemedicine-based training program could improve the quality of care delivered by primary healthcare providers in rural areas and what influences rural primary healthcare providers' engagement in the program.

Who can participate?
Village doctors from rural primary healthcare centers who were practicing Western medicine from randomly selected villages and households in each selected village

What does the study involve?
Following a baseline survey, 40 townships in our trial were randomly assigned to either the intervention group or the control group. In the intervention group, sample primary healthcare providers were offered the opportunity to participate in a telemedicine-based training program for 7 months. Sample primary healthcare providers in the control group did not receive any intervention. Within three months after the training program ended, sample primary healthcare providers were followed up to assess their clinical knowledge and practices, and sample rural residents were followed up to assess patient satisfaction, utilization of primary medical services, their own health behavior and knowledge, as well as health services provided by doctors in their village clinic and township health center.

What are the possible benefits and risks of participating?
The study was expected to benefit rural primary healthcare providers and residents in the townships randomly assigned to the intervention group. Potential benefits to primary healthcare providers include improved clinical knowledge. Rural residents served by primary healthcare providers in the intervention group may benefit from improved care. There are no risks involved in participating in this study.

Where is the study run from?
Shaanxi Normal University (China)

When is the study starting and how long is it expected to run for?
August 2019 to August 2022

Who is funding the study?
UBS Optimus Foundation (Switzerland)

Who is the main contact?
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Additional identifiers

EudraCT/CTIS number
Nil known

IRAS number

ClinicalTrials.gov number
Nil known

Secondary identifying numbers
AEARCTR-0010327

Study information

Scientific Title
Telemedicine-based training and the quality of primary care in rural China: A randomized controlled trial

Study objectives
The telemedicine-based training intervention developed for rural primary healthcare providers will improve providers' clinical knowledge and practices. Participants in the intervention condition will improve more on the primary and secondary outcomes than participants in the control condition.

Ethics approval required
Old ethics approval format

Ethics approval(s)
1. Approved 22/06/2020, Xi'an Jiaotong University Institutional Review Board (No. 76, Yanta Road West, Yanta District, Xi'an 710061, China; +86 29 82757512; gengjz@xjtu.edu.cn), ref: IRB2020-1239
2. Approved 17/12/2019, Xi'an Gaoxin Hospital Institutional Review Board (No. 16, Tuanjie Road South, Yanta District, Xi'an 710077, China; +86 29 88332206, gxyyec@163.com), ref: IRB2019-KY005

Study design
Interventional cluster randomized controlled trial

Primary study design
Interventional

Secondary study design
Randomised controlled trial

Study setting(s)
GP practice

Study type(s)
Other

Participant information sheet
No participant information sheet available

Health condition(s) or problem(s) studied
Primary healthcare quality

Interventions
Within each cluster, sample primary healthcare providers and sample rural residents were randomly selected by computer software. We combined stratified randomization at the county level with clustered randomization at the township level. Specifically, within each county, we planned to use a computerized random number generator to randomly assign half townships to the intervention group and the other half to the control group. Since the number of townships in the sample counties was unevenly distributed, we ultimately assigned 19 townships to the intervention group and 21 townships to the control group by computer software.

In each township, we randomly selected 3 eligible doctors in the township health center using a computerized random number generator and included all of the village doctors from 3 randomly selected villages. These doctors were included in our trial and are hereafter referred to as "sample primary healthcare providers." For each selected village, we used a computerized random number generator to randomly select 5 households to take surveys (hereafter, "sample rural residents").

Sample primary healthcare providers in the intervention group were invited to participate in a telemedicine-based training program for 7 months. During this program, online training and teleconsultation services were provided by experts in an urban comprehensive tertiary hospital

who were qualified at least as attending physicians. The voluntary online training consisted of 31 sessions covering a series of common diseases in rural areas. Teleconsultation creates a hands-on approach to learning: sample primary healthcare providers could contact experts via teleconsultation when they needed help with patient cases, which served as another form of training and allowed for learning by doing. Sample primary healthcare providers were allowed to use the teleconsultation services for free during business hours.

Sample primary healthcare providers in the control group did not receive any intervention.

Intervention Type
Behavioural

Primary outcome measure
1. Clinical knowledge of primary healthcare providers measured using the Vignettes Method and Structural Questionnaire Test within three months after the training program ended
Each primary healthcare provider in the sample was administered Vignettes presenting three disease cases: asthma, unstable angina, and child diarrhea. The analysis will focus on process quality, the correctness of diagnoses, and the appropriateness of treatment, which will all be evaluated by experts.
A series of ten test items related to common diseases were adopted in a structural questionnaire. The test scores will be calculated based on the number of correctly answered test items, which will also be evaluated by experts.

2. Clinical practice of primary healthcare providers measured using the Standardized Patients Method within three months after the training program ended
Unannounced standardized patients (hereafter, “SPs”) were used to assess the clinical practice of primary healthcare providers. We chose three cases presented by Standardized Patients: asthma, unstable angina, and child diarrhea. In principle, each primary healthcare provider received 0 to 2 cases of SP visits based on predetermined rules. The analysis will focus on process quality, the correctness of diagnoses, the appropriateness of treatment, and consultation length, which will all be evaluated by experts.

Secondary outcome measures
All outcomes are measured within three months after the training program ended
1. Patient satisfaction with primary healthcare providers is reported by unannounced standardized patients and sample rural residents using the patient experience questionnaire
2. Utilization of primary medical services collected from sample rural residents measured by the frequency of their visits to primary health facilities. Patient load was measured by the number of patient visits reported by sample primary healthcare providers.
3. Health behavior of sample primary healthcare providers collected from sample rural residents measured by how often primary health providers offer chronic disease management services
4. Health behavior and knowledge of residents reported by sample rural residents measured by their medication adherence and self-monitoring of chronic diseases. Health knowledge of residents was measured by a series of test items on chronic diseases.

Overall study start date
01/08/2019

Completion date
31/08/2022

Eligibility

Key inclusion criteria
Primary healthcare providers:
1. Aged 18 years old and over
2. Male or female
3. Employed as doctors who were practicing Western medicine in village clinics and township health centers in the study area

Rural residents who were invited to take household surveys:
1. Aged 18 years old and over
2. Male or female
3. Permanent residents in villages in the study area

Participant type(s)
Mixed

Age group
Adult

Lower age limit
18 Years

Sex
Both

Target number of participants
We aimed to include 40 townships. Each township is estimated to have at least 6 primary healthcare providers from 4 primary health facilities (i.e., 3 doctors randomly selected from the township health center and all village doctors from 3 randomly selected villages) and 15 households (i.e., 5 households randomly selected from the same 3 randomly selected villages). We expected to enroll at least 240 primary healthcare providers and roughly 600 households in the study.

Total final enrolment
279

Key exclusion criteria
1. Primary healthcare providers who were only practicing traditional Chinese medicine
2. Rural residents who were unable to take the survey because of cognitive dysfunction or were temporarily living in the surveyed village

Date of first enrolment
01/01/2021

Date of final enrolment
31/12/2021

Locations

Countries of recruitment
China

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University/education

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ROR
https://ror.org/0170z8493

Funder(s)

Funder type
Charity

Funder Name
UBS Optimus Foundation

Alternative Name(s)

Funding Body Type
Private sector organisation

Funding Body Subtype
Trusts, charities, foundations (both public and private)

Location
Switzerland

Results and Publications

Publication and dissemination plan
Planned publication in a high-impact peer reviewed journal.

Intention to publish date
31/07/2025

Individual participant data (IPD) sharing plan
The data sharing plans for the current study are unknown and will be made available at a later date

IPD sharing plan summary
Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Other files			16/09/2024	No	No