Chinese Culture-Specific Intervention to Decrease the Stigma of Nursing Students towards Schizophrenia——A Pilot Randomized Controlled Trial

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Introduction

Mental illness stigma does enormous damage to those with mental illness as well as their families, and the health care system (Brouwers, 2020). Schizophrenia is the most stigmatized disease among mental illnesses (Valery & Prouteau, 2020). In China, nearly 7.8 million people are diagnosed with schizophrenia, and 100,000 new diagnoses are recorded each year (Hu, 2018; Yao et al., 2013). The stigma of schizophrenia is mainly characterized by the stereotypes of danger, unpredictability, and a poor prognosis (Crisp, Gelder, Rix, Meltzer, & Rowlands, 2000). People with schizophrenia are widely considered as more dangerous and unpredictable than people with other mental illnesses (Reavley & Jorm, 2014).

In different cultures, people have different understandings of stigma meanings, treat it in different ways and yield different results (Yang, 2007). In China, some people believe that schizophrenia is caused by black magic or possessed or disturbed by spirits (gods or devils) (Tseng et al., 2013). Studies showed that socio-cultural and religious factors strongly affect stigmatizing attitudes (Waqas et al., 2020).

However, in China, few studies have been conducted with a focus on Chinese culture when it comes to decreasing mental illness stigma. China is a developing country with a culture of face-saving and Confucianism, totally different from western countries (Yang et al., 2014). Nurses play an essential role in all health care systems. When nursing students begin their nursing career, their attitude and behavior toward schizophrenia will affect the treatment and nursing of people with schizophrenia. A study showed that compared with medical students, nursing students hold even a more negative attitude towards people with schizophrenia (Taşkın et al., 2003).

In mainland China, fourth-year nursing students have finished their theoretical knowledge and then undertake clinical practice in the hospital prior to their graduation. Given the high prevalence of mental illness, such as schizophrenia, it is likely for the nursing students to meet some mental health consumers who require physical treatment and nursing care. Their stigma on consumers with schizophrenia will affect their delivery of quality healthcare and consumers' achievement of optimal health outcomes and prevent them from entering the mental health workforce after graduation. It is fundamental to address nursing students' stigma with appropriate intervention strategies.

There are three ways of decreasing mental illness stigma: protest, education, and contact with people who have a mental illness (Corrigan, Edwards, et al., 2001). The "contact" has superior efficacy and effectiveness in decreasing stigma as it may evoke an empathic emotional reaction (Tippin et al., 2019). Empathy is recognized as how an individual know other people's thinking and feeling and figure out what makes someone give a response to other people's suffering with sensitivity and care (Batson,

2009). It is found that improvement of empathy for the stigmatized group will be extended to a larger group of people with other mental illness (Batson et al., 2002;).

Besides, transformative learning can help individuals to transform their beliefs, assumptions, and experiences from new perspectives (Dincer & Inangil, 2021). It may develop nursing students' empathy and positive attitude towards people with schizophrenia. There are four transformative learning methods in education: investigative, collaborative, higher-order thinking, and interactive learning activities (Tsimane & Downing, 2020). To decrease nursing students' stigma towards schizophrenia, intervention methods should incorporate the transformative learning.

Knowledge-attitude-behavior practice (KABP) paradigm was used to guide researchers to develop intervention to decrease mental illness stigma (Foster, 2017;) as the lack of mental health knowledge and misconception of the fact will lead to stigma (Thornicroft, 2006). Thus, a good intervention framework should combine transformative learning and KABP paradigm.

Review of previous intervention studies in decreasing mental illness stigma show certain limitations. Studies showed that socio-cultural and religious factors strongly affect stigmatizing attitudes, but seldom taken in consideration in most previous studies (Waqas et al., 2020). They were mostly not guided by theoretical frameworks, and only two studies guided by theoretical frameworks (Papish et al., 2013). Previous studies mainly focused on decreasing common or severe mental disorders stigma without in-depth study targeting for schizophrenia (Amsalem et al., 2020). Most studies were also lack of follow-up time, and the efficacy of the interventions in the long-term was unsure (Amsalem et al., 2020). Furthermore, interventions were traditionally conducted face to face Amsalem et al., 2020), and this is not feasible during the Covid-19 pandemic period. But with the development of internet technology, time and social distance is no longer a problem. Thus, developing an online intervention programme to decrease the stigma towards schizophrenia will be more convenient and flexible without the restriction. Such intervention programme will be the first of its kind in mainland China.

Aim

This study aims to develop a Chinese culture specific intervention to decrease schizophrenia stigma among fourth-year nursing students in mainland China. The intervention will also be assessed for its feasibility, acceptability and the preliminarily efficacy in a pilot RCT study.

Method

Study Design

This study consists of quantitative and qualitative research design. There are three phases of the whole study.

1) In the first phase, a literature review and descriptive qualitative focus group interview will be used to inform the intervention development of a pilot RCT.

2) The second phase will be a pilot RCT. The pilot RCT consists of three stages,

including the investigative learning activity (6 hours), the collaborative learning activity (4 hours), and the higher-order thinking activity (4 hours). The control group has one stage—reading a book about schizophrenia knowledge.
3) The third phase is a process evaluation to explore the barriers or facilitators of the intervention in implementation, figure out additional problems which may affect the intervention in implementation, and refine the study design for a future full power RCT.

Study Setting, Participants, Sampling and Sample size
This study will be implemented in Xiang Ya Hospital, Changsha, Hu Nan province in mainland China. The participant will be fourth-year nursing students in mainland China. The first phase and third phase of focus group interviews will initially involve four participants in each focus group and the number of participants will increase until reaching data saturation. Based on the previous literature review on sample size calculations for feasibility studies, the sample size of the second phase of study was suggested between 24 and 50 (Julious, 2005; Sim & Lewis, 2012). Considering a drop-out rate of 20% reported in many psychosocial intervention studies (Van Daele, Hermans, Van Audenhove, & Van den Bergh, 2011), the total number of participants will be set at 60 (both intervention and control group will have 30 participants). Convenience sampling method will be used to recruit the participants.

Inclusion criteria of participants are those:

- Participants should be 18 years old or above.
- Participants should complete all the school courses to ensure that they have similar theoretical knowledge in psychiatric nursing.
- Participants can communicate in Mandarin.
- Participants are voluntarily participating in this study.
- Participants have not participated in any other similar intervention before.
- Participants are doing a clinical practicum in Xiangya Hospital, Changsha, Hunan Province.

Exclusion criteria are those:

- Participants are receiving treatment of schizophrenia or other mental illness.
- Participants are lack of essential equipment to take an online interview.
- Regular personal contact with someone with schizophrenia or other mental illness (more than three times a month). Because people's prejudice may decrease when they meet and interact with people with mental illness.

Procedures

Phase 1: Pre-intervention qualitative study

The first phase study aims to explore the knowledge, attitude, empathy, and intention behavior towards people with schizophrenia among nursing students through online focus group interview which is essential for developing an intervention programme.

Phase 2: Pilot intervention study

It involves the implementation of this study intervention based on the literature review, findings of phase one focus group interview and transformative learning theory (Dincer & Inangil, 2021; Tsimane & Downing, 2020). A feasibility study using a pilot randomized controlled trial design will assess the preliminary effect of the intervention on knowledge, attitude, empathy, and intention behavior of the fourth-year nursing students towards people with schizophrenia. The research outcome will be measured at three time points: Baseline (T0), after the intervention (T1), three months post-intervention (T2).

R software will be used to generate a randomization table in this study. To decrease the potential selection bias, allocation concealment will be applied to ensure there is no prior knowledge for group assignment (Suresh, 2011). A postgraduate student will be invited to help us generate the randomization table by R software. The participants' group belonging will be determined after the participants have signed the consent form.

The intervention programme will include investigative, collaborative, higher-order thinking, and interactive learning activities. For investigative learning activities, nursing students will be encouraged to access information through evidence-based research to discover the information by themselves and which will last about 6 hours.

The collaborative learning activities will include people recovered from schizophrenia to share their experiences throughout the treatment and recovery period with nursing students who will be encouraged to raise their questions. Nursing student will create scenario-based simulation and take roles in it. The contact activity will be held through online interviews. These collaborative learning activities will last about 4 hours.

The higher-order thinking activities will include nursing students' self-criticism after scenario-based simulation, nursing students will be asked to write their opinions about schizophrenia and people with schizophrenia. Nursing students will prepare concept maps for the problems a person with schizophrenia in daily life encounter and the corresponding solutions. The higher-order thinking activities are also held online and will last about 4 hours. Nursing students will interactively take part in the above-mentioned activities, which belong to interactive learning activities.

Blinding

This research is an open-label study due to the practical impossibility of blinding participants and the self-completed measures. Some strategies for minimizing allocation and assessor bias will be implemented. To minimize allocation bias, the assistant who performed randomization will be blinded. To minimize the assessor bias,

the research assistants who collected and entered the data for analysis in this study will be blinded. They were concealed of group allocation and not notified what the group labels (group 1 and groups 2) mean.

Feasibility of Intervention

The outcome of this study will be mainly measured by the feasibility and acceptability of the intervention. Summary of the outcome measures feasibility of the intervention is shown in table 1.

Table 1 Primary Outcome of the Intervention

Primary outcome	feasibility outcomes	① Subject recruitment time ② Achievable recruitment rate ③ Eligibility rate of participants ④ The response rate of scales
	acceptability outcomes	① Drop-out rate of participants

Preliminary Efficacy of the Intervention

We will assess the intervention efficacy at baseline, post intervention, and at three-month follow-up, including the participants' change in knowledge, attitude, intention behavior, and empathy. The self-assessment questionnaires will include as following:

1) Basic socio-demographic data will be gathered, and which will include information like age, gender, marital status, ethnic groups, university, province, religion, average family income per year, friends or family members with mental illness problems, mental illness history, whether they had contact with people with schizophrenia in the past, and whether they participated in any similar research before.

2) Knowledge about Schizophrenia Test (KAST)-Chinese version will be used to measure the stigma-related schizophrenia knowledge of participants. KAST, including 18 items, demonstrate an acceptable reliability coefficient of 0.68. The content validity index of items (I-CVI) ranged from 0.83 to 1.00, while the S-CVI/UA and S-CVI/Ave were 0.83 and 0.97, respectively, and known-group validity was satisfactory (Zhou et al., 2020).

3) Mental Illness Clinicians' Attitudes Scale (MICA)- Chinese version (Kassam, Glozier, Leese, Henderson, & Thornicroft, 2010; Li et al., 2014) will be used to measure stigma-related mental illness attitude of participants. MICA is a six-point scale that includes 16 items, and response options are from 1=totally agree to 6=totally disagree. The total score range is taken from 16-96. A lower score indicates participants having a positive attitude towards mental illness. The internal consistency is 0.72-0.75, and test-retest reliability is 0.76-0.87 of MICA in the Chinese version (Li et al., 2014; Pan Shengmao et al., 2013).

4) Reported and Intended Behavior Scale (RIBS)-Chinese version (Li et al., 2014) will be used to measure the stigma-related mental illness behavior of participants. RIBS is a five-point scale that includes eight items, and response options are designed as 1=totally disagree, 2=disagree, 3=do not know, 4=agree, 5=totally agree. The total score range is taken from 4-20 of items 5-8. The higher score

indicates the participants are more willing to contact people who have a mental illness. The internal consistency is 0.82, and test-retest reliability is 0.68 of RIBS in the Chinese version.

5) Jefferson Scale of Empathy-Health Profession Students (JSE-HPS)-Chinese version (Hsiao et al., 2012) will be used to measure the nursing students' empathy towards people with schizophrenia. S-JSE-HPS is a seven-point scale that includes twenty items, and response options are designed as 1=totally disagree to 7= totally agree. The total score range is taken from 20-140. The higher score indicates the participants have greater empathic attitudes. The internal consistency is 0.93, and test-retest reliability is 0.92 of JSE-HPS in the Chinese version.

Intervention Fidelity

A fidelity checklist will be used to assess the intervention fidelity (Borrelli et al., 2005). All sessions will be videotaped and rated independently by a research assistant. The assessor of the checklist will be an independent research assistant, who will be trained to use the checklist to assess the intervention fidelity.

Phase 3: Process evaluation

This phase aims to collect feedbacks from online focus group interview to explore the barriers and facilitating factors in implementing the intervention, figure out additional problems which may affect the intervention, and refine the study design for a future full power RCT.

Ethical issues and data safety

Ethical approval has been obtained from the Research Ethics Committee of The Hong Kong Polytechnic University (HSEARS20220127002) and the Research Ethics Committee of Xiang Ya Hospital of Central South University (KE202203129) to conduct this study. All participants will be reminded of the voluntary nature of the research and will be provided a participant information sheet. All information of participants will be kept confidential, and the information will be destroyed three years after the whole research. Participants can withdraw during any period in this research without any penalty or influence in their clinical rotation. There will be a clear written and verbal explanation of this study to all participants. The protocol will be prospectively registered at ClinicalTrials.gov. All participants will be asked to sign a written consent before this study starts.

Data Collection

The interview guide for focus group interview will include a series of open-ended questions. The interview guide will be used to interview one participant before an official interview (phase 1 and 3). All focus groups' discussions will be recorded with videotaping online and transcribed verbatim. A detailed field note will be used to record the participants' non-verbal expressions, and emotional status of the informant and reflective notes will be used to record the researcher's speculation, feelings, and impressions towards the participants in the interview. Wen Juan Xing, an online

platform will be used to administer the self-assessment questionnaires. Only the researcher (the Ph.D. student) who has the password can login into this platform and access the data. The data will be kept in a U Disk Encryption that could only be accessed by the Ph.D. student with the password or others who is authorized. Tencent Video Conference will be used to conduct online intervention. All participants will receive a password and one-time access link to login the Tencent Video Conference. All participants' voices and facial expressions can be wholly captured. Each interview which lasts about 60 minutes will be recorded by videotape.

Data Management

Information on the scales will be collected, coded, and enter SPSS 26.0 software to establish a database. A research assistant will help data entry. The PhD student and the research assistant will double-check the dataset of the raw data to make sure the data is accurate. Data will be kept strictly confidential. All participants will be anonymous in this study with only a code to represent his or her identity. Personal particulars will be removed in the analysis, all electronic files will be kept in a U Disk Encryption that could only be accessed by the PhD student with the password or others who is authorized.

Data Analysis

Quantitative data analysis

The demographic characteristics of participants will be presented by using descriptive statistics; means, standard deviation (SD), or percentage, if appropriate. The demographical variables and outcome variables were compared between groups at baseline. Numerical variables will be analyzed by an independent t-test, and nominal variables will be analyzed by $\chi 2$. Supposing the data cannot satisfy the requirement of parametric analyses, the Mann-Whitney U tests will be performed to compare the scores obtained from the four Scale among intervention and control groups created according to demographic characteristics. Generalized estimated equations (GEE) will be used to analyze the effectiveness of the intervention at three-time points as compared with control group. The significance level will be set at $P < 0.05$, for a two-tailed test. SPSS 26.0 of IBM will be used to analyze collected data (SPSS Inc., Chicago, IL, USA). Multiple imputations would be used to replace missing data if data missing is inevitable.

Qualitative Content Analysis

Manifest and latent content analysis will be adopted in this analysis. We will stop interview participants until data saturation is reached. NVivo 12 will be used to manage and organize qualitative data. There are five steps of the qualitative content analysis, which includes data preparing and organizing, reading and memoing, codes developing, generating categories, and representing the description and themes (Creswell, 2013).

Issues of Trustworthiness of Data

Qualitative validity requires the researcher use some procedures to examine the accuracy of the findings; while qualitative reliability requires the approach be consistent between different researchers and projects (Gibbs, 2018). Credibility, Dependability,

Transferability, and Confirmability are the four criteria in the trustworthiness of rigor qualitative studies (Lincoln & Guba, 1986). The quantitative data will be examined by two independent research assistants who will double-check the data collected to avoid data missing or inconsistency and ask the participants to reassure the data they provide if possible.

Implications for the future research

This research is an open-label, small sample size pilot study. Guided by the theories of transformative learning and KAB theory. Intervention in decreasing schizophrenia stigma among nursing students through the online intervention will be more flexible for participants under the COVID-19 pandemic or other inconvenient face-to-face situations. Our result will also inform other population groups in mainland China about the education and contact intervention to decrease stigma of different kinds of mental disorders. Thus, we anticipate this study can guide future full power RCTs in decreasing different kinds of mental disorders stigma.

Research Schedule

Time	Research implement process
July,2022-August,2022	First phase focus group interview
August 2022-October,2022	Second phase Pilot RCT intervention
October 2022-December,2022	Second phase process evaluation
January 2023-February,2022	Data analysis
March,2022-August,2023	Thesis writing

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Appendix 1 Activities of schizophrenia education and contact intervention

Time	Intervention group activities		Control group activities
Week 1 -Week 4	**investigative learning**: nursing students to access information through evidence-based research to discover the information themselves. A guide outline will be used to help nursing students to search information, and this outline may add some more guidance when stage one is done. Nursing students will be asked relevant information during week one, and every two points will require one hour. Students will be asked to spend two hours every two days to search relevant information of schizophrenia. **Collaborative learning activities** **Higher-order thinking activities** **interactive learning activities (Week 1-Week 4)**	**Week one:** 1) Traditional Chinese culture and religion toward mental illness or schizophrenia.2) Reasons of schizophrenia stigma formation. 3) Diagnosis and treatment of schizophrenia. 4) Violent, aggressiveness, and independence about schizophrenia. 5) How to communicate with people who have schizophrenia. 6) Daily stigma toward schizophrenia from media, like newspapers, TV series, movies, news, advertisement. 7) The early warning signs of schizophrenia and how to provide initial help to someone in a schizophrenia crisis and the symptoms, causes, and evidence-based treatments for schizophrenia. Summary: Knowledge and information sharing among students **Week two**: Nursing students interview people who recover from schizophrenia share their experiences throughout the treatment and recovery period and discuss problems with them (a female and a male). Summary: Knowledge and information sharing among students **Week three**: Scenario-based simulation, in the simulation application, students took the roles of the persons with schizophrenia or the nurses, and evaluate their performance, and view the events from a different perspective. Summary: Knowledge and information sharing among students **Week four:** Nursing students' self-criticism after scenario-based simulation, nursing students will be asked to write their opinion about schizophrenia and People with Schizophrenia. After that, nursing students were read their opinions and discussed their assumptions. Self-reflection, critical reflection, and imaginative activities enabled them to examine themselves critically (Theme: What would I feel if I have schizophrenia). Nursing students prepared concept maps for the problems and solutions of a person with schizophrenia in the daily life.	Giving a book about schizophrenia to nursing students in the control group and asking them to finish reading it in a month.

Appendix 2 Questioning route in the focus groups before pilot study

1	What do you know about Schizophrenia (SZ)? (Probe: causal factors, manifestation, prognosis; where you obtained such information?
2	What do you think the life of people with SZ? (Probe: social support> intimate relationship > education> working)
3	What's your experiences of interacting with people with SZ and/or their family members, (if no personal encounter, any story you heard?) [When> what happened> who> what did you say> How do you feel>].
4	What do you think of traditional Chinese culture and religion on schizophrenia? [How do Confucianism, Taoism, and Buddhism view and deal with schizophrenia> What do these religions think the reason of schizophrenia and how to deal with it]
5	What do you think of the pressure experienced by people with SZ compared with other mental illnesses?
6	How do you think the stigma often encountered by people with SZ?
7	What do you think of caring people with SZ in the future?

Appendix 3 Basic socio-demographic Information

Age		
Gender	Male	Female
Ethnic groups (Please fill in your nationality, such as Han, Miao, etc.)		
Marital status	Married	unmarried
Name of university (University name)		
Name of province		
Grade	Year 4	Year 5

Religion (Religion of belief such as Buddhism, Taoism, if not, fill in none) Average families income per year (Ten thousand yuan)		
Friends or family members with mental illness problem	Yes	No
Have you been in contact with a People with Schizophrenia in the past	Yes	No
Did you suffer from mental illness?	Yes	No

Have you participated in similar research before	Yes	No

Appendix 4 Knowledge about Schizophrenia Test (KAST)

1. Schizophrenia is most likely caused by:

A. Brain problem

B. Drug use

C. Evil spirits

D. Pollution

E. Stress

2. A common symptom of schizophrenia is:

A. Being overly happy and having extra energy

B. Overeating and weight gain

C. Sudden anxiety attacks

D. Thinking that others are watching or following

E. Violence, theft, or physical attacks toward others

3. The best person to decide if someone has schizophrenia is a(n):

A. Emergency room doctor

B. Family member

C. Preacher or Minister

D. Psychiatrist

E. School teacher

4. With treatment, the most common long-term outcome

for schizophrenia is:

A. Complete cure

B. Dementia

C. Mild to moderate mental retardation

D. Relief of symptoms, with possibility of relapse

E. Severe mental deterioration

5. Medicines that are used for hearing voices are called:

A. Antibiotics

B. Anti-depressants

C. Anti-psychotic

D. Sedatives

E. Tranquilizers

6. The best place to get information about schizophrenia is from:

A. Books or websites

B. Friends

C. Neighbors

D. Newspapers

E. Preachers or ministers

7. To help deal with stress, most patients with schizophrenia benefit from:

A. Alcohol use

B. Counseling or psychotherapy

C. Cutting back on social activities

D. Pain-relief medications

E. Physical therapy

8. The cause of schizophrenia is most likely related to:

A. Biology

B. Environment

C. Family

D. Personality

E. Society

9. A person strongly believes that the FBI has put a computer chip in his/her body. This symptom is called a:

A. Daydream

B. Delusion

C. Hallucination

D. Phobia

E. Worry

10. A doctor usually makes a diagnosis of schizophrenia by a(n):

A. Blood test

B. CAT scan

C. Interview

D. Reading test

E. Urine test

11. Most people who have schizophrenia need to be in some sort of treatment for:

A. Days

B. Weeks

C. Months

D. Years

E. Not at all

12. The best treatment for the symptoms of schizophrenia is:

A. Medicine

B. Operation

C. Relaxation

D. Strict diet

E. Vitamins

13. People with Schizophrenia benefit most from:

A. Being put into a hospital for years

B. Having fun or exercising

C. Strict schedules with full-time employment

D. Support from family/friends and low stress

E. Vitamins, minerals, or herbs

14. A 19-year-old begins to hear voices and act paranoid several months after graduating from high school. The most likely causes of his symptoms is:

A. Drinking alcohol

B. Genetic tendency toward developing an illness

C. Graduating high school

D. Personality weakness

E. Puberty and adolescence

15. The symptoms of schizophrenia usually begin in which stage of life?

A. As a baby

B. Elementary school years

C. Late teen-age years or young adulthood

D. 40–50 years old

E. 60–70 years old

16. Which of the following is one of the new "atypical" medicines for schizophrenia?

A. Chlorpromazine (Thorazine)

B. Haloperidol (Haldol)

C. Fluphenazine (Prolixin)

D. Trifluoperazine (Stelazine)

E. Quetiapine (Seroquel)

17. Which group is the best source of information and support for family members of People with Schizophrenia?

A. American Medical Association (AMA)

B. Association of Psychologists and Psychiatrists (APAP)

C. Centers for Disease Control and Prevention (CDC)

D. National Alliance for the Mentally Ill (NAMI)

E. Schizophrenia Family Association (SFA)

18. After hospitalization, a patient with schizophrenia would benefit most from:

A. Constant observation by family

B. Eating more meats and breads

C. Follow-up with a preacher or minister

D. Follow-up with an outpatient psychiatrist

Appendix 5 Clinicians' attitudes to people with mental illness (healthcare students and professionals)

Instruction: For each question of 1-16, please tick √ in the appropriate box. The mental illness (illness) referred to here refers to an illness that requires a visit to a psychiatrist.

	strongly agree	agree	somewhat agree	somewhat disagree	disagree	strongly disagree
1. I just learn about mental health when I have to and would not bother reading additional material on it.						
2. People with severe mental illness can never recover enough to have a good quality of life.						
3. Working in the mental health field is just as respectable as other fields of health and social care						
4. If I had a mental illness, I would never admit this to any of my friends because I would fear being treated differently						
5. People with mental illness are dangerous more often than not						
6. Health/social care staff know more about the lives of people treated for a mental illness than do family members and friends						
7. If I had a mental illness, I would never admit this to any of my colleagues because I would fear being treated differently						

E. Getting a full-time job and staying busy

Appendix 6 Reported and Intended Behaviour Scale（RIBS）

Instructions: The following questions ask about your experiences and views in relation to people who have mental health problems (for example, people seen by healthcare staff), For each of questions1-4, please respond by taking one box only.

	Yes	No	Don't know
1. Are you currently living with, or have you ever lived with, someone with a mental health problem?			
2. Are you currently working with, or have you ever worked with, someone with a mental health problem?			
3. Do you currently have, or have you ever had, a neighbor with a mental health problem?			
4. Do you currently have, or have you ever had, a close friend with a mental health problem?			

Instructions: For each of the questions 5-8, please respond by ticking one box only.

	Agree strongly	Agree slightly	Neither agree nor disagree	Disagree slightly	Disagree strongly	Don't know
5. In the future, I would be willing to live with someone with a mental health problem						
6. In the future, I would be willing to work with someone with a mental health problem						
7. In the future, I would be willing to live nearby to someone with a mental health problem						
8. . In the future, I would be willing to continue a relationship with a friend who developed a mental health problem						

Thank you very much for your help

Appendix 7 Jefferson Scale of Empathy-Health Profession Students

Answer instructions: Please circle the answer that best suits your opinion according to the following questions.

The evaluation method of each question adopts a 7-point method, 1 point means very disagree, 7 points means very agree

1_____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7_____

Strongly disagree strongly agree

Items	Item content	1	2	3	4	5	6	7
1	My understanding of how my patients and their families feel does not influence medical or surgical treatment							
2	My patients feel better when I understand their feelings.							
3	It is difficult for me to view things from my patients' perspectives.							
4	consider understanding my patients' body language as important as verbal communication in caregiver-patient relationships.							
5	I have a good sense of humor that I think contributes to a better clinical outcome.							
6	Because people are different, it is difficult for me to see things from my patients' perspectives.							
7	I try not to pay attention to my patients' emotions in history taking or in asking about their physical health.							
8	Attentiveness to my patients' personal experiences does not influence treatment outcomes.							
9	I try to imagine myself in my patients' shoes when providing care to them.							
10	My patients value my understanding of their feelings which is therapeutic in its own right.							
11	Patients' illnesses can be cured only by medical or surgical treatment; therefore, emotional ties to my patients do not have a significant influence on medical or surgical outcomes.							
12	Asking patients about what is happening in their personal lives is not helpful in understanding their physical complaints.							
13	I try to understand what is going on in my patients' minds by paying attention to their non-verbal cues and body language.							

14	I believe that emotion has no place in the treatment of medical illness.							
15	Empathy is a therapeutic skill without which success in treatment is limited.							
16	An important component of the relationship with my patients is my understanding of their emotional status, as well as that of their families.							
17	I try to think like my patients in order to render better care.							
18	I do not allow myself to be influenced by strong personal bonds between my patients and their family members.							
19	I do not enjoy reading non-medical literature or the arts.							
20	I believe that empathy is an important therapeutic factor in medical or surgical treatment.							

Jefferson Scale of Physician Empathy

Scoring Algorithm

A respondent must answer at least 16 (80%) of the 20 items; otherwise, the form should be regarded as incomplete and excluded from the data analysis.

In the case of a respondent with 4 or fewer unanswered items, missing values should be replaced with the mean score calculated from items completed by the respondent.

To score the scale, items 1, 3, 6, 7, 8, 11, 12, 14, 18, and 19 are reverse scored items (i.e., Strongly Agree=1,…Strongly Disagree=7), while the other items are directly scored on their Likert weights (i.e., Strongly Agree=7,…Strongly Disagree=1).

The total score is the sum of all item scores.

The higher the score, the more empathic the behavioral orientation.

Appendix 8 Fidelity checklist

Treatment fidelity strategies	present	absent but should be present	not applicable
Treatment design			
1.Provided information about treatment dose in the intervention condition			
Length of contact session(s)			
Number of contacts			
Content of treatment			
Duration of contact over time			
2.Provided information about treatment dose in the comparison condition			
Length of contact session(s)			
Number of contacts			
Content of treatment			
Duration of contact over time			
3. Mention of provider credentials			
4. Mention of a theoretical model or clinical guidelines on which the intervention is based			
Training providers			
1.Description of how providers were trained			
2.Standardized provider training			
3.Measured provider skill acquisition post-training			
4.Described how provider skills maintained over time			
Delivery of treatment			
1.Included method to ensure that the content of the intervention was being delivered			

as specified (e.g., treatment manual, checklist, computer program)			
2 . Included method to ensure that the dose of the intervention was being delivered as specified (e.g., records number of contact minutes.			
3. Included mechanism to assess if the provider actually adhered to the intervention plan (applies to human providers only?) (e.g., audiotape, observation, self-report of provider, exit interview with participant)			
4. Assessed nonspecific treatment effects			
5. Used treatment manual			
Receipt of treatment			
1.Assessed subject comprehension of the intervention during the intervention period			
2. Included a strategy to improve subject comprehension of the intervention above and beyond what is included in the intervention			
3. Assessed subject's ability to perform the intervention skills during the intervention period			
4. Included a strategy to improve subject performance of intervention skills during the intervention period			
Enactment of treatment skills			
1. Assessed subject performance of the intervention skills assessed in settings in which the intervention might be applied			
2. Assessed strategy to improve subject performance of the intervention skills in settings in which the intervention might be applied			

Appendix 9 Questioning route used in the focus groups

1	How do you evaluate the program？ (The investigative learning， high-order thinking, and collaborative learning activities) [Which part do you like the most or which part you dislike the most, and why?]
2	How do you comment on the ease of finish of the intervention? (The cost of time). Why do you think it is easy or difficult to adherence? >What do you think of the frequency of intervention and the duration of each intervention? >How often do you think is the best frequency and how long do you think is the best duration of intervention?]
3	What do you think of online intervention? [What do you think of the effects of online intervention of these three interventions (investigative learning, higher-order thinking, and collaborative learning activities), and why?]
3	How would you evaluate the questionnaires that you completed in the study? [Are these questionnaires suitable for measuring schizophrenia knowledge, attitudes, behavior, empathy, and stigmatization intention behavior? Why?]
4	Please describe how this intervention affects the ways you think of SZ.
5	What are your suggestions to improve the study design?
6	Is there anything else related to the study that has not been discussed?