Reducing Stigma Among College Students Toward People With Schizophrenia: A Randomized Controlled Trial Grounded on Intergroup Contact Theory

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Objective: Public stigma has been shown to have multidimensional negative impacts on people with schizophrenia (PWS). A new 1-day intervention grounded on the intergroup contact theory was developed and implemented in the current study to reduce college students' stigma toward PWS. We hypothesized that intergroup contact could better alleviate the stigmatizing situation compared with absence of direct contact and different levels of contact may have different functions on stigma reduction. *Methods:* To examine the effectiveness of the intervention, a randomized controlled trial was conducted in Hong Kong with 37 college students participating the intervention. Different levels of contact (zero, moderate, and intimate) with PWS were organized in the intervention group while no direct contact with PWS was introduced in the control group. Participants' knowledge of schizophrenia, stigmatizing attitudes and social distance toward PWS were measured at pre-, post, 1-month and 3-month after the intervention. *Results:* Repeated-measures ANOVA revealed significant changes in all outcome variables in the intervention group with moderate-to-high effect sizes. The results indicated that different levels of contact with PWS had different functions in stigma reduction. Knowledge session without direct contact contributed most to participants' knowledge improvement, and moderate and intimate level of contact led to an obvious improvement in participants' stigmatizing attitudes and social distance changes. Also, psychoeducation and direct contact should be combined to tackle with the 3 components of stigma. *Conclusions:* The current study provided evidence supporting the efficacy of the new intervention based on intergroup contact theory and practical experience for future research design regarding stigma reduction.

Keywords: publicstigma/intervention/intergroupcontact/schizophrenia

Introduction

Public stigma which indicates "the public endorsement of prejudice and discrimination toward minority groups"[1] has existed for centuries in all societies. People with psychotic illnesses are most commonly stigmatized. One of the most devalued illnesses—schizophrenia—is addressed in the current study, as the illness has acute and obvious symptoms often triggering fear in the general public.[2] The existing literature of stigma gives 3 components—cognitive knowledge, attitude, behavior—that should be tackled in order to alleviate the problem of stigma.[3,4] On one hand, correct and comprehensive knowledge of the stigmatized group should be provided. On the other hand, the public's prejudicial attitudes and discriminative behavior should be reduced.[5–8]

It was widely accepted that social contact was an effective method in achieving stigma reduction.[9–12] However, there has not been a clear explanation of the components of stigma that could be improved by contact between the general public and the stigmatized group. Also, the different degrees of contact were not specifically illustrated. Whether stigma reduction is affected by general conversation or intense interaction between the 2 sides needs to be further explored. Furthermore, theory-based interventions designed for alleviating public stigma toward PWS with structured sessions are rare in Hong Kong. To fill these research gaps, a new contact-based intervention to reduce college students' stigma toward PWS was designed and implemented in the current study.

The intervention design was primarily guided by the intergroup contact theory. This theory argues that successful contact between groups provides opportunities for more understanding of each other and thus alleviates perceptions of stigma.[13,14] Four conditions are required to achieve successful contact: equal status between

majority and minority groups; common goals shared by the 2 groups; institutional supports (law, customs, local atmosphere); and cooperation between the 2 groups.[15] The implementation of successful contact could further contribute to knowledge improvement,[16,17] anxiety reduction,[17–20] and increased ability in perspective-taking[21,22] between the 2 sides. The 4 conditions required in the achievement of successful contact were used to guide the current intervention design.

Different levels of contact were set up in different sessions of the current intervention, in order to explore the function of different levels of contact on the stigma reduction outcome. Session 1 is the first level: knowledge session without direct contact between the 2 sides. Only a video clip of about 6 min, introducing core information about schizophrenia such as symptoms and prognosis is provided for participants. Session 2 is the moderate contact level (limited contact is introduced with guided instructions). A guide group discussion is organized to realize interaction between college students and PWS. The final and highest level in session 3 is the intimate level of contact (people from both sides have free conversation with each other). At this level they are invited to work on a cooperative task together which allows for the highest degree of idea exchange and understanding from each other. Specifically, drama performance is introduced at this level of contact as the cooperative task. Practice of psychodrama and drama therapy has shown that the drama method can create a fail-safe and playful environment, and can encourage participants to explore new ideas, self-reflect, and make low-risk changes.[23,24] In the dramatic context, idea sharing of PWS may be accepted in a manner more tolerant than critical, and college student participants may immerse themselves in the given context to think from the other side's perspective.[25–27] The arrangement for the control group is quite similar to the intervention group. Participants in the control group will also attend 3 sessions with knowledge video, guided group discussions, and drama performance. The only difference is that they will not have PWS joining them in the discussion and drama session. They will watch an artwork exhibition including photos, poems, and stories provided by PWS. The reason of using such an active control format is to avoid group gathering effect and to be more attractive to participants.

In comparison with existing stigma-reduction intervention, the current design can be finished in 1 day, guaranteeing efficiency and avoiding a high dropout rate. A pilot trial conducted by the author demonstrated the effectiveness of the current intervention design on stigma reduction toward PWS among college students in Hong Kong. All the 3 components (knowledge, stigmatizing attitude, intended behavior toward PWS) were measured in the pilot study, and all of them were improved after the intervention. The results also revealed different functions of different levels of contact on the improvement of the 3 components of public stigma toward PWS. knowledge session without direct contact contributed most to the participants' knowledge improvement, while the contact session was more effective on improving prejudicial attitudes and behaviors. The reduced stigmatizing level was maintained at the 1-month follow-up test. Although the results from the pilot trial were satisfying, we only collected 17 participants' responses before and after the intervention without having a control group for comparison.

To further examine the effectiveness of the intervention, a randomized controlled trial was conducted among college students in Hong Kong to provide evidence with higher reliability. Based on the results from the pilot study, we hypothesize that in comparison with the control group, participants in the intervention group will report better knowledge, reduced stigmatizing attitudes, and decreased social distance from PWS. We also hypothesize that a higher level of contact between college students and PWS will better contribute to the alleviation of stigmatizing attitudes.

Methods

Participants

This research focuses on the reduction of college students' stigma toward PWS in the context of Hong Kong. The inclusion criteria of participants were current college students aged over 18 who could understand and communicate in Chinese. Qualified self-registered participants were then randomly assigned to the intervention and the control group. Subgroups in the intervention group and the control group were organized with no more than 10 participants each. The PWS were peer specialists diagnosed with schizophrenia currently in remission status and were recruited from local community mental health service institutions. Each subgroup included 1 PWS. Consent forms were collected from the participants before data collection, and they were informed about the purpose and arrangement of the study. The University of Hong Kong's Human Research Ethical Committee approved the study (EA1909033).

With reference to results from previous pilot trials, moderate-to-large effect sizes have been obtained from the results of all outcome measures ($d = 0.52–1.05$). Power analysis using G*Power 3.1.9.4 reveals that for a moderate effect ($d = 0.5$) to be detected at a 5% significance level with the power of 95%, at least 22 participants in total are needed for the current study.[28] The flowchart of the inclusion and randomization is shown in figure 1. Eligible participants are allocated to the intervention and control group randomly based on the random number table created by Excel software. As the intention to attend the intervention group is presented to be higher
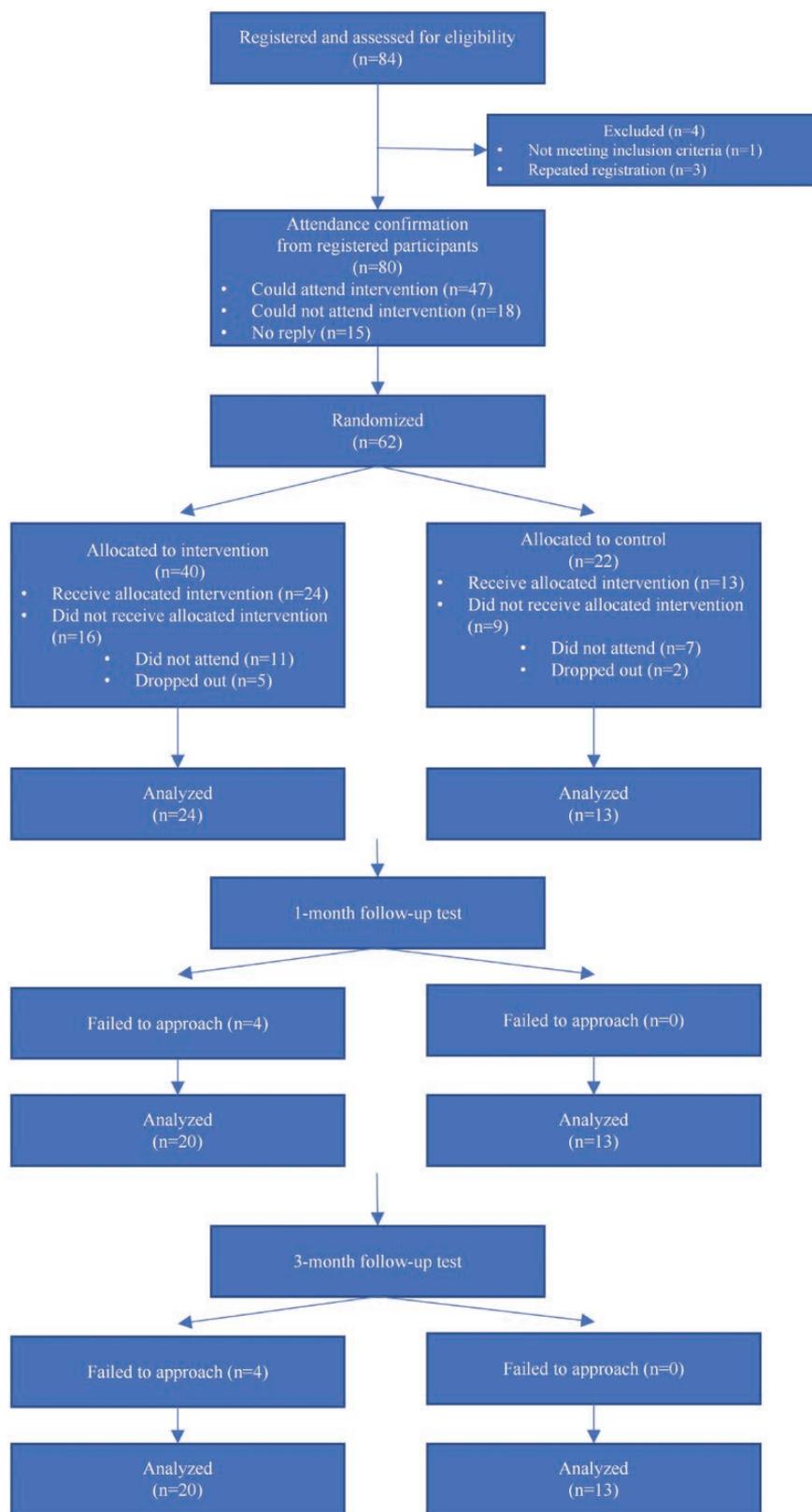
Fig. 1. Flowchart of randomization procedure.

than the control group, unequal randomization with 2:1 ratio is implemented in the current study to guarantee recruitment number and test the effectiveness of the new intervention design. The single-blind method was used in the current study avoiding the allocation result was acknowledged by the participants before the intervention.

Intervention Procedures

Intervention Group. Session 1 is the knowledge session. Participants watch a video clip of about 6 min, introducing core information about schizophrenia such as symptoms and prognosis. The purpose of the knowledge session is to provide participants with correct and direct information of what schizophrenia is like. In this session, contact with the PWS is absent.

Session 2 is the guided group discussion. Each group contains a maximum of 10 college student participants, 1 PWS serving as a peer specialist from local community mental health institution, and 1 instructor. The PWS shares their personal experience of living with schizophrenia. Emphasis on their efforts to beat the illness and their reflections during the whole process is encouraged, with time for questions and answers organized by the instructor at the end. In this session, the level of contact is increased from zero to moderate. The participants' conversation with the PWS is guided in the discussion group and their communication with the PWS is limited.

Session 3 is the cooperative task session. After the group discussion participants and the PWS become more familiar with each other, and participants obtain more knowledge of the PWS's own experience. Based on the improved understanding, the final session of the intervention aims at reinforcing empathy and understanding toward the PWS. Participants are required to focus on the most touching story shared by the PWS. They then work in detail on this story and create a 15- to 20-min drama performance, working with the PWS to obtain more details and adding their own understanding and reflections to the story. Finally, each group presents their play to the other groups. In this session, contact between participants and the PWS is at the highest level, as they need to work together to finish the given task. Participants should not only digest the information of the PWS's personal experience but also view it from their own perspective. In this reflective process, participants may reshape their thoughts, and the increase of understanding and empathy may help to reduce intrinsic stigma perception and attitudes.

Control Group. Session 1 is the same knowledge session as provided for the intervention group.

Session 2 is the self-learning session. Participants enter a photography exhibition on the topic of schizophrenia and the daily life of a PWS. Four sets of photos are provided by the PWS, recording significant people and stories in their life, difficulties experienced, and planning for the future. All artwork reflects the lived experience of the PWS. The purpose of the exhibition is to provide a vivid presentation of schizophrenia and PWS. Participants understand the real life of a PWS, feel the emotion behind the artworks, and provide their own feedback.

Session 3 is the cooperative task session. After viewing the artwork provided by the PWS, each group works together to give a drama performance about schizophrenia. They may focus on touching points from the art exhibition and add their own reflections in the drama performance. Although direct contact with the PWS is not included in this session, the format of the group task is similar to that of the intervention group.

The arrangement for the control group imitated the structure of the intervention group as far as possible. The reason of using such an active control format is to avoid group gathering effect and to be more attractive to participants. At the same time, the key difference with the intervention group is the absence of direct contact with PWS.

Measurements

The current intervention is designed to reduce public stigma toward PWS from 3 perspectives: knowledge improvement, attitude change, and behavioral change. The effectiveness of the intervention was examined in accordance with the 3 perspectives before and after each session in both the intervention and control groups. Measuring instruments included: a knowledge quiz of schizophrenia to test knowledge improvement, the shortened Chinese version of the Community Attitudes toward the Mentally Ill (CAMI-SF) scale to measure participants' attitude change, and the social distance scale (SDS) to test participants' intended behavior change. The purpose of measuring participants' attitudes and intended behavior after each session was to examine whether changes occur and how any changes develop during the intervention. Measurements of the 3 perspectives were also completed 1 and 3 months after the intervention to check whether the improvement in these key outcome variables had been maintained.

Demographic Characteristics. Self-reported demographic characteristics including age, gender, education level, marital status, religion, and previous diagnosis of mental illnesses were collected before the intervention.

Previous Level of Contact. The Level-of-Contact Report[29] was used to ask participants about previous contact with the mentally ill before the intervention. Specific instruction was given, providing a concrete description of the mentally ill as PWS. There were 12 descriptions of previous contact experience representing 12 levels of contact. Higher levels of contact refer to closer contact with PWS. The participants' level of contact was determined by the behavior with the highest contact level.

Knowledge of Schizophrenia. A knowledge quiz with 12 true-or-false items was developed to test participants' understanding of schizophrenia, with a total score of 12. The quiz content covered diagnosis, symptoms, treatment, prevalence, and common misunderstandings of

schizophrenia. Participants choosing the correct answer obtained 1 point, while choosing the wrong answer had a point deducted. No point was gained from choosing the option *Unsure*. This scoring method was used to discourage random guessing.

Public Stigma. A validated short-form was used to examine the participants' attitude toward PWS. The Chinese version of the CAMI-SF scale retains the 4-subscale structure and the 5-point format. It comprises 17 items with 5 items under the authoritarian (AT) subscale, 3 items under the benevolence (BN) subscale, 4 items under the social restrictiveness (SR) subscale, and 5 items under the community mental health ideology (CMHI) subscale. Accordingly, the total score of each subscale was 25, 15, 20, and 25. Specific instruction is given in the scale, providing a concrete description of the mentally ill as PWS. Higher scores of AT and SR subscales indicate a more stigmatizing attitude, while higher scores of BN and CMHI subscales indicate a less stigmatizing attitude. The validation was conducted by the author before application in the current study. The reliability of the short-form Chinese version of the CAMI scale yielded McDonald's Omega from 0.58 to 0.76.

Intended behavior. The SDS[30] was used to examine the participants' intended behavior toward PWS. The 4-point Likert scale included 7 items asking about the participants' attitudes to different social contexts (eg, living next door to the mentally ill). Specific instruction was given, providing a concrete description of the mentally ill as PWS. The score range of the SDS was 0–3. Higher scores indicated a greater distance from PWS. The reliability of the SDS yielded Cronbach's alpha coefficients of .75 to .76 among college samples.[31,32]

Data Analysis

Analysis was conducted using SPSS version 23. Within-group changes in the scores of participants' knowledge, attitude, and intended behavior from the baseline to 3 months after intervention were compared using repeated-measures ANOVA. Cohen's *d* was calculated for each outcome variable of the intervention and control group, respectively, to obtain the power of changes brought by the intervention. Multivariate analysis was also conducted to examine the predictability of demographic variables on the outcome variables. To evaluate the efficacy of the intervention, Time × Group interaction effects were examined by repeated-measures MANOVA.

Results

Demographic Characteristics

The intervention group comprised 29 participants, and the control group had 15. However, 5 participants in the intervention group and 2 in the control group dropped out early, giving 37 participants in total. At the 1-month and 3-month follow-up tests 33 participants were approached. Of the 37 participants, all were current college students with a mean age of 28.54 years (SD = 8.28). Of these students, 28 were female and 9 male, none of whom had a previous diagnosis of mental illnesses. Most of them had low contact levels with PWS previously (N = 15, contact level ranking under 4), see table 1. No significant difference on any demographic or outcome variables could be found at the baseline measurement between the intervention and control group, except in age ($t(35) = -3.47$, $P = .001$) and marital status ($X^2(1, N = 37) = 5.58$, $P = .02$). Detailed demographic information of the valid participants is listed in table 1.

Within-Group Comparison: Knowledge, Attitudes, and Intended Behavior Toward PWS

Intervention Group. The results of repeated-measures ANOVA revealed significant changes in all outcome variables in the intervention group from T0 (preintervention) to T3 (postintervention), except for the scores of the AT subscale. Moderate-to-high effect sizes were obtained for each outcome variable. Following the intervention, participants had increased their knowledge about schizophrenia, and their stigmatizing attitudes and social distance toward PWS were significantly reduced (table 2).

The mean knowledge scores differed significantly between T0 and T3 ($F(3, 66) = 21.00$, $P < .001$), yielding an extremely large effect size with $d = 1.05$. The scores increased most rapidly between T0 and T1 ($P < .001$) and such a significant increase could still be found a month (T4) after the intervention ($t(19) = -5.48$, $P < .001$).

The mean scores of the 3 subscales (BN, SR, and CMHI) of the CAMI-SF scale also presented significant changes after the intervention. There was a significant reduction in scores for the SR subscale ($F(3, 66) = 7.44$, $P < .001$). A significant increase was also obtained from the other 2 subscales of CAMI-SF: the BN subscale ($F(3, 66) = 7.16$, $P < .001$) and CMHI subscale ($F(3, 66) = 11.89$, $P < .001$). The results showed that the most obvious changes of the BN score and the SR score both occurred at T2 ($P = .005$ and .013, respectively). The scores of the SDS again indicated a significant reduction after the intervention ($F(2.05, 45.12) = 17.92$, $P < .001$) with an extremely large effect size ($d = 1.04$). Although there were only slight changes between the 4 time points, the results still showed significant changes between T0 and T1 ($P = .047$), and T1 and T2 ($P = .007$). However, no significant improvement on the scores of the 3 subscales and SDS could be found at follow-up tests in comparison with their baseline scores.

Age, gender, education level, marital status, and previous contact levels with PWS were found to have

Table 1. Demographic Characteristics and Outcome Measures of Participants at Baseline

Demographic Variables Frequency (%)		Group		
		Intervention Group ($n = 24$)	Control Group ($n = 13$)	P
Age	18–20	3 (12.5%)	0	.001*
	21–25	13 (54.2%)	3 (23.1%)	
	26–30	5 (20.8%)	2 (15.4%)	
	31–35	2 (8.3%)	3 (23.1%)	
	36 and above	1 (4.2%)	5 (38.5%)	
	Mean (SD)	25.5 (5.25)	34.15 (10.00)	
Gender	Female	19 (79.2%)	9 (69.2%)	.5
	Male	5 (20.8%)	4 (30.8%)	
Education	Undergraduate	7 (29.2%)	1 (7.7%)	.29
	Master	13 (54.2%)	10 (76.9%)	
	Doctor	3 (12.5%)	2 (15.4%)	
	Missing	1 (4.2%)	0	
Marital status	Single	20 (83.3%)	6 (46.2%)	.02*
	Married	4 (16.7%)	7 (53.8%)	
Religion	None	16 (66.7%)	7 (53.8%)	.45
	Christian	6 (25%)	5 (38.5%)	
	Christian and Buddhism	0	1 (7.7%)	
	Taoism	1 (4.2%)	0	
	Catholic	1 (4.2%)	0	
Score of previous contact level	0–4	11 (45.8%)	4 (30.8%)	.61
	4–8	6 (25%)	5 (38.5%)	
	8–12	7 (29.2%)	4 (30.8%)	
Diagnosis of MI	None	24 (100%)	13 (100%)	NA
Outcome Variables Mean (SD)		Intervention Group ($n = 24$)	Control Group ($n = 13$)	P
Quiz		5.04 (2.63)	5.38 (2.69)	.71
CAMI-AT		10.46 (2.50)	11 (2.61)	.54
CAMI-BN		12.58 (1.50)	11.69 (1.89)	.13
CAMI-SR		7.58 (2.48)	8.92 (3.03)	.16
CAMI-CMHI		19.67 (2.30)	19.54 (2.76)	.88
SDS		1.07 (0.62)	1.19 (0.49)	.57

Note: MI, mental illness; AT, authoritarian; BN, benevolence; SR, social restrictiveness; CMHI, community mental health ideology; SDS, social distance scale.
*indicates $P < 0.05$ significant difference occured between the intervention and the control group.

associations with changes in outcome variables. Specifically, the 18–20 age group presented lower social distance scores than those in the 31–35 age group at T1 ($F(4, 13) = 4.71$, $P = .01$). Male participants obtained lower BN scores than female participants at T1 ($F(1, 16) = 8.53$, $P = .01$). In comparison with participants who had a high contact level with PWS before the intervention, those with a low contact level presented lower SR scores at T1 ($F(2, 15) = 4.06$, $P = .04$).

Control Group. The results of repeated-measures ANOVA also revealed significant changes in knowledge scores, SR scores, CMHI scores, and SDS scores in the control group after the intervention. Moderate-to-high effect sizes were obtained for these outcome variables (table 3).

The mean knowledge scores differed significantly between T0 and T3 ($F(3, 33) = 6.23$, $P = .02$). The scores of

the 2 subscales SR and CMHI also presented significant changes after the intervention. There was a significant reduction in scores of the SR subscale ($F(2.12, 23.34) = 5.06$, $P = .014$). A significant increase was obtained in the CMHI subscale ($F(3, 33) = 6.11$, $P = .002$). All significant improvement could only be found after the intervention (T3). For the CMHI scores, significant changes were found 3 months after the intervention (T5) compared with the baseline scores as well. The scores of the SDS again indicated a significant reduction after the intervention ($F(1.50, 16.54) = 7.70$, $P = .007$). Significant changes could also be found a month after the intervention (T4) compared with the baseline scores ($P = .02$).

Between-Group Comparison: Knowledge, Attitudes, and Intended Behavior Toward PWS

When comparing changes of all outcome variables between the intervention group and the control group,

Table 2. Means and Effect Sizes at Different Time Points—Within-Group Comparison of the Intervention Group

N = 24	T0 (Pre)		T1 (After Session 1)		T2 (After Session 2)		T3 (Post)		T4 (1-month N = 20)		T5 (3-month N = 20)		F (T0–T3)	P	Cohen's d (T0–T3)
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
Quiz	5.04	2.63	8.61	2.55	8.57	2.45	8.12	2.21	8.50	2.07	7.20	3.55	21.00	<.001	1.05
CAMI-AT	10.46	2.50	9.57	2.41	10.13	2.34	9.75	2.35	10.35	2.48	10.00	2.38	2.60		0.36
CAMI-BN	12.58	1.50	12.26	1.57	13.26	1.51	13.33	2.01	12.75	1.94	13.00	2.152	7.16		0.52
CAMI-SR	7.58	2.48	7.48	2.64	6.39	2.27	6.04	2.48	7.00	2.18	7.50	2.4	7.44		0.66
CAMI-CMHI	19.67	2.30	20.78	2.75	21.57	2.52	21.75	2.74	20.55	2.87	20.15	2.76	11.89		0.99
SDS	1.07	0.62	0.94	0.63	0.75	0.65	0.72	0.65	0.88	0.58	0.97	0.53	17.92		1.04

Note: AT, authoritarian; BN, benevolence; SR, social restrictiveness; CMHI, community mental health ideology; SDS, social distance scale.

Table 3. Means and Effect Sizes at Different Time Points—Within-Group Comparison of the Control Group

N = 13	T0 (Pre)		T1 (After Session 1)		T2 (After Session 2)		T3 (Post)		T4 (1-month N = 13)		T5 (3-month N = 13)		F (T0–T3)	P	Cohen's d (T0–T3)
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
Quiz	5.38	2.69	8.25	3.14	7.62	2.63	8.15	2.54	7.00	3.27	7.21	2.87	6.23	.02	1.13
CAMI-AT	11.00	2.61	10.00	2.99	10.00	2.83	9.46	2.57	10.15	2.73	9.36	3.27	2.78	.057	0.68
CAMI-BN	11.69	1.89	12.08	1.88	11.85	1.86	12.08	1.98	11.38	2.18	12.5	1.79	1.14	.35	0.45
CAMI-SR	8.92	3.03	8.50	2.51	7.69	3.04	7.31	2.75	8.08	2.99	7.71	2.614	5.06	.014	0.89
CAMI-CMHI	19.54	2.76	20.58	2.50	21.15	2.76	21.85	2.58	20.69	2.66	21.14	2.538	6.11	.002	0.51
SDS	1.19	0.49	1.13	0.34	0.89	0.44	0.88	0.44	1.00	0.45	1.03	0.43	7.70	.007	0.85

Note: AT, authoritarian; BN, benevolence; SR, social restrictiveness; CMHI, community mental health ideology; SDS, social distance scale.

Table 4. Between-Group Comparison of Intervention and Overall Efficacy on Outcome Variables Between the Intervention and the Control Group

| Outcome Variables | Intervention Efficacy (Between Groups) | | | | Overall Efficacy (T0–T4) | | |
| | T2 vs T2 | | T3 vs T3 | | | | |
	t	P	t	P	F	Time × Group (P Value)	η_p^2
Quiz	1.09	.28	−0.04	.97	0.25	0.623	0.008
CAMI-AT	0.15	.88	0.35	.73	0.76	0.391	0.025
CAMI-BN	2.48	.02	1.47	.15	2.02	0.166	0.065
CAMI-SR	−1.46	.15	−1.43	.16	4.36	0.046	0.131
CAMI-CMHI	0.45	.65	−0.1	.92	0.13	0.725	0.004
SDS	−0.68	.5	−0.79	.44	3.51	0.071	0.108

Note: AT, authoritarian; BN, benevolence; SR, social restrictiveness; CMHI, community mental health ideology; SDS, social distance scale.

a significant Time × Group effect was revealed in the participants' BN and SR scores (table 4). At T2, participants in the intervention group had higher BN scores than those in the control group ($t(34) = 2.48$, $P = .018$). Significant differences could also be found between the 2 groups in the SR scores ($F(1, 29) = 4.36$, $P = .046$). Specifically, after the intervention (T3), participants in the intervention group had lower SR scores compared to those in the control group ($P = .047$).

Discussion

The findings of this randomized controlled trial offer evidence that a 1-day intervention with different levels of intergroup contact can contribute to stigma reduction toward PWS. When we analyzed the results of within-group changes in the intervention group, significant improvements were found in all 3 components of public stigma. In the participants' knowledge increase, CMHI scores, and social distance scores, the magnitude of change reached large effect sizes ranging from 0.99 to 1.05. When comparing changes of all outcome variables between the intervention group and the control group, a significant Time × Group effect was revealed in the participants' BN and SR scores. For each participant, score changes in knowledge, stigmatizing attitudes, and discriminatory behaviors before and after the intervention were statistically significant. This finding supported our assumption that short-term contact-based intervention could contribute to stigma reduction toward PWS among college students.

From the mean score changes of the intervention group at different measuring points, we found that the increase in participants' knowledge mainly resulted from the knowledge session. In fact, mean knowledge scores after sessions 2 and 3 gradually decreased. We could infer from this result that education methods may be more effective than contact methods in equipping participants with a knowledge of schizophrenia. As our participants were all

current college students, the quiz format may be better adapted for them to digest provided information. Such improvement on knowledge could still be maintained 1 month after the intervention. However, more information of schizophrenia did not mean more understanding. As shown in figure 2, the BN scores dropped from the baseline after the knowledge session. As the knowledge session introduced the long-term suffering and low recovery rates of PWS, it may arouse anxiety and fear in participants. This may help explain the inadequacy of using education content only in stigma reduction projects.

We may further infer that the changing of participants' attitudes toward PWS was an incremental process, as shown in figure 2. Both the BN and CMHI scores of the intervention group increased gradually after each session of the intervention, and SR and SDS scores decreased gradually between T1 and T3. Specifically, significant changes in BN, SR, and SDS scores occurred after session 2, and the significant changes of CMHI scores occurred after the whole intervention. In other words, the increased level of contact and cooperation between participants and PWS motivated the reduction in stigmatizing attitudes. This finding echoed the necessity of establishing successful contact. Familiarity and acceptance between the 2 sides required a cumulative process. The increased level of contact provided the possibility of breaking the stereotype and receiving first-hand information for all group members. Moreover, we found that the AT score of the intervention group even increased compared with previous measuring points, which reminded us that even contact was introduced, the moderate contact level may still be inadequate for changing the deep-rooted stigmatizing attitudes. As a result, we argued that psychoeducation without direct contact and the purposeful contact session needed to be combined together to achieve the goal of stigma reduction of all the 3 components.

Although the control group presented a significant increase in 3 outcome perspectives (knowledge, attitudes, and intended behavior); however, their changing scope
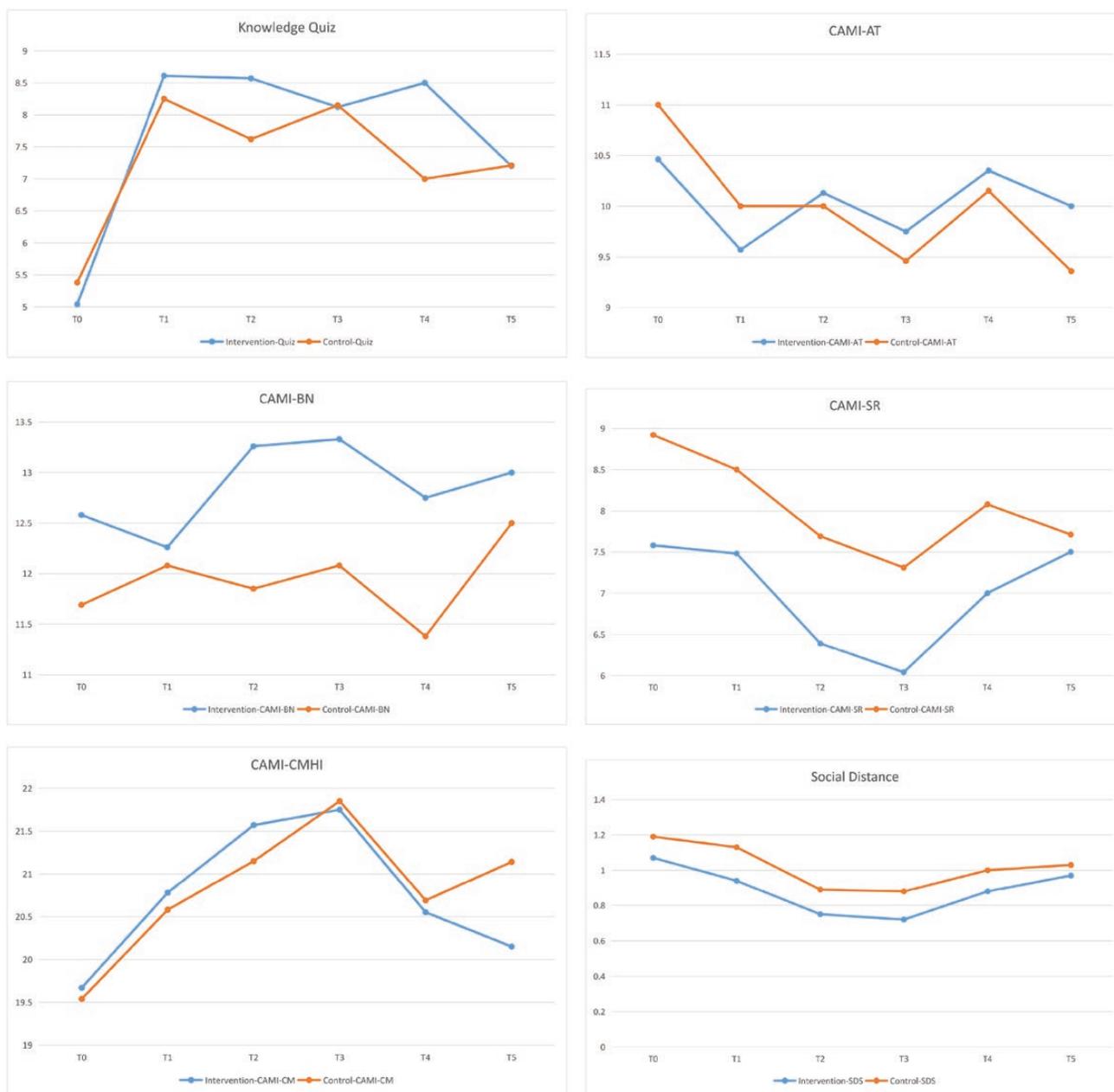
Fig. 2. Mean scores of knowledge quiz, CAMI-SF scale, and SDS at 6 time points. *Note*: AT, authoritarian; BN, benevolence; SR, social restrictiveness; CMHI, community mental health ideology; SDS, social distance scale.

was mostly lower than the intervention group. This indicated that even if the control group benefitted from certain therapeutic effects on stigma reduction, improvement in the 3 components of public stigma was still limited. Also, the statistically significant changes in the control group could only be obtained at T3, while we found changes throughout the intervention process in the intervention group. It could be claimed that direct contact was more effective in the participants' attitude change than viewing the artwork exhibition in the control group. The former emphasized an interactive and positive learning process, compared to a more passive format of the latter. However, it is quite interesting that

the reduced social distance and improved acceptance of community health services in the control group could still be found at 1-month and 3-month follow-up test, respectively. Such finding may provide a new idea that the combination of artwork exhibition and drama performance could be a better design to guarantee both immediate and long-term therapeutic effect of the intervention.

We also examined the relation between previous contact with PWS and restrictive attitudes in the intervention group, and found that participants who had less contact with PWS showed a less restrictive attitude after session 1. This may also support our intervention design emphasizing the establishment of successful contact.

Although some participants may have had previous contact with PWS, the context and experience could be quite different and possibly even negative. Thus, receiving more information on schizophrenia could intensify any negative memories, suggested by higher SR scores than in participants who had had less contact with PWS. For this reason, the design of our intervention aimed to fulfill the core elements of successful contact to achieve the goal of stigma reduction.

Limitations

The limitation of the current study was mainly the sample size. We only had validated responses from 37 participants and a larger sample size would be required to prove the effectiveness of the current intervention design. Moreover, in the current study we only had 9 male participants. More male participants should be recruited in order to better analyze gender influence on stigma reduction outcome. As the results indicated that male participants usually presented less tolerant attitudes toward PWS, the feedback from male participants should be emphasized in the future implementation. Also, a qualitative study could be added after the intervention to further explore participants' attitude changes. The mechanism that triggers participants' attitude changes could be discussed and the results could further guide the revision of the current intervention design. Furthermore, we only focused on one type of severe mental illness—schizophrenia in the current intervention and participants were only recruited among college students. The 2 sides of contact could be more diversified in a future study.

Conclusion

To conclude, the current study provided evidence supporting the efficacy of stigma reduction intervention based on intergroup contact theory. The results indicated great improvement in the participants' knowledge, attitudes, and intended behavior toward PWS. The magnitude of changes yielded large effect sizes for all the 3 components. The intervention could be finished within 6 h, guaranteeing efficiency of implementation.

We found that different levels of contact with PWS have different functions in the reduction of stigma components. Knowledge session without direct contact contributed most to participants' knowledge improvement, but may not be effective for attitude and intended behavior changes. However, opposite changes such as less tolerant attitudes could also be gained through a knowledge session. From our findings we argue that providing only an educational program might not be an optimal design for the reduction of stigmatizing attitudes. By examining the changing trend at each of the measuring points, we could see that the changing of participants' attitudes toward PWS was an incremental process, as empathy and understanding toward PWS increased gradually after each session of the intervention. Statistically significant changes only occurred after session 2. Therefore, the contact session and the interactive task session contributed most to the participants' attitudes and intended behavior changes. As a result, contact is a compulsory element to be included in the stigma reduction program. In comparison with the art exhibition design created by PWS, the direct contact and cooperative task design in the intervention group brought about greater understanding and a reduction in hostile attitudes toward PWS. This further supported our assumption that direct contact was the key element in improving stigmatizing attitudes and shortening social distance between college students and PWS. Findings from the current study could provide practical experience for future research design regarding stigma reduction. Furthermore, the current effective and efficient intervention design could be tested in other fields to clarify misunderstandings or alleviate stigma in the future.

Acknowledgments

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