

Research Article

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Effectiveness of a peer-facilitated, recovery-focused self-illness management program for adults with first-episode psychosis: A randomized controlled trial

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Abstract

Background. Psychosocial interventions for people with mental illness are increasingly focusing on facilitating recovery and self-care. Despite evidence from Europe on the short-term effects of recovery self-planning programs for people discharged from crisis resolution teams, similar programs and supporting evidence in other countries or healthcare contexts are lacking, particularly regarding cultural adaptation and long-term assessment. This randomized controlled trial compared a 4-month peer-facilitated, recovery-focused self-illness management (Peer-RESIM) program for Chinese adults with first-episode psychosis with psychoeducation (PE) and treatment as usual (TAU).

Methods. Patients ($N = 198$) were recruited from four Integrated Community Centres for Mental Wellness in Hong Kong and randomly assigned to the Peer-RESIM, PE, or TAU group (66/group). The primary outcomes were recovery and functioning levels; the secondary outcomes were psychotic symptoms, problem-solving ability, rehospitalization rate, and service satisfaction. Assessments were conducted at baseline and immediate, 9, and 18 months post-intervention.

Results. The generalized estimating equation test revealed that the Peer-RESIM group reported significantly greater improvements in recovery, functioning, problem-solving ability, psychotic symptoms, average duration of rehospitalizations, and service satisfaction ($p = 0.01$ – 0.04 , small to large effect sizes) than the TAU group at all three posttests and the PE group at 18 months postintervention.

Conclusions. The Peer-RESIM can enhance long-term recovery and self-care in adults with early-stage psychosis.

Introduction

People with early-stage or first-episode psychosis (FEP) often face overwhelming stress due to unpreparedness for the illness and its disturbing behaviors, which disrupt activities of daily living and functioning [1]. Without early psychosocial intervention or good adherence to antipsychotic medication, two thirds of patients with FEP will repeatedly relapse and be re-hospitalized within the first 3 years postdiagnosis [1, 2].

Despite their effectiveness for symptom control, antipsychotic medications are associated with adverse effects (e.g., weight gain, metabolic change) [3], poor adherence [4], and poor functional recovery [5]; accordingly, psychosocial interventions that facilitate recovery and minimize long-term disabilities are receiving attention [6]. Several psychosocial interventions for FEP have demonstrated short-term reductions in psychotic symptoms and relapse; however, evidence regarding long-term outcomes (e.g., recovery and remission) and functional benefits remains limited [7], demonstrating the need for research on innovative psychosocial interventions [8, 9].

Increasingly, recovery-based interventions are shown to enhance patients' self-management of psychiatric illnesses. The recovery-oriented approach emphasizes the individual's need to set well-being goals and manage their illness effectively. As a key intervention component, patients use self-help strategies to control psychosis symptoms independently, with structured guides and back-up support from therapists or professionals [10]. Recovery-based self-help or self-illness management interventions focus on identifying and establishing individual strengths and self-care strategies and overcoming challenges through empowerment, hope, and optimism regarding positive changes in daily behaviors and functioning [11, 12]. Studies have demonstrated the preliminary benefits of recovery-based interventions for FEP [13, 14]; however, their accessibility and long-term effects, particularly regarding self-illness management and psychosocial functioning, remain uncertain [15].

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Support from peers recovering from similar illnesses has increasingly been included in mental health interventions in Australia [16] and the United Kingdom (UK) [17]. A recent UK trial demonstrated significant effects of CORE, a peer-led recovery intervention for severe mental illness, on reducing hospital admission and prolonging the duration to readmission at a 12-month follow-up [18]. Accordingly, the researchers suggested that a peer-support worker (PSW)-facilitated, recovery-focused self-management program with a guided personal recovery plan and booklet could improve patients' recovery from serious early-stage mental illness (e.g., psychosis) by enhancing their self-illness care through increasing perceived peer support. Additional trials with diverse patient populations, strong adaptation to local mental healthcare services and resources, more personalized recovery and self-care planning, higher treatment fidelity, and longer term follow-up are recommended.

Informed by a few controlled trials involving early-stage psychosis care, we adapted the CORE manual to local mental healthcare resources/services, life situations (used in case scenarios), and the behaviors of Chinese populations (e.g., less active help-seeking and emotional expression) [19–21]. The modified, translated CORE program was pilot tested among 75 patients with recent onset psychosis (<5 years) [22], with the CORE group showing significantly greater improvements in recovery and time to hospitalization over 4 months. In verbal feedback, participants recommended increases in sharing of coping and rehabilitation experiences, personal assistance with challenging life situations, and focused family/interpersonal skills in later sessions. The current randomized controlled trial (RCT) aimed to test the effects of this culturally adapted, peer-facilitated, recovery-focused self-illness management (Peer-RESIM) on recovery, functioning, and other health outcomes in Chinese adults with FEP over 18 months.

Methods

Trial design

A multicenter, three-arm, repeated measures, parallel-group RCT was conducted to compare the effects of Peer-RESIM with psychoeducation (PE) and treatment as usual (TAU) in adults with FEP. The trial protocol was registered at ClinicalTrials.gov (NCT06487195). Ethical approval was received from the Joint CUHK-NTEC Clinical Research Ethics Committee (Ref. No. CREC 2202.012).

Participants and settings

The study was conducted in four Integrated Community Centres for Mental Wellness (ICCMWs), which serve over 30% (~8000) of families of people with FEP ($N = 2000$) and other common mental disorders across Hong Kong. Simple random sampling was used to select participants. The inclusion criteria were (a) Hong Kong Chinese residents aged 18–60; (b) within 3 years of illness onset and clinical primary diagnosis of FEP according to the DSM-V criteria (American Psychiatric Association 2013); (c) ability to understand Cantonese/Mandarin; and (d) Global Assessment of Functioning score ≥ 51 [23]. The exclusion criteria were: (a) recently received/currently receiving another psychosocial or psychoeducation intervention; (b) comorbid learning/cognitive/personality disorder and/or clinically significant medical disease; or (c) visual/language/communication difficulty/disorder.

Randomization, blinding, and concealment

An independent statistician generated four lists of computer-generated random numbers. A research assistant randomly allocated participants to one of three study arms. For group allocation, four sets of computer-generated random permuted blocks of six participants were used. To minimize reporting biases, participants were not informed about their intervention group assignment, or which intervention was hypothesized to be superior. To minimize contamination bias, participants were asked not to disclose their intervention participation with other ICCMW service users. Post-intervention outcome assessments were completed by a research assistant blinded to group and intervention assignments.

Sample size

A priori sample size estimation was based on previously published relevant effect sizes for recovery and functioning (Cohen's $d = 0.46$ – 0.68) [19, 22, 24]; we adopted a conservative effect size of 0.46. The required sample size to achieve this effect at a study power of 0.80, with a two-sided $p < .05$ and nonsphericity correction $\epsilon = 1.0$ (adjusting for design effects and between-center differences), was 56/group. Considering an average attrition rate of 15% [13, 19, 22], 66 participants/group ($N = 198$ patients) were recruited.

Interventions

Peer-RESIM

The Peer-RESIM program was based on the modified CORE program workbook and manual [24] and psychoeducation programs developed and validated by the research team [22, 24]. The self-care and personal plan workbook for recovery contained four key components: *personal recovery goals, plans to re-establish community functioning and support networks following a crisis, identifying early warning signs and creating a relapse prevention plan, and strategies and coping resources for problem solving and maintaining well-being*. After constructing a personal recovery and self-care plan, participants were facilitated by trained PSWs, namely ex-patients with lived experience with psychosis and active rehabilitation and recovery. Participants completed the workbook at their own pace, with support from the facilitator in facilitating recovery plans and self-care actions. Participants met in groups with peer facilitators for 10 sessions (interval: 7–12 days) over 4 months.

Eight PSWs (two per center) were randomly selected from current volunteer/part-time-employed PSWs (six to eight available per center) willing to serve as peer facilitators. Each Peer-RESIM subgroup (10–12 participants each) was assigned to one case manager (registered nurse/social worker) at the ICCMW who offered resources and crisis intervention upon peer facilitators' request. As Chinese people prefer hands-on experiences to information and/or emotion sharing alone, group members were encouraged to contact and support each other and rehearse self-management of life problems [18]. Table 1 outlines the Peer-RESIM program.

PE

The PE group intervention (10–12 participants/subgroup) was led by a psychiatric nurse with psychiatric rehabilitation and PE group facilitation experience, guided by a validated PE group protocol for psychotic disorders based on McFarlane et al.'s [25] and the research team's RCTs [19, 21]. The program comprised 10 weekly/biweekly 2-hour sessions (over 4 months) with five key components: introduction and goal setting; education on psychosis,

Table 1. Overview of the structure and content of the peer-facilitated, recovery-focused self-illness management program (Peer-RESIM)

Theme/session	Goals/objectives	Content
Sessions 1 and 2 <ul style="list-style-type: none"> - Orientation and engagement into the group program - Understanding psychosis, its treatment, and care 	Session 1. Orientation and engagement <ul style="list-style-type: none"> - Introduction of the problem-solving, self-management manual - Identifying and clarifying peer support worker's role, treatment goals, and objectives Session 2. Information on psychosis care and personal recovery <ul style="list-style-type: none"> - Providing information about psychosis and illness-related behaviors - Introducing and clarifying the importance of illness self-care - Orientation to personal recovery goals setting and action plans 	<ol style="list-style-type: none"> (1) Rationale for using self-care or self-management and problem-solving based intervention for psychosis care (2) Expected roles and responsibilities of service users and peer support (3) Resources for important information in the workbook/manual, schedule of the self-management program, and telephone support provided by the peer-support worker, or a case manager, as needed (4) Introduction of the role of group members, peer support, and psychological preparation for psychosis care (5) Participants' self-assessment about their (mis-)understanding of psychosis and identifying their psychosocial and rehabilitation needs (6) Information about medications, self-management of their illness, and community services (7) Setting up personal recovery goals and plans to reestablish community functioning and support network, particularly following a crisis or pre-relapse psychotic condition
Sessions 3 and 4 <ul style="list-style-type: none"> - Accepting and maintaining long-term self-care for own well-being - Learning problem-solving skills in personal recovery plans and actions 	Session 3. Best understanding about psychosis condition and the use of problem-solving strategies <ul style="list-style-type: none"> - Further understanding of first-episode psychosis and its care - Appreciate how to use problem-solving framework Session 4. Working through emotions, self-care challenges and effective coping skills <ul style="list-style-type: none"> - Assisting patients to work through their emotions - Reflecting upon how they are currently looking after themselves - Evaluating current coping strategies used and developing effective coping and self-care alternatives 	<ol style="list-style-type: none"> (1) What is psychosis? (e.g., symptoms and causes, types and myths, stereotypes and stigma; role of a patient, and peers; common experiences of the illness) (2) Introduction to problem-solving approaches, self-assessment, styles and strengths and weaknesses of each approach (3) Understand most patients' emotions and well-being; identify key areas of self-care difficulties and stressors encountered; using the ADAPT method in problem solving: A – Adopt a positive, optimistic attitude toward the problem; D – Define correctly the problem by writing all the facts, identify the obstacles to solving the problem, and specify a realistic goal; A – Think of a variety of alternative ways for overcoming the problem and achieving the goal; P – Predict the consequence that may occur for each alternative; T – Try out the problem-solving approach in “real-life” and evaluate if the chosen approach works
Sessions 5 and 6 <ul style="list-style-type: none"> - Developing coping skills and effective communication and relationships 	Session 5. Coping with illness and self-care for maintaining well-being <ul style="list-style-type: none"> - Examining effective interpersonal interactions, equip them about how to self-manage the illness-related problems when lacking motivation, socially withdrawn, engaging in risky and unstrained behaviors, and to explore ways for caregivers to respond to suicidal behaviors, depression and anxiety, suicide and self-harm Session 6. Understanding expressed emotion, effective communication, and symptom management <ul style="list-style-type: none"> - Understanding ways and levels of expressed emotion and negative impacts on patients; effective communication and relationships with family/peers; coping with hallucinations, delusions and aggressive behaviors, the negative symptoms (e.g. lack of motivation, social withdrawal); managing the side-effects of medications 	<ol style="list-style-type: none"> (1) Learn/Practice effective communication skills and motivational techniques; assist in assessment and prevention of social withdrawal, risky behaviors (e.g., aggression and harms), disturbed sleep and psychotic symptoms with problem-solving approach; review on their attitudes toward caregiving and conflicts with patients; manage weight gain, reluctant to take medication, substance misuse; depression, and suicidal ideas (2) Understanding expressed emotion and negative impacts on patients; effective communication and relationships with family/peers; coping with hallucinations, delusions and aggressive behaviors, the negative symptoms (e.g. lack of motivation, social withdrawal); managing the side-effects of medications
Sessions 7 and 8 <ul style="list-style-type: none"> - Learning self-awareness and motivating help-seeking - Creating a relapse prevention plan 	Session 7. Learning self-care, relaxation and alertness of signs for danger or behavioral changes, and seeking helps <ul style="list-style-type: none"> - Identifying early warning signs and creating a relapse prevention plan Session 8. Development of relapse prevention strategies and plans <ul style="list-style-type: none"> - Successfully coping with symptoms and self-managing the early signs of relapse 	<ol style="list-style-type: none"> (1) Sharing of life experiences in crisis intervention and management; discuss early warning signs and appropriate reactions/responses; acting on and evaluation of the real-life practice of coping skills supported by the facilitator (peer-support worker) (2) Promoting well-being of patients with emotional/practical support; understanding of relapse prevention, medication use, stress management, and family support; reinforcing the use of problem-solving approach
Sessions 9 and 10 <ul style="list-style-type: none"> - Reinforcing within group and home practices, reviewing progress - Developing future plans 	Session 9. Getting the best out of support services <ul style="list-style-type: none"> - To enable patients to access support services and get most out of these services Session 10. Preparation for future <ul style="list-style-type: none"> - Self-reflection of learning experiences and discussing and reviewing plan for future 	<ol style="list-style-type: none"> (1) Patients' rights and responsibilities, access to community support services; confidentiality and seeking financial support; communicating and building relationships with service providers and framework for asking questions from peer support worker and service providers; asking advice and making complaints/voicing out concerns; understanding approaches to problem solving and practicing its related activities (2) Review of self-care, self-help, and coping skills learned and practiced in family life situations; issues expected in future life and psychological and behavioral preparation for future; summing up of knowledge, attitude, and practices in psychosis management; making plans for future life and psychosis care

treatments, and community mental health services; group exercises and homework assignments; and rehearsals and discussions of illness management, coping, and self-care; and summary, progress review, and future planning.

TAU (control)

Participants received usual care, including routine community mental healthcare services such as regular psychiatric consultations and treatments, education on psychosis, outpatient clinic visits and medication, home visits by a community psychiatric nurse or case manager, and social welfare service referrals as needed. They also received an information booklet on psychosis management to minimize the potential Hawthorne effect of the Peer-RESIM booklet.

Outcome evaluation

The primary outcomes were illness recovery and functioning levels; the secondary outcomes were psychotic symptoms, problem-solving ability, rehospitalization rate, and service satisfaction. Outcomes were measured at baseline (T0) and immediate (T1), 9 months (T2), and 18 months (T3) postintervention. Sociodemographic and clinical data (e.g., gender, age, clinical diagnosis, illness duration, medications) were collected at T0.

Illness recovery level was measured using the 22-item Process of Recovery Questionnaire (QPR) [26], which covers three subscales (self-empowerment, effective interpersonal relationships, and rebuilding life); responses are given on a 5-point Likert-scale (0, “disagree strongly” to 4, “agree strongly”). The Chinese-translated QPR showed high internal consistency (Cronbach’s $\alpha = 0.88$ – 0.90), sensitivity to contrasting groups (symptom severity; $t = 4.68$, $p < 0.01$), and strong test–retest reliability (intraclass correlation coefficient [ICC] = 0.87 – 0.92) [27].

Patient functioning was measured with the 43-item Specific Level of Functioning Scale (SLOF) [28]; it comprises three domains, physical functioning/personal care, social functioning, and community living skills, with responses given on a 5-point Likert-scale (1, “totally dependent/highly untypical/prevents general functioning” to 5, “no problem/totally self-sufficient/highly typical”). The Chinese-translated scale showed satisfactory content validity, test–retest reliability (ICC = 0.80), and internal consistency (Cronbach’s $\alpha = 0.88$ – 0.96) among patients with psychosis [19, 20].

Psychotic symptoms were assessed using the 30-item Positive and Negative Syndrome Scale (PANSS) [29], which includes three subscales (positive symptoms, negative symptoms, and general psychopathology) with responses given on a 7-point Likert-scale (1, “absent” to 7, “extreme”). The PANSS showed satisfactory concurrent validity with the Brief Psychiatric Rating Scale and symptom-rating scales, test–retest reliability (ICC = 0.85 – 0.90), and internal consistency (Cronbach’s $\alpha = 0.88$ – 0.91) in patients with psychosis [19, 30].

Problem-solving ability was assessed using the Chinese-version Revised Social-Problem-Solving Inventory (C-SPSI-R:S) [31], with items rated on a 5-point Likert scale (0, “not at all true of me” to 4, “extremely true of me”). It showed satisfactory internal consistency (Cronbach’s $\alpha = 0.68$ – 0.81) and concurrent validity with coping scales ($r = 0.48$ – 0.56 , $p < 0.01$) in Chinese adolescents and patients with psychosis [21, 32].

Frequency and time to rehospitalization over the previous 5–9 months were reported by participants at T0 and all reassessment time points and cross-checked with medical records. The average number and duration of hospitalizations per month and time to readmission were calculated.

Satisfaction level was measured using the 8-item Client Satisfaction Questionnaire (CSQ-8) [33], rated on a 4-point Likert-scale (1, “very dissatisfied” to 4, “very satisfied”). It was validated in various patient populations, with satisfactory internal consistency (Cronbach’s $\alpha = 0.80$ – 0.91) and concurrent validity with satisfaction rating scales [19, 31].

Data collection

Participants received an explanation of the study, gave written consent, and provided sociodemographic, clinical, and outcome (QPR, SLOF, PANSS, C-SPSI-R:S, CSQ-8, and rehospitalization rate) data at baseline. Peer-RESIM and PE group attendance was recorded. The six outcome measures, number and durations of rehospitalizations, and total number hospitalizations were assessed at immediate and 9 and 18 months postintervention by a research assistant blinded to group and intervention assignments.

Data analysis

The effects of Peer-RESIM and PE on the primary and secondary outcomes were examined by comparing changes in mean values between three study groups over time (T0–T3) on an intention-to-treat basis. SPSS, version 23 (IBM, NY, US) was used to perform the general estimating equation (GEE) test, followed by pairwise contrast tests for significant outcomes. The Kruskal–Wallis (KW) test was used to compare the total number of participants hospitalized between groups at all time points. The significance level was 0.05 (two-tailed).

Results

Baseline participant characteristics

From February to July 2023, 980 patients (i.e., 49.0% of adults with FEP in four ICCMWs) were assessed for eligibility, and 715 (72.9%) met eligibility criteria (see Figure 1). After excluding 81 (11.3%) who refused to participate, 198 remaining participants were randomly selected to participate in this study and completed baseline measurements. Among them, 17 (8.6%) lost contact and seven (3.5%) withdrew from the study, including 12 (6.1%) who lost contact ($n = 8$) or withdrew ($n = 4$) during the intervention or at T1. Based on the intention-to-treat principle, data from 183 participants (60–62/group) were included in the outcome analyses, whereas eight participants who lost contact before T1 and seven who withdrew from the study were excluded from the analyses. The main reasons for withdrawal or loss of contact were lack of time to attend or inconvenience ($n = 7$), worsening mental condition ($n = 5$), and loss of interest in participation ($n = 3$). The Peer-RESIM and PE attendance rates were 90.2% (range = 3–10; median = 8.5 sessions) and 87.0% (range = 3–10; median = 6.5 sessions), respectively.

Table 2 presents the sociodemographic and clinical characteristics of the 198 participants (66/group). There were no significant between-group differences at baseline ($p = 0.15$ – 1.00).

Treatment effects

In the Peer-RESIM group, significant interaction (Group \times Time) treatment effects were found on the primary (QPR, SLOF) and

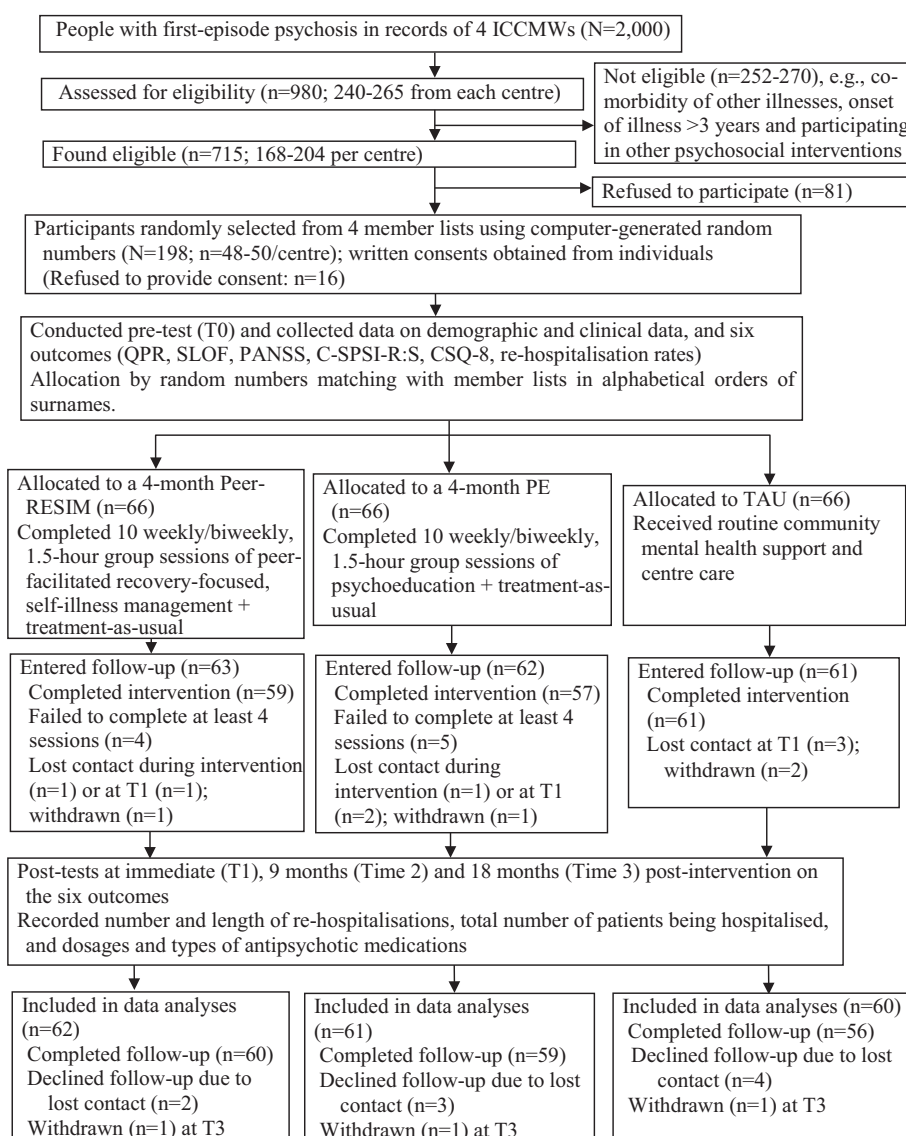


Figure 1. Flow diagram of the randomized controlled trial procedure. Peer-RESIM, peer-facilitated, recovery-focused self-illness management program; PE, psycho-education program; TAU, treatment-as-usual only; ICCMWs, integrated Community Centres for Mental Wellness; QPR, questionnaire about the process of recovery; SLOF, specific levels of functioning scale; PANSS, positive and negative syndrome scale; C-SPSI-R:S, Chinese revised short-form social-problem-solving inventory; CSQ-8, eight-item client satisfaction questionnaire.

secondary outcomes (PANSS, CPSI-RS, CSQ, duration of rehospitalization) over the 18-month follow-up (Wald $\chi^2 = 6.45$ – 14.85 , $p = 0.01$ – $.04$) with small-to-large effect sizes ($\eta^2 = 0.04$ – 0.15). Significant decreases in hospitalization were observed in the Peer-RESIM group at T1, T2, and T3 (KW = 8.42, $p = 0.01$), including a consistent decrease in the total number from 20 at T0 to 6 (70% reduction) at T3 (vs. 13 and 18 for PE and TAU, respectively; Table 3).

Pairwise contrast tests revealed that compared with TAU and/or PE, Peer-RESIM yielded significantly greater improvements, as follows.

Primary outcomes

- Recovery progress (QPR) at T1–T3 (mean difference, MD = 4.00, 5.94, 9.55, and $p = 0.01$, 0.005, 0.001, respectively) versus TAU and at T3 (MD = 4.89, $p = 0.01$) versus PE.

- Patient functioning (SLOF) at T1–3 (MD = 3.81, 6.77, 13.27 and $p = 0.02$, 0.008, 0.001, respectively) versus TAU and at T3 (MD = 10.16, $p = 0.005$) versus PE.

Secondary outcomes

- Psychotic symptoms (PANSS) at T1–3 (MD = 7.90, 17.70, 18.74 and $p = 0.03$, 0.006, 0.005, respectively) versus TAU and at T2 (MD = 7.92, $p = 0.03$) versus PE.
- Problem-solving ability (C-SPSI-R:S) at T2–3 (MD = 5.00, 7.71 and $p = 0.02$, 0.008, respectively) versus TAU and at T3 (MD = 5.81, $p = 0.02$) versus PE.
- Service satisfaction (CSQ-8) at T2–3 (MD = 2.84, 4.74 and $p = 0.03$, 0.01, respectively) versus TAU and at T3 (MD = 2.84, $p = 0.03$) versus PE.
- Duration of rehospitalization (days of hospital stay) at T1–3 (MD = 5.50, 10.85, 9.25 and $p = 0.02$, 0.005, 0.008, respectively) versus TAU and at T3 (MD = 6.04, $p = 0.01$) versus PE.

Table 2. Sociodemographic and clinical characteristics of participants (*N* = 198)

Characteristics	Peer-RESIM (<i>n</i> = 66) ^a	PEG (<i>n</i> = 66) ^a	TAU (<i>n</i> = 66) ^a	Kruskal–Wallis test, <i>p</i> value
Gender				1.40, 0.20
Male	36 (55%)	35 (53%)	37 (0.56%)	
Female	30 (45%)	31 (47%)	29 (0.44%)	
Age	25.3 ± 4.9	26.0 ± 5.7	26.8 ± 6.1	1.02 ^Δ , 0.28
18–25	32 (48%)	33 (50%)	33 (50%)	0.58, 0.99
26–30	24 (36%)	22 (33%)	23 (35%)	
31–35	7 (11%)	7 (11%)	6 (9%)	
36–40	3 (5%)	4 (6%)	4 (6%)	
Education level				0.29, 0.99
Primary school or below	6 (9%)	7 (11%)	7 (11%)	
Secondary school	41 (62%)	42 (64%)	40 (61%)	
University or postgraduate degree	19 (29%)	17 (26%)	19 (29%)	
Clinical diagnosis				0.44, 1.00
Schizophrenia and schizophreniform disorder	21 (32%)	22 (33%)	20 (30%)	
Delusional disorder	8 (12%)	7 (11%)	8 (12%)	
Schizoaffective disorder	9 (14%)	8 (12%)	9 (14%)	
Brief psychotic disorder	19 (29%)	21 (32%)	20 (30%)	
Others (e.g., schizotypal disorder and unspecified psychotic disorders)	9 (14%)	8 (12%)	9 (14%)	
Main family caregivers				1.28, 0.97
Child	9 (13%)	8 (12%)	10 (15%)	
Parent	29 (44%)	30 (45%)	30 (45%)	
Spouse	17 (26%)	18 (27%)	19 (29%)	
Others (e.g., sibling)	11 (17%)	10 (15%)	7 (11%)	
Monthly household income (HK\$) ^b	24,658 ± 6,302	25,120 ± 6,813	24,805 ± 6,933	1.65 ^Δ , 0.19
4000–15,000	12 (18%)	10 (15%)	11 (17%)	0.55, 0.99
15,001–25,000	23 (35%)	22 (33%)	24 (36%)	
25,001–35,000	21 (32%)	22 (33%)	21 (32%)	
35,001–45,000	10 (15%)	12 (18%)	10 (15%)	
Employment status				0.50, 0.97
Employed (full-time)	28 (42%)	29 (44%)	26 (39%)	
Employed (part-time)	23 (35%)	24 (36%)	26 (39%)	
Unemployed	15 (23%)	13 (20%)	14 (21%)	
Duration of illness (months)	16.64 ± 8.92, 3–27 months	17.08 ± 10.01 3–28 months	15.28 ± 10.22 2–27 months	1.91 ^Δ , 0.15
1.0–8.0	20 (30%)	19 (29%)	21 (32%)	0.34, 0.99
8.1–16.0	22 (33%)	23 (35%)	22 (33%)	
16.1–23.0	16 (24%)	15 (23%)	14 (21%)	
>23.0	8 (12%)	9 (14%)	9 (14%)	
Use of services				1.43, 0.99
Outpatient clinic	47 (71%)	42 (64%)	39 (59%)	
Day hospital/daycare center	9 (14%)	7 (11%)	10 (15%)	
CPNS/EASY	49 (74%)	50 (76%)	45 (68%)	
Counseling and social/recreational service	8 (12%)	10 (15%)	9 (14%)	
ICCMW/Community health center	65 (98%)	64 (97%)	63 (95%)	

Continued

Table 2. Continued

Characteristics	Peer-RESIM (<i>n</i> = 66) ^a	PEG (<i>n</i> = 66) ^a	TAU (<i>n</i> = 66) ^a	Kruskal–Wallis test, <i>p</i> value
Dosage of medication ^c				0.65, 0.96
High	7 (11%)	5 (8%)	6 (8%)	
Medium	30 (45%)	31 (47%)	33 (50%)	
Low	29 (44%)	30 (45%)	27 (41%)	
Types of psychotropic drugs				0.73, 0.99
Atypical antipsychotic	28 (42%)	29 (44%)	26 (39%)	
Typical antipsychotic	12 (18%)	11 (17%)	12 (18%)	
Antidepressant/mood stabilizer	11 (17%)	12 (18%)	13 (20%)	
Blended mode ^d	9 (14%)	8 (12%)	10 (15%)	
Others (e.g., anxiolytics)	6 (9%)	6 (9%)	5 (8%)	

Abbreviations: Peer-RESIM, peer-facilitated, recovery-focused self-illness management program; PE, psycho-education program; TAU, treatment-as-usual only; CPNS, Community Psychiatric Nursing Service; EASY, Early Assessment Services for Young People; ICCMW, Integrated Community Centre for Mental Wellness.

^aAn ANOVA test (*F* value, *df* = 2, 195) was used to compare mean values of continuous variables between three study groups.

^bData denote frequency (*f*, %) or mean \pm SD and range.

^cUS\$1 = HK\$7.8.

^dDosage of antipsychotropic medications were compared with the average dosage of medication taken in oral haloperidol equivalents: low: <4 mg/day, medium: 4–10 mg/day, and high: >10 mg/day (Andreasen et al., 2010).

^eReceiving more than one type of psychotropic medication, such as both typical and atypical antipsychotics, or atypical antipsychotics and antidepressants.

Discussion

This was the first multicenter RCT of a culturally adapted Peer-RESIM program incorporating the CORE and psychoeducation programs developed in the United Kingdom and Hong Kong, respectively, for recovery, functioning, and other health outcomes in Chinese patients with FEP. The findings demonstrate the long-term (18-month follow-up) benefits of the Peer-RESIM on patients' subjective recovery and functioning levels (primary outcomes) and psychotic symptoms, problem-solving ability, duration of rehospitalization, and service satisfaction (secondary outcomes). The Peer-RESIM's effects on all outcomes were superior to those of PE, mainly at T3. While the short-term results of this RCT are consistent with those of Johnson et al.'s [18] 2018 CORE intervention study (UK) for severe mental illness at a 4-month follow-up, we demonstrated a more sustainable long-term benefit of our Peer-RESIM program in terms of patients' recovery. Compared with the TAU group, the Peer-RESIM group also showed significantly greater improvements in psychosocial functioning, including activities, interpersonal relationships, and social acceptability, during the 18-month follow-up. In contrast, Johnson et al. [18] reported that the CORE program had no significant effects on social relationships (e.g., loneliness, social network size) during an 18-month follow-up. The sustainable effects of our Peer-RESIM program on the primary outcomes can be explained by a few reasons. First, the program was specifically designed and tailored for adults with FEP, whose motivation for self-illness care and hope and specific plans for recovery could be much greater than those of the patients with various mental disorders of diverse chronicity with in Johnson et al. and other psychosis care programs. Compared with those studies, participants in our Peer-RESIM program also may have received better, more focused support for FEP recovery from selected PSWs who had faced similar illnesses and related life and self-care challenges. These trained peer facilitators were likely to have exchanged knowledge, practices, emotions, hope, and determination confidently and competently with the participants [34]. Second, compared with the participants in Johnston et al.'s CORE trial, the

participants in the current RCT had less severe mental illness and related symptoms and thus required lower dosages of antipsychotic medications. Our participants' better ability and stronger initiative to undertake self-management of their illness and to plan and complete recovery actions might have affected their intervention engagement and responses, making it easier to see the longer term benefits of this recovery-based intervention.

Furthermore, the participants in our RCT had a wide variety of psychotic disorders, including brief psychotic disorder, schizophrenia spectrum disorders, and unspecified psychotic disorders (according to the DSM-V). The Peer-RESIM intervention may be acceptable and useful for not only reducing psychotic symptoms and relapse episodes, but also enhancing recovery and functioning in patients with various early-stage psychotic disorders. The findings support the hypothesis that Peer-RESIM could equip patients with self-care and problem-solving strategies for managing their symptoms and functioning effectively in the community over the long term. Our results also are consistent with the 2015 recommendation by Orygen Youth Mental Health [35] that young adults with FEP should be supported in retaining or regaining their ability to successfully and independently function and live meaningfully through knowledge and skills; this is as important as symptom remission, as lost ability can negatively affect their developmental trajectory and disrupt psychosocial functioning over the long term. As hope and optimism are strong motivators, effective self-care and problem solving, as well as peer support, can be important facilitators of FEP recovery, thus reducing the internalized stigma (e.g., the self as incompetent and dysfunctional) and disruptions in social integration and a meaningful life [36].

PE and routine community mental healthcare services often include education about psychosis care and treatment, stress management strategies, and coping skills; thus, the participants in the PE and TAU groups showed mild improvements in problem-solving ability. Participants in the PE group also showed consistent mild improvements in symptom control, recovery, and functioning. However, participants in the Peer-RESIM group showed

Table 3. Outcome scores and results of generalized estimating equation tests for three study groups over T0–T3 ($n = 183$)

Instrument	Time	Peer-RESIM ($n = 62$) ^a		PEG ($n = 61$)		TAU ($n = 60$)		GEE test		
		$M \pm SD$	95% CI	$M \pm SD$	95% CI	$M \pm SD$	95% CI	Group effect	Time effect	Group \times time effect
								β (95% CI), p	β (95% CI), p	β (95% CI), p , Wald χ^2 , ES
QPR (17–85) ^a	T0	38.02 \pm 8.51	29.52, 46.54	38.90 \pm 7.58	31.32, 46.48	37.61 \pm 8.02	29.59, 45.63	0.35 (0.26, 0.44), 0.01	0.25 (0.19, 0.29), 0.04	1.14 (0.89, 1.39), 0.01 Wald $\chi^2 = 13.53$, ES = 0.14
	T1	42.01 \pm 7.90	34.11, 49.91	39.88 \pm 6.98	32.90, 46.86	38.01 \pm 7.83	30.18, 45.84			
	T2	44.19 \pm 8.43	35.76, 52.65	40.20 \pm 7.24	33.00, 47.44	38.25 \pm 8.90	29.35, 47.15			
	T3	46.70 \pm 8.43	38.32, 55.20	41.81 \pm 7.98	33.83, 49.79	37.15 \pm 9.57	27.58, 46.72			
SLOF (17–85)	T0	33.54 \pm 7.18	26.36, 40.72	34.10 \pm 6.78	27.43, 40.88	33.51 \pm 7.20	26.31, 40.71	0.38 (0.28, 0.48), 0.01	0.35 (0.27, 0.43), 0.02	1.23 (0.92, 1.54), 0.01 Wald $\chi^2 = 14.85$, ES = 0.15
	T1	37.93 \pm 7.90	30.03, 45.83	35.20 \pm 6.83	28.38, 42.05	34.12 \pm 8.14	25.98, 42.26			
	T2	42.80 \pm 8.47	34.33, 51.27	37.90 \pm 8.34	29.56, 46.24	36.03 \pm 9.08	26.98, 45.11			
	T3	47.29 \pm 8.35	38.94, 55.64	37.13 \pm 8.98	28.15, 46.11	34.02 \pm 9.85	24.17, 43.87			
PANSS (43–215)	T0	129.80 \pm 15.10	114.70, 144.90	128.87 \pm 15.90	112.97, 144.77	127.73 \pm 13.70	114.03, 141.43	−0.30 (−0.42, −0.18), 0.03	−0.33 (−0.40, −0.26), 0.02	−1.14 (−1.30, −0.98), 0.02 Wald $\chi^2 = 11.86$, ES = 0.12
	T1	116.30 \pm 14.81	101.49, 131.11	122.98 \pm 13.10	109.88, 136.08	124.20 \pm 15.49	108.71, 139.69			
	T2	107.31 \pm 16.18	91.13, 123.49	115.23 \pm 10.71	104.52, 125.94	125.05 \pm 15.23	109.82, 140.28			
	T3	99.93 \pm 13.25	86.68, 113.18	109.90 \pm 12.22	97.68, 122.12	118.67 \pm 15.02	103.65, 133.69			
C-SPSI-R:S (0–100)	T0	45.90 \pm 8.02	37.88, 53.92	47.03 \pm 7.65	39.38, 54.68	45.98 \pm 9.01	36.97, 54.99	0.25 (0.20, 0.30), 0.04	0.28 (0.24, 0.32), 0.03	1.02 (0.95, 1.09), 0.04 Wald $\chi^2 = 9.98$, ES = 0.10
	T1	50.23 \pm 9.10	41.13, 59.33	49.02 \pm 8.19	40.83, 57.22	47.07 \pm 9.32	37.75, 56.39			
	T2	54.12 \pm 8.71	45.42, 62.83	50.82 \pm 8.01	42.81, 58.83	49.12 \pm 9.02	40.10, 58.14			
	T3	56.01 \pm 6.77	49.24, 62.78	50.20 \pm 7.98	42.22, 58.18	48.30 \pm 9.30	39.00, 57.60			
Rehospitalizations										
Average number [~]	T0	1.45 \pm 0.80	0.65, 2.25	1.40 \pm 0.75	0.65, 2.15	1.50 \pm 0.70	0.80, 2.20	0.20 (0.17, 0.23), 0.06	0.19 (0.15, 0.23), 0.07	0.72 (0.65, 0.85), 0.08 Wald $\chi^2 = 6.45$, ES = 0.04
	T1	1.00 \pm 0.65	0.35, 1.65	1.10 \pm 0.60	0.50, 1.70	1.20 \pm 0.80	0.60, 2.00			
	T2	0.85 \pm 0.50	0.35, 1.35	1.00 \pm 0.50	0.50, 1.0 8	1.25 \pm 0.70	0.45, 1.95			
	T3	0.95 \pm 0.60	0.35, 1.55	1.30 \pm 0.65	0.65, 1.952	1.24 \pm 0.80	0.64, 2.04			
Length of hospital stay [^]	T0	17.80 \pm 6.90	10.90, 24.70	17.50 \pm 7.50	10.00, 25.00	17.10 \pm 7.10	10.00, 24.20	−0.33 (−0.38, −0.28), 0.01	−0.35 (−0.42, −0.28), 0.01	−1.25 (−1.48, −1.02), 0.01 Wald $\chi^2 = 14.15$, ES = 0.14
	T1	14.30 \pm 6.71	7.59, 21.01	15.58 \pm 7.90	7.68, 23.48	19.80 \pm 7.50	12.30, 27.30			
	T2	11.10 \pm 6.30	4.80, 17.40	14.82 \pm 8.00	6.82, 22.82	21.95 \pm 9.55	12.44, 31.50			
	T3	10.10 \pm 5.85	4.25, 15.95	16.05 \pm 7.00	9.05, 23.05	19.35 \pm 7.90	11.45, 27.35			

Continued

Table 3. Continued

Instrument	Time	Peer-RESIM (<i>n</i> = 62) [#]		PEG (<i>n</i> = 61)		TAU (<i>n</i> = 60)		GEE test		
		<i>M</i> ± SD	95% CI	<i>M</i> ± SD	95% CI	<i>M</i> ± SD	95% CI	Group effect	Time effect	Group × time effect
								<i>β</i> (95% CI), <i>p</i>	<i>β</i> (95% CI), <i>p</i>	<i>β</i> (95% CI), <i>p</i> , Wald χ^2 , ES
No. of patients being hospitalized	T0	(20) [*]		(19)		(20)				KW = 8.42 [®] , 0.01
	T1	(11)		(15)		(20)				
	T2	(9)		(10)		(17)				
	T3	(6)		(13)		(18)				
CSQ-8 (8–32)	T0	16.12 ± 5.33	10.79, 21.45	16.32 ± 5.43	10.89, 21.75	16.38 ± 5.33	11.05, 21.71	0.30 (0.23, 0.37), 0.03	0.35 (0.25, 0.40), 0.01	1.10 (0.92, 1.28), 0.02 Wald χ^2 = 11.04, ES = 0.12
	T1	18.83 ± 5.98	12.85, 24.81	17.65 ± 6.01	11.64, 23.66	17.02 ± 6.54	10.48, 23.56			
	T2	19.97 ± 6.12	13.85, 26.09	18.83 ± 6.91	11.92, 25.74	17.13 ± 7.12	10.01, 24.25			
	T3	21.75 ± 7.02	14.73, 28.77	18.91 ± 7.10	11.81, 26.01	17.01 ± 7.98	9.03, 24.99			

Abbreviations: Peer-RESIM, peer-facilitated, recovery-focused self-illness management program; PE, psycho-education program; TAU, treatment-as-usual only; T0, baseline measurement at recruitment; T1, immediate postintervention; T2, 9 months postintervention; T3, 18 months postintervention; QPR, questionnaire about the process of recovery; SLOF, specific level of functioning scale; PANSS, positive and negative syndrome scale; C-SPSI-R:S, Chinese revised short-form social-problem-solving inventory; CSQ-8, eight-item client satisfaction questionnaire.

ES, effect size in terms of eta squared (η^2) using GEE/ANOVA test; whereas $\eta^2 < 0.06$: small, 0.06–0.13: moderate, and 0.14 or higher: large effect.

[#]Sample size reduced by 4 to 6 because 2 to 3 participants withdrew and 1 to 2 lost contacts during intervention or at T1 from each of the three study groups.

^aPossible range of scores of each scale in parentheses.

[~]Average number of readmissions to a psychiatric hospital or in-patient unit over previous 5–6 months at the four measurements (T0–T3).

[^]Length of readmissions to a psychiatric unit in terms of average number of days of hospital stay over previous 5–6 months between two measurements.

⁺Total number of participants per group being hospitalized over previous 5–6 months at T0–T3 indicated in parentheses.

[®]Value of Kruskal–Wallis test was used to compare the total number of participants being hospitalized between T0, T1, T2, and T3.

The italic-bold values indicate statistical significance at $p < 0.05$.

significantly greater increases in problem-solving ability and functioning at 9 and 18 months than either the TAU or PE group. These findings suggest that the Peer-RESIM program might equip patients with important recovery-focused knowledge and skills in addition to basic illness knowledge and coping skills. As suggested by a recent systematic review on peer support and empowerment for psychosis recovery [37], the important recovery enhancing skills provided by Peer-RESIM might include the individually tailored action plan, problem solving for recovery and empowered self-care, and peer support to implement positive lifestyle changes; such skills may sustainably increase participants' adaptivity when facing important life situations. Other recent evidence concurs that self-management and peer-support empowerment are essential strategies of self-illness management for people with FEP [18, 24, 38].

While routine community mental healthcare services can provide short-term illness care, we found that Peer-RESIM yielded significantly greater improvements in service satisfaction at the 9- and 18-month follow-ups. Due to limited healthcare resources, the empowered self-care and problem-solving skills that patients obtain from the Peer-RESIM program and similar peer-facilitated self-management programs might encourage appropriate service utilization and help seeking [37]. In addition, through establishing good personal plans and recovery care, participants in the Peer-RESIM group achieved a significantly reduction in relapse risk, resulting in fewer rehospitalizations and shorter durations of rehospitalization over the 18-month follow-up. These results are consistent with the significant effects of the CORE program [18, 24] in terms of reducing readmission to acute care, inpatient admissions, and bed usage over 1 year of follow-up. However, the Peer-RESIM program extended the relapse prevention effect to at least 18 months postintervention.

Our results also indicate the superiority of the Peer-RESIM over a well-established PE intervention in terms of most patient outcomes at 18 months postintervention. These findings suggest that integrating peer support with recovery-focused and self-illness management approaches and strategies might offer benefits beyond those of commonly accepted PE approaches for FEP recovery. While conventional PEG programs provide essential knowledge and skills about illness management and coping with stress, the peer-facilitated, recovery-focused self-psychosis management skills covered by the Peer-RESIM program in this study integrate additional therapeutic components of psychosocial interventions for enhancing FEP recovery, mainly peer support and sharing, an individualized recovery plan, empowered illness-related self-care, and problem-solving skills training. In particular, peer facilitators who are empathetic to the patients' lived experiences and have experience with effective psychosis care strategies [34, 39] are less likely to induce stigma and have a more realistic understanding of copatients' health needs than many health professionals [38].

This study has several limitations. First, as this was a behavioral intervention, it was impossible to blind the participants, even though they were unaware of other group interventions. Second, although randomized sampling was used, the participants were sampled from four of 24 ICCMWs in Hong Kong, possibly reducing the representativeness of the sample or generalizability of the findings. A formative or process evaluation was not conducted to identify factors that might influence the effectiveness of the interventions, such as the adequacy and appropriateness of the peer support provided, the patients' clinical characteristics (e.g.,

duration of illness, comorbidity), and the patients' perceived usefulness of and barriers to intervention participation and home assignments. In addition, the therapeutic effects of individual components of the Peer-RESIM program were not evaluated. We recommend that further studies examine the mechanisms of these actions and of the program.

Conclusion

The Peer-RESIM program for adults with FEP effectively enhanced patients' recovery, functioning, problem-solving ability, and service satisfaction and reduced the duration of rehospitalization over an 18-month follow-up. Our findings support the implementation of the Peer-RESIM program in routine community mental healthcare services.

Data availability statement. Data are available upon request from the corresponding author.

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Competing interests. The authors declare none.

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