A randomized controlled trial of a peer-facilitated self-management program for people with recent-onset psychosis

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ABSTRACT

Early patient-centered interventions can improve mental health and prevent psychotic relapse in people with recent-onset psychosis (ROP). However, limited effective peer-facilitated early interventions are found worldwide. We aimed to test the effects of a four-month peer-facilitated self-management intervention (PFSMI) for Chinese patients with ROP compared with a psychoeducation group (PEG) and treatment-as-usual (TAU) group. A randomized controlled trial was conducted at six Integrated Community Centers for Mental Wellness in Hong Kong. The primary outcome was level of recovery. Secondary outcomes were improvement of problem-solving ability, insight into illness/treatment, and functioning, and reducing psychotic symptoms and re-hospitalization rates. Overall, 180 ROP patients were randomly selected, and after collecting baseline data, randomly assigned to the PFSMI, PEG or TAU (60 per group). Their outcomes were measured at 1-week and 6-month post-intervention. One hundred and sixty-one patients (89.4 %) completed their interventions, with an overall attrition rate of 7.8 % (n = 14). Based on intention-to-treat principle, results of generalized estimating equation test indicated that the PFSMI group reported significantly greater improvements in levels of recovery, functioning and insight into illness/treatment and reductions in psychotic symptoms and duration of re-hospitalizations (p = 0.0007–0.02, with moderate to large effect sizes) than the TAU group at 1-week post-intervention, and both the TAU and PEG at 6-month post-intervention. Significantly fewer PFSMI participants were hospitalized than the TAU and PEG over 6-month follow-up (p = 0.003). The findings support that PFSMI can produce medium-term positive effects on the mental health and functioning of patients with ROP.

1. Introduction

Psychosis is often a deteriorating and disabling condition in which more than half of patients experience a relapse or hospitalization within the first five years of onset/diagnosis (i.e., recent-onset psychosis) (Brown et al., 2017). Given that the first five years following an initial episode of psychosis is such a critical period early intervention teams/programs have been established in many developed Western countries (e.g., Early Intervention in Psychosis teams, NHS England). These services aim to treat psychosis as early and intensively as possible to promote recovery, prevent relapse, and subsequently contribute to long-term positive health outcomes, such as improved functioning and quality of life (Johnson, 2013; Lloyd-Evans et al., 2019). While mental health professionals and researchers increasingly favor early interventions for recent-onset psychosis (ROP), there is limited and inconclusive research evidence on their effectiveness. Bosnjak Kuharic et al. (2019) and Chan et al. (2019) in their systematic reviews suggested that the availability and quality of the research evidence on early interventions in psychosis were low. Both reviews recommended more high-quality controlled trials to test/confirm the effects of early intervention programs such as commonly accepted psychoeducation programs for early-stage psychosis on improving diverse patient outcomes (e.g., recovery and functioning), especially at medium- to long-term follow-up.

Considering limited resources and accessibility to early intervention services, recent studies in Western and Asian countries have investigated the effects of illness self-management programs (Lean et al., 2019; Taylor et al., 2014). These programs have been recommended as core...
interventions for enhancing self-care and promoting recovery for people with ROP in the National Institute for Health and Clinical Excellence best practice guideline (NICE, UK) (The National Collaborating Centre for Mental Health, 2014). A meta-analysis of 37 randomized controlled trials of self-management programs for people with severe mental illness indicated these interventions might overcome the limitations of current resources and services, provide self-care and problem-solving skills, and empower patients to make informed decisions about treatment and promote their functioning and recovery (Lean et al., 2019). The improvements in patient outcomes could contribute to reductions in hospital readmissions and relapses from psychosis.

In addition, the recovery-focused mental healthcare model using peer-delivered services has been widely advocated internationally, particularly in the national mental healthcare framework in developed countries (e.g., Australia and the UK and US) (Council of Australian Governments Health Council, 2017; Health Education England, 2017). Peer-support workers (PSWs) are people who have personal experience of mental illness and are trained to provide mental health care and supportive services that are rooted in personal recovery experiences. PSWs can be effective in reducing admissions among patients they work with (peers) and improving their lives, ultimately encouraging active recovery among the peers (Davidson et al., 2005; Repper and Carter, 2011).

Therefore, we conducted a randomized controlled trial of a peer-facilitated self-management intervention (PFSMI) for Chinese patients with ROP. The PFSMI was modified from the CORE (Crisis-resolution-team Optimization and Relapse Prevention) program for severe mental illness in the UK indicating significant improvements in frequency and

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**Fig. 1.** The CONSORT flow diagram of study procedure.
time to psychiatric rehospitalizations and service satisfaction over 6–12 months follow-up (Craig et al., 2004; Johnson et al., 2018).

Our primary hypothesis was that when compared to the conventional psychoeducation group (PEG) and usual community mental healthcare only (treatment-as-usual, TAU), the PFSMI group would indicate a significantly greater increase in the level of recovery, at 1-week and 6-months post-intervention. Secondary hypotheses were that in comparison with the PEG and TAU groups, the PFSMI group would show significantly greater improvements in re-hospitalization rates, symptom severity, functioning, problem-solving, and insight into illness at 6-months post-intervention.

2. Methods

A multi-center, three-arm RCT of a community-based PFSMI, with a repeated measure parallel groups design, was conducted in Hong Kong between October 2020 and November 2021. A CONSORT flow diagram of the study procedure is outlined in Fig. 1.

2.1. Participants

We included participants with a clinical diagnosis of psychosis for ≤5 years (ROP) (Chien et al., 2016), who were experiencing and distressed by common psychotic symptoms (e.g., hallucinations and delusions) according to the structured clinical interview for DSM-V (American Psychiatric Association, 2013). Participants were randomly selected using computer-generated random numbers (via RANDOM. ORG) from the member lists of six Integrated Community Centers for Mental Wellness (ICCMWs). These six of 25 ICCMWs (i.e., two in each of the three largest geographical regions) provided community support and social rehabilitation services for people with suspected/diagnosed mental health problems in Hong Kong. Four hundred and fifty of 820 patients attending the ICCMWs (73–78 per center) met the below inclusion criteria after screening. Of these, 62 (13.8 %) refused to participate and 180 of these eligible patients (30 per center) were randomly selected from the six ICCMW member lists by one researcher (WTC).

Patients were included if they were: (1) Hong Kong Chinese residents, aged 18–60 years; (2) having Global Assessment of Functioning scores ≥ 51, indicating mild to moderate symptoms and difficulty in psychosocial/occupational functioning and mentally stable to comprehend the self-care skills training provided (American Psychiatric Association, 2013); and (3) able to communicate in written and speaking Chinese/Cantonese. Potential participants were excluded if they were (1) recently provided with or participating in other psychosocial interventions; (2) with co-morbidity of another mental illness (learning disability/cognitive and personality disorders) and/or any clinically significant medical diseases; and (3) having visual/language/communication difficulty.

2.2. Randomization

Six lists (one per center) of computer-generated random numbers were obtained from an independent statistician. A researcher (WTC) randomly selected 30 eligible participants per ICCMW (totally 180 participants) by matching the computer-generated random numbers with each of the six member lists (using a numerical code, e.g., 001–078). After the random selection and baseline measurement, the participants were randomly allocated to one of the three arms (i.e., PFSMI/PEG/TAU) using another set of computer-generated random numbers by one researcher assistant who was not involved in the interventions and outcome assessments. To prevent allocation bias, the code was concealed until the completion of the baseline measurements.

2.3. Sample size and power

Sample size was calculated a priori in terms of primary outcome using G*Power (version 3.17). Based on two controlled trials of CORE program for severe mental illness in the UK and European countries (Johnson et al., 2018; Lloyd-Evans et al., 2019), the effect sizes (Cohen’s d) on level of recovery (QPR) were 0.48 and 0.50 at post-test between the CORE and usual care group. Therefore, a total of 180 participants (60 per arm) after taking account of 15 % of potential attrition were needed to achieve a study power of 80 % and a significance level set at p < 0.05 (2-sided). This sample size could also detect any statistically significant difference in changes in recovery score of 3.5 points (SD = 6.25), or hospitalization rate of 6.0 days/month (SD = 12.5) (Chien and Bressington, 2015; Chien et al., 2017; Chien and Norman, 2009), between three arms (PFSMI versus TAU and versus PEG) at post-test, showing a conservative effect size of 0.48 based on the above-mentioned studies.

2.4. Outcome measures

Patient outcomes were assessed by a trained research assistant who was blind to the group/intervention allocation.

2.4.1. Primary outcome measure

Primary outcome was patients’ level of recovery, measured with the Questionnaire about the Process of Recovery (QPR). The 22-item QPR consists of three subscales (self-empowerment, effective interpersonal relationships, and rebuilding life) rated on a 5-point Likert scale (from 0–‘disagree strongly’ to 4–‘agree strongly’). The Chinese version demonstrated satisfactory internal consistency (Cronbach’s α = 0.88–0.90) and test-retest reliability (ICC = 0.87–0.92) in Hong Kong Chinese psychotic patients (Chien and Chan, 2013).

2.4.2. Secondary outcome measures

Secondary outcomes included patients’ psychosocial functioning (Specific Level of Functioning Scale [SLOF]) (Schneider and Struening, 1983), psychotic symptoms (Positive and Negative Syndrome Scale [PANSS]) (Kay et al., 1987), problem-solving ability (Social-Problem-Solving Inventory [SPSI-R:S]) (D’Zurilla and Nezu, 2007), insight into illness/treatments (Insight and Treatment Attitude Questionnaire [ITAQ]) (McEvoy et al., 1989), and re-hospitalization rates.

The 43-item SLOF consists of three domains: - physical functioning and personal care (12 items), social functioning (14 items), and community living skills (17 items) (Schneider and Struening, 1983). Items are rated on a five-point Likert scale (from 1 ‘totally dependent’ to 5 ‘highly self-sufficient’). The Chinese version demonstrated satisfactory content validity, test-retest reliability (Pearson’s r = 0.76) and internal consistency (Cronbach’s α = 0.88–0.96) (Chien et al., 2006).

The 30-item PANSS contains three subscales to assess the severity of psychotic symptoms and related behavioral effects: positive symptoms, negative symptoms, and general psychopathology (Kay et al., 1987). The scale is rated on a seven-point Likert scale (from 1–‘absent’ to 7–‘extreme’) and showed high internal consistency (Cronbach’s α = 0.88–0.91) and concurrent validity with the Brief Psychiatric Rating Scale (Pearson’s r = 0.85–0.90) (Bell et al., 1992).

The 25-item SPSI-R:S is rated on a five-point Likert scale (from 0–‘not-at-all true’ to 4–‘extremely true’) on two domains: problem-solving style and orientation (positive/negative) (D’Zurilla and Nezu, 2007). The Chinese version demonstrated satisfactory internal consistency (Cronbach’s α = 0.68–0.81) and concurrent validity with coping scales in Chinese psychotic patients (Bell et al., 1992).

The 11-item ITQA measures insights/recognition of illnesses and attitudes toward the need for treatments (McEvoy et al., 1989). Items are rated on a three-point Likert scale (0–‘Not necessary to receive medication/treatment’ to 2–‘Medication/treatment should be continued/required regularly’). The Chinese version demonstrated good internal

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consistency (Cronbach’s α = 0.85–0.88) and test-retest reliability (Pearson’s r = 0.80–0.86) in psychotic patients (Chien and Thompson, 2014).

The average number and duration (day/month) of patients’ rehospitalizations and the total number of patients being hospitalized over the past 5–6 months were obtained from patient records in the centers.

2.5. Treatment

Over four months, three study groups received usual care (TAU) and two treatment groups additionally received the PFSMI or PEG. The PSWs were recruited from the volunteer/part-time employed PSWs in the ICCMWs who were interested and agreed to be peer-facilitators for the current study. The case managers (registered nurses/social workers) who conducted the PFSMI, advanced practice psychiatric nurses who conducted the PEG, and research assistants received training from the research team with a 3-day (20 h) workshop. Half of the treatment sessions were randomly selected, audio-taped and scored by two researchers independently to monitor treatment fidelity using a checklist based on the NIMH-Behavior-Consortium recommendations (Bellg et al., 2004). Very satisfactory levels of treatment fidelity based on the overall levels of the two researchers’ agreement on item (checklist) fulfillments (91.0–96.5 %) were found. The main contents of the two interventions are attached in Supplementary material.

2.5.1. Peer-facilitated self-management intervention

The PFSMI was developed on the basis of the Chinese translated CORE program (Johnson et al., 2018; Lloyd-Evans et al., 2019) and self-care/behavioral management manual (Chien and Bressington, 2015; Chien et al., 2017). The PFSMI was validated by the research team, two PSWs and four experts (i.e., advanced practice nurse, clinical psychologist, social worker, and professor/researcher in mental health) on self-management of mental illness. Face and content validity of the overall manual and individual items/topics were rated very satisfactory (i.e., >95 % rated satisfactory (3) or very satisfactory (4) in terms of appropriateness and relevance, using a 4-point Likert scale). Specific Hong Kong and Chinese social/cultural considerations were added to the program. These included local mental healthcare services and resources and consideration of the impacts of high levels of social stigma toward mental illness (e.g., families might feel disgrace and guilty about having a relative with psychosis). The cultural tendency for nonactive help-seeking and reluctance of open expression/discussion of intense and negative emotions/feelings (e.g., feeling of guilt and self-blame on the presence of mental illness) was also examined. Other considerations included the close and intense family relationship, particularly within the cramped living environment in Hong Kong, and engaging in collective (i.e., emphasizing needs and goals of the group over their individual needs and desires) and mutual support behaviors (Chien and Bressington, 2015; Chien et al., 2016).

The PFSMI consisted of 10 weekly/biweekly, 1.5-hour sessions over four months. Following a 3-day training workshop provided by the research team, each of the six trained PSWs adopted several important roles in the 10 PFSMI group sessions. The main roles of the PSWs included: (1) providing education about psychosis care, illness self-management and personal recovery; (2) guiding participants to reflect current life condition, work through their emotions and develop effective coping strategies; (3) facilitating participants to developing coping skills and effective communication and relationships through experience sharing and real-life scenarios; and (4) through sharing experience and journey in recovery, motivating/assisting participants to set up and review their plan for recovery. During each session, the PSWs assisted participants to work through the workbook at their own pace in each subgroup of the PFSMI (10–12 per subgroup). In addition, one trained case manager (registered nurse/social worker) in each ICCMW acted as resource person and offered advice to the PFSMI participants and the PSWs, if requested.

Participants in the PFSMI were also asked to complete a self-management and plan for recovery workbook, including (1) personal recovery goals; (2) plans to re-establish community functioning and support networks following a crisis, identifying early warnings signs, and creating a relapse prevention plan; and (3) strategies and coping resources to problem-solve and maintain wellbeing. Each part required about 20–30 min to complete. During all sessions, participants were encouraged to contact and support each other and rehearse problem-solving strategies on life problems, given that hands-on experiences is often favored over information/emotional sharing in Chinese populations (Chien et al., 2017; Chien and Norman, 2009; Chien et al., 2016).

2.5.2. Psychoeducation group program

The PEG was led by one trained advanced practice psychiatric nurse per ICCMW who was experienced in psychiatric rehabilitation, following a standardized and validated psychoeducation intervention protocol for psychosis (Chien and Bressington, 2015; Chien and Thompson, 2014; McFarlane et al., 2003). Similar to the PFSMI, the PEG program consisted of 10 weekly/biweekly, 1.5- to 2-hour sessions over four months. It comprised of six components: (1) introduction and goal-setting; (2) basic understanding of psychosis and symptom and emotion self-care; (3) education workshop on psychosis care, treatment, and community support services; (4) learning about self-care skills, (5) establishing social support and effective coping skills; and (6) skills practices, review and future plan.

2.5.3. Treatment-as-usual

TAU provided at the ICCMWs included routine community mental healthcare services and psychiatric outpatient care. This consisted of monthly psychiatric consultation and treatments prescribed by psychiatrists, nursing advice on community care, brief education about mental illness and its care by psychiatric nurses, home visits by case managers, and/or referrals to social welfare and employment support services.

2.6. Procedure

Ethical approval was granted by the Joint CUHK-NTEC Clinical Research Ethics Committee (CREC 2019.626). Upon obtaining written informed consent, another trained research assistant (blind to group allocation) administered the baseline measurement (Time-0), performed the random group assignment and then two outcome measurements at 1-week (Time-1) and 6-month (Time-2) post-intervention. Rehospitalizations (frequency and duration) and psychotropic medications used were recorded every month.

2.7. Statistical analyses

IBM’s SPSS®, version 27.0 was used to analyze all socio-demographic and clinical characteristics and outcome data. Based on the intention-to-treat principle, all outcome data were analyzed based on participants’ randomly allocated groups, except those who withdrew from the study and did not allow us to use their data (McCoy, 2017). One-way ANOVA/Chi-square tests were used to examine the heterogeneity of the three groups at baseline. Generalized estimating equation (GEE) test was used to examine the changes in mean scores in individual primary and secondary outcomes between the two treatments and one control group across the three measurements (Times 0–2) assessed the interaction (Group × Time) treatment effects. Random effects of missing data were assessed in the GEE test by using the maximum likelihood estimation. Pairwise contrast tests were used to identify where the significant between-group differences in each outcome mean scores(s) were located if outcomes indicated significant between-group differences over time (Pituch and Stevens, 2016). The total number of patients being hospitalized over the
past 5–6 months, and the numbers/types of anti-psychotic drugs and community mental health services received, were compared between and within groups across time using the Kruskal-Wallis H test. In addition, differences between study centers and between non-completers (≤4 sessions) and completers (≥6 sessions) in the PFSMI on those outcomes indicating significant results in GEE test, and dosage of anti-psychotics used/adjusted, were examined by using ANOVA test. The level of statistical significance was set at p < 0.05.

3. Results

3.1. Participant flow and sample characteristics

After screening 820 patients, 450 were found eligible in the six ICCMWs and agreed to participate (response rate = 86.2%). From the 450 eligible subjects, 180 (30 per center) were randomly selected and after completing the baseline measurements, randomly allocated into one of the three arms. Finally, 161 patients (89.4%) completed the intervention; one in the PFSMI and two in the PEG and TAU withdrew; and three in the TAU refused to continue study participation during interventions (and did not allow us to use their data). Hence, the data from these eight withdrawals were not included in the final analysis. Overall, 54 (90%) and 52 (86.7%) in the PFSMI and PEG, respectively, completed ≥6 sessions. The overall attrition rate at the final post-test (Time 2) was 7.8% (n = 3, 4, and 7 in PFSMI, PEG, and TAU, accordingly). The main reasons for withdrawals or discontinuations included: inadequate time/effort to attend (n = 4), unstable mental condition (n = 3), and/or loss of interest and refusal to participate in the study (n = 3).

The socio-demographic and clinical characteristics of participants are summarized in Table 1. Their mean age was 25.0–26.1 years (SD = 5.8–6.2). The majority were male (56.7–60.0%), taking a low or medium dosage of anti-psychotic drugs (>80%); more than half were atypical anti-psychotics, and ≤24 months of psychosis. There were no significant differences between the three groups in any socio-demographic and clinical characteristics at baseline (p > 0.10).

3.2. Treatment effects

The mean and SD values of all study outcomes for the three study groups are presented in Table 2. There were no significant differences on any outcome mean scores between groups at baseline (p = 0.12–0.26). Missing data in the three study groups were low (<6%) indicating normal random effect in the maximum likelihood estimation (Pituch and Stevens, 2016).

Results of GEE test (Table 2) showed significant interaction (Group × Time) treatment effects on five outcomes (QPR, SLOF, PANSS, ITAQ, and duration of re-hospitalizations) between three groups over 6-month follow-up (Wald χ² = 14.98–21.87, p = 0.0007–0.02), with moderate to high strength of association (p < 0.01)

### Table 1
Demographic and clinical characteristics of participants (N = 180).

| Characteristics                  | PFSMI (n = 60) f (%) | PEG (n = 60) f (%) | TAU (n = 60) f (%) | Chi-square test, p value |
|----------------------------------|---------------------|-------------------|-------------------|-------------------------|
| Gender                           | Male                | Female            |                   |                         |
|                                  | 36 (60.0)           | 34 (56.7)         | 36 (60.0)         | χ² = 2.45               |
|                                  | p = 0.15            |                   |                   |                         |
| Age (M, SD)                      | 25.5 (5.8)          | 25.0 (6.0)        | 26.1 (6.0)        |                         |
| 18–25                            | 28 (46.6)           | 27 (45.0)         | 26 (43.3)         |                         |
| 26–30                            | 18 (30.0)           | 17 (28.3)         | 17 (28.3)         | p = 0.12                |
| 31–35                            | 10 (17.7)           | 11 (18.3)         | 12 (20.0)         |                         |
| 36–43                            | 4 (6.7)             | 5 (8.3)           | 5 (8.3)           |                         |
| Education level                  |                     |                   |                   |                         |
| Primary school or below          | 9 (15.0)            | 8 (13.3)          | 10 (16.7)         | χ² = 2.03               |
| Secondary school                 | 39 (65.0)           | 38 (63.3)         | 40 (66.7)         | p = 0.18                |
| University or postgraduate degree| 12 (20.0)           | 14 (23.3)         | 10 (16.7)         |                         |
| Monthly household income (HK$)† | M, SD               |                   |                   |                         |
| 5000–10,000                      | 9 (15.0)            | 7 (11.7)          | 10 (16.7)         | χ² = 1.75               |
| 10,001–15,000                    | 23 (38.3)           | 24 (40.0)         | 23 (38.3)         | p = 0.20                |
| 15,001–25,000                    | 19 (31.7)           | 19 (31.7)         | 18 (30.0)         |                         |
| 25,001–35,000                    | 9 (15.0)            | 10 (16.7)         | 9 (15.0)          |                         |
| Employment status                |                     |                   |                   |                         |
| Employed (full-time)             | 25 (41.7)           | 25 (41.7)         | 27 (45.0)         | χ² = 1.68               |
| Employed (part-time)             | 19 (31.7)           | 20 (33.3)         | 19 (31.7)         | p = 0.20                |
| Unemployed                       | 16 (26.7)           | 15 (25.0)         | 14 (23.3)         |                         |
| Duration of illness (months) M, SD|                     |                   |                   |                         |
| 0–8                              | 12 (20.0)           | 15 (25.0)         | 13 (21.7)         | χ² = 1.50               |
| 9–18                             | 21 (35.0)           | 20 (33.3)         | 21 (35.0)         | p = 0.23                |
| 19–24                            | 14 (23.3)           | 16 (26.7)         | 17 (28.3)         |                         |
| Services receiving               |                     |                   |                   |                         |
| Outpatient department            | 40 (66.7)           | 38 (63.3)         | 42 (70.0)         | χ² = 2.18               |
| Day hospital/center              | 5 (8.3)             | 6 (10.0)          | 9 (15.0)          | p = 0.12                |
| CPNS/EASY                        | 28 (46.7)           | 29 (48.3)         | 26 (43.3)         |                         |
| Counseling and social/recreational service | 8 (13.3)      | 9 (15.0)          | 7 (11.7)          |                         |
| ICCMW                            | 60 (100)            | 60 (100)          | 59 (98.3)         |                         |
| Dosage of medication             |                     |                   |                   |                         |
| High                             | 10 (16.7)           | 9 (15.0)          | 10 (16.7)         | χ² = 2.33               |
| Medium                           | 39 (65.0)           | 40 (66.7)         | 38 (63.3)         | p = 0.10                |
| Low                              | 11 (18.3)           | 11 (18.3)         | 12 (20.0)         |                         |
| Types of psychotropic drugs      |                     |                   |                   |                         |
| Atypical anti-psychotic          | 32 (53.3)           | 33 (55.0)         | 34 (56.7)         | χ² = 1.50               |
| Typical anti-psychotic           | 19 (31.7)           | 13 (21.7)         | 13 (21.7)         | p = 0.18                |
| Blended antipsychotics           | 7 (11.7)            | 8 (13.3)          | 10 (16.7)         |                         |
| Antidepressant/mood stabilizer   | 3 (5.0)             | 4 (6.7)           | 3 (5.0)           |                         |
| Others (e.g., anxiolytics)       | 5 (8.3)             | 4 (6.7)           | 4 (6.7)           |                         |

PFSMI, peer-facilitated self-management intervention; PEG, psycho-education group; TAU, treatment-as-usual or routine care only.
CPNS, Community Psychiatric Nursing Service; EASY, Early Assessment Services for Young People.

† US$1 = HK$7.8.

b Dosage of antipsychotics in terms of oral haloperidol equivalents as suggested by Andreasen et al. (2010), low: <4 mg per day; medium: 4-10 mg per day; high: >10 mg per day. [Note: Andreasen NC, Pessler M, Nopoulos P, Miller D, Ho B-C. Antipsychotic dose equivalents and dose-years: a standardized method for comparing exposure to different drugs. Biol Psychiatry. 2010;67:255–262.]
Table 2
Results of outcome measures and generalized estimating equation tests over six months follow-ups (n = 172).

| Instrument | PFSMI (n = 58) | PEG (n = 57) | TAU (n = 57) | GEE analysis |
|------------|---------------|--------------|--------------|--------------|
|            | M ± SD | 95 % CI | M ± SD | 95 % CI | M ± SD | 95 % CI | β (95 % CI), p | β (95 % CI), p | β (95 % CI), p, Wald $\chi^2$, ES |
| QPR (0–88) \(a\) | | | | | | | | | |
| T0 | 37.56 ± 28.53 | 38.01 ± 29.98 | 38.12 ± 29.60 | 0.60 (0.30), 0.50 (0.29), 1.68 (1.22), 0.89, 0.05 | 0.73, 0.01, 2.14, 0.001 | | | |
| T1 | 34.85 ± 33.02 | 40.81 ± 32.50 | 36.08 ± 26.17 | Wald $\chi^2$ = 18.69, ES = 0.14 | | | | |
| T2 | 49.98 ± 38.61 | 42.50 ± 32.28 | 34.42 ± 26.11 | | | | | |
| SLOF (17–85) | | | | | | | | | |
| T0 | 30.54 ± 23.88 | 30.92 ± 24.98 | 30.82 ± 24.38 | | | | | |
| T1 | 35.41 ± 28.62 | 31.04 ± 24.95 | 28.18 ± 26.05 | | | | | |
| T2 | 42.82 ± 32.86 | 29.83 ± 22.74 | 27.94 ± 18.83 | | | | | |
| PANSS (43–215) | | | | | | | | | |
| T0 | 108.33 ± 91.42 | 110.22 ± 98.66 | 110.12 ± 100.81 | | | | | |
| T1 | 126.23 ± 115.56 | 121.79 ± 9.89 | 120.21 ± 106.14 | | | | | |
| T2 | 145.52 ± 132.21 | 131.13 ± 14.10 | 134.31 | | | | | |
| SPSI-R:S (0–100) | | | | | | | | | |
| T0 | 45.98 ± 37.82 | 47.33 ± 39.78 | 46.98 ± 37.04 | | | | | |
| T1 | 50.23 ± 45.80 | 50.02 ± 41.82 | 47.87 ± 38.37 | | | | | |
| T2 | 54.12 ± 45.13 | 51.82 ± 42.75 | 47.83 ± 36.80 | | | | | |
| ITAQ (0–33) | | | | | | | | | |
| T0 | 20.10 ± 11.98 | 21.52 ± 12.40 | 21.90 ± 12.88 | | | | | |
| T1 | 23.22 ± 22.91 | 20.64 ± 9.10 | 31.08 | | | | | |
| T2 | 20.15 ± 12.20 | 20.83 ± 12.79 | 18.52 ± 10.50 | | | | | |
| Re-hospitalizations | | | | | | | | | |
| Average number \(b\) | | | | | | | | | |
| T0 | 1.32 ± 0.42 | 1.45 ± 0.54 | 1.47 ± 0.58, 2.36 | 0.35 (0.19), 0.22 (0.13), 0.81 (0.52), 0.90, 0.21, 0.91, 2.36, 0.89 | 0.51, 0.06, 0.31, 0.10, 1.10, 0.09 | | | |
| T1 | 1.02 ± 0.21, 1.33 ± 0.33, 1.60 ± 0.59, 2.61, 1.00, 2.02, 1.00, 2.32, 1.01 | | | | | | | |
| T2 | 0.99 ± 0.25, 1.58 ± 0.46, 1.51 ± 0.39, 2.71, 0.72, 1.72, 1.12, 2.70, 1.20 | | | | | | | |
| Duration \(c\) | | | | | | | | | |
| T0 | 19.52 ± 12.67 | 20.05 ± 11.21 | 18.90 ± 9.78 | | | | | |
| T1 | 6.85 ± 26.37 | 8.84 ± 28.89 | 9.12 ± 28.02, 0.24 (0.26), 0.11, 0.02 | | | | | |
| T2 | 14.21 ± 6.44, 16.21 ± 7.21, 20.80 ± 10.89, 7.67, 22.18, 9.00, 25.21, 9.01, 25.00 | | | | | | | |
| No. of patients being hospitalized | | | | | | | | | |
| T0 | (29) \(d\) | (28) | (29) | KW = 8.91, 0.003 | | | | |
| T1 | (11) | (18) | (22) | | | | | |
| T2 | (6) | (13) | (25) | | | | | |

Note: PFSMI, peer-facilitated self-management intervention; PEG, psycho-education group; TAU, treatment-as-usual only. T0, baseline measurement at the start of intervention; T1, 1-week post-intervention; T2, 6-month post-intervention. ITAQ, Insight and Treatment Attitude Questionnaire; PANSS, Positive and Negative Syndrome Scale; QPR, Questionnaire about the Process of Recovery; SLOF, Specific Level of Functioning Scale; SPSI-R:S, Social Problem Solving Inventory-Revised. Short version.

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

\(a\) level of significance was set at \(p=0.05\)

\(b\) Possible range of scores for each scale in parentheses.

\(c\) Average number of readmissions to a psychiatric hospital or inpatient unit over the past 5–6 months at the three measurements (T0–T2).

\(d\) Total number of patients per group being hospitalized over the past 5–6 months at T0–T2 indicated in parentheses.

\(e\) Value of Kruskal–Wallis test was used to compare the total number of patients hospitalized across T0–T2.

Large effect sizes (\(\eta^2\)) between 0.10 and 0.23. Similar significant results were indicated in the Group and Time effects on these five outcomes in the GEE analysis. Results of pairwise contrasts tests (Table 3) indicated that compared with the TAU and/or PEG, the PFSMI reported significantly greater changes in mean scores (improvements) of:

- Level of recovery (QPR) at Times 1 and 2 (mean difference: 7.77 and 15.56, \(p = 0.01\) and 0.001, respectively) than the TAU, and at Time 2 (mean difference: 7.48, \(p = 0.01\)) than the PEG; and
- Patient functioning (SLOF) at Times 1 and 2 (mean difference: 7.23 and 14.88, \(p = 0.01\) and 0.001, respectively) than the TAU, and at Time 2 (mean difference: 12.99, \(p = 0.003\)) than the PEG;
Psychotic symptoms (PANSS) at Times 1 and 2 (mean difference: 20.91 and 45.64, p = 0.0005 and 0.0001, respectively) than the TAU, and at Time 2 (mean difference: 12.98, p = 0.0003) than the PEG; and

- Insights into illnesses/treatment at Times 1 and 2 (mean difference: 5.50 and 7.33, p = 0.03 and 0.01, respectively) than the TAU, and at Time 2 (mean difference: 5.31, p = 0.03) than the PEG.

In addition, the participants in the PFSMI reported a significant reduction in duration of re-hospitalizations at Times 1 and 2 (mean difference: 6.49 and 10.66, p = 0.03 and 0.005, respectively) compared to the TAU; whereas, no significant difference was found between the PFSMI and PEG. Kruskal-Wallis test showed that significantly fewer patients in the PFSMI were hospitalized than those in the TAU and PEG over 6-months follow-up (KW value = 8.91, p = 0.003). Otherwise, there were no significant differences in the number of types and dosages of anti-psychotic drugs used/adjusted, community mental health services received, and intervention completion rates between the three study groups (p = 0.12–0.30).

4. Discussion

4.1. Primary outcome – levels of recovery

The 4-month PFSMI based on the CORE program developed in the UK demonstrated very positive effects on psychotic patients' recovery and a few psychosocial health outcomes over 6-month follow-up in Hong Kong (Lloyd-Evans et al., 2019). The PFSMI participants reported significantly greater improvements in levels of recovery at both 1-week and 6-month follow-ups, than the TAU and/or the PEG. This finding supported the primary study hypothesis regarding the effect of the PFSMI on promoting recovery from ROP. The finding makes an important contribution to understanding given that the current evidence regarding such an intervention approach is inconclusive/inconsistent (Lean et al., 2019; Repper and Carter, 2011). This finding is also of clinical relevance considering that no peer-facilitated service for early-stage psychosis (as provided by many developed Western countries) is currently available in Hong Kong. In addition, this finding echoed Johnson and colleagues' controlled trial (Johnson et al., 2018), using the peer-supported CORE program, which also found that the self-rated level of recovery improved immediately post-intervention. However, the current study showed that the effect of PFSMI is sustainable over a medium-term (6-month) follow-up with a greater effect on self-reported recovery (i.e., large effect size of $\eta^2 = 0.14$) than the CORE trials in the UK and European countries (Johnson et al., 2018; Lloyd-Evans et al., 2019). This finding indicates that a recovery-focused, self-management program facilitated by PSWs, with a guided personal recovery plan/booklet, can be an effective early intervention program in facilitating or improving ROP patients' recovery by enhancing their illness self-care, with increasing peer support (e.g., social and instrumental support) (Craig et al., 2004; Johnson et al., 2018). This self-management program contrasts with traditional psychotherapies, and/or psychoeducation programs, in which health information and skills training was delivered to participants using a didactic approach (Johnson et al., 2018; Lloyd-Evans et al., 2019).

When compared with the psychoeducation group (PEG), the PFSMI did not show significant differences in improving recovery at 1-week post-intervention. This might be attributed to the short-term significant beneficial effects of the PEG on improving recovery of patients experiencing psychosis, as suggested in other controlled trials comparing psychoeducation group with other well-established problem-solving based self-care, cognitive and stress management programs for psychosis (Chien and Bressington, 2015; Chien et al., 2017; Taylor et al., 2014). Therefore, the PFSMI demonstrated significantly greater improvements in recovery than the PEG at 6-month follow-up in this study. When integrated with peer support (and minimal professional support), guided self-care management with goals/plans for recovery may facilitate daily illness management, promote independent living with instrumental and emotional support from experienced peers, and help maintain wellness when facing challenging situations (Johnson, 2013; Johnson et al., 2018; Lloyd-Evans et al., 2019).

| Outcomes | Groups | Comparison | Mean difference | Standard error | 95% confidence interval | Slope | p-Value |
|----------|--------|------------|-----------------|---------------|------------------------|-------|---------|
| QPR      | PFSMI  | vs. TAU   | T1 7.77         | 0.89          | 6.66 – 8.95            | 7.01  | 0.01    |
|          |        |           | T2 15.56        | 2.30          | 13.28 – 17.81          | 10.89 | 0.001   |
|          | PFSMI  | vs. PEG  | T1 3.04         | 1.70          | 1.23 – 4.72            | 3.12  | 0.05    |
|          |        |           | T2 7.48         | 2.06          | 5.41 – 9.52            | 7.40  | 0.01    |
| SLOF     | PFSMI  | vs. TAU  | T1 7.23         | 1.35          | 5.93 – 8.59            | 6.89  | 0.01    |
|          |        |           | T2 14.88        | 3.98          | 12.70 – 17.08          | 10.41 | 0.001   |
|          | PFSMI  | vs. PEG  | T1 4.37         | 0.98          | 3.20 – 5.56            | 3.40  | 0.05    |
|          |        |           | T2 12.99        | 2.54          | 10.38 – 15.52          | 9.85  | 0.003   |
| PANSS    | PFSMI  | vs. TAU  | T1 -20.91       | 4.98          | -15.95 – -25.09        | -13.89| 0.0005  |
|          |        |           | T2 -45.64       | 5.02          | -40.60 – -50.65        | -22.43| 0.0001  |
|          | PFSMI  | vs. PEG  | T1 -6.66        | 1.62          | 0.98 – -2.67           | -0.86 | 0.18    |
|          |        |           | T2 -12.98       | 2.64          | -10.33 – -15.64        | -9.81 | 0.003   |
| ITAQ     | PFSMI  | vs. TAU  | T1 5.50         | 1.05          | 4.44 – 6.57            | 4.18  | 0.03    |
|          |        |           | T2 7.33         | 0.98          | 6.34 – 8.32            | 6.85  | 0.01    |
|          | PFSMI  | vs. PEG  | T1 3.19         | 1.31          | 2.85 – 4.30            | 3.27  | 0.05    |
|          |        |           | T2 5.31         | 0.87          | 4.20 – 6.30            | 4.10  | 0.03    |
| Duration of re-hospitalizations* | PFSMI  | vs. TAU  | T1 -6.49        | 1.30          | -5.10 – -7.80          | -5.23 | 0.03    |
|          |        |           | T2 -10.66       | 2.34          | -8.31 – -13.00         | -8.75 | 0.005   |
|          | PFSMI  | vs. PEG  | T1 -1.90        | 1.02          | -0.86 – -2.92          | -1.98 | 0.09    |
|          |        |           | T2 -0.95        | 0.83          | -0.13 – -1.79          | -0.82 | 0.14    |

Note: PFSMI, peer-facilitated self-management intervention; PEG, psycho-education group; TAU, treatment-as-usual or routine care only.

* baseline measurement at the start of intervention; T1, 1–2 weeks post-intervention; T2, 6-month post-intervention.

ITAQ, Insight and Treatment Attitude Questionnaire; PANSS, Positive and Negative Syndrome Scale; QPR, Questionnaire about the Process of Recovery; SLOF, Specific Level of Functioning Scale.

$^a$ the level of significance was set at p=0.05

$^b$ Duration/length of readmissions to a psychiatric ward/unit in terms of average number of days of hospital stay over the past 5–6 months at T0-T2.
4.2. Secondary outcomes

The PFSMI demonstrated diverse benefits to patients with ROP at 6-months post-intervention. These benefits included significantly improved functioning, psychotic symptoms, and insight into the illness/treatment, as well as fewer patients being hospitalized and shorter durations of re-hospitalizations. These favorable results support the hypothesis that the PFSMI can equip patients with much better self-care to manage their illness and symptoms. The PFSMI also provides an opportunity to learn from and share experiences with the PSWs (i.e., mutual support for each other) in promoting recovery and relapse prevention from ROP. The results were encouraging, similar to the two UK trials of the CORE program (Johnson et al., 2018; Lloyd-Evans et al., 2019), indicating that when compared to the TAU group patients in the CORE group had significantly fewer re-hospitalizations, shorter lengths of hospitalizations and higher levels of service satisfaction over 6–12 months follow-up.

In addition to a significantly greater reduction in duration of rehospitalizations, the PFSMI group had significantly fewer patients being hospitalized (19 % and 10 % of the group) at 1-week and 6-month follow-ups, when compared with the TAU only group (39 % and 44 %). This finding may reveal that routine community mental health services are not sufficient in providing illness management and support for patients with ROP for relapse prevention (Chien and Bressington, 2015; Lo et al., 2016). Integrating the PFSMI into routine care should be considered to promote the recovery and independent living of this patient group with a high risk of relapse.

Moreover, it is noteworthy that most of the study outcomes in the PFSMI (QPR, SLOF, PANSS, and ITAQ) were significantly better than the PEG at 6-months follow-up. This finding may reflect that the peer-facilitated, problem-solving-based training in illness self-management can provide more sustainable benefits as an early intervention for ROP than the well-accepted psychoeducation group program. The problem-solving-based, self-care training, together with peer support and empowerment, could be the core components of effective psychosocial interventions for early-stage psychosis, as suggested by recent controlled trials and practice guidelines (Davidson et al., 2005; Lean et al., 2019; Marshall and Rathbone, 2011; The National Collaborating Centre for Mental Health, 2014).

4.3. Study retention

Participants’ completion rate of the PFSMI (90 %) in this study was much higher, and attrition was significantly lower than other similar peer-support illness management and CORE trials (Davidson et al., 2005; Johnson et al., 2018; Lean et al., 2019; Lloyd-Evans et al., 2019; Repper and Carter, 2011). This high participation rate may be due to the PFSMI promoting effective patient engagement with routine community mental healthcare services (McCoy, 2017; Stewart, 2013), as well as the beneficial effects of peer support and self-management throughout the PFSMI intervention itself (Pituch and Stevens, 2016). The PFSMI was designed to allow participants to work through the self-management of their ‘plan for recovery’ workbook at their own pace with the support from the PSW facilitator(s), which could increase both intervention and service engagement/involvement. In addition, the interactions and sharing between the participants and PSWs might increase participants’ self-efficacy in restoring their own psychosocial functioning, which in turn could promote their recovery and improve their quality of life (McCoy, 2017).

4.4. Strengths and limitations

This was the first trial to evaluate the effects of a peer-facilitated self-management program for Chinese patients with ROP in improving recovery and functioning over a medium-term (6-month) follow-up. This was a high-quality RCT with good internal validity, including clear procedures for recruitment, blinding and randomization, and data collection and analyses. The comprehensive and systematic research report can allow for future replications.

However, this study was subject to several limitations. First, it was not feasible to blind the participants to the behavioral intervention owing to its nature, though the participants were unaware of the intervention provided for the other study groups. Second, the PFSMI consisted of three main components, namely, peer support, problem-solving, and self-management, causing difficulties in pinpointing a single key element that could be attributed to the effectiveness of the PFSMI. Third, the amount and intensity of peer support among the PFSMI participants outside group sessions could vary among the participants/subgroups and were not assessed by the research team. Therefore, the consistency and confounding effect of these contacts and supports among the participants were not controlled/monitored. Last, it was not feasible to compare and identify any potential differences in the socio-demographic and clinical characteristics and baseline outcome measure scores between the participants and non-participants; thus the representativeness of the sample and/or generalization of the findings to the ROP population could not be established.

5. Conclusion

The 4-month PFSMI, in addition to routine community mental healthcare services, can assist people with recent-onset psychosis to improve recovery, symptom severity, functioning, and insight into illness/treatment, thus reducing their re-hospitalizations/relapses. These positive findings suggest further research to test the PFSMI for patients experiencing psychosis with diverse socio-demographic, clinical and ethnic characteristics and comorbidities of other mental disorders in Chinese/Asian countries, and over a longer period of follow-up (e.g., >1 year). An in-depth qualitative investigation of the PFSMI about the experiences and views of the participants is also recommended to identify the therapeutic components and mechanism of action of the intervention.

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Ethical approvals and consents

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consents were obtained from all individual participants (patients) in the study.

CRediT authorship contribution statement

WTC led all aspects of the study, including study design, funding acquisition, subject recruitment, intervention training, and data collection and analyses, and provided final edits on the article. RG refined study design and assisted in intervention fidelity monitoring. LKH coordinated intervention training and writing of the article. DB provided inputs to funding acquisition, study design, interpretation of findings and writing of the article. All authors contributed to and have approved the final manuscript.
Declaration of competing interest

All authors declare that they have no conflict of interest regarding the conduct of this study.

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Appendix. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.schres.2022.09.028.

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