

**Randomised Controlled Trial Evaluating the
Strengths Model Case Management in Hong Kong**

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Abstract

Objectives: Strengths-based approaches to case management for people with mental illness have been widely used in Western countries. The aim of this study was to evaluate the effectiveness of Strengths Model Case Management (SMCM) among mental health clients in Hong Kong.

Method: Two hundred and nine service clients were recruited from three Integrated Community Centres. Multiple measures related to recovery progress (e.g., Recovery Assessment Scale) were reported by both the clients and caseworkers before intervention and at six and 12 months post-recruitment.

Results and conclusion: Although there were no significant differences in improvement of most outcomes between the SMCM and control groups, the recovery scores of the SMCM group remained stable over time regardless of age, and also middle-aged participants (i.e., 40-59 years old) in the SMCM group achieved higher recovery scores over time than those in the control group.

Trial registration number: Australian New Zealand Clinical Trials Registry (ACTRN) 12617001435370.

Keywords

Strengths model intervention, recovery, goal, working alliance, SMCM fidelity

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Introduction

Background

The Hong Kong Mental Morbidity Survey 2010-2013 indicated the clinical diagnosis of adults aged 16-75 years with a prevalence rate of one week at 13.3% Common Mental Disorders (CMD) (Lam et al., 2015) and 2.5% psychotic disorders (Chang et al., 2015). The highest proportions of diagnoses include depression, generalized anxiety, and mixed anxiety and depressive disorders. While the Hospital Authority manages services for inpatients, the Social Welfare Department (SWD) is responsible for carrying out public policies and for developing and arranging social welfare services in Hong Kong. Since 2010, the SWD has established 24 Integrated Community Centres for Mental Wellness (ICCMW), which are allocated across the region. These centres are the core providers of community mental health services in Hong Kong (Hong Kong Government, 2013).

The Strengths Model Case Management (SMCM) approach was developed as a pilot project for people with mental illness at the University of Kansas School of Social Welfare in the United States in 1982 (Goscha, 2020; Rapp & Goscha, 2012). In spite of tremendous research endeavours devoted to this treatment program, its generalizability to different cultural contexts and demographic responses, including different age groups, awaits further investigation. The purpose of this study was to examine the efficacy of SMCM in the Hong Kong Chinese-speaking cultural context.

The philosophical assumption of SMCM regarding human nature is that people are viewed as capable and possessing a unique array of personal strengths and environmental resources. It also invites professionals to focus their efforts and support towards helping people live a meaningful

life and achieve unique life goals they set for themselves, as anyone else in the community might pursue (Weick et al., 1989).

SMCM is guided by six major principles: (1) people with mental illness have the capacity to recover, reclaim, and transform their lives; (2) the focus is on the strengths of individuals; (3) the community is perceived as an oasis of resources; (4) the client is the director of the helping process; (5) the worker-client relationship is essential; and (6) the primary setting of the work is the community (Rapp & Goscha, 2012). In addition, SMCM lays emphasis on three themes. First, caseworkers should be creative about how to help each client achieve a life that brings purpose, meaning, and a valued identity. Second, SMCM does not neglect the problems and impediments that clients are facing; rather, problems and obstacles are addressed within the context of the goals that the client desires to achieve (Deci & Ryan, 2000). Third, SMCM is not only about a change in clinical practice: it also requires the transformation of our care systems, such as the way we communicate with each other to best support clients in finding niches within their community in which they can thrive.

There are five key tools or implementation strategies in SMCM: strengths assessment, personal recovery plan, group supervision, field mentoring, and fidelity review. The strengths assessment is designed to elicit the aspects of life that are most meaningful and important to people and to identify personal and environmental strengths that could be mobilised to help them build the life they desire. The personal recovery plan is designed to help people explore and achieve self-identified goals; it allows the worker and the client to stay focused on implementable steps while moving towards their goals (Chopra et al., 2009; Shepherd et al., 2008). Group supervision provides a safe space for workers to reach out to their team when they are stuck and to generate hope-inducing ideas about the potential pathways to support clients in

their recovery. Field mentoring is designed to help workers develop and refine their SMCM practice skills in the field with clients. The fidelity review is conducted to ensure adherence to the key components of the model during the implementation process (Fukui et al., 2012).

Relevant Studies

Implementations of SMCM have extended beyond the original borders of Kansas to include California, Oregon, Iowa, Oklahoma, Texas, and other cultural contexts (e.g., Canada, the Netherlands, Australia, New Zealand, Japan, Taiwan, and Hong Kong; Björkman et al., 2002; Deane et al., 2019; Fukui et al., 2021; Gelkopf et al., 2016; Hui et al., 2015; Krabbenborg et al., 2013; Krabbenborg et al., 2015; Oades & Anderson, 2012; Schuetz et al., 2019; Song & Shih, 2014; Tong, 2011; Tse et al., 2010; Tsoi et al., 2019). Thirteen studies have tested the effectiveness of SMCM for adults with mental illnesses. Eight of these studies employed experimental or quasi-experimental designs (Barry et al., 2003; Björkman et al., 2002; Gelkopf et al., 2016; Macias et al., 1994; Macias et al., 1997; Modrcin et al., 1988; Stanard, 1999; Tsoi et al., 2019) and five used non-experimental methods (Fukui et al., 2021; Kisthardt, 1994; Rapp & Chamberlain, 1985; Rapp & Wintersteen, 1989; Ryan et al., 1994). These studies have collectively produced positive outcomes in the areas of psychiatric hospitalisation, housing, employment, reduced symptoms, leisure time, and social and family support. Similarly, our recent review (Tse et al., 2016) showed that the benefits associated with the strengths-based approach (four out of seven studies under review were directly related to SMCM) include improvements in clients' general attitudes towards recovery-relevant dimensions (e.g., self-efficacy and sense of hope) and increases in job satisfaction and morale among mental health professionals. Further, SMCM fidelity scores were found to be associated with clients' outcomes across service sites, with high-fidelity SMCM associated with lower rates of psychiatric

hospitalisation and higher employment rates (Fukui et al., 2012). Recently, there have been a series of studies led by a Canadian team to explore the connection among fidelity scores, therapeutic ingredients, recovery outcomes, and management support (e.g., Briand et al., 2022; Durbin et al., 2022; Latimer et al., 2022; Roebuck et al., 2021, 2022). However, there are three major limitations to the existing studies. First, among the empirical studies that have investigated the effectiveness of SMCM in mental healthcare settings, only two (Björkman et al., 2002; Gelkopf et al., 2016) used a randomised controlled trial (RCT) in their research; the other studies used either secondary data analyses or quasi-experimental approaches with a pre and post design. Second, none of the studies conducted in Hong Kong or a Chinese cultural context used a fidelity assessment to ensure that the intervention group was actually using the strengths model (Tse et al., 2016). Third, although aging tends to create resistance to recovery processes as a person's functional ability tends to decline, none of the existing studies paid special attention to the participants' age as an independent variable in the Chinese community (Tang et al., 2022). The recovery paradigm was introduced to the Chinese community much later than in Western countries. Assessing the responses of individuals from various age groups to strengths-based interventions is critical (Tsoi et al., 2022). Chinese people, especially the older generations, tend to believe that "recovery may not be possible". Does SMCM instil hope for recovery regardless of different age groups?

Current Study

The main objective of the present study is to assess the effectiveness of SMCM when implemented among clients in community mental health centres in Hong Kong, using an RCT design. Specifically, the research team hypothesised that clients in the SMCM group will experience higher levels of personal recovery, as well as symptom reduction, improved hope,

community integration, mattering, working alliances, and goal attainment, relative to their counterparts in the control group, which incorporates an attention placebo. The second objective is to explore the differential intervention effects on the recovery outcomes by age.

Method

Ethical Approval and Considerations

The study received ethical approval from the Human Research Ethics Committee of The University of Hong Kong (HRECNC: EA1703078) based on the adherence to five basic principles: Beneficence and non-maleficence, fidelity, responsibility, integrity, and respect for people's rights and dignity (American Psychological Association [APA], 2003). Written informed consent was obtained from all participants after they were provided with a detailed explanation of the study's objective, the voluntary nature of their participation, their right to withdraw, and the risks and benefits of the study. The present trial was registered with the Australian New Zealand Clinical Trial Registry (ACTRN 12617001435370).

Design and Setting

This study was a multi-centre RCT consisting of two arms: an SMCM intervention group and a control group (treatment as usual). The clients in both arms were recruited from three ICCMWs, operated by different non-governmental organisations. These centres provide mental health services to individuals with either suspected mental health problems or a mental illness diagnosis. Specifically, the services provided include treatment and support groups, caregiver support, and community groups, as well as programs for former clients to reintegrate into society (Mindhk, 2022).

Sample and Sampling

The research team recruited a total of 209 clients (out of the 254 centre members) from the three ICCMWs. At each centre, a trained social worker was responsible for screening the eligibility of client participants (clients, hereafter) on the basis of the inclusion and exclusion criteria. To meet the inclusion criteria, an individual had to be (i) a client of mental health services at ICCMWs; (ii) aged 18 or above; (iii) Chinese, with the ability to read Chinese and speak Cantonese; (iv) diagnosed with a mental illness, including major depressive disorder, anxiety disorder, bipolar disorder, and psychotic disorders, by a psychiatrist; and (v) able to provide written informed consent to join the study and willing to be assigned to either group (SMCM or control group). The exclusion criteria were applied to those clients who were (i) likely to engage in immediate risky behaviour, such as suicide and/or violence; and/or (ii) affected by overt symptoms and unable to sustain a meaningful conversation for more than 10 minutes, as screened by caseworkers at their ICCMWs.

Recruitment and Training of Caseworkers

The caseworkers responsible for the delivery of the SMCM intervention were ICCMW staff who were registered social workers, programme workers, occupational therapists, or nurses. All caseworkers who participated were recruited on a voluntary basis. Respectively, 16 and 10 caseworkers were recruited for the control and SMCM groups. Those in the SMCM group received two days of training on SMCM covering various aspects of SMCM practices (e.g., “Recovery – Illuminating the path of hope”; “Strengths assessment – Amplifying wellness”) provided by one of the founders of SMCM.

Participants’ Characteristics at Baseline and Caseworkers’ Background

In total, 209 participants (Mean age = 50.24 years, SD = 13.01, range = 18–81 years old) were randomly assigned to the SMCM ($n = 105$) and control ($n = 104$) groups at baseline (T_0).

The proportion of participants who were married (35.4%) or single (38.8%) was comparable. More than half of the entire sample (51.2%) had received a secondary to tertiary level of education. The three most common diagnoses were depression (51.7%), psychosis/schizophrenia (29.5%), and anxiety disorder (18.8%). On average, the participants had suffered from their illness for about 12.1 years ($SD = 10.5$) and had used community mental health services for about 3.3 years ($SD = 2.6$). There were no significant between-group baseline differences in demographic or clinical variables except that the control group (62.5%) had more people receiving government welfare allowance than the SMCM group (48.6%), $p < .04$ (Table 1).

[Insert Table 1 here]

The workers in the control group had 6.6 years ($SD = 6.3$) of experience in the mental health sector, which was significantly longer than their counterparts in the SMCM group (3.8 years) ($p < .02$), although the self-rated recovery knowledge scores did not differ between the SMCM (mean = 3.75, $SD = .36$) and control (mean = 3.54, $SD = .36$, $p > .05$) groups at baseline.

Interventions

After screening for their study eligibility, all clients completed a face-to-face baseline questionnaire. The research project coordinator, who was the social worker based at each ICCMW, contacted the research team to obtain group allocation information, and participants were randomly assigned to either the SMCM or the control group. After group assignment, clients received the respective interventions and were asked to complete the same questionnaires at six and 12 months. Clients were informed that there were two forms of psychosocial intervention, but they did not know which intervention they were assigned to. The trained outcome assessors, who were peer researchers, were blind to the group allocation information, but the caseworkers in both the intervention and control groups were not. Peer researchers, who

were individuals with lived experience of mental illness, were recruited and trained by the research team to act as paid fieldworkers to collect data during the trial. In order to minimise contamination, caseworkers in the control group did not use any of the SMCM tools (e.g., strengths assessment, personal recovery plan) or receive any strengths-based group supervision. Incentives in the form of supermarket coupons (worth HK\$50 or US\$6.5) were given to the clients at all three time points as compensation for participating in the study. Figure 1 shows the CONSORT diagram, which illustrates the flow of participants throughout the research process.

[Insert Figure 1 here]

Eligible client participants were randomly assigned to each group in a 1:1 ratio according to a predetermined randomisation list generated by an online randomisation program (www.randomization.com). Block randomisation was performed to reduce bias and achieve a balance in allocating participants to the SMCM and control groups.

SMCM Group

The clients assigned to the SMCM group received individual SMCM sessions lasting about 30 minutes once every two weeks for 12 months. The strengths assessment and the personal recovery plan were used in the intervention sessions. During the intervention, the caseworkers helped the clients identify recovery goals that were meaningful to them and workers attended weekly strengths-based group supervision at their ICCMWs. Fidelity of implementation was monitored through the use of chart reviews of treatment plans, strengths assessments, personal recovery plans, and progress notes by two independent evaluators who were not the ICCMWs' staff members and had undergone training in conducting fidelity reviews. Supervisors attended ongoing monthly online group supervision led by RG. Details of the SMCM group can be found in the published protocol (Tse et al., 2019). The SMCM fidelity scale of the service unit was

used every six months to monitor program adherence and provide consultations to improve and maintain high fidelity for the SMCM group.

Control Group

The clients in the control group received a regular intervention (i.e., treatment as usual), which included recovery groups, medical appointments, leisure/hobby groups, and general community activities. Caseworkers had contact with clients once every two weeks, which served as the attention placebo. Caseworkers did not use any of the SMCM tools (e.g., strengths assessment, personal recovery plan) during their sessions with the clients. Table 2 compares the key characteristics of SMCM and control groups.

[Insert Table 2 here]

Measures

Outcome Measures

The primary outcome measure was the Recovery Assessment Scale (RAS; Giffort et al., 1995), which measures personal recovery in five areas: personal confidence and hope, willingness to ask for help, goal and success orientation, reliance on others, and no domination by symptoms. The items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with a higher score indicating greater perceived recovery. The scale has previously been validated (Salzer & Brusilovskiy, 2014) and used in an RCT of a peer-led programme (Cook et al., 2012) and in a cross-cultural study (Fukui et al., 2021; Fukui & Salyers, 2021). The RAS has been translated into Chinese (Cook et al., 2012), yielding good internal consistency and concurrent and construct validity. It achieved fair to excellent internal reliability in the present study (Cronbach's alpha = .73 to .93).

Other secondary outcome measures completed by clients included validated scales on state of hope (Snyder et al., 1996), level of symptoms (Conrad et al., 2001; Mak & Wu, 2006), community integration (McColl et al., 2001), mattering (Elliott et al., 2004), working alliance (Hatcher & Gillaspay, 2006; Hsu et al., 2016; Hsu & Yu, 2017), functional outcomes, goal achievements (i.e., self-identified goals, progress, perceived meaningfulness of the goal), and socio-demographic information. Additionally, data on working alliance and clients' goal progress were collected from caseworkers; how specific the goals were and the extent to which the goals identified by the client overlapped with those identified by the caseworker were rated by independent researchers. Details of the instruments and the psychometric properties used for measuring the primary and secondary outcomes are available as supplementary information (Supplementary Information on Outcome Measures).

Fidelity Measures

To ensure the SMCM group's adherence to the SMCM model, which differentiated it from the control group, two independent evaluators who had a thorough understanding of SMCM conducted a fidelity review at baseline (T₀) as well as at six (T₁) and 12 (T₂) months after the start of the intervention. The SMCM Fidelity Scale (Rapp & Goscha, 2012; for further details, see Latimer et al., 2022; Roebuck et al., 2022) has been validated, including the predictive validity for client outcomes (Fukui et al., 2012) and has been identified as a valid tool to implement and monitor the SMCM implementation (Teague et al., 2012). It was composed of nine items across three areas: structure, supervision/supervisor, and clinical/service. The fidelity review consisted of interviews with staff and clients, site observations, and reviews of the SMCM tools and case notes. The SMCM teams should have achieved an average fidelity score of 4 (out of 5) on the scale, including an average rating of four out of five in each of the three

areas. Advice was given to caseworkers by the fidelity evaluators in order to improve the efficacy of the SMCM implementation.

Statistical Analyses

The software applications we used for data analysis are SPSS Statistics version 28 (IBM, 2021) and JMP Pro version 16 (SAS Institute, 2021). Background information, including socio-demographic characteristics and all outcome variables, were summarised using means and standard deviations for continuous variables and frequencies, percentages, and cross-tabulations for categorical variables. Univariate and multivariate outliers, histograms, probability plots, and residual plots were examined to check compliance of parametric assumptions and to select the best-fitting models. We also conducted growth curve modelling (Muthén & Asparouhov, 2011), analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), and exploratory data analysis (EDA)/data visualization to test or explore whether or not there were any post-intervention improvements in participants' outcomes (e.g., RAS, goal progress, community integration) at T₀, T₁, and T₂. Clients were nested within caseworkers who were nested within agencies (implementation sites). Given the small sample size at the worker and agency levels, a fixed-effects model was used at the agency level to control for potential agency effects.

The overarching analytical orientations of this study are triangulation and pattern-seeking. Triangulation was employed to examine the data through multiple approaches, including MANOVA, ANOVA repeated measures, growth-curve modelling, and data visualization. Triangulation is a multi-faceted method to analyse data of the same study with the goal of enhancing internal validity. There are different approaches to triangulation, such as incorporating different data sources, different analytical methods, and different research paradigms (e.g., qualitative and quantitative methodologies; Bhandari, 2022; Creswell & Plano Clark, 2017;

Hasson-Ohayon et al., 2015). In this study the second type of triangulation was employed. Using the analogy that voting by a panel is better than decision-making by a single individual, Heesen et al. (2016) argued that triangulation is preferable to methodological purism.

Data visualization is one of the indispensable components for the discovery of hidden patterns and extracting insight from data (Yu, 2014, 2017, in press). The issue of over-reliance on confirmatory data analysis (CDA), especially basing decisions off the p value, has been discussed by statisticians for many years (Wagenmakers, 2007; Wasserstein & Lazar, 2016; Wasserstein et al., 2019; Wilkinson, 1999), and data visualization is considered one of the viable remedies. Cleveland (1993) argued that visualization stresses a penetrating look at the structure of data. In this sense, data visualization is the process of exploring data in a manner that can unearth subtle and hidden data patterns, ultimately resulting in providing the researcher with insight to answer the research question.

Hypotheses

In order to answer the research questions of this study, the null hypotheses are formulated as follows:

H1: There is a significant difference between the control and the SMCM groups in terms of the overall RAS scores, i.e., the SMCP group outperformed the control group.

H2: There is significant growth of the overall RAS scores over time.

H3: There is an interaction effect of the grouping factor and the time factor in terms of the overall RAS scores.

H4: There are significant differences between the control and the SMCM groups in terms of the RAS subscale scores, i.e., the SMCM group outperformed the control group.

H5: There is significant growth of the RAS subscale scores over time.

H6: There are interaction effects of the grouping factor and the time factor in terms of the RAS subscale scores.

H7: There is a significant relationship between client age and recovery outcome.

The null hypotheses of all of the above suggest otherwise.

Results

Descriptive Statistics

On average, the participants in both groups attended 12 sessions throughout the 12-month trial. In terms of session location, 76% of the sessions in the SMCM group took place in the community (e.g., meeting in a local park, exploring/visiting community services) versus 32.6% in the control group, which was consistent with one of the six major principles of SMCM: that is, the primary setting of an SMCM intervention is the community (Rapp & Goscha, 2012). The overall dropout rates for the SMCM at T₁ and T₂ were 8.6% and 8.3%, respectively, whereas for the control group they were 11.5% and 4.3% at T₁ and T₂, respectively. Regarding the fidelity scores for the SMCM group, before the trial started, the average fidelity score across the three agencies was 3.05; this score increased to 4.20, 4.39, and 4.37 at T₀, T₁, and T₂, respectively. However, for the control group, the fidelity scores remained at a low level, averaging 1.88 throughout the 12-month trial, which was expected (for details, see supplementary information, Appendix 2).

The Effect of SMCM on Recovery

The findings failed to confirm H1, H2, and H3. Two-way repeated measures ANOVAs were conducted on the RAS with group membership (SMCM versus control) by measurement times (T₀, T₁, and T₂). The between-subject factor is the grouping variable whereas the within-subject factor is the time-point. As shown in Table 3, no significant difference was found in the grouping

factor ($p = .51$, $\eta^2 = .001$), the time factor ($p = .67$, $\eta^2 = .002$), or the interaction ($p = .36$, $\eta^2 = .002$).

There was a slight increase in the reliance (on others) subscale of the RAS in the SMCM group as compared to the control group over the 12-month period ($F(1, 174) = 2.31$, $p = .1$). There were no other statistically significant interaction effects for the total score (RAS-Total) or other subscales of RAS, although there was a significant group effect for RAS-No domination by symptoms ($p < .03$), where the SMCM group had higher scores than the control group across all measurement times (Table 3).

[Insert Table 3 here]

The Effects of SMCM on Other Psychosocial Measures and Goals

Neither H4 nor H5 was confirmed. However, there was a statistically significant group by time interaction (H6) between the SMCM and control groups over the 12-month period in regard to caseworkers' rated working alliance, indicating that the SMCM group had a greater increase than the control group across time, $F(1, 149) = 20.28$, $p < .01$. No statistically significant interaction effects for psychosocial measures were found, although there was a significant increase in mattering ($p = .02$, $\eta^2 = .023$) and working alliance ($p < .0001$, $\eta^2 = .323$) over time as reported by the clients in the SMCM. Regarding the goal-related measurements (Table 4), significant time effects were found for number of goals ($p < .0001$, $\eta^2 = .073$), progress ($p < .0001$, $\eta^2 = .075$), achievement index (in relation to meaningfulness and progress; $p < .0001$, $\eta^2 = .782$), and the overlap between workers and clients ($p < .0001$, $\eta^2 = .188$), although there were no interaction effects on goal-related scores.

[Insert Table 4 here]

The Effects of SMCM by Age

The data rejected the null and supported the alternate of H7. The research team utilized data visualization and regression analysis to gain a more thorough understanding of the data pattern on the topics under study (Cleveland, 1993; Tukey, 1977). First, a scatterplot of age and the change in RAS-Total score between the first and the last time points in the SMCM intervention group was examined (i.e., $T_2 - T_0$; 'positive change score' denotes improvement at T_2 ; 'negative change score' denotes deterioration at T_2). Figure 2 shows a flat regression line, implying the absence of a relationship between age and change in RAS-Total score for the SMCM group, and the regression model confirmed this ($b = .000138$, $t = .03$, $p = .9761$, 95% CI[-.008949, .0092242]). However, Figure 3 shows a different data pattern for the control group: an inverse relationship between change in RAS-Total score and age, meaning that as age increased, the positive change score decreased, or more deterioration of recovery was observed (represented by the increase in negative change score). The regression model verified this significant association ($b = -.009995$, $t = -2.73$, $p = .0077$, 95% CI [-.017236, -.002753]). Similar age-dependent data patterns were observed in all RAS subscales (confidence, help, goal, reliance, and symptoms disturbance) as well as in two other secondary measures (hope and psychiatric symptoms, measured by the Colorado Symptom Index). For example, while age was unrelated to change of hope in the SMCM group, the inverse relationship was evident in the control group.

[Insert Figures 2 and 3 here]

Second, we examined the growth curve model for individual participants in the SMCM and control groups across the three age groups, focusing on RAS-Total as the dependent variable and other constructs as independent variables. Tables 5 and 6 show only the statistically significant results; only the participants in middle adulthood had significant results. β_{11} and β_{21} are linear

and quadratic changes, respectively. Linear means a rate of change per unit of time; quadratic means alteration in the rate of change (i.e., accelerating or decelerating). Middle-aged participants in the SMCM group demonstrated a significant improvement ($\beta_{11} = .204, t = 2.44, p < .05$) in RAS-Total and a significant decrease in the rate of improvement for each time interval ($\beta_{21} = -.096, t = -2.51, p < .05$). This implies that RAS-Total rose sharply at first then decreased gradually at subsequent time points. We next explored time-invariant (e.g., age at illness onset and duration of membership at ICCMW) and time-varying (e.g., hope, mattering, goal progress) predictors of the primary outcome, RAS-Total, for middle-aged participants in the SMCM group. None of the time-invariant factors were significant in predicting RAS-Total. However, two of the time-varying factors were found to be significant predictors of RAS-Total: community ($t(21.4) = 4.94, p < .001$) and achievement index ($t(-2.35), p < .05$) (See Tables 5 and 6).

[Insert Tables 5 and 6 here]

Discussion

Although no significant differences were found between the SMCM group and the attention-placebo control group in terms of improving overall recovery and psychosocial outcomes, the participants in the SMCM group showed a slight increase in reliance on others (e.g., clients had friends they could count on, someone had confidence in the client) at T₂. Moreover, compared with the control group, there was a stronger therapeutic alliance between clients and caseworkers, as rated by the workers, in the SMCM group across the 12-month intervention.

By using data visualisation techniques, the participants in the SMCM group maintained a stable RAS-Total score regardless of their age. This data pattern was not found in the control group, where the recovery outcomes deteriorated among the participants in the older age group. The MANOVA results confirmed that the young and middle-aged participants (18-59 years old)

in the SMCM group achieved higher RAS-Total scores than the participants in the control group at T₂. Consistently, the growth curve modelling also showed that the middle-aged participants (40-59 years old) showed an increase in their personal recovery and goal progress in the SMCM group, although the rates of improvement slowed down over time. No such improvements were found for the control group. Additionally, the above desirable outcomes were obtained in the SMCM despite the fact that the SMCM caseworkers (3.8 years) had considerably fewer years of working experience in mental health than the control group caseworkers (6.6 years).

In the current study, the SMCM group showed similar null findings in personal recovery, functional recovery, goal achievement, and level of symptoms to those reported in a previous RCT with individuals with severe mental illness (Björkman et al., 2002), a meta-analysis (Ibrahim et al., 2014), and a non-randomised controlled trial conducted with participants in supported accommodation (Tsoi et al., 2019). A plausible explanation for this could be that the recovery process is highly individualistic and existing scales (e.g., RAS) have limitations in terms of their ability to capture different aspects of improvement (Fukui & Salyers, 2021). Another plausible explanation could be the high levels of recovery knowledge possessed by the caseworkers in both groups. With the increased training in the recovery approach in local mental health services, which emphasises empowerment and self-determination, caseworkers in the control group may also provide a recovery-oriented service environment for their clients to achieve a meaningful life that is comparable to SMCM. Nevertheless, the principles and tools of SMCM seem to provide a good framework for caseworkers with less experience to achieve similar therapeutic outcomes to those with more experience.

Moreover, it is noteworthy that SMCM showed a stabilising effect, in that the changes in the scores on recovery were not affected by age, whereas the control group did not have such effect.

This could be related to a crucial element of the SMCM approach, which assists clients with their individual recovery and life goals. According to the self-determination theory (Deci & Ryan, 1985, 2000), the fulfilment of life goals (represented by three psychological constructs, namely, autonomy, competence, and relatedness) is essential for the well-being and quality of life of people of different age groups, clinical and socioeconomic status (Felton et al., 2017; Ng et al., 2012). It also suggests that intrinsic life goals, such as personal development, building meaningful relationships, and connecting with and contributing to the community, facilitate satisfaction of psychological needs and hence promote well-being (Shepherd et al., 2008; Tew et al., 2011). As SMCM promotes the identification of these intrinsic goals by using a personal recovery plan, this could be the reason for the stabilising effect found in the SMCM group relative to the control group (Tse et al., 2021).

Limitations

Several limitations of this study should be noted. First, although this was an RCT study and the two conditions were well controlled, the control group in the same agency had a similar level of recovery knowledge, which may have elevated the primary outcome scores in the control group.

Second, this study uses a factorial design entailing both between-subject and within-subject factors. Most within-subject studies are subject to the testing effect, in which having taken a first test has an effect on the outcomes of taking a second test. In other words, the previous measurements inform the participants of what is expected, and they might respond to the questions accordingly. Moreover, when the participants are measured repeatedly, fatigue and boredom factors might also affect data quality. Despite the research team having made a

tremendous effort to train the raters, the changes in observer mood and other uncontrollable conditions might produce changes in rating outcomes (Shadish et al., 2002).

Third, the findings of this study might not be generalizable to other service settings in non-Chinese speaking communities, or even other Chinese communities. It is noteworthy that Chinese communities are very diverse, and there exists a high degree of cultural variations between mainland China, Taiwan, Hong Kong, Macau, and Singapore. Hence, generalizability of the findings to other Chinese communities awaits further research.

Finally, the research team was well aware that multiple tests were run in this study and thus there is a risk of committing Type I errors. When the p value is extremely small (e.g., $< .0001$), the Bonferroni correction method that multiplies the precise p value by the number of tests could not be employed. Nonetheless, while some findings in this project are based on p values, which are tied to infinite sampling distributions, parts of the findings are discovered by data visualization, which aims to unearth the pattern of the data at hand (Yu, in press).

Summary

With the development of the recovery movement in Hong Kong in recent decades, this first RCT of SMCM among Chinese adults provides an important addition to the existing literature. In particular, the stabilising effect of an SMCM group and its benefit to workers with less experience suggest that it could be a useful model to adopt in community mental health service settings. Future studies could include RCTs to assess the effectiveness of SMCM in other psychiatric settings. Particularly, the similar levels of recovery knowledge in intervention and control groups should be addressed. A more individualised outcome measure on recovery could be developed to capture the gains from adopting this case management approach.

Declaration of Conflicting Interests

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Supplemental Material

Supplementary material for this article is available online.

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Table 1.
Demographics of client participants.

	SMCM (n=105)	Control (n=104)	Overall (n=209)	<i>t/X²</i>	<i>p</i>
Age (year)	50.39 (12.95)	50.09 (13.13)	50.24 (13.01)	.17	.87
Gender - Female	77 (73.3%)	77 (74.0%)	154 (73.7%)	.01	.91
Marital Status				.24	.97
Single	39 (37.1%)	42 (40.4%)	81 (38.8%)		
Married	38 (36.2%)	36 (34.6%)	74 (35.4%)		
Separated/Divorced	18 (17.1%)	17 (16.3%)	35 (16.7%)		
Widowed	10 (9.9%)	9 (8.7%)	19 (9.1%)		
Education Level				5.26	.51
Primary school or below	20 (19.1%)	24 (23.0%)	44 (11.5%)		
Junior	28 (26.7%)	30 (28.8%)	58 (27.8%)		
High School	28 (26.7%)	29 (27.9%)	57 (27.3%)		
Tertiary (not completed)	6 (5.7%)	7 (6.7%)	13 (6.2%)		
Tertiary/Postgrad (completed)	23 (22.0%)	14 (18.2%)	37 (17.7%)		
Current Occupation				13.61	.09
Student	2 (2.0%)	0 (0%)	2 (1.0%)		
Employed	23 (23.2%)	13 (13.1%)	36 (18.2%)		
Take care of family	22 (22.2%)	29 (29.3%)	51 (25.8%)		
Sheltered workshop	0 (0%)	2 (2.0%)	2 (1.0%)		
Daytime training	3 (3.0%)	5 (5.1%)	8 (4.0%)		
Supported Employment	0 (0%)	4 (4.0%)	4 (2.0%)		
Unemployed	20 (20.2%)	24 (24.2%)	44 (22.2%)		

Retired	23 (23.2%)	18 (18.2%)	41 (20.7%)		
Others	6 (6.1%)	4 (4.0%)	10 (5.1%)		
Type of Housing				2.28	.68
Public housing	42 (41.2%)	44 (43.1%)	86 (42.2%)		
Renting house	11 (10.8%)	12 (11.8%)	23 (11.3%)		
Private housing	39 (38.2%)	41 (40.2%)	80 (39.2%)		
Hostel	4 (3.9%)	2 (2.9%)	7 (3.4%)		
Others	6 (5.9%)	2 (2.0%)	8 (3.9%)		
On CSSA/Government Allowance				4.10	.04
	51 (48.6%)	65 (62.5%)	116 (55.5%)		
Personal Monthly Income				18.36	.14
No income	24 (26.7%)	22 (23.9%)	46 (25.3%)		
\$1 - \$5,000	33 (36.7%)	51 (55.4%)	84 (46.1%)		
\$5,001 - \$10,000	22 (24.4%)	9 (9.9%)	31 (16.9%)		
\$10,001 - \$15,000	6 (6.7%)	7 (7.6%)	13 (7.1%)		
\$15,001 - \$20,000	1 (1.1%)	1 (1.1%)	2 (1.1%)		
\$20,001 and above	4 (4.4%)	2 (2.2%)	6 (3.3%)		
Duration of Illness (year)	12.10 (11.12)	12.11 (9.97)	12.11 (10.54)	-.01	.99
Diagnosis					
Depression	55 (52.4%)	52 (51.0%)	107 (51.7%)	.04	.84
Anxiety disorder	22 (21.0%)	17 (16.7%)	39 (18.8%)	.62	.43
Psychosis/Schizophrenia	32 (30.5%)	29 (28.4%)	61 (29.5%)	.10	.75
Bipolar disorder	6 (5.7%)	7 (6.9%)	13 (6.3%)	.12	.73
Duration of receiving services prior to the research				1.47	.15
	3.64 (2.79)	2.91(2.44)	3.25 (2.62)		

Table 2.*Key characteristics of SMCM intervention and control groups.*

Dimensions	SMCM Group	Control Group
1. Intervention Integrity & Infrastructure	- To ensure a supportive strengths model context through the <i>Fidelity Scale</i> , which was designed to assess the adequacy of SMCM implementation in three core areas: structure, supervision/supervisor, and clinical/service.	- No routine fidelity review for the implementation of recovery-oriented services.
2. Individual Sessions		
a. Strengths Assessment	- To collect information on personal and environmental strengths using the <i>Strengths Assessment</i> tool as the basis of work. - Domains in daily living, assets, employment/education, supportive relations, wellness/health, leisure, spirituality/culture. - Ongoing process.	- No specific tool for assessing personal strengths; therefore, they would not be assessed by the case worker in a structured way.

b. Recovery Plan - To create a mutual agenda for work, focusing on achieving the goals that the person has set.

- To write down the person's goals (Passion Statement) and plan specific steps (short-term goals) to achieve the goals in the *Personal Recovery Plan*.

- Work on specific goals.

- No specific tool.

3. Group Supervision - To provide support and affirmation, ideas, and learning.

- Weekly supervision following specific steps:

- ✓ The presenting staff hand out service users' strengths assessments and specify the help needed from the group.
- ✓ The team clarify the assessment and brainstorm ideas.
- ✓ The presenting staff review the ideas and state the next steps.

- Adopt the existing supervision arrangements.

Table 3.

Psychosocial outcome measures: Baseline and 6- and 12-month post-intervention scores of SMCM intervention group and control group.

	SMCM Intervention (n=105)			Control (n=104)			ANOVA <i>n</i> (I, C)	<i>Time</i> <i>p</i>	<i>Group</i> <i>p</i>	<i>Interaction</i> <i>p</i>
	Baseline	6-month	12-month	Baseline	6-month	12-month				
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)				
RAS-Total	3.61 (.56)	3.69 (.50)	3.65 (.53)	3.62 (.54)	3.61 (.56)	3.62 (.55)	88,88	.51	.67	.36
Confidence	3.47 (.63)	3.56 (.62)	3.53 (.67)	3.48 (.62)	3.49 (.65)	3.46 (.64)	88,88	.48	.63	.54
Help	4.02 (.74)	4.10 (.59)	4.05 (.64)	4.07 (.56)	4.04 (.63)	4.05 (.62)	88,88	.83	.95	.55
Goal	3.65 (.70)	3.64 (.62)	3.65 (.58)	3.74 (.62)	3.72 (.69)	3.74 (.64)	88,88	.90	.28	.99
Reliance	3.63 (.74)	3.79 (.63)	3.71 (.64)	3.68 (.69)	3.64 (.80)	3.68 (.69)	88,88	.49	.62	.10
No Domination by Symptoms	3.49 (.79)	3.66 (.72)	3.55 (.80)	3.31 (.85)	3.35 (.89)	3.38 (.84)	88,88	.29	.03*	.47
State of Hope	31.01 (8.45)	32.85 (8.28)	32.83 (8.26)	30.95 (10.17)	31.63 (9.94)	31.60 (9.33)	87,87	.55	.49	.53

Community Integration	39.89 (7.68)	40.20 (6.42)	39.57 (7.07)	39.51 (7.23)	38.66 (5.87)	39.43 (6.32)	87,88	.83	.44	.26
Mattering	9.60 (2.48)	10.36 (1.84)	10.08 (1.91)	9.70 (2.32)	9.98 (2.16)	9.77 (1.96)	87,88	.02*	.43	.35
Symptoms	30.40 (11.68)	28.88 (10.13)	29.46 (10.95)	31.79 (12.71)	31.27 (12.74)	30.33 (11.29)	83,84	.18	.34	.54
Working Alliance- Client	58.01 (12.55)	63.49 (11.00)	65.59 (10.57)	59.08 (15.16)	61.37 (13.44)	63.27 (13.52)	80,81	.00**	.50	.17
Working Alliance- Worker	55.03 (7.99)	63.88 (7.78)	68.19 (6.92)	55.87 (11.73)	59.59 (8.73)	60.93 (8.91)	69,82	.00**	.00**	.00**

* $p < .05$; ** $p < .01$

Table 4.

Goals-related measure: Baseline and 6- and 12-month post-intervention scores of SMCM intervention group and control group.

	SMCM Intervention (n=105)			Control (n=104)			ANOVA <i>n</i>	<i>p</i>	<i>p</i>	<i>p</i>
	Baseline	6-month	12-month	Baseline	6-month	12-month				
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	(I, C)			
No. of goals	2.56 (1.84)	2.91 (1.96)	3.12 (2.06)	2.40 (1.88)	2.98 (2.03)	3.67 (2.41)	85,87	<.001*	.52	.12
¹ Concreteness	1.82 (.60)	1.82 (.47)	1.79 (.41)	1.77 (.55)	1.79 (.47)	1.85 (.46)	65,63	.91	.96	.59
Meaningfulness	4.50 (.60)	4.33 (.78)	4.38 (.58)	4.47 (.64)	4.46 (.54)	4.47 (.63)	65,63	.45	.42	.53
Progress	2.73 (1.09)	3.13 (.93)	3.20 (.97)	2.75 (.94)	3.21 (.98)	3.19 (.96)	63,62	<.001*	.79	.93
Achievement index	-1.20 (1.01)	1.22 (1.10)	1.77 (1.26)	-1.27 (1.07)	1.25 (1.01)	1.72 (1.16)	63,62	<.001*	.75	.93
¹ Overlap between workers and clients	.60 (.73)	.87 (.74)	.78 (.77)	.35 (.52)	.83 (.67)	.83 (.70)	76,82	<.001*	.27	.12

* $p < .001$

¹ These two items were rated independently by a research assistant. “Concreteness” refers to how specific the goals identified by the service users were: “0” = not concrete at all; “1” = somewhat measurable goals with general steps working towards the goal; “2” = goals have a clear context and working steps. “Achievement index” refers to how much progress was made towards achieving the goals considered as highly meaningful. The higher the index, the more progress had been made towards achieving the meaningful goal.

Table 5.*Variation of growth rates of different variables across individuals in SMCM group.*

	<u>All</u>				<u>Young Adulthood</u>				<u>Middle Adulthood</u>				<u>Late Adulthood</u>			
	β_{11}	t	β_{21}	T	β_{11}	t	β_{21}	t	β_{11}	t	β_{21}	t	β_{11}	t	β_{21}	t
RAS_total									.204	2.44*	-.096	-2.51*				
Mattering	1.26	3.36***	-.500	-2.83**									2.16	2.82**	-.960	-2.70*
Community Symptoms																
WAIClient	6.88	3.45***	-1.66	-1.76					8.10	3.33***	-2.65	-2.33*				
Change of goals																
Progress	.651	2.62**	-.180	-1.51					1.06	3.43***	-.33	-2.27*				
Concreteness																
Achievement index					1.25	2.12	-1.24	-4.36***								

Notes: RAS - Recovery Assessment Scale; WAI - Working Alliance Inventory* $p < .05$; ** $p < .01$; *** $p < .001$

Table 6.*Variation of growth rates of different variables across individuals in control group.*

	<u>All</u>		<u>Young Adulthood</u>				<u>Middle Adulthood</u>				<u>Late Adulthood</u>					
	β_{11}	t	β_{21}	t	β_{11}	t	β_{21}	t	β_{11}	t	β_{21}	t	β_{11}	t	β_{21}	t
RAS_total																
Mattering					2.31	2.17*	-1.05	-2.05								
Community																
Symptoms					-7.42	-3.20**	2.16	1.96								
WAIclient					11.2	2.13*	-4.32	-1.74								
Change of					1.92	2.10*	-0.766	-1.76								
goals																
Progress	.771	3.14**	-.263	-2.23*					.638	2.49*	-.222	-1.78				
Concreteness													.526	2.32*	-.189	-1.83
Achievement																
Index																

Notes: RAS - Recovery Assessment Scale; WAI - Working Alliance Inventory

* $p < .05$; ** $p < .01$

Figure 1.

CONSORT diagram reflecting the flow of participants through the current study.

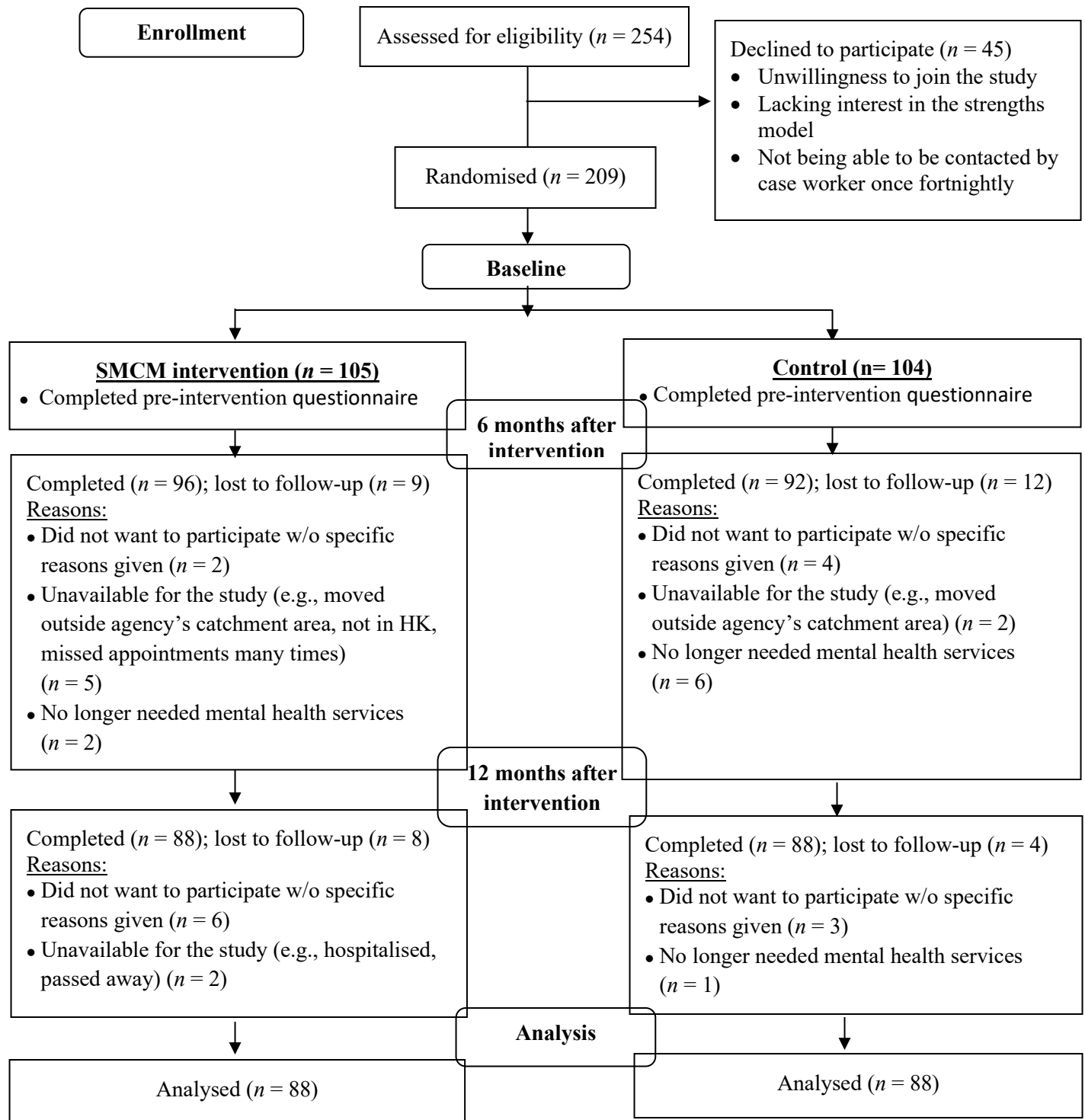


Figure 2.

Scatterplot of age and the change of RAS total score between the first and the last time points in the SMCM intervention group.

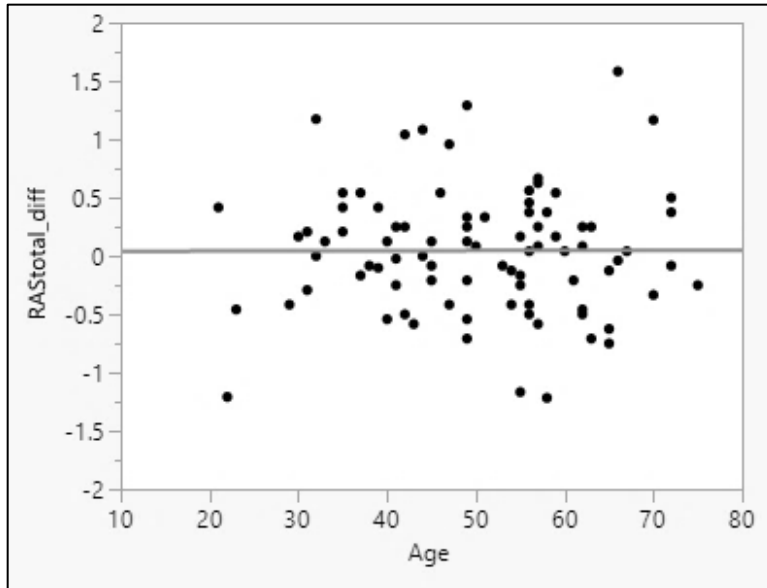


Figure 3.

Scatterplot of age and the change of RAS total score between the first and the last time points in the control group.

