A feasibility study of a home-based intervention for elderly depression among Hong Kong Chinese

Abstract

Depression is the leading cause of premature disability and depression in elderly that is associated with increased disability, higher mortality, and poorer health outcomes. The Smiley Activation Program (SAP) is a home-based intervention that is targeted to reduce depressive symptoms in elderly for Hong Kong Chinese. The SAP includes eight social worker's home visits and two volunteer visits over 19 weeks and a three-month follow up, integrating problem solving treatment and behavioral activation. This study aims to evaluate the feasibility and effectiveness of the SAP in reducing depressive symptoms for elderly depression in Hong Kong, by comparing the outcomes at pretest, posttest, and three-month follow-up. 219 old adults aged 60 or above with depressive symptoms were recruited. Significant improvements in depression (t=12.79, p<.01) and an effect size of 0.96 was reported. Other benefits include improvements in perceived general health, physical and social activeness and pleasant activity level. The low attrition rate and high participant satisfactory level supported the feasibility of the programme. Implications to social work research and practice are discussed.

抑鬱是殘疾的主要成因，長者抑鬱與殘疾，死亡率及不良的健康後果關係密切。<躍動晚情 – 長者抗抑鬱地區計劃>通過家居介入減低中國籍長者的抑鬱癥狀。計劃包括八節社工探訪及兩節義工探訪，歷時十九週，另加三個月跟進。計劃內容結合解難治療及行為激活法。本研究通過比較參加者在前測，後測及三個月跟進，檢討計劃的可行性及有效性。研究招募了 219 位 60 歲或以上出現抑鬱癥狀的長者。結果顯示抑鬱指數有顯

著改善 (t=12.79, p<.01) , 效益值 0.96 為高水平。其他獲益包括自覺健康, 身體及社交活躍程度, 愉快活動水平。計劃的低流失率及參加者高滿意水平顯示其可行性。文中並討論對社工研究及實務的意義。

Keywords:

elderly depression, home-based intervention, Chinese

Introduction

Depression is the leading cause of premature disability worldwide and by year 2020, it will rank the second in global burden of diseases (World Health Organization, 2008). Depression in elderly is associated with increased disability, higher mortality, and poorer outcomes from physical illness (Rodda, Walker and Carter, 2011).

The prevalence of depression among elderly in Hong Kong is similar to other countries. Chi and her colleagues interviewed 917 community-dwelling Chinese elders in 2005 and reported that 12.5% of them suffered from depressive symptoms (Chi et al., 2005). The Hong Kong Mental Health Survey reported significant age differences in past week prevalence of major depressive episode. The age group from 16 to 25 had a prevalence of 0.55 only for past-week depressive episode but the prevalence for people aged 66 to 75 was 4.70, eight times higher than the younger age group (Lam et al., 2015). One primary concern about outcome of depression is suicide (Nock, Millner, Deming, & Glenn, 2014). In 2016, there were 276 people committed suicide in Hong Kong, and 104 of them were aged 65 or above. Their suicide rate was 23.8 per 100 000 population, which was the highest among all age groups which was also 80% higher than the second highest group (age 55 to 64) (Centre for Suicide Research and Prevention, 2018). In view of ageing population, identification and timely treatment of elderly depression become a prominent concern of the mental health professionals in Hong Kong.

Although the same diagnostic criteria of major depression is used, older adults are more likely to complain a loss of interest than to present an overt expression of a depressive mood than middle-aged adults (Blazer & Hybels, 2014). Other subtle differences such as a stronger sense of self-worthlessness, inappropriate guilt, diminished ability to concentrate or to make decision, fatigue, and insomnia. The challenges in assessment and treatment for depression among Chinese is further complicated by somatization, that is a tendency to report physical pain or distress such as heartache, chronic fatigue, sleeplessness, and bodily pains when

experiencing depression (Kleinman, 1982; Lee, Kleinman, and Kleinman, 2007). The emotional non-expression and perception of low energy (often described as low *qi* in Chinese language) implies that mental health professionals should explore alternative modality in treatment, instead of relying on western psychotherapy that is often based on client's articulation of negative moods and thoughts (Chentsova-Dutton, Ryder, & Tsai, 2014).

The role of problem solving and pleasant activity in elderly depression

To reduce the disease burden, one major strategy is to develop methods of applying psychological treatments in a simpler and more efficient way, so that intervention can be implemented to more people in need and in a more cost effective way (Cuijpers, 2015). Western studies in help seeking behaviour reported that less than half of people with depressive disorders receive treatment and this is much lower for low income and older adults. On the other way, more established treatment such as Cognitive Behavioural Therapy and Interpersonal Therapy required higher level of expertise and fully trained psychotherapists are often unavailable for timely and intensive treatment. Mental health professionals can play a significant role in filling the gap and reach out to old adults in need by providing home-based intervention.

Both Behavioral Activation (BA) and Problem Solving Therapy (PST) are found to be favourable options based on above consideration. BA is a behavioral treatment that primarily focuses on increasing rewarding activities, overcoming avoidance living patterns, and re-establishing healthy life routines through pleasant activity scheduling (Hopko et al., 2003). Pleasant activity scheduling is the process in which participants learn techniques to monitor their mood and daily activities and see the connection between these, and then develop a plan to increase number of pleasant activities and positive interactions with their environment (Lewinsohn, Biglan, & Zeiss, 1976). Research has shown that increased social and physical

activities lead to decreased depression (e.g., Glass et al., 2006; Strawbridge et al., 2002). Practitioners of BA can assist individuals with depression in identifying pleasant activities and increasing positive interactions between the persons with depression and their environment (Kanter, Busch, and Rusch, 2009). Pleasant activities also include social activities that can be used to manage depression (Glass et al., 2006). Social activities may promote physical health, which may in turn improve depressive symptoms (McNeil, LeBlanc, & Joyner, 1991). Activity may also promote active coping strategies (Holahan, Moos, Holahan, & Brennan, 1997), and reinforce life-long patterns of attachment through which other psychosocial resources may be available (Barnas, Pollina, & Cummings, 1991).

PST is another brief, practical psychological treatment which helps participants to identify and solve problems (Hegel & Arean, 2003). Problems are defined as any situations in which immediate and easily recognizable solutions are not apparent; and problem-solving is defined as the process by which a person attempts to identify, discover, or invent effective or adaptive coping responses for specific problematic situations encountered in everyday living (Mynors-Wallis, 2002). Evidence has linked weak problem-solving abilities to the etiology and maintenance of psychological disorders (D'Zurilla, 1990). The rationale underpinning the treatment is that participants' psychological symptoms are caused by the everyday problems that they are experiencing, and problem-solving treatment teaches the patient a specific problem-solving procedure in an attempt to resolve their problems in a structured way (Mynors-Wallis, 2002). Therefore, if the participants' problems can be resolved, their symptoms will improve. PST develops a structured format for solving problems that includes defining problems, setting realistic goals, generating multiple solutions, evaluating solutions, selecting a solution, and implementing the solution is used to problem solving therapy (Nezu and Wilkins, 2005). Reviews of randomized studies confirmed that BA and PST had similar effects with major psychotherapy approaches such as Cognitive Behavioral Therapy and

Interpersonal Psychotherapy in treating depression (Cuijpers, van Straten, and Andersson, 2008; Cuijpers et. al, 2014; Kirkham et. al, 2015).

Background to adapting a home-based intervention for elderly depression among Hong Kong Chinese

In Hong Kong, many old adults receive social services in non-government organizations but the form of assistance are often restricted to tangible assistance, such as financial assistance, meal service, and physical rehabilitation. Currently community mental health services has been developed and treatment for common mental disorders are provided in out-patient service in hospitals or clinics. Besides, Integrated Community Centre for Mental Health and Wellbeing (ICCMW) is available but service users are mostly young people and adults with psychosis. For those who are home restricted or socially withdrawal by depressive symptoms, home-based intervention is probably a preferred option of treatment.

During the preparation of this elderly depression project, the four authors conducted a survey to understand the mental health conditions of 234 service users in Integrated Home Care Units (IHC) and Neighborhood Elderly Centre (NEC) in Hong Kong. It was found that 48.10% of IHC users reported minor or major depressive symptoms while the rate for those in NEC was 20.9%. IHC users are usually frail or home-restricted and they are less accessible to centre-based services and even less likely to approach the community mental health service, which does on providing tailor made services to this specific age group. Older adults from the IHC service also reported lower levels of perceived health condition, social activities, physical activities, and pleasant activities, and among the four variables, only pleasant activities was the significant predictor of depression (β= -1.13, $p < .05$). These findings supported social worker's clinical impression that an intervention based on BA and PST would be helpful for Chinese elderly with depression. A project named "Smiley Activation Project" (SAP) was launched in

2015 to offer a home-based intervention programme to older adults for managing their depressive symptoms.

The development of SAP take references to a similar evidence-based intervention, a Program for Encouraging Active Rewarding Lives (PEARLS) in United States (Steinman, Edmondson, and Snowden, 2012). PEARLS combine PST and BA for older adults with depression. A randomized controlled trial (RCT) was conducted for 138 older adults with minor depression and dysthymia, in low-income and multiple chronic medical conditions were randomized into PEARLS and usual care. Results showed that at twelve-month follow-up, PEARLS participants had a significantly better improvement in depressive symptoms. While 43% of them had a 50% reduction in depressive symptoms, only 15% from the usual care group had similar changes. PEARLS participants also reported better health-related quality-of-life and emotional well-being (Ciechanowski et al., 2004).

In addition to the above study of PEARLS, four studies of home-based intervention for depression with a reasonable sample size over 100 were identified before the commencement of our project. A RCT was conducted for 361 primary care patients with chronic ill old adults with depression to compare the outcome of the Depression in Elderly with Long Term Afflictions (DELTA) with usual care in the Netherlands. An average of four sessions, each lasting our hour, over a maximum period of three months were delivered. After nine months of the intervention, participants receiving the program had fewer depressive symptoms and a better quality of life than controls (Lamers et al., 2010). Another RCT was conducted to evaluate the Depression in Late Life Intervention Trial of Exercise (DeLLITE) in the New Zealand. 193 participants were assigned to individualized physical activity program, with eight one-hour visits, or social visits, over six months (Kerse et al., 2010). A study at United Kingdom recruited 105 participants and assigned to the Collaborative Care Model for Managing Depression or usual care group. Participants were less likely to suffer from major depressive

disorder compared with the counterparts. Finally, a RCT study was conducted to investigate the home-based intervention for 208 African Americans who were assigned to Helping Older Adults Beat the Blues Program or four month wait-list. Participants reported reduction in depression severity and quality of life (Gitlin et al., 2013).

Although home-based intervention has been found to be effective in old age depression, most studies with larger sample size were western studies and only one of them was based on African Americans (Gitlin, 2014; Pickett, Raue, and Bruce, 2012). Such effectiveness in Chinese populations was seldom discussed in previous literature. A study focused on the cultural adaptation of problem solving therapy for Chinese old adults and highlighted themes in reducing stigma, effective management of provider-client relationship expectation, and other cultural themes but the authors offered a single case study only (Chu, Huynh, and Arean, 2012). Another randomized controlled study (N = 50) reported the effectiveness of a music programme on depression in old adults that was implemented in eight week, home-based intervention in Singapore (Chan, Onishi, & Thayala, 2012). However, the study had limitations including as the absence of participant's racial background information, small sample size, and the use of specific intervention strategy.

This study investigated the feasibility and effectiveness of the SAP program in reducing depressive symptoms of older adults in the community. The hypothesis was that older adults would show a significant reduction in depressive symptoms after receiving the SAP programme. The study has obtained the ethics approval from the second author's university research office (ref. 3-1-201504_03).

Method

Participants

All participants in the SAP programme were voluntary and were 60 years old or above. To

recruit the sample, programme leaflets and referral forms were sent to IHCS teams, psychiatric units, other social services for elderly in the community. Social workers and mental health professionals can make referrals to the project team and self-referrals are also accepted. Project team members would conduct an initial screening to applicants by phone calls. Participants were asked if they had any depressive symptoms, readiness to commit in the home-based intervention program, and agreed with the research purpose. The following applicants would be excluded: people who did not report any depressive symptoms in PHQ-9; those who reported to have alcoholism, substance abuse or psychotic disorder; and a score below 3 in the Brief 6-item Memory Cognition Screen was included for excluding those with cognitive impairment. These criteria follows the practice of PEARLS (Steinman, Edmondson, and Snowden, 2012).

The SAP project team received 259 applications, and 40 of them were rejected (4 without depressive symptoms, 2 due to death or hospitalization, 34 refusal to home visits). 219 participants completed their baseline assessment and offered their written consent to for this study. A detailed face-to-face assessment for collecting get baseline data using Patient Health Questionnaire (PHQ-9). If the applicant meet the criteria of dysthymia, minor depression, or major depression, participants would be accepted for the SAP and written consent would be collected.

Among the participants, 74.0% of them were female and the mean age was 81.0 with a standard deviation of 8.9 years. At the time of pre-test (T1), based on the scoring of Patient Health Questionnaire (PHQ-9) (Kroenke & Spitzer, 2002), 5.0% of them had dysthymia, 36.5% had minor depression, 32.9% had moderate depression, 21.0% was classified as moderately severe, and 4.6% was classified as severe. 47.5% of them were living alone. 24.7% of them were on psychiatric medication and 38.8% were referred by psychiatric unit. 41.6% of them had two or three chronic diseases, and 18.7% of them had more than three. More details about the participants are displayed in Table 1.

Procedures

The SAP included 10 sessions and each lasting for 60 minutes. Eight sessions are administered by SAP practitioners. Sessions 1, 2 and 3 are scheduled on weekly basis, sessions 4 and 5 are on biweekly basis, and sessions 6 through 8 are on monthly basis. Two volunteer sessions between session 6 and 8 for strengthening the engagement of participants in selected activities. The duration of the SAP lasts for 19 weeks. A follow-up call is conducted three months after the completion of programme.

After collecting the permission the PEARLS representative from the University of Washington, the SAP project team translated the programme materials and protocol into Chinese. Session 1 includes the baseline assessment, an orientation of SAP programme, and PST. PST is included in each session and BA starts from session 3. SAP practitioners review the principles of PST and BA, discuss the options and evaluate the outcome. The project protocol also allows a flexibility to practitioners who can decide to focus on BA if the participants are reluctant to discuss their personal issues in details and prefer the scheduling of social and pleasant activities. Three major changes are made when the Chinese version of SAP protocol is prepared: Firstly, Chinese recreational activities are included in the list, such as playing mahjong, tai-chi, and calligraphy. Secondly, SAP practitioners experienced difficulties in identifying problems in PST with the participants and gave more emphasis on BA, as many older adults either feel shameful or inconvenient to share their personal issues at home. This is particularly a concern when the SAP is implemented at participant's home as some family members were present when the programme is conducted. Besides, due to the small size of the home environment particularly for those with low income, some participants may feel embarrassed that the personal sharing may be heard by the neighbours. Finally, we incorporate two volunteer sessions in the whole SAP programme. Matching of volunteer and participants are based on the former's expertise and interest and this expects to further enhance the level of

participation's satisfaction in social and pleasant activities.

All SAP practitioners are social workers working in elderly services or family services who have possessed a qualification of bachelor degree of social work or above. They received a two-day professional training who were conducted by the first two authors, and consultation was provided by the fourth author who is an experienced trainer of Cognitive Behavioural Therapy. The training programme included practical knowledge and skills in conducting assessment interviews, administering the PHQ-9 and other measures, implementing SAP programmes and the principles of PST and BA. An adherence form was provided to all SAP practitioners for self-evaluation of their adherence to the programme. Consultation sessions were offered by the project team leaders and the first two authors.

Measures

Assessment interviews were conducted by the responsible SAP social worker at class 1 (T1), class 8 (T2, 19 weeks after T1), and follow-up (3 months after T2). The following variables and measures were administered by the SAP practitioners in the interview:

Depression

The primary outcome of the study is depression and it is assessed by the Patient Health Questionnaire-9 (PHQ-9; Kroenke & Spitzer, 2002). It is a 9-item self-report measurement and each item is scored on 4-point scales (0=not at all and 3=nearly every day). Higher scores indicate greater severity of depressive symptoms. During the assessing, SAP practitioners read the symptoms and discussed the current situations with participants, and finally rate on the score sheet. Based on the scores, the severity of depression is interpreted as follows: none or minimal for a score of 0 to 4, mild depression for a score of 5 to 9, moderate depression for a score of 10 to 14, moderately severe depression for a score of 15 to 19, and severe depression 20 to 27. The PHQ-9 has been validated in local population with good validity and reliability (Yu et al., 2012). In this study, Cronbach's alpha was .74.

General health, Social activeness, and Pleasant activities

The SAP translated the measures of perceived general health, social activeness, and frequency of pleasant activities from the PEARLS programme (Steinman, Edmondson, and Snowden, 2012). Four components were used in this study: (a) a single item self-report perceived general health measurement scored on a 5-point scale (1=poor and 5=excellent) that a higher score indicates better self-perceived general health; (b) a single item self-report social activeness measurement scored on a 6-point scale (1=none and 5=extremely active) that a higher score indicates being more socially active; (c) a five-item self-report social activity number that a higher score indicates doing more social activities, and its Cronbach's alpha in this study was .53; and (d) a single item self-report pleasant activity level scored on a 5-point scale (1=hardly at all and 5=every day) that a higher score indicates more frequently participating in pleasant activities.

Physical activities

The Rapid Assessment of Physical Activity (RAPA; Topolski et al. 2006) is a nine-item self-report measurement. Each item is scored by yes or no. A higher scores indicate more aerobic, strengthening, and flexibility-promoting activities. In this study, Cronbach's alpha was .58.

Attrition and participant satisfaction

The attrition rate was calculated by participants who did not complete half of the sessions. We also invited the participants to complete an 8-item satisfaction questionnaire. It assessed the older adult's overall satisfaction about SAP, their levels of satisfaction towards social worker's service, volunteer service, format of intervention, whether participants experienced improvements in depression and the reasons of improvement.

Data analysis

All analyses are carried out according to the intention-to-treat approach. Missing values of participants who did participate in SAP will be imputed using the last-observation-carried-

forward method. Pair-sample t-tests were used to evaluate the effects of the SAP. The analyses of the primary and secondary outcome measures, including PHQ9, perceived general health, social activeness, number of social activities, physical activeness, and pleasant activity level were analyzed. In addition to the immediate programme effects, outcomes measured at T2 and T3 were compared, to assess whether maintenance effects will be sustained at 3-months.

We also examined the overall attrition rate and calculate the mean scores in participation satisfaction data were used to investigate the overall feasibility of the programme.

Sub-group analyses were conducted to identify possible predictors of outcome. Two way (3 time points x pretreatment variables) repeated-measures ANOVA was conducted to test whether pretreatment variables (including gender, age, depression severity, singleton, number of medical illness, referrals from psychiatric unit, and on medication) predict significant differences in changes of depression. All analyses were performed using SPSS version 22.0.

Results

Using intention-to-treat analyses, paired sample *t*-tests were conducted to investigate intervention effects of SAP, by comparing the mean differences between pretest and posttest of outcome variables. Participants' missing values due to drop-out will be imputed using the last-observation-carried-forward method.

As shown in table 2, participants showed significant improvements in depression (t=12.79, p<.01), perceived general health (t=-4.31, p<.01), social activeness (t=-5.52, p<.01), number of social activities (t=-5.55, p<.01), physical activeness (t=-5.17, p<.01), and pleasant activity level (t=-7.77, p<.01) after completing the SAP programme (comparing measures at T1 and T2). All these improvements sustained in the three-month follow-up in depression (t=13.79, p<.01), perceived general health (t=-4.70, p<.01), social activeness (t=-5.12, p<.01), number of social activities (t=-5.69, p<.01), physical activeness (t= -5.00, p<.01), and pleasant activity

level (t=-6.15, p<.01) (comparing measures at T1 and T3). There are no significant changes between the time of completing the programme and that of the follow up study (comparing measures at T2 and T3). Based on the comparison of outcomes at T1 and T3, the large effect size (*Cohen's d*) of depression was 0.96 and the other secondary outcomes had a mild to moderate effect sizes from 0.33 to 0.50.

The distribution of participants with different depression severity was shown in Table 3. At pretest (T1), only 5.0% of the participants had none or minimal symptoms (who were diagnosed as dysthymia), 36.5% of participants had mild level of depression, and 32.9% of them had moderate level of depression. 25.6% had moderately severe or severe levels of depression. It means that over half of the participants had moderate level of depression or above. At post-test (T2), the distribution was largely improved that the number participants with moderate, moderately severe and severe levels of depression were largely decreased to 16.9%, 6.9% and 0.9% respectively. The participants with moderate level of depression or above was less than one-fourth, i.e., 24.7%. At 3-month follow up, the distribution had minimal changes when compared with T2, and those with moderate level of depression or above was 25.6%, showing more than 50% decrease in the proportion.

Furthermore, we assess the clinical significance of changes in outcome after SAP by the number of participants reporting improvement in severity, and the number of participants reporting a 50% reduction in PHQ-9 symptom scores. Using the first criteria, table 4 categorized that the number of participants who reported improvement, no change and worsen in depression severity after SAP. It showed that 58.9% of participants showed improvements in depression after completing the programme, comparing measures at T1 and T2, and the proportion of improved participants further increased to 59.4% at three-month follow-up, comparing measures at T1 and T3. For the second criteria, presented in table 5, 38.4% of participants showed 50% or more reductions in PHQ-9 at posttest (T2), and the proportion

increased to 42.0% at three-month follow-up (T3).

We further conducted subgroup analyses and identified possible predictors of outcome. Table 6 showed that gender, singleton, being on medication, number of medical illnesses, and psychiatric referrals did not predict changes in depressive symptoms. However, significant differences in outcome were found in age subgroups and depression severity subgroups. All participants were divided into three age sub-groups, young old (aged 60 to 78), middle old (aged 79 to 85) and old old (aged 86 to 112). Young old group had the largest improvement in symptom score, comparing with middle old and old old subgroups (F=4.67, p<.01). For depression severity subgroups, except none or minimal sub-group, all other four sub-group reported improvements in depressive symptoms at T2. The mild, moderate, and moderately severe sub-groups showed further improvements in three-month follow-up, but the severe sub-group had slight deterioration during the period. Overall, the stronger the depressive symptoms, the larger the improvements after the SAP programme. Such differences between sub-groups were significant (F=13.20, p<.01).

The attrition rate of SAP project was 13.2%. 29 participants withdrew from the program prematurely: Two passed away, one showed symptoms of cognitive impairment, six felt disturbed during home visits, one felt improved and no need for intervention, and 19 participants loss contact without knowing reasons. All completers of SAP were invited to fill up a satisfaction questionnaire. 85.6% of the participants agreed or strongly agreed that the intervention can improve their understanding of problem-solving methods. 99.5% were satisfied or strongly satisfied with service of SAP practitioners. 93.9% were satisfied or strongly satisfied with the format. 94.9% were satisfied or strongly satisfied with visitations of volunteers. 96.4% were satisfied or strongly satisfied with the overall SAP service, and 94.5% agreed or strongly agreed that the SAP programme improved their depression. However, we acknowledged the satisfaction rate may be inflated due to the inclusion of completers only.

Discussion

The aim of this study was to evaluate the feasibility and effectiveness of this home-based intervention for elderly depression among Hong Kong Chinese. We found significant differences in depression and overall activity levels between pre-test and post-test, and such intervention effect sustained in the three-month follow-up. A strong effect size of 0.96 in depressive symptoms is particularly impressive. It suggested that such home-based intervention might be effective in reducing depressive symptoms for Hong Kong Chinese. It is encouraging that the BA approach and a brief intervention can produce significant effects in relieving depressive symptoms of the elderly. Such benefits are very crucial for those who are less accessible to centre-based community mental health service. It also suggests that social workers can play a prominent role in reducing the burden of the health care system through the delivery of home-based intervention.

The extremely low attrition rate and the high participation satisfaction of the study showed that the SAP and the delivery mode of home-based intervention is acceptable to the older adults. Although our SAP practitioners still encountered some challenges in engaging a small proportion of participants who felt extremely reluctant and embarrassed to reveal their personal issues and depressive symptoms in their homes, it is likely that the activity based approach of BA can largely reduce the resistance of most participants.

Another encouraging finding of this study was the stronger effect size in the severe symptom group. Old adults with the highest levels of depressive symptoms benefited more from the program, which was consistent with the recent review of low-intensity intervention program (Bower et al., 2013). We found the moderately severe sub-group reported further improvement in the follow-up period, and the severe sub-group slightly deteriorated after the post-test. This might indicate that for people with severe depression, a brief intervention like

SAP was not enough, and more intensive treatment such as long-term psychotherapy or medication are required. In view of the burden on public health and the high prevalence of elderly depression, it is recommended that brief interventions like the SAP can be delivered to all older adults with depression and who have difficulties to participate in the psychosocial intervention in the social service or mental health centres. For those in need of more intensive intervention, the SAP programme can still be provided as a complementary intervention together with other outreaching mental health service.

The positive findings of this study verified that older Chinese participants with mild to moderate depressive symptoms could benefit from a home-based intervention. Based on the participant profile 58.9% of them did not seek help from psychiatric care in spite of mild to moderate depressive symptoms, probably due to the association of depression and mental illness with misconduct, particularly among the old generation (Lin & Lin, 1981). However, our records further showed that 86.9% of applicants accepted the offer of SAP and 87.7% of the completed the program. It suggested that a home-based intervention can largely improve the accessibility of mental health care to frail, home-bound old adults. It should also be noticed that SAP practitioners encountered difficulties in program delivery due to the overcrowded living environment for low-income old adults in Hong Kong, and strived to offer treatment in a safe but limited space. The use of behavioral activation approach would be most suitable to a pragmatic Chinese mindset who aims to improve personal mental health and avoid enduring conversations on negative feelings and unresolved personal and family issues. It suggested that home-based intervention may be feasible among people living in collective culture or minority cultural groups.

The integration of volunteer visits in the SAP programme serves to explore an alternative and sustainable delivery mode of the home-based intervention. In view of the rapid growth of aging population and the demand of mental health services, the possibility of injecting more

quality volunteers in home-based intervention for elderly depression and other mental health problems should be investigated. In the SAP programme, we found the input of volunteers were well recognized by the participants and the project team. Such a partnership between mental health professionals and volunteers can definitely help to provide the evidence-based programme to more people and in achieving a higher cost-effectiveness.

Limitations and Future Research Questions

First, despite good results were found, this study is based on a quasi-experimental design and we are not able to compare the participants of SAP with a control group. Initially the project team planned to conduct the study using a waitlist control design during the second half of the project. However, we encountered the concerns from referrers and SAP practitioners that asking applicants with depressive symptoms may have ethical issues in practice. The research team may consider a comparison study between SAP with another intervention, such as home-based cognitive behaviour therapy or medication so that the effectiveness of SAP can be verified in a more rigorous design.

Second, the present study was conducted by a Hong Kong NGO. The study should be replicated in other locations by other researchers among Chinese populations, to re-examine the outcome and participation satisfaction of such home-based intervention. Special attention may be considered on its effectiveness in older adults with severe depression, or to develop a modality that includes a high proportion of volunteer visits.

Third, further studies should consider more comprehensive assessments other than self-reported measures for an effectiveness study. For instance, the overall improvements in health conditions, and exact reduction in health care burden should be explored. We assume those participants who benefits from SAP would have less unplanned consultations and hospitalizations but such data was not collected in our study. The cost-effectiveness of SAP

programme should also be examined, compared with medication and other intervention approaches.

Acknowledgments

We would like to acknowledge the sponsorship of the Community Chest and HSBC in the Smiley Activation Project.

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Table 1. Selected demographics of participants ($N = 219$)

Variables		n	%
Gender	Male	57	26.03%
	Female	162	73.97%
Age	(Mean, SD)	81.02	8.92
Singleton	Yes	104	47.49%
	No	115	52.51%
On medication	Yes	54	24.66%
	No	165	75.34%
No. of medical illness	(Mean, SD)	2.16	1.70
Referrals from psychiatric unit	Yes	85	38.81%
	No	129	58.90%

Table 2. Paired sample *t*-test results comparing pretest, posttest and follow-up

	Pre (Phase1, T1)		Post (Phase 2, T2)		Follow-up (Phase 3, T3)		Phase 1-2		Phase 1-3		Phase 2-3		*Effect size*[1]
	N = 219		*N* = 219		*N* = 219								Cohen's
Measure	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*t*	*p*	*t*	*p*	*t*	*p*	*d*
Depression	11.19	4.58	6.94	4.65	6.68	4.80	12.79	.00	13.79	.00	1.03	.30	0.96
Perceived general health	1.80	0.79	2.06	0.89	2.09	0.85	-4.31	.00	-4.70	.00	-0.51	.61	-0.35
Social activeness	2.31	1.05	2.73	1.18	2.71	1.06	-5.52	.00	-5.12	.00	0.33	.75	-0.38
Number of social activities	0.95	0.53	1.14	0.56	1.13	0.55	-5.55	.00	-5.69	.00	0.65	.52	-0.33
Physical activeness	4.38	1.91	5.05	1.94	5.07	1.87	-5.17	.00	-5.00	.00	-0.28	.78	-0.37
Pleasant activity level	2.05	1.16	2.72	1.11	2.61	1.08	-7.77	.00	-6.15	.00	1.77	.08	-0.50

note: [1] effect size calculation is based on the outcome measures at T1 and T3

Table 3. Number of participants with different depression severity

	Pre (Phase 1) $N = 219$		Post (Phase 2) $N = 219$		Follow-up (Phase 3) $N = 219$	
	n	*%*	*n*	*%*	*n*	*%*
None or Minimal	11	5.02	70	31.96	85	38.81
Mild	80	36.53	95	43.38	78	35.62
Moderate	72	32.88	37	16.89	37	16.89
Moderately Severe	46	21.00	15	6.85	17	7.76
Severe	10	4.57	2	0.91	2	0.91

Table 4. Number of participants reporting improvement in severity

	Phase 1-2		Phase 1-3		Phase 2-3	
	n	*%*	*n*	*%*	*n*	*%*
Improved	129	58.90	130	59.36	45	20.55
No change	77	35.16	77	35.16	138	63.01
Worsen	13	5.94	12	5.48	36	16.44

Table 5. Number of participants reporting a 50% reduction in depression

	Phase 1-2		Phase 1-3		Phase 2-3	
	n	*%*	*n*	*%*	*n*	*%*
With 50% reduction	84	38.36	92	42.01	36	16.44
Without 50% reduction	135	61.64	127	57.99	183	83.56

Table 6. Sub-group analyses

		Pre (T1)		Post (T2)		Follow-up (T3)			
	n	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Gender								1.21	.30
Male	57	10.88	5.34	6.54	5.17	7.02	5.42		
Female	162	11.30	4.29	7.07	4.46	6.56	4.57		
Age (33.3% for each group)								4.67	.00
Young (60-78)	67	11.40	4.77	5.99	4.73	4.96	4.16		
Mid (79-85)	67	10.84	4.81	7.00	4.77	7.09	5.17		
Old (86-112)	66	11.02	4.28	7.32	4.28	7.55	4.66		
Depression severity								13.20	.00
None or minimal	11	3.27	1.19	3.73	2.65	3.36	2.62		
Mild	80	7.44	1.37	4.98	3.50	4.66	3.21		
Moderate	72	11.69	1.36	7.44	3.96	7.21	4.52		
Moderately severe	46	16.61	1.16	9.74	5.12	8.83	5.26		
Severe	10	21.30	1.16	9.60	7.46	12.80	6.49		
Singleton								.76	.46
Yes	104	11.16	4.48	7.28	4.57	6.71	4.57		
No	115	11.21	4.69	6.63	4.72	6.65	5.01		
On medication								.36	.67
Yes	54	11.35	5.28	7.39	5.30	6.69	4.78		
No	165	11.13	4.34	6.79	4.42	6.68	4.81		
No. of medical illness								1.11	.35
Few (0-1)	87	11.15	4.41	6.44	4.71	5.94	4.62		
Moderate (2-3)	91	11.23	4.86	7.15	5.06	7.30	5.31		
Many (>3)	41	11.17	4.41	7.51	3.38	6.88	3.73		
Referrals from psychiatric unit								1.704	.186
Yes	85	11.84	4.64	7.45	5.23	6.62	4.80		
No	129	10.76	4.50	6.51	4.16	6.62	4.78		