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ORIGINAL PAPER

SELF-CARE PROGRAM FOR OLDER COMMUNITY-DWELLERS: PROTOCOL FOR A RANDOMIZED CONTROLLED TRIAL

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Abstract

Aim: To report a trial protocol to determine if a self-care program enhances quality of life and sense of coherence in community-dwellers aged 65 years or over. *Design:* A randomized controlled trial with a two-group pretest and posttest will be conducted in a community activity center involving a sample of 64 community-dwellers who are 65 years or over. *Methods:* The intervention group will receive Resource Enhancement and Activation Program, a structured 12-week self-care program comprising 24 activities based on a salutogenic framework. The control group will receive the routine service. Both outcome and process evaluations will be used. Outcomes will be measured using standardized tools and these include quality of life, sense of coherence, satisfaction with life, activation measure, well-being, depression, loneliness and resilience. Focus group interviews will be conducted to explore participants' views on the program. *Conclusion:* This study will provide evidence on the feasibility and effectiveness of a self-care program that is based on a salutogenic framework to promote quality of life and sense of coherence among older community-dwellers.

Key words: older people, quality of life, randomized controlled trial, resilience, salutogenesis, self-care.

Introduction

Aging is a worldwide trend and this phenomenon is affecting the way societies work and how healthcare is delivered (Beard et al., 2011). Active older people are a valuable resource to the community and economy. If older people can keep a positive attitude and continue to enjoy optimal health, be active and be engaged with the society, they can postpone retirement and deterioration with age (Howse, 2012; Suh et al., 2012). Health promotion effort to achieve these desired outcomes has to be structured, coordinated, and targeted at key areas for the community-dwellers and it should be based on a strong theoretical framework (Antonovsky, 1996; The Swedish National Institute of Public Health, 2007). Thus, an evidence-based intervention program to promote healthy aging among older people living in the community is necessary.

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Improved life expectancy coupled with declined fertility has increased the proportion of older people globally and this trend is expected to continue, particularly in Asia where the acceleration of the aging trend surpasses that in the Western countries (Beard et al., 2011; National Institute on Aging, 2011). For example, between 2000 and 2012, the percentage of older people, aged 65 or over, has risen from 7.2% to 9.9% in Singapore and this is expected to climb to 18.7% by 2030 (Singapore Department of Statistics, 2012). In addition, the household structure is evolving and the proportion of households consisting of only older people is increasing more prevalently in developed countries (United Nations Department of Economic and Social Affairs, 2005). In Korea and Singapore, while many older people will continue to live with their younger family members, the traditional support for older parents is weakening, resulting in an increased number of older people who will live alone or with their aging spouse/relative (Park, Park, 2013; Singapore Ministry of Social and Family Development, 2009). With smaller households, older people need to remain healthy and be capable of living independently,

especially when older people prefer to live at home (Economist Intelligence Unit, 2009).

Healthy aging keeps older people active and reduces the burden on healthcare (Thiamwong et al., 2013). It can be achieved through self-care which is about "individuals taking responsibility for their own health and well-being (...). This includes: staying fit and healthy, both physically and mentally; taking action to prevent illness and accidents; the better use of medicines and treatment of minor ailments, within the community and better care of long term conditions." (Somerset Primary Care Trust, 2010, p. 1). Effective self-care programs can promote healthy aging through engaging older people as activated partners and enabling them to access personal and community resources, optimize their functional capacity, maintain autonomy and optimal independence and enhance sense of well-being and quality of life (QOL) (Lezwijn et al., 2011; Rowe, Kahn, 1997).

Salutogenesis, a stress resource-oriented concept, is being proposed as an appropriate self-care approach. Examining from the origin of health perspective, salutogenesis focuses on the person's health maintenance processes, promotes review of available resources, fosters a stronger sense of coherence (SOC) and engagement and makes health the way to lead a productive and enjoyable life (Eriksson, Lindström, 2008). SOC is an important concept in salutogenesis that encompasses comprehensiveness, manageability and meaningfulness (Antonovsky, 1996).

An integrated literature review on salutogenesis and health in people over 65 years highlighted that older people with access to internal and external resources, such as positive appraisal, effective coping strategies and good social support, have a stronger SOC and better health and QOL. However, few well formulated studies had been conducted. All available studies had been conducted in Western societies and mostly in Nordic countries (Borglin et al., 2006; Drageset et al., 2008; Ekwall, Hallberg, 2007; Forssén, Carlstedt, 2006, Lutgendorf et al., 1999; Nesbitt, Heidrich, 2000; Read et al., 2005; Söderhamn et al., 2008). The review suggested the need for both qualitative and longitudinal evaluation of intervention programs involving professionals to help older people to enhance their SOC to attain better self-care, health and QOL (Tan et al., 2013). A salutogenic approach requires active input from the stakeholders and collection of both quantitative and qualitative data to provide insights into the needs and resources of older people (Lezwijn et al., 2011).

The Singapore government and voluntary welfare organizations are expanding physical amenities such as senior activity centers (SACs) in the neighborhood. It is vital that we explore effective approaches to promote healthy aging. Activities in these centers are often recreational, repetitive and not programmatic. To date, there has been no empirical evaluation of the outcomes in these SACs. Well-structured and empirically evaluated programs developed on a sound theoretical framework are indicated for community-dwelling older people. Internationally, several quantitative studies on self-care programs have been reported and they focused on chronic disease (Lorig et al., 2001; Melchior et al., 2013). In comparison, there were fewer studies that adopted an interventional program approach with a health promotion perspective (Yeun et al., 2013) and even fewer that were studying older people and these often concentrated on physical activity and fitness (Sung, Bae, 2012). There is no evidence on the impact of self-care programs for community-dwellers aged 65 years or over in Asia with salutogenesis as the health promotion stance and focused on holistic health. Thus, this study with a randomized controlled trial design is the first feasibility study to be conducted.

Aim

This study aims to determine if the self-care program Resource Enhancement and Activation Program (REAP) enhances QOL and SOC in community-dwellers aged 65 years or over. The objectives are to: (i) determine the effect of the REAP on the QOL, SOC, satisfaction with life, well-being, depression risk, loneliness, activation and resilience; and (ii) explore participants' opinions on the REAP's usefulness and ways to improve its content and delivery. The study hypothesizes that compared with the control group, participants who complete the REAP will report: (i) significant improvement in the levels of QOL, SOC, satisfaction with life, well-being, activation measures and resilience; and (ii) significant reduction in the depression risk and loneliness levels.

Methods

Design

This is a feasibility randomized controlled trial. A two-group pretest and posttest, between-subjects design will be adopted. The study will be conducted in an SAC in Singapore. Outcomes will be measured at baseline and immediately after the 12-week REAP intervention. A process evaluation will examine the informants' views using focus group interviews in the

language the informants are most comfortable with. The aim is to explore their opinions on the usefulness of the REAP and ways to improve its content and delivery.

The self-care program will be conducted at a SAC managed by a registered voluntary welfare organization which serves the local community by providing quality psychosocial care and counseling to enhance their well-being. The organization has qualified counselors and social workers to support the participants if necessary. The center is situated near to a public mass rapid transport station and in the heart of a public housing estate. The SAC serves a geographic zone which has 15.2% of its residents aged 65 or over. This ranked seventh highest among 35 zones in Singapore (Singapore Department of Statistics, 2012).

Sample

The research team will recruit a convenience sample in the SAC. All attendees of exercise sessions at the SAC will be approached. A printed information sheet will be provided to promote recruitment. The inclusion criteria are: older people must be at least 65 years old; living in the community in Singapore; able to communicate in Mandarin and/or English; and give informed consent. The exclusion criteria are: a known psychiatric history; severe hearing or vision impairment; and inability to ambulate independently to the activity center or demonstrate commitment to the time required for the 12-week program. The control group will receive routine service at the SAC, the experimental group, on top of the routine service, will attend a 24-activity program over a 12-week period.

The sample size can be determined by the number of participants required to maintain statistical power for the statistical tests used in data analysis (Cohen, 1992). In this study, the independent t-test will be mainly used to do data analysis. For a full-scale randomized controlled trial (RCT) of medium effect size with power = 0.8 and p = 0.05, a total of 128 participants is required (Cohen, 1992). To estimate the sample size needed for this feasibility RCT, an upper bound of 40% was used. Hence, a total of 52 participants with 26 in each arm will be required (Hertzog, 2008). To provide for possible attrition, this study plans to recruit 64 participants with 32 in each arm.

Random-number generator software will be used for the randomization procedure. A set of 32 random numbers between 1 and 64 will be generated. Older people who meet the eligibility criteria will randomly draw a number between 1 and 64. The participants whose numbers match with the pre-generated list will be assigned to the experimental group. All participants will have equal chance of being selected. All the participants in the experimental group (n = 32) will be invited for focus group interview after the intervention. Based on their global satisfaction level at the end of the REAP, they will be grouped into a positive appraisal group and a dropout / negative appraisal group. Their decisions to participate will be respected. At least four focus groups will be conducted with not more than ten informants in a group (Wong, 2008).

Ethical considerations

The trial has obtained approval from a university's institutional review board in January 2013. Informed consent will be sought with a written participant information sheet and a consent form; copies of these documents will be given to participants. The older people will be assured that collected information will be kept confidential and secure. They can also withdraw at any point in the study without any negative consequence. It is expected that there will be no more than minimum risk to the participants. Participants identified with Geriatric Depression Scale (GDS) of five or more will be referred to a counselor in the SAC upon their consent.

Intervention

Treatment fidelity assures researchers that the intervention is delivered as planned in order to enhance the validity and reliability of their findings (Bellg et al., 2004). The National Institute of Health Behavior Change Consortium recommended researchers to adopt necessary measures to promote treatment fidelity on five areas, namely intervention design, training providers, and delivery, receipt and enactment of treatment (Bellg et al., 2004).

The intervention design is theoretically grounded and is detailed here. The REAP was developed based on current local evidence and literature on salutogenesis. In 2012, the authors conducted two preliminary studies on older people in Singapore – a descriptive study on the functional capacity and QOL, and an exploratory study that examined local older people's experience of living on their own and their perceived personal resources. Preliminary analysis of the descriptive study of 60 older people showed that, while most of them were satisfied with their living environment, their social relationships and psychological health domains of QOL needed further improvement. Also, preliminary analysis of the exploratory study on 25 older people who lived alone or with another older person revealed that some of them had accumulated valuable personal resources over their lives and these were vital to their daily living. External resources existed but some were

inaccessible or not effectively used by the older people. However, there were older people who remained disengaged with society at large.

For older people, engagement with the community complements and enhances self-care ability. This personal strength to care for oneself and to use available resources facilitates daily living and health (Gardner, 2011; Söderhamn et al., 2008). Personal and community resources are reported to be associated with the SOC and QOL of older people (Tan et al., 2013). This evidence suggests a need to strengthen older people's motivation to use both their internal and available external resources to achieve better QOL. Thus informed the development of the REAP.

The REAP consists of 24 activities over three months with two activities per week (Table 1). It has included many of the major topics identified in literature (The Swedish National Institute of Public Health, 2007). They are nutrition, physical activity, mental health, social capital, preventive health services, injury prevention, and environment. The REAP activities fall into four themes, namely physical well-being, psycho-social well-being, physical activity and motivation. Each activity lasts about 90 minutes and each contributes to the promotion of comprehensibility, manageability and meaningfulness dispositions to develop a SOC and QOL. The activities focus on promoting more positive outlook in life when appraising situations. The program highlights current government policies and available community resources and suggests how the participants can garner them to better support their daily living and health. They are also required to review their motivation and examine their coping strategies to acquire autonomy and a sense of purpose in life. Some of the activities will be held outside the SAC (e.g. supermarket, library).

To ensure the size of the group is manageable, the REAP will be conducted over two runs. The participants are required to attend as many of the 24 activities as possible but must attend at least 12 of the 24 activities during the program duration; six of the required 12 activities are predetermined core activities that aim to promote manageability and meaningfulness disposition in their SOC. Attendance will be recorded.

To reduce attrition of participants in the experimental group, it is vital to foster cohesion among participants and promote enjoyment in the process. In addition, reminders on the upcoming planned activities can also stimulate interest. Telephone calls to participants who miss a session will be made to keep them informed of the activities ahead and to attend to their immediate concerns that may arise.

An expert panel comprising eight experts reviewed the program manual. The panelists were: Ministry of Health administrator, directors of senior centers, gerontology-prepared program coordinators, advanced practice nurse in a gerontology setting, and well-published researchers. Their comments helped to improve the program manual.

Appropriate measures will also be undertaken to promote treatment fidelity in the area of training providers and the delivery of the intervention. The REAP will primarily be facilitated by the first author and his trained assistant throughout the study to ensure consistency. The team will examine and discuss each lesson plan carefully ahead of the scheduled session and will adhere to lesson plans during the treatment delivery. The team will not participate in the routine service at the SAC and thus minimize contamination across the experimental and control groups. The REAP will be conducted with support from a diverse group of professionals, namely nurses, counselors and social workers, public librarians, police officers, and voluntary helpers (students from different healthcare professions, senior citizen and crime prevention ambassadors). A 60-minute preparation session that includes the study protocol, expected outcomes and the delivery plan of the scheduled activities will be provided to all these helpers.

During the intervention, receipt of treatment will be monitored in this feasibility study. Many of the planned REAP sessions aim to promote manageability and meaningfulness dispositions as the participants apply their knowledge and demonstrate the necessary skills through the activities. The team of facilitators will observe and support the process.

Outcome measurements

Outcomes will be measured using standardized tools at baseline and immediately after the 12-week REAP intervention. Data will be collected through a face-to-face structured interview as many participants are illiterate.

Primary outcomes

The primary outcomes are QOL and SOC.

QOL is measured by World Health Organization QOL, a 26-item 5-point scale, to assess different domains of life quality. The Chinese version of the instrument has been used in longitudinal and cross-sectional studies on older persons in Asia and the Cronbach's alphas of the four domains were

Table 1 Resource Enhancement and Activation Program

Activity	Sense of Coherence	General Resistance Resources	Objective
Physical Well-being			
Oral health and dentition	Comprehensibility; Manageability; Meaningfulness	Cognitive-emotional	Understand and practice good oral hygiene and dentition
Prevention and management of common illnesses/conditions			Understand cause, effect, preventive measures, treatment and care of common illnesses/conditions
Understanding nutrition labels and requirements			Understand healthy eating and recognize nutrition labels
Participating in a supermarket healthy grocery shopping trip			Acquire skills to make good choice on food
Prevention and management of urinary incontinence			Understand cause, effect, preventive measures, treatment and care of urinary incontinence
Environmental health (haze and dengue) – risks and actions to protect health			Participate in pelvic floor exercise Understand environmental risks to health Identify appropriate actions to protect health
Psychosocial Well-being			
Understanding unhelpful beliefs, thoughts or emotions Giving and receiving feedback Handling unhelpful beliefs, thoughts or emotions	Comprehensibility; Manageability; Meaningfulness	Valuative-attitudinal; Interpersonal-relational; Macro-sociocultural	Understand that individuals are unique Understand the effect of negative thoughts and emotions on health Acquire skills to manage negative thoughts and emotions
Understanding the impact of stress on well-being and various coping methods Participating in relaxation exercise	Comprehensibility; Manageability; Meaningfulness	Valuative-attitudinal; Macro-sociocultural	Understand the cause, effect and preventive measures to manage stress Participate in activities to manage stress
Understanding death and what it means to people around us Discuss government policies related to advanced care planning Exploring a life plan in advance	Comprehensibility; Manageability; Meaningfulness	Valuative-attitudinal; Macro-sociocultural	Understand government policies related to the end of life Discuss individual perception and plans towards death and dying
Physical Activity			
Understanding and performing exercise	Comprehensibility; Manageability; Meaningfulness	Artifactual-material; Interpersonal-relational	Understand the importance of physical activity on health
Visiting physical activities groups/facilities in the areas			Participate in elastic band exercise Able to verbalize the venues where people exercise in their neighborhood
Understanding the risk and prevention of falls Coordination and balance	Comprehensibility; Manageability; Meaningfulness	Artifactual-material; Interpersonal-relational	Identify the risk of falls and hazards at home Undertake appropriate actions to reduce the risk of falls at home Participate in Otago balance exercise
Utility exercise activity and group excursion	Manageability; Meaningfulness	Artifactual-material; Interpersonal-relational	Participate in utility exercise Able to verbalize resources available in the community Participate in group excursion – helping each other and interacting in the group

Activity	Sense of Coherence	General Resistance Resources	Objective
Motivation			
Current government policies Understanding current government and general healthcare policies	Comprehensibility	Artifactual-material	Understand relevant policies and the impact on the participants
Community living – understanding the risks (e.g. theft, robbery, cheat) and available external resources to improve safety	Comprehensibility; Manageability; Meaningfulness	Interpersonal-relational	Undertake appropriate actions to manage risks faced by older people living in the community
Adapting to new roles and responsibilities Positive thinking	Comprehensibility;	Valuative-attitudinal;	Understand the new roles the participants may adopt
Building confidence and developing effective partnerships with healthcare professionals	Manageability; Meaningfulness	Macro-sociocultural	Have the ability to advocate needs when communicating with professionals
Planning for sustenance of activities	Manageability; Meaningfulness	Interpersonal-relational	Plan for self-efficacy and continuation of healthy ageing

satisfactory – physical health (0.69), psychological health (0.72), social relationships (0.79) and environment (0.68) (Chan et al., 2007).

SOC, measured by a 13-item 7-point SOC scale (SOC-13), has been reported to be reliable and have high construct and criterion validity (Eriksson and Lindström, 2005). SOC-13 has been used in the Western and Asian languages and cultures with Cronbach's alpha = 0.76–0.83 (Bergman et al., 2011; Shiu, 2001).

Secondary outcomes

Satisfaction with Life Survey, a 5-item 7-point instrument, is a global cognitive assessment of satisfaction with life. It has been used in Asia and the internal consistency was reported to be 0.86 (Aishvarya et al., 2014). The Chinese version has been used in Hong Kong (Chan et al., 2003).

World Health Organization (Five) Well-Being Index, a 5-item 6-point instrument has been used in Asia and with older population to screen for depression and it has been reported with high internal consistency (Allgaier et al., 2013; Saipanish et al., 2009). The Chinese version has been used in China (Volinn et al., 2010).

The 15-item 2-point GDS has been reported to be a useful tool for screening older adults for depressive symptoms (Mitchell et al., 2010). The Chinese version was assessed to have sensitivity (84.0%) and specificity (85.7%) with the area-under-the-curve at 0.93 (95% CI: 0.90-0.97) (Lim et al., 2000).

Gierveld's Loneliness Scale, a 6-item instrument, measures emotional and social loneliness. It has been translated to Chinese and was reported to be valid and reliable (Cronbach's alpha = 0.76) when evaluated on older people (Leung et al., 2008).

Patient Activation Measure is reported to be valid and highly reliable (Green et al.; 2010, Hibbard et al., 2007). It can be used at the individual level to assess changes in activation and self-management behavior (Hibbard et al., 2007). It was strongly associated with health-related outcomes (Greene, Hibbard, 2011).

Connor-Davidson Resilience Scale focuses on individual's strength and positive attributes and can be used to assess response to an intervention. The Chinese 10-item scale is reliable (Cronbach's alpha = 0.91; test-retest reliability = 0.90), has construct validity and has been used in Asia (Wang et al., 2010).

Demographic data will be collected, which include gender, race, religion, marital and household status, house ownership, source of financial support, monthly disposable allowance and telephone number.

Data collection

To monitor and collect feedback to improve the enactment of intervention, pretest and posttest outcome measures and focus group discussions with the experimental group are planned in order to illicit information in real-life settings (Bellg et al., 2004).

The procedure of the study is presented in the CONSORT diagram in Figure 1. The steps are as follows:

(1) Participants are recruited from and via attendees of the SAC.
(2) Written informed consent will be sought from eligible participants.
(3) Baseline measurement will be collected by the researchers and a trained assistant either at participants' residence or at the SAC.
(4) Based on computerized randomization, the researchers will allocate the participants to the experimental or control group.

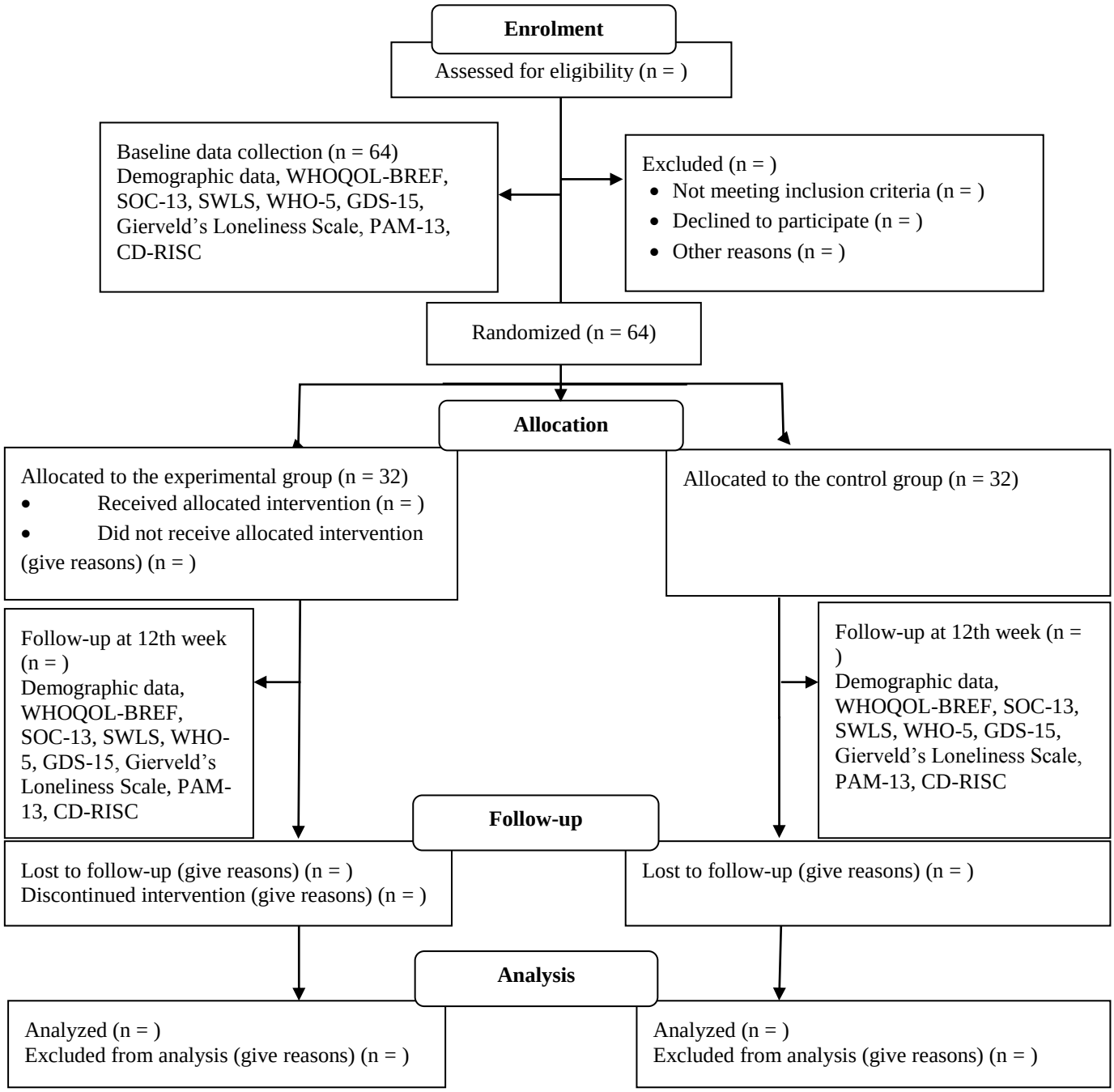

Figure 1 The CONSORT flow diagram of the study

Legend:
WHOQOL-BREF: World Health Organization Quality Of Life 26-item
SOC-13: Sense of Coherence
SWLS: Satisfaction with Life Scale
WHO-5: World Health Organization (Five) Well-Being Index
GDS-15: Geriatric Depression Scale
PAM-13: Patient Activation Measure
CD-RISC: Connor-Davidson Resilience Scale

(5) The REAP will be delivered by the researchers with the help of volunteers.
(6) Posttest 1 will be conducted immediately after the intervention period (i.e. 12 weeks) for both the experimental and control groups.
(7) After the REAP, participants in the experimental group will be invited to participate in the focus group interviews. The sessions will be conducted in a quiet room and facilitated by the principal investigator. The interview will last for approximately 60 minutes. The sessions will be audio-recorded. Aims of the interview will be clarified at the outset and the participants will be assured that all points of view will be welcomed and received as valid. The interviewer will also use clarifying questions, probing, prompt and paraphrasing techniques when facilitating the session.

Process evaluation

An interview guide has been developed to guide the focus group interview. Examples of the question include:

- "How is your experience as a participant of the Resource Enhancement and Activation Program?"
- "What benefits, if any, did the participation offer you?"
- "How does the program influence you whether you are living alone or with another older person?"
- "What aspects of the program, if any, you like (and dislike) in particular?"
- When applicable, "What are the reasons why you did not continue with this program?"
- "Please suggest how the program may enhance this experience to make it useful to you / enjoyable / convenient for you?"
- "How can this program be made more popular to other older people?"

Data analysis

Data will be checked prior to analysis and any discrepancies will be verified against original data sources. All quantitative data will be analyzed using the SPSS version 22 (IBM Corporation). Continuous data will be described by means, standard deviation, and ranges and for ordinal, or nominal data, frequencies and percentages. Inferential statistics will be performed between the groups with t-test, or ANOVA, where appropriate. Intention-to-treat analysis using the last observation carried forward method will be performed.

The recorded non-English material from the focus group discussion will be transcribed into Chinese. Data will be analyzed in its original language. Thematic analysis will be conducted (Gao et al., 2012). In the initial stage, both the digital audio recording and the transcription will be accessed, to ensure accuracy of the transcription and to encourage immersion with the data, which enhances the quality of data analysis. Then, significant words, phrases, patterns of data and exemplars will be extracted, constantly compared and categorized into themes around the specific research questions and aims. Translation to English will only be performed at the time of reporting of findings.

Validity and reliability

Randomization is used to manage confounding variables in the participants and to avoid selection bias. The REAP has a theoretical underpinning and is developed based on examples of a self-management program and is appraised by a team of experts. All of the adopted outcome measures have been tested psychometrically though not all have been used in the local setting.

To maintain trustworthiness, focus group interviews will be conducted by the researcher who has facilitated the REAP as rapport will be built between the researcher and the participants. The informants will be reminded of the purpose of the focus groups to improve credibility of the data. The qualitative data will be analyzed in their original language and by the principal investigator who shares the same first language. The analysis process will be checked by a second team member. The two researchers will discuss to resolve any differences. Audit trail will be maintained to improve dependability.

Discussion

This paper reports a protocol which aims at evaluating the impact of the REAP for older people aged 65 years or over in the community setting. The REAP is a broad-based structured program with a clear objective for each activity that promotes psychosocial well-being, SOC, and motivation and contributes to the overall objective of enhancing QOL. Salutogenic perspective emphasizes on being person-centric and on promoting greater health in collaboration with various agencies (Antonovsky, 1996; Davies, 2008). Including a supporting theoretical framework in the intervention provides a stronger structure to the health promotion approach. In the REAP, the participants will have the opportunities to review personal resources and to engage with existing valuable resources (e.g. current government policies, voluntary welfare organization,

physical activity groups, professionals) to enhance their lives and health. The program requires commitment from the participants and specific outcomes will be evaluated.

This feasibility study has some limitations. Firstly, it is the two-group pretest and posttest design. Hence, the longer term outcome is not evaluated in this pilot study. Secondly, it involves a small sample size recruited at an SAC and the participants may be more motivated than the targeted population at baseline. Also, the participants from both the experimental and control groups attend the same routine service, and thus contamination across the two groups cannot be controlled. In addition, the first author will be involved throughout the research process, namely in participant recruitment and randomization, implementation of the REAP and both outcome and process evaluations. While he will be mindful and be objective, the responses from the participants and informants may be affected by social desirability.

Conclusion

This protocol reports an exploratory trial to identify an effective and acceptable approach in promoting healthy aging through activating personal resources and mobilizing community resources. This feasibility study provides information on the planning, implementation, effectiveness, relevance and acceptability of a self-care program for community-dwelling older people. It determines the feasibility of implementing a future trial and the revisions that need to be made to the REAP manual. If the results of this study are positive, the investigators will apply further funding to conduct a larger-scale multicenter randomized controlled trial to evaluate the effectiveness and other benefits of the program. The intervention program, if deemed feasible and has an impact, can be replicated with international partners and further enhanced to possibly reduce healthcare and social costs for the individual and the government, and influence policy formulation. Long-term sustenance of the program is possible by involving and preparing suitable activated older people as volunteers and trainers.

Ethical aspects and conflict of interest

The protocol for the research project was approved by the National University of Singapore Institutional Review Board (Reference Code: 12-459) in January 2013. The research team will seek informed consent from all the participants and their confidentiality will be preserved.

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