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# Effects of a nurse-led peer support intervention for stroke survivors: protocol for a randomised controlled trial

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## ABSTRACT

**Introduction** Many stroke survivors have unmet psychosocial needs during the recovery phase following stroke. There is emerging evidence that peer support interventions may play a valuable role in the management of stroke. However, evidence regarding the effectiveness of peer support interventions on the psychosocial outcomes of stroke survivors is uncertain. This study aims to develop a nurse-led peer support intervention for stroke survivors based on the Person-Environment-Occupation-Performance Model and to evaluate its effects on psychosocial outcomes of stroke survivors.

**Methods and analysis** This is an assessor-blinded two-arm randomised controlled trial. A convenience sample of 120 stroke survivors will be recruited from the community, with 60 participants each in the intervention and control groups. The nurse-led peer support intervention includes six weekly peer support sessions facilitated by a nurse and at least one peer facilitator. The primary outcomes include social participation and participation self-efficacy. The secondary outcomes include anxiety and depression, social support, stigma towards disease, and quality of life. Data will be collected at baseline, immediately after the intervention, and three months after the intervention. A process evaluation will be conducted qualitatively and quantitively to examine the mechanism by which the intervention impacts the psychosocial outcomes of stroke survivors. All outcomes will be analysed following the intention to treat principle. Generalised Estimation Equation models will be used to assess the intervention effect.

**Ethics and dissemination** This protocol was approved by the Joint Chinese University of Hong Kong-New Territories East Cluster Clinical Research Ethics Committee (CREC Ref. No.: 2021.196-T). Results of the study will be disseminated through publication in peer-reviewed journals, and presentation at local or international conferences.

**Trial registration number** This study has been registered with the Chinese Clinical Trial Registry (No. ChiCTR2100050853). Protocol V.1.0 date 28 February 2022 Original.


**Keywords:** Mental health; Social medicine; Stroke

## Strengths and limitations of this study

1. This will be the first study to evaluate the effectiveness of peer support interventions on psychosocial outcomes of stroke survivors conducted in China.
2. This randomised clinical trial evaluates an evidence-based intervention that is theoretically grounded in the Person-Environment-Occupation-Performance Model.
3. Participants will be randomly assigned to the intervention group and control group with attention care, which will disentangle the benefits of attention from the impacts of the intervention itself.
4. Process evaluation will be conducted qualitatively and quantitatively to understand the fidelity of intervention implementation and how the intervention impacts the psychosocial outcomes of stroke survivors.
5. Due to the nature of the intervention, only the assessors will be blinded to participants' group allocation, the researcher who delivers the intervention and participants will not be masked from the group assignment.

## INTRODUCTION

Stroke has high incidence, prevalence, and mortality. Recent studies report this disease as the third leading cause of disability and the second leading cause of death globally.[1-3] In 2016, there were 13.7 million new stroke cases worldwide, of which 5.51 million cases were reported in China, which has the highest age-standardised incidence of stroke internationally. Stroke has also become the first leading cause of death in the country,[4, 5] with 1.79 million deaths in 2016.[3]

Many stroke survivors face physical and psychosocial challenges after hospital discharge. One-third of stroke survivors have moderate to severe physical impairment,[3, 6] and the same proportion are estimated to suffer from post-stroke depression.[7] Moreover, 20% also report the experience of anxiety symptoms post-stroke.[8] These emotional symptoms are associated with increased mortality, slow recovery, and decreased quality of life.[9-11] In addition, physical impairments after stroke pose different degrees of activity limitation and participation restriction.[12, 13] These barriers significantly impact survivors' physical and mental health. Evidence suggests participation restrictions are associated with social isolation, the occurrence of recurrent stroke, and increased mortality.[14-17]

Despite efforts made to improve acute stroke care, less attention has been given to post-discharge care, especially in terms of psychosocial support.[18-20] Evidence regarding

interventions aimed at improving psychosocial health, especially post-stroke social participation, is lacking. Studies about stroke rehabilitation often do not include outcomes to assess participation, and studies involving participation often do not adopt a theoretical framework to guide the development of interventions and the choice of outcome measures.[20, 21] Therefore, more theory-based psychosocial intervention studies are needed.

Peer support interventions that enhance social support may potentially improve the psychosocial outcomes of stroke survivors. There is emerging evidence that peer support interventions may play a valuable role in the management of stroke.[22, 23] A systematic review showed that group self-management interventions involving peer support could facilitate experience-sharing, increase knowledge and communication, improve goal setting and problem solving, and boost motivation and self-efficacy among stroke survivors.[23]

Peer support is defined as assistance and encouragement from persons with a similar condition to an individual.[24] Peers may understand the target population's condition in a comprehensive way that healthcare professionals may not, thus the knowledge, coping strategies, and experiences presented by peers could be more persuasive for individuals who share the same experience.[25] After training, the peer facilitators can provide informational, emotional, and appraisal support to their peers which may lead to better psychosocial outcomes, such as increased self-efficacy, more effective coping, decreased emotional symptoms, and enhanced social participation.[24]

However, evidence regarding the effectiveness of peer support interventions on the psychosocial outcomes of stroke survivors is not very clear. We conducted a systematic review of 11 randomised controlled trials (RCTs) and non-RCTs and found that stroke survivors might benefit from peer support interventions, particularly in terms of improving their psychological outcomes. However, the evidence about the effects of peer support interventions on social outcomes was uncertain.[26] Moreover, the sample sizes of previous studies are relatively small and most of the studies did not use a power analysis to estimate the sample size. Most previous studies also did not adopt a theory to guide the design of the intervention.[26] Furthermore, none of the studies conducted in China evaluated the effectiveness of peer support interventions on the psychosocial outcomes of stroke survivors. Thus, there is still a need to develop and evaluate peer support interventions for stroke survivors so as to address prominent research gaps and provide evidence for future practice.

Another systematic review found that interventions delivered by healthcare workers appeared to be more effective in improving chronic disease management among vulnerable community populations compared with alternatives.[27] Thus, incorporating healthcare workers into peer support interventions may be a feasible option to ensure specialist knowledge of the disease when needed. Nurses are relatively accessible and less costly to employ [28], and most importantly, patients express satisfaction with health services provided

by nurses in the communities.[29, 30] A study involving 390 stroke survivors after hospital discharge aimed at addressing psychosocial problems found that nurse-led stroke aftercare effectively addressed psychosocial problems and had a lower cost as compared to usual care.[31] This study will involve nurses in the peer support interventions and will develop a nurse-led peer support intervention (NPSI) for stroke survivors to improve the psychosocial outcomes of stroke survivors.

**Aim and hypothesis**

This study aims to develop a theory-driven nurse-led peer support intervention (NPSI) for stroke survivors based on the Person-Environment-Occupation-Performance Model (PEOP) and to evaluate its effects on stroke survivors' psychosocial outcomes.

We hypothesise that, compared with stroke survivors receiving attention care in the control group, at 6 weeks after commencing the intervention and at 3 months after completion of the intervention, the stroke survivors receiving NPSI will have: increased social participation and social support; greater participation self-efficacy; less anxiety and depression; less stigma towards disease, and improved quality of life.

## METHODS AND ANALYSIS

### Design

An assessor-blinded two-arm RCT will be conducted (see Figure 1 for the flow diagram of the study). We will report this protocol according to the Standard Protocol Items: Recommendations for Interventional Trials reporting guidelines.[32]

### Setting and participants

Participants will be recruited from the community in Yangzhou, a medium-sized city in Jiangsu province, Eastern China. Recruitment posters will be distributed to community health centers, family physician centers, rehabilitation units, and day rehabilitation centers at the recruitment sites.

***Inclusion criteria***

Individuals who meet the following criteria will be recruited:

(1) Have a clinical diagnosis of ischaemic or haemorrhagic first-ever or recurrent stroke before enrollment;

(2) Aged ≥18 years old;

(3) Able to communicate meaningfully in Mandarin and provide informed consent.

***Exclusion criteria***

(1) Are not medically stable or have a terminal illness;

(2) Diagnosed with a mental illness;

(3) Have moderate or severe cognitive impairment and cannot participate meaningfully in the workshop sessions (e.g., Mini-Mental State Examination (MMSE) ≤20) [33] or do not have the physical capacity to travel to the workshop site even with assistance;

(4) Are participating in another intervention research program;

(5) Plan to move out of the area within six weeks, or do not have a reasonable expectation that they will attend a program for 2h/week for up to 6 weeks.

**Sample size planning**

G*Power (version 3.1) was used to calculate the sample size. The power calculation is based on the primary outcomes of social participation and participation self-efficacy. The effect size of peer support interventions on participation self-efficacy was 0.58.[34] In order to have 80% power to detect a significant difference at a significance level of 0.05, enrolling 48 participants in each group is needed. With an estimated attrition rate of 20%, enrolling 120 stroke survivors with 60 participants in each group is planned. This sample size is also enough for an effect size of 0.74 for the outcome of social participation, which was drawn from a systematic review and meta-analysis.[26]

**Randomisation**

After completing baseline assessments, participants will be randomly allocated to the NPSI or control group (1:1 ratio). Blocked randomisation [35] will be used with 4 or 6 as a block via a computer-generated, random-number sequence. Sequentially numbered, opaque, sealed envelopes will be used to guarantee allocation concealment. Randomisation will be stratified by recruitment sites and residential areas to achieve balanced randomisation. Both randomisation and allocation procedures will be conducted by a research assistant not involved in recruitment, intervention delivery, and outcome assessment.

**Blinding**

Due to the nature of the intervention, the researcher who delivers the intervention and the participants themselves will know the group allocation. Only the two research assistants who assess the outcomes will be blinded from group assignments. The two research assistants will also be responsible for data entry but will not be involved in data analysis.

**Intervention**

***Components***

The NPSI consists of six sessions, in which participants will discuss stroke-related topics in groups and support each other. These discussions will be facilitated by a nurse and a least one peer facilitator. The stroke-related topics include didactic education (e.g., the pathophysiology of stroke, stroke prevention); self-management strategies (e.g., use of problem-solving

techniques, action planning), social participation (e.g., home role attainment, community reintegration), and emotional management (see detailed content of each session in Table 1).

***Theoretical Underpinning***

The NPSI will be developed based on the PEOP model. This model is a client-centered model aiming to improve the performance and social participation of individuals.[36] It has four components: occupation (what people want or need to do in their daily lives); performance (the actual act of doing); person (intrinsic factors, e.g., psychological, physiological, neurobehavioral, cognitive, and spiritual factors); and environment (extrinsic factors, e.g., health system; social supports; social & economic system; culture and value; natural environment). In the PEOP model, complex interactions exist between the person and the environment in which people carry out meaningful activities. The interaction of personal capacity, environmental factors, and chosen activities lead to performance and participation. To achieve a desired level of participation, people and groups must overcome personal and environmental barriers that limit their participation in activities and attempt to make use of personal capacity and environment enablers which support them in doing meaningful activities. The peer support groups will discuss these barriers, facilitators, and problem-solving strategies around the intervention topics during the peer support sessions. It is expected that through these discussions, the self-efficacy or social participation of the participants can be improved.

***Intervention delivery and training***

The NPSI will be conducted in groups (4–8 participants per group) and delivered weekly for six weeks. Each session will be conducted face-to-face and last around 1.5–2 hours. Participants in each group will discuss one or two topics per session (see table 1 for the detailed contents of each session). During the session, group members will discuss barriers, facilitators, and possible problem-solving strategies for a meaningful goal (e.g., community integration) proposed by each participant. At the end of each session, participants will make an action plan and then report any relevant progress to the group at the beginning of the next session. The location of the group sessions will be chosen according to the convenience of the group members. Participants will arrange their own transportation. An information booklet that includes stroke-related knowledge and the intervention content will be provided to participants. Stroke survivors can attend the sessions with their caregiver or a friend. A participant will be considered to have completed the intervention if they attend four or more sessions.

To ensure the participants' adherence, the sessions will be fixed at the same time each week for a peer support group (e.g., participants in group one gather in the Tuesday afternoon every week) in case they forget the gathering time due to the decreased memory. The peer facilitators will call the participants at least once each week in order to encourage the

participants to implement their action plan and remind them not to forget the time and place of the next session. If a participant did not attend a session or withdrew from the study, the reasons will be collected and recorded.

***Facilitators and training***

A nurse and at least one peer facilitator will facilitate all the sessions using the same verified workbook. Peer facilitators can be recommended by clinicians, self-recommended or selected by the researchers. At least 4 peer facilitators will be recruited and trained in this study. They should meet the following criteria:[37] 1) is a stroke survivor (or stroke survivor with caregiver); 2) stroke occurred at least 18 months previously; 3) have good communication and expression abilities; 4) willing to assist others and feels confident that they could contribute to helping others with post-stroke rehabilitation.

A training program will be provided to the peer facilitators. The program will be conducted face-to-face via four group sessions (2h per session, total 8h). It will be held twice a week for two weeks and will be facilitated by a nurse, an occupational therapist, and a physical therapist. The training content includes stroke knowledge, communication and group facilitation skills, and self-management skills. A variety of training methods will be employed in the training sessions including verbal explanation, discussion, group brainstorming, case-based scenarios and group facilitation simulations.[38] Additionally, as the nurse facilitator will observe the implementation of the intervention by peer facilitators at all times, she will also provide them with ongoing feedback.

**Table 1. Content for scheduled NPSI sessions.**

| Sessions | Contents |
|---|---|
| Session 1：Introduction, group norms, self-management strategy. | Activity 1: Self-introduction and identifying the problems of each group member.<br>Activity 2: Introducing the course and responsibilities of the participants.<br>Activity 3: Introducing self-management strategies.<br>Activity 4. Introducing how to prevent stroke recurrence.<br>Activity 5: Making an action plan for preventing stroke recurrence.<br>Activity 6: Summary. |
| Session 2：Management of emotional changes after stroke. | Activity 1: Debriefing and problem-solving.<br>Activity 2: Discussion about common thoughts, fears, and other emotional changes after stroke.<br>Activity 3: Introducing problem-solving strategies to address the emotional changes.<br>Activity 4: Communication skills.<br>Activity 5: Making an action plan to deal with emotional changes and facilitate effective communication.<br>Activity 6: Summary. |
| Session 3：Participation at home. | Activity 1: Debriefing and problem-solving.<br>Activity 2: Participation at home. |

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|---|---|
| | Activity 3: Common symptoms after stroke and possible problem-solving strategies.<br>Activity 4: Making an action plan for home participation.<br>Activity 5: Summary. |
| Session 4: Community integration and leisure activities. | Activity 1: Debriefing and problem-solving.<br>Activity 2: Community integration and leisure activities.<br>Activity 3: Rehabilitation exercises and physical exercises.<br>Activity 4: Making an action plan for community participation or leisure activities.<br>Activity 5: Summary. |
| Session 5: Socialization. | Activity 1: Debriefing and problem-solving.<br>Activity 2: Socialization.<br>Activity 3: Maintaining a healthy diet.<br>Activity 4: Making an action plan for social activities.<br>Activity 5: Summary. |
| Session 6：Returning to work and summary. | Activity 1: Debriefing and problem-solving.<br>Activity 2: Education, work and volunteer work.<br>Activity 3. Guidelines for taking medication for stroke.<br>Activity 4: Making an action plan for returning to work.<br>Activity 5: Summary of the course. |

## Patient and public involvement

In order to develop the patient-tailored intervention, 30 stroke survivors meeting the eligibility criteria were invited to contribute to identifying the intervention components and peer support topics. The stroke survivors were asked to provide information regarding their rehabilitative experiences, the risk factors of post-stroke psychological distress and participation restriction, and their psychological and social needs. After intervention delivery, participants' satisfaction and comments on the intervention's usefulness and acceptability will be collected through an investigator-generated satisfaction questionnaire and in-depth interviews.

## Control group

Participants randomised to the control group will receive attention care from the nurse facilitator. This will be individual face-to-face guidance scheduled weekly for six weeks. The contents and duration of the guidance will be the same as the intervention components included in the NPSI but will be delivered individually without support from peers.

## Outcome measures

The following outcomes will be measured at baseline (T0), post-intervention (six weeks later) (T1), and three months after the intervention (T2) for the stroke survivors in both groups (Table 2).

**Table 2. Assessment schedule and measures for outcomes.**

| Outcomes | Instruments | Baseline (T0) | Immediately after 6 weeks of NPSI (T1) | 3 months post-intervention (T2) |
|---|---|---|---|---|
| **Primary outcomes** | | | | |
| Social participation | The Impact on Participation and Autonomy (IPA) | × | × | × |
| Participation self-efficacy | Participation Strategies Self-Efficacy Scale- Chinese version (PS-SES-C) | × | × | × |
| **Secondary outcomes** | | | | |
| Anxiety and depression | Hospital Anxiety and Depression Scale (HADS) | × | × | × |
| Social support | Multidimensional Scale of Perceived Social Support (MSPSS) | × | × | × |
| Stigma towards disease | Stigma Scale for Chronic Illnesses-8 items (SSCI-8 items) | × | × | × |
| Quality of life | EuroQol-5D-5L | × | × | × |

| | | |
|---|---|---|
| Participants' satisfaction-survey | Investigator-generated satisfaction questionnaire (only for the intervention group) | × |
| Participants' feedback-interview | / | × |

***Primary outcomes***

**Social participation.** Social participation will be measured using the Impact on Participation and Autonomy (IPA).[39] The Chinese version of the IPA (IPA-C) has been validated in Chinese stroke survivors.[40] The IPA-C comprises 25 items including four domains: autonomy indoors (7 items), social relations (6 items), family role (7 items), and autonomy outdoors (5 items). The Cronbach's α of IPA-C was 0.959, with each domain ranging 0.782–0.965. The test-retest reliability was 0.969, with each domain between 0.915–0.951.[40] Each item of the IPA-C is rated from 0 (excellent) to 4 (very poor). The total score range of IPA-C is 0–100, with a lower score indicating better self-perceived participation and autonomy.

**Participation Self-efficacy.** Participation self-efficacy will be assessed using the Participation Strategies Self-Efficacy Scale-Chinese version (PS-SES-C). It measures individuals' self-efficacy in using strategies to participate in home, community, work, and social activities. It comprises 35 questions with six subscales: (1) managing home participation, (2) staying organised, (3) planning and managing community participation, (4) managing work/productivity, (5) managing communication, and (6) advocating for resources. Each item is rated on a Likert scale of 1–10 with higher scores indicating greater self-efficacy. This instrument has good reliability, with the Cronbach's α ranging from 0.861–0.926.[41] The PS-SES-C had good internal consistency and test-retest reliability, with a Cronbach's α of 0.98 and intraclass correlation coefficient of 0.79.[42]

***Secondary outcomes***

**Anxiety and depression.** Anxiety and depression will be assessed using a Chinese version of Hospital Anxiety and Depression Scale (HADS). HADS is a 14-item self-report questionnaire, with 7 items to assess severity of anxiety and 7 items to assess severity of depression.[43] It is a widely used instrument in research and has good psychometric properties in stroke patients.[44, 45] A greater HADS score indicates a higher level of psychological distress.

**Social support.** Participants' perceived social support will be assessed using the 12-item Multidimensional Scale of Perceived Social Support (MSPSS).[46] It measures support from three sources: family (4 items), friends (4 items), and a significant other (4 items). Each item of the MSPSS is rated from 1 (totally disagree) to 7 (totally agree). The sum of the score

represents the level of perceived social support, with a higher score indicating higher perceived social support. The Chinese version of MSPSS has been validated and used in various populations.[47, 48]

**Stigma towards disease.** Participants' stigma toward disease will be measured using the Chinese version of the Stigma Scale for Chronic Illnesses-8 items (SSCI-8). It was developed by Molina et al. (2013) and is a simplified version of the 24-version stigma scale for chronic disease.[49] It has been demonstrated to have good validity and reliability with a Cronbach's α of 0.892 and test-retest interclass correlation of 0.809.[50]

**Quality of life.** The quality of life of the participants will be measured by using the Chinese version of EuroQol 5D ([EQ-5D-5L] [51]. The EQ-5D-5L includes five dimensions: mobility; self-care; usual activities; pain/discomfort; and anxiety/depression. Each dimension has five levels (no problem, slight problem, moderate problem, severe problem, and extreme problems, respectively). The total scores range from 5–25 and higher scores indicate lower quality of life. EQ-5D-5L was reported to have good psychometric properties for measuring physical and social functioning and overall health after stroke.[52]

**Satisfaction.** Participants' satisfaction with the NPSI will be assessed using an investigator-generated 8-item satisfaction questionnaire. This questionnaire measures patients' level of satisfaction with the NPSI regarding the usefulness, acceptability and satisfaction with the intervention. Each item was rated from 1 (not satisfied) to 4 (very satisfied).

**Data collection procedures**

The researcher responsible for recruitment will contact potential participants by phone and conduct preliminary screening for eligibility. Eligible participants will be invited to participate in the study. Stroke survivors who consent to participate will sign a written consent form. Those who have consented will be scheduled for baseline assessment by two research assistants at their home, rehabilitation unit, or the community health center. To aid any survivor with low health literacy, the research assistants will read all the materials to the participants. After randomisation, the intervention group will receive the six-week NPSI. Participants in both groups will be invited back for post-intervention data collection (T1) within one week post-intervention. Follow-up data will be collected three months after the intervention for participants in both groups. The data that will be collected and the instruments that will be used at each time point are presented in Table 2. We will also try to collect all the outcome data for participants who discontinue or deviate from intervention protocols

The two research assistants will receive standard training for data collection. Their skills will be evaluated before the data collection and the inter-rater reliability between the two research assistants will be assessed.

**Data management**

The data from participants will only be used for research purpose. The data will be entered into statistics software and double-checked by the two research assistants who are responsible for the data collection. The hard copy of the data will be kept in a locked cabinet and the electronic data will be stored in a hard disk protected with passwords. Only the principal investigator has access to the data. All the data will be destroyed five years later after the completion of the study.

**Process evaluation**

Process evaluation will be conducted according to the recommendation of the Medical Research Council Framework.[53] An expert panel on stroke care will review the clarity, relevance, and appropriateness of the workbook used by the facilitators and the information booklet. To ensure intervention consistency for every group, all the group sessions will be facilitated by the same nurse. All peer facilitators will receive training together using a standardised training manual and procedures. The nurse facilitator will conduct regular meetings with peer facilitators. To guarantee commitment to the intervention, every group session will be planned and structured with an agenda. The nurse facilitator will record the process of every session and make a summary after each session. The recruitment rate, attrition rate, and completion rate will be recorded.

To understand the mechanism of the effect of the intervention, the mediating effect of social support, participation self-efficacy, stigma towards disease, depression and anxiety will be examined to explore the mechanism by which the NPSI influences social participation and quality of life.

Participants' satisfaction will be assessed using an investigator-generated 8-item satisfaction questionnaire. A semi-structured interview will be conducted to obtain their feedback on the intervention's acceptability and usefulness. A purposive sample of 20 participants in the intervention group will be invited from participants with low and high satisfaction. Content analysis will be used to analyse the qualitative data from the participants.

**Data analysis**

Data will be analysed using IBM SPSS Statistics 23. Socio-demographic and clinical characteristics and the baseline outcome data will be described using means (SD), medians (IQR), or frequencies, where appropriate. Data between the two groups will be compared using the appropriate statistics according to their level of measurement. Continuous data will be analysed using independent t-tests or Mann-Whitney U tests.[54] Categorical data will be compared using Chi-square test or Fisher's exact tests.

The effects of NPSI on the primary and secondary outcomes will be evaluated following the intention to treat principle. Generalised Estimation Equation (GEE) models will be used to assess the intervention effect over time by controlling other possible covariates even in the presence of randomly missing data.[55] Regression-based mediation analysis [56] will be used to explore the mechanisms by which NPSI influences social participation and quality of life. The possible mediating effect of social support, self-efficacy, stigma towards disease, anxiety, and depression will be determined.

**Monitoring and trial management**

Due to the type of intervention, a data monitoring committee was not organised. A study committee including the principal investigator, one research professional, one physical therapist, one occupational therapist, and two professional nurses will supervise the conduct of the study and monitor any safety issues that arise. Adverse events related to the NPSI will be assessed and medical help will be suggested by the committee when necessary. If problems that can affect the study's implementation raised, modification of the study's protocol may be made by the principal investigator after a committee meeting; The modifications of the study protocol will be submitted to the related ethics committee for approval before the implementation of the modified study protocol.

**Ethics and dissemination**

The research team will follow the International Conference on Harmonization-Good Clinical Practice (ICH-GCP) and the Declaration of Helsinki. The protocol has obtained ethical approval from the Joint Chinese University of Hong Kong – New Territories East Cluster Clinical Research Ethics Committee (the Joint CUHK-NTEC CREC). An information sheet with details of the study, including research content, requirements, potential benefits, and risks, will be provided to the participants before enrollment. Written consent will be obtained from each participant by the researcher who conduct the recruitment. The data and information collected from participants will be handled following the principles of confidentiality and anonymity. Results of this study will be disseminated through local or international conferences presentations and publishes in peer-reviewed journals.

**DISCUSSION**

There is emerging evidence that peer support interventions may play a valuable role in enhancing stroke recovery.[22, 23] However, the evidence regarding the effectiveness of peer support interventions on the psychosocial outcomes of stroke survivors remains unclear. This is the first study conducted in China to evaluate the effectiveness of peer support interventions on the psychosocial outcomes of stroke survivors. This will also be a well-conducted RCT with sample sizes estimated using power analysis, which will be more robust in determining the value of peer support as an intervention.

The results of this study can add to the body of knowledge regarding the usefulness of peer support interventions in stroke rehabilitation and provide evidence for future research on the effectiveness, delivery format, dosage, and intervention components of peer support interventions, especially for Chinese stroke survivors. This study will also provide evidence for future nursing practice on the organization and support of stroke peer support groups in terms of service content and training of peer volunteers. In addition, this study applies the PEOP model in the development of peer support interventions. This may provide evidence for the applicability of the PEOP model in the care of stroke survivors and stroke rehabilitation.

**Author Contributions**

XW and JPCC designed the study and wrote the manuscript. YW, LX and WG are members of the study team who contributed to the recruitment, development of the intervention, and development of the study methods. All authors approved the final version of the manuscript.

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**Competing interests statement**

None declared.

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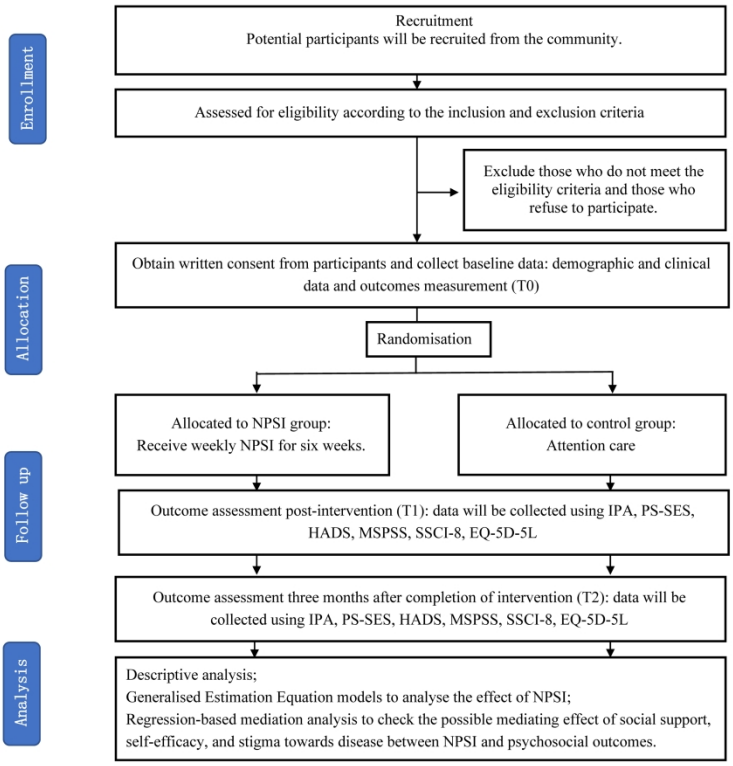


**Figure 1.** Study flow diagram

149x212mm (600 x 600 DPI)

**Information Sheet and Consent Forms**

| | |
|---|---|
| **Title of the study** | Effects of a Nurse-led Peer Support Intervention on the psychosocial outcomes of stroke survivors: A randomized controlled trial |
| **Principal Investigator** | Ms WAN Xiaojuan (PhD student in the Nethersole School of Nursing, the Faculty of Medicine, the Chinese University of Hong Kong) |
| **Academic supervisor** | Professor CHAU Pak Chun, Janita (Professor of the Nethersole School of Nursing, the Faculty of Medicine, the Chinese University of Hong Kong) |

***Research purpose***

This study aims to develop a nurse-led peer support intervention (NPSI) based on Person-Environment-Occupation Performance Model and to evaluate the effectiveness of the NPSI on stroke survivors' psychological (participation self-efficacy, self-efficacy in managing the chronic condition, psychological distress, disease stigma, and quality of life) and social outcomes (social participation and social support).

***Research Procedure***

After recruited into this study, you (i.e., stroke survivors) will be randomly assigned to participate in the intervention group (i.e., receiving the nurse-led peer support intervention + usual care) or control group (i.e., receiving usual care) with 50% chance. Sealed, opaque envelopes will be used to assign participants in the randomization process with each participant has the same chance to be allocated to the intervention group or control group. If you are assigned to the control group, you will receive the out-patient healthcare services provided by the hospital (e.g., routine post discharge follow up services from nurses or clinicians). If you are assigned to the intervention group, you will also receive the nurse-led peer support intervention

besides the usual care mentioned above. The nurse-led peer support intervention includes six group sessions (6-10 participants each group) scheduled weekly (total duration of 6 weeks) with each session lasting for 1.5-2h. During each session, the participants will discuss a specific stroke-related topic among group members facilitated by a nurse facilitator and at least one peer facilitator.

Before intervention initiation, immediately post-intervention (six weeks after the commencement of the nurse-led peer support intervention) and 3 months post-intervention, you (both intervention group and control group) will receive a 30-40 min assessment (demographic and clinical characteristics, psychosocial outcomes) by research assistants.

***Risks and benefits***

The assessment and the intervention of this study will not cause any discomfort, pain or harm to you. The potential benefits in this study are that the nurse-led peer support intervention may improve the self-efficacy, social support, social participation and quality of life and decrease the psychological distress of the stroke survivors.

***Compensation***

The participants do not need to pay for the service provided in the study. They will receive a cash compensation of 15 RMB (equal to 18 HKD) for taxi fee after completing data collection at each time point.

***Anonymity, Confidentiality and Nature of Participation***

Any information you provide in this study will be kept anonymous and confidential. Your identity information will not be presented in the study report. The data you provided will only be used for research purpose and will be kept in a secure location. Only the researchers have access to the data. All the data will be destroyed five years after the completion of the study. The participation is voluntary. You can cease to participate at any time. Your decisions will not influence the quality of the present and future medical service.

***Inquiry***

This study is undertaken by Miss WAN Xiaojuan (PhD student in Nursing, the Nethersole School of Nursing, the Faculty of Medicine, CUHK) and supervised by Professor Professor CHAU Pak Chun, Janita (Professor of the Nethersole School of Nursing, the Faculty of Medicine, the Chinese University of Hong Kong). Should you have any questions about the project, before or after participation, please feel free to contact Miss WAN at Tel: 86-13665278059 (Yangzhou). Email address: xjwan@link.cuhk.edu.hk. Address: Rm 604, 6/F, Esther Lee Building, The Chinese University of Hong Kong, New Territories, HK SAR, China. OR the academic supervisors of the principal investigator, Professor CHAU Pak Chun, Janita (Tel:852-3943 6226, janitachau@cuhk.edu.hk).

In addition, any enquiry about your right in the study, please contact the Joint Chinese University of Hong Kong – New Territories East Cluster Clinical Research Ethics Committee (Tel.: 852-3505 3935).

*You are cordially invited to participate in this study.*

***Consent of participants***

I confirm that I have read and have been informed of the study purpose, the procedure that will undergo, and the risk and benefit that I may experience. I have had opportunities to ask questions which have been explained to my satisfaction. I understand that the participation is voluntary and I have the right to decline the participation at any time without providing any reasons. I also understand that all the information I give will be used only in this research, kept confidentially and anonymously. I have read and I understand this consent form. Therefore, I agree to give my consent to participate in this study.

| | | |
|---|---|---|
| (Survivor's name) | (Survivor's signature) | (Date) |
| | | |

| (Researcher's name) | (Researcher's signature) | (Date) |
|---|---|---|

# Reporting checklist for protocol of a clinical trial.

Based on the SPIRIT guidelines.

## Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the SPIRITreporting guidelines, and cite them as:

Chan A-W, Tetzlaff JM, Gøtzsche PC, Altman DG, Mann H, Berlin J, Dickersin K, Hróbjartsson A, Schulz KF, Parulekar WR, Krleža-Jerić K, Laupacis A, Moher D. SPIRIT 2013 Explanation and Elaboration: Guidance for protocols of clinical trials. BMJ. 2013;346:e7586

| | | Reporting Item | Page Number |
|---|---|---|---|
| **Administrative information** | | | |
| Title | #1 | Descriptive title identifying the study design, population, interventions, and, if applicable, trial acronym | Page 1 |
| Trial registration | #2a | Trial identifier and registry name. If not yet registered, name of intended registry | Page 2 |
| Trial registration: data set | #2b | All items from the World Health Organization Trial Registration Data Set | Page 2 |
| Protocol version | #3 | Date and version identifier | Page 2 |
| Funding | #4 | Sources and types of financial, material, and other support | Page 15 |
| Roles and responsibilities: contributorship | #5a | Names, affiliations, and roles of protocol contributors | Page 15 |

| | | | |
|---|---|---|---|
| Roles and responsibilities: sponsor contact information | #5b | Name and contact information for the trial sponsor | n/a<br><br>It is an investigator-initiated trial, the principal investigator (first author) is the "sponsor-investigator". |
| Roles and responsibilities: sponsor and funder | #5c | Role of study sponsor and funders, if any, in study design; collection, management, analysis, and interpretation of data; writing of the report; and the decision to submit the report for publication, including whether they will have ultimate authority over any of these activities | Page 15 |
| Roles and responsibilities: committees | #5d | Composition, roles, and responsibilities of the coordinating centre, steering committee, endpoint adjudication committee, data management team, and other individuals or groups overseeing the trial, if applicable (see Item 21a for data monitoring committee) | Page 14 |
| **Introduction** | | | |
| Background and rationale | #6a | Description of research question and justification for undertaking the trial, including summary of relevant studies (published and unpublished) examining benefits and harms for each intervention | Page 3,4,5 |
| Background and rationale: choice of comparators | #6b | Explanation for choice of comparators | Page 10 |
| Objectives | #7 | Specific objectives or hypotheses | Page 5 |
| Trial design | #8 | Description of trial design including type of trial (eg, parallel group, crossover, factorial, single group), allocation ratio, and framework (eg, superiority, equivalence, non-inferiority, exploratory) | Page 5 |
| **Methods: Participants,** | | | |

| | | | |
|---|---|---|---|
| **interventions, and outcomes** | | | |
| Study setting | #9 | Description of study settings (eg, community clinic, academic hospital) and list of countries where data will be collected. Reference to where list of study sites can be obtained | Page 5 |
| Eligibility criteria | #10 | Inclusion and exclusion criteria for participants. If applicable, eligibility criteria for study centres and individuals who will perform the interventions (eg, surgeons, psychotherapists) | Page 6,7 |
| Interventions: description | #11a | Interventions for each group with sufficient detail to allow replication, including how and when they will be administered | Page 6,7,8,9 |
| Interventions: modifications | #11b | Criteria for discontinuing or modifying allocated interventions for a given trial participant (eg, drug dose change in response to harms, participant request, or improving / worsening disease) | Page 14 |
| Interventions: adherance | #11c | Strategies to improve adherence to intervention protocols, and any procedures for monitoring adherence (eg, drug tablet return; laboratory tests) | Page 7,8 |
| Interventions: concomitant care | #11d | Relevant concomitant care and interventions that are permitted or prohibited during the trial | Page 14 |
| Outcomes | #12 | Primary, secondary, and other outcomes, including the specific measurement variable (eg, systolic blood pressure), analysis metric (eg, change from baseline, final value, time to event), method of aggregation (eg, median, proportion), and time point for each outcome. Explanation of the clinical relevance of chosen efficacy and harm outcomes is strongly recommended | Page 10,11,12 |
| Participant timeline | #13 | Time schedule of enrolment, interventions (including any run-ins and washouts), assessments, and visits for participants. A schematic diagram is highly recommended (see Figure) | Page 12 |

| | | | |
|---|---|---|---|
| Sample size | #14 | Estimated number of participants needed to achieve study objectives and how it was determined, including clinical and statistical assumptions supporting any sample size calculations | Page 6 |
| Recruitment | #15 | Strategies for achieving adequate participant enrolment to reach target sample size | Page 5,12 |
| **Methods: Assignment of interventions (for controlled trials)** | | | |
| Allocation: sequence generation | #16a | Method of generating the allocation sequence (eg, computer-generated random numbers), and list of any factors for stratification. To reduce predictability of a random sequence, details of any planned restriction (eg, blocking) should be provided in a separate document that is unavailable to those who enrol participants or assign interventions | Page 6 |
| Allocation concealment mechanism | #16b | Mechanism of implementing the allocation sequence (eg, central telephone; sequentially numbered, opaque, sealed envelopes), describing any steps to conceal the sequence until interventions are assigned | Page 6 |
| Allocation: implementation | #16c | Who will generate the allocation sequence, who will enrol participants, and who will assign participants to interventions | Page 6 |
| Blinding (masking) | #17a | Who will be blinded after assignment to interventions (eg, trial participants, care providers, outcome assessors, data analysts), and how | Page 6 |
| Blinding (masking): emergency unblinding | #17b | If blinded, circumstances under which unblinding is permissible, and procedure for revealing a participant's allocated intervention during the trial | n/a |
| **Methods: Data collection, management, and analysis** | | | |

| | | | |
|---|---|---|---|
| Data collection plan | #18a | Plans for assessment and collection of outcome, baseline, and other trial data, including any related processes to promote data quality (eg, duplicate measurements, training of assessors) and a description of study instruments (eg, questionnaires, laboratory tests) along with their reliability and validity, if known. Reference to where data collection forms can be found, if not in the protocol | Page 12 |
| Data collection plan: retention | #18b | Plans to promote participant retention and complete follow-up, including list of any outcome data to be collected for participants who discontinue or deviate from intervention protocols | Page 7,12 |
| Data management | #19 | Plans for data entry, coding, security, and storage, including any related processes to promote data quality (eg, double data entry; range checks for data values). Reference to where details of data management procedures can be found, if not in the protocol | Page 13 |
| Statistics: outcomes | #20a | Statistical methods for analysing primary and secondary outcomes. Reference to where other details of the statistical analysis plan can be found, if not in the protocol | Page 13,14 |
| Statistics: additional analyses | #20b | Methods for any additional analyses (eg, subgroup and adjusted analyses) | Page 13,14 |
| Statistics: analysis population and missing data | #20c | Definition of analysis population relating to protocol non-adherence (eg, as randomised analysis), and any statistical methods to handle missing data (eg, multiple imputation) | Page 13,14 |
| **Methods: Monitoring** | | | |
| Data monitoring: formal committee | #21a | Composition of data monitoring committee (DMC); summary of its role and reporting structure; statement of whether it is independent from the sponsor and competing interests; and reference to where further details about its charter can be found, if not in the | Page 14<br><br>Due to the type of intervention, a data monitoring committee was not organised |

| | | | |
|---|---|---|---|
| | | protocol. Alternatively, an explanation of why a DMC is not needed | |
| Data monitoring: interim analysis | #21b | Description of any interim analyses and stopping guidelines, including who will have access to these interim results and make the final decision to terminate the trial | n/a |
| Harms | #22 | Plans for collecting, assessing, reporting, and managing solicited and spontaneously reported adverse events and other unintended effects of trial interventions or trial conduct | n/a<br>Referring to subject informed consent form attached |
| Auditing | #23 | Frequency and procedures for auditing trial conduct, if any, and whether the process will be independent from investigators and the sponsor | n/a |
| **Ethics and dissemination** | | | |
| Research ethics approval | #24 | Plans for seeking research ethics committee / institutional review board (REC / IRB) approval | Page 14 |
| Protocol amendments | #25 | Plans for communicating important protocol modifications (eg, changes to eligibility criteria, outcomes, analyses) to relevant parties (eg, investigators, REC / IRBs, trial participants, trial registries, journals, regulators) | Page 14 |
| Consent or assent | #26a | Who will obtain informed consent or assent from potential trial participants or authorised surrogates, and how (see Item 32) | Page 14 |
| Consent or assent: ancillary studies | #26b | Additional consent provisions for collection and use of participant data and biological specimens in ancillary studies, if applicable | n/a |
| Confidentiality | #27 | How personal information about potential and enrolled participants will be collected, shared, and maintained in order to protect confidentiality before, during, and after the trial | Page 14 |
| Declaration of interests | #28 | Financial and other competing interests for principal investigators for the overall trial and each study site | Page 15 |

| | | | |
|---|---|---|---|
| Data access | #29 | Statement of who will have access to the final trial dataset, and disclosure of contractual agreements that limit such access for investigators | Page 13 |
| Ancillary and post trial care | #30 | Provisions, if any, for ancillary and post-trial care, and for compensation to those who suffer harm from trial participation | n/a<br><br>None |
| Dissemination policy: trial results | #31a | Plans for investigators and sponsor to communicate trial results to participants, healthcare professionals, the public, and other relevant groups (eg, via publication, reporting in results databases, or other data sharing arrangements), including any publication restrictions | Plan 14 |
| Dissemination policy: authorship | #31b | Authorship eligibility guidelines and any intended use of professional writers | n/a<br><br>None |
| Dissemination policy: reproducible research | #31c | Plans, if any, for granting public access to the full protocol, participant-level dataset, and statistical code | n/a<br><br>None |
| **Appendices** | | | |
| Informed consent materials | #32 | Model consent form and other related documentation given to participants and authorised surrogates | Attached |
| Biological specimens | #33 | Plans for collection, laboratory evaluation, and storage of biological specimens for genetic or molecular analysis in the current trial and for future use in ancillary studies, if applicable | n/a<br><br>None |

BMJ Open

# Effects of a nurse-led peer support intervention for stroke survivors: protocol for a randomised controlled trial

| | |
|---|---|
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| Manuscript ID | bmjopen-2022-062531.R1 |
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| Primary Subject Heading: | Rehabilitation medicine |
| Secondary Subject Heading: | Mental health, Neurology, Sociology |
| Keywords: | SOCIAL MEDICINE, MENTAL HEALTH, Stroke < NEUROLOGY |
| | |

# Effects of a nurse-led peer support intervention for stroke survivors: protocol for a randomised controlled trial

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## ABSTRACT

**Introduction** Many stroke survivors have unmet psychosocial needs during the recovery phase following a stroke. There is emerging evidence that peer support interventions may play a valuable role in managing stroke. However, evidence regarding the effectiveness of peer support interventions on the psychosocial outcomes of stroke survivors is uncertain. This study aims to develop a nurse-led peer support intervention for stroke survivors based on the Person-Environment-Occupation-Performance Model and evaluate its effects on the psychosocial outcomes of stroke survivors.

**Methods and analysis** This is an assessor-blinded two-arm randomised controlled trial. A convenience sample of 120 stroke survivors will be recruited from two community centres and one rehabilitation unit in Yangzhou, a medium-sized city in eastern China, with 60 participants each in the intervention and control groups. The participants allocated to the intervention group will receive the nurse-led peer support intervention, which includes six weekly peer support sessions facilitated by a nurse and at least one peer facilitator. Participants randomised to the control group will receive the same dose of interpersonal interaction as intervention participants, including weekly individual face-to-face session for six weeks. The primary outcomes are social participation and participation self-efficacy. The secondary outcomes are psychosocial distress, social support, stigma towards disease, self-efficacy in managing chronic conditions, and quality of life. Data will be collected at baseline, immediately after the intervention, and three months after the intervention. A process evaluation will be conducted qualitatively and quantitively to examine the mechanism by which the intervention impacts the psychosocial outcomes of stroke survivors. All outcomes will be analysed following the intention to treat principle. Generalised Estimation Equation models will be used to assess the intervention effect.

**Ethics and dissemination** This protocol was approved by the Joint Chinese University of Hong Kong-New Territories East Cluster Clinical Research Ethics Committee (CREC Ref. No.: 2021.196-T). All participants will be required to provide written informed consent.

Results of the study will be disseminated through publication in peer-reviewed journals and presentation at local or international conferences.

**Trial registration number** Chinese Clinical Trial Registry, ChiCTR2100050853. Protocol V.1.0 (28 February 2022, original).

**Keywords:** Mental health; Social medicine; Stroke

**Strengths and limitations of this study**

- This randomised clinical trial evaluates an evidence-based intervention theoretically grounded in the Person-Environment-Occupation-Performance Model.
- Participants will be randomly assigned to intervention group and attention control group, which will disentangle the benefits of attention from the impacts of the intervention itself.
- Process evaluation will be conducted qualitatively and quantitatively to understand the fidelity of intervention implementation and how the intervention impacts the psychosocial outcomes of stroke survivors.
- Although outcome assessors will be blinded to reduce investigator bias, participants and the interveners will not be blinded to the group allocation due to the intervention nature.
- There is a risk that some participants may drop out during the study period due to the longitudinal nature of the study, especially due to COVID-19 outbreak disruptions, which may contribute to the attrition bias.

## INTRODUCTION

Stroke has high incidence, prevalence, and mortality. Recent studies report this disease as the third leading cause of disability and the second leading cause of death globally.[1-3] In 2016, there were 13.7 million new stroke cases worldwide, of which 5.51 million cases were reported in China, which has the highest age-standardised incidence of stroke internationally.

Many stroke survivors face psychosocial challenges after hospital discharge. It is reported that one-third of stroke survivors suffer from post-stroke depression,[4] while 20% report the experience of anxiety symptoms post-stroke.[5] These emotional symptoms are

associated with increased mortality, slow recovery, and decreased quality of life.[6-8] In addition, physical impairments after stroke pose different degrees of activity limitation and participation restriction.[9 10] Evidence suggests participation restrictions are associated with social isolation, the occurrence of recurrent stroke, and increased mortality.[11-14]

Despite efforts made to improve acute stroke care, less attention has been given to post-discharge care, especially in terms of psychosocial support.[15-17] Evidence regarding interventions aimed at improving psychosocial health, especially post-stroke social participation, is lacking. Studies about stroke rehabilitation often do not include outcomes to assess participation, and studies involving participation often do not adopt a theoretical framework to guide the development of interventions and the choice of outcome measures.[17 18] Therefore, more theory-based psychosocial intervention studies are needed.

Peer support interventions that enhance social support may potentially improve the psychosocial outcomes of stroke survivors. A systematic review showed that group self-management interventions involving peer support could facilitate experience-sharing, increase knowledge and communication, improve goal setting and problem solving, and boost motivation and self-efficacy among stroke survivors.[19]

Peer support is defined as assistance and encouragement from persons with a similar condition to an individual.[20] Peers may understand the target population's condition in a comprehensive way that healthcare professionals may not, thus the knowledge, coping strategies, and experiences presented by peers could be more persuasive for individuals who share the same experience.[21] According to the concept analysis proposed by Dennis[20], trained peer facilitators can provide informational, emotional, and appraisal support to their partners (see Figure 1). Through the direct, buffering or mediating effect, both peer partners and peer facilitators can attain better psychosocial outcomes, such as increased self-efficacy, enhanced effective coping, decreased emotional symptoms, and increased social participation.[20]

However, evidence regarding the effectiveness of peer support interventions on the psychosocial outcomes of stroke survivors is still not very clear. We conducted a systematic review of 11 randomised controlled trials (RCTs) and non-RCTs and found that stroke survivors might benefit from peer support interventions, particularly in terms of improving their psychological outcomes. However, the evidence about the effects of peer support interventions on social outcomes was uncertain.[22] Most previous studies did not adopt a theory to guide the design of the intervention.[22] None of the studies conducted in China evaluated the psychosocial outcomes of stroke survivors.

Another systematic review found that interventions delivered by healthcare workers appeared to be more effective in improving chronic disease management among vulnerable community populations compared with alternatives including usual care, enhanced usual care, or no intervention.[23] Thus, incorporating healthcare workers into peer support interventions

may be a feasible option to ensure specialist knowledge of the disease when needed. Nurses are relatively accessible and less costly to employ,[24] and most importantly, patients express satisfaction with health services provided by nurses in the communities.[25 26] A study involving 390 stroke survivors after hospital discharge aimed at addressing psychosocial problems found that nurse-led stroke aftercare effectively addressed psychosocial problems and had a lower cost as compared to usual care.[27]

### Aim and hypothesis

This study aims to develop a theory-driven nurse-led peer support intervention (NPSI) for stroke survivors based on the Person-Environment-Occupation-Performance Model (PEOP) and evaluate its effects on stroke survivors' psychosocial outcomes.

We hypothesise that, compared with stroke survivors receiving attention care in the control group, at 6 weeks after commencing the intervention and at 3 months after completion of the intervention, the stroke survivors receiving the NPSI will have: increased social participation and social support; greater participation self-efficacy; less psychological distress; higher self-efficacy in managing chronic conditions, less stigma towards disease, and improved quality of life.

## METHODS AND ANALYSIS

### Design

An assessor-blinded two-arm RCT will be conducted (see Figure 2 for the flow diagram of the study). This protocol will adhere to the Standard Protocol Items: Recommendations for Interventional Trials reporting guidelines.[28]

### Setting and participants

Participants will be recruited from two community centres and one rehabilitation unit near the two communities in Yangzhou, a medium-sized city in Jiangsu province, Eastern China. Recruitment posters will be distributed to community health centres, family physician centres, day rehabilitation units, and a rehabilitation unit at the recruitment sites.

#### *Inclusion criteria*

Individuals who meet the following criteria will be recruited:

(1) Have a clinical diagnosis of ischaemic or haemorrhagic first-ever or recurrent stroke before enrollment according to the diagnostic criteria of the Chinese Society of Neurology, Chinese Stroke Society;[29 30]

(2) Aged ≥18 years old;

(3) Able to communicate meaningfully in Mandarin and provide informed consent.

#### *Exclusion criteria*

(1) Are not medically stable or have a terminal illness;

(2) Diagnosed with a mental illness;

(3) Have moderate or severe cognitive impairment and cannot participate meaningfully in the workshop sessions (e.g., Mini-Mental State Examination (MMSE) ≤20) [31] or do not have the physical capacity to travel to the workshop site even with assistance;

(4) Are participating in another intervention research program;

(5) Plan to move out of the area within six weeks, or do not have a reasonable expectation that they will attend a program for 2h/week for up to 6 weeks.

**Sample size**

G*Power (version 3.1) was used to calculate the sample size. The power calculation is based on the primary outcomes of social participation and participation self-efficacy. In a multicenter randomised trial of 185 stroke survivors, the effect size of peer support interventions on participation self-efficacy was 0.58.[32] In order to have 80% power to detect a significant difference at a significance level of 0.05, enrolling 48 participants in each group is needed. With an estimated attrition rate of 20%, enrolling 120 stroke survivors with 60 participants in each group is planned. This sample size is also enough for an effect size of 0.74 for the outcome of social participation, which was drawn from a systematic review and meta-analysis.[22]

**Randomisation**

After completing baseline assessments, participants will be randomly allocated to the NPSI or control group (1:1 ratio). Blocked randomisation [33] will be used with blocks of 4 or 6 via a computer-generated, random-number sequence. Sequentially numbered, opaque, sealed envelopes will be used to guarantee allocation concealment. Randomisation will be stratified by recruitment sites and residential areas to achieve balanced randomisation. Both randomisation and allocation procedures will be conducted by a researcher not involved in recruitment, intervention delivery, and outcome assessment.

**Blinding**

Due to the nature of the intervention, the researchers who deliver the intervention and the participants themselves will know the group allocation. Only the two research assistants who assess the outcomes will be blinded from group assignments. The person conducting the data analysis will not be blinded.

**Intervention**

***Components***

The NPSI consists of six sessions, in which participants will discuss stroke-related topics in groups and support each other. The stroke-related topics include didactic education (e.g., the

pathophysiology of stroke, stroke prevention); self-management strategies (e.g., use of problem-solving techniques, action planning), social participation (e.g., home role attainment, community reintegration), and emotional management (see detailed content of each session in Table 1). The content of the intervention was informed by findings from our previous systematic review on the effectiveness of peer support interventions.[22] The dose of the interventions varied across studies and the typical number of sessions was 6–8 sessions.[22] As such, we set six sessions for the NPSI based on the learning activities for each session.

***Theoretical underpinning***

The NPSI will be developed based on the PEOP model. This model is a client-centered model aiming to improve the performance and social participation of individuals.[34] It has four components: occupation (what people want or need to do in their daily lives); performance (the actual act of doing); person (intrinsic factors, e.g., psychological, physiological, neurobehavioral, cognitive, and spiritual factors); and environment (extrinsic factors, e.g., health system; social supports; social & economic system; culture and value; natural environment). In the PEOP model, complex interactions exist between the person and the environment in which people carry out meaningful activities. The interaction of personal capacity, environmental factors, and chosen activities lead to performance and participation. To achieve a desired level of participation, people and groups must overcome personal and environmental barriers that limit their participation in activities and attempt to make use of personal capacity and environment enablers which support them in doing meaningful activities. The peer support groups will discuss these barriers, facilitators, and problem-solving strategies around the intervention topics during the peer support sessions. It is expected that through these discussions, the self-efficacy or social participation of the participants can be improved.

***Intervention delivery***

The NPSI will be conducted in groups (4–8 participants per group) and delivered weekly for six weeks. Each session will be conducted face-to-face and last around 1.5–2 hours. Participants in each group will discuss one or two topics per session (see table 1 for the detailed contents of each session). During the session, group members will discuss barriers, facilitators, and possible problem-solving strategies for a meaningful goal (e.g., community integration) proposed by each participant. At the end of each session, participants will make an action plan and then report any relevant progress to the group at the beginning of the next session. The location of the group sessions will be chosen according to the convenience of the group members. Participants will arrange their own transportation with costs reimbursed by the researchers. An information booklet that includes stroke-related knowledge and the intervention content will be provided to participants. Stroke survivors can attend the sessions

with their caregiver or a friend. A participant will be considered to have completed the intervention if they attend four or more sessions.

To ensure participant adherence, the sessions will be fixed at the same time each week for a peer support group (e.g., participants in group one gather on Tuesday afternoon every week) in case they forget the gathering time due to decreased memory ability. The peer facilitators will call the participants at least once each week to encourage them to implement their action plan and remind them to remember the time and place of the next session.

***Facilitators and training***

A nurse facilitator and at least one peer facilitator will administer each peer support session using the same verified workbook. At least 4 peer facilitators will be recruited and trained in this study. They should meet the following criteria:[35] 1) is a stroke survivor (or stroke survivor with caregiver); 2) stroke occurred at least 18 months previously; 3) have good communication and expression abilities.

A training program will be provided to peer facilitators. The program will be conducted face-to-face via four group sessions (2h per session, total 8h). It will be held twice a week for two weeks and will be facilitated by a nurse, an occupational therapist, and a physical therapist. The training content includes stroke knowledge, communication and group facilitation skills, and self-management skills. A variety of training methods will be employed in the training sessions including verbal explanation, discussion, group brainstorming, case-based scenarios and group facilitation simulations.[36]

**Table 1. Content for scheduled NPSI sessions**

| Sessions | Contents |
|---|---|
| Session 1：Introduction, group norms, self-management strategy. | Activity 1: Self-introduction and identifying the problems of each group member.<br>Activity 2: Introducing the course and responsibilities of the participants.<br>Activity 3: Introducing self-management strategies.<br>Activity 4. Introducing how to prevent stroke recurrence.<br>Activity 5: Making an action plan for preventing stroke recurrence.<br>Activity 6: Summary. |
| Session 2：Management of emotional changes after stroke. | Activity 1: Debriefing and problem-solving.<br>Activity 2: Discussion about common thoughts, fears, and other emotional changes after stroke.<br>Activity 3: Introducing problem-solving strategies to address the emotional changes.<br>Activity 4: Communication skills.<br>Activity 5: Making an action plan to deal with emotional changes and facilitate effective communication.<br>Activity 6: Summary. |
| Session 3：Participation at home. | Activity 1: Debriefing and problem-solving.<br>Activity 2: Participation at home. |

| | |
|---|---|
| | Activity 3: Common symptoms after stroke and possible problem-solving strategies.<br>Activity 4: Making an action plan for home participation.<br>Activity 5: Summary. |
| Session 4: Community integration and leisure activities. | Activity 1: Debriefing and problem-solving.<br>Activity 2: Community integration and leisure activities.<br>Activity 3: Rehabilitation exercises and physical exercises.<br>Activity 4: Making an action plan for community participation or leisure activities.<br>Activity 5: Summary. |
| Session 5: Socialisation. | Activity 1: Debriefing and problem-solving.<br>Activity 2: Socialization.<br>Activity 3: Maintaining a healthy diet.<br>Activity 4: Making an action plan for social activities.<br>Activity 5: Summary. |
| Session 6：Returning to work and summary. | Activity 1: Debriefing and problem-solving.<br>Activity 2: Education, work and volunteer work.<br>Activity 3. Guidelines for taking medication for stroke.<br>Activity 4: Making an action plan for returning to work.<br>Activity 5: Summary of the course. |

## Patient and public involvement

In order to develop the patient-tailored intervention,[30] stroke survivors meeting the eligibility criteria were invited to provide insights regarding their rehabilitative experiences, the risk factors of post-stroke psychological distress and participation restriction, and their psychological and social needs to inform the development of the components of the NPSI. After intervention delivery, participants' satisfaction and comments on the intervention's usefulness and acceptability will be collected through an investigator-generated satisfaction questionnaire and in-depth interviews.

## Control group

Participants randomised to the control group will receive attention care from the nurse facilitator. This will be individual face-to-face guidance scheduled weekly for six weeks. The contents and duration of the guidance will be the same as the intervention components included in the NPSI but will be delivered individually without support from peers.

## Outcome measures

The following outcomes will be measured at baseline (T0), post-intervention (six weeks later) (T1), and three months after the intervention (T2) for the stroke survivors in both groups (Table 2).

**Table 2. Assessment schedule and measures for outcomes**

| Outcomes | Instruments | Baseline (T0) | Immediately after 6 weeks of NPSI (T1) | 3 months post-intervention (T2) |
|---|---|---|---|---|
| **Primary outcomes** | | | | |
| Social participation | The Impact on Participation and Autonomy (IPA) | × | × | × |
| Participation self-efficacy | Participation Strategies Self-Efficacy Scale- Chinese version (PS-SES-C) | × | × | × |
| **Secondary outcomes** | | | | |
| Psychological distress | Hospital Anxiety and Depression Scale (HADS) | × | × | × |
| Social support | Multidimensional Scale of Perceived Social Support (MSPSS) | × | × | × |
| Stigma towards disease | Stigma Scale for Chronic Illnesses-8 items (SSCI-8 items) | × | × | × |

| | | | | |
|---|---|---|---|---|
| Self-efficacy in managing chronic conditions | Self-efficacy for Managing Chronic Disease six-item Scale (SECD6) | × | × | × |
| Quality of life | EuroQol-5D-5L | × | × | × |
| **Satisfaction with the intervention** | | | | |
| Participants' satisfaction-survey | Investigator-generated satisfaction questionnaire (only for the intervention group) | | × | |
| Participants' feedback-interview | / | | × | |

***Primary outcomes***

**Social participation.** Social participation will be measured using the Impact on Participation and Autonomy (IPA).[37] The Chinese version of the IPA (IPA-C) has been validated in Chinese stroke survivors.[38] The IPA-C comprises 25 items including four domains: autonomy indoors (7 items), social relations (6 items), family role (7 items), and autonomy outdoors (5 items). The Cronbach's α of IPA-C was 0.959, with each domain ranging 0.782–0.965. The test-retest reliability was 0.969, with each domain between 0.915–0.951.[38] Each item of the IPA-C is rated from 0 (excellent) to 4 (very poor). The total score range of IPA-C is 0–100, with a lower score indicating better self-perceived participation and autonomy.

**Participation Self-efficacy.** Participation self-efficacy will be assessed using the Participation Strategies Self-Efficacy Scale-Chinese version (PS-SES-C).[39] It measures individuals' self-efficacy in using strategies to participate in home, community, work, and social activities. It comprises 35 questions with six subscales: (1) managing home participation, (2) staying organised, (3) planning and managing community participation, (4) managing work/productivity, (5) managing communication, and (6) advocating for resources. Each item is rated on a Likert scale of 1–10 with higher scores indicating greater self-efficacy. The PS-SES-C had good internal consistency and test-retest reliability, with a Cronbach's α of 0.98 and intraclass correlation coefficient of 0.79.[39]

***Secondary outcomes***

**Psychological distress.** Psychological distress will be assessed using a Chinese version of Hospital Anxiety and Depression Scale (HADS). HADS is a 14-item self-report questionnaire, with 7 items to assess severity of anxiety and 7 items to assess severity of depression.[40] It is a widely-used instrument in research and has good psychometric properties in stroke patients.[41 42] A greater HADS score indicates a higher level of psychological distress.

**Social support.** Participants' perceived social support will be assessed using the 12-item Multidimensional Scale of Perceived Social Support (MSPSS).[43] It measures support from three sources: family (4 items), friends (4 items), and a significant other (4 items). Each item of the MSPSS is rated from 1 (totally disagree) to 7 (totally agree). The sum of the score represents the level of perceived social support, with a higher score indicating higher perceived social support. The Chinese version of MSPSS has been validated and used in various populations.[44 45]

**Stigma towards disease.** Participants' stigma toward disease will be measured using the Chinese version of the Stigma Scale for Chronic Illnesses-8 items (SSCI-8). It was developed by Molina et al. (2013) and is a simplified version of the 24-version stigma scale for chronic disease.[46] It has been demonstrated to have good validity and reliability with a Cronbach's α of 0.892 and test-retest interclass correlation of 0.809.[47]

**Self-efficacy in managing chronic conditions.** The Chinese version of Self-Efficacy for Managing Chronic Disease 6-Item Scale (SES6C) will be used to assess participant self-efficacy in managing chronic conditions. The SES6C had acceptable psychometric properties with a Cronbach's α of 0.88 in Chinese population.[48] It is scored with a 10-point Likert scale from 1 (not at all confident) to 10 (totally confident). The total score ranges from 6–60 and a higher score indicates higher level of self-efficacy.

**Quality of life.** The quality of life of the participants will be measured by using the Chinese version of EuroQol 5D (EQ-5D-5L) .[49] The EQ-5D-5L includes five dimensions: mobility; self-care; usual activities; pain/discomfort; and anxiety/depression. Each dimension has five levels (no problem, slight problem, moderate problem, severe problem, and extreme problems, respectively). The total scores range from 5–25 and higher scores indicate lower quality of life. The EQ-5D-5L was reported to have good psychometric properties for measuring physical and social functioning and overall health after stroke.[50]

***Satisfaction with the NPSI***

Participants' satisfaction with the NPSI will be assessed using an investigator-generated 8-item satisfaction questionnaire. This questionnaire measures patients' level of satisfaction with the NPSI regarding the usefulness, acceptability and satisfaction with the intervention. Each item was rated from 1 (not satisfied) to 4 (very satisfied).

**Data collection procedures**

The researcher responsible for recruitment will contact potential participants by phone and conduct preliminary screening for eligibility. Eligible participants will be invited to participate in the study. Stroke survivors who consent to participate will sign a written consent form. Those who have consented will be scheduled for baseline assessment by two research assistants at their home, rehabilitation unit, or community health centre. To aid any survivors with low health literacy, the research assistants will read all the materials to the

participants. After randomisation, the intervention group will receive the six-week NPSI. Participants in both groups will be invited back for post-intervention data collection (T1) within one week post-intervention. Follow-up data will be collected three months after the intervention for participants in both groups. The data that will be collected and the instruments that will be used at each time point are presented in Table 2.

The two research assistants will receive standard training for data collection. Their skills will be evaluated before the data collection and the inter-rater reliability between the two research assistants will be assessed.

**Data management**

The data from participants will only be used for research purpose. The data will be entered into statistics software and double-checked by the two research assistants who are responsible for data collection. The hard copy of the data will be kept in a locked cabinet and the electronic data will be stored in a hard disk protected with passwords. Only the principal investigator will have access to the data. All the data will be destroyed five years after the completion of the study.

**Process evaluation**

Process evaluation will be conducted according to the recommendation of the Medical Research Council Framework.[51] An expert panel on stroke care will review the clarity, relevance, and appropriateness of the workbook used by the facilitators and the information booklet. To ensure intervention consistency for every group, all the group sessions will be facilitated by the same nurse. All peer facilitators will receive training together using a standardised training manual and procedures. The nurse facilitator will conduct regular meetings with peer facilitators. The nurse facilitator will record the process of every session and make a summary after each session. The recruitment rate, attrition rate, and completion rate will be recorded.

To understand the mechanism of the effect of the intervention, the mediating effect of social support, participation self-efficacy, stigma towards disease, self-efficacy in managing chronic conditions, psychological distress will be examined to explore the mechanism by which the NPSI influences social participation and quality of life.

Participants' satisfaction will be assessed using an investigator-generated 8-item satisfaction questionnaire. Semi-structured interviews will be conducted to obtain their feedback on the intervention's acceptability and usefulness. A purposive sample of 20 participants in the intervention group will be invited from participants with low and high satisfaction. Content analysis will be used to analyse the qualitative data from the participants.

**Data analysis**

Data will be analysed using IBM SPSS Statistics 23. Socio-demographic and clinical characteristics and the baseline outcome data will be described using means (SD), medians (IQR), or frequencies, where appropriate. Data between the two groups will be compared using the appropriate statistics according to their level of measurement. Continuous data will be analysed using independent t-tests or Mann-Whitney U tests.[52] Categorical data will be compared using Chi-square test or Fisher's exact tests.

The effects of NPSI on the primary and secondary outcomes will be evaluated following the intention to treat principle. Generalised Estimation Equation (GEE) models will be used to assess the intervention effect over time by controlling other possible covariates even in the presence of randomly missing data.[53] Regression-based mediation analysis [54] will be used to explore the mechanisms by which the NPSI influences social participation and quality of life. The possible mediating effect of social support, self-efficacy, stigma towards disease, psychological distress will be determined.

**Monitoring and trial management**

Due to the type of intervention, a data monitoring committee was not organised. A study committee including the principal investigator, one research professional, one physical therapist, one occupational therapist, and two professional nurses will supervise the conduct of the study and monitor any safety issues that arise. Adverse events related to the NPSI will be assessed and medical help will be suggested by the committee when necessary. If problems that can affect the study's implementation emerge, the principal investigator may make relevant modifications to the study protocol after a committee meeting; the modifications of the study protocol will be submitted to the relevant ethics committee for approval before the implementation of the modified study protocol.

## ETHICS AND DISSEMINATION

The research team will adhere to the International Conference on Harmonization-Good Clinical Practice (ICH-GCP) and the Declaration of Helsinki. The protocol has obtained ethical approval from the Joint Chinese University of Hong Kong – New Territories East Cluster Clinical Research Ethics Committee (the Joint CUHK-NTEC CREC). An information sheet with details of the study, including research content, requirements, potential benefits, and risks, will be provided to the participants before enrolment. Written consent will be obtained from each participant by the researcher conducting recruitment (see supplemental material). The data and information collected from participants will be handled following the principles of confidentiality and anonymity and will only be used for research. Only the researchers have access to the data. Results of this study will be disseminated through local or international conference presentations and published in peer-reviewed journals.

## DISCUSSION

There is emerging evidence that peer support interventions may play a valuable role in enhancing stroke recovery.[19 55] However, the evidence regarding the effectiveness of peer support interventions on the psychosocial outcomes of stroke survivors remains unclear. This is the first study conducted in China to evaluate the effectiveness of peer support interventions on the psychosocial outcomes of stroke survivors. This will also be a well-conducted RCT with sample sizes estimated using power analysis, which will be more robust in determining the value of peer support as an intervention. The results of this study can add to the body of knowledge regarding the usefulness of peer support interventions in stroke rehabilitation and provide evidence for future research on the effectiveness, delivery format, dosage, and intervention components of peer support interventions, especially for Chinese stroke survivors.

Although the strengths of this study are substantial, there are also some limitations. First, due to the nature of the intervention, both the participants and the interventionists will not be blinded to the group allocation. To reduce the potential bias, participants will only be told that they will receive the nurse-led peer support intervention or the individual face-to-face guidance and they will remain unaware of which one may be better. The outcome assessors will be blinded to reduce detection bias. Second, similar to any other longitudinal study, there may be challenges in participation recruitment and retention especially during the COVID-19 pandemic. Stroke survivors may refuse to continue or drop out of the trial due to various reasons, which may contribute to the attrition bias. To address these challenges, the researchers will work closely with the staff in the recruitment sites to encourage participant recruitment and retention. In addition, the interventionists will try to develop a trusting relationship with the participants. Third, as the intervention will be facilitated by a nurse facilitator and at least one peer facilitator, it might be difficult to differentiate between the impact of peer or professional facilitators.

## Contributors

XW and JPCC designed the study and wrote the manuscript. YW, LX and WG are members of the study team who contributed to the recruitment, development of the intervention, and development of the study methods. All authors approved the final version of the manuscript.

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## Competing interests

None declared.

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**Lists of figure titles:**

**Figure 1. Effect mechanism of peer support interventions**

**Figure 2. Study flow diagram**

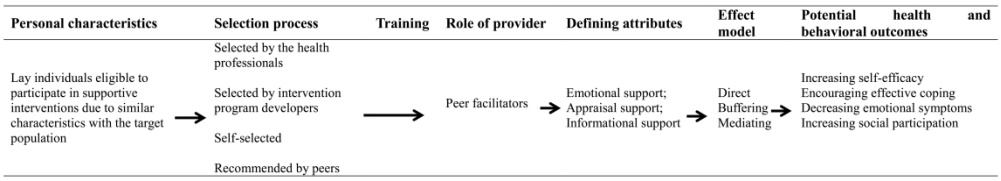


**Figure 1. Effect mechanism of peer support interventions**

269x64mm (600 x 600 DPI)

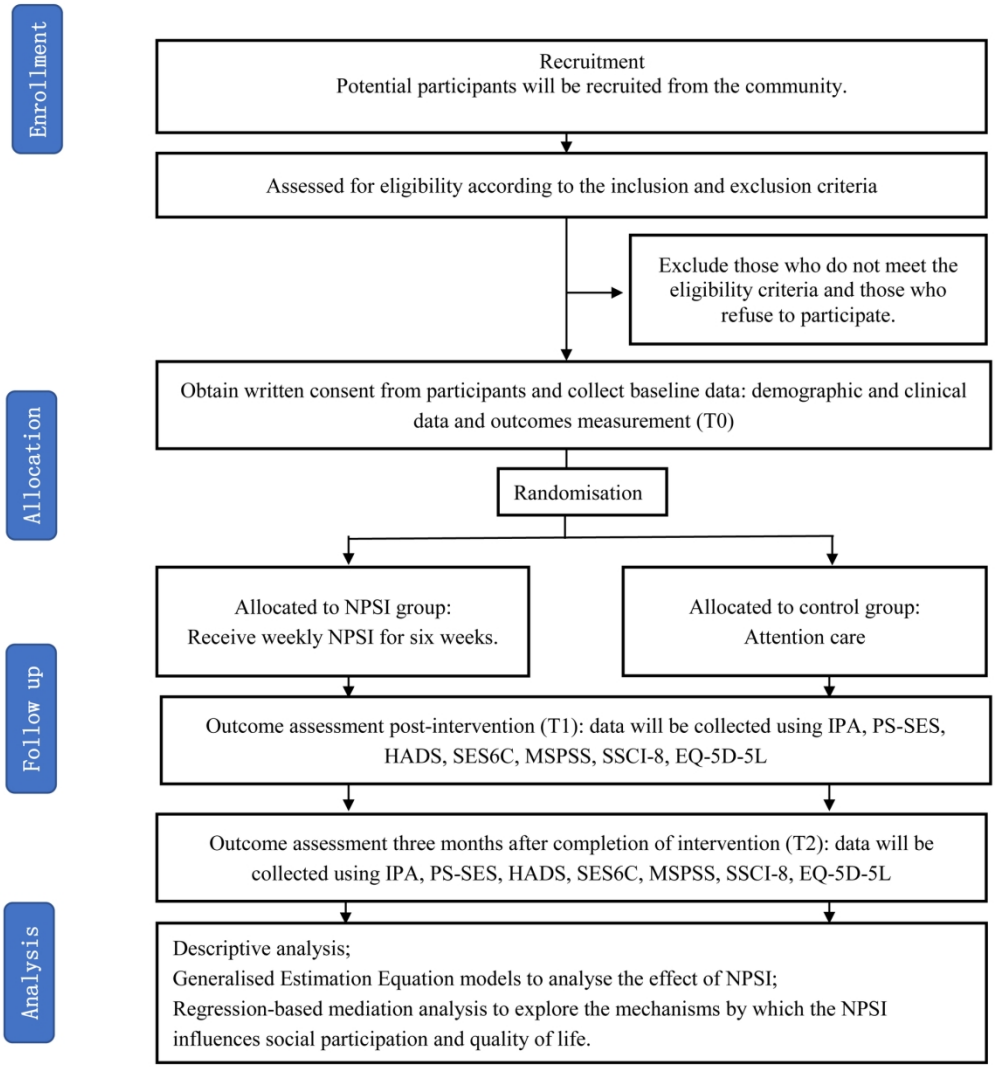


**Figure 2.** Study flow diagram

84x95mm (600 x 600 DPI)

**Information Sheet and Consent Forms**

| | |
|---|---|
| **Title of the study** | Effects of a Nurse-led Peer Support Intervention on the psychosocial outcomes of stroke survivors: A randomized controlled trial |
| **Principal Investigator** | Ms WAN Xiaojuan (PhD student in the Nethersole School of Nursing, the Faculty of Medicine, the Chinese University of Hong Kong) |
| **Academic supervisor** | Professor CHAU Pak Chun, Janita (Professor of the Nethersole School of Nursing, the Faculty of Medicine, the Chinese University of Hong Kong) |

***Research purpose***

This study aims to develop a nurse-led peer support intervention (NPSI) based on Person-Environment-Occupation Performance Model and to evaluate the effectiveness of the NPSI on stroke survivors' psychological (participation self-efficacy, self-efficacy in managing the chronic condition, psychological distress, disease stigma, and quality of life) and social outcomes (social participation and social support).

***Research Procedure***

After recruited into this study, you (i.e., stroke survivors) will be randomly assigned to participate in the intervention group (i.e., receiving the nurse-led peer support intervention + usual care) or control group (i.e., receiving usual care) with 50% chance. Sealed, opaque envelopes will be used to assign participants in the randomization process with each participant has the same chance to be allocated to the intervention group or control group. If you are assigned to the control group, you will receive the out-patient healthcare services provided by the hospital (e.g., routine post discharge follow up services from nurses or clinicians). If you are assigned to the intervention group, you will also receive the nurse-led peer support intervention

besides the usual care mentioned above. The nurse-led peer support intervention includes six group sessions (6-10 participants each group) scheduled weekly (total duration of 6 weeks) with each session lasting for 1.5-2h. During each session, the participants will discuss a specific stroke-related topic among group members facilitated by a nurse facilitator and at least one peer facilitator.

Before intervention initiation, immediately post-intervention (six weeks after the commencement of the nurse-led peer support intervention) and 3 months post-intervention, you (both intervention group and control group) will receive a 30-40 min assessment (demographic and clinical characteristics, psychosocial outcomes) by research assistants.

***Risks and benefits***

The assessment and the intervention of this study will not cause any discomfort, pain or harm to you. The potential benefits in this study are that the nurse-led peer support intervention may improve the self-efficacy, social support, social participation and quality of life and decrease the psychological distress of the stroke survivors.

***Compensation***

The participants do not need to pay for the service provided in the study. They will receive a cash compensation of 15 RMB (equal to 18 HKD) for taxi fee after completing data collection at each time point.

***Anonymity, Confidentiality and Nature of Participation***

Any information you provide in this study will be kept anonymous and confidential. Your identity information will not be presented in the study report. The data you provided will only be used for research purpose and will be kept in a secure location. Only the researchers have access to the data. All the data will be destroyed five years after the completion of the study. The participation is voluntary. You can cease to participate at any time. Your decisions will not influence the quality of the present and future medical service.

***Inquiry***

This study is undertaken by Miss WAN Xiaojuan (PhD student in Nursing, the Nethersole School of Nursing, the Faculty of Medicine, CUHK) and supervised by Professor Professor CHAU Pak Chun, Janita (Professor of the Nethersole School of Nursing, the Faculty of Medicine, the Chinese University of Hong Kong). Should you have any questions about the project, before or after participation, please feel free to contact Miss WAN at Tel: 86-13665278059 (Yangzhou). Email address: xjwan@link.cuhk.edu.hk. Address: Rm 604, 6/F, Esther Lee Building, The Chinese University of Hong Kong, New Territories, HK SAR, China. OR the academic supervisors of the principal investigator, Professor CHAU Pak Chun, Janita (Tel:852-3943 6226, janitachau@cuhk.edu.hk).

In addition, any enquiry about your right in the study, please contact the Joint Chinese University of Hong Kong – New Territories East Cluster Clinical Research Ethics Committee (Tel.: 852-3505 3935).

*You are cordially invited to participate in this study.*

***Consent of participants***

I confirm that I have read and have been informed of the study purpose, the procedure that will undergo, and the risk and benefit that I may experience. I have had opportunities to ask questions which have been explained to my satisfaction. I understand that the participation is voluntary and I have the right to decline the participation at any time without providing any reasons. I also understand that all the information I give will be used only in this research, kept confidentially and anonymously. I have read and I understand this consent form. Therefore, I agree to give my consent to participate in this study.

| | | |
|---|---|---|
| (Survivor's name) | (Survivor's signature) | (Date) |
| (Researcher's name) | (Researcher's signature) | (Date) |

# Reporting checklist for protocol of a clinical trial.

Based on the SPIRIT guidelines.

## Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the SPIRITreporting guidelines, and cite them as:

Chan A-W, Tetzlaff JM, Gøtzsche PC, Altman DG, Mann H, Berlin J, Dickersin K, Hróbjartsson A, Schulz KF, Parulekar WR, Krleža-Jerić K, Laupacis A, Moher D. SPIRIT 2013 Explanation and Elaboration: Guidance for protocols of clinical trials. BMJ. 2013;346:e7586

| | | Reporting Item | Page Number |
|---|---|---|---|
| **Administrative information** | | | |
| Title | #1 | Descriptive title identifying the study design, population, interventions, and, if applicable, trial acronym | Page 1 |
| Trial registration | #2a | Trial identifier and registry name. If not yet registered, name of intended registry | Page 3 |
| Trial registration: data set | #2b | All items from the World Health Organization Trial Registration Data Set | Page 3 |
| Protocol version | #3 | Date and version identifier | Page 3 |
| Funding | #4 | Sources and types of financial, material, and other support | Page 16 |
| Roles and responsibilities: contributorship | #5a | Names, affiliations, and roles of protocol contributors | Page 16 |

| | | | |
|---|---|---|---|
| Roles and responsibilities: sponsor contact information | #5b | Name and contact information for the trial sponsor | n/a<br><br>It is an investigator-initiated trial, the principal investigator (first author) is the "sponsor-investigator". |
| Roles and responsibilities: sponsor and funder | #5c | Role of study sponsor and funders, if any, in study design; collection, management, analysis, and interpretation of data; writing of the report; and the decision to submit the report for publication, including whether they will have ultimate authority over any of these activities | Page 16 |
| Roles and responsibilities: committees | #5d | Composition, roles, and responsibilities of the coordinating centre, steering committee, endpoint adjudication committee, data management team, and other individuals or groups overseeing the trial, if applicable (see Item 21a for data monitoring committee) | Page 14 |
| **Introduction** | | | |
| Background and rationale | #6a | Description of research question and justification for undertaking the trial, including summary of relevant studies (published and unpublished) examining benefits and harms for each intervention | Page 3,4,5 |
| Background and rationale: choice of comparators | #6b | Explanation for choice of comparators | Page 10 |
| Objectives | #7 | Specific objectives or hypotheses | Page 5 |
| Trial design | #8 | Description of trial design including type of trial (eg, parallel group, crossover, factorial, single group), allocation ratio, and framework (eg, superiority, equivalence, non-inferiority, exploratory) | Page 5 |
| **Methods: Participants,** | | | |

| | | | |
|---|---|---|---|
| **interventions, and outcomes** | | | |
| Study setting | #9 | Description of study settings (eg, community clinic, academic hospital) and list of countries where data will be collected. Reference to where list of study sites can be obtained | Page 5 |
| Eligibility criteria | #10 | Inclusion and exclusion criteria for participants. If applicable, eligibility criteria for study centres and individuals who will perform the interventions (eg, surgeons, psychotherapists) | Page 5,6 |
| Interventions: description | #11a | Interventions for each group with sufficient detail to allow replication, including how and when they will be administered | Page 6,7,8,9 |
| Interventions: modifications | #11b | Criteria for discontinuing or modifying allocated interventions for a given trial participant (eg, drug dose change in response to harms, participant request, or improving / worsening disease) | Page 14 |
| Interventions: adherance | #11c | Strategies to improve adherence to intervention protocols, and any procedures for monitoring adherence (eg, drug tablet return; laboratory tests) | Page 8 |
| Interventions: concomitant care | #11d | Relevant concomitant care and interventions that are permitted or prohibited during the trial | Page 14 |
| Outcomes | #12 | Primary, secondary, and other outcomes, including the specific measurement variable (eg, systolic blood pressure), analysis metric (eg, change from baseline, final value, time to event), method of aggregation (eg, median, proportion), and time point for each outcome. Explanation of the clinical relevance of chosen efficacy and harm outcomes is strongly recommended | Page 10,11,12 |
| Participant timeline | #13 | Time schedule of enrolment, interventions (including any run-ins and washouts), assessments, and visits for participants. A schematic diagram is highly recommended (see Figure) | Page 12,13 |

| | | | |
|---|---|---|---|
| Sample size | #14 | Estimated number of participants needed to achieve study objectives and how it was determined, including clinical and statistical assumptions supporting any sample size calculations | Page 6 |
| Recruitment | #15 | Strategies for achieving adequate participant enrolment to reach target sample size | Page 5,15 |
| **Methods: Assignment of interventions (for controlled trials)** | | | |
| Allocation: sequence generation | #16a | Method of generating the allocation sequence (eg, computer-generated random numbers), and list of any factors for stratification. To reduce predictability of a random sequence, details of any planned restriction (eg, blocking) should be provided in a separate document that is unavailable to those who enrol participants or assign interventions | Page 6 |
| Allocation concealment mechanism | #16b | Mechanism of implementing the allocation sequence (eg, central telephone; sequentially numbered, opaque, sealed envelopes), describing any steps to conceal the sequence until interventions are assigned | Page 6 |
| Allocation: implementation | #16c | Who will generate the allocation sequence, who will enrol participants, and who will assign participants to interventions | Page 6 |
| Blinding (masking) | #17a | Who will be blinded after assignment to interventions (eg, trial participants, care providers, outcome assessors, data analysts), and how | Page 6 |
| Blinding (masking): emergency unblinding | #17b | If blinded, circumstances under which unblinding is permissible, and procedure for revealing a participant's allocated intervention during the trial | n/a |
| **Methods: Data collection, management, and analysis** | | | |

| | | | |
|---|---|---|---|
| Data collection plan | #18a | Plans for assessment and collection of outcome, baseline, and other trial data, including any related processes to promote data quality (eg, duplicate measurements, training of assessors) and a description of study instruments (eg, questionnaires, laboratory tests) along with their reliability and validity, if known. Reference to where data collection forms can be found, if not in the protocol | Page 12,13 |
| Data collection plan: retention | #18b | Plans to promote participant retention and complete follow-up, including list of any outcome data to be collected for participants who discontinue or deviate from intervention protocols | Page 5,12,13,15 |
| Data management | #19 | Plans for data entry, coding, security, and storage, including any related processes to promote data quality (eg, double data entry; range checks for data values). Reference to where details of data management procedures can be found, if not in the protocol | Page 13 |
| Statistics: outcomes | #20a | Statistical methods for analysing primary and secondary outcomes. Reference to where other details of the statistical analysis plan can be found, if not in the protocol | Page 14 |
| Statistics: additional analyses | #20b | Methods for any additional analyses (eg, subgroup and adjusted analyses) | Page 14 |
| Statistics: analysis population and missing data | #20c | Definition of analysis population relating to protocol non-adherence (eg, as randomised analysis), and any statistical methods to handle missing data (eg, multiple imputation) | Page 14 |
| **Methods: Monitoring** | | | |
| Data monitoring: formal committee | #21a | Composition of data monitoring committee (DMC); summary of its role and reporting structure; statement of whether it is independent from the sponsor and competing interests; and reference to where further details about its charter can be found, if not in the | Page 14<br><br>Due to the type of intervention, a data monitoring committee was not organised |

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|---|---|---|---|
| | | protocol. Alternatively, an explanation of why a DMC is not needed | |
| Data monitoring: interim analysis | #21b | Description of any interim analyses and stopping guidelines, including who will have access to these interim results and make the final decision to terminate the trial | n/a |
| Harms | #22 | Plans for collecting, assessing, reporting, and managing solicited and spontaneously reported adverse events and other unintended effects of trial interventions or trial conduct | n/a<br><br>Referring to subject informed consent form attached |
| Auditing | #23 | Frequency and procedures for auditing trial conduct, if any, and whether the process will be independent from investigators and the sponsor | n/a |
| **Ethics and dissemination** | | | |
| Research ethics approval | #24 | Plans for seeking research ethics committee / institutional review board (REC / IRB) approval | Page 14 |
| Protocol amendments | #25 | Plans for communicating important protocol modifications (eg, changes to eligibility criteria, outcomes, analyses) to relevant parties (eg, investigators, REC / IRBs, trial participants, trial registries, journals, regulators) | Page 14 |
| Consent or assent | #26a | Who will obtain informed consent or assent from potential trial participants or authorised surrogates, and how (see Item 32) | Page 14 |
| Consent or assent: ancillary studies | #26b | Additional consent provisions for collection and use of participant data and biological specimens in ancillary studies, if applicable | n/a |
| Confidentiality | #27 | How personal information about potential and enrolled participants will be collected, shared, and maintained in order to protect confidentiality before, during, and after the trial | Page 14 |
| Declaration of interests | #28 | Financial and other competing interests for principal investigators for the overall trial and each study site | Page 16 |

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|---|---|---|---|
| Data access | #29 | Statement of who will have access to the final trial dataset, and disclosure of contractual agreements that limit such access for investigators | Page 14 |
| Ancillary and post trial care | #30 | Provisions, if any, for ancillary and post-trial care, and for compensation to those who suffer harm from trial participation | n/a<br><br>None |
| Dissemination policy: trial results | #31a | Plans for investigators and sponsor to communicate trial results to participants, healthcare professionals, the public, and other relevant groups (eg, via publication, reporting in results databases, or other data sharing arrangements), including any publication restrictions | Page 14 |
| Dissemination policy: authorship | #31b | Authorship eligibility guidelines and any intended use of professional writers | n/a<br><br>None |
| Dissemination policy: reproducible research | #31c | Plans, if any, for granting public access to the full protocol, participant-level dataset, and statistical code | n/a<br><br>None |
| **Appendices** | | | |
| Informed consent materials | #32 | Model consent form and other related documentation given to participants and authorised surrogates | Attached |
| Biological specimens | #33 | Plans for collection, laboratory evaluation, and storage of biological specimens for genetic or molecular analysis in the current trial and for future use in ancillary studies, if applicable | n/a<br><br>None |