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Improving post-acute stroke follow-up care by adopting telecare consultations in a nurse-

led clinic: Study protocol of a hybrid implementation-effectiveness trial

ABSTRACT

Aim

To evaluate the clinical effectiveness and implementation strategies of telecare consultations in post-stroke nurse-led clinics.

Background

Telecare consultations could be an alternative to conventional in-person consultations and improve continuity of care for stroke survivors following their discharge from hospital. Previous studies utilizing telecare consultations only focused on testing their clinical effectiveness on stroke survivors; the appropriateness and feasibility of adopting this new delivery modality in a real-world setting were not examined.

Design

A Type II hybrid effectiveness-implementation design will be adopted.

Methods

Eligible stroke survivor participants will be randomly assigned to the intervention group (telecare consultation) or control group (usual in-person clinic consultation). Both groups will receive the same nursing intervention but delivered through different channels. The Reach, Effectiveness, Adoption, Implementation, Maintenance framework will be used to evaluate the clinical effectiveness and implementation outcomes. The primary outcome is the non-inferiority of the degree of disability between the two groups at 3 months into the intervention

and at 3 months post-intervention. The paper complies with the SPIRIT guidelines for study protocols adapted for designing and reporting parallel group randomized trials.

Conclusion

The findings of this study will provide key insights into the processes for implementing and adopting telecare consultations into long-term services for post-stroke patients.

Impact

This study contributes to the translation of telecare consultations for stroke survivors into reallife settings. If effective, this program may provide guidance for expanding telecare consultations to other post-stroke nurse-led clinics or to patients with other chronic diseases.

Trial Registration

This study has been registered at clinicaltrials.gov (identifier: NCT05183672). Registered on 10 January 2022.

INTRODUCTION

Recurrent stroke is a common global phenomenon. About 185,000 stroke survivors suffer from recurrent stroke every year (Tsao et al., 2023). Based on a study conducted in Hong Kong, the risk of recurrent stroke is high, with over 21% of stroke survivors suffering from recurrent stroke (Woo et al., 2014). After the first episode of stroke, stroke survivors are usually affected by a range of complications that lower their quality of life, such as cognitive impairment (Rost et al., 2022), muscle weakness (Dorsch et al., 2016), gait imbalance (Xu et al., 2018), sensory impairment (Carlsson et al., 2018), and psychological problems (Rafsten et al., 2018). Recent studies have raised the importance of initiating a structured rehabilitative follow-up program as soon as patients are discharged from the hospital to prevent further deterioration of their physical abilities and to help them maintain their ability to live independently in the community (Abreu et al., 2020).

Stroke survivors are usually followed up in post-stroke nurse-led clinics and supported by a multidisciplinary healthcare team consisting of neurologists, social workers, physiotherapists, and occupational therapists (Hospital Authority, 2017). Nurses in the clinic follow a structured stroke management guideline and provide comprehensive health assessments, suggest different types of rehabilitative exercises, and offer education on the prevention of recurrent stroke. During regular multidisciplinary case conferences, the healthcare team discusses the care plan of each client to ensure that the patients' multidisciplinary care needs are met through a planned and coordinated approach. The existing evidence suggests that regular post-stroke follow-ups can lead to lower blood pressure (Parappilly et al., 2018), a higher quality of life (Lin et al., 2020), and self-efficacy (Lin et al., 2022), and prevent hospital readmissions (Condon et al., 2016) among stroke survivors. Despite the above benefits, some patients hesitate to visit these

clinics due to mobility limitations, the time and cost of travelling, and long waiting times in the clinic, hence leading to a loss of follow-up after their initial visit (San Luis et al., 2023).

During the COVID-19 pandemic, these clinic-based stroke rehabilitation services were closed due to social distancing restrictions and isolation regulations (Bashir, 2020). Some stroke survivors tend to avoid social activities and prefer not to attend clinic-based follow-ups (Burns et al., 2022). Telecare consultations, an innovative delivery mode, have sparked attention since the COVID-19 pandemic as they allow healthcare services to be accessed from a distance, prevent the direct transmission of microorganisms and overcrowding in a packed clinic, and at the same time ensure the adherence of patients to follow-up. Telecare consultations are defined as the delivery of medical consultations through a virtual platform to overcome geographical barriers between healthcare professionals and patients (O'Cathail et al., 2020). A systematic review and meta-analysis showed that it is feasible to deliver nursing consultations through telecare to improve blood pressure monitoring among stroke survivors (Lee et al., 2022). A recent randomized controlled trial (RCT) conducted in a nurse-led stroke clinic also suggested that telecare consultations involving a multidisciplinary healthcare team can improve the physical strength and quality of life of stroke survivors (Wu et al., 2020).

BACKGROUND

Although telecare consultations have been seen in various studies to be beneficial to stroke rehabilitation, their implementation as a routine service in hospitals is methodically challenging due to several barriers such as technical issues (Grata-Borkowska et al., 2022), the absence of well-established guidelines and training protocols (Wong, Bayuo, Wong, Kwok, Tong, et al., 2023a; Wong, Bayuo, Wong, Kwok, Yuen, et al., 2023b), and a hesitation to change routine workflows under a situation of manpower shortages (Koivunen & Saranto, 2018). Therefore,

recent studies on telecare consultations have focused only on evaluating their clinical effectiveness at the RCT trial phase without going beyond to ask a broader range of questions, including what other impacts they might have, how they work, how they interact with the context in which they are implemented, how they contribute to systemic changes, and how the evidence can be used to support real-world decision-making (Skivington et al., 2021). The aim in implementation science is to test the uptake and sustainment of an evidence-based implementation strategy into real-world practice by investigating its adoption in different levels, such as by participants, service providers, hospitals, the community, and the whole healthcare system (Handley et al., 2016). It not only questions "does telecare consultation work," but also asks "how and why telecare consultation works in routine nursing follow-ups."

Influenced by the COVID-19 pandemic, the Hospital Authority of Hong Kong plans to develop a new feature this year, to allow online synchronized visual communication between patients and nurses during their scheduled post-stroke clinic follow-ups. The present study takes advantage of this opportunity to integrate telecare consultations into a nurse-led post-stroke clinic and evaluate their clinical effectiveness, as well as implementation strategies under implementation science frameworks. This will be the first study to provide insights into the process of implementing telecare consultations in a nurse-led clinic and overcoming the barriers to integrating telecare consultations from research to real-world practice, so as to improve the quality of healthcare services.

The study

Theoretical framework

Three frameworks will be used as to guide this study plan, namely: (1) the Exploration, Preparation, Implementation, Sustainment (EPIS) Framework; (2) the Consolidated Framework for Implementation Research (CFIR); and (3) the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) Framework.

Exploration, preparation, implementation, sustainment (EPIS) framework

The EPIS is a comprehensive framework with four well-defined phases, which guide the process of implementation research and practice (Aarons et al., 2011). First, the exploration phase illustrates the stage at which the research team and the hospital management team will collaboratively identify and discuss the intervention components and implementation strategies that could be adopted into real-life practice to address the existing needs of both patients and frontline staff. Second, during the preparation phase, the team will develop a detailed plan to maximize the implementation facilitators and address potential barriers. Third, the implementation plan will be executed in the implementation phase. Finally, the sustainment phase will involve the provision of ongoing support from both the hospital management team and the frontline staff for the long-term maintenance of the program.

Consolidated framework for implementation research (CFIR)

The CFIR brings out 39 implementation-related constructs, which the researchers can consider when adopting an evidence-based program in a clinical setting (Damschroder et al., 2009). After discussions within the research-hospital management team, a total of 13 constructs will be applied in different EPIS phases to facilitate the delivery of telecare consultations in a poststroke nurse-led clinic.

Reach, effectiveness, adoption, implementation, and maintenance (RE-AIM) framework

The RE-AIM framework proposes five dimensions to guide and evaluate the clinical effectiveness and implementation strategies of a program, including: Reach into the target

population, Effectiveness of the intervention, Adoption by the staff and setting, Implementation fidelity, and Maintenance (Glasgow et al., 1999). It will be applied to evaluate the process of implementing the nurse-led telecare consultation program in this study.

Aims

There are two aims in the present study: (1) to evaluate the implementation strategies of telecare consultation in a post-stroke nurse-led clinic using a mixed-methods approach (Implementation aim) and (2) to evaluate and compare the clinical effectiveness of a telecare consultation program with the usual face-to-face clinic-based consultations on improving stroke survivors' physical health (degree of disability, incidence of recurrent stroke), psychosocial health (quality of life, post-stroke depression), health behaviours (medication adherence, social participation), and health service utilization (attendance at a general practitioner, emergency department, hospital, and general out-patient clinic) (Effectiveness aim).

METHODS

Design

A randomized controlled trial using a hybrid effectiveness-implementation design (Type II) will be adopted in this study. Both qualitative and quantitative methods will be used to evaluate the strategies for implementing the telecare consultation program, while quantitative data will be used to compare the clinical effectiveness of the telecare consultations and the usual inperson consultations. This protocol follows the Standard Protocol Items: Recommendations for Intervention Trials guidelines (Chan et al., 2013). Guidelines for reporting parallel group randomized trials are found in File S1.

Study setting

This study will be implemented in the nurse-led post-stroke clinic of Queen Elizabeth Hospital (QEH), which is one of the largest acute care hospitals in Hong Kong. Every year around 200–300 stroke patients are discharged from the acute stroke unit in QEH and referred to the nurse-led post-stroke clinic for follow-up.

Inclusion and exclusion criteria

Stroke survivors who have been discharged from the acute stroke unit in QEH and who meet the eligibility criteria will be recruited to this study. The inclusion criteria are: (1) received a confirmed diagnosis of stroke within 1 month before joining the program, (2) will be discharged within a week, (3) aged 18 or above, (4) cognitively competent as assessed by the Montreal Cognitive Assessment Hong Kong version (score \geq 22), and (5) have a smartphone. Exclusion criteria are as follows: (1) have unaccompanied hearing or vision loss, (2) lives in an area with no Internet connection, (3) cannot be contacted by phone, (4) is bedbound, (5) is participating in other telecare research studies, and (6) needs nursing care requiring physical contact (e.g., wound dressing).

Randomization

Potential subjects will be identified by Advanced Practice Nurses (APNs) using the Clinical Management System (CMS), the hospital's Intranet. Research assistant A (RA-A) will meet potential subjects for eligibility screening and introduce the program during her visit in the ward. From the eligible subjects who agree to join this study, RA-A will collect the written consent form and baseline data. After the baseline assessments, the principal investigator (PI) will be notified to perform the randomization process. The PI will generate a random assignment schedule using the software "Research Randomizer" and place the assignments in sealed envelopes to ensure allocation concealment. These sealed envelopes will be opened in

sequence by the PI after receiving notification from the RA-A. Participants will be randomly allocated at a 1:1 ratio to either the intervention group (the telecare consultation group) or the control group (the usual face-to-face consultation group). Due to the nature of the intervention, only RA-A (the data collector) will be blinded to the group allocations.

Implementation process

The implementation design is guided by the Exploration, Preparation, Implementation, Sustainment (EPIS) framework.

Exploration phase

The research team have attended meetings with the hospital management team and the APNs of the post-stroke nurse clinic in QEH to discuss the possible impact of adopting telecare consultations in the current post-stroke follow-up practice. Details of the logistics of the program have also been revised to suit the routine operation of the post-stroke nurse clinic and the needs of stroke survivors.

Preparation phase

Before the first consultation, the APNs will be introduced to the program protocol and logistics. The eligibility criteria of this program will also be explained to the APNs to facilitate the recruitment process. Research assistant B (RA-B) will provide training sessions to the participants on how to download and operate the HA GO, which is a mobile application developed by the Hospital Authority and used for telecare consultations, and will perform a trial run. All participants in the intervention group will receive an instruction guide about using HA Go at home.

Implementation phase

The study will be of 3-month duration, with a total of three monthly consultations. Stroke survivors in both the intervention and control groups will receive the same post-acute stroke nursing follow-up based on the working protocols in the hospital after their discharge, however with different delivery modes. Participants in the intervention group will attend a post-stroke consultation through the telecare platform, while the control group will attend an in-person clinic follow-up. To minimize the operator effect, consultations for both groups will be delivered by the same group of APNs with more than 20 years of experience in neurology. During the 1-h consultation session, APNs will review the participants' health condition (e.g., vital signs, investigation results), discuss and evaluate the patient-centred rehabilitation plan, and provide education on the secondary prevention of stroke (i.e., ways to modify stroke-specific risk factors, self-management skills, and medication). The family and caregivers of stroke survivors will be encouraged to join the consultation. Nurses will also make referrals to other multidisciplinary team members based on the referral guidelines, when necessary.

Sustainment phase

Regular meetings will be conducted among the research team, the hospital management team (i.e., Chief of Service, ward manager), and the frontline staff, including the APNs, neurologists, social workers, physiotherapists, and occupational therapists, to evaluate implementation strategies and the process, and to modify the program guideline during implementation phase to deal with the problems encountered and improve the service delivery, if necessary. All changes will be documented to facilitate the continuous improvement of nurse-led telecare consultations in future decision-making.

Implementation strategies

The design of this telecare consultation program was guided by the results of our pilot study (Wong, Bayuo, Wong, Kwok, Tong, et al., 2023a; Wong, Bayuo, Wong, Kwok, Yuen, et al., 2023b) and five domains of CFIR: (1) Intervention characteristics, (2) Outer settings, (3) Inner settings, (4) Characteristics of individuals, and (5) Process of Implementation. A detailed description of the development of the implementation strategies corresponding to each CFIR construct is given in Table 1.

CFIR constructs	Definitions (Damschroder	Implementation strategies		
	et al., 2009)			
Intervention characteristics				
Adaptability	"The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs."	In each consultation session, APNs will discuss and set a tailor-made rehabilitation care plan to meet the individual needs of every client.		
Complexity	"Perceived difficulty of implementation, reflected by duration, scope, radicalness, disruptiveness, centrality, and intricacy and number of steps required to implement."	A standard telecare protocol and guideline, which were designed by various stakeholders (e.g., the research team, hospital management team, APNs), will be adopted to guide the workflow of this post- stroke telecare consultation program		
Design quality & packaging	"Perceived excellence in how the intervention is bundled, presented, and assembled."	and to ensure the consistency of the service delivery, including its content and referral process.		
Outer setting				

TABLE 1. Implementa	ation strategi	ies framed b	y CFIR.
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Cosmopolitanism	"The degree to which an	Collaborating with QEH, various
	organization is networked with	healthcare services are accessible
	other external organizations."	for referral when necessary (e.g.,
		physiotherapy). Training will be
		provided to the multidisciplinary
		healthcare providers (e.g.,
		physiotherapist, speech therapist) to
		ensure that they are competent to
		use the same set of telecare
		protocols and guidelines.
Patient needs &	"The extent to which patient	Stroke survivors and their caregivers
resources	needs, as well as barriers and	will be encouraged to join the
	facilitators to meet those needs,	telecare consultation sessions to
	are accurately known and	allow for a deeper understanding of
	prioritized by the organization."	each client's needs. APNs will set an
		individualized goal, care plan, and
		appropriate referral for every client
		through a shared decision-making
		process.
Inner setting		<u> </u>
Networks &	"The nature and quality of webs of	APNs will make referrals to other
communications	social networks and the nature and	multidisciplinary healthcare
	quality of formal and informal	providers when necessary. The CMS
	communications within an	will be used to communicate among
	organization."	members of the healthcare team.
Goals and	"The degree to which goals are	The hospital senior management
feedback	clearly communicated, acted upon,	team and the APNs will discuss the
	and fed back to staff, and	goals, logistics, and details of the
	alignment of that feedback with	telecare consultations. Moreover,
	goals."	regular meetings will be conducted

Leadership	"Commitment, involvement, and	to evaluate the implementation		
engagement	accountability of leaders and	process and adjust the program		
	managers with the	guideline to make continuous		
	implementation."	improvements during the study.		
Chamatamistics of in	dividuala			
	luividuais			
Self-efficacy	"Individual belief in their own	Prior training will be provided to		
	capabilities to execute courses of	both APNs and stroke survivors on		
	action to achieve implementation	the use of HA GO. Technological		
	goals."	support will be provided during the		
		implementation to increase their		
		confidence in using telecare as the		
		mode of communication.		
Process of impleme	ntation			
Planning	"The degree to which a scheme or	Various stakeholders will be		
	method of behaviour and tasks for	involved in the planning of this		
	implementing an intervention are	telecare program, including the		
	developed in advance, and the	hospital management team and		
	quality of those schemes or	APNs. Meetings will be conducted		
	methods."	to develop a working protocol that		
Engaging	"Attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modelling, training, and other similar activities."	best suits the post-stroke nurse clinic, prior to the start of the program.		

Executing	"Carrying out or accomplishing	Regular meetings will be conducted
	the implementation according to	during the implementation phase
	plan."	with the research team, the hospital
Deflection 9		management team (i.e., the Chief of
Reflecting &	Quantitative and qualitative	Service, ward manager), the APNs,
evaluating	feedback about the progress and	and multidisciplinary healthcare
	quality of implementation	providers to discuss any problems
	accompanied with regular	that are encountered during the
	personal and team debriefings about progress and experiences."	service delivery, and to evaluate and
		modify the program guideline
		accordingly.

Sample size

A power analysis will be conducted within the framework of the non-inferiority criteria based on the primary outcome, the degree of disability after stroke. Based on the guidelines of the European Agency and previous studies (European Medicines Agency, 2005; Horvath et al., 2023), the non-inferiority limit was set at less than 25% below the minimal clinically significant difference in the primary outcome, which is a change of 20% in a simplified modified Rankin scale. With a non-inferiority margin of 15%, a population variance of 0.45, and an expected mean difference of 0.03 derived from our pilot study, 98 subjects per group will be necessary, provided that we assume a type 1 error of 5%, a power of 80%, and a dropout rate of 20%. Therefore, the total sample size for the study will be 196 for two groups.

Data collection

The quantitative data will be collected by RA-A, who will be blinded to the group allocations, at the following three time intervals: baseline pre-intervention (T1), 3 months into the intervention (T2), and 3 months post-intervention (T3). RA-A will meet each participant at the

acute stroke ward in QEH to collect baseline data before the intervention and contact them through telephone to collect T2 and T3 data.

Three 1-h semi-structured interviews will be conducted in T2 with ward managers, APNs, and stroke survivors, respectively. The interview guides will follow the same framework, but tailor-made questions will be provided for each of the three groups. A total of four ward managers, four APNs, and 20% of the stroke survivors will be invited to take part in the interviews.

Outcome measures

The evaluation of the study will be guided by the RE-AIM framework. All background demographic data of the participants, including their age, gender, marital status, number of days of attending the post-stroke clinic after discharge, type of stroke (ischaemic or haemorrhagic), past medical history, and time needed to travel to the clinic, will be collected by RA-A at baseline to identify differences between the groups, and subsequently controlled as covariates.

Effectiveness aim

The primary outcome of the study is the change of the degree of disability, which will be measured using a simplified modified Rankin scale (smRS) (Bruno et al., 2010). The score will be converted to a utility weight and will be used generate the number of quality-adjusted-life-years gained. Other outcomes include the incidence of stroke recurrence, quality of life, post-stroke depression, medication adherence, social participation, and health service utilization. The incidence of stroke recurrence between T1 and T2, and T2 and T3 will be extracted from the hospital's Intranet (i.e., CMS). Quality of life will be measured using the Hong Kong version of EuroQol 5-dimension 5-level (EQ-5D-5L) (Wong et al., 2018). EQ-5D-5L, which

has good validity and reliability, is widely used to evaluate both physical and psychological quality of life in five dimensions, namely, mobility, self-care, usual activities, pain/discomfort, and anxiety/depression (Wong et al., 2018). Post-stroke depression will be evaluated using the Chinese version of the Geriatric Depression Scale. This scale has high internal consistency, with a Cronbach's alpha of 0.89 (Chan, 1996). Medication adherence will be measured using the Adherence to Refills and Medications Scale (ARMS), which consists of 12 questions on a 4-point Likert scale (Kripalani et al., 2009). Social participation will be evaluated using the 11-item Reintegration to Normal Living Index, with higher scores indicating greater satisfaction with their adaptation to the disease to live a normal social life (Wood-Dauphinee & Williams, 1987). Health service utilization will be determined by the number of attendances at an emergency department, hospital, or general out-patient clinic, and will be extracted from the CMS. The number of attendances at the general practitioner, however, will be self-reported by the participants.

Implementation aim

Reach

Reach refers to the coverage of the implementation strategy to the target population. The number of stroke survivors who are eligible, excluded, recruited, and have completed all telecare consultation sessions will be counted. The key demographic data, for example, living area, type of stroke, and IT literacy, of enrolled patients and non-enrolled patients will be compared to evaluate the representativeness of the participants in our target population. All demographic data will be extracted from the CMS, with the exception of IT literacy. IT literacy will be assessed with the following question: "How confident are you in using a smartphone to have meetings with others?" using a 5-point scale. Both participating and non-participating

stroke survivors will be asked about their reasons for enrolling or not enrolling to understand the factors affecting the reach of this program.

Adoption

The adoption of this program in the nurse-led clinic will be evaluated both qualitatively and quantitatively. Qualitatively, a semi-structured interview guided by the CFIR will be conducted with stroke survivors, APNs, and ward managers, to understand their acceptance of telecare consultations and their views on the adopted implementation strategies. Quantitatively, the 42-item Readiness for Implementation Model Survey will be used to understand how successfully the telecare consultations have been adopted in the post-stroke clinic at the staff and clinic levels (Wen et al., 2010). The APNs will be asked to rate factors affecting the implementation process, such as the environment of the organization, meeting user needs, fitting in with the department, and usefulness of the technology, in scores from 0 to 100, with higher scores indicating better adoption.

Implementation

The implementation of the program will be evaluated every 2 months. A performance checklist developed by the PI will be used to identify whether the telecare consultations are being conducted as intended.

Maintenance

The maintenance of this program will be evaluated by measuring the sustained effect of the effectiveness outcomes mentioned above at 2 months after the program. The number of patients who have withdrawn from the program or who have asked to change to the other group (either changing from the intervention group to the control group or vice versa), and the reasons for

this will be explored and recorded by the RA-A. Moreover, a costing evaluation will be performed using an ingredient approach from the provider perspective (set-up and ongoing costs) and the societal perspective (patients' travel and time costs) to provide insights for the hospital management team to determine the worthiness of investing in this telecare program over the long term. Cost questionnaires will be distributed to healthcare providers and patients to collect more information. The total estimated cost for both groups will be compared.

Data analysis

Statistical analysis for quantitative data will be performed using the Statistical Package for Social Sciences version 26 software. An independent samples t-test will be used to calculate the 95% one-sided confidence interval of the difference between the two groups for effectiveness outcomes. If the upper bound of the confidence interval is lower than the noninferiority margin, the null hypothesis will be rejected. In addition, a regression-based moderator analysis will be used to identify those stroke survivors with the demographic characteristics to most likely to benefit from the telecare program. An intention-to-treat analysis will be performed. Statistically significant differences will be achieved if the level of significance is <.05.

The principles of directed content analysis will be adopted for qualitative data (Hsieh & Shannon, 2005). All transcripts will be organized using the NVivo 12 software. The qualitative data will be analysed using three steps: (1) open coding for comprehension, (2) identifying patterns, and (3) applying theories to understand the acceptability of telecare consultations to the participants and their opinions on its adoption in a post-stroke nurse-led clinic. Strategies will be applied to ensure rigour of coding, including the triangulation of data from three groups of participants, the incorporation of analytical reflexivity by taking field notes after each

interview, and prolonged engagement (1 h each) to ensure group dynamics and an in-depth understanding of different opinions on the process of implementing telecare consultations.

Ethical considerations

Ethical approval was granted from the Human Subjects Ethics Application Committee of the Hong Kong Polytechnic University on 4 January 2022 (No. HSEARS20211207003). Information of significance, and the aims, procedures, benefits, and risks of the program will be explained to all eligible subjects. The subjects will be given assurances that they can refuse to participate and can withdraw from the study at any time without any penalty. Subjects will sign the consent form after they have expressed an understanding of the study a willingness to participate.

DISCUSSION

The present study adopts a hybrid implementation-effectiveness design (Type II) to evaluate the adoption of telecare consultations for stroke survivors in a nurse-led clinic. Telecare consultations may be beneficial for stroke survivors, who may find it difficult to attend onsite consultations because of physical disabilities (i.e., hemiplegia, hemiparesis). In addition, nursing consultations conducted at a distance can serve as a preliminary method of screening those stroke survivors who may require further medical investigations in a clinic, and thus reduce the number of clients in the clinic and shorten waiting times. However, current research studies have focused only on the clinical effectiveness of telecare consultations without considering how they can be implemented in a real-world setting. Therefore, this study aims to fill this research gap to shed light on the effectiveness of the implementation strategies that were co-developed by both the research team and the hospital on the adoption telecare consultations in post-stroke nurse-led clinics in Hong Kong. As of 30 September 2023, a total of 80 stroke patients who met the inclusion criteria were recruited from the hospital. Follow-up data have been collected from 20 participants at T2 and from 10 participants at T3. However, five participants were lost to follow-up as they did not respond to the research assistant's call. It is worth mentioning that the intervention has been running smoothly without encountering any technical issues during this period.

To the best of our knowledge, this is the first study to adopt a hybrid design (Type II) to examine both the implementation and effectiveness outcomes of the adoption of telecare consultations in a post-stroke nurse-led clinic. Under the guidance of the RE-AIM framework, the Type II hybrid design not only allows the effectiveness of telecare consultations on improving health outcomes to be evaluated from the perspective of stroke survivors but also allows the implementation strategies to be evaluated from the view of stakeholders (e.g., service providers and the hospital senior management team). Evidence generated from this type of study is more valuable to policymaking as it provides broader insights from all key stakeholders and facilitates the adoption of an evidence-based program into real practice (Curran et al., 2012). The results of the program can guide the scaling up of the adoption of telecare consultations in other post-stroke clinics in Hong Kong, and for patients with other chronic diseases.

Despite the above strengths, some limitations could be encountered during the implementation of the program. First, due to the nature of the intervention, participants and APNs cannot be blinded, but they will not be involved in the data collection process. Second, the technological literacy of the participants could influence their acceptance of the program. Therefore, our research team will provide a training session on using HA Go prior to the first consultation, to ensure that all of the participants have a basic knowledge of its functions and utilization. Third, the implementation of telecare consultations will be affected by the stability of the Internet. An information technology team will help to solve any Internet or technical problems faced by both the healthcare providers and the patients.

CONCLUSION

Worldwide, stroke survivors are followed up in nurse-led post-stroke clinics in the community to prevent recurrent stroke. In recent years, even before the outbreak of the COVID-19 pandemic, stroke survivors would sometimes choose not to attend a follow-up in a clinic, due to their physical disability and to long travel times and waiting times in the clinic. The latest research indicates that telecare consultations seem to be effective and beneficial for stroke survivors, although evidence for this remains at the academic level. This study, with its hybrid implementation-effectiveness (Type II) design, may shed light on the translation of evidencebased telecare programs into real-world settings by evaluating both effectiveness and implementation outcomes. If proven effective and feasible, the implementation strategies used in the program may help guide the scaling up of telecare consultations in Hong Kong and other developed societies.

AUTHORS' CONTRIBUTIONS

Arkers Kwan Ching Wong and Frances Kam Yuet Wong conceptualized the program. Vivian Wai Yan Kwok, Bernard Man Kam Yuen, Ching Sing Fong, Shun Tim Chan, and Wah Chun Li designed the implementation strategies of the program. Arkers Kwan Ching Wong and Athena Yin Lam Lee drafted the manuscript. Danny Wah Kun Tong and Shiyi Zhou revised the manuscript. All authors provided intellectual input on the study design, methodology, and evaluation and contributed to, reviewed, and approved the manuscript.

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CONFLICT OF INTEREST STATEMENT

All of the authors declare that they have no competing interests.

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