Modification to virtual implementation of a community-based stroke exercise program called: fitness and mobility exercise

Marie-Andrée Gagnon[1,2], Charles Sèbiyo Batcho, PhD[1,2], Krista L Best, PhD[1,2]

[1] Department of Rehabilitation, Faculty of Medicine Université Laval, Quebec City, Canada;

[2] Center for Interdisciplinary Research in Rehabilitation and Social Integration (Cirris), Centre intégré universitaire de santé et de services sociaux de la Capitale-Nationale (CIUSSS-CN), Quebec City, Canada

INTRODUCTION

Stroke is a major cause of disability and death around the world [1]. Many stroke survivors face long term complications, such as reduced physical function, mobility, cognitive and communication impairment [2]. In addition, approximately 33% of stroke survivors experience depression post-stroke [3]. Physical activity (PA) reduces disability [4] and increases quality of life among stroke survivors [5]. Despite the known benefits of physical activity (i.e., improvement of physical condition, walking capacity, reduction of depression and anxiety symptoms and social isolation), stroke survivors are not enough active to accrue health advantage [6]. Physical inactivity is a major risk factor for a second stroke [7] and secondary complications (e.g., heart disease, fatigability, reduced cardiorespiratory fitness, falls) [6]. An evidence-based community exercise program exists for stroke survivors, called Fitness and Mobility Exercise (FAME), that effectively improves physical function, health condition and psychosocial health (www.fameexercise.com) [8, 9]. However, stroke survivors often experience barriers to accessing community-based programs such as transportation, accessibility of buildings, cost, and weather conditions [10]. The COVID-19 pandemic has increased barriers to community-based activities, reduced access to rehabilitation services [11] and worsened physical condition of individuals with disabilities [12]. Stroke survivors use technology every day to communicate with their relatives [13], and approximately 64% of stroke survivors (n=102) expressed they would like virtual training and exercise programs [14]. Thus, a virtual physical activity program may provide an approach that reduces barriers, while responding to the physical activity needs of stroke survivors. Given the potential contraindications and risks of exercise among stroke survivors, it is critical to consult experts to ensure safety of a virtual home-based program.

The aim of this study was to adapt the FAME program to be safe for delivery as virtual home-based program (FAME@home).

METHODS

Design

A qualitative study used focus groups. The study was approved by the Ethics committee of the *Centre intégré et universitaire de santé et des services sociaux de la Capitale-Nationale.* All participants provided informed consent.

Procedure

Health professionals (i.e., physiotherapists, kinesiologists, occupational therapists, social workers) and researchers who had expertise and at least 3 years of experience with a stroke population and telerehabilitation were purposively recruited to adapt the FAME program for virtually delivery in the home (n=5 x 2 groups). Small sample sizes per group allowed participation from each participant to share their unique experiences [15]. Eight topics were discussed, including inclusion criteria, hybrid intervention, FAME components, training frequency, intensity monitoring, physical evaluations, technological problems and security procedure. The FAME manual was sent 7 days before the focus group and a brief summary of FAME program was provided at beginning of focus group. Focus groups of 90 minutes in duration were conducted and audiorecorded using ZOOM platform. Focus group were animated by a moderator (MAG) and a research assistant using a focus group guide that was created by the research team. The data were transcribed verbatim and were coded and analyzed using NVivo software [16]. Based on the questions, common categories were extracted and organized into major themes. The focus

group data were analyzed deductively to identify specific recommendations for the virtual delivery of FAME@home to stroke survivors using videoconference technology.

RESULTS

The first focus group (n = 5) was composed of 2 kinesiologists, 1 physiotherapist, 1 occupational therapist and 1 social worker. The second focus group was composed of 4 researchers with expertise in stroke telerehabilitation. See table 1 for more details.

Table 1. Focus group' demographics information

Participant Characteristics	n (%)
Health professionals (n=5)	
Age, y, mean (SD)	35 (12)
Sex, F*	3 (60)
Education level	
Professional diploma	1 (20)
Bachelor	3 (60)
Master	1 (20)
Stroke experience, y, mean (SD)	9 (9)
3 > 4	3 (60)
7 > 8	1 (20)
≥ 25	1 (20)
Work type	
Clinical	1 (20)
Public system	2 (40)
Community organization	1 (20)
Physical fitness center	1 (20)
Researchers (n=4)	
Age, y, mean (SD)	57 (14)
Sex, F	3 (60)
Stroke and telerehabilitation experience, y, mean (SD)	28 (16)
15 > 20	2 (40)
25 > 30	1 (20)
≥ 50	1 (20)

*F: Female

Recommendations from the eight following topics were made by health professionals and researchers:

1. Modify inclusion criteria
Suggested changes were: increase minimum walking distance from 10 to 25 meters, increase minimum standing time from 5 to 10 minutes, and to add a clear indicator of clinical judgment to complement the Mini Mental State Examination (score > 22). Suggested inclusion criteria to be added were: minimal balance score, stand up from the floor to a chair, independent community-living (i.e., grocery shopping, go outside). It was also suggested to have smaller homogenous group (e.g., 3) rather than 10 as in FAME.

2. Provide a hybrid intervention
It was suggested to: provide options for virtual and in-person FAME@home sessions; ask participants to video themselves completing exercises independently at home; make training videos available between training sessions to help improve motivation; and ensure the trainer is aware of participants restrictions and health risks (e.g., diabetes, hemiparesis, spatial neglect).

3. FAME components
It was suggested to: remove exercises that could put participants at higher risk of falling (e.g, stepping, side-to-side) and to increase functional exercises (e.g., walking on the spot, sit-to-stand, balance); promote exercise in semi-static position behind a chair was recommended to increase safety; and ensure individualization based on group and participant capacity.

4. Training frequency
Suggestions were made to deliver FAME@home for 12 to 16 weeks between 2 to 3 sessions of 1 hour per week. Experts agreed that home-based training could reduce participants fatigue associated with transportation, which could facilitate more time to do more targeted exercises.

5. Intensity monitoring
It was suggested that exercise intensity be monitored using an exertion scale (as in FAME), smartwatch (e.g., Fitbit), fingertip oximeter or blood pressure before or after training. Experts recommended using a heart monitor without a chest strap (as in FAME) to facilitate use by individual with upper extremity impairment.

6. Physical evaluation
It was suggested that evaluations be conducted in-person instead of virtually to ensure the FAME@home exercises could safely take place in the participant's environment and to evaluate whether the person was physically capable to participate (i.e., be sure person is not at risk of falling). In person evaluations may help to cultivate credibility, ensure confidentiality and permit evaluations that would be more difficult to collect virtually.

7. Technology
The videoconferencing platform must be easy to use (e.g.., only one button to click without anything else to do) to reduce risk of attrition. Example were given including React+, Medexa, Tera+ platforms. One participant expressed that stroke survivors may experience difficulty to connect on videoconferencing platform. It was suggested that the platform be available on any devices and brands (i.e., Apple, Windows) and secure (i.e.,

ensure confidentiality). Concerns were raised about the ability of the trainer to monitor safety with more than two stroke survivors (i.e., when you talk to two individuals, you do not focus on others). Questions were also raised about the video images that should be made available to the participant (e.g., should participants see each other or only the health professional?).

8. Security procedure
It was recommended that participants exercise in a secure environment with enough space to move and even more important for stroke survivors with hemineglect. Stroke survivors should always have a chair and exercise close to a wall or counter during FAME@home. Recommendations to reduce risk of falls, such as removing carpet and reducing external distractions (e.g., pets, radio, TV) were made. Having the presence of a caregiver was also suggested in case of fall, as well as obtaining two emergency contacts and ensuring the participants' main door is unlocked in the case of an accident. FAME@home should be delivered by a health professional with stroke experience, and who has ability to know when to stop a participant. Participants should be placed in groups with people of similar functioning ability (e.g., strength).

DISCUSSION

Although the use of telehealth by health professionals has been increasing since 2000 [17], there is a dearth of evidence for physical activity programs for stroke survivors. Virtual delivery of physical activity programs is relatively new in stroke populations; therefore, there are little evidenced-based recommendations. The expert suggestions summarized in this study may inform future virtual delivery of physical activity programs such as FAME@home. FAME@home may provide a solution to meet the physical activity needs of stroke survivors. Future studies are needed to evaluate the feasibility and efficacy of virtual physical activity programs for reducing the risk of secondary strokes and the burden on hospitalization care. Moreover, virtual physical activity programs may provide services and socialization for stroke survivors who are more vulnerable to COVID-19. In addition to potential health benefits, FAME@home delivered in groups may offer social support and reduce risk of depression and anxiety due to COVID-19 [18].

CONCLUSION

Recommendations made by health professionals and researchers helped to adapt the FAME program for virtual delivery. The resulting home-based program named FAME@home is a safe and adapted stroke specific program. A pilot study should be made to evaluate if more modifications are needed before implantation on a larger scale.

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