Title: Zoomers for the Capital Region: A Peer-Led Exercise Program for Aging Adults

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Background

Between 2006 and 2011, the number of older adults aged 65 years and over in Canada increased to 16.9% of the population [1]. As the number continues to rise, it is important to help older adults remain independent for as long as possible, therefore, improving their quality of life. Research shows that being physically active enhances overall health; moreover, the resulting functional health leads to greater independence, and, more importantly, prolonged independence [2-5]. However, less than 13% of older Canadians are currently reaching the national physical activity guidelines, when measured objectively [6], that calls for a minimum 150 minutes of aerobic activities per week, along with two sessions of resistance training [7].

There are well-documented health benefits of being regularly active and being – and remaining– functional and independent. These are crucial to maintaining a healthy social life and boosting strength, continence, mental health, and cognitive function [8]. Many older adults consider the ability to carry out daily activities a high priority and regular physical activity is the foundation to maintaining this ability [9-11]. It has been shown that regular physical activity would translate to about 30% decrease in relative risk of loss of independence [12]. Based on the above literature, physical activity is often treated as a cornerstone strategy to improve wellness.

To help older adults achieve these goals, many non-profit and for-profit exercise programs are offered in communities across Canada. Recently, Recreation New Brunswick (NB) did a provincial analysis to gain a better understanding of the types of programs that are provided, barriers to participate, who delivers such programs, and if they are evaluated [13]. They reported that about 10% of exercise programs offered to older adults were evaluated. Therefore, the vast majority of older adults in NB participate in exercise programs for which the efficacy is unknown. As a result, organizations that offer such programs are having a hard time to decide where to increase or reduce resources. The Recreation NB report also shared success stories of exercise programs across NB and concluded that most of these programs were peer-led. Peer-led exercise programs have shown success in the past for different reasons [14-16]. First, this model is sustainable [16], and can be delivered at a low cost. Second, research indicates that these types of programs are successful because peer leaders promote social connectedness [15]. The peer leader, being of similar age and life experience, is seen as a positive role model, and has participants feeling they are better understood [17]. In fact, one study reported that peer-led exercise programs were as effective as professionally led exercise programs in the community [14].

The Present Study

As New Brunswick is no exception to the growing older population, we need to ensure that adults are having access to exercise programs that have been evaluated to ensure they are provide its participants with beneficial outcomes. Increasing levels of physical activity and reducing the risk of falls is an important outcome for not only our health care system, but for the individuals and their quality of life. It is important to evaluate exercise programs offered to older adults, to ensure that funds are being allocated to beneficial exercise programs.

The peer-led exercise program choice: The program to be evaluated is called Zoomers on the Go. The program has had 1,800 participants since it started in 2009, it was initially designed for people aged 50 years and older to reduce the rate of falls through exercise. It is offered by the St. Joseph's Community Health in Saint John NB. The 12-week program involves two 60-minute sessions per week and involves aerobic and resistance exercises, as well as flexibility and balance activities. There is also an educational pamphlet discussed at the end of each session. Besides being peer-led, this exercise program was selected for different reasons. First, the Zoomers on the Go program is extremely well-documented and can be replicated. Second, the program is currently designed to meet the current physical activity guidelines in terms of volume, mode of exercise, and intensity even if the program was originally developed for fall

prevention. Third, because the program is offered through the Horizon Health Network, it is possible to link the outcomes of the program to administrative data (e.g., hospital admission or clinical outcomes such as glucose level). Four, the program was developed in collaboration with older adults to meet their needs. Finally, because it was implemented as part of the public health care system, there is a possibility to expand the program across the province by using the same model with a possible partnership of Recreation NB and NB PLAYS Gold.

This study has one main objective. The objective is to recruit a group of older adults who have never participated in this exercise program, Zoomers on the Go, and study a broad set of physical health, mental health, and social outcomes when participants go through the exercise program. It is predicted that participants involved in the exercise program will improve their physical functioning, mental state, and social engagement throughout the 12-week program. For aging adults involved in the program, it is expected that they will experience positive outcomes in comparison to adults similar in demographics who are not involved in the program.

Methods

Participants

Adults (male and female) who are 50 years of age or older will be permitted to participate in this study. These individuals must be physically capable to exercise with limited supervision, and they must report being available to partake in a 12-week exercise program. Adults who cannot independently exercise and who do not receive physical activity clearance from a physician or other health care provider will be excluded from this study. The reasoning for this inclusion criteria is because this is the population that the exercise program targets.

This study will involve a sample size of 60 participants from the Fredericton area who have never participated in the Zoomers program. It is intended that 30 participants will be randomly assigned to the intervention group, and 30 participants will be randomly assigned to the control group. The sample size was determined by the funding agency (GNB), which required a minimum of 30 participants to be tested before and after the Zoomers on the Go program. In addition, based on previous data that was collected at the Zoomers program in Saint John NB, an improvement of 1.72 seconds ± 3.40 seconds was observed for the Sit-to-Stand test (standing from a seated position as fast as possible). Assuming that the control group will not improve, with a power of 80%, an alpha of 95%, it is estimated that 19 people per group will be required. However, we need to account for the drop-out rate, which is normally around 20-30% for this type of trial, and the fact that the control might improve due to other reasons; all of which will slightly reduce the effect size.

Materials

In order to measure the main research objective, many of the Senior Fitness Tests will be conducted, all of which have been validated with clinical populations. The 6-minute walk test (6MWT) will be used. It is a submaximal exercise test used to assess aerobic capacity and endurance. The goal for the participant is to cover as much distance as possible in six minutes, using as many breaks as necessary. The test is often performed using a hallway, but requires no specific equipment. Another test will be the 30-second chair stand test. The purpose of this test is to assess lower-body strength. The participant is instructed to sit in the middle of a chair, and stand up and sit down as many times as possible in 30 seconds. The only equipment needed is a chair and a stopwatch. The 30-second arm curl test will also be performed. This assess upper-body strength. The participant sits in a chair with his/her feet flat on the floor, and the number of arm curls that are completed in 30 seconds is recorded. The arm must fully extend so that it is perpendicular to the floor. A chair, a stopwatch, a 5 lb dumbbell (for women) and an

8 lb dumbbell (for men) are required. The chair sit-and-reach test will be conducted to evaluate lower body flexibility. The participant sits at the end of a chair, with one leg extended straight, and hinges at the hips and reaches as far as possible while the leg remains straight. The measurement is taken in relation to the midpoint of the toe. A chair and a ruler are required to administer this test. In addition, the upper-body flexibility will be assessed using the Back Scratch Test. The participant reaches one hand over the shoulder, and one down the back so that the two hands try to touch. A ruler is needed to measure the distance between the fingers. The Timed Up-and-Go test assesses agility and dynamic balance. It involves having the participant sit in a chair and on the "go" signal get up and walk as quickly as possible around a cone placed 8 feet away from the chair, and then return to seated position. The one-leg stance is another functional test being evaluated. This tests a participant's balance, leg strength and endurance. No equipment is required besides a stopwatch and a chair or wall. The participant is instructed to balance on one leg for as long as possible, for a maximum of 45 seconds.

Some of these tests will require the participants to wear a foot pod attach to their shoe to provide biomechanical variables such as cadence and stride length. A foot pod is a small tool that attach to the laces and is small as a watch. Other tests will be performed on a balance tracking system platform (called a force plate) to assess other biomechanical outcomes such as sway and centre of mass while participants are asked to stand in balance for a maximum of 45 seconds.

Demographic data will be assessed via a single questionnaire. Anthropometric measures will also be taken, including height and weight. Resting blood pressure, resting heart rate, and blood glucose will also be measured. The blood glucose will be measured by a capillary blood draw in the finger. The participant will be required to fast for 12 hours prior to this test. In addition, a pedometer will be used to quantify baseline physical activity and sedentary behaviour only prior to the intervention.

Aside from physical functions, baseline characteristics will also be used to determine what characteristics, if any, are associated with health and psychosocial outcomes such as quality of life and mental well-being. Issued questionnaires will assess lifestyle (current and prior to the exercise program) and will be given participants. Questionnaires including:

- The Depression Anxiety Stress Scales- 21 item (DASS-21) which measures weekly depression, anxiety, and stress (Lovibond & Lovibond, 1995)
- The Short Form Health Survey- 36 items (SF36) which is a measure of day-to-day functioning/quality of life (Ware & Sherbourne, 1992)
- A researcher-generated measure of exercise self-efficacy based on Bandura's concept of self-efficacy (Bandura, 1977)

For participants who provide consent to be interviewed, interviews will also be conducted prior and following the intervention. These will investigate the participant's feelings of social connectedness, sense of belonging, and friendships.

Procedure

This study is a randomized control trial where subjects will be randomly assigned to a control or an intervention group. Participants will be recruited through general advertisements (e.g. radio, newspaper, posters), in Fredericton and surrounding areas. These participants will be volunteers, and no compensation will be provided besides having access to a free exercise program in their community. Eligibility will be determined by the research staff prior to the baseline assessment day.

Eligible participants will be evaluated at an initial day of testing at either a Horizon Community Health Centre or at the University of New Brunswick in the Cardiometabolic Exercise and Lifestyle Laboratory (CELLab). This first visit will involve the confirmation of eligibility, reading and signing a consent form, and the administration of the measurements discussed previously. All research staff will have received the appropriate training to deliver these fitness assessments, finger pricks, and interviews. At the end of the baseline visit, research staff will randomly assign participants to the intervention or control group. The participant will wear a pedometer for seven consecutive days following this initial visit.

The paper form for any information collected (e.g. consent form) will be stored in the CELLab at UNB in a locked cabinet. The CELLab has limited access; only staff has access through a password to the lab. All information will be linked to a participant number for which the only linkable personal information (e.g., name, age, sex) will be kept in a password protected computer and only the Principal Investigator, Co-Investigators, and Research Coordinator will have access to this information. Information will be stored for a maximum of 7 years.

Following this baseline assessment, participants in the intervention group will be assigned to an exercise program most convenient to them. This is a 12-week exercise program, offered twice a week. Full attendance is not mandatory for being a participant. This is a peer-led exercise program, meaning it is instructed by a leader of similar age. This leader has received extensive Fitness New Brunswick training to deliver a program aimed to reduce the risk of falls and help older adults safely increase their physical activity levels. This 60-minute exercise program involves aerobic and resistance exercise, as well as flexibility and balance activities. The program is currently designed to help individuals meet the physical activity guidelines. Participants' numbers will be used to register attendance from the leaders**.**

Following this 12-week intervention or control period, participants will repeat all the baseline assessments (including questionnaires and interviews), with an exception that they will not have to wear the pedometer in the follow up visit. The primary objective will be to determine whether participants' experiences with the program were positive or negative, and specifically identifying participants' attributions of why/how the exercise intervention positively impacted their physical and/or mental health.

Data Analysis Plan

We will estimate treatment effects with random-intercept linear mixed models to account for repeated measures on each participant and clustering of participants within Community Health Centres facilities or leaders. The independent variables will be time (pre-post) and treatment group (intervention or control), and the baseline value of the outcome will be entered as a covariate. Although the uncertainty (variance) provided by generalized estimating equations is unnecessarily large when few clusters are present, this approach requires fewer assumptions than the linear mixed model, and provides a useful check on the results of the linear mixed model.

Baseline characteristics will also be used to determine what characteristics, if any, are associated with psychosocial outcomes such as quality of life, social connectedness, and mental well-being. Finally, interviews will be used to rationalize and/or explain the quantitative findings. Interviews will be recorded, then transcribed and coded.

Conclusion

NB has the second highest percentage of older adults in Canada. Most of them are not performing enough physical activities that can ensure greater independence and quality of life. This project focuses on an established peer-led exercise program catered to older people, with the possibility of expanding it through a partnership of regional universities, provincial health networks, Recreation NB, and Fitness NB. Zoomers on the Go has the potential to be an evidence-based reference for developing a general exercise and testing program for older adults across the province. The proposed research project addresses gaps and opportunities from: 1- the last report written by Recreation NB to evaluate exercise programs delivered to older adults; 2- the Wellness Strategies to develop initiatives that will address many indicators of health; 3- the three main goals of the Aging Strategy in NB a) to enable seniors to live independently, b) to achieve sustainability and innovation by doing research, and c) to embrace a province-wide culture of person-centered care and support by involving many stakeholders during the entire process. The current research is going to evaluate the effectiveness of an exercise program that is already being delivered in Saint John, New Brunswick to provide evidence whether the sustainability of this program is or is not worth investing in. Older adults who volunteer as leaders will receive credible certification, and participants will receive access to a free exercise program in their community.

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