Safety and predictors of adherence of a new rehabilitation program for older women with congestive heart failure

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Abstract

Objectives To assess the safety of a cardiac rehabilitation program for older women with Congestive Heart Failure (CHF) and determine if certain factors influence adherence. **Methods** Women over the age of 65 with CHF attended an exercise program supervised by a physiotherapist. Quality of life was measured by the Minnesota Living with Heart Failure Questionnaire (MLHFQ) and severity of disease by the New York Heart Association (NYHA) Class. Subjects were classified into those who attended 90% or more of the sessions and those who attended less than 90% of the sessions. **Results** Fifty-one subjects were studied. Eight subjects did not attend any sessions. Of the 43 attendees, the average percentage of sessions attended was 87%. There were no significant differences between the two groups in age, MLHFQ or NYHA Class. There was only one adverse event out of 280 participant attendances. **Conclusions** The program had a high level of adherence in this population. Age, MLHFQ or NYHA Class did not impact on session attendance. Our data suggests this program is safe for this population. Further research is needed to determine other predictors of attendance and the examination of safety issues and long-term adherence to exercise in this population.

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1 Introduction

Research regarding the rehabilitation of congestive heart failure (CHF) has grown rapidly in recent years, as the prevalence of the disease escalated. Prior to the late 1980s, it was believed that physical activity in CHF was dangerous and would negatively affect patients.^[1,2] However, emerging research began to shift traditional interventions towards an exercise based, non-pharmacological approach. Studies have proved exercise helped decrease symptoms, such as breathlessness and fatigue, decreased mortality and improved exercise endurance resulting in improved quality of life.^[2–8] Research has further described the benefits of exercise in CHF populations.^[3] To date, aerobic exercise in patients with New York Heart Association (NYHA) class II or III CHF has shown to be effective,^[2] however, clinical guidelines to help guide these rehabilitation processes are still needed.

Women traditionally demonstrate lower exercise adherence rates than those of men.^[9] While both sexes show low exercise compliance, female rates are generally 10%–40% lower than those of males.^[10] Studies have also shown females are less likely to be referred to cardiac rehabilitation programs by their doctors,^[11,12] yet older patients are likely to continue exercising after receiving doctor's advice.^[12]

This paper is part of a larger, randomized control trial aimed at assessing an interdisciplinary rehabilitation program for older women with CHF.^[13] This paper will specifically describe the exercise protocol prescribed by the physiotherapist used to treat the participants and aims to report the overall adherence with the exercise program, discern any predictors of adherence and assess the safety of the program.

2 Methods

As this paper is a part of a larger study, the methods and results have been described elsewhere.^[13] Briefly, female patients over the age of 65 with a diagnosis of CHF were referred from the Ottawa Hospital and surrounding community. All participants spoke English and/or French and were medi-

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cally stable and capable of engaging in an exercise program. Participants were excluded if they had significant cognitive impairment (Mini Mental State Examination < 24), were classified NYHA class IV or were at a palliative stage of the disease. Participants received written and verbal information regarding the study from the clinical coordinator, a registered nurse, and consented to participating in the study. The Research Ethics Board of the Ottawa Hospital granted approval for the study.

Participants randomized to the intervention group followed a clinical pathway that emphasized education and exercise through the efforts of an interdisciplinary team made up of a physician, nurse, physiotherapist, occupational therapist, dietician, pharmacist and social worker. The program lasted for six weeks and consisted of twelve visits in total; nine of these visits were designated physiotherapist-lead exercise sessions. This paper will focus solely on those participants in the intervention arm of the trial attending the exercise sessions directed by the physiotherapist.

The physiotherapist was involved in assessing, training and supervising participants throughout the course of the six weeks. Participants were scheduled for nine exercise sessions, with the exception of three participants who were offered seven sessions due to unforeseen circumstances. An initial assessment was conducted by the physiotherapist for each participant. Subjective information such as history of cardiac disease, past medical history, social history, current and past levels of activity, current medication usage and participant's activity goals was gathered. The participant's resting heart rate (RHR) and blood pressure were measured. The CHF exercise protocol and the rate of perceived exertion (RPE) scale and self-monitoring of symptoms were introduced.^[14] Their target heart rate (THR) was established using the formula $RHR + 20$ beats per minute.^[15] The physiotherapist and each participant then went for a two to five minute assessment walk to determine the participant's heart rate response to exercise (EXHR) as well as blood pressure response. If the EXHR was greater than that of the THR, the participant was instructed to exercise at a lower intensity. The physiotherapist then provided an individualized exercise prescription and selected the appropriate starting protocol interval for each participant based on the results of the assessment walk.

Each exercise session began with a five-minute seated group warm-up lead by the physiotherapist followed by a measurement of each participant's warm-up heart rate. At the end of exercise sessions, EXHR was measured followed by a five-minute cool-down period. Blood pressure response to exercise was measured periodically in each participant. In

order to discern adherence to the exercise program, participants were contacted following missed exercise sessions to determine their reasons for absence. A final assessment was conducted to review individualized exercise capacities and discharge exercise program/recommendations.

2.1 Physiotherapy exercise prescription and protocol

Throughout the study, participants followed one of five exercise intervals in any given session. Interval 1 was the lowest intensity/duration and interval 5 was the highest. Participants were able to progress to higher intervals once specific requirements were met. Each exercise session followed the same procedure:

(1) The participant was encouraged to meet the maximum exercise duration for their respective interval. Interval 1: exercise between one and five minutes, as able. Goal: 5 min of continuous exercise. Interval 2: exercise for 5 min (one work phase "ON") followed by 1 min of rest ("OFF"). This sequence was repeated to a maximum of five work phases (5 ON, 1 OFF × 5). Goal: 25 min of accumulated exercise. Interval 3: 10 min ON, followed by one minute OFF to a maximum of three work phases (10 ON, 1 OFF × 3). Goal: 30 min of accumulated exercise. Interval 4: 30 min of continuous exercise. Interval 5: 30 min of continuous exercise at target heart rate.

(2) Following completion of the exercise, the participant was assessed to determine RPE, EXHR and whether they were experiencing any symptoms, such as chest pain or atypical angina, nausea, palpitations, excessive sweating, shortness of breath and/or any other muscle or joint pain.

(3) Progression to the next interval could occur if maximum intensity/duration was completed during which the RPE was less than five, their EXHR was less than the target heart rate, and participants were asymptomatic.

(4) If the exercise duration and/or the requirements were not met, the participant would continue with their respective exercise interval the following session.

2.2 Data collection

Participants were required to complete the Minnesota Living with Heart Failure Questionnaire (MLHFQ)^[16] as well as other tests in a pre-trial data collection session. RPE was used to quantify a subject's perception of exertion during an exercise session.^[14] Exercise adherence in the study was credited with attending an exercise session if they fully participated in the session. NYHA Classification of function was used in order to discriminate between participants and their physical limitations.

Six months following completion of the six week study, intervention group participants received a phone call asking: “Are you still following the exercise program prescribed to you by the physiotherapist at the CHF clinic?”

In data analysis, in order to assess for differences between high and low attendees, subjects were divided into two groups: those who attended less than 90% of the scheduled sessions (20 subjects), and those who attended more than 90% of the scheduled sessions (23 subjects). NYHA Class, age and MLHFQ score were compared in the high attendees and the low attendees as possible predictors of exercise adherence. All data were entered into an Excel Spreadsheet and analyzed using SPSS software. Age and MLHFQ were analyzed using non-parametric methods and NYHA class was analyzed using a Chi-square analysis.

3 Results

Fifty-one participants were randomized to the intervention group; however, eight dropped out at the beginning of the study and hence did not attend any of the exercise sessions. The characteristics and the attendances of the remaining 43 subjects were analyzed and are reported in Table 1.

The average age of the subjects was 74.4 years (standard deviation of 6.9 years). The average MLHFQ score was 27.4 (standard deviation of 17.4). Twenty eight percent of the subjects were NYHA Class I, 42% NYHA Class II and 30% NYHA Class III with respect to symptomatology.

The number of scheduled exercise sessions attended was very high. On average, each subject attended 87% of the exercise sessions. Only two subjects attended less than 50% of the scheduled sessions and 16 attended all of the scheduled sessions.

There were no statistically significant differences in the mean ages, MLHFQ scores or NYHA Class between the two groups as demonstrated in Tables 1 and Table 2. The analyses were repeated using a threshold of 80% to separate the frequent attendees from the infrequent attendees and again, no differences were found in the three variables. Only one participant developed angina during the exercise sessions. The participant was instructed to stop exercising. In two cases, participants presented with leg symptoms prior to starting the exercise. One participant with angina was sent to the emergency room.

In response to the follow-up telephone call six months later, 13 participants indicated they were still exercising, 10 indicated they were sometimes exercising, 20 indicated they were not exercising.

4 Discussion

There is a lack of an available research base for comparison as previous studies conducted on cardiac populations have,

Table 1. Mean Age and Minnesota Living with Heart Failure Questionnaire (MLHFQ) scores for high and low attendees.

	Attendance	n	Mean $\pm$ SD
Age (yrs)	Low (< 90%)	20	74.10 $\pm$ 6.62
	High (> 90%)	23	74.65 $\pm$ 7.16
MLHFQ Score	Low (< 90%)	20	26.30 $\pm$ 17.98
	High (> 90%)	23	28.35 $\pm$ 17.18

Table 2. New York Heart Association (NYHA) Class frequency for high and low attendees.

	Attendance	I	II	III
NYHA Class	Low (< 90%)	6	9	5
	High (> 90%)	6	9	8

generally included middle aged, male populations.^[9] With that said, many of the statistics observed with this older female population correspond to the results found in similar studies conducted with middle-aged men.

As the results indicate, adherence to the exercise protocol was high in this study, with 87% of sessions attended. This is in congruence with various studies performed in the past that indicated a compliance percentage of 74% in CHF populations.^[17] However, to our knowledge, this was the first study that reports adherence rates focusing solely on an older female CHF population. In the past, females with cardiovascular disease have been shown to have lower attendance rates than men in cardiac exercise programs.^[11,12] There were only females involved in this study, therefore we are not able to directly compare with a male population and are limited to concluding that the attendance for females in this setting was very high.

Of the three variables examined as potential predictors of exercise adherence (age, MLHFQ score and NYHA Class), none were shown to be predictors of exercise adherence. In studies conducted on cardiac rehabilitation programs, age has been shown to be a large predictor of adherence with the youngest (< 40 years of age) and oldest (> 70 years of age) being the least compliant and less likely to adhere to an exercise program.^[10] This was not the case in this study of females, as no relevant age difference was found between the high attendees and the low attendees. Over 90% of the subjects attended at least two thirds of the scheduled exercise sessions.

MLHFQ scores and NYHA Class were not found to be predictors of exercise adherence. The majority of participants in this study were NYHA Class I or II which may have limited the analysis. Similarly, the mean MLHFQ score was 27.4 which suggest that the whole group had a relatively good quality of life, despite dealing with CHF.

Although based on a relatively small sample, there was only one adverse event in 280 participant attendances, at times with five participants being monitored by one staff member. This is consistent with previously published studies that have shown few adverse events tend to occur.^[4,17]

Eight subjects (15% of the total) recruited to the study dropped out and never attended a single exercise session for a variety of reasons and were excluded from the analysis. In studies looking at male heart failure populations, dropout rates were recorded at 21%.^[18]

The six-month follow-up telephone call showed that only 12 of the 43 participants were still exercising regularly; therefore, long-term exercise adherence was poor. While exercise uptake and adherence to exercise programs are both important factors, research on long term adherence following completion of an exercise program is minimal.^[8] It is especially important that subjects continue to exercise, as any benefits gained during an exercise program will subsequently dwindle if the exercise is not continued over a prolonged period of time.

In conclusion, the described exercise protocol can be administered with limited resources in multiple sessions and is a useful tool in any CHF setting. The preliminary data shows not only high exercise adherence rates, but also, with proper assessment and monitoring, a high level of safety for the complex CHF participants. However, the six-month follow up indicates long-term adherence following the formal exercise program was poor. Future studies should employ larger samples in order to establish both predictors of, as well as tools that can effectively increase long-term adherence.

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