Heart & Lung 44 (2015) 2–8

Contents lists available at ScienceDirect

Heart & Lung

journal homepage: www.heartandlung.org

Physical Activity, Function, and Exercise in Cardiopulmonary Patients

Understanding physical activity and exercise behaviors in patients with heart failure

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ARTICLE INFO

Article history:
Received 11 May 2014
Received in revised form
25 August 2014
Accepted 25 August 2014
Available online 17 September 2014

Keywords:
Value
Adherence
Barriers
Benefits
Confidence
Emotions

ABSTRACT

Objective: Explore perceptions of physical activity/exercise in patients with chronic heart failure (HF).
Background: Although activity/exercise are HF self-care expectations, perceptions of patients are not well understood.
Methods: Ambulatory adults with HF were interviewed. Data were transcribed, categorized, and themes were developed.
Results: Of 48 participants, mean age was 58.8 ± 13.2 years. Themes that emerged were: patients not knowing and physicians not telling; scared into doing or not doing it; life gets in the way; meaningful support versus meaningless talk; emotional connections to exercise; value does not equal motivation to move; and disconnection between self-confidence and actions. Self-confidence in and value of physical activity/exercise were not primary motivators to action. Generally, physicians failed to provide details regarding exercise dose, length, warm-up and cool-down expectations, and usual and adverse effects.
Conclusions: Patient perceptions of what physical activity/exercise means are multi-dimensional; and fears, emotions, priority and participatory social support contribute to adherence.

Introduction

Heart failure (HF) is a great burden with respect to incidence, morbidity, mortality and adherence to guideline-directed self-care therapies. HF is the cumulative and progressive result of conditions that cause structural defects and functional abnormalities in cardiomyocytes.[1] In 2010 in the United States, approximately 5.1 million people had HF, 825,000 new cases were diagnosed, and there were 1.02 million hospital discharges for HF.[2] One in 9 deaths were attributed to HF in 2010, and HF was the primary cause in over 57,000 deaths.[2] In 2012, the estimated cost of HF care was $20.7 million, and costs are expected to increase almost 127% by 2030, to $69.7 billion.[2]

A large body of research is available on interventions that may reduce HF morbidity and mortality. Of self-care activity expectations important to HF management, the American College of Cardiology (ACC)/American Heart Association (AHA) recommended regular exercise as Class IIa evidence, reflecting that benefits outweigh risks and it is reasonable to implement.[1] Further, HF specific performance measures include pre-hospital discharge education on physical activity[3] and outpatient education on physical activity and exercise.[4]

In adults with HF, physical activity and exercise were associated with multiple benefits; however, most reports with positive exercise outcomes came from small samples, were single centered, or had short durations. The effects of exercise training for patients with chronic HF were increased exercise capacity, improved clinical symptoms, improved quality of life, and reduced risk of future clinical events, including HF-related hospitalizations.[5–9] Other benefits of exercise in patients with HF included improved muscular blood flow,[10,11] capillary density,[12] endothelial function,[12] autonomic function due to increased vagal tone and reduced sympathetic nervous tone,[13] respiratory function, oxygen saturation,[8,12,14,15] and oxidative enzymes[16]; decreased ergoreflex activation,[17] and inflammatory cytokines[18,19]; and altered cardiac cell function by increasing mitochondria density.[16] Finally, in 2009, the HF: A Controlled Trial Investigating Outcomes of Exercise Training (HF-ACTION) investigators reported benefit of regular exercise on

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0147-9563/$ – see front matter © 2015 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.hrtlng.2014.08.006

all-cause death and hospitalization, cardiovascular death, HF hospitalization, and quality of life after adjusting for four characteristics (duration of the cardiopulmonary exercise test, left ventricular ejection fraction, depressive symptoms, and history of atrial fibrillation or flutter).[20,21]

Although exercise was beneficial, most researchers did not discuss adherence to the exercise plan. In HF-ACTION, no matter the time point in follow-up, about 30% of HF-ACTION exercise training group subjects exercised at or above the target exercise minutes per week, despite receiving a treadmill or exercise bike in their homes.[20] Lack of adherence to exercise recommendations is an emerging theme in the HF literature. In one study, researchers measured usual daily walking activities of patients with HF and reduced and preserved ejection fractions, via accelerometer. Activities were grouped into four categories; passive, activity, walking and fast walking. Over an 8-day period, 61% of minutes (patients in New York Heart Association functional class I) to 72% of minutes (patients in functional class III) each day were spent in passive actions and only 1–4% of minutes were in fast walking activities.[22] Some researchers highlighted exercise adherence issues,[20,22–26] such as depression, high body mass index, and low self-confidence for exercise; however, there is a lack of research about the experiences and meaning of physical activity and exercise in a sample of ambulatory patients with HF who are capable of being active and exercising. It is likely that multiple factors affect patients' adherence to HF–related activity and exercise ACC/AHA guideline expectations. There is a gap in the research literature of patients' perceptions of activity and exercise in relation to HF. It is important to understand patients' current state of, meaning of, and value placed on activity and exercise to better understand adherence issues. Understanding patients perceptions of the benefits or motivators and barriers of engaging in and adhering to activity and exercise, as well as confidence in, education received by health care providers, and support from others for activity and exercise will provide new knowledge about rationale for exercise adherence or non-adherence that will aid clinicians' in next steps in developing interventions aimed at improving activity and exercise adherence. Although the terms activity and exercise have unique meanings, they were included together in this research study since patients were generally passive and non-adherent to exercise in the review of the literature. By including both terms, a broader representation of participant experiences was possible. The specific aims of this qualitative study were to learn the activity and exercise behaviors patients engaged in (to determine general adherence to HF guideline recommendations); what patients were told about activity and exercise by health care providers; the perceived meaning and value of activity and exercise; perceived benefits and barriers, confidence in, and support from others related to activity and exercise.

Methods

Design

This qualitative, descriptive single-center study is part of a mixed methods research project. The quantitative component was multicenter and used a cross-sectional, correlational design and questionnaires to learn the predictors of physical activity and exercise among patients with chronic HF. A qualitative approach was used to provide rich descriptions of participants' perceptions of activity and exercise that would not be possible with quantitative data alone. The qualitative approach helped to identify and explore multiple factors that may be related to patients' adherence to activity and exercise from their perspectives. Approval of the research study was obtained from the hospital's Institutional Review Board and patients provided informed consent. Semi-structured, open-ended questions guided the interview process. Participants were asked to consider the previous month when responding to 10 questions (see Table 1).

Sampling design

This study was conducted at a 1200 bed quaternary care medical center in Northeast Ohio. Ambulatory adult patients with chronic HF (defined as having HF for a minimum of 3 months) were enrolled when attending an HF outpatient clinic for a prescheduled non-urgent appointment. Electronic medical records of patients scheduled for office care were reviewed to determine eligibility based on the inclusion and exclusion criteria. Inclusion criteria were age 18 years and above, able to read and write, able to walk independently without a cane, walker, or personal assistance, and willing to participate in the interview process after completing questionnaires and objective assessments of functional capacity. Exclusion criteria included medical record documented psychiatric or cognitive conditions, skilled nursing, long-term, or hospice care facility housing, use of continuous oxygen (use at night was allowed), continuous intravenous inotropic agent (milrinone or dobutamine) administration, and documented New York Heart Association functional class IV status at the time of data collection. Adults with HF due to complex congenital heart disease, those with chronic renal failure, HF post cardiac transplantation, or with a ventricular assist device were also excluded. To ensure greater diversity among participants and generalizability of findings, potential subjects were assessed for physical activity level, age category, race (Caucasian versus non-Caucasian), and gender prior to enrollment in this sub-study. Enrollment goals were to assure an equitable number of patients who did not engage in activity or exercise, or did so infrequently, and those who exercised moderately or vigorously; then to enroll a minimum of 2 subjects of each age, race and gender category.

Data collection

Demographic data were collected as part of the quantitative research component, and completed before the interview process. The ordering of having patients complete questionnaires before interviews allowed participants to become exposed to research themes; specifically, level of activity and exercise; attitudes, opinions and value of exercise; barriers, benefits and self-efficacy of

Table 1
Interview questions about activity and exercise by study aims.

Study aim	Interview questions[a]
Current level	• Provide examples of current physical activities and exercises.
Meaning	• What does exercise mean to you regarding your general health? • What does exercise mean to you regarding HF?
Value	• What is the value of being physically active to you? • What is the value of exercising to you?
Benefits/motivators and barriers for *engagement*	• Describe reasons for engaging (benefits/motivators) or not engaging in (barriers) physical activity and exercise.
Benefits/motivators and barriers for *adherence*	• Describe reasons for sticking with (benefits/motivators) or not sticking with (barriers) physical activity and exercise.
Confidence	• Describe factors that gave you confidence or decreased your confidence for engaging in physical activity and exercise
Support from others	• What do others say about exercising?
Education received	• What were you told by your doctor/health care provider about exercising?

[a] Listed in the order interview data were collected.