



The Feasibility of Delivering a Home-based Motivational Exercise Program to African-American Breast Cancer Survivors

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Abstract

Most African-American breast cancer survivors do not meet current exercise recommendations for cancer survivors, which include both aerobic and strength-training exercises. This pilot study tested the feasibility of delivering a home-based exercise intervention to African-American breast cancer survivors. Sedentary African-American breast cancer survivors were recruited for a 16-week motivational home-based progressive aerobic and strength-training exercise pilot study. Participants completed weekly exercise logs and received weekly phone calls. To assess feasibility, we evaluated recruitment, retention, and adherence rates, as well as participant acceptance and safety. 17 women enrolled; 13 completed the intervention (76%). Participants had moderately-high adherence (70%) to walking goals, but only 51% for strength training goals which progressed to three times a week towards the end of the study. All women indicated that they planned to continue exercising regularly. Additionally, they all reported they would continue walking, but only nine of 13 indicated they would continue strength-training. This study addresses gaps in the exercise oncology literature since very few exercise studies have targeted African-American breast cancer survivors. Also, most exercise studies among breast cancer survivors have focused only on increasing aerobic physical activity. The intervention was feasible and safe to deliver. However, study modifications to improve recruitment and adherence in future mixed modality exercise interventions are recommended.

Keywords

African-American breast cancer survivors; physical activity; strength-training; walking; recruitment; retention; adherence; acceptability

Cover Page Footnote

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ABSTRACT

Most African-American breast cancer survivors do not meet current exercise recommendations for cancer survivors, which include both aerobic and strength-training exercises. This pilot study tested the feasibility of delivering a home-based exercise intervention to African-American breast cancer survivors. Sedentary African-American breast cancer survivors were recruited for a 16-week motivational home-based progressive aerobic and strength-training exercise pilot study. Participants completed weekly exercise logs and received weekly phone calls. To assess feasibility, we evaluated recruitment, retention, and adherence rates, as well as participant acceptance and safety. 17 women enrolled; 13 completed the intervention (76%). Participants had moderately-high adherence (70%) to walking goals, but only 51% for strength training goals which progressed to three times a week towards the end of the study. All women indicated that they planned to continue exercising regularly. Additionally, they all reported they would continue walking, but only nine of 13 indicated they would continue strength-training. This study addresses gaps in the exercise oncology literature since very few exercise studies have targeted African-American breast cancer survivors. Also, most exercise studies among breast cancer survivors have focused only on increasing aerobic physical activity. The intervention was feasible and safe to deliver. However, study modifications to improve recruitment and adherence in future mixed modality exercise interventions are recommended.

Keywords: African-American Breast Cancer Survivors, Physical Activity, Strength-training, Walking, Recruitment, Retention, Adherence, Acceptability

INTRODUCTION

The majority of breast cancer survivors are not meeting general physical activity recommendations as endorsed by the American Cancer Society (ACS) for cancer survivors of at least 150 minutes of moderate intensity aerobic physical activity per week or 75 minutes per week of vigorous intensity physical activity for health promotion and disease prevention (Blanchard, Courneya, & Stein, 2008; Rock et al., 2012) Recommendations also include engagement in muscle strength-training exercises of major muscle groups at least twice per

week. Blanchard et al. (2008) reported that only 37.1% of breast cancer survivors met the recommendation for aerobic physical activity. African-American breast cancer survivors typically engage in less physical activity following diagnosis and treatment compared to women from other racial/ethnic groups; they also have higher mortality rates (American Cancer Society, 2012; American Cancer Society, 2013).

Breast cancer survivors who are physically active often have better health-related quality of life (HRQoL) outcomes compared to those who are inactive (McNeely, Campbell, Rowe, Klassen, & Mackey, 2006; Schmitz, Holtzman, Courneya, Masse, Duval, & Kane, 2005; Speck, Courneya, Masse, Duval, & Schmitz, 2010). Additionally, recent data suggest a survival advantage for women with early-stage breast cancer who engage in higher levels of physical activity compared to those who are less active (Ballard-Barbash, Friedenreich, Courneya, Siddiqi, McTiernan, & Alfano, 2012; Ibrahim & Al-Homaidh, 2011). Home-based exercise interventions (i.e., walking programs with telephone counseling) for breast cancer survivors have been feasible to deliver and successful at increasing physical activity (Pinto et al., 2005; Matthews et al., 2007). Women in these studies also reported improvements in physical and emotional well-being. However, these studies were conducted primarily among White women and did not incorporate strength-training as an additional exercise modality. The present study addresses gaps in the area of exercise oncology research by focusing on African-American breast cancer survivors, who are known to have worse clinical outcomes than their White counterparts. The study also utilized a combined aerobic and strength-training home-based intervention, as opposed to only an aerobic exercise intervention.

The goal of this study was to report on the feasibility of delivering a home-based progressive walking and strength-training program to African-American breast cancer survivors. For the purposes of this study, feasibility of delivering the program was evaluated by determining recruitment and retention rates, adherence rates, safety and acceptability of the program. The effects of the exercise intervention on physical activity, physical health/fitness and quality of life have been previously reported (Spector, Deal, Amos, Yang, & Battaglini, 2014).

METHODS

A single-arm design was used for this 16-week home-based motivational aerobic and strength-training pilot study. The study was approved by the institutions' medical institutional review board. All participants provided written informed consent.

Participants

African American women aged ≥ 18 who completed primary treatments within the prior two years for Stage 0-IIIa breast cancer were eligible to participate if they met the following criteria: 1) sedentary (i.e., exercising <60 minutes/week); 2) received medical clearance from their primary physician; 3) no other cancer history (exception for non-melanoma skin cancer); 4) no comorbidities that would preclude exercising safely at home (e.g., symptomatic cardiovascular disease); 5) no plans for major surgery during the 16-weeks; and 6) no major psychiatric illness.

Recruitment

Multiple strategies were used during 7 months of recruitment including direct clinic referrals, study brochures, e-mails through the cancer center's cancer survivorship listserv, as well as the use of mailed study introduction letters to potentially eligible participants identified through the cancer center's cancer registry once passive physician consent was obtained.

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Seventy-one women who met initial study criteria (i.e., Stage 0-IIIa breast cancer, ≥ 18 years of age, and diagnosed within the past 2 years) were identified through the cancer registry. Study introduction letters were mailed to these women, which included study contact information and an opt-out card with a stamped, return envelope to be mailed back within 2 weeks if they wished not to receive a phone call about the study. Follow-up calls began 4 weeks after letters were mailed if opt-out cards were not returned. Several attempts were made to reach women by telephone at different times of the day.

Intervention

The progressive aerobic exercise program was designed based on the previously successful Diabetes Prevention Program (Knowles et al., 2002) with the goal to achieve 2.5 hours of exercise per week (i.e., 150 minutes/week) at the end of the 16-week study. Walking began at a low intensity two days/week and progressed to moderate-intensity four days/week. The progressive resistance training (i.e., strength-training) protocol (see Appendix) followed guidelines from the American College of Sports Medicine (ACSM). Stretching exercises of major muscle groups were also included. Participants were given a heart rate monitor watch for determining exercise training intensity (i.e., heart rate training zones for aerobic training), which gradually increased throughout the program. They were also given three color-coded Therabands of varying strengths for resistance training. Exercise workbooks were provided, which included weekly exercise logs, training plans, and motivational quotes. To enhance cultural acceptability and relevance, illustrations of all resistance exercises and stretches in the workbooks were depicted by photographs of African-American breast cancer survivors.

Participants received instruction on the exercise program during their initial visit to the Integrative Exercise Oncology Laboratory (IEOL) on the university campus. They were required to come into the IEOL for baseline and post-intervention health and fitness testing. After completing all baseline tests, participants received resistance training instruction from a certified exercise trainer who had all women provide a return demonstration of safe practice. During this visit, women received a \$10.00 gas card to help with transportation costs. Parking was free. Culturally-appropriate, individually tailored monthly newsletters were mailed during the 4-month intervention, each addressing an exercise-related topic (i.e., exercise goal-setting, barriers, benefits, and social support). Pictures of African-American women exercising, and in some cases families exercising together, were incorporated into the newsletters. Additionally, inspirational quotes were used where appropriate. Upon study completion, women received another \$10.00 gas card and a \$25.00 check for their time and effort.

Following baseline testing and receipt of exercise instruction, the nurse researcher conducted Motivational Interviewing (MI) sessions with participants to determine exercise goals, facilitators and potential barriers. Initial MI sessions began with opening guiding questions, such as: 1) "What are your top reasons for wanting to exercise?", 2) "What do you think you are able to do at this time?" and 3) "What else have you accomplished that helps you know you can do this?" The nurse researcher also conducted all weekly telephone sessions, incorporating MI strategies as needed. MI techniques help elicit participant's own motivations for engaging and adhering to regular physical exercise and help promote self-efficacy (Rollnick, Miller, & Butler, 2008).

Measures

Feasibility was operationalized by determining the percentage of women enrolled among those who were eligible, the percentage of women who completed the study, the percentage of

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prescribed walking and strength-training sessions completed among women who remained in the study, the percentage of women completing their weekly logs and telephone sessions.

Acceptability of the program was determined through a patient evaluation form.

Analysis

Frequencies (i.e., percentages) of participation from the various recruitment strategies were determined. For retention, the proportion of participants who completed the 4 month intervention and final assessments (e.g., cardiorespiratory function, body composition, strength, fatigue and quality of life assessments) was calculated. Descriptive statistics were conducted to assess attrition rate (i.e., percentage of drop-outs), adherence to weekly exercise goals for both aerobic and strength-training components of the program (i.e., frequencies and percentages along with means and standard deviations), compliance with weekly phone calls (i.e., mean) and completion rate of weekly logs (i.e., percentage). Mean scores were calculated for scaled questions on the participant evaluation form. Analyses were performed with SPSS version 19.0.

RESULTS

Recruitment

Of the 17 study participants, four were referred from clinicians, five self-referred, and eight women from the cancer registry enrolled. Seventy-one potentially eligible women were identified from the cancer registry; 60 were non-reachable (49%), disinterested (15%), or ineligible (27%) (See: Figure 1). Ineligibility was determined either through a medical chart review or through conversations directly with the women. Of 36 women whom we had contact with from the cancer registry, 11 (31%) were both eligible and interested.

Participant Characteristics

Participant's socio-demographic and medical characteristics are described in Table 1. Women were between the ages of 30-69 years (mean 51.6 years). Approximately half were married (54%). All women had at least some college education, 54% worked full-time and 31% had a total annual household income below \$40,000. The average body mass index was 30.2. Most women had at least one co-morbid condition (e.g., hypertension, diabetes mellitus, dyslipidemia, arthritis). All women had surgery and 62% received chemotherapy. Over half were on adjuvant hormonal therapy.

Figure 1. Recruitment and Retention Flowchart.

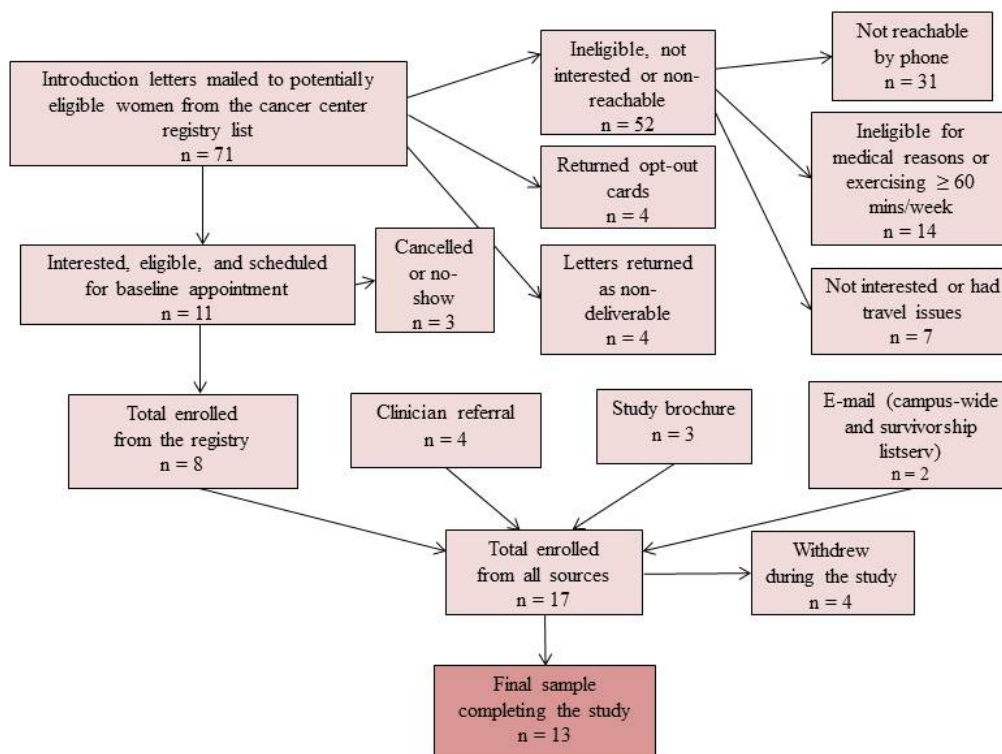


Table 2 shows the weekly adherence for the prescribed minimum walking and resistance training goals. On average, participants had moderately-high adherence (70%) to walking goals across the 16-week intervention. At week one the mean minutes of walking was 66.9 (SD = 56.9) and by week 16, the reported mean was 137.9 minutes (44.3). While weekly walking goals were not always met, the majority of women walked for exercise each week. Average adherence rates for resistance training goals across the 16 weeks were lower (51%). There was a precipitous drop after week 6 when sessions increased to 3 times/week, but over half the women (64%) performed resistance training at least twice/week starting at week 3 when it was recommended to increase from once/week. At week 16, the mean number of sessions/week was 1.8 (SD = 1.3). With regard to the prescribed number of resistance training sets/session (12-15 repetitions/set),

70% of the participants met weekly goals on average. At week 1, 85% of the participants met the weekly goal (i.e., 1 set/session) and 77% met the goal of three sets/session, at 16 weeks.

Most women were compliant with the 15 weekly telephone sessions (M = 14), however some weeks a few women requested e-mail contact versus phone contact due to hectic work and family schedules and/or summer vacations. No calls were scheduled the last week of the study. Ten of the thirteen women (77%) completed their weekly exercise logs, two were partially completed and one participant stated that she lost her log sheets.

All women were able to safely perform the resistance exercises and there were no reports of adverse events related to the exercise intervention. Due to unforeseen medical/health issues with three of the participants, we did extend the study by two-five weeks, which was the time

that they had to suspend exercise. One participant required a breast biopsy during the intervention, which resulted in high anxiety and negatively affected her exercise plan. Subsequently she experienced a prolonged asthmatic episode, which hindered her ability to exercise for five weeks. Another participant fell when moving furniture that resulted in a mild ankle injury and the third developed a minor infection that required rest and antibiotic therapy. Each woman requested to remain in the study and was willing to extend the intervention period to allow them the full 16-week exercise program.

Table 1. *Participant Characteristics (N=13).*

Characteristics	n (%)	Characteristics	n (%)
Age (years), mean (SD)	51.6 (12.9)	Cancer stage	
Marital status		0 (DCIS)	1 (8)
Single	2 (15)	IA	3 (23)
Married	7 (54)	IIA	5 (38)
Divorced/separated	3 (23)	IIB	1 (8)
Widowed	1 (8)	IIIA	3 (23)
Employment status		Bodymass index, mean (SD)	30.2 (5.1)
Full-time	7 (54)	Comorbidities	
Unemployed	3 (23)	Cardiovascular disease	2 (15)
Retired	3 (23)	Hypertension	6 (46)
Education		Diabetes Mellitus	4 (31)
Some college	4 (31)	Dyslipidemia	4 (31)
Associate's/Bachelor's degree	4 (31)	Pulmonary disease	3 (23)
Graduate/Professional degree	5 (38)	Arthritis	3 (23)
Annual household income		Treatment	
< \$20,000	3 (23)	Surgery	13 (100)
\$20,000-\$39,999	1 (8)	Chemotherapy	8 (62)
\$40,000-\$59,999	3 (23)	Radiation therapy	8 (62)
\$60,000-\$79,999	1 (8)	Hormonal therapy	8 (62)
≥\$80,000	5 (38)		

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Table 2. Adherence to Weekly Walking and Resistance Training Exercise Goals.

	Prescribed walking (mins)	n (%) meeting goal	Mean (SD) (mins)	Prescribed RT sessions	n (%) meeting goal	Mean (SD)	Prescribed RT sets per session	n (%) meeting goal	Mean (SD)
Week 1	30	11 (85)	66.9 (56.9)	1	11 (85)	1.6 (1.3)	1	11 (85)	0.9 (0.5)
Week 2	30	12 (92)	62.5 (47.5)	2	9 (69)	1.6 (0.8)	1	11 (85)	1.5 (0.7)
Week 3	60	10 (77)	69.8 (28.8)	2	10 (77)	1.6 (0.8)	2	10 (77)	1.6 (0.8)
Week 4	60	10 (77)	82.7 (49.9)	2	10 (77)	1.8 (0.9)	2	10 (77)	1.6 (0.8)
Week 5	60	11 (85)	78.4 (46.2)	2	9 (69)	1.5 (1.1)	2	9 (69)	1.4 (0.9)
Week 6	60	10 (77)	75.6 (33.1)	2	10 (77)	1.7 (0.9)	2	11 (85)	1.7 (0.8)
Week 7	80	9 (69)	100.2 (40.6)	3	4 (31)	1.5 (1.3)	2	8 (62)	1.3 (0.9)
Week 8	88	9 (69)	103.2 (46.9)	3	7 (54)	2.0 (0.9)	2	9 (69)	1.5 (0.9)
Week 9	100	6 (46)	101.2 (90.7)	3	3 (23)	1.3 (1.3)	2	8 (62)	1.3 (0.9)
Week 10	100	6 (46)	118.4 (63.1)	3	5 (38)	1.9 (1.3)	2	10 (77)	1.5 (0.9)
Week 11	100	7 (54)	115.8 (56.5)	3	6 (46)	2.0 (1.2)	2	9 (69)	1.5 (0.8)
Week 12	100	9 (69)	130.0 (53.9)	3	5 (38)	1.8 (1.4)	2	10 (77)	1.5 (0.8)
Week 13	100	8 (62)	128.8 (59.5)	3	3 (23)	1.6 (1.3)	2	9 (69)	1.5 (0.9)
Week 14	100	7 (54)	109.9 (47.0)	3	3 (23)	1.4 (1.2)	2	9 (69)	1.5 (1.1)
Week 15	120	8 (62)	127.2 (35.5)	3	5 (38)	1.9 (1.3)	3	6 (46)	1.9 (1.3)
Week 16	120	12 (92)	137.9 (44.3)	3	6 (46)	1.8 (1.3)	3	10 (77)	2.0 (1.2)

Acceptability

Results from scaled questions on participant evaluations are reported in Table 3. Additional questions yielding qualitative responses included the following: 1) What was most useful/least useful in helping you meet your exercise goals?; 2) Do you plan to continue exercising regularly (at least 150 minutes/week)? 3) If yes, what type of exercise do you plan on doing?; and 4) What could we do to improve the exercise program? Responses of what was most useful included “Being held accountable, logging exercises, having someone to check in with”, “Weekly telephone calls, which helped boost my morale”, “The encouragement from the instructor, mainly the weekly calls” and “Easy to follow, weekly phone calls”. Responses to least useful were “Having to find the time to record activities”, and “Fitting it into my schedule”. All women indicated that they planned to continue exercising regularly. Additionally, they all reported they would continue walking, but only nine of 13 indicated they would continue resistance training. Comments about program improvement included: “To have a 6-12 month follow-up plan”, “Maybe a little more core exercise”, “Possibly make it longer – 6 months”, and “Incorporate diet component...”.

Table 3. Participant Evaluations.

Evaluation Questions	Mean
<i>How would you rate the exercise program overall?</i> 1 = poor to 5 = excellent	4.7
<i>To what extent was participating in this exercise program worth your time?</i> 1 = not at all to 5 = extremely	4.8
<i>To what extent do you feel more able to exercise regularly as a result of this program?</i> 1 = not all to 5 = extremely	4.6
<i>How helpful was the ... [1 = not at all helpful to 4 = very helpful]</i>	
Baseline physical fitness information	3.8
4-month physical fitness information	3.8
Exercise instruction/demonstration	3.8
Weekly telephone calls	3.8
Exercise workbook	3.8
Monthly newsletters	3.4

DISCUSSION

This is the first published report on a home-based combined aerobic and strength-training exercise pilot intervention specifically for African-American breast cancer survivors. Our findings suggest that it is feasible and safe to deliver a home-based progressive walking and resistance training

program to African-American breast cancer survivors. Retention (76%), average adherence to weekly walking goals (70%), compliance with weekly telephone calls and written exercise logs were all moderately high. While higher adherence for the walking goals would have been desirable, it was comparable to the average adherence rate (69.76%) reported by Pinto et al. (2005) for a 12 week home-based exercise program (primarily walking) of predominantly White breast cancer survivors. Although the average adherence to weekly resistance training exercise goals was only 51%, several of the women were very diligent about completing at least two resistance training sessions each week. The intervention was successful at increasing physical activity levels to achieve the goal of at least 150 minutes of moderate-intensity physical activity/week, which is recommended for cancer survivors. Additionally, the exercise program was rated highly by the participants and all women indicated that they planned on maintaining a regular walking schedule. However, not all women felt they would continue with the resistance training.

While our recruitment rate was lower than those reported from other exercise studies among breast cancer survivors it was not surprising considering the short recruitment phase (i.e., 7 months) and the fact that African-Americans typically have lower enrollment rates than Whites into cancer clinical trials (Banda, St. Germain, McCaskill-Stevens, Ford, & Swain, 2012). Other home-based exercise studies conducted among breast cancer patients had longer recruitment periods and higher reported acceptance rates (i.e., initial uptake during recruitment), but they included primarily White women (Pinto et al., 2005; Matthews et al., 2007; Ligibel et al., 2012). In a recent review by Maddocks et al. (2009) the rate of uptake across 29 breast cancer exercise studies was 51% (35-80%) compared to our 31% rate of interested and eligible women whom were recruited through the cancer registry. However, our recruitment rate was higher than those reported for two exercise-based studies conducted among African-American breast cancer survivors. Stolley et al. (2006) reported a recruitment rate of 23% (interested and eligible) from 100 women that were informed about a weight loss intervention which included both an exercise and dietary component. Wilson et al. (2005) had 10% recruitment from 230 potentially eligible women for their walking intervention, but the recruitment period lasted only 3 months. One factor that has been reported as an issue for recruitment into clinical trials among African-American cancer survivors is that of ineligibility due to comorbidities (Banda et al., 2012). Many women that we screened from the cancer registry had comorbid conditions that made them ineligible and it may have been an issue for some of the women we were never able to reach as well. Frequently reported barriers towards cancer clinical trials among minorities are as follows: mistrust of medical research, fear, lack of education about clinical trials, cost, demographics, transportation, time commitment and family issues (Banda et al., 2012). While we attempted to address transportation and cost issues in our study by offering a free program; along with free exercise bands, a pedometer, gas cards, and a \$25 incentive for completion of the study, there were other barriers that we could not address, such as issues around time and family. For those women we were able to speak directly with, attempts were made to allay any expressed apprehension they had regarding study participation.

In the review by Maddocks et al. (2009), a median exercise intervention completion rate of 90% (82-93%) was reported compared to our 76% completion rate. However, the 90% completion rate included exercise interventions that were both center- and home-based and three-quarters of the studies involved only walking as the form of exercise. They also included breast cancer patients in treatment and post-treatment. Retention rates for the weight loss intervention and walking intervention among African-American breast cancer survivors were 87% and 92%, respectively, both of which were higher than our study completion rate (Stolley, Sharp, Oh, & Schiffer, 2009; Wilson, Porter, Parker, & Kilpatrick, 2005). Retention (22 of 24 women) in the study by Wilson et al. (2005)

may have been higher due the shorter duration of the intervention (i.e., 8 weeks) and the incorporation of a weekly group session for education and motivational support, which were held in the community. While the study by Stolley and colleagues (2006) was longer (i.e., 6 months) considering it was a weight loss intervention, retention was high (20 of 23 women). The delivery of this intervention was also group-based and offered a variety of physical activities, such as African dance, salsa, yoga; as well as traditional aerobics and some strength-training. Promotion of group support was emphasized, which likely contributed to the high retention rate.

Adherence rates for the walking component of the program ranged from 77-92% in the first 6 weeks of the study, but dropped off to below 70% from weeks 7-15. However, the rate increased to 92% the last week of study. This increase in activity during week 16 may have been related to the participants wearing an accelerometer, which was used only during weeks 1, 8, and 16. Interestingly, week 8 walking adherence goals were only 69% despite the use of the activity monitor. The decline in adherence after week 6 corresponds to an increase in the number of walking days prescribed (i.e., from 3 days to 4 days for 20 minutes). Women may have found it more difficult to find the time to add this extra day of exercise. This pattern is similar to that found by Pinto et al. (2005) where adherence dropped off in the middle of the 12-week intervention, but adherence remained low through the 12 weeks. While average adherence to the weekly walking goals was 70%, it was more challenging for women to achieve weekly goals for resistance training (51%). Adherence was highest in week 1 (85%) and was only 46% at week 16. As with adherence to walking goals, resistance training goals dropped substantially after week 6 when weekly sessions increased from 2 to 3. It is important to note that even though women may not have had 100% adherence each week with the duration and frequency of their aerobic activity, they did engage in a portion of the planned walking. Additionally, most women performed some resistance training each week and 64%, on average, performed these exercises at least twice weekly, which is the minimum recommendation for cancer survivors. A few women were very reluctant to do the resistance exercises despite our conversations about the benefits of strength-training. Some complained they were “boring” even though they understood the health value. It appears as though other strategies are needed to help motivate some women to engage in regular resistance training. A stronger support system may be needed, such as having participants partner together to offer each other encouragement over the phone or via e-mail.

Limitations include the small sample size and lack of a control group. However, the intent of this pilot study was to determine feasibility of delivering a home-based exercise program prior to the implementation of a controlled randomized clinical trial.

Recruitment and retention of minority cancer survivors to cancer-related studies has been challenging, especially among African-Americans (Banda et al., 2012). Ashing-Giwa et al. (2004) reported that African-American breast cancer survivors had the lowest enrollment and participation rates to a multiethnic study of breast cancer survivors. Considering the need to recruit a larger number of African-American breast cancer survivors for a randomized clinical exercise trial, it would be necessary to more fully address potential challenges to recruitment and study participation. Strategies that may help improve recruitment include allowing for a longer recruitment period and extending recruitment to additional sites, such as other local cancer centers and community breast cancer organizations, especially local Sister’s Networks (African-American breast cancer survivor’s support groups). Another option might be to adjust the inclusion criteria to include sedentary women up to five years after completion of their primary treatments. Other strategies to increase enrollment, as well as adherence to the exercise protocol, might involve hiring and training of physically active African-American breast cancer survivors to assist with recruitment and to serve as culturally-sensitive role models who can encourage women to overcome exercise barriers. It is possible that the

resistance training goals were set too high in the current study. A more reasonable expectation might be that women perform at least one set of 8-10 repetitions for each major muscle group twice weekly and once these exercises become too easy they could advance to two sets twice weekly for the remainder of the 16 weeks. One set of resistance training exercises, 8-10 repetitions for each major muscle group, done two times a week is the minimum recommendation for strength training from the U.S. Department of Health & Human Services (U.S. Department of Health & Human Services, 2008). These guidelines have been endorsed by the ACS and the ACSM for cancer survivors as well (Rock et al., 2012; Schmitz et al., 2010). Due to the fact that several women complained about the resistance bands and had difficulty achieving their weekly resistance training goals, future research may need to factor in the use of light-weight dumbbells for women who may find these more appealing than the bands for upper body exercises. However, this would involve a higher study cost because they are more expensive than resistance bands. Another possibility is including a family member or friend in the exercise training for social support and motivation. Additionally, providing more information and placing higher emphasis on the multitude of benefits derived from engagement in regular resistance training may be helpful to improve adherence rates.

CONCLUSION

Results from the study support the feasibility and safety of delivering a motivational home-based exercise intervention to African-American breast cancer survivors; although study modifications to improve recruitment and adherence in future mixed modality exercise interventions are recommended. This study addresses gaps in the exercise oncology literature since very few exercise studies have targeted ethnic minority breast cancer survivors and most studies focused only on aerobic exercise. African- American breast cancer survivors are often more sedentary and have worse clinical outcomes than women from other racial/ethnic groups. Considering regular physical activity has been shown to have a myriad of benefits including improvements in cardiorespiratory function, strength, fatigue, body composition, quality of life, and possibly decreasing recurrence and increasing survival, it is prudent to develop exercise programs that are effective, practical and acceptable to ethnic minority women. Additionally, offering programs that are primarily home-based are more cost-effective to deliver and can extend the reach well beyond a center-based exercise approach.

Appendix 1: Recommended Exercise Plan for Progressive Walking and Resistance Training

Week	Walking sessions per week	Walking minutes per week	RT sessions per week	RT sets per session	Target HR reserve (%)
1	2	15	1	1	40-50
2	2	15	1	2	40-50
3-6	3	20	2	2	50-60
7	4	20	2	3	50-60
8	4	22	2	3	50-60
9-14	4	25	2	3	55-65
15-16	4	30	3	3	55-65

Note. RT = resistance training; HR = heart rate.

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