

# Changes in Physical Activity and Psychological Factors Among Breast Cancer Survivors Enrolled in a YMCA Program

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## Abstract

**Background:** Given the impact of physical activity on wellness among cancer survivors, we tested the feasibility, acceptability, and potential effectiveness of a coach-assisted intervention at metro-Atlanta YMCAs targeting physical activity (PA) among breast cancer survivors and examined psychosocial correlates of change in PA.

**Methods:** Fifty women diagnosed with breast cancer within two years at the Winship Cancer Institute were provided a 24-week membership to a metro-Atlanta YMCA and the "Coach Approach". Assessments (Godin for PA, Multidimensional Fatigue Inventory, Patient Health Questionnaire–9 item) were conducted at baseline and week 24.

**Results:** Participants were on average 54.38 (SD=10.67) years old; 50.0% were Black. Overall, 82.0% attended a YMCA; 56.0% met with a coach. Those who attended a YMCA reported favorable process outcomes. PA increased from baseline to week 24 among all participants ( $p<.001$ ); those who met a coach had greater increases in PA ( $p=.026$ ). Increased PA was associated with increased use of exercise self-management strategies ( $p=.046$ ), reduced fatigue ( $p=.015$ ), and reduced depressive symptoms ( $p=.020$ ). Regression examining predictors of increased PA indicated that the only predictor was reduced fatigue ( $p=.012$ ).

**Conclusions:** Participants reported increases in PA over time, with those meeting with a coach reporting greater increases. Increases in PA were associated with improvements in exercise self-management strategy use, fatigue, and depressive symptoms.

## INTRODUCTION

In the last two decades, it has become clear that physical activity (PA) plays a vital role in cancer prevention and control (Courneya & Friedenreich, 2001; World Cancer Research Fund/American Institute for Cancer Research, 2007). Courneya and Friedenreich (2007) proposed a Physical Activity and Cancer Control Framework that highlights specific phases along the cancer continuum where exercise has a logical role and identifies two distinct periods before diagnosis and four periods after diagnosis with objectives for exercise programs in each phase. There is a growing body of evidence suggesting that exercise decreases the risk of many of cancers (Physical Activities Guidelines Advisory Committee, 2008; World Cancer Research Fund/American Institute for Cancer Research, 2007), and

data to support the premise that exercise may extend survival for breast and colon cancer survivors are emerging (Holmes, Chen, Kroenke, & Colditz, 2005; Irwin, Smith, McTiernan, & et al, 2008; Meyerhardt, Giovannucci, Holmes, & et al, 2006; Meyerhardt, Heseltine, Niedzwiecki, & et al, 2006). In addition, PA before and after breast cancer diagnosis has been shown to be associated with a decreased risk of recurrence or death from breast cancer in observational studies (Friedenreich, Gregory, Kopciuk, Mackey, & Courneya, 2009; Holmes et al., 2005; Irwin et al., 2008).

Recent guidelines for PA among cancer survivors were developed against the backdrop of existing recommendations for exercise from the American College of Sports Medicine (ACSM) and the American Heart Association (AHA)

(Haskell, Lee, Pate, & et al, 2007), the American Cancer Society (ACS) (Doyle, Kushi, Byers, & et al, 2006), and the recent 2008 US Department of Health and Human Services (USDHHS) Physical Activity Guidelines for Americans (Physical Activities Guidelines Advisory Committee, 2008). The recent USDHHS guidelines indicate that, when individuals with chronic conditions such as cancer are unable to meet the stated recommendation on the basis of their health status, they "should be as physically active as their abilities and conditions allow." An explicit recommendation was made to "avoid inactivity," and it was clearly stated that "Some physical activity is better than none." The key USDHHS guideline for aerobic activity focused on an overall volume of weekly activity of 150 min of moderate-intensity exercise or 75 min of vigorous-intensity exercise or an equivalent combination. Guidance for strength training is to perform two to three weekly sessions that include exercises for major muscle groups (Haskell et al., 2007; Physical Activities Guidelines Advisory Committee, 2008). Flexibility guidelines are to stretch major muscle groups and tendons on days that other exercises are performed (Haskell et al., 2007; Nelson, Rejeski, Blair, & et al, 2007). Given that the recent guidelines accommodate chronic conditions and the health status of the individual (Doyle et al., 2006; Nelson et al., 2007; Physical Activities Guidelines Advisory Committee, 2008), there was consensus that the exercise recommendations noted above are generally appropriate for cancer survivors.

One review (Schmitz et al., 2010) of 32 randomized controlled trials (RCTs) assessed the safety and efficacy of exercise training in breast cancer survivors who have completed surgery, chemotherapy, and radiation therapy. While not universally documented, research has indicated that exercise training resulted in greater aerobic capacity, muscle strength, flexibility, and energy level as well as improved body size and composition (Schmitz et al., 2010). Notably, there was also evidence of reduced fatigue (Schmitz et al., 2010). In addition, there was some support for reduced depression and increased quality of life (Schmitz et al., 2010).

Moreover, this research concluded that exercise was safe after treatment. The adverse events reported in the studies reviewed were rare, mild, and expected on the basis of the activity prescribed (e.g., plantar fasciitis from walking, other musculoskeletal injuries) (Schmitz et al., 2010). One

particular set of adverse events worth noting is that 25% of participants in a home-based intervention for shoulder rehabilitation in the 2 weeks after breast cancer surgery had to discontinue the exercises because of symptoms or swelling (Kilgour & Jones, 2008). The estimated prevalence of long-term arm and shoulder morbidity is 35%-58% in breast cancer survivors (Lauridsen, Overgaard, Overgaard, Hessov, & Christiansen, 2008; Nesvold, Dahl, Lokkevik, Marit Mengshoel, & Fossa, 2008). Thus, exercise programs may need to be adapted for the individual survivor on the basis of their health status, treatments received, and anticipated disease trajectory.

Cancer diagnosis and treatment affect numerous body systems that are required for and affected by exercise training, including the neurologic, musculoskeletal, immune, endocrine, metabolic, cardiopulmonary, and gastrointestinal systems. Cancer survivors may not know the level of specificity required for a fitness professional to discern the expected effects of cancer on these body systems. Multiple efforts are underway to increase the capacity of fitness professionals to serve the unique needs of cancer survivors, including the newly released ACSM Cancer Exercise Trainer certification, SM a set of webinars intended to prepare fitness professionals for the certification examination, a book to help study for the certification examination (expected in 2010), and the ACSM guidelines. Multiple training programs already exist to assist fitness professionals with deepening their knowledge of the effects of cancer diagnosis and treatment on both the tolerance of and the need for exercise training.

The Coach Approach: An Exercise Support Process® is a standardized treatment intended to induce a habit of regular PA. It is based on social cognitive theory (Bandura, 1986; Pinto, Frierson, Rabin, Trunzo, & Marcus, 2005), which posits a triadic, reciprocal relationship between person, environment, and behavior and suggests that individuals receive reinforcement by connecting behaviors such as PA to valued outcomes (e.g., perception of a more attractive body; improved mood). The Coach Approach is delivered via six monthly meetings between a new exerciser and a trained wellness specialist, supported by a computer program. The Coach Approach protocol instructs participants in an array of self-management and self-regulatory techniques (e.g., cognitive restructuring, behavioral contracting). Improving self-regulation skills increases self-efficacy in overcoming exercise barriers and improve adherence to exercise

(Umstadd, Wilcox, Saunders, Watkins, & Dowda, 2008). In addition, goal-setting and progress feedback methods are used in Coach Approach to communicate and display improvements in order to increase feelings of competence and expectations of further improvements in PA. In general, the Coach Approach focuses on increasing feelings of mastery and competence at maintaining a regimen of PA over measured physiological changes. Additionally, PA regimens are adjusted to induce favorable post-exercise feelings (Annesi, 2005), leading to greater chronic mood improvements than is typical when initiating an exercise program (Annesi & Westcott, 2004). The Coach Approach has been tested in six trials in the United States, United Kingdom, Canada, and Italy involving 53 YMCA and medically-based wellness facilities, with results indicating significant reductions in dropout from newly established exercise regimens (from 40-50%) and increased attendance of exercise sessions (averaging 52%) compared to control conditions (Annesi & Unruh, 2007; Annesi, Unruh, Marti, Gorjala, & Tennant, 2011).

Little research has examined the promotion of community-based approaches to increase PA among cancer survivors or the psychosocial factors predicating changes in PA. Moreover, the Coach Approach has not been extended to address breast cancer survivors or tested in terms of its promise in promoting PA in this group. Thus, the current study aimed to: 1) test the feasibility, acceptability, and potential effectiveness of a Coach-assisted, community-based exercise intervention at the metro-Atlanta YMCA targeting PA among breast cancer survivors; and 2) examine psychosocial correlates of change in PA from baseline to week 24 among breast cancer survivors. Specifically, we used a one-arm within subjects research design to examine differences in baseline (week 0) to end-of-treatment (week 24) exercise and related psychosocial factors among 50 breast cancer survivors recently completing treatment enrolled in a “Coach Approach” program and given a free six-month membership to the YMCA.

## **METHODS**

### **Participants & Procedures**

The current study was approved by the Emory University Institutional Review Board. Participants were recruited through Winship Cancer Institute through medical record review, physician referral, and staff presence in the clinics. Inclusion criteria were: (1) 30-75 years old, (2) speak English, (3) 2 weeks to 2 years post treatment, with the

exception of hormone therapy; (4) must not be diagnosed with metastatic bone disease; and (5) able to provide their own transportation. Recruiting recently diagnosed patients was intended to capitalize on the window of opportunity that likely coincides with recent diagnosis (Cooley et al., 2009; Walker et al., 2006). Eligible participants were informed about the nature of the study, consented, assigned a study ID number, and administered a baseline pen-and-paper assessment either in-person during clinic visits or via mail. They were provided a free six-month membership to the metro-Atlanta YMCA program and were able to select the location of the YMCA they preferred, and were connected via email and other contact information with a Coach from the “Coach Approach” program. The referral of each participant to the YMCA was done through the Coach via an email. Patients and coaches were directed to make a “Coach Approach consultation” prior to beginning any work-out program. However, meeting with the Coach was not mandatory. No one offered the program (and thus, enrollment in the study) declined participation.

### **Intervention**

Coaches used the exercise-counseling protocol entitled “The Coach Approach” at the YMCA. Coaches were YMCA employees who undergo training from the YMCA using a standardized behavioral curriculum and receive annual retraining. Those offering services to participants were also trained to address breast cancer survivors. Specifically, a nurse practitioner (JG) conducted an in-person training highlighting the newly released ACSM guidelines and adopting components from the Cancer Exercise Trainer certificationSM program, including a set of webinars intended to prepare fitness professionals for the certification examination and a book to help study for the certification examination. The general goal of the training was to assist the Coaches with deepening their knowledge of the effects of cancer diagnosis and treatment on both the tolerance of and the need for exercise training.

Participants were screened for eligibility of the Coach Approach program. If they reported that that worked out at least 2 to 3 days per week and have done that consistently for at least 6 months, they were not eligible to meet with a Coach. Participants eligible for the Coach Approach were provided the program at a YMCA in the metro-Atlanta area, which included an initial visit with the Coach and monthly meetings with the Coach. Those that met with a Coach were prescribed three exercise sessions per week over the 24 week

period including aerobic and resistance training based on national recommendations and the participants capacity. Visits were recorded electronically through the YMCA computer system. Whether participants were eligible for the Coach Approach was not recorded by YMCA records.

### **Measures**

Participants were administered measures at baseline (week 0) and end-of-treatment (week 24) either in person during regularly scheduled clinic visits or via mail. Participants were provided a \$30 gift card per assessment. Completed exercise sessions were recorded electronically through the YMCA computer system. Below we outline our outcome measures and other factors of interest.

*Exercise Outcomes.* We administered the Godin Leisure-Time Exercise Questionnaire (Godin & Shephard, 1985), which was developed to be reliable, valid, and easy to complete quickly without a need for detailed review and can be used to monitor the impact of health and physical fitness promotion programs in the community. It assesses mild, moderate, and vigorous activity for at least 15 minutes over the past 7 days. It has demonstrated reliability and validity.(Godin & Shephard, 1985) In order to score the Godin, the calculation for the overall score is  $(9 \times \text{Strenuous}) + (5 \times \text{Moderate}) + (3 \times \text{Light})$  (Godin & Shephard, 1985). We also assessed strengths training over the past 7 days.

*Process Outcomes.* At follow-up, we assessed satisfaction with, utilization of, and perceived importance of intervention components (see Table 2 for list of assessments).

*Sociodemographics.* We assessed age, race/ethnicity, education level, employment status, monthly income, and marital status.

*Cancer-related Factors.* We assessed time since treatment completion and whether the treatment included chemotherapy, radiation therapy, and/or surgery.

*Exercise Self-Efficacy.* Participants completed the Exercise Self-Efficacy Scale (Resnick & Jenkins, 2000), which is an 9-item scale assessing one's self-efficacy to engage in exercise in the face of several barriers (e.g., when the weather was bothering you, when you felt tired, when you did not enjoy it). This scale has demonstrated reliability and validity (Resnick & Jenkins, 2000). Cronbach's alpha in the current study was 0.96.

*Exercise Self-Management Strategies.* Participants were asked to complete a 10-item scale assessing the use of cognitive and behavioral self-management strategies (e.g., self-monitoring, positive self-talk) to increase physical activity, which has been previously developed and tested for validity (Saelens, Sallis, Calfas, Sarkin, & Caparosa, 2000). Cronbach's alpha in the current study was 0.90.

*Fatigue.* Participants completed the Multidimensional Fatigue Inventory,(Smets, Garssen, Bonke, & De Haes, 1995) which is a 20-item self-report instrument designed to measure following dimensions of fatigue: general fatigue, physical fatigue, mental fatigue, reduced motivation, and reduced activity. These five factors were supported in factor analyses. Construct and convergent validity were also documented (Smets et al., 1995). Cronbach's alpha in the current study was 0.83, with subscale alphas ranging from 0.77 to 0.90.

*Depressive Symptoms.* Participants completed the Patient Health Questionnaire – 9 item (Kroenke & Spitzer, 2002), which is a 9-item assessment of depressive symptoms (e.g., feeling depressed or blue, little interest or pleasure). Each of the items is scored 0 to 3, providing a 0 to 27 severity score. Cronbach's alpha in the current study was 0.81.

*Quality of Life.* Quality of life was assessed using the Functional Assessment of Cancer Therapy – General (Cella et al., 1993), which is a 28-item scale assessing reactions to different items in terms of how they apply to the individual on a scale of 0 = "Not at all" to 4 = "Very much." It yields a total score and subscale scores for physical, functional, social, and emotional well-being. Coefficients of reliability and validity have been shown to be uniformly high. The scale's ability to discriminate patients on the basis of stage of disease, performance status rating, and hospitalization status supports its sensitivity. It has also demonstrated sensitivity to change over time. Finally, the validity of measuring separate areas, or dimensions, of quality of life was supported by the differential responsiveness of subscales when applied to groups known to differ along the dimensions of physical, social/family, emotional, and functional well-being. Cronbach's alpha in the current study was 0.81, 0.83, 0.40, and 0.77, respectively.

### **Data Analysis**

We conducted descriptive statistical analyses to describe the sample and process outcomes. We then conducted repeated measures multiple regression to examine differences from

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pre- to post-test in measures of physical activities and psychosocial outcomes. We also examined psychosocial predictors of physical activity change from pre- to post-test, specifically examining baseline psychosocial measures and change scores. Finally, we conducted a multivariate regression examining predictors of increased physical activity, including appropriate covariates and psychosocial measures.

## RESULTS

Table 1 displays participant characteristics. Participants were an average of 54.38 (SD=10.67) years old, 50.0% were Black, 58.0% had ≥bachelor’s degree, 50.0% were employed full-time, and 59.2% were married. They had completed treatment an average of 23.80 (SD=32.04) weeks prior to enrollment, and the majority had chemotherapy (63.3%), radiation therapy (98.0%), and surgery (86.0%).

**Table 1**

Baseline participant sociodemographic and cancer treatment characteristics

Characteristic	M (SD) or N (%)
<i>Sociodemographic Factors</i>	
Age (SD)	54.38 (10.67)
Race (%)	
White	25 (50.0)
Black	25 (50.0)
Other	0 (0.0)
Education (%)	
≤High school diploma or GED	6 (12.0)
Some college	15 (30.0)
College graduate	13 (26.0)
Advanced degree	16 (32.0)
Employment status (%)	
Employed full-time	25 (50.0)
Employed part-time	6 (12.0)
Unemployed	5 (10.0)
Other	14 (28.0)
Monthly income (%)	
≤\$2399	13 (28.3)
\$2400 to \$4199	13 (28.2)
≥\$4200	20 (43.5)
Marital status (%)	
Married/living with partner	29 (59.2)
Divorced/separated	13 (26.5)
Never been married	6 (12.2)
Widowed	1 (2.0)
<i>Cancer Treatment Factors</i>	
Time since completed treatment, weeks (SD)	23.80 (32.04)
Treatment included chemotherapy (%)	31 (63.3)
Treatment included radiation therapy (%)	49 (98.0)
Treatment included surgery (%)	43 (86.0)

Table 2 displays process outcomes. Overall, 56.0% had a record of meeting with a Coach, with an average of 3.14 (SD=1.56) meetings among those who ever met with a Coach. Despite the YMCA not having a record of which participants did not have an exercise schedule at baseline (and thus, were ineligible to meet with a Coach), we did examine the PA of those that did not meet with a Coach at baseline per the Godin. We found that 13 of the 22 that did not meet with a Coach reportedly had exercised at least two

times per week. Thus, 9 participants (18.0%) seem to have been eligible but did not meet with a Coach. Interestingly, however, 24 of the 28 participants that did meet with a Coach had also exercised at least two times per week at baseline. We examined average baseline Godin scores among those that met with a Coach versus did not and found that those that did not meet with a Coach had significantly higher baseline PA (M=11.27, SD=12.27 vs. M=21.98, SD=12.27, respectively, p=.029), indicating that a proportion of those who did not meet with a Coach were likely already engaged in a routine PA regimen. In addition, 82.0% of all participants had a record of attending the YMCA for an exercise session with an average of 27.59 (SD=25.77) exercise sessions recorded by the YMCA system among these participants. Those who attended the YMCA reported favorable process outcomes (e.g., 97.2% reported they would recommend the program to other survivors).

**Table 2**

Process outcome assessments

Characteristic	M (SD) or N (%)
<i>YMCA attendance (per YMCA records)</i>	
Record of YMCA Coaching session or attendance (%)	42 (84.0)
Record of YMCA Coaching session (%)	28 (56.0)
Record of YMCA attendance (%)	41 (82.0)
Number of Coaching sessions (SD) <sup>a</sup>	3.14 (1.56)
Number of exercise sessions attended (SD) <sup>b</sup>	27.59 (25.77)
<i>Self-report process outcomes<sup>c</sup></i>	
Helpful to have access to YMCA (SD) <sup>d</sup>	4.53 (0.88)
Helpful to have a Coach at YMCA (SD) <sup>d</sup>	4.50 (0.91)
Difficult to keep your schedule of attending YMCA (SD) <sup>d</sup>	2.60 (1.36)
Difficult to keep your Coaching sessions (SD) <sup>d</sup>	2.22 (1.25)
Having access to YMCA increased motivation to exercise (%)	31 (86.1)
Having access to Coach increased motivation to exercise (%)	31 (86.1)
Having access to YMCA increased confidence to exercise (%) <sup>*</sup>	32 (91.4)
Having access to Coach increased confidence to exercise (%) <sup>*</sup>	31 (86.1)
Satisfaction with YMCA program (SD) <sup>d</sup>	4.47 (0.74)
Satisfaction with Coach at YMCA (SD) <sup>d</sup>	4.56 (0.77)
How knowledgeable was Coach about your needs (SD) <sup>d</sup>	4.36 (0.83)
Influence of overall program on motivation to exercise (SD) <sup>d</sup>	4.42 (0.97)
Influence of overall program on confidence to exercise (SD) <sup>d</sup>	4.36 (0.93)
Would recommend to the program to other cancer survivors (%) <sup>*</sup>	35 (97.2)

<sup>a</sup> Among the 28 who met with a Coach

<sup>b</sup> Among the 41 that had a record of attending the YMCA

<sup>c</sup> Among participants that ever attended the YMCA or had a Coaching session per YMCA records and completed week 24 follow-up (n=36)

<sup>d</sup> On a scale of 1 = not at all to 5 = very

<sup>\*</sup> Responded yes

Table 3 shows changes in mild, moderate, and strenuous physical activity and strengths training from baseline to week 24, indicating significant increases in all of these measures across all participants. Overall, there were significant increases in PA per the Godin from baseline to week 24 among all participants (M=15.26, SD=16.29 vs. M=30.81, SD=20.80, p<.001). While there were no differences in Godin scores among those with a record of YMCA attendance versus not (M=15.58, SD=20.52 vs. M=15.25, SD=5.33, respectively, p=.919), those with a record of meeting with a Coach versus not had significantly greater increases in their physical activity per the Godin

(M=7.68, SD=20.26 vs. M=21.37, SD=17.08, respectively,  $p=.026$ ). As mentioned above, baseline Godin scores differed between those that met with a Coach versus those that did not; however, there were no significant differences between those that met with a Coach and those that did not at follow-up (M=31.87, SD=20.19 vs. M=29.38, SD=22.14, respectively,  $p=.718$ ).

**Table 3**

Changes in physical activity from baseline to week 24 follow-up assessment

Characteristic	Baseline	Week 24 FU	p-value
<i>Average 7-Day PA</i>			
Number of 15-minute sessions, strenuous (SD)	0.41 (0.93)	1.25 (1.81)	.004
Number of 15-minute sessions, moderate (SD)	1.50 (2.01)	2.60 (1.65)	.003
Number of 15-minute sessions, mild (SD)	1.35 (1.69)	2.19 (1.75)	.038
Godin score (SD)	15.26 (16.29)	30.81 (20.80)	<.001
Strengths training (SD)	0.40 (1.15)	1.55 (1.75)	<.001
<i>Psychosocial Factors</i>			
Exercise Self-Efficacy (SD)	6.81 (2.50)	6.84 (2.43)	.936
Exercise Self-Management Strategies (SD)	26.81 (7.80)	32.16 (5.45)	<.001
MFI-General (SD)	12.23 (3.68)	10.60 (3.87)	.015
PHQ-9 (SD)	5.59 (4.45)	3.18 (2.92)	.001
FACT-Physical (SD)	201.21 (33.83)	209.10 (26.69)	.082
FACT-Social/Family (SD)	156.15 (32.61)	153.10 (33.85)	.558
FACT-Emotional (SD)	149.69 (22.15)	151.54 (16.84)	.640
FACT-Functional (SD)	145.03 (35.76)	158.31 (32.62)	.009
FACT-Total (SD)	654.50 (98.43)	674.50 (80.10)	.145

Notes: 40 completed the week 24 follow-up (80% retention).

In terms of psychosocial measures, exercise self-efficacy did not change significantly, while the reported use of exercise self-management strategies increased from pre- to post-test among all participants ( $p<.001$ ). In addition, fatigue per MFI scores decreased from pre- to post-test ( $p=.015$ ); examination of subscale scores revealed that the only subscale that changed from pre- to post-test was the reduced activity subscale, which reduced from 9.35 (SD=3.93) to 7.78 (SD=3.83,  $p=.002$ ). Depressive symptoms also decreased from pre- to post-test ( $p=.001$ ). In addition, the only subscale score of the FACT that improved from pre- to post-test was the functional subscale ( $p=.009$ ).

No sociodemographic, cancer-related, or baseline psychosocial measures predicted change in PA, meeting with a Coach, or attending the YMCA. However, change in PA was associated with change in change in exercise self-management strategy use ( $r=.331$ ,  $p=.046$ ), change in MFI scores ( $r=-.383$ ,  $p=.015$ ), and change in PHQ-9 scores ( $r=-.373$ ,  $p=.020$ ). In the multivariate regression examining predictors of change in PA per the Godin, we found that the only significant predictor was change in MFI scores ( $p=.012$ ).

## DISCUSSION

The current study aimed examined the feasibility, acceptability, and potential effectiveness of a coach-assisted,

community-based exercise intervention at the metro-Atlanta YMCA targeting breast cancer survivors and psychosocial correlates of change in PA from baseline to week 24 among breast cancer survivors. Specifically, we used a one-arm within subjects research design to examine differences in baseline (week 0) to end-of-treatment (week 24) exercise and related psychosocial factors among 50 breast cancer survivors recently completing treatment enrolled in a “Coach Approach” program and given a free six-month membership to the YMCA.

The most notable finding was that exercise increased from baseline to follow-up among all participants. In addition, those who met with a Coach demonstrated greater increases in PA than those that did not. These findings are in line with prior research documenting that the Coach Approach led to increased attendance of exercise sessions (Annesi & Unruh, 2007; Annesi et al., 2011) and may reflect that those who met with a Coach had more significant progress to make in increasing PA than those who did not meet with a Coach. It is also important to note that those who met with a Coach and those that did not demonstrated no significant differences in PA at follow-up despite those that did not meet with a Coach reporting more PA at baseline. Thus, the Coach Approach may be beneficial for individuals that are not physically active in improving their level of PA.

Moreover, individuals increased in their use of exercise self-management strategies from baseline to follow-up but not exercise self-efficacy. In line with prior research (Schmitz et al., 2010), some psychosocial measures improved from baseline to follow-up, specifically fatigue, depressive symptoms, and functional quality of life. The dimension of fatigue most notably affected was the reduced activity subscale of the MFI, which reflects that, despite feeling fatigue, participants are engaging in activity. Interestingly, there were no sociodemographic or baseline psychosocial predictors of change in PA from baseline to follow-up. Increase in PA was found to be associated only with reductions in fatigue in the regression, underscoring the relationship between PA and fatigue reduction among cancer survivors (Puetz & Herring, 2012; Schmitz et al., 2010).

Interestingly, meeting with a Coach was not associated with changes in any psychosocial factors, contradicting the theoretical foundation suggesting that it should increase self-efficacy in overcoming exercise barriers and use of self-management strategies (Umstadtd et al., 2008) as well as lead to greater mood improvements (Annesi & Westcott, 2004). It

is important to note, however, that all participants reported increases in PA, as well as increased use of self-management strategies, reduced fatigue and depressive symptoms, and increased functional quality of life. Thus, it is possible that this ubiquitous increase made it difficult to document the specific impact of the Coach Approach. Among those who did meet with a Coach, they provided evidence that the program was helpful and satisfactory.

The current study has important implications for research and practice. Further research is needed to examine barriers to engaging in the Coach Approach, given that roughly one-fifth of participants who had access did not capitalize on this opportunity. Moreover, a two-arm study is necessary to be able to disentangle the true effects of the Coach Approach in a randomized controlled trial. Finally, hospitals and cancer centers might benefit from considering community-based programs such as the YMCA that could be leveraged toward providing cancer survivors with convenient and effective resources for promoting PA. Moreover, healthcare providers, particularly those working with cancer survivors, must monitor and promote PA as part of routine clinical practice.

#### *Limitations*

This study has some limitations. First, the lack of systematic recording of how the Coach Approach was delivered and to whom is a significant limitation. Second, this sample generally reflects the characteristics of breast cancer survivor populations from the medical setting from which they were recruited; however, the high education attainment and 50% Black participation may not be generalizable to other cancer survivor populations. Third, we cannot provide data regarding those who declined participation versus those that consented to participate, as our clinical recruitment strategy did not comprehensively track or assess participation rates or reasons for not participating. Also, it is possible that other important factors may have impacted PA among this sample but were not explored in this study. Future research should examine the predictive validity of this finding in a randomized clinical trial and/or longitudinal studies examining smoking initiation and potentially smoking cessation.

#### *Conclusions*

Current findings suggest the potential utility of the Coach Approach program as a resource for increasing PA among breast cancer survivors. Furthermore, this research suggests

a need to examine barriers to engaging in the Coach Approach, given that nearly half of participants who had access did not capitalize on this opportunity. Finally, these findings underscore the importance of PA in reducing fatigue and depressive symptoms and increasing some aspects of quality of life among cancer survivors, specifically those surviving breast cancer.

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