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Motivations Associated With Physical Activity in Young Breast Cancer Survivors

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Abstract

Physical activity is associated with positive health outcomes in breast cancer survivors. However, factors that promote or discourage physical activity in this population are not fully understood. This cross-sectional study was designed to examine approach and avoidance motivations, barriers for exercise, and their association with physical activity in breast cancer survivors younger than 50 years old at time of diagnosis. Current physical activity levels, approach and avoidance motivations, and barriers to exercise were assessed through self-report questionnaires in young breast cancer survivors ($N = 156$). Results indicated that barriers to exercise were negatively associated with physical activity ($p < .01$) while approach motivations were positively associated with physical activity ($p < .01$) and were most relevant in the context of low perceived barriers ($p < .05$). Avoidance motivations were not associated with physical activity ($p = .91$).

Keywords

Breast Cancer; Physical Activity; Motivations; Barriers

Many breast cancer survivors in industrialized countries fall below exercise guidelines (Szymlek-Gay, Richards, & Egan, 2011; Smith & Chagpar, 2010) despite growing evidence linking regular physical activity with cancer-specific and overall survival (Ogunleye &

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Holmes, 2009; Carmichael, Daley, Rea, & Bowden, 2010) and improved quality of life (Park & Gaffey, 2007; Paxton et al., 2012). This study set out to examine two determinants of physical activity, *motivations and barriers*, in women diagnosed with breast cancer before the age of fifty who report lower quality of life and higher levels of fatigue than older women (Ganz, Greendale, Petersen, Kahn, & Bower, 2003; Howard-Anderson, Ganz, Bower, & Stanton, 2012) and are also at risk for greater weight gain (Denmark-Wahnefried et al., 2001; Makari-Judson, Judson, & Mertens, 2007).

Approach motivations (Elliot, 2006), such as exercising because it feels good, are associated with exercise in healthy adults (Ingledew, Markland, & Medley, 1998; Lochbaum, Podlog, Lichtfield, Surles, & Hilliard, 2013). Only a few studies have examined this association among cancer populations (Milne, Wallman, Guilfoyle, Gordon, & Courneya, 2008; Rogers et al., 2008). *Avoidance motivations* (Elliot, 2006) are aimed at moving away from an unpleasant state, such as a cancer recurrence, and are effective in predicting “one-shot” health behaviors such as getting vaccinated (Gerend & Sheperd, 2012; Strecher, Champion, & Rosenstock, 1997). Yet, avoidance motivations were not associated with regular exercise in a sample of healthy young women (Schmiege, Aiken, Sander, & Gerend, 2007), but have not yet been examined in breast cancer survivors for whom a cancer recurrence poses a significant health threat. Motivations for exercise are distinct from other commonly examined health behavior theory constructs. For instance, although outcome expectations are indicative about people’s attitude towards exercise, motivations provide specific information as to *why* people engage in exercise. Despite their association with exercise, approach motivations are typically not incorporated into prominent health models that examine physical activity.

Barriers help us understand why breast cancer survivors do *not* engage in exercise (Courneya et al., 2008; Perna, Craft, Carver, & Antoni, 2008) and to our knowledge, no research has examined how barriers and motivations for exercise interact with each other. For instance, approach motivations may help breast cancer survivors overcome negative effects of barriers associated with exercise (Carmichael, Daley, Rea, & Bowden, 2010; Milne et al., 2008) or ameliorate negative cognitions associated with avoidance motivations by highlighting the positive aspects of being physically active (Coats, Janoff-Bulman, & Alpert, 1996).

We hypothesized that approach motivations for exercise would be associated with higher levels of regular physical activity. We did not specify any direction for the association between avoidance motivations and exercise, but hypothesized that approach motivations would moderate any negative effects of avoidance motivations on physical activity. Finally, we predicted that barriers would be associated with lower levels of exercise (Courneya et al., 2008; Perna, Craft, Carver, & Antoni, 2008), and that approach motivations would moderate this effect.

Methods

A detailed description of study procedures can be found in Ventura et al. (2013). Women who had been diagnosed with stage 0, I, or II breast cancer before the age of 50, completed cancer treatment at least 6 months previously (with the exception of endocrine therapy), and

showed no evidence of recurrence or new cancer were identified from the UCLA Health System Tumor Registry. We mailed women questionnaires assessing physical activity and related psychological and behavioral variables. Analyses for this paper included 156 women who returned the questionnaire and reported their current physical activity levels (see Ventura et al., 2013 for responders vs. non-responders' characteristics). Study procedures were approved by the University California, Los Angeles institutional review board and all participants provided informed consent.

Physical activity during a typical 7-day period was assessed using the widely used Leisure Time Questionnaire (Godin & Shepard, 1985; Jones, Courneya, Fairey, & Mackey, 2005; Jacobs, Ainsworth, Hartman, & Leon, 1993). Participants indicated the frequency of mild, moderate, or strenuous physical activity during a typical week and the duration of each activity bout for which we assigned a metabolic equivalent (MET) score: mild = 3, moderate = 5, strenuous = 9. We summed across all three categories of activity, dividing the sum by 60 (to convert minutes to hours). For example, one bout of mild exercise during a typical week for 60 minutes ($1 \times 60 \times 3 = 180$) and two bouts of strenuous exercise for 35 minutes ($2 \times 35 \times 9 = 630$) received a final physical activity score of 13.50 ($180+630/60 = 13.50$). To normalize the distribution, we transformed the final score before analyses using a square root transformation

We chose specific items from the Exercise Motivation Inventory-2 (EMI-2) that are relevant for approach and avoidance motivations (Markland & Ingledew, 1997) and added one cancer specific avoidance motivation item (Table 1). Cronbach's coefficient alpha was .83 for the avoidance and .92 for the approach subscale. We measured perceived barriers to exercise by employing 21 items from a study in breast cancer survivors (Rogers et al., 2008) and 5 items from the PACE+ study (Calfas et al., 2002). For the motivation and barrier scales, we calculated a total score by summing across items, with higher scores indicating more approach/avoidance motivations and perceived barriers.

Bivariate associations between approach and avoidance motivations, barriers and MET hours of physical activity per week were examined using Pearson's product-moment correlation. We mean centered motivations and barriers to exercise and used multiple regression to examine interactions between approach and avoidance motivations and between approach motivations and barriers on MET hours of physical activity.

Results

See Table 2 for sample characteristics. On average women performed 19.81 MET hours of physical activity per week ($SD = 16.42$, range = 0 – 98). We examined demographic and cancer-related variables as potential covariates, none of which were significantly correlated with physical activity (all $ps > .05$).

The average score for approach motivation was 3.73 ($SD = 1.09$), and 3.79 ($SD = 1.29$) for avoidance motivation. The average score for barriers was 29 ($SD = 18.25$, range = 0 – 92) (for a list of the most common barriers see Ventura et al., 2013).

Physical activity was significantly correlated with approach motivations ($r = .22, p < .01$) and perceived barriers ($r = -.38, p < .01$) but not with avoidance motivations ($r = .09, p = .25$). Approach motivations were positively correlated with avoidance motivation ($r = .32, p < .01$) and negatively correlated with perceived barriers ($r = -.33, p < .01$).

Analyses testing the interaction between approach and avoidance motivations indicated a main effect of approach ($\beta = 0.25, p = .01$) but not of avoidance motivations ($\beta = 0.10, p = .91$) and no significant interaction ($\beta = 0.06, p = .51$); overall $F(3, 152) = 3.04, p = .03, R^2 = .06$. Analyses testing the interaction between approach motivations and barriers showed a main effect of barriers ($\beta = -0.36, p < .001$) and a significant interaction ($\beta = -0.15, p = .05$); overall $F(3, 151) = 11.14, p < .001, R^2 = .18$. The main effect of approach motivations was not significant in this model ($\beta = 0.12, p = .13$). Simple slope analyses (Figure 1) indicated that when perceived barriers were high, approach motivations were not significantly associated with MET hours of exercise ($\beta = -.01, p = .89$); however, when barrier levels were low, higher levels of approach motivations were significantly associated with higher levels of MET hours of exercise ($\beta = .26, p < .05$).

Discussion

Among the younger breast cancer survivors in this study, approach motivations were associated with higher levels of physical activity and barriers to exercise with lower levels of physical activity. This is consistent with previous studies linking approach motivations to exercise in healthy adults (Lochbaum et al., 2013) and breast cancer survivors (Milne et al., 2008). However, approach motivations did not appear to help women overcome the negative effects of perceived barriers on exercise, but were most relevant in the context of low barriers. These findings are the first to suggest that approach motivations might be more effective for women reporting low levels of barriers. Although health models postulate that perceiving a health threat is a prime motivator for health behaviors (Strecher, Champion, & Rosenstock, 1997), avoidance motivations were not significantly associated with physical activity in this sample.

Study limitations include the study's cross-sectional design, which prevents us from making any causal inferences. The lack of a prospective design limits our ability to examine how different types of motivations may prompt initiation and maintenance of exercise as women undergo breast cancer treatment. For instance, avoidance motivations might be more important for exercise initiation and approach motivations for exercise maintenance. Studying the effects of approach and avoidance motivations on exercise at different stages of the disease trajectory is an important topic for future research.

Notwithstanding these limitations, the findings provide evidence for the importance of approach motivations and perceived barriers to exercise in younger breast cancer survivors, for whom physical activity is particularly important for maintaining energy balance (i.e., weight) and potentially affecting other factors that may influence the risk for breast cancer recurrence and death (Ogunleye & Holmes, 2009). Thus, intervention efforts promoting approach motivations in tandem with efforts to reduce barriers might prove helpful in promoting exercise in this at-risk population.

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Fig. 1. Interaction between approach motivations and perceived barriers (low levels indicate 1 SD below and high levels 1 SD above the mean) on MET hours of physical activity.

Table 1

Approach and Avoidance Motivation Questionnaire items

Approach Motivations Personally, I exercise (or might exercise)	Avoidance Motivations Personally, I exercise (or might exercise)
Because it makes me feel good	To avoid ill-health
To have a healthy body	To prevent health problems
Because I find exercise invigorating	To prevent breast cancer recurrence
Because I want to maintain good health	
For the enjoyment of the experience of exercising	
Because I find exercising satisfying in and of itself	

Note: items are rated on a scale ranging from 0 = *not at all* to 5 = *very true*.

Table 2

Sample Characteristics

Variable	N	%	Mean	S.D.	Range
Current Age	156		47.49	5.71	28.60 – 56.50
Age at diagnosis	156		44.11	5.53	27.00 – 50.80
Ethnicity					
White	107	68.10			
African American	8	5.13			
Asian	21	13.46			
Hispanic	17	10.90			
Other	3	1.92			
College graduate	105	67.30			
Employed full-time	82	52.60			
Married/living as married	118	75.60			
Has children	106	67.90			
Child(ren) live(s) at home	85	54.50			
BMI	156		25.23	5.55	16.80 – 46.20
Time since diagnosis (yrs.)	156		3.38	1.49	1.00 – 7.00
Medical treatment					
Surgery ^a					
Lumpectomy	58	32.70			
Mastectomy	93	60.00			
None ^b	4	2.60			
Adjuvant Therapy					
Chemotherapy	37	23.72			
Radiation Therapy	13	8.33			
Radiation + Chemotherapy	85	54.48			
None	21	13.46			
Current endocrine treatment	94	60.30			

^aData for surgery for one participant missing^bTumor was removed during biopsy