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Effects of treatment factors, comorbidities and health-related quality of life on self-efficacy for physical activity in Cancer Survivors

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Abstract

Objective: The physical and psychological benefits of exercise for cancer survivors are well documented. Researchers have examined self-efficacy as a target for promoting exercise; however, the predictors of self-efficacy, including treatment factors and comorbidities, have not been examined extensively. The purpose of this cross-sectional analysis was to examine how variables related to cancer and cancer treatment, comorbid health problems, health-related quality of life (QOL), and depression relate to self-efficacy (SE) for physical activity in cancer survivors.

Methods: This secondary analysis examined treatment factors, comorbidity and QOL data from 148 breast cancer and 134 prostate cancer survivors who had participated in studies examining exercise and QOL. A predictive regression model for self-efficacy was developed by testing each variable individually with SE and including the variables that had a significance level of ≤ 0.2 in a multivariate regression model.

Results: For the breast cancer population vitality (B = 0.23, $p = 0.02$), bodily pain (B = 0.16, $p = 0.07$) and mental health (B = 0.15, $p = 0.01$) were associated with SE for physical activity. For the prostate cancer survivors, education, (B = −0.20, $p = 0.036$) vitality (B = 0.26, $p = 0.01$), and bodily pain (B = 0.13, $p = 0.182$) remained in the model.

Conclusion: Treatment factors and health comorbidities were not associated with SE for physical activity, but health-related QOL factors of vitality and bodily pain were associated with higher levels of SE. Thus, subjective measures of well-being are important factors to consider when developing targeted interventions to increase physical activity in cancer survivors.

Keywords

physical activity; self-efficacy; quality of life; cancer; oncology

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INTRODUCTION

The physical and psychological benefits of exercise for cancer survivors are well documented. Cancer survivors participating in exercise demonstrate improved cardiovascular fitness and muscle strength [1–3], improved physical functioning [3, 4], improved body image [5], decreased body fat [3, 6], reduced fatigue [2, 3], and improved overall quality of life [7]. Because participation in physical activity can have a positive influence on the health and quality of life (QOL) of cancer survivors, it is important to encourage the adoption and maintenance of regular physical activity.

Social Cognitive Theory (SCT) provides a framework to explain how people develop and maintain physical activity behavior. SCT suggests that behavior (e.g. experience), environmental influences (e.g. physical, social), and personal factors (e.g. cognitive beliefs, knowledge) interact to influence behavioral patterns. Much of SCT research has focused on self-efficacy, which is a person's belief in his or her ability to perform a specific behavior in specific circumstances. Self-efficacy is associated with the initial stages of adoption and long term maintenance of physical activity [8, 9]. Initial participation in physical activity is related to an individual's beliefs in his or her ability to be active despite barriers that arise. Higher levels of self-efficacy are associated with higher levels of the adoption of physical activity, and individuals that are more efficacious are more likely to continue to be habitually physically active.

Self-efficacy for a behavior is developed from four sources of information which include mastery experiences (e.g. performance accomplishments), vicarious experience (e.g. observing others modeling the behavior), verbal persuasion (e.g. positive feedback or encouragement), and physiological and affective states (e.g. perceived exertion) [10]. For example, an individual may develop a high degree of self-efficacy to walk for exercise through successful experiences at walking (mastery experience), encouragement from others for walking (positive feedback), observation of others walking for exercise (vicarious experience), and through positive physical and/or emotional sensations resulting from walking (physiological and affective states during and /or after exercise).

While there is some literature supporting the important role of mastery experiences, vicarious learning and verbal persuasion, there is less empirical data on the role of physiological and affective states. Such states may be particularly important in working with cancer survivors who often experience enduring physical and emotional symptoms or side effects following treatment that may interfere with the successful adoption and maintenance of regular physical activity by influencing physical activity-related self-efficacy.

Appraisal of physiological sensations during exercise can be positive or negative, thereby increasing or decreasing self-efficacy. For example, survivors can experience and interpret somatic sensations such as increased heart rate and respiration, fatigue and muscle soreness either as signs of diminished physical capacity or as modifiable consequences of sedentary behavior. A few studies in cancer survivors have shown that physical symptoms affect self-efficacy for exercise. When examining correlates of task and barrier self-efficacy for exercise among breast cancer survivors during treatment, self-efficacy was lowest when

survivors felt nauseated and tired [11]. In examining factors such as social support, enjoyment, fatigue and prediagnosis activity levels, Rogers et al.,[12] found that fatigue was a significant correlate of barrier and task self-efficacy among breast cancer survivors.

Affect during behavioral performance also can influence self-efficacy by activating memories of either success or failure. For example, survivors may experience a positive mood state when engaging in enjoyable activities with one another or a negative mood state when engaging in physical activities they do not enjoy or have never mastered. General mood state such as chronic depressed mood might also lower self-efficacy. When examining angioplasty patients undergoing cardiac recovery, Jensen [13] found that greater mood disturbance was associated with lower levels of self-efficacy for carrying out recovery related behaviors. Similarly, another study of angioplasty patients found lower levels of mood disturbance were associated with higher self-efficacy expectation scores and increased behavior performance of recovery activities [14].

Nonetheless, there is limited published research on factors that influence self-efficacy in cancer survivors. For cancer survivors, a group who faces ongoing health threats, we hypothesized that factors related to their cancer history, and their physical and emotional health as proxies for somatic sensations and affect, would be associated with their self-efficacy for physical activity. To test this hypothesis, we examined the association between variables related to cancer and cancer treatment, comorbid health problems, health-related quality of life, depression and self-efficacy for increasing physical activity in two separate cancer survivor samples: a cross sectional survey of post-treatment breast cancer survivors and prostate cancer survivors receiving continuous androgen-ablation therapy participating in a randomized exercise trial.

METHODS

Participants

This is a secondary analysis of data from two separate studies examining physical activity behavior among cancer survivors. The first group of cancers survivors included one hundred forty-eight women who had completed treatment for breast cancer and were subsequently recruited for a survey on physical activity. Participants had been diagnosed within 5 years of the start of the study, were over 18 years old, spoke, and read English. The protocol was reviewed and approved by the Institutional Review Boards at the University of Texas M.D. Anderson Cancer Center and the Harris County Hospital District. They had been recruited between January and October 2002 from The University of Texas M.D. Anderson Cancer Center, the Houston chapter of the Sisters' Network, The Rose (a non-profit agency that provides breast cancer screening and diagnosis and runs support groups for women with breast cancer) and Lyndon B. Johnson Harris County Hospital District General hospital in Houston, Texas.

The second group of cancer survivors comprised 134 prostate cancer patients receiving continuous androgen ablation therapy who had been enrolled in a randomized trial comparing the efficacy of a lifestyle physical activity program to improve QOL with that of an education support program and a standard care control condition [15, 16]. Baseline data

from the trial was analyzed for this paper. Participants had received approval of their primary care physicians to participate in moderate physical activity, could speak and read English, resided within 1 hour of the intervention site and were not currently physically active. Participants had been recruited from M.D. Anderson Cancer Center, other Texas Medical Center institutions and the Houston community. Participants were identified through medical clinics were mailed physician signed letters of invitation, contacted by telephone with additional information about the study and screened for eligibility. Participants were officially enrolled to the original study after investigators obtained informed consent and medical clearance from their primary physicians.

Measures

Demographic and comorbidity information—As part of both original studies, participants completed questionnaires on demographic information (age, ethnicity, education) and health information. Health information included cancer treatment history and health comorbidities. Health comorbidities were collected using a self-report questionnaire and included cardiovascular problems, lung problems, hypertension, diabetes, arthritis, other medical conditions and side effects of cancer treatment. Comorbid health conditions were categorized as dichotomous (i.e. yes or no) variables by combining groups of like ailments. Cardiovascular conditions included heart attack, heart failure, heart condition, circulation problems, blood clots, and stroke. Participants who indicated ever having had any of those conditions were considered positive for a cardiovascular condition. Participants were considered positive for lung problems if they had ever had any lung disease, positive for diabetes if they indicated having diabetes, and positive for hypertension if they indicated having hypertension. Arthritis included fibromyalgia, lupus, rheumatoid arthritis and osteoarthritis. Other medical conditions included history of seizure, paralysis, kidney problems and hepatitis. Treatment side effects for breast cancer survivors included lymphedema and peripheral neuropathy.

QOL and Depression—As part of the original studies participants also completed the Medical Outcomes Study Short Form-36 (SF-36) [17], a 36-item self-report measure of health-related QOL that includes eight health concepts: physical functioning, social functioning, pain, mental health, energy and vitality, general health, role limitations because of physical problems, and role limitations because of emotional problems [18]. This index has high degree internal consistency reliability (Cronbach's alpha =.78-.93). Depression was measured using the Center for Epidemiological Studies Depression Scale (CESD), a well validated, 20-item self-report measure, with scores from 0 to 60. A score of 16 or higher indicates a need for clinical evaluation. It has high internal consistency (Cronbach's alpha = .84-.90), moderate test-retest reliability (kappa = .51-.70), and good construct validity with other measures of depression [19].

Self-Efficacy for Physical Activity—The five item self-efficacy questionnaire developed by Marcus et al. was used to examine self-efficacy for physical activity [20]. Participants rate their confidence in their ability to engage in physical activity under various circumstances using a 5 point scale (1 = "not confident at all" to 5 = "extremely confident"). The kappa index of reliability for this scale is .78 [20].

Physical Activity—Physical activity was assessed using the 7-Day Physical Activity Recall Questionnaire (7-DPARQ) [21, 22]. This is a valid and reliable [21, 22] interviewer-administered measure used to assess physical activity participation in the past week, including household and occupational activities, leisure activity, and intentional exercise. The amount of time spent in sleep and moderate-, hard-, and very hard-intensity activities is gathered through the interview process, and the amount of time spent in light-intensity activities is imputed from the other activities. Test-retest reliability is adequate, except for moderate intensity activity [21]. Research coordinators attended a 2 – hour training session in which the recall interview was demonstrated; they ten conducted 3 – 5 practice interviews with each other, interviewed the trainer and received feedback on their performances.

Analysis

We used self-efficacy for physical activity as the outcome variable and potential predictive variables were split into three categories, including demographic and cancer variables, comorbid health conditions, health-related quality of life and depression. Demographic variables included body mass index (BMI), age, ethnicity, and education level. Cancer variables included stage of cancer at diagnosis, time since diagnosis and treatment side effects. Comorbid health conditions were dichotomous variables created by combining groups of like ailments.

Scores were calculated for the CESD and self-efficacy if 80% or more of the questions were answered. Missing values were replaced with the mean of completed questions for each instrument. When scoring the SF – 36, each subscale was scored if 80% of the questions for that subscale were completed. Missing values were replaced by the mean values of completed questions for each subscale. In the regression analysis, missing data was managed by cases being excluded listwise. This left 143 total cases in the final model for the breast cancer survivors and 131 cases for the final model for the prostate cancer survivors. Self-efficacy scores, age, time since diagnosis and BMI were analyzed as continuous variables. Stage of diagnosis, race, education, marital status, stage of cancer diagnosis, treatment side effects (yes/no) and comorbid health conditions were analyzed as categorical variables.

All analyses were completed using SPSS Version 12 for Windows. To develop the predictive regression model for self-efficacy, each potential predictive variable was tested individually with self-efficacy for physical activity. Any variable with a significance level of 0.2 or less was then added to a multivariate model. Variables that did not contribute to the significance of the model were dropped. The testing was conducted in three steps, with the first including demographic and cancer variables, the second including the comorbid health conditions, and the third including health-related QOL and depression. Significant variables from each group were used to create a multivariate model. This technique was used for both the breast and the prostate groups.

RESULTS

Table 1 shows the demographic information, and frequency of health comorbidities. The majority of breast cancer survivors had completed some college (23%) or had completed college and/or graduate school (66%). The mean age of the women was 54.2 years and the

most commonly reported health conditions were arthritis (27%) and hypertension (27%). Table 2 shows the means for QOL scores, self-reported physical activity, depression and self-efficacy for physical activity. The majority of breast cancer survivors (67%) reported participating in 150 minutes or more of physical activity per week. The mean score for self-efficacy for physical activity was 3 on a 5-point sale. The results of the univariate analysis of demographic variables, health-related QOL and comorbid health problems (not shown) of the breast cancer survivors indicate that education level, history of arthritis, CESD score and all eight subscales of the SF-36 demonstrated an association ($p \leq 0.2$) with self-efficacy for physical activity. Each of the significant variables was added one at a time to create a multivariate model shown in Table 3. The final predictive model for the breast cancer population included the SF-36 subscales for vitality (B = 0.23, p = 0.022), bodily pain (B = .16, p = .074) and mental health (B = .15, p = .106) accounting for 21% of the variance in self-efficacy for physical activity (R^2= .211). All other variables were not included in the model.

Descriptive data for the prostate cancer survivors is also shown in Table 1. Among this group of cancer survivors, 24% had completed college and 23% had completed a graduate degree. The most commonly reported comorbid medical conditions were cardiovascular problems (31%) and hypertension (53%). As shown in Table 2, slightly less than half (49%) reported participating in 150 minutes or more of moderate physical activity per week, and the mean score for self-efficacy for physical activity was 2.9. The results of the univariate analysis of demographic variables, health-related QOL and comorbid health problems (not shown) among the prostate cancer survivors indicate that education level, CESD score and seven of the eight SF-36 subscales (excluding the Role Emotional subscale) all demonstrated associations ($p \leq .2$) with self-efficacy for physical activity. Each of the significant variables was added one at a time to create a multivariate model shown in Table 4. The final predictive model for the prostate cancer population included the SF-36 subscales for vitality (B = .26, p = .01) and bodily pain (B = .13, p = .182) and education accounting for 16 % of the variance in self-efficacy for physical activity (R^2 = .158). Men with no college education had lower self-efficacy than those who had a bachelors degree (B = −0.20, p = .036). All other variables dropped out of the model.

DISCUSSION

The purpose of this analysis was to examine how variables related to cancer and cancer treatment, comorbid health problems, health-related QOL and depression were associated with self-efficacy for physical activity. In our sample of breast and prostate cancer survivors, components of health-related QOL including vitality and bodily pain were associated with self-efficacy for physical activity. Comorbid health conditions such as diabetes, cardiovascular problems or other health problems were not associated with self-efficacy for physical activity. Thus, results may suggest that a subjective rating of health-related QOL has a greater influence on self-efficacy for physical activity than the individual's actual health status. These findings are consistent with SCT in that the interpretation of physical symptoms may affect self-efficacy.

Cancer survivors often report ongoing problems with pain [23, 24] and fatigue [24, 25], which may affect self-efficacy for physical activity and adherence to physical activity programming. Pain may be a barrier if physical activity is viewed as a source of discomfort or if activity aggravates an existing condition and thus increases pain. These issues and concerns may also lower confidence in an individual's ability to be active.

Vitality, or energy level, has been linked with higher levels of physical activity in breast cancer survivors and with perceptions of health among women 40 years and older in the general population [26]. Physical activity has been beneficial in helping improve symptoms of fatigue in breast and prostate cancer survivors [27–30]. Designing interventions to increase moderate physical activity may benefit survivors by reducing their fatigue and increasing perceptions of their own vitality, thus helping them maintain regular physical activity. To address fatigue, interventions should emphasize that exercise may ameliorate its symptoms and help participants identify and address barriers to activity by developing plans for scheduling activity at times when energy level is at its highest, or by breaking activity into short bouts. In addition, because pain may be a caused by cancer treatment or other physical issues, it is important to identify activities that will not increase pain and strategies that would minimize discomfort to encourage survivors to participate in physical activity.

Contrary to what we predicted, health comorbidities and cancer related variables were not associated with self-efficacy. Conditions such as arthritis, (reported by 27% of breast cancer participants and 7% of prostate cancer participants) have been identified as a barriers for increasing physical activity in older adults and adults with diabetes [31, 32]. Although history of arthritis was correlated with self-efficacy for physical activity for breast cancer survivors in the univariate analysis, there was no correlation in the multivariate analysis. Arthritis may be highly correlated with pain, which may explain why the effect was not apparent in the final model. Comorbidities that cause pain may be related to self-efficacy for physical activity, but this was not evident in these analyses.

It was somewhat surprising that the two samples of cancer survivors had similar mean scores for self-efficacy for physical activity (breast cancer survivors, 3.0; prostate cancer survivors, 2.9); particularly because the sample groups had such different mean ages and the fact that the prostate cancer participants were recruited only if they had low activity levels. These scores are in the same range as those in other research examining this construct among breast cancer survivors [5, 33, 34]. In addition to similarities in self-efficacy, the majority of breast cancer survivors (67%) and almost half of the prostate cancer survivors (49%) reported meeting the U.S. Surgeon General's recommendation of participating in 30 minutes of moderate physical activity most days of the week. However, because self-reported physical activity measures contain a certain degree of error due to errors in recall, or the chance that the past 7 days included in the recall period do not represent typical activity levels, our measures may contain more variability in physical activity than are apparent in this analysis. Future research should include objective measures such as using accelerometers to validate and supplement self-reported measures.

We also found that different levels of education predicted self-efficacy for physical activity among prostate cancer survivors, but not among breast cancer survivors. Although both

groups were well educated (73% of breast and prostate cancer survivors had a bachelors' degree or higher) prostate cancer survivors with lower educational levels (i.e. no college education) had lower self-efficacy than those with a bachelors' degree (Table 4). Conversely, different educational levels were not associated with self-efficacy for physical activity among breast cancer survivors. This difference may be related to age since the prostate cancer survivors were older. For older adults, exercise is less normative and this effect may be more pronounced among those with lower levels of education. Recent surveys indicate a higher prevalence of insufficient activity in older adults and adults with lower levels of education[35].

Although we have found that perceptions of certain aspects of health-related QOL are associated with self-efficacy for physical activity among these cancer survivors, this finding should be considered within the limitations of this study. The cross-sectional design of this analysis does not allow for resolving issues of causality. To understand directionality, future research should focus on how health-related QOL and health comorbidities relate to self-efficacy for physical activity over time. Comparisons between groups should be made with caution because of differences in study selection criteria for each and study design. Breast cancer survivors were part of a cross-sectional survey on physical activity and its determinants, and were eligible regardless of their current physical activity. Prostate survivors were selected because of lower activity levels and were enrolled in a trial of interventions to improve QOL, one of which was a lifestyle physical activity intervention. The willingness of prostate cancer survivors to participate in a randomized intervention study may distinguish them from the general population of survivors. Further, the difference in study design (cross-sectional vs. randomized trial) also limits comparisons.

In summary, self-efficacy can influence physical activity [8, 36–39] physical activity can have a positive effect on the health of cancer survivors [1–7]. Identifying factors that influence self-efficacy for physical activity among this population is important for planning effective physical activity programs and survivorship activities. This investigation was an initial step in understanding the factors that influence self-efficacy among cancer survivors.

References

1. Courneya KS and Friedenreich CM, Physical activity and cancer control. Semin Oncol Nurs, 2007. 23(4): p. 242–52. [PubMed: 18022052]
2. Galvao D. and Newton R, Review of exercise interventions studies in cancer patients. J Clin Oncol, 2005. 23(4): p. 899–909. [PubMed: 15681536]
3. McTiernan A, Physical activity after cancer: physiologic outcomes. Cancer Invest, 2004. 22(1): p. 68–81. [PubMed: 15069764]
4. Segal R. and Evans W, Structured exercise improves physical functioning in women with stage I and II breast cancer: Results of a randomized controlled trial. J. Clin. Oncol, 2001. 19(3): p. 657–665. [PubMed: 11157015]
5. Pinto B, et al. , Psychological and fitness changes associated with exercise participation among women with breast cancer. Psychooncology, 2002. 12: p. 118–126.
6. Courneya KS, et al. , Randomized controlled trial of exercise training in postmenopausal breast cancer survivors: cardiopulmonary and quality of life outcomes. J Clin Oncol, 2003. 21(9): p. 1660–8. [PubMed: 12721239]

7. Courneya KS, Exercise in cancer survivors: An overview of research. Med Sci Sports Exerc, 2003. 35(11): p. 1846–52. [PubMed: 14600549]
8. McAuley E, The role of efficacy cognitions in the prediction of exercise behavior in middle-aged adults. Journal of Behavioral Medicine, 1992. 15(1): p. 65–87. [PubMed: 1583674]
9. McAuley E, Lox C, and Duncan T, Long-term maintenance of exercise, self-efficacy, and physiological change in older adults. Journal of Gernontology, 1993. 48(4): p. 218–224
10. Bandura A, Self-Efficacy: The Exercise of Control. 1997, New York: W.H. Freeman and Company.
11. Rogers LQ, et al. , Exercise barrier and task self-efficacy in breast cancer patients during treatment. Support Care Cancer, 2006. 14(1): p. 84–90. [PubMed: 16007455]
12. Rogers LQ, et al. , *Correlates of Physical Activity Self-efficacy* Among Breast Cancer Survivors. Am J Health Behav, 2008. 32(6): p. 594–603. [PubMed: 18442339]
13. Jensen K, et al. , Advanced rehabilitation nursing care of coronary angioplasty patients using self-efficacy theory. J Adv Nurs, 1993. 18(6): p. 926–31. [PubMed: 8320387]
14. Perkins S. and Jenkins LS, Self-efficacy expectation, behavior performance, and mood status in early recovery from percutaneous transluminal coronary angioplasty. Heart Lung, 1998. 27(1): p. 37–46. [PubMed: 9493881]
15. Carmack Taylor CL, et al. , Active for Life After Cancer: a randomized trial examining a lifestyle physical activity program for prostate cancer patients. Psycho-oncology, 2006. 15(10): p. 847–62. [PubMed: 16447306]
16. Carmack Taylor CL, et al. , Quality of life intervention for prostate cancer patients: design and baseline characteristics of the Active for Life after cancer trial. Controlled Clinical Trials, 2004. 25: p. 265–285. [PubMed: 15157729]
17. Ware JE Jr. and Sherbourne CD, The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care, 1992. 30(6): p. 473–83. [PubMed: 1593914]
18. McHorney CA, Ware JE Jr., and Raczek AE, The MOS 36-Item Short-Form Health Survey (SF-36): II. Psychometric and clinical tests of validity in measuring physical and mental health constructs. Med Care, 1993. 31(3): p. 247–63. [PubMed: 8450681]
19. Radloff LS, The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement, 1977. 1(3): p. 385–401.
20. Marcus BH, et al. , Self-efficacy and the stages of exercise behavior change. Res Q Exerc Sport, 1992. 63(1): p. 60–6. [PubMed: 1574662]
21. Blair SN, Haskell WL, and Ho P, Assessment of habitual physical activity by seven-day recall in a community survey and controlled experiments. American Journal of Epidemiology, 1985. 122: p. 794–804. [PubMed: 3876763]
22. Sallis JF, Haskell WL, and Wood PD, Physical activity assessment methodology in the five-city project. American Journal of Epidemiology, 1985(121): p. 91–106. [PubMed: 3964995]
23. Ganz PA, et al. , Quality of life in long-term, disease free survivors of breast cancer: a follow-up study. Journal of the National Cancer Institute, 2002. 94(1): p. 39–48. [PubMed: 11773281]
24. Deimling GT, Bowman KF, and Wagner LJ, The effects of cancer-related pain and fatigue on functioning of older adult, long-term cancer survivors. Cancer Nurs, 2007. 30(6): p. 421–33. [PubMed: 18025913]
25. Young KE and White CA, The prevalence and moderators of fatigue in people who have been successfully treated for cancer. J Psychosom Res, 2006. 60(1): p. 29–38. [PubMed: 16380307]
26. Gross GJ, et al. , Postmenopausal breast cancer survivors at risk for osteoporosis: physical activity, vigor, and vitality. Oncol Nurs Forum, 2002. 29(9): p. 1295–300. [PubMed: 12370699]
27. Segal RJ, et al. , Resistance exercise in men receiving androgen deprivation therapy for prostate cancer. J Clin Oncol, 2003. 21(9): p. 1653–9. [PubMed: 12721238]
28. Fillion L, et al. , A brief intervention for fatigue management in breast cancer survivors. Cancer Nurs, 2008. 31(2): p. 145–59. [PubMed: 18490891]
29. Vallance JK, et al. , Randomized controlled trial of the effects of print materials and step pedometers on physical activity and quality of life in breast cancer survivors. J Clin Oncol, 2007. 25(17): p. 2352–9. [PubMed: 17557948]

30. Cramp F. and Daniel J, Exercise for the management of cancer-related fatigue in adults Cohrane Database of Systematic Reviews, 2008(2).
31. Arthritis as a Potential Barrier to Physical Activity among Adults with Diabetes: United States, 2005 and 2007. 2008, MMWR. p. 486–489.
32. Neuberger GB, et al. , Determinants of exercise and aerobic fitness in outpatients with arthritis. Nurs Res, 1994. 43(1): p. 11–7. [PubMed: 8295833]
33. Rogers LQ, et al. , Exploring social cognitive theory constructs for promoting exercise among breast cancer patients. Cancer Nurs, 2004. 27(6): p. 462–73. [PubMed: 15632787]
34. Rogers LQ, et al. , Social cognitive theory and physical activity during breast cancer treatment. Oncol Nurs Forum, 2005. 32(4): p. 807–15. [PubMed: 15990910]
35. Behavioral Risk Factor Surveillance System. 2007, Centers for Disease Control and Prevention.
36. McAuley E, et al. , Enhancing exercise adherence in middle-aged males and females. Preventive Medicine, 1994. 23: p. 498–506. [PubMed: 7971878]
37. McAuley E, Self-efficacy in the maintenance of exercise participation in older adults Journal of Behavioral Medicine, 1993. 16(1): p. 103–113. [PubMed: 8433355]
38. Oman R. and King A, Predicting the adoption and maintenance of exercise participation using self-efficacy and previous participation rates. American Journal of Health Promotion, 1998. 12(3): p. 154–161. [PubMed: 10176088]
39. Miller YD, Trost SG, and Brown WJ, Mediators of physical activity behavior change among women with young children. American Journal of Preventive Medicine, 2002. 23(2S): p. 98–103.

Table 1

Participant Characteristics

Variable	Breast Cancer Survivors (n = 148)		Prostate Cancer Survivors (n = 132)	
	n	%	n	%
Education [a]				
< High school	8	5	14	11
High school/GED	30	21	13	10
Technical/vocational	3	2	8	6
Some college	33	23	32	24
Bachelors degree	45	31	34	26
Masters degree	17	12	11	8
Doctoral degree	10	7	20	15
Ethnicity [b]				
African American	32	22	27	20
Hispanic	22	15	7	5
Asian/Pacific Islander	1	1	2	2
White, non-Hispanic	92	62	98	73
Missing:	1	1		
Comorbidities				
Hypertension	40	27	71	53
Cardiovascular problems	34	23	41	31
Lung problems	19	13	10	7
Diabetes	10	7	21	16
Arthritis	40	27	17	13
Other conditions	10	7	13	10
Treatment effects	66	45		n/a
	Mean ± standard deviation			
Body Mass Index	26.1 ± 5.2		30.3 ± 11.2	
Age, years	54.2 ± 10.3		69.41 ± 8.7	

[a] Data for two survivors were missing in both the breast and prostate cancer groups.

[b] Data for one survivor was missing in the breast cancer group.

Table 2

Scores for quality of life, depression, self-efficacy for physical activity and self-reported physical activity among breast and prostate cancer survivors

Variable	Mean ± standard deviation	
	Breast Cancer Survivors ***n = 148***	**Prostate Cancer Survivors** ***n = 134***
SF-36		
Physical functioning	75.6 ± 24.7	69.8 ± 22.2
Mental health	79.6 ± 15.8	82.2 ± 14.1
Vitality	61.3 ± 22.6	60.7 ± 21.5
Physical role	72.2 ± 35.7	65.4 ± 37.3
Emotional role	80.7 ± 34.2	83.3 ± 31.3
Pain	73.0 ± 25.4	72.2 ± 23.3
General health	76.0 ± 18.0	64.3 ± 23.3
Social functioning	83.7 ± 22.3	86.6 ± 20.5
Depression (CESD)	9.3 ± 8.5	8.0 ± 7.1
Self-efficacy for physical activity	3 ± .93	2.9 ± .79
Self- reported physical activity ≥ 150 minutes per week	97 (67%)	65 (49%)

Table 3

Regression analysis summary for factors associated with self-efficacy for physical activity among breast cancer survivors

Variable	B	SE	β	R^2	*p*
Mental health	0.009	0.370	0.153		0.106
Vitality	0.010	0.004	0.232		0.022
Bodily pain	0.006	0.003	0.166		0.074
				0.21	

Table 4

Regression analysis summary for factors associated with self-efficacy for physical activity among prostate cancer survivors

Variable	B	SE	β	R^2	*p*
Vitality	0.010	0.004	0.260		0.008
Bodily pain	0.004	0.003	0.125		0.182
Education (high school or less) *	−0.392	0.185	−0.200		0.036
Education (some college)	−0.239	0.182	−0.129		0.192
Education (graduate school) +	−0.092	0.179	−0.049		0.610
				0.16	

*Reference group, college graduate.

+This term was included even thought p>.20, because it was part of the overall education term, which was significant.