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Cancer-Specific Concerns and Physical Activity Among Recently Diagnosed Breast and Prostate Cancer Survivors

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Abstract

Background—Cancer treatment-related side effects may have a negative impact on quality of life among cancer survivors, and may limit participation in physical activity.

Hypothesis—Cancer-specific concerns will be reduced throughout a 10-month diet and exercise intervention among recently-diagnosed cancer survivors. Additionally, participants reporting greater levels of physical activity will also report fewer cancer-specific concerns.

Study Design—This study is an exploratory analysis of 452 recently diagnosed, early stage breast and prostate cancer survivors who participated in the FRESH START diet and exercise trial. Data were collected at baseline and 1-year follow-up via telephone administration of the Functional Assessment of Cancer Therapy (FACT) instrument and the 7-Day Physical Activity Recall.

Results—At baseline, chief concerns among prostate cancer survivors included ability to have an erection (mean score [SD]: 1.0 [1.3]) and urinary frequency (2.5 [1.4]), whereas among breast cancer survivors eminent concerns were not feeling sexually attractive (2.0 [1.3]) and worry about cancer in other members of their family (2.1 [1.3]). At 1 year, there was a significant improvement in cancer-specific concerns on breast cancer specific-concerns ($p<0.01$), but not on prostate cancer-specific concerns. Physical activity (PA) was generally not related to cancer-specific concerns, though at baseline women who were self-conscious about their dress had higher levels of PA, whereas men reporting issues with incontinence reported lesser increases in PA in response to the intervention.

Conclusion—While cancer survivors have several cancer-specific concerns, these concerns diminish over time, especially among breast cancer survivors. Furthermore, this reduction appears independent of changes in physical activity. Among prostate cancer survivors, incontinence is a significant barrier that hinders benefit from PA interventions. Thus, there is a need either for medical interventions to ameliorate incontinence or for behavioral interventions to address this issue among survivors, especially given the importance of PA for overall health.

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Keywords

breast neoplasms; prostatic neoplasms; physical activity; quality of life

Introduction

This year in the United States, an estimated 230,480 women will be diagnosed with breast cancer, and 240,890 men will be diagnosed with prostate cancer.[1] These are the most prevalent gender-related cancers in this country.[2] With advancements in screening and treatment, the 5-year survival rate for localized disease of the breast or prostate is greater than 98%.[3] However, cancer treatments often have inherent side-effects. As patients continue to live longer following treatment, they are vulnerable to various late effects that may impact function, activities of daily living, and overall quality of life. Moreover, cancer-specific concerns, specifically issues of sexuality and anxiety can be overwhelming and lead to serious distress among survivors.[4-6] Breast cancer survivors may experience cancer-specific concerns, such as feeling self-conscious about appearance, not feeling like a woman, tenderness in the arms, and worry about cancer risk among their family members.[7] Prostate cancer survivors may experience problems with urinary and bowel continence, and the ability to have an erection.[8] Although experiencing cancer-specific concerns is fairly common, survivors may be embarrassed or ashamed to mention these concerns to their health care team, especially men.[4]

Cancer-specific concerns not only impact mental health, they can also influence physical well-being. Side-effects of treatment may limit a survivor's ability to be active and engage in regular physical activity. This is counteractive to cancer recovery since regular exercise has proven benefits, e.g., decreased fatigue, increased fitness, and improved physical functioning.[9,10] Previous cross-sectional studies have observed associations between exercise and overall health-related quality of life among cancer survivors.[11-13] However, little is known regarding exercise and cancer-specific concerns, and even less is known about how cancer-specific concerns and physical activity interact post-treatment.

There are two main objectives of the current (secondary) analysis. First, we describe cancer-specific concerns among recently-diagnosed breast and prostate cancer survivors who participated in the FRESH START trial, and how they changed over time in response to an exercise intervention. Second, we evaluated associations between cancer-specific concerns and physical activity, both at baseline and throughout the intervention. In conceiving of this analysis, we hypothesized that an inverse association would exist between cancer specific concerns and self-reported minutes of weekly physical activity, i.e., survivors who report fewer cancer-specific concerns are more physically active. We also believed participants would report fewer cancer-specific concerns at 1-year compared to baseline. Finally, we anticipated that those who reported greater increases in physical activity from baseline to 1-year would experience a reduction in cancer-specific concerns.

Methods

Data collection

The FRESH START trial was a 10-month randomized, single blind, parallel group controlled phase II clinical trial. The goals of this trial were to improve diet and exercise behaviors among recently diagnosed breast and prostate cancer survivors, and to test whether sequentially-tailored mailed print materials were more effective than standardized diet and exercise print materials in the public domain. Participants in the intervention arm received materials specifically tailored on personal barriers, stage of readiness, progress

towards goal attainment, cancer coping style, and demographic characteristics. Data were gathered by trained interviewers who were blinded to study condition using computer-assisted, telephone interviews at baseline and 1-year follow-up. Interviews typically lasted 45 minutes and gathered demographic, behavioral, and cancer-related information from participants. The trial was approved by the Duke University Health System Institutional Review Board and took place from July 2002 to October 2005. The main outcomes of the FRESH START trial and other analyses have been published previously.[14-19]

Participants

Individuals were considered eligible if they were diagnosed with loco-regionally staged breast or prostate cancer within the past nine months. Other eligibility criteria included the practice of less than two of the following health behaviors: 1) exercising at least 150 minutes per week; 2) adherence to a low fat diet; or 3) consumption of five or more daily servings of fruit and vegetables. Individuals were not eligible if they had evidence of recurrence or progressive disease or had any conditions that would preclude unsupervised physical activity or participation in a home-based behavioral intervention administered via print materials and evaluated via telephone survey.[20] Participants were recruited through self-referral, and by obtaining contact information from cancer registries and oncology practices in the US and Canada. Eligible individuals provided written informed consent and participated in the baseline assessment. Only participants who received some form of exercise intervention (either the standardized or tailored) and who provided follow-up data were included in this analysis.

Cancer-specific concerns

Cancer-specific concerns were measured by the ”additional concerns” subscale of the Functional Assessment of Cancer Therapy – Breast (FACT-B) in breast cancer survivors and the Functional Assessment of Cancer Therapy – Prostate (FACT-P) in prostate cancer survivors. The FACT-B questionnaire asks participants to rate the extent of nine breast cancer-specific items as they apply to the previous seven days. Scores were based on a Likert scale anchored at 0 and 4 (0 = not at all; 4 = very much). Items associated with poorer quality of life were reversed scored so that 4 = not at all and 0 = very much. The nine items were then summed to obtain a breast cancer-specific concern score which ranges from 0 to 36. The FACT-P questionnaire is similar but includes 12 prostate cancer-specific items with the total score ranging from 0 to 48. A higher cancer-specific concern score corresponds to fewer reported concerns (better functioning). Both the FACT-B and FACT-P are reliable and valid instruments for assessment of cancer-specific concerns and quality of life among breast and prostate cancer survivors, respectively.[7,8]

Physical Activity

Engagement in physical activity was measured using the 7-Day Physical Activity Recall (PAR). Participants reported the time, in minutes, they spent engaged in moderate, hard, or very hard activity over the past week. Participants were also asked how many hours they slept each night. The 7-Day PAR is a valid and reliable instrument that has been previously used in samples of cancer survivors.[13,21] In the FRESH START trial, self-reported physical activity was corroborated by objective physical activity data captured via accelerometers in a subset of participants.[17]

Covariates

Additional data were collected on age, education, race, body mass index, cancer coping style (fighting spirit, fatalist, other), stage of cancer (unknown, 0, I, II, IIIA – breast only),

comorbidities, and type of treatment (surgery, radiation, chemotherapy, hormonal therapy, other).

Statistical Analysis

Baseline demographic data were expressed with means and frequencies, as appropriate. To address objective 1, each individual cancer-specific concern on the FACT-B and FACT-P was also expressed with a mean, with a floor of 0 and ceiling of 4, by cancer type. A summary score was also created separately for the FACT-B breast-specific and FACT-P prostate-specific concern subscale. Paired t-tests were used to determine if cancer-specific concerns were reduced when measured at 1-year compared to baseline. To address objective 2, Spearman correlations were used to evaluate the baseline association between cancer-specific concerns (total and individual) and reported minutes of weekly physical activity. The distribution of change in physical activity from baseline to 1-year was evaluated and one individual who reportedly decreased their physical activity by more than 420 min/week was considered an outlier and excluded. Separate linear regressions were used to evaluate the association between 1) baseline cancer-specific concerns and minutes of physical activity at 1 year and 2) change in cancer-specific concerns from baseline to 1 year and change in physical activity. No corrections for multiple testing were used given the exploratory nature of this analysis.

Results

Demographic characteristics on the complete sample of FRESH START trial participants have been reported previously.[14] The characteristics of the subset included in this analysis were similar to the larger sample of FRESH START participants with the majority being White, reporting stage I or stage II cancers, having received surgical treatment, and reporting college or postgraduate educational level. The mean age of breast cancer survivors (n=259) in the current sample was 54 years (SD 11.4), and 62 years (SD 8.3) for prostate cancer survivors (n=193). See Table 1.

Prostate cancer survivors

Prostate cancer survivors in our sample reported an average baseline FACT-P prostate-specific concern score of 38.4 (out of 48). The issues of most concern were the ability to have and maintain an erection (mean score of 1.0, corresponding to ‘a little bit’), and frequency of urination (mean score 2.5). Dissatisfaction with comfort, not feeling like a man, and being bothered by aches and pains also were concerns. See Table 2. The item of least concern among prostate cancer survivors was body weight maintenance. Significant reductions from baseline to 1 year were observed in concerns related to having an erection and urination frequency (actual score increased), while increases were reported in concerns associated with pain (actual scores decreased from baseline to 1 year). See Table 2. However, overall no net difference was observed in the total cancer-specific concern score among men with prostate cancer from baseline to 1-year follow-up.

No significant associations were observed between baseline cancer-specific concerns and reported physical activity, nor between change in physical activity and change in cancer-specific concerns from baseline to 1 year (data not shown). There was a significant association between the baseline cancer-specific concern of ”activities limited by urination” and minutes of physical activity at 1 year, after controlling for baseline activity ($p = 0.02$). Individuals who responded ”quite a bit” to this concern increased activity by an average of 20 minutes per week. Those who responded ”not at all” to this concern increased 51 minutes per week. See Table 3.

Breast cancer survivors

Our sample of breast cancer survivors reported an average baseline breast cancer-specific concern score of 25.2 (out of 36) on the FACT-B. Items with the lowest average concern scores (meaning reduced functioning) included; feeling sexually attractive (mean score 2.0), worry about other family member getting the same illness (mean score 2.1), and worry about the effect of stress on my illness (mean score 2.3). See Table 2. The least reported cancer-specific concern among breast cancer survivors was shortness of breath (mean score 3.7). Among breast cancer survivors, there was a positive correlation (meaning women who reported less concern also reported less physical activity) between ”I am self-conscious about the way I dress” and baseline minutes of physical activity ($p = 0.01$). There was no association between baseline cancer-specific concerns and physical activity at 1 year (controlling for baseline activity). Breast cancer survivors reported significant reductions in concerns related to physical appearance from baseline to 1 year (actual scores increased). Upon intervention completion, there was a significant increase in the cancer-specific concern score, indicating a reduction in overall reported concerns (average increase was 1.2 points, $p < 0.01$). No association was observed between change in physical activity and change in cancer-specific concerns from baseline to 1 year among breast cancer survivors.

Discussion

This is the first study to explore associations between physical activity and cancer-specific concerns in both breast and prostate cancer survivors. As anticipated, we found that this population is vulnerable to various treatment related side-effects that may negatively impact well-being. The most prominent cancer-specific concerns reported among prostate cancer survivors in our study were issues of sexual performance and urination frequency, whereas issues regarding weight and appetite were considered minor concerns. In contrast, breast cancer survivors reported being self-conscious about several aspects of their appearance, including weight, but also reported issues with sexuality.

Among prostate cancer survivors, our sample reported a slightly higher baseline cancer-specific concern score on the FACT-P (38.4) compared to previous research. Studies examining men with varying stages of prostate cancer have reported cancer-specific concern scores ranging from 29.7 to 34.7.[22,23] A study by Robinson et al. evaluated changes in the cancer-specific concern score from pre-cryosurgery treatment to three years follow-up in 75 men.[24] Before treatment, men reported an average prostate-specific score of 38, but six weeks after treatment the average score fell to 31, and then rose again at three months follow-up to 36. This study also observed a dramatic decrease in reported sexual function (erection and satisfied with sex life) from baseline to 6 weeks following treatment.[24] Our sample may have reported a slightly higher prostate-specific score simply because more time had elapsed from diagnosis and time from treatment. Also, the individuals enrolling in this study were interested in improving diet and increasing activity, and thus may be healthier than the average prostate cancer patient who does not volunteer for research studies concerning health promotion.

Previous studies have reported breast-specific concern scores on the FACT-B ranging from 22.4 (in a sample with lymphedema) to 27.8 (a sample of breast cancer survivors 2-5 years following their initial treatment).[25,26] Among breast cancer patients who were within the first few weeks of diagnosis, the average breast-specific concern score was 25.4.[5] Kwan et al. observed that being older, white, and not having surgery was associated with a higher score.[5] Breast cancer patients who underwent breast conserving treatment, compared to those who had mastectomy treatment, also report higher cancer-specific scores.[27] The average cancer-specific concern score of 25.2 in our sample was consistent with these previous research studies.

Similar to the systematic review by McNeely et al. who reported that exercise results in significant increases in FACT-B scores and physical functioning,[9] at completion of the study period, breast cancer survivors in the current trial also significantly improved their cancer-specific FACT-B score, i.e., reduced concerns over time. Additionally, the individual concerns of feeling sexually attractive, self-conscious about dress, and hair loss were significantly reduced from baseline to 1 year. While this result could suggest that exercise interventions lead to improvements in breast cancer specific quality of life, the fact that these improvements were not significantly associated with increases in physical activity suggests that the effect seen here could have resulted from just the passage of time. Prostate cancer survivors in our sample also reported a small (non-significant) increase in the FACT-P cancer-specific concern score. Men in this group had both significant improvements and declines in individual cancer-specific concerns. This result also may suggest natural fluctuation in concerns over time, or may be a consequence of trying to be more physically active.

Prostate cancer survivors who reported ”problems with urination limit my activities” also made smaller gains in physical activity in response to the interventions, however it should be noted that there were small numbers of men who reported ”quite a bit” (n=3) and ”somewhat” (n=18). However, urinary incontinence is a common and well-documented problem in this patient population. The finding that it may impede uptake of a physical activity intervention is concerning, especially since the FRESH START tailored intervention materials provided guidance (albeit minimal) for overcoming this barrier, i.e., wearing pads and limiting fluids prior to exercise. Given that urinary continence was strongly associated with exercise adherence, either more powerful behavioral interventions or medical interventions are needed to overcome the barrier of incontinence at least in some subsets of prostate cancer survivors if they are to achieve recommended levels of physical activity. Additionally, we observed an unexpected finding as women who reported lower levels of self-consciousness about dress also reported less physical activity at baseline. Those reporting ”not at all” self-conscious about dress reported the lowest levels of activity. Thus, being aware and anxious about appearance may actually serve as motivation to engage in activity, rather than a deterrent.

The primary limitations of this study include reliance on data based on self-report and that emanate from a largely White sample. Additionally, the sample was self-referred and those who were more health conscious or with fewer cancer-related complications may have been more apt to participate, however we did exclude people already practicing two or more health behaviors in diet and exercise. This analysis was conducted on a large sample without adjustment for multiple comparisons and some results may have been significant by chance. Being an exploratory study, we believe this is an acceptable approach and future research will need to confirm any significant findings. Despite limitations, our study has several strengths. We were able to evaluate cancer-specific concerns and physical activity among a substantial sample of both breast and prostate cancer survivors using reliable and valid instruments. Moreover, our study corroborated self-report measures with objective means and had a low rate of attrition (<8%). Finally, we present information on individual cancer-specific concerns, not simply a summed total score, in hopes of providing more detail to the practitioner who may benefit from this information.

Physical and emotional recovery from cancer is a long process and more research needs to be conducted with regards to cancer-specific concerns. There is a need for future research to focus on evaluating other groups of cancer survivors, as well as those with more advanced stages of disease, or those who have a longer survival time since diagnosis and treatment. Additionally, qualitative research may provide information concerning cancer-specific concerns that are not formally asked about on the FACT as well as provide an opportunity to

discuss how cancer-specific concerns can be addressed and managed both professionally by the medical staff and personally by the cancer survivor themself.

Conclusions

Breast and prostate cancer survivors who are diagnosed with early stage cancers have a host of cancer-specific concerns that relate to their sexuality, organ function, and worry about their family members. Over the course of time, these cancer-specific concerns diminish; however, in the current study this effect was only significant among breast cancer survivors, and appeared independent of the level of physical activity. In men with prostate cancer, urinary incontinence appeared to serve as significant barrier to physical activity, since men reporting this problem had far less uptake of the physical activity intervention than men in whom this was not a concern. Given the importance of physical activity to overall health, there is a need to develop interventions that can overcome the complex problems of cancer survivors, and for which the expertise of a multidisciplinary team of behavioral scientists, physicians and other health care members can be of benefit.

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Table 1

Participant Characteristics

Characteristic	Breast Cancer Survivors n (%)	Prostate Cancer Survivors n (%)
Age (years, mean (SD))	53.5 (11.4)	62.0 (8.3)
Comorbidities (mean (SD))	2.2 (1.7)	2.1 (1.6)
Race		
Non-white	58 (22)	21 (11)
White	201 (78)	172 (89)
Cancer stage		
0	33 (13)	0 (0)
1	132 (51)	77 (40)
2	78 (30)	101 (52)
3	16 (6)	0 (0)
Unknown	0 (0)	15 (8)
Treatment		
Radiation	153 (59)	35 (18)
Hormonal Therapy	147 (57)	27 (14)
Chemotherapy	122 (47)	0 (0)
Surgery	257 (99)	125 (65)
Education		
High school graduate or less	30 (12)	21 (11)
Some college or associate	89 (34)	52 (27)
College graduate / postgraduate	140(54)	120 (62)

Table 2

Mean Scores of Cancer-Specific Concerns from the FACT[a]

Cancer-Specific Concern	Prostate Cancer Survivors Mean Score (SD)		P-value <0.05	Breast Cancer Survivors Mean Score (SD)		P-value <0.05
	Baseline	1 year		Baseline	1 year	
Able to have and maintain an erection	1.0 (1.3)	1.4 (1.3)	<0.0003			
Urinary frequency	2.5 (1.4)	2.8 (1.3)	0.0013			
Comfort	3.1 (1.0)	3.1 (1.0)				
Feel like a man/ woman	3.2 (1.0)	3.1 (1.0)		3.1 (1.0)	3.2 (1.0)	
Bothered by aches and pains	3.2 (0.9)	3.0 (1.0)	0.005			
Experiencing aches and pains	3.4 (1.0)	3.3 (1.1)				
Urination	3.6 (0.9)	3.7 (0.7)	0.006			
Activities limited by urination	3.6 (0.7)	3.7 (0.6)				
Appetite	3.7 (0.6)	3.6 (0.6)				
Bowel function	3.7 (0.6)	3.7 (0.7)				
Pain does not hinder activities	3.8 (0.6)	3.6 (0.9)	0.005			
Body weight	3.8 (0.6)	3.8 (0.5)		2.6 (1.5)	2.5 (1.5)	
I feel sexually attractive				2.0 (1.3)	2.2 (1.2)	0.003
Worry about other members of my family getting the same illness I have				2.1 (1.3)	2.1 (1.2)	
Worry about the effect of stress on my illness				2.3 (1.3)	2.2 (1.3)	
Self-conscious about dress				3.0 (1.3)	3.3 (1.1)	0.002
Hair loss				3.0 (1.4)	3.7 (0.7)	<0.0001
Arms are swollen/ tender				3.4 (0.9)	3.4 (1.0)	
Shortness of breath				3.7 (0.7)	3.6 (0.8)	
Total	38.4 (5.2)	39.0 (5.7)		25.2 (6.2)	26.3 (5.6)	<0.0001

[a] scores range from 0-4, higher indicates better function

Table 3

Minutes of Physical Activity at Baseline and 1 Year by Responses to “My Problems with Urinating Limit My Activities” [a,b]

	Minutes of Physical Activity Mean (standard deviation)		
My Problems with Urinating Limit My Activities (n)	**Baseline**	**1 Year**	**Average Change from Baseline to 1 Year**
Quite a bit (3)	0 (0)	20 (34.6)	20 (34.6)
Somewhat (18)	77.8 (131.3)	55.7 (64.1)	−22.1 (125.5)
A little bit (30)	31.8 (44.6)	65.4 (64.7)	33.5 (74.1)
Not at all (141)	50.0 (82.4)	100.7 (128.9)	50.7 (130.1)

Parameter estimate: 26.2

Standard error: 11.1

P-value: .02

[a] only asked among prostate cancer survivors

[b] linear regression estimate independent variable: score from “my problems with urinating limit my activities” dependent variable: minutes of physical activity at 1 year; controlling for baseline activity