Online Exclusive Article

Exercise Programming and Counseling Preferences of Breast Cancer Survivors During or After Radiation Therapy

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Purpose/Objectives: To explore exercise programming and counseling preferences and exercise-related beliefs in breast cancer survivors during and after radiation therapy, and to compare differences based on treatment and insurance status.

Design: Cross-sectional survey.

Setting: Ambulatory cancer center in a rural community in eastern North Carolina.

Sample: 91 breast cancer survivors during or after radiation therapy.

Methods: The researchers administered the questionnaire to participants.

Main Research Variables: Exercise programming and counseling preferences and exercise beliefs moderated by treatment status (on-treatment, early, and late survivors) and insurance status (Medicaid, non-Medicaid).

Findings: Chi-square analyses indicated that fewer Medicaid users were physically active and reported health benefits as an advantage of exercise compared to non-Medicaid users ($p < 0.05$). In addition, more Medicaid users preferred exercise programming at their cancer center compared to non-Medicaid users ($p < 0.05$). More on-treatment and early survivors listed health benefits as advantages to exercise, but fewer indicated weight control as an advantage compared to late survivors ($p < 0.05$). Early survivors were more likely than on-treatment survivors to indicate that accessible facilities would make exercising easier for them ($p < 0.05$).

Conclusions: Medicaid users are less active, less likely to identify health benefits as an advantage for exercising, and more likely to prefer cancer center-based exercise programming compared to non-Medicaid users. In addition, on-treatment and early survivors are more likely to list health benefits and less likely to indicate weight control as advantages of exercising compared to late survivors.

Implications for Nursing: The low activity levels of Medicaid users may be best targeted by providing cancer center–based exercise programming. Exercise interventions may be most effective if tailored to the unique needs of treatment status.

Exercise participation after breast cancer diagnosis has been associated with a number of positive outcomes, including enhanced quality of life, reduced risk of recurrence, and improved survival times (Holick et al., 2008; McNeely et al., 2006). Despite those benefits, many breast cancer survivors do not achieve recommended amounts of physical activity (Courneya & Friedenreich, 1999; Haskell et al., 2007). Based on the National Coalition for Cancer Survivorship's definition, the term cancer *survivor* refers to people anywhere along the cancer spectrum from diagnosis until the end of life (Leigh & Logan, 1991).

A myriad of variables influence exercise behavior, including demographic, biologic, psychological, behavioral, social, and environmental factors (Trost, Owen, Bauman, Sallis, & Brown, 2002). This article focuses on exploring exercise-related beliefs and features of programming and counseling that may influence exercise behavior in breast cancer survivors during or after radiation therapy. Although those variables represent only a small proportion of the factors that influence exercise behavior, they are important to study because they may be changed as a result of exercise interventions targeting social cognitive variables and thoughtful program design.

Few studies have examined exercise counseling and programming preferences in cancer survivors (Jones & Courneya, 2002; Jones et al., 2007; Karvinen, Courneya, Campbell, et al., 2007; Karvinen et al., 2006; Rogers, Courneya, Shah, Dunnington, & Hopkins-Price, 2007; Rogers, Markwell, Verhulst, McAuley, & Courneya, 2009; Vallance, Courneya, Jones, & Reiman, 2006), but almost all of them have been with survivors who were post-treatment. In general, cancer survivors indicated an interest in receiving exercise counseling and programming, preferred moderate intensity activity, enjoyed walking as a modality, and indicated a preference for starting exercise

programming after treatment. However, exercise counseling and programming preferences likely differ based on treatment status as a result of treatment-related side effects. Typically, quality-of-life issues related to treatment (e.g., fatigue, stress) are more pronounced during therapy and gradually dissipate with time (Jereczek-Fossa, Marsiglia, & Orecchia, 2002; Knobf, 2007). Therefore, treatment-related side effects likely affect patients' preferences for exercise programming and counseling.

Only Rogers et al. (2007) examined exercise programming and counseling preferences in on-treatment cancer survivors in a small cross-sectional study. The sample of 23 patients with breast cancer during treatment indicated a preference for walking (n = 23, 100%) and exercising at or near their home (n = 18, 78%). Twelve participants (52%) were in favor of receiving exercise counseling information before or during treatment, with the most preferred information source being written materials (n = 9, 39%). The findings differed from those of previous studies with post-treatment patients with cancer who indicated a preference for face-to-face exercise counseling at the cancer center and for exercise programming to begin after treatment (Jones & Courneya, 2002; Karvinen, Courneya, Venner, & North, 2007; Karvinen et al., 2006). Taken together, the results suggest that exercise counseling and programming preferences of survivors may differ based on treatment status.

Also important for designing effective exercise interventions for cancer survivors is understanding their beliefs about physical activity, such as through the Theory of Planned Behavior (TPB) (Ajzen, 1991; Courneya, Karvinen, & Vallance, 2007; Hagger, Chatzisarantis, & Biddle, 2002). According to the TPB, intentions are the central determinant of exercise behavior. Intention is determined by three independent constructs: attitude, subjective norm, and perceived behavioral control. Perceived behavioral control also may directly influence behavior. Attitude, perceived behavioral control, and subjective norm are influenced by behavioral beliefs, control beliefs, and normative beliefs. Behavioral beliefs are defined as the perceived advantages and disadvantages of exercising, whereas control beliefs are the perceived barriers and facilitating factors. Normative beliefs consist of perceived approval from others for exercise. Past research suggested that the TPB can explain exercise participation in cancer survivors (Karvinen et al., 2009; Rogers et al., 2008). However, knowledge of specific beliefs of cancer survivors has not been well explored, although this knowledge would be meaningful for understanding determinants of exercise behavior in this population.

As with research on exercise programming and counseling preferences, most past studies on exercise beliefs have sampled primarily off-treatment survivors (Courneya & Friedenreich, 1999; Karvinen, Courneya, Campbell, et al., 2007; Karvinen et al., 2009; Rogers et al., 2007, 2008), a group who likely has different barriers and attitudes toward exercise compared to on-treatment or recently post-treatment cancer survivors. To examine exercise beliefs of patients during treatment, Courneya and Friedenreich (1999) retrospectively assessed on-treatment exercise beliefs of post-treatment breast cancer survivors and found a number of salient beliefs, many of which were related to cancer treatment. In contrast, beliefs of post-treatment cancer survivors tend to be similar to those of general populations and include behavioral beliefs (e.g., weight loss) and control beliefs (e.g., lack of time) (Karvinen, Courneya, Campbell, et al., 2007). Given the paucity of research on exercise programming and counseling preferences and beliefs in on-treatment patients with cancer, further investigation in this area is warranted.

Although some research has examined exercise programming and counseling preferences and beliefs in cancer survivors, little has considered the effect of poverty on those variables. However, previous research in general populations has shown that poorer individuals tend to be less active (Ross, 2000) and may indicate different beliefs about exercise-related health behaviors (Masse & Anderson, 2003).

In one of the few studies addressing poverty, Rogers et al. (2009) examined a sample of rural breast cancer survivors. Results showed that lower-income survivors were more interested in supervised exercise training programs than higher-income survivors. The findings suggested that lower-income cancer survivors may have different needs than higher-income survivors. Further investigation is needed to more completely elucidate differences in exercise programming and counseling preferences and beliefs based on poverty.

The current study examined exercise behavior, exercise programming, and counseling preferences and exercise beliefs in a sample of breast cancer survivors during or after radiation therapy. Secondary purposes were to examine whether treatment status and insurance status as a proxy measure of poverty moderated the primary findings. On-treatment and early survivors as well as Medicaid users were expected to report being less active and to have different exercise programming and counseling preferences and beliefs compared to late survivors.

Methods

The study design was a cross-sectional researcher-administered survey conducted at an ambulatory cancer center in a rural community in eastern North Carolina. Data were collected via questionnaire and medical records. Study approval was obtained from the University and Medical Center Institutional Review Board at East Carolina University.

Inclusion criteria were (a) being within five years of receiving external beam radiation therapy for breast

cancer, (b) not currently receiving chemotherapy, (c) being aged 18 years or older, (d) being female, and (e) being able to give informed consent. Eligible breast cancer survivors were approached by a member of the research team before or after their scheduled radiation therapy or follow-up appointments. Nurses and other staff helped identify potential participants. Once approached, survivors were told about the study and informed consent was obtained. The questionnaire was administered with a proctor in private evaluation rooms within the cancer center.

Instruments

Demographic information was obtained from a questionnaire (e.g., income, education level, ethnicity, employment, marital status) and medical records (e.g., age). Medical information (e.g., months since diagnosis, stage) was gathered from medical records. Height and weight were obtained from the questionnaire and were used to calculate body mass index ([BMI] = kg/m^2). In addition, treatment status was determined from medical records. Survivors were categorized as being on treatment (i.e., currently receiving radiation therapy), early (i.e., off radiation therapy but within two years of diagnosis), or late (i.e., off radiation therapy but two to five years postdiagnosis).

Insurance status was obtained from medical records. Survivors were recorded as Medicaid users (high poverty) and non-Medicaid users (low poverty). Individuals eligible for Medicaid have low income and assets and are considered financially in need (Centers for Medicare and Medicaid Services, 2005). Therefore, insurance status served as an approximate proxy measure of poverty.

Table 1. Sample Characteristics by Treatment and Insurance Status

			Treatment Status						Insurance Status			
	Total (N = 91)		On Treatment (N = 41)		Early (N = 29)		Late (N = 21)		Medicaid (N = 27)		Non-Medicaid (N = 64)	
Variable	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Age (years)	57.1	12	55.5	13.2	59.7	11.4	56.8	10.1	53.1	12.5	58.8	11.5
Body mass index (kg/m^2)	31.8	8.5	32.3	9.3	29.2	6.1	34.1	8.7	35.5	11.4	30.1	6.2
Months since diagnosis	14.9	14.7	5.2	8.5	13.1	6.5	36.2	9.8	13.4	15.6	15.5	14.4
Variable	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Cancer stage												
In situ	7	8	–	–	4	14	3	14	2	7	5	8
I	34	37	13	32	13	45	8	38	6	22	28	44
II	30	33	16	39	8	28	6	29	12	44	18	28
III	13	14	8	20	3	10	2	10	3	11	10	16
IV	4	4	2	5	–	–	2	10	3	11	1	2
Missing	3	3	2	5	1	3	–	–	1	4	2	3
Hormone therapy												
Receiving	50	55	20	49	17	59	13	62	14	52	36	56
Not receiving	41	45	21	51	12	41	8	38	13	48	28	44
Ethnicity												
Caucasian	46	51	18	44	16	55	12	57	5	19	41	64
African American	41	45	21	51	12	41	8	38	21	78	20	31
Other	3	3	2	5	–	–	1	5	1	4	2	3
Missing	1	1	–	–	1	3	–	–	–	–	1	2
Marital status												
Married	51	56	26	63	16	55	9	43	8	30	43	67
Not married	40	44	15	37	13	45	12	57	19	70	21	33
Annual income ($)												
Less than 20,000	21	23	12	29	3	10	6	29	17	63	4	6
20,000 or higher	57	63	22	54	22	76	13	62	7	26	50	78
Missing	13	14	7	17	4	14	2	10	3	11	10	16
Employed												
Working	38	42	19	46	12	41	7	33	7	26	31	48
Not working	49	54	18	44	15	52	13	62	17	63	29	45
Missing	4	4	4	10	2	7	1	5	3	11	4	6
Education												
High school or less	34	37	22	54	7	24	5	24	6	22	7	11
More than high school	56	62	19	46	21	72	16	76	4	15	9	14
Missing	1	1	–	–	1	3	–	–	17	63	48	75

Note. Because of rounding, not all percentages total 100.

Exercise behavior was measured with a modified version of the **Leisure Time Exercise Questionnaire (LTEQ)** (Godin, Jobin, & Bouillon, 1986; Karvinen, Courneya, Venner, et al., 2007). The modified LTEQ measures the average weekly frequency and duration of light (e.g., easy walking), moderate (e.g., fast walking), and vigorous (e.g., running) exercise in the past month. The LTEQ has been found to have strong reliability and to be valid compared to nine other self-report physical activity measures (Jacobs, Ainsworth, Hartman, & Leon, 1993). Minutes of moderate to vigorous exercise per week were calculated by adding the average weekly totals of each. Participants also were categorized as meeting American College of Sports Medicine (ACSM) recommendations for exercise (i.e., at least 150 minutes of moderate and vigorous exercise or 60 minutes of vigorous exercise per week) or not (Haskell et al., 2007).

Exercise programming and counseling preferences were determined primarily using closed-ended questions with categorical response options derived from previous studies of exercise programming and counseling preferences in cancer survivors (Jones & Courneya, 2002; Karvinen, Courneya, Venner, et al., 2007). Items assessed when, from whom, where, and in what format participants preferred exercise counseling and programming. Additional items assessed other details of preferred exercise programming. The reliability and validity of the items have not been addressed to date, but they were selected based on face validity by the primary author and others who have expertise in the area of exercise and cancer.

Behavioral (advantages and disadvantages) and control (barriers and facilitating factors) beliefs toward exercise were assessed with open-ended questions derived from previous studies examining exercise determinants in cancer survivors (Courneya & Friedenreich, 1999), based on the TPB (Ajzen, 2002). Normative beliefs were not included because of a narrow variety of possible responses and because they generally are weak predictors of exercise. To assess advantages, participants were asked, "What do you feel are advantages for you for participating in regular exercise right now?" Disadvantages were assessed with the question, "What do you feel are the disadvantages for you for participating in regular exercise right now?" Barriers were elicited by the item, "What factors make it difficult for you to exercise regularly right now?" Finally, facilitating factors were determined by the question, "What factors would make it easier for you to exercise regularly right now?"

Analysis

All analyses were conducted with SPSS®, version 14.0. Descriptive statistics were used to characterize the sample as a whole. Chi-square statistics and analyses of variance (ANOVA) were used to evaluate whether treatment and poverty status groups differed on demographic characteristics, medical variables, exercise behavior, and exercise programming and counseling preferences. Exercise programming and counseling preferences and exercise beliefs were dichotomized for chi-square analyses for ease of interpretation and to allow sufficient power to detect differences. Dichotomization was determined by collapsing categories with low sample sizes and combining categories that were conceptually related to one another. The exercise counseling variables were dichotomized as (a) prefer to be counseled within the next two weeks versus later, (b) want counseling from an exercise specialist from the cancer center versus someone else, (c) prefer counseling at the cancer center versus elsewhere, and (d) desire private face-to-face counseling versus other format. The exercise programming preferences were dichotomized as (a) prefer to start an exercise program in the next two weeks versus later, (b) interested in walking versus other form of exercise, (c) preference for exercising alone versus with others, (d) prefer to exercise at home versus elsewhere, and (e) want light intensity versus moderate to vigorous intensity activity.

A content analysis was conducted on open-ended data assessing exercise beliefs by grouping similar responses under broader, higher-order themes. Once the broader

Table 2. Exercise Counseling Preferences of Sample

Variable	n	%
When do you think would be the ideal time for you to be counseled about exercise? (N = 90)		
Within the next two weeks	34	38
At least two weeks from, now but within the next two months	23	26
At least two months from now	21	23
Never	12	13
From whom would you prefer to receive exercise counseling? (N = 90)		
Oncologist	4	4
Nurse	3	3
Patient with cancer or cancer survivor	8	9
Exercise specialist from community	11	12
Exercise specialist from cancer center	64	71
Where would you have preferred counseling to take place? (N = 91)		
Cancer center	43	47
Community center	15	17
My home	29	32
Other	4	4
How would you have preferred to be counseled? (N = 91)		
Private, face to face	50	55
Group counseling	27	30
Telephone	3	3
Print	6	7
Internet	5	6

Note. Because of rounding, not all percentages total 100.

Table 3. Sample Exercise Programming Preferences

Variable	n	%
When do you think would be the ideal time for you to start an exercise program? (N = 90)		
Within the next two weeks	30	33
At least two weeks from now, but within the next two months	27	30
At least two months from now	29	32
Never	4	4
Types of exercise most interested in (N = 83)[a]		
Walking	51	61
Weight training	20	24
Cycling	20	24
Swimming	12	15
With whom would you prefer to exercise? (N = 91)		
Alone	19	21
Other cancer survivors	23	25
Friends	18	20
Family	9	10
No preference	22	24
Where would you prefer to exercise? (N = 89)		
At home	33	37
At a community fitness center	14	16
Fitness facility in the cancer center	29	33
No preference	13	15
At what intensity would you prefer to exercise? (N = 91)		
Light	41	45
Moderate	43	47
Vigorous	3	3
No preference	4	4
Same or different activities for each exercise session? (N = 91)		
Same activity	20	22
Different activity	71	78
Supervised or unsupervised exercise sessions? (N = 90)		
Supervised	59	66
Unsupervised	31	34
Spontaneous and flexible or scheduled exercise sessions? (N = 90)		
Spontaneous and flexible	41	46
Scheduled	49	54

[a] Participants could select multiple responses.

Note. Because of rounding, not all percentages total 100.

themes were identified, two members of the research team independently coded each participant response into a higher-order theme. Subsequent analyses determined that inter-rater reliability was suitable for the items coded in each of the following categories: advantages of physical activity (Cohen's kappa = 0.88, $p < 0.001$), disadvantages of physical activity (Cohen's kappa = 0.87, $p < 0.001$), factors that make exercising difficult (Cohen's kappa = 0.89, $p < 0.001$) and factors that make exercising easier (Cohen's kappa = 0.89, $p < 0.001$). Beliefs about exercise were described through frequency analysis, as well as chi-square analyses to compare treatment and insurance status groups.

Results

Participant recruitment occurred from April 2007 to March 2008. One-hundred four potential breast cancer survivors who received radiation therapy were approached and invited to participate in the study. Of those, 50 post-treatment and 41 on-treatment survivors completed the study for an overall response rate of 88%. The main reasons for declining participation were "no time" and "not interested."

Table 1 shows descriptive statistics of demographic and medical variables. Some demographic and medical information were missing as a result of participants declining to provide information and because some information was not apparent in the medical records. Chi-square analyses indicated significant differences in income ($\chi^2[1, N = 78] = 33.97$, $p < 0.001$), ethnicity ($\chi^2[2, N = 90] = 16.82$, $p < 0.001$), and marital status ($\chi^2[1, N = 91] = 10.87$, $p = 0.001$) based on insurance status. More Medicaid users were African American, reported an annual household income lower than $20,000 per year, and were not married compared to non-Medicaid users. One-way ANOVAs indicated significant differences in BMI ($F[1, 82] = 7.9$, $p = 0.006$) and age ($F[1, 89] = 4.43$, $p = 0.038$) based on insurance status. On average, Medicaid users were younger and had higher BMIs than non-Medicaid users.

A one-way ANOVA indicated significant differences in months since diagnosis ($F[2, 81] = 99.08$, $p < 0.001$) based on treatment status. Tukey post hoc tests revealed that on-treatment survivors were significantly closer to their diagnosis date compared to early and late survivors ($p < 0.001$), and early survivors were significantly closer to their diagnosis date compared to late survivors ($p < 0.001$).

Exercise Behavior

On average, participants accumulated 67.8 minutes of moderate-to-vigorous exercise per week (SD = 18.4; range 0–420). No differences existed between treatment status groups on moderate to vigorous exercise accumulated on average per week (on-treatment survivors: $\bar{X} = 48.5$, SD = 99.1; early survivors: $\bar{X} = 92.3$, SD = 137.9; late survivors: $\bar{X} = 67.8$, SD =118.4; $F[90] = 1.18$, $p = 0.312$) or based on insurance status (Medicaid users: $\bar{X} = 98.7$, SD = 19; non-Medicaid users: $\bar{X} = 124.4$, SD = 55.6; $F[1, 89] = 2.46$, $p = 0.12$). Nineteen participants (21%) reported sufficient moderate to vigorous exercise to meet ACSM guidelines (Haskell et al., 2007). A similar percentage of on-treatment survivors (n = 7, 17%), early survivors (n = 7, 24%), and late survivors (n = 5, 24%) met ACSM guidelines ($\chi^2[2, N = 91] = 0.655$, $p = 0.721$). Fewer Medicaid users (n = 2, 7%)

compared to non-Medicaid users (n = 17, 27%) reported sufficient activity to meet ACSM guidelines ($\chi^2[1, N = 91] = 4.22$, $p = 0.04$).

Exercise Counseling and Programming Preferences

For details of exercise counseling and programming preferences, see Tables 2 and 3. In summary, participants were most interested in being counseled within the next two weeks, preferred exercise counseling from an exercise specialist from the cancer center, indicated a preference for counseling at the cancer center, and indicated a desire for private face-to-face counseling.

Chi-square analyses indicated no significant differences on any of the exercise counseling or programming preferences based on treatment status (all, $p > 0.05$). For insurance status, 13 Medicaid recipients (48%) indicated a preference for exercising at the cancer center compared to 16 non-Medicaid participants (25%) ($\chi^2[1, N = 91] = 4.69$, $p = 0.03$). No other significant differences were found on exercise counseling and programming preferences based on insurance status (all, $p > 0.05$).

Exercise Beliefs

Table 4 shows the most commonly reported behavioral and control beliefs. In comparing treatment status groups on exercise beliefs, significant differences were found in participants who listed health benefits ($\chi^2[2, N = 87] = 7$, $p = 0.03$) and weight control ($\chi^2[2, N = 87] = 7.33$, $p = 0.026$) as advantages of exercising and in those who indicated availability of accessible facilities as a helping factor ($\chi^2[2, N = 70] = 6.64$, $p = 0.036$). Follow-up pairwise comparisons indicated that 23 on-treatment survivors (58%) and 14 early survivors (50%) listed health benefits as an advantage to exercise compared to 4 late survivors (21%) (see Table 5). Only 7 early survivors (26%) and 13 on-treatment survivors (32%) listed weight control as an advantage compared to 12 late survivors (63%). Only 6 on-treatment survivors (17%) compared to 9 early survivors (50%) indicated that having accessible facilities available would make exercising easier. Although four late survivors (24%) indicated that accessible facilities would help them exercise, this proportion was not significantly different from on-treatment and early survivors (all $p > 0.05$).

For insurance status, only eight Medicaid users (31%) reported health benefits as an advantage of exercising compared to 33 non-Medicaid users (54%) [$\chi^2[1, N = 87] = 3.98$, $p = 0.046$]. No other significant differences were found in exercise beliefs between Medicaid and non-Medicaid users (all $p > 0.05$).

Table 4. Most Frequently Cited Behavioral and Control Beliefs

Belief	n	%
Behavioral Beliefs		
Main advantages of exercising (N = 86)[a]		
Health benefits	41	48
Feel better	35	41
Weight control	32	37
More energy	16	19
Main disadvantages of exercising (N = 39)		
Too time consuming	11	28
Feel worse or more tired	9	23
Causes pain or stiffness	9	23
May cause injury	7	18
Other	3	8
Control Beliefs		
Factors that make exercising difficult (N = 69)[a]		
Lack of time	24	35
Health problems	20	29
Lack of energy or too tired	17	25
Bad weather	12	17
Factors that make exercising easier (N = 70)		
Someone to exercise with	23	33
Availability of accessible facilities	19	27
More free time	12	17
Other	16	23

[a] Participants could select multiple responses.

Note. Because of rounding, not all percentages total 100.

Discussion

The current study assessed exercise behavior, exercise programming and counseling preferences, and exercise beliefs in breast cancer survivors who received radiation therapy. In addition, the authors evaluated whether treatment and insurance status moderated those findings. Results provided partial support for the hypotheses by indicating some differences in exercise behavior, exercise counseling and programming preferences, and exercise beliefs based on insurance status and treatment status.

As expected, very few Medicaid users (7%) reported meeting ACSM recommendations for physical activity compared to non-Medicaid users (27%). The finding is consistent with previous research indicating that exercise participation rates are lower in populations experiencing poverty (Hallal et al., 2005; Wardle & Steptoe, 2003). Interestingly, no significant differences in exercise behavior were found based on treatment status, suggesting similarly low activity levels are to be expected in survivors regardless of their status on the cancer continuum. Clinicians should be aware that although breast cancer survivors who received radiation therapy in general tend to be sedentary and need exercise guidance, participants experiencing poverty in the current study may be particularly inactive and, therefore, require additional exercise guidance.

Although the authors predicted that exercise programming and counseling preferences would differ based on

Table 5. Pairwise Comparisons of Differences in Exercise Beliefs Based on Treatment Status

Variable	χ^2	p
Health benefits (N = 87)		
On-treatment versus early survivors	0.37	0.541
On-treatment versus late survivors	6.89	0.009
Early versus late survivors	4.01	0.045
Weight control (N = 87)		
On-treatment versus early survivors	0.33	0.564
On-treatment versus late survivors	4.96	0.026
Early versus late survivors	6.38	0.012
Availability of accessible facilities (N = 70)		
On-treatment versus early survivors	6.32	0.012
On-treatment versus late survivors	0.3	0.584
Early versus late survivors	2.62	0.105

treatment status and insurance status, only one significant difference was found. About half of Medicaid users indicated an interest in exercising at their cancer center, compared to only 25% of non-Medicaid users. Low-income survivors may have fewer resources for physical activity and, therefore, may view the cancer center as one of few options for exercise. In general, disadvantaged people (e.g., those with low-socioeconomic status, minority groups) tend to live in areas with few resources for physical activity (Lovasi, Hutson, Guerra, & Neckerman, 2009). Therefore, low-income survivors may benefit the most from having a cancer center–based exercise program available to them. Of interest, no other differences were found in exercise programming or counseling based on insurance status or treatment status. The finding suggests to practitioners that special accommodations in exercise counseling and programming are not necessary, based on those variables.

Similar to past research sampling breast cancer survivors within two years of diagnosis (Courneya & Friedenreich, 1999), the top advantages of exercise reported by participants all centered on health issues and recovery from cancer. The finding suggests that clinicians may be able to use those advantages as an influential point of discussion involving the importance of exercise for their patients, especially among on-treatment or early survivors. For late survivors, weight control seems to be a more important issue than health benefits. In terms of insurance status, less than 33% of Medicaid users listed health benefits as an advantage of exercising compared to more than 50% of non-Medicaid users. The finding is consistent with previous research indicating that lower socioeconomic status was associated with stronger beliefs about the influence of chance on health rather than the practice of good health behaviors (Wardle & Steptoe, 2003). Clinicians may find that education on the link between health and exercise may be important, particularly for low-income survivors. Given that 9 of 39 participants (23%) felt that exercise might make them feel worse, clinicians may wish to dispel myths about exercise and advise about safe and effective exercise programming.

Lack of time was the most prevalent barrier to exercise, which is similar to research on other breast cancer survivors (Courneya & Friedenreich, 1999) and the general population (Downs & Hausenblas, 2005). Health problems and lack of energy also were commonly cited control factors and may be attributed to cancer-related symptoms or other comorbidities. Early survivors were more likely than on-treatment and late survivors to report that having an accessible facility would support regular exercise. The discrepancy may be a reflection of the desire for early survivors to have a facility to use and may indicate that this time in survivorship may be ideal for implementing exercise programming.

Strengths and Limitations

A major strength of the current study was its ability to include all types of survivors because of the researcher-administered on-site survey design. To the authors' knowledge, the current study was the first to examine differences in exercise programming and counseling preferences and beliefs in breast cancer survivors based on treatment status.

In terms of limitations, some participants may have demonstrated social desirability bias by offering favorable responses toward exercise because of the questionnaire being administered in a face-to-face setting. In addition, differences based on insurance status may have been confounded by ethnicity and marital status, given that significantly more Medicaid users were African American and unmarried. An additional limitation is the small sample sizes of the treatment and insurance status subgroups. Larger sample sizes would have yielded greater power for analyses and further confidence in the generalizability of the findings.

Conclusions

Overall, the results show that lower-income breast cancer survivors who received radiation therapy report very low levels of exercise and, therefore, are particularly in need of exercise guidance. Few differences were found in exercise programming and counseling preferences based on insurance and treatment status, suggesting intervention strategies need not be tailored based on those variables. Differences in exercise beliefs based on treatment and insurance status do exist and may require different approaches when clinicians provide exercise guidance to those subgroups.

Implications for Nursing

Nurses may use specific findings from the current study as a guide when giving exercise recommendations

to breast cancer survivors who received radiation therapy. Although exercise counseling and programming may not need to be tailored based on insurance and treatment status, nurses should be aware that low-income survivors report very low levels of exercise, but they also indicate the most interest in cancer center–based programming. Therefore, lower-income survivors may be the most important targets (and justification) for cancer center–based exercise programming. Health benefits seem to be the most commonly reported advantages to exercise, particularly in on-treatment and early survivors, and may be a motivational starting point for discussions about exercise with patients. In later survivors, the importance of exercise in weight control may be more motivational. Poorer survivors may require further information about the connection between exercise and health benefits. Tailoring exercise programming and counseling with those specific beliefs may be prudent for optimally encouraging an active lifestyle in breast cancer survivors who receive radiation therapy.

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