RESEARCH AND PRACTICE

Factors associated with body mass index among African American breast cancer survivors

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ABSTRACT

Background: Weight gain after diagnosis and treatment is common among breast cancer survivors (BCSs). Little information exists regarding associations between body mass index (BMI) and lifestyle factors and health-related quality of life (HR-QoL) among African American (AA) BCSs. The present study sought to determine associations between BMI, dietary intake, and physical activity as lifestyle modification strategies and HR-QoL among AA BCSs.

Methods: For this cross-sectional study, a lifestyle assessment tool was administered to 195 AA BCSs. Possible predictor variables included socio-demographic and medical characteristics, dietary intake and physical activity patterns, and physical health. The outcome variable was BMI.

Results: Many BCSs (63%) had BMIs ≥25 Kg/M^2 and presented with stage I cancer (41%) at diagnosis. Among those presenting with late-stage cancer (IIIA, IIIB, IV), 76% were overweight or obese (p=0.0008). Eighty-four percent reported excellent-to-good physical health (p=0.0499) and were less likely to have higher BMIs compared to those reporting fair-to-poor physical health (OR=0.616 [CI=0.192-1.978]). Responders with graduate level education were more likely to have healthy body weights than those attaining high school or less educational levels (OR=2.379 [CI=0.617-9.166]).

Conclusions: Most AA BCSs surveyed were overweight or obese, did not engage in recommended physical activity levels and failed to consume diets linked to breast cancer prevention. Interventions are needed to promote weight loss, improve dietary intake, and enhance physical activity among AA BCSs.

Key Words: Body mass index; dietary intake, physical activity, HR-QoL, cancer survivors

INTRODUCTION

In 2014, there were more than 3.1 million breast cancer survivors (BCSs) in the United States, accounting for about 21% of the total cancer survivors (American Cancer Society (ACS), 2015). Weight gain after diagnosis and treatment is common among women with breast cancer (Irwin, et al. 2005) and is associated with poorer outcomes, including poorer quality of life, increased recurrence, breast cancer deaths, and all-cause mortality (Demark- Wahnefried, Campbell & Hayes, 2012). A sustained loss of 10% of initial weight may reduce risk of recurrence of new primary breast cancers (Chlebowski, Aiello & McTiernan, 2002; Ansa, Yoo, Whitehead, Coughlin, & Smith, 2015). Possible factors for weight gain include fatigue and reduced physical activity, reductions in lean body mass and resting energy expenditure, overeating as a means to cope, and/or treatment-related increases in appetite (Kroenke, Chen, Rosner & Holmes, 2005).

For many chronic diseases, physical exercise improves quality of life and reduces all-cause mortality (Döring, Pfueller, Paul, & Dörr, 2012; Heran, et al. 2011; Atlantis, Chow, Kirby & Singh, 2004). Physical activity may be an effective intervention for enhancing quality of life and overall survival, since moderate levels reduce the risk of breast cancer death (Holmes, Chen, Feskanich, Kroenke & Colditz, 2005; McNeely, et al. 2006; Brown, Winters-Stone, Lee & Schmitz, 2012).

There is now considerable interest in health-related quality of life (HR-QoL) of BCSs. HR-QoL is a broad, multidimensional concept that usually includes subjective evaluations of both positive and negative aspects of life (Centers for Disease Control and Prevention (CDC)). HR-QoL constructs include measures of overall health, physical health, mental health, and social functioning.

Since BCSs are heterogeneous in their demographic profile (e.g., age, race/ethnicity, level of education, and socioeconomic status), behavioral profile (e.g., smoking status, alcohol consumption, and obesity), disease

pathophysiology, treatment protocols, symptoms, side effects, and HR-QoL constructs (McNeely, et al. 2006), summarizing the lifestyle risk factors and performance of HR-QoL studies across such a disparate group may be difficult. Nevertheless, racial-ethnic disparities in modifiable breast cancer risk factors (obesity, physical inactivity, and low consumption of fruits and vegetables) are large and persistent, especially between White and African American (AA) women (Halbert, et al. 2008). Data from the Behavioral Risk Factor Surveillance System (BRFSS) revealed that AA women, compared to White women, are more likely to be obese (57.6% vs. 32.8%); consume less fruits and vegetables (12.6% vs. 17.4%); and to be physically inactive (63.8% vs. 50.9%) (CDC, 2007; National Center for Health Statistics, 2015; Vásquez, Shaw, Gensburg, Okorodudu & Corsino, 2013). AA BCSs are also underrepresented in research targeting lifestyle modifications. Results from one of the few studies with their inclusion, the Women's Healthy Eating and Living (WHEL) Study, found that, at baseline, AA survivors are more likely than Whites to consume more calories from fat (+3.2%) and fewer servings of fruits (-0.7/day) (Paxton, et al. 2011) and are less successful at making and maintaining dietary changes (Paxton, et. al. 2012). This disparity may extend to nonclinical outcomes, including HR-QoL. Relative to their White counterparts, AA women with and without breast cancer have consistent HR-QoL deficits (Matthews, Tejeda, Johnson, Berbaum & Manfredi, 2012; Bowen, et al. 2007).

For AA women, who have some of the highest obesity rates in this country, effective long-term lifestyle modification is a target for reducing cancer disparities and enhancing prognosis among BCSs. The present study sought to describe the association between dietary intake, physical activity, and HR-QoL, as predictor variables, and body mass index (BMI), as the outcome, in a sample of AA BCSs.

METHODS

Participants/Data Source

The research protocol for this study, *Assessing lifestyle modification needs and experiences of AA BCSs*, has been described elsewhere (Smith, et al. 2015). Briefly, 240 AA BCSs were recruited from Survivors Involving Supporters Taking Action to Advance Health (SISTAAH) Talk, a support group for AA BCSs aimed at mitigating traumatic events (i.e., breast cancer-related concerns, self-reported physical well-being, isolation, loneliness, distress, depression, anxiety, etc.). The purpose of SISTAAH Talk is to provide a forum for AA women to communicate about and make sense of their breast cancer experience in order to achieve improved physical and mental health outcomes. The sampling technique for the recruitment of participants was non-randomized.

A lifestyle assessment tool (LAT), including validated scales related to dietary intake/physical activity, weight loss history, HR-QoL, and cancer risk, was administered to study participants. LAT scales were derived from: 1) the Behavioral Risk Factor Surveillance System (BRFSS) physical activity questionnaire (CDC); 2) the National Health and Nutrition Examination Survey (NHANES) weight history questionnaire (CDC); and 3) the National Health Interview Survey (NHIS) Cancer Control Supplement Questionnaire (CDC). Additional components included demographics, breast cancer diagnosis and treatment history, HR-QoL, weight history, physical activity, and dietary intake. Three modes of administration were used: self-administered online, a mailed copy, and facilitator-administered through a telephone interview.

The Institutional Review Board at Morehouse School of Medicine approved the study protocol. Participants received information on the study and consented to participate.

Measures

There were four self-reported categories of predictor variables: 1) socio-demographics including age (18-34 years, 35-54 years, and 55 years and older); education (high school diploma or less, college, and graduate); income (≤$24,999, $25,000-$50,000, ≥$50,000); and marital status (single, married, or widowed/divorced); 2) American Joint Committee on Cancer TNM system stage of diagnosis (I, II, IIIA, IIIB, and IV) as obtained from their physicians (BCSs without knowledge of or unwilling to disclose stage of diagnosis were grouped as 'don't know' with recurrence as 'yes,' if BCSs reported having recurrence; 'no', if there was none; or 'don't know,' if the respondent had no knowledge); 3) dietary intake and physical activity assessed by use of NHANES and BRFSS scales; and 4) HR-QoL, captured using the Patient-Reported Outcomes Measurement Information System (PROMIS) Global 10-item Health Scale of HR-QoL domains, including physical and mental health. HR-QoL physical health variables were categorized as good (excellent-to-good) or poor (fair-to-poor). The outcome variable was BMI, defined as weight in kilograms divided by the square of height in meters (CDC). Height and weight were self-reported by participants. BCSs were grouped as 'healthy' (BMI< 25 Kg/M^2), 'overweight' (BMI= 25-29 Kg/M^2), or 'obese' (BMI≥ 30 Kg/M^2).

Statistical Analyses

All data from socioeconomic, TNM staging system, dietary intake, and HR-QoL variables were summarized with frequencies and percentages and were compared according to BMI categories using chi-square and Fisher's exact test. A multivariate regression analysis was conducted, modeling those who were overweight or obese by each demographic and clinical variable, and by physical health status. P-values were two-sided, and, if <0.05, were considered statistically significant. The analyses were accomplished with SAS statistical software, version 9.2 (SAS Institute, Cary, NC).

RESULTS

Of the 240 AA BCSs recruited, 45 were excluded for failure to complete the weight and height questions; the overall response rate was 81%. For this present report, 195 AA BCSs, with ages ranging between 18 and ≥ 55 years, completed the LAT (Table 1). Many were in the ≥55years age group (59.4%), had college education (62.7%), had an annual income between $25,000 and $50,000 (35.6%), and presented with stage I cancer at diagnosis (40.7%). The age groups 18-34 years and 35-54 years accounted for 3.1% and

37.5% of the study population, respectively. Thirteen respondents (6.6%) reported being underweight; since this number was considered too small to have any effect on the statistical analyses, they were included in the 'healthy BMI' group.

Of the BCSs, 37.5% (including the 13 underweight participants) had BMIs <25 Kg/M^2, 31.8% were overweight (BMI=25-29 Kg/M^2), and 30.7% were obese (BMI >30 Kg/M^2) (Table1). Forty-one (21.7%) reported late-stage breast cancer (IIIA, IIIB, or IV), and 128 (67.7%) had stages I or II. Of those with late-stage disease, 75.6% had BMIs ≥25 Kg/M^2 (P=0.0008). Although there was no statistically significant association between breast cancer recurrence and BMI status, 77% reporting a recurrence had high BMIs compared to 59% of those who did not (p=0.2816).

Table 1. Descriptive Characteristics of AA BCSs by BMI* Status after Breast Cancer Treatment

Variable	Total N=195 (100%)	Healthy n (%)	Overweight n (%)	Obese n (%)	p-value**
Age (Years)					0.8825
18-34	6 (3.1)	3 (4.2)	1 (1.6)	2 (3.4)	
35-54	72 (37.5)	25 (34.7)	23 (37.7)	24 (40.7)	
≥55	114 (59.4)	44 (61.1)	37 (60.7)	33 (55.9)	
Income (Annual)					0.5913
≤$24,999	62 (32.5)	18 (25.4)	22 (36.7)	22 (36.6)	
$25,000-$50,000	68 (35.6)	28 (39.4)	21 (35.0)	19 (31.7)	
≥$50,000	61(31.9)	25 (35.2)	17 (28.3)	19 (31.7)	
Education					0.5798
High school or Less	42 (21.8)	13(18.1)	13 (21.3)	16 (26.7)	
College	121 (62.7)	45 (62.5)	41 (67.2)	35 (58.3)	
Graduate	30 (15.5)	14 (19.4)	7 (11.5)	9 (15.0)	
Marital Status					0.7838
Single	46 (24.0)	15 (20.8)	15 (25.0)	16 (26.7)	
Married	72 (37.5)	31 (43.1)	20 (33.3)	21 (35.0)	
Widowed or Divorced	74 (38.5)	26 (36.1)	25 (41.7)	23 (38.3)	
Stage at Diagnosis					**0.0008**
Stage I	77 (40.7)	34 (47.9)	22 (37.3)	21 (35.6)	
Stage II	51 (27.0)	14 (19.7)	23 (38.9)	14 (23.7)	
Stage IIIA, IIIB, IV	41 (21.7)	10 (14.1)	9 (15.3)	22 (37.3)	
Don't Know	20 (10.6)	13 (18.3)	5 (8.5)	2 (3.4)	
BC Recurrence					0.2816
Yes	39 (20.3)	9 (12.5)	17 (27.9)	13 (22.0)	
No	150 (78.1)	62 (86.1)	43 (70.5)	45 (76.3)	
Don't know	3 (1.6)	1 (1.4)	1 (1.6)	1 (1.7)	

Some variables reflect an n <195 due to missing data for those variables.
*BMI= Body Mass Index in Kg/m^2: Healthy (BMI<25); Overweight (BMI=25-29); Obese (BMI≥30)
** p-values <0.05 were significant.

The BMI status of responders correlated with meeting current cancer prevention guidelines (Table 2). The reported number of days consuming vegetables and fruits and engaging in physical activity were not positively correlated to respondents' BMI status. However, more survivors consuming recommended vegetable and fruit servings (44.2%) and achieving recommended physical activity levels (41.1%) for at least 12 days per month, had healthier weights than those not meeting cancer prevention guidelines (p=0.2977 and p=0.4311, respectively).

Table 2. AA BCSs Complying with the Cancer Prevention Guidelines by BMI* Status after Breast Cancer Treatment

Activity	Total N=195 (100%)	Healthy n (%)	Overweight n (%)	Obese n (%)	p-value**
Fruit Servings: Ate fruits in the past 30 days					0.2977
0 -7 days	133 (68.2)	47 (65.3)	41 (66.1)	45 (73.8)	
8-11 days	10 (5.1)	2 (2.8)	3 (4.9)	5 (8.2)	
≥12days	52 (26.7)	23 (31.9)	18 (29.0)	11 (18.0)	
Vegetable Servings: Ate vegetables in the past 30 days					0.7714
0 -7 days	134 (68.7)	52 (72.2)	40 (64.5)	42 (68.8)	
≥12days	55 (28.2)	19 (26.4)	19 (30.7)	17 (27.9)	

Activity	Total N=195 (100%)	Healthy n (%)	Overweight n (%)	Obese n (%)	p-value**
Physical Activity					0.4311
0-7days	139 (71.28)	49 (68.1)	48 (77.4)	42 (68.9)	
≥8 days	56 (28.72)	23 (31.9)	14 (22.6)	19 (31.1)	

*BMI= Body Mass Index in Kg/m^2: Healthy (BMI<25); Overweight (25-29); Obese (BMI>30)
** p-values <0.05 are significant

Results for dietary intake and physical activity (Table 3) revealed that 74.4% of BCSs consumed more red meat and 78.5% consumed more processed meat than recommended; <40% in each of the two groups had normal BMIs (p=0.7036 and p=0.1884, respectively). Fewer responders ate adequate fruits, vegetables, and salads (48.2%); drank adequate amounts of water (44.1%); and changed their eating habits (32.8%) after breast cancer diagnosis. More than half (52.3%) reported exercising; not eating less sugar, candy, sweets (66.2%); and not eating less "junk" or "fast" food (68.2%).

Table 3. Physical Activity and Dietary Profile of AA BCSs by BMI* Status after Breast Cancer Treatment

Activity	Total N=195(100%)	Healthy n (%)	Overweight n (%)	Obese n (%)	p-value**
Exercised					0.8008
Yes	102 (52.3)	37 (51.4)	31 (50.0)	34 (55.7)	
No	93 (47.7)	35 (48.6)	31 (50.0)	27 (44.3)	
Ate Red Meat					0.7036
Yes	145 (74.4)	56 (77.8)	45 (72.6)	44 (72.1)	
No	50 (25.6)	16 (22.2)	17 (27.4)	17 (27.9)	
Ate processed meat					0.1884
Yes	153 (78.5)	59 (81.9)	51 (82.3)	43 (70.5)	
No	42 (21.5)	13 (18.1)	11 (17.7)	18 (29.5)	
Chose whole grain					0.6693
Yes	159 (81.5)	61 (84.7)	49 (79.0)	49 (80.3)	
No	36 (18.5)	11 (15.3)	13 (21.0)	12 (19.7)	
Ate "Diet" foods or Products					0.6967
Yes	21 (10.8)	8 (11.1)	8 (12.9)	5 (8.2)	
No	174 (89.2)	64 (88.9)	54 (87.1)	56 (91.8)	
Drank adequate amounts of water					0.8014
Yes	86 (44.1)	31 (43.1)	26 (41.9)	29 (47.5)	
No	109 (55.9)	41 (56.9)	36 (58.1)	32 (52.5)	
Ate less sugar, candy, sweets					0.4786
Yes	66 (33.8)	24 (33.3)	18 (29.0)	24 (39.3)	
No	129 (66.2)	48 (66.7)	44 (71.0)	37 (60.7)	
Ate more fruits, vegetables, salad					0.6110
Yes	94 (48.2)	35 (48.6)	27 (43.5)	32 (52.5)	
No	101 (51.8)	37 (51.4)	35 (56.5)	29 (47.5)	
Changed eating habits					0.8738
Yes	64 (32.8)	22 (30.6)	21 (33.9)	21 (34.4)	
No	131 (67.2)	50 (69.4)	41 (66.1)	40 (65.6)	
Ate less 'junk food' or 'fast food'					0.3663
Yes	62 (31.8)	23 (31.9)	16 (25.8)	23 (37.7)	
No	133 (68.2)	49 (68.1)	46 (74.2)	38 (62.3)	

*BMI= Body Mass Index in Kg/m^2: Healthy (BMI<25); Overweight (BMI= 25-29); Obese (BMI>30)
** p-values <0.05 are significant

Most survivors reported excellent-to-good HR-QoL. The association of BMI status with the physical health component of HR-QoL was statistically significant (Table 4). Of respondents with excellent-good physical health, 78.9% had normal BMI values, compared to 21.1% with fair-to-poor physical health (p=0.0499). BCSs with excellent-to-good overall quality of life (87.5%; p=0.1227) and excellent-to-good physical functioning (90.1%, p=0.9190) had healthy BMI values.

Table 4. Physical Health HR-QoL by BMI* Status after Breast Cancer Treatment

Measure	Total N=195(100%)	Healthy n (%)	Overweight n (%)	Obese n (%)	p-value
Overall Quality of Life					0.1227
Excellent-Good	180 (92.3)	63 (87.5)	60 (33.3)	57 (31.7)	
Fair-Poor	15 (7.7)	9 (12.5)	2 (13.3)	4 (26.7)	
Physical Health					**0.0499**
Excellent-Good	162 (84.4)	56 (78.9)	58 (93.5)	48 (81.4)	
Fair-Poor	30 (15.6)	15 (21.1)	4 (6.5)	11 (18.6)	
Physical Functioning					0.9190
Excellent-Good	177 (91.2)	64 (90.1)	57 (91.9)	56 (91.8)	
Fair-Poor	17 (8.8)	7 (9.9)	5 (8.1)	5 (8.2)	

Some variables reflect an n < 195 due to missing data for those variables.
*BMI= Body Mass Index in Kg/m^2: Healthy (BMI<25); Overweight (BMI= 25-29); Obese (BMI>30)
** p-values <0.05 are significant.

Use of a stratified multivariate model for those with BMIs ≥25 Kg/M^2, with adjustments for demographic, clinical, and HR-QoL variables (Table 5), revealed that age <35years (OR=0.140 [CI: 0.010-2.019]), lower income ≤ $25,000 (OR=0.693 [CI: 0.252-1.901]), and being married (OR= 0.677 [CI: 0.237-1.935]) were protective factors against high BMIs. Survivors reporting excellent-to-good physical health and physical functioning were also less likely to be overweight or obese (OR= 0.616 [CI: 0.192-1.978]; and OR=0.4212 [CI: 0.130-1.299] respectively). Lower level education and breast cancer recurrence were risk factors for high BMIs; BCSs with high school education or less were 2.4 times (C.I: 0.617-9.166) more likely to have BMIs ≥25 Kg/M^2 than those with graduate level education, and those reporting recurrence were 1.4 times (CI: 0.495-4.114) more likely to have higher BMIs than survivors who did not. BCSs reporting excellent-to-good overall HR-QoL were more likely to have BMIs ≥25 Kg/M^2 than those who reported fair-to-poor HR-QoL (OR=3.645 [C.I: 0.775-17.132]). All of the odds ratios reported were not statistically significant. The wide confidence interval for overall HR-QoL is a result of the unbalanced frequencies between the comparison groups.

Table 5. Physical Health HR-QoL by Weight Status after Breast Cancer Treatment (Adjusted)

	Overweight or Obese After BC Treatment	
Variables	**Odds Ratio**	**95% Confidence Interval**
Age (Years)		
18-34 years vs. ≥55 years	0.140	0.010-2.019
35-54 years vs. ≥55 years	0.606	0.299-1.226
Income (Annual)		
≤$24,999 vs. ≥$50,000	0.693	0.252-1.901
$25,000-$50,000 vs. ≥$50,000	0.959	0.404-2.275
Education		
High school or Less vs. Graduate	2.379	0.617-9.166
College vs. Graduate	1.671	0.651-4.286
Marital Status		
Married vs. Single	0.677	0.237-1.935
Divorced/Widowed vs. Single	0.974	0.370-2.568
Recurrence		
Yes vs. No	1.427	0.495-4.114
Physical Activity (Exercised)		
Yes vs. No	1.125	0.315-4.019
Overall Quality of Life		
Excellent-Good vs. Fair-Poor	3.645	0.775-17.132
Physical Health		
Excellent-Good vs. Fair-Poor	0.616	0.192-1.978
Physical Functioning		
Excellent-Good vs. Fair-Poor	0.412	0.130-1.299

DISCUSSION/CONCLUSIONS

Most of the participants were overweight/obese (63%). For this group of survivors, the overweight/obesity rate was 615 per 1000 BCSs. A mediator for weight gain was stage at breast cancer diagnosis (P=0.0008). Three fourths (75.6%) of survivors who presented with stages IIIA, IIIB, or IV at diagnosis had high BMIs. Weight status was not significantly influenced by age, income, education, or marital status; however, not being married and reporting breast cancer recurrence were linked to higher BMIs.
High consumption of red meat and processed meat is a risk factor for breast cancer (Guo, Wei, & Zhan, 2015). Three quarters of the study population reported consuming more than the recommended servings of red meat and processed meat, and were overweight/obese. Most reported unhealthy habits, such as consuming sweets and 'junk foods.' Engaging in the recommended levels of physical activity and fruit/vegetable consumption are protective against high BMIs (Kushi, et al. 2012); however, in this study, 71% of survivors reported not engaging in the recommended physical activity levels. Physical activity rates reported for BCSs (Irwin, et al. 2004) and among healthy US women (Kruger, Kohl III & Miles, 2007) are 32% and 49.7%, respectively.

Lower levels of physical activity and higher rates of weight gain/obesity among AA BCSs constitute public health challenges, for obesity and weight gain are negative prognostic indicators of survival (Rock & Demark-Wahnefried, 2002; McTiernan, Irwin, & VonGruenigen, 2010). After a breast cancer diagnosis, body composition affects clinical outcome, with women who are obese at diagnosis having a 1.5 to 2.5 increased risk of recurrence and death relative to normal-weight survivors (Chlebowski, Aiello & McTiernan, 2002; Cleveland, et al. 2007). In this study, breast cancer recurrence was not significantly associated with higher BMI (p=0.2816) (OR=1.427[C.I: 0.495-4.114]).

Results were statistically significant in only the physical health component of HR-QoL based on BMI status (p=0.0499). This finding is similar to results from the WHEL Study (Paxton, et. al. 2012) with few statistically significant results in HR-QoL outcomes by obesity status among AA BCSs. Possible explanations for this lack of association is that many AA women were overweight or obese before their breast cancer diagnosis and/or that cultural norms promote acceptance of higher weights (Ganz, Rowland, Desmond, Meyerowitz, & Wyatt, 1998; Ashing- Giwa, Ganz & Petersen, 1999). This may explain why BCSs reporting excellent-to-good overall physical health were 3.7 times more likely to have BMIs $\geq$25 Kg/M^2 relative to their counterparts reporting fair-to-poor overall physical health.

Both nationally and in Georgia, AA women of all age groups are more likely than any other ethnic group to die from breast cancer (ACS). Effective, long-term lifestyle modifications are an approach for reducing cancer disparities and enhancing prognoses among AA women. Although culturally-specific interventions have met with some success for weight loss among AA women, there is a need to implement behavioral strategies for long-term and sustained behavioral change. Since the concept of "one size fits all" may not be effective, tailored approaches are recommended. Moreover, governmental environmental policy initiatives, such as safe walking trails and bicycle paths, may enhance community engagement by providing opportunities for promotion of health. Recreational programs sponsored by city or county governments can foster an improved quality of life for local citizens.

This study has several strengths. It is among the few population-based studies examining physical and dietary activity levels and the burden of overweight/obesity among BCSs and also examining these measures solely in AA women. Limitations include self-reporting and possible recall bias. Utilization of a cross-sectional design limits generalizability of results to other groups of BCSs and reduces the possibility of determining causality. Since the number of stage IV survivors was small, these were together grouped with stage III survivors for more accurate statistical analyses. This study did not utilize medical records to capture hormone receptor status or menopausal status of survivors. This information would be useful because hormone receptor-positive and postmenopausal patients tend to have high BMIs (Santa-Maria, Yan, Xie & Euhus, 2015). Since this was a cross-sectional study, survivors were not followed for long periods to measure change in BMI status. Despite these limitations, this work profiled dietary factors, physical activity, and HR-QoL patterns of a vulnerable group at risk for disparities in BMI and disease outcomes.

Additional research is needed to explain the lack of adherence to cancer prevention guidelines among AA BCSs. Culturally-relevant physical activity and dietary intake interventions may prove beneficial in promoting lifestyle changes.

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