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Efficacy of a Weight Loss Intervention for African American Breast Cancer Survivors

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Efficacy of a Weight Loss Intervention for African American Breast Cancer Survivors

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A B S T R A C T

Purpose

African American women with breast cancer have higher cancer-specific and overall mortality rates. Obesity is common among African American women and contributes to breast cancer progression and numerous chronic conditions. Weight loss interventions among breast cancer survivors positively affect weight, behavior, biomarkers, and psychosocial outcomes, yet few target African Americans. This article examines the effects of Moving Forward, a weight loss intervention for African American breast cancer survivors (AABCS) on weight, body composition, and behavior.

Patients and Methods

Early-stage (I-III) AABCS were randomly assigned to a 6-month interventionist-guided ($n = 125$) or self-guided ($n = 121$) weight loss program supporting behavioral changes to promote a 5% weight loss. Anthropometric, body composition, and behavioral data were collected at baseline, post-intervention (6 months), and follow-up (12 months). Descriptive statistics and mixed models analyses assessed differences between groups over time.

Results

Mean (\pm standard deviation) age, and body mass index were 57.5 (± 10.1) years and 36.1 (± 6.2) kg/m², respectively, and 82% had stage I or II breast cancer. Both groups lost weight. Mean and percentage of weight loss were greater in the guided versus self-guided group (at 6 months: 3.5 kg v 1.3kg; $P < .001$; 3.6% v 1.4%; $P < .001$, respectively; at 12 months: 2.7 kg v 1.6 kg; $P < .05$; 2.6% v 1.6%; $P < .05$, respectively); 44% in the guided group and 19% in the self-guided group met the 5% goal. Body composition and behavioral changes were also greater in the interventionist-guided group at both time points.

Conclusion

The study supports the efficacy of a community-based interventionist-guided weight loss program targeting AABCS. Although mean weight loss did not reach the targeted 5%, the mean loss of $> 3\%$ at 6 months is associated with improved health outcomes. Affordable, accessible health promotion programs represent a critical resource for AABCS.

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INTRODUCTION

Breast cancer mortality rates are highest for African American (AA) women, even after controlling for demographic, diagnostic, and treatment-related factors.^{1,2} All-cause mortality rates are also higher for AA breast cancer survivors (AABCS) due to high rates of comorbid conditions, such as diabetes and hypertension.³⁻⁵ Ninety-two percent of white women will survive at least 5 years after diagnosis, compared with 81% of AA women. These differences are not easily explained and involve multiple issues; obesity

and lifestyle factors are important contributors.^{6,7} Evidence from a 2014 meta-analysis of 82 studies found that prediagnosis and postdiagnosis obesity was associated with higher breast cancer-specific and overall mortality; overweight was associated with higher overall mortality.⁸ Over 82% of AA women are classified as overweight/obese, and 56.6% have obesity.⁹ The likelihood of an AA woman being overweight or obese when diagnosed with breast cancer is high. Women often gain weight in the years after their diagnosis, with some data suggesting AA women gain twice as much weight as white women.¹⁰⁻¹³

ASSOCIATED CONTENT



Data Supplement
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Weight loss intervention trials with breast cancer survivors report improvements in diet and physical activity, biomarkers of inflammation and insulin resistance, and quality of life, but inclusion of AABCS is limited.^{14,15} Considering the high rates of mortality, comorbidities, and obesity among AABCS, weight loss is an important priority. However, due to a complex interaction of environmental, societal, and policy-related factors, weight management may be uniquely challenging for many AAs in the United States, particularly those with limited income.¹⁶⁻¹⁸ AA women are under-represented in weight loss trials, and if they do participate, they are more apt to drop out and lose less weight.^{19,20} The feasibility of weight loss interventions for AABCS is established; however, previous studies were underpowered and none examined body composition.²¹⁻²³ We report the effects of a 6-month interventionist-guided versus a self-guided weight loss program on anthropometric, body composition, and behavioral outcomes in overweight/obese AABCS postintervention and at the 12-month follow-up.

Patient Population

Eligible participants were AABCS (stages I-III), were ≥ 18 years of age, had a body mass index (BMI) of ≥ 25 kg/m², had completed cancer treatment at least 6 months before recruitment (hormonal therapy allowed), were physically able to participate in a moderate physical activity program per health-care provider approval, and were agreeable to study procedures. Women were excluded if they were pregnant or planning to become pregnant during the study, taking prescription weight loss medication, or planning weight loss surgery in the coming year. Recruitment involved direct contact by letter and phone using hospital cancer registry contact information from three Chicago-area academic cancer centers and community-based efforts, including referrals from oncologists, flyers, social media, and presentations. The respective institutional review boards approved all study procedures, and each participant provided written informed consent. Women were randomly assigned using a random digit generator after the baseline interview.

Interventions

Participants were randomly assigned to either the 6-month Moving Forward Interventionist-Guided program (MFG) or the Moving Forward Self-Guided program (SG). Program goals for the 6-month period were identical: 5% weight loss achieved by decreased caloric intake (−500 kcal daily), increased fruit and vegetable consumption, and increased physical activity (minimum ≥ 150 minutes per week) on the basis of the American Cancer Society cancer survivor guidelines.²⁵ The cognitive-behavioral weight loss intervention was grounded within a socioecological model^{26,27} to promote self-efficacy, social support, and perceived access to community-based healthy eating and activity resources.^{24,28,29} To enhance its cultural relevance, the intervention was guided by the framework of Kreuter et al³⁰

PATIENTS AND METHODS

Study Design

Moving Forward was a community-based, randomized, weight loss intervention trial with 246 overweight/obese AABCS (Fig 1). Survivors were recruited between September 2011 and September 2014. Detailed methods were published previously.²⁴

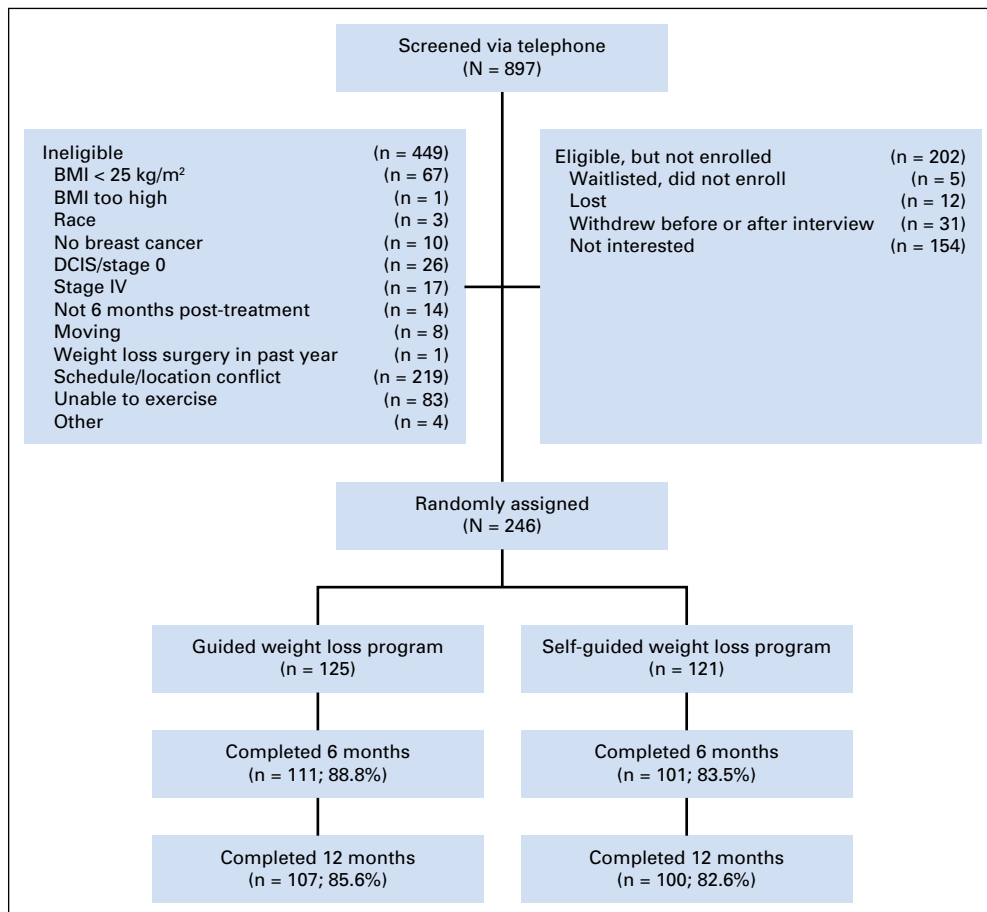


Fig 1. Flow of participants through the Moving Forward Study. BMI, body mass index.

using strategies that were (1) peripheral (logo, recruitment materials, exercise music); (2) evidential (evidence on health impact of breast cancer, obesity, comorbidities in AA community); (3) constituent (intervention was developed in collaboration with AABCS; led by individuals with whom participants could identify); and (4) sociocultural (honored values, such as the woman's central role in families, the importance of religion and worship and how it affects health perspectives, heavier body image ideals, and traditional importance of food).

MFG included twice-weekly in-person classes with supervised exercise and twice-weekly text messaging targeting enhanced self-efficacy, social support, and access to health promotion resources. Weekly Class 1 (90 minutes) began with weighing in and supervised exercise, followed by 45- to 60-minute interactive learning modules (Table 1) that addressed knowledge (eg, relationship between obesity and cancer/health), attitudes (eg, cancer/health fatalism), and cognitive behavioral strategies (eg, self-monitoring, goal setting). Participants received a program binder with hand-outs, recipes, and other supportive materials as a resource for review, reinforcement, and reminders. Weekly Class 2 (60 minutes) was a stand-alone 60-minute exercise class that included aerobic and resistance exercise training. Classes were held in the evening (6-8 PM) at neighborhood Chicago Park District facilities and were led by a study-trained community nutritionist and exercise trainer. SG participants also received the program binder, but no classes or text messaging. They met once with a non-intervention staff member to receive and review program materials. At 6 months, both groups received monthly newsletters with reinforcing information from the curriculum, news of local healthy eating and exercise resources, and participant testimonials. The choice of the SG comparator was based on strong feedback from our study advisory committee (comprising disparities researchers and AABCS), referring oncologists, and

community stakeholders. A conventional usual-care or even an attention placebo group would necessitate the withholding of lifestyle information with known benefits on health. The committee deemed this unethical and further surmised that accrual for this community-based intervention would be nearly impossible. Budgetary and time constraints precluded the use of a wait-list control group.

Measurements

Anthropometric, body composition, and behavioral outcomes were measured at baseline, 6 months, and 12 months. Height (baseline only) was measured to the nearest 0.1 cm using a portable stadiometer (Seca, Chino, CA). Weight was measured to the nearest 0.1 kg using a digital scale (Tanita; Arlington Heights, IL), with participants wearing light clothes without shoes. Two measurements for height and weight were taken; a discrepancy of more than 0.5 cm for height or 0.2 kg for weight resulted in a third measurement. The mean of the two most closely aligned measurements were used to calculate BMI (weight [kg]/height [m²]). Waist and hip circumference were measured with participants standing without outer garments and with empty pockets. Waist circumference was measured to the nearest 0.1 cm at the umbilicus during gentle expiration. Hip circumference was recorded as the maximum circumference over the buttocks. Two measurements were taken, with a discrepancy of more than 1 cm resulting in a third measurement. The mean of the two measurements most closely aligned were used for analyses. Body composition, specifically, body fat and lean tissue mass, was measured by dual-energy x-ray absorptiometry using the ilunar device (software version 13.6; GE, Chicago, IL).³¹ Dietary intake assessment was interviewer administered using the Block 2005 Food Frequency Questionnaire, which has been validated with diverse populations.^{32,33} Results were procured from Nutrition Quest to determine consumption of energy, fruits and vegetables, fat, fiber, meat, and added sugars. Physical activity, including the frequency and duration of moderate and vigorous activity over the last 6 months, was measured by the Modified Activity Questionnaire.³⁴ Medical record abstraction and self-report questionnaires provided information on comorbidities, breast cancer diagnosis, and treatment information.

Statistical Analyses

Descriptive statistics were reported for all outcomes of interest at baseline, including anthropometric and behavioral outcomes. Outcomes for MFG and SG groups at various times were assessed using a linear mixed effects model, with random effects terms to account for the correlation in repeated measures (including baseline) from a single woman. Interaction terms were included in the linear model to account for differences in trend across time between groups. A compound symmetry covariance structure was assumed for the correlation between outcomes from the same woman across time.^{35,36} For each outcome, adjusted differences in mean using the linear model, as well as estimated standard errors for the adjusted differences, were reported. At each of the 6-month and the 12-month follow-ups, the statistical significance of the difference between outcomes between the MFG and SG terms was assessed by the *P* value of the appropriate interaction term in the linear model. Difference across time within the SG, as well as within the MFG, were compared using appropriate contrast terms. An overall significance level of .05 was used, with multiplicity corrections wherever necessary. All statistical analyses were performed using SAS software version 9.3 (SAS Institute, Cary, NC).

RESULTS

Participants

A total of 897 women were screened, resulting in 246 randomly assigned to MFG (*n* = 125) or SG (*n* = 121; Table 2; Fig 1). Recruitment letters on the basis of tumor registry

Table 1. Moving Forward Weight Loss Program Weekly Topics

Week	Topic
1	Obesity and lifestyle behaviors—associations with breast cancer and overall health
2	ACS guidelines; self-monitoring and goal setting
3	Using self-monitoring tools to make better choices to meet guidelines
4	Energy requirements; body composition—why fat matters for cancer and overall health
5	Dealing with pain, fatigue, adverse effects of treatment as barriers to exercise
6	Why portions matter
7	Breakfast and water—two key tools to losing weight
8	Healthy grocery shopping—dealing with neighborhood barriers
9	Meal planning
10	Holiday eating (scheduled according to when holiday falls)
11	Stimulus control—for health promotion
12	Mindfulness for eating and cancer concerns
13	Eating away from home—restaurant and party strategies
14	Program review —where were you, where are you now?
15	Building movement into your daily life—benefits of activity for cancer and overall health risk reduction
16	Barriers to healthy eating and exercise
17	Problem solving
18	The power of habit
19	Benefits of fruits and vegetables and strategies to increase
20	Where you were, where you are, and where you plan to go
21	Relapse prevention I—what is a lapse versus relapse
22	Relapse prevention II—identifying high-risk situations
23	Relapse prevention III—maintaining a physically active lifestyle
24	Relapse prevention IV—motivation to maintain changes
25	Transitioning from Moving Forward to being on your own
26	Graduation

NOTE: Underlying each topic was the experience and perspective of being a breast cancer survivor.

Abbreviation: ACS, American Cancer Society.

contact information were the most successful recruitment mode, followed by community event presentations. Retention was 86% (n = 212) at 6 months and 84% (n = 206) at 12 months. Groups were comparable at baseline. Mean (standard deviation [SD]) age was 57.5 (10.1) years, mean (SD) BMI was 36.1 (6.2) kg/m², and 82% were diagnosed with stage I or II disease; 58.1% reported having hypertension, and 23.4% reported having diabetes. Participants were a mean of 6.7 years from diagnosis and reflected a broad range of education and income levels.

MFG Intervention Attendance

Participants attended an average of 55% of the 48 classes offered. Interestingly, if women attended the first class, their mean attendance increased to 61%. Average attendance at the first weekly class, which included education, support, and supervised exercise, was higher (75%) than that for the second class (50%), which included supervised exercise only.

Anthropometric Outcomes

Within both groups, weight, waist and hip circumferences, and body fat were significantly reduced at both time points (Table 3). Lean mass decreased slightly, but relative to total mass, the percentage of lean mass increased. Greater attendance in MFG was associated with greater weight losses (P = .019). Smoking was not associated with weight loss. Between groups, MFG demonstrated significantly greater improvements than SG for weight and percentage of weight loss (-3.49 kg v -1.27 kg; P < .001; 3.6% v 1.4%, respectively), waist circumference (-3.31 cm v -1.37 cm; P = .028), percentage of body fat (-1.44 v -0.58; P < .001), fat mass (-2.87 kg v -0.93 kg; P < .001), and percentage of lean mass (0.134 v 0.56; P = .008) at 6 months, and for weight (-2.70 kg v -1.57 kg; P < .05), percentage of body fat (-0.97 v 0.35; P = .008), and fat mass (-2.19 kg v -0.92 kg; P = .008) at 12 months. In terms of clinically meaningful weight losses, 68.2% of MFG participants lost ≥ 3% compared with 44.4% of SG; 44.3% of MFG and 19% of SG lost ≥ 5% (P < .05). MFG showed greater losses of lean mass (kg) compared with SG at both time points, but relative

Table 2. Characteristics for the African American Breast Cancer Survivors Participating in Moving Forward: A Behavioral Weight Loss Intervention

Variable	Group			P
	Total N = 246 No. (%)	1 Intervention n = 125 No. (%)	2 Control n = 121 No. (%)	
Age, years				.308*
No.	246	125	121	
Mean ± SD	57.5 ± 10.1	56.8 ± 10.0	58.1 ± 10.1	
Menopausal status				.921†
Postmenopausal	214 (87.0)	109 (87.2)	105 (86.8)	
Education				.399†
Some HS, HS grad, GED	59 (24.0)	24 (19.2)	35 (28.9)	
Some college, associate's degree, 2-year certificate	93 (37.9)	48 (38.4)	45 (37.2)	
College graduate	47 (19.1)	24 (19.2)	23 (19.0)	
Graduate or professional degree	47 (19.1)	29 (23.2)	18 (14.9)	
Combined family income, last 12 months, \$.208†
< 20,000	58 (23.6)	30 (24.0)	28 (23.1)	
20,000-39,999	56 (22.8)	25 (20.0)	31 (25.6)	
40,000-59,999	48 (19.5)	20 (16.0)	28 (23.1)	
60,000-79,999	33 (13.4)	18 (14.4)	15 (12.4)	
≥ 80,000	50 (20.3)	32 (25.6)	18 (14.9)	
Missing	1 (0.4)	0 (0.0)	1 (0.8)	
BMI, kg/m ²				.564*
Mean ± SD	36.1 ± 6.2	35.9 ± 6.2	36.4 ± 6.4	
Missing	0	0	0	
Stage				.187†
I	85 (38.3)	51 (44.0)	34 (32.1)	
II	98 (44.1)	46 (39.7)	52 (49.1)	
III	39 (17.6)	19 (16.4)	20 (18.9)	
Missing	24	9	15	
Currently receiving endocrine therapy				.757†
No	169 (70.4)	87 (71.3)	82 (69.5)	
Missing	6	3	3	
Treatment				
Surgery	240 (99.6)	122 (100.0)	118 (99.2)	.310†
Radiation	191 (79.3)	91 (74.6)	100 (84.0)	.071†
Chemotherapy	177 (73.4)	88 (72.1)	89 (74.8)	.640†
Missing	5	3	2	
Current smoker				.511†
No	202 (91.4)	101 (90.2)	101 (92.7)	
Missing	25	13	12	

Abbreviations: BMI, body mass index; HS, high school; SD, standard deviation.

*t test.

†χ² test.

Table 3. Comparison of Anthropometric Changes Within and Between Interventionist and Self-Guided Groups Over Time for the African American Breast Cancer Survivors Participating in Moving Forward: A Behavioral Weight Loss Intervention

Variable	Interventionist-Guided			Self-Guided			Between Groups	
	Baseline M (SD)	Δ Baseline to 6 Months* M (SE) n = 100	Δ Baseline to 12 Months* M (SE) n = 96	Baseline M (SD)	Δ Baseline to 6 Months* M (SE) n = 100	Δ Baseline to 12 Months* M (SE) n = 96	Overall P (6 months) †	Overall P (12 months) †
Weight, kg	96.0 (18.7)	-3.49 (0.39) P < .001	-2.70 (0.40) P < .001	96.1 (17.5)	-1.27 (0.40) P = .002	-1.57 (0.41) P < .001	< .001	.050
% Loss		3.6 (5.1)	2.6 (5.8)		1.4 (3.6)	1.6 (4.5)	< .001	.050
Waist, cm	112.6 (15.3)	-3.31 (0.61) P < .001	-2.05 (0.63) P = .001	113.9 (15.1)	-1.37 (0.64) P = .03	-1.94 (0.64) P = .003	.028	.909
Hip, cm	120.8 (14.0)	-2.79 (0.55) P < .001	-2.46 (0.57) P < .001	120.3 (12.8)	-1.35 (0.58) P = .02	-1.20 (0.58) P = .04	.073	.123
Body fat, %	46.1 (5.0)	-1.44 (0.18) P < .001	-0.97 (0.19) P < .001	46.4 (5.1)	-0.58 (0.19) P = .003	0.35 (0.19) P = .07	< .001	.008
Fat mass, kg	44.5 (12.9)	-2.87 (0.32) P < .001	-2.19 (0.33) P < .001	44.7 (12.3)	-0.93 (0.34) P = .006	-0.92 (0.34) P = .007	< .001	.008
Lean mass, %	47.9 (6.6)	1.34 (0.17) P < .001	0.88 (0.18) P < .001	47.8 (6.7)	0.56 (0.18) P = .002	0.33 (0.18) P = .07	.008	.172
Lean mass, kg	47.9 (606)	-0.58 (0.16) P < .001	-0.74 (0.16) P < .001	47.8 (6.7)	0.04 (0.17) P = .820	-0.42 (0.17) P = .014	.008	.172

Abbreviations: M, mean; SD, standard deviation.
 *Δ represents adjusted estimates of differences in the outcomes between times within each group, the interventionist-guided group and self-guided group. These adjusted differences are calculated using the linear mixed model described in the Statistical Analyses section in the main text. The P values for these adjusted differences within groups are reported directly below them.
 †These overall P values are for differences in outcomes between groups, the interventionist-guided group and self-guided group, at each follow-up time, using the significance of the appropriate interaction term in the linear mixed model described in the Statistical Analyses section in the main text.

Table 4. Comparison of Behavioral Outcome Changes Within and Between Interventionist and Self-Guided Groups Over Time for the African American Breast Cancer Survivors Participating in Moving Forward: A Behavioral Weight Loss Intervention

Variable	Interventionist-Guided			Self-Guided			Between Groups	
	Baseline M (SD)	Δ Baseline to 6 Months* M (SE) n = 100 P = .001	Δ Baseline to 12 Months* M (SE) n = 96 P < .001	Baseline M (SD)	Δ Baseline to 6 Months M (SE) n = 100 P = .02	Δ Baseline to 12 Months M (SE) n = 96 P = .003	Overall P† (6 months)	Overall P† (12 months)
Physical activity, min/wk	153.8 (177.4)	98.4 (0.42) P = .001	97.8 (0.43) P < .001	152.3 (213.2)	60.6 (0.44) P = .02	77.4 (0.44) P = .003	.298	.596
Moderate		17.4 (0.08) P < .001	14.4 (51.3) P = .003	13.2 (46.1)	2.40 (0.08) P = .639	-3.00 (0.08) P = .575	.03	.014
Vigorous	8.8 (29.6)							
Dietary intake	2,187.4 (1,187.0)	-563.9 (72.6) P < .001	-576.0 (74.1) P < .001	1,872.3 (993.5)	-262.4 (75.8) P < .001	-353.9 (75.9) P < .001	.004	.037
Daily energy intake, kcal	39.7 (5.5)	-2.19 (0.74) P = .003	-1.05 (0.75) P = .165	40.2 (6.9)	-0.67 (0.77) P = .381	0.93 (0.77) P = .228	.154	.911
kcal from fat, %	9.6 (3.8)	3.24 (0.33) P < .001	1.75 (0.34) P < .001	9.3 (3.2)	0.91 (0.35) P = .009	0.78 (0.35) P = .026	< .001	.046
Fiber, g/1,000 kcal	1.3 (1.2)	-0.41 (0.09) P < .001	-0.04 (0.09) P < .001	1.2 (1.1)	-0.18 (0.09) P = 0.06	-0.35 (0.09) P < .001	.14	.10
Meat, beef, pork, lamb servings/day	1.4 (1.1)	0.41 (0.11) P < .001	0.12 (0.11) P = .295	1.4 (1.1)	0.13 (0.11) P = .247	0.07 (0.11) P = .533	.078	.774
Fruits, cups	2.3 (1.5)	0.28 (0.12) P = .020	-0.09 (0.12) P = .46	2.0 (1.3)	0.12 (0.13) P = .920	-0.16 (0.13) P = .217	.124	.711
Vegetables, cups	1,568.5 (257.8)	-755.2 (126.3) P < .001	-799.9 (129.0) P < .001	1,569.0 (286.7)	-339.58 (131.8) P = .01	-559.5 (131.9) P < .001	286	.370
Sodium, g/1,000 kcal	18.0 (15.3)	-6.98 (1.02) P < .001	-7.25 (1.04) P < .001	15.3 (12.9)	-3.85 (1.06) P < .001	11.4 (8.9) P < .001	.035	.030
Added sugars, tsps								

Abbreviations: min, minutes; tsps, teaspoons; wk, week.
 * Δ represents adjusted estimates of differences in the outcomes between times within each group, the interventionist-guided group and self-guided group. These adjusted differences are calculated using the linear mixed model described in the Statistical Analyses section in the main text. The P values for these adjusted differences within groups are reported directly below them.
 † These overall P values are for differences in outcomes between groups, the interventionist-guided group and self-guided group, at each follow-up time, using the significance of the appropriate interaction term in the linear mixed model described in the Statistical Analyses section in the main text.

lean mass increased more in MFG. No between-group differences were noted for hip circumference.

Behavioral Outcomes

Within-group improvements were significant for moderate activity, daily energy intake, fiber, sodium, and added sugars in both groups at 6 and 12 months (Table 4; $P < .05$). MFG participants also showed improvements for percentage of calories from fat, fruits, and vegetables at 6 months and for vigorous activity and meat at 6 and 12 months ($P < .01$). SG participants had decreased meat intake at 12 months only ($P < .001$), but no changes were observed in vigorous activity, fruit intake, or vegetable intake at either time point. Between groups, MFG showed greater beneficial changes for vigorous activity, daily energy intake, fiber intake, and added sugars at both time points ($P < .05$). More MFG compared with SG participants (64.9% v 44.6% at 6 months; $P = .003$; 65.4% v 52.0% at 12 months; $P < .05$) engaged in > 150 minutes of weekly physical activity, a benchmark associated with improved health outcomes.³⁷ Groups did not differ on percentage of calories from fat, fruits, vegetables, or meat at any point. No adverse events were reported.

In summary, to our knowledge, the Moving Forward study is the first fully powered intervention trial to examine a targeted weight loss intervention's effects on anthropometrics, body composition, and behavioral outcomes among AABCS. By design, both groups showed positive changes. However, MFG demonstrated significantly greater improvements for weight, percentage of weight loss, waist circumference, body fat and lean mass, vigorous activity, daily energy intake, fiber, sodium, and added sugars postintervention; benefits remained for weight, body fat and percentage of lean body mass, vigorous activity, fiber, and added sugars at the 12-month follow-up.

Overweight and obesity in breast cancer survivors is associated with increased risk of all-cause mortality, breast cancer mortality, recurrence, and comorbidities. Weight management is particularly crucial for AABCS, given the high rates of obesity-related comorbidities. For ethical reasons, Moving Forward was intended to induce weight loss in both study groups. However, MFG participants lost more than twice as much as SG participants. This level of weight loss is superior to that reported in the few studies conducted with AABCS and in most trials with AA women in the general population.^{21,23,38,39} For example, two 12-week pilot intervention studies with AABCS reported mean weight losses of below 1 kg.^{21,23} In keeping with the literature showing racial differences in weight loss in noncancer populations, mean weight loss in our study was lower than that reported in many trials with white breast cancer survivors.^{15,40-42}

Currently, weight loss benchmarks associated with reduction in breast cancer mortality or recurrence are not established.¹⁴ However, in 2013, an expert panel formed by the National Institutes of Health provided graded evidence statements noting that weight loss beginning at 3% (for glycemic measures and triglycerides) and 5% (for blood pressure, HDL and LDL cholesterol) should be considered clinically meaningful.^{37,43,44} It is encouraging that mean percentage of weight loss for MFG (3.6%) met the lower benchmark and that 44% of participants lost at least 5% (compared with 19% of SG participants). To encourage larger weight losses in future trials, emphasis and consideration should be given to

the recommended energy prescription. A 2014 study examining differential weight loss among white and AA women receiving identical interventions found that despite equivalent adherence between groups, AA women lost an average of 3.6 kg less than white women.⁴⁵ The authors concluded that the lower energy requirement observed among AA women suggested that they required a lower energy prescription to support weight losses equivalent to that of white participants. Per the Moving Forward intervention prescription, the MFG demonstrated a mean caloric deficit of over 500 kcal and a significant increase in moderate and vigorous physical activity. Although greater deficits would lead to greater weight losses, difficulty maintaining the changes should be balanced with the advantages of smaller lifestyle changes that may be more easily maintained.

Despite the modest weight loss, both groups showed significant improvements in body fat (% and kg) and central adiposity. This is the first study to examine body composition changes in a weight loss trial with AABCS using dual-energy x-ray absorptiometry, a more precise methodology. These findings have important implications for potential biologic pathways associated with breast cancer recurrence and comorbidities. Reductions in weight, body fat, and waist circumference reduce inflammation and insulin resistance, which are associated with reduced risk of breast cancer recurrence and multiple chronic health conditions.^{14,15} Compared with available data primarily from white breast cancer survivors, our study showed smaller changes, likely relative to the amount of weight lost.⁴⁶⁻⁴⁸ Future studies will examine the associations between body composition changes and biomarkers of overall health and breast cancer recurrence in AABCS.⁴² This is a significant limitation in the current literature on weight loss in AAs in the general population as well.²⁰ We also observed small lean mass (kg) losses in the MFG group. Weight reduction by caloric restriction alone often leads to lean mass losses that can be associated with sarcopenia and unfavorable metabolic profiles.⁴⁶ Integrating resistance exercise/strength training into weight management interventions can preclude such losses. Importantly we did not detect any sarcopenia at the beginning and end of our trial. In fact, we observed increases in percentage of lean mass, with greater improvements noted for MFG. This is likely owing to the twice-weekly exercise classes that included at least 20 minutes of strength training. Although most participants had little experience with strength training, they were interested in understanding why such training mattered for health and quality of life. Participants were also eager to monitor their progress. Informal strength assessments were conducted at the beginning, midway through, and at the end of the 6 months. These assessments provided motivation for maintaining and/or increasing efforts.

Within-group anthropometric and behavioral improvements remained at the 12-month follow-up, but most attenuated compared with those observed immediately postintervention for MFG participants. These findings highlight the need for ongoing support and accountability during the maintenance phase. Although we provided informational newsletters to all participants (MFG and SG), MFG participants were accustomed to class participation and support. These results underscore the need for and interest in health promotion resources among AABCS, which can be accessed easily and affordably. Interestingly, SG participants continued to show subtle improvements from baseline to the 12-month follow-up for many outcomes. Conceivably, the minimal contact provided

via newsletters promoted behavioral changes that led to continued, albeit small, weight reductions.

Strengths of the current study include the randomized design, a focus on an understudied group with a history of disparate health outcomes, recruitment of a diverse study sample (age, education, income), a culturally informed intervention developed with the targeted population, high retention, and the inclusion of body composition measurements. Although all study measures were well validated, diet and physical activity data were based on self-report. Additional limitations included selection bias, lack of a true control group, and limited generalizability because only AABCS were engaged. Also, because we did not expect changes in the SG group, we did not collect data on their engagement with study materials.

In conclusion, the Moving Forward weight loss trial supports the efficacy of an interventionist-guided and a self-guided weight loss program for AABCS. However, the interventionist-guided program led to greater weight loss than other studies involving AABCS, and a subset met the intended goal of 5%. Notably, Moving Forward was conducted collaboratively within public recreation system facilities. As the cancer survivor population grows, ongoing community-based programs that support healthy lifestyles are required. This is particularly true for AABCS, who have high rates of obesity, often live in resource-poor neighborhoods, and face multiple barriers to healthy lifestyles.

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Disclosures provided by the authors are available with this article at jco.org.

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REFERENCES

- Joslyn SA, West MM: Racial differences in breast carcinoma survival. *Cancer* 88:114-123, 2000
- Newman LA, Griffith KA, Jatoi I, et al: Meta-analysis of survival in African American and white American patients with breast cancer: Ethnicity compared with socioeconomic status. *J Clin Oncol* 24:1342-1349, 2006
- Tammemagi CM, Nerenz D, Neslund-Dudas C, et al: Comorbidity and survival disparities among black and white patients with breast cancer. *JAMA* 294:1765-1772, 2005
- Eley JW, Hill HA, Chen WW, et al: Racial differences in survival from breast cancer. Results of the National Cancer Institute black/white cancer survival study. *JAMA* 272:947-954, 1994
- Gerend MA, Pai M: Social determinants of black-white disparities in breast cancer mortality: A review. *Cancer Epidemiol Biomarkers Prev* 17:2913-2923, 2008
- McKenzie F, Jeffreys M: Do lifestyle or social factors explain ethnic/racial inequalities in breast cancer survival? *Epidemiol Rev* 31:52-66, 2009
- Chlebowski RT, Chen Z, Anderson GL, et al: Ethnicity and breast cancer: Factors influencing differences in incidence and outcome. *J Natl Cancer Inst* 97:439-448, 2005
- Chan DS, Vieira AR, Aune D, et al: Body mass index and survival in women with breast cancer—systematic literature review and meta-analysis of 82 follow-up studies. *Ann Oncol* 25:1901-1914, 2014
- Ogden CL, Carroll MD, Kit BK, et al: Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA* 311:806-814, 2014
- Irwin ML, McTiernan A, Baumgartner RN, et al: Changes in body fat and weight after a breast cancer diagnosis: Influence of demographic, prognostic, and lifestyle factors. *J Clin Oncol* 23:774-782, 2005
- Saquib N, Flatt SW, Natarajan L, et al: Weight gain and recovery of pre-cancer weight after breast cancer treatments: Evidence from the women's healthy eating and living (WHEL) study. *Breast Cancer Res Treat* 105:177-186, 2007
- Demark-Wahnefried W, Winer EP, Rimer BK: Why women gain weight with adjuvant chemotherapy for breast cancer. *J Clin Oncol* 11:1418-1429, 1993
- Rock CL, Flatt SW, Newman V, et al: Factors associated with weight gain in women after diagnosis of breast cancer. Women's Healthy Eating and Living Study Group. *J Am Diet Assoc* 99:1212-1221, 1999
- Playdon M, Thomas G, Sanft T, et al: Weight loss intervention for breast cancer survivors: A systematic review. *Curr Breast Cancer Rep* 5:222-246, 2013
- Reeves MM, Terranova CO, Eakin EG, et al: Weight loss intervention trials in women with breast cancer: A systematic review. *Obes Rev* 15:749-768, 2014
- Paxton RJ, Phillips KL, Jones LA, et al: Associations among physical activity, body mass index, and health-related quality of life by race/ethnicity in a diverse sample of breast cancer survivors. *Cancer* 118:4024-4031, 2012
- Dennis Parker EA, Sheppard VB, Adams-Campbell L: Compliance with national nutrition recommendations among breast cancer survivors in "stepping stone." *Integr Cancer Ther* 13:114-120, 2014
- Paxton RJ, Taylor WC, Chang S, et al: Lifestyle behaviors of African American breast cancer survivors: A Sisters Network, Inc. study. *PLoS One* 8:e61854, 2013
- Foster GD, Wadden TA, Swain RM, et al: Changes in resting energy expenditure after weight loss in obese African American and white women. *Am J Clin Nutr* 69:13-17, 1999
- Kumanyika SK, Whitt-Glover MC, Gary TL, et al: Expanding the obesity research paradigm to reach African American communities. *Prev Chronic Dis* 4:A112, 2007
- Sheppard VB, Hicks J, Makambi K, et al: The feasibility and acceptability of a diet and exercise trial in overweight and obese black breast cancer survivors: The Stepping STONE study. *Contemp Clin Trials* 46:106-113, 2016
- Delgado-Cruzata L, Zhang W, McDonald JA, et al: Dietary modifications, weight loss, and changes in metabolic markers affect global DNA methylation in Hispanic, African American, and Afro-Caribbean breast cancer survivors. *J Nutr* 145:783-790, 2015
- Chung S, Zhu S, Friedmann E, et al: Weight loss with mindful eating in African American women following treatment for breast cancer: A longitudinal study. *Support Care Cancer* 24:1875-1881, 2015
- Stolley MR, Sharp LK, Fantuzzi G, et al: Study design and protocol for moving forward: A weight loss intervention trial for African-American breast cancer survivors. *BMC Cancer* 15:1018, 2015
- Rock CL, Doyle C, Demark-Wahnefried W, et al: Nutrition and physical activity guidelines for cancer survivors. *CA Cancer J Clin* 62:243-274, 2012
- Bandura A. *Social Foundations of Thought and Action*. Englewood Cliffs, NJ, Prentice-Hall, 1986
- Stokols D: Translating social ecological theory into guidelines for community health promotion. *Am J Health Promot* 10:282-298, 1996
- Stolley MR, Sharp LK, Oh A, et al: A weight loss intervention for African American breast cancer survivors, 2006. *Prev Chronic Dis* 6:A22, 2009
- Stolley MR, Sharp LK, Wells AM, et al: Health behaviors and breast cancer: Experiences of urban African American women. *Health Educ Behav* 33:604-624, 2006
- Kreuter MW, Lukwago SN, Bucholtz RD, et al: Achieving cultural appropriateness in health promotion

programs: Targeted and tailored approaches. *Health Educ Behav* 30:133-146, 2003

31. Going SB, Massett MP, Hall MC, et al: Detection of small changes in body composition by dual-energy x-ray absorptiometry. *Am J Clin Nutr* 57:845-850, 1993

32. Block G, Hartman AM, Dresser CM, et al: A data-based approach to diet questionnaire design and testing. *Am J Epidemiol* 124:453-469, 1986

33. Block G, Woods M, Potosky A, et al: Validation of a self-administered diet history questionnaire using multiple diet records. *J Clin Epidemiol* 43:1327-1335, 1990

34. Kriska A, Caspersen C: Introduction to a collection of physical activity questionnaires. *Med Sci Sports Exerc* 29:5-9, 1997

35. McCulloch CE, Searle SR, Neuhaus JM (eds): *Generalized, Linear, and Mixed Models*. Hoboken, NJ, Wiley, 2001

36. Cohen J, Cohen P, West SG, et al (eds): *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences* (ed 3). New York, NY, Routledge Academic, 2002

37. Jensen MD, Ryan DH, Apovian CM, et al: 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and

the Obesity Society. *J Am Coll Cardiol* 63:2985-3023, 2014

38. Kong A, Tussing-Humphreys LM, Odoms-Young AM, et al: Systematic review of behavioural interventions with culturally adapted strategies to improve diet and weight outcomes in African American women. *Obes Rev* 15:62-92, 2014 (suppl 4) [Erratum: *J Am Coll Cardiol* 63:3029-3030, 2014]

39. Greenlee HA, Crew KD, Mata JM, et al: A pilot randomized controlled trial of a commercial diet and exercise weight loss program in minority breast cancer survivors. *Obesity (Silver Spring)* 21:65-76, 2013

40. Harrigan M, Cartmel B, Lofffield E, et al: Randomized trial comparing telephone versus in-person weight loss counseling on body composition and circulating biomarkers in women treated for breast cancer: The lifestyle, exercise, and nutrition (LEAN) study. *J Clin Oncol* 34:669-676, 2016

41. Rock CL, Flatt SW, Byers TE, et al: Results of the exercise and nutrition to enhance recovery and good health for you (ENERGY) trial: A behavioral weight loss intervention in overweight or obese breast cancer survivors. *J Clin Oncol* 33:3169-3176, 2015

42. Kumanyika SK, Whitt-Glover MC, Haire-Joshu D: What works for obesity prevention and treatment

in black Americans? Research directions. *Obes Rev* 15:204-212, 2014 (suppl 4)

43. Williamson DA, Bray GA, Ryan DH: Is 5% weight loss a satisfactory criterion to define clinically significant weight loss? *Obesity (Silver Spring)* 23:2319-2320, 2015

44. Ryan D, Heaner M: Guidelines (2013) for managing overweight and obesity in adults. Preface to the full report. *Obesity (Silver Spring)* 22:S1-S3, 2014 (suppl 2)

45. DeLany JP, Jakicic JM, Lowery JB, et al: African American women exhibit similar adherence to intervention but lose less weight due to lower energy requirements. *Int J Obes* 38:1147-1152, 2014

46. Thomson CA, Stopeck AT, Bea JW, et al: Changes in body weight and metabolic indexes in overweight breast cancer survivors enrolled in a randomized trial of low-fat vs. reduced carbohydrate diets. *Nutr Cancer* 62:1142-1152, 2010

47. Mefferd K, Nichols JF, Pakiz B, et al: A cognitive behavioral therapy intervention to promote weight loss improves body composition and blood lipid profiles among overweight breast cancer survivors. *Breast Cancer Res Treat* 104:145-152, 2007

48. Jen KL, Djuric Z, DiLaura NM, et al: Improvement of metabolism among obese breast cancer survivors in differing weight loss regimens. *Obes Res* 12:306-312, 2004

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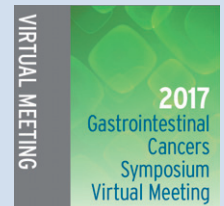
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Efficacy of a Weight Loss Intervention for African American Breast Cancer Survivors

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