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Weight loss with mindful eating in African American women following treatment for breast cancer: a longitudinal study

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Abstract

Purpose—Women with higher body mass index (BMI) following breast cancer (BC) treatment are at higher risk of BC recurrence and death than women of normal weight. African American (AA) BC patients have the highest risk of BC recurrence and gain more weight after diagnosis than their white counterparts. The purpose of this study was to evaluate the association between a mindful eating intervention and weight loss in AA women following chemotherapy for BC.

Methods—A single-group 24-week longitudinal pilot study with repeated measures was conducted. AA women (N= 22, BMI=35.13 kg/m^2, range=27.08–47.21) with stage I–III BC who had finished active cancer treatment received a 12-week mindful eating intervention with individual dietary counseling and group mindfulness sessions, followed by bi-weekly telephone follow-up for 12 weeks. Linear mixed models were used to evaluate the effects of the intervention and of baseline mindfulness on the weight change over time.

Results—In the overall group (N=22), MEQ scores increased over time (p=0.001) while weight decreased over time (−0.887 kg, p=0.015). Weight loss over time was associated with higher T1 MEQ scores (p=0.043). Participants in the higher MEQ group (n=11) at T1 experienced significant weight loss over time (−1.166 kg, p=0.044), whereas those in the low MEQ (n=11) did not lose

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weight. Participants who were diagnosed with stage 1 BC experienced significant weight loss over time (−7.909 kg, p=0.014).

Conclusions—This study suggests that a mindful weight loss program may be effective for weight reduction and maintenance in some AA women who have completed treatment for BC, particularly those diagnosed with stage 1 BC and with initially higher mindful eating behaviors. Mindful weight loss program is proposed as a promising way in which to reduce obesity-related conditions in AA BC survivors.

Keywords

African Americans; Breast cancer; Mindfulness; Weight loss

Background

Approximately half of breast cancer (BC)-related deaths among postmenopausal women in the USA are attributable to being overweight [1–4]. Women with high body mass index (BMI) have up to twice the risk of BC recurrence and death than women of normal weight [5–7]. Unfortunately, a majority of women gain weight following BC diagnosis and treatment [8], and African American (AA) BC survivors tend to gain twice the weight of white women [9]. Although weight gain following a BC diagnosis is also well documented in white women, their decreased relative rates of obesity and postdiagnosis weight gain suggest that ethnic minority women, particularly AA women, require more urgent attention for weight loss.

Mindfulness, defined as a “non-judgmental, present-oriented, focused attention,” [10], includes cultivating awareness of the unity between mind and body as well as exploring the role of unconscious thoughts and feelings in undermining emotional, physical, and spiritual health. Mindfulness is suggested as an influential force across cognitive, affective, and behavioral domains and shown to enhance weight loss in non-cancer populations [11–13]. The value of mindfulness as an adjunct to cognitively based weight interventions holds promise, especially for influencing long-term maintenance of achieved weight loss, a persistently troubling problem reported in the literature.

Mindfulness training is an acceptable approach for AAs for stress management and may be useful for prevention of stress-related health disparities [14]. Although mindfulness interventions for weight loss in AA women have not been reported thus far, such approaches have been used in multiracial populations of patients with cancer to target improvement in inflammation and psychosocial health. A mindfulness intervention in breast and prostate cancer patients resulted in decreased T helper type 1 cells that produce tumor necrosis factor (TNF), a potent mediator of inflammatory and immune responses [15]. A mindfulness-based stress reduction program conducted with BC patients demonstrated decreased levels of IL-6 and other inflammatory markers compared to the control group [16]. Evidence of growing associations between mindfulness interventions and reduction in markers of inflammation suggest that weight loss in combination with a mindfulness approach to eating may result in a compounded reduction benefit beyond what is normally observed in traditional weight loss. In early-stage BC patients, a mindfulness-based stress reduction intervention

demonstrated improved psychosocial adjustment to the diagnosis, increased emotional control, and decreased depressive symptoms in the mindfulness-based stress reduction group compared to women in the usual supportive care and nutrition education groups [17]. This study suggests that an advantage in psychosocial health outcomes may be achieved by using mindfulness-based interventions with BC patients, which may result in better behavioral and cognitive success with interventions for weight loss.

Mindfulness as an adjunct to cognitively based weight interventions holds promise, especially in its potential to influence long-term maintenance of achieved weight loss, a persistently troubling problem reported in the literature. For AA BC survivors, the potential for enhanced weight loss using mindfulness training is an easily incorporated technique that may be of great additional benefit during active weight loss as well as in reducing weight regain. Therefore, we developed a mindfulness-guided intervention of culturally targeted approaches to food, eating, and cooking. The purpose of this study was to evaluate the effectiveness of a mindful weight loss intervention on weight loss in overweight and obese AA women with a history of BC in order to assess the feasibility of mindful eating as a weight loss approach for AA BC survivors.

Methods

A single-group longitudinal study was conducted. Following University of Maryland Institutional Review Board study approval, recruitment was done through oncology practices, community churches, and health fairs. Eligibility criteria included having (1) a self-described black or AA racial background; (2) BMI>25 kg/m^2; (3) a history of BC, stages I–III; (4) completed active treatment (surgery/radiation/chemotherapy) at least 3 months prior (with exception of aromatase inhibitors/tamoxifen); (5) ability to speak English; and (6) medical clearance from an oncologist or primary care provider.

Intervention

The intervention consisted of an active weight loss program and a follow-up period. The weight loss program (weeks 1–12) included a bi-weekly registered dietician (RD)-delivered individual dietary counseling, which was based on the American Dietetic Association recommendations for weight loss [18]. Calorie requirements were calculated for each participant using the Mifflin-St. Jeor formula for daily calorie needs. A daily 500 calorie deficit was calculated in addition to 50–55 % carbohydrate, 15–20 % protein, and 30 % fat of total calories. In addition, six bi-weekly small group sessions with five to eight participants alternating with individual counseling weeks were delivered to incorporate principles of mindful weight loss in addition to reinforcement of healthy eating principles, such as planning a balanced eating plan and identifying hidden fats. On six different evenings, participants assembled at the American Cancer Society Hope Lodge to participate in a 120-min interactive program. The program was designed to provide formal mindfulness instruction and practice, as well as to facilitate group discussion related to lifestyle management for weight loss.

- Mindfulness session: components included mindfulness, mindful eating, and body scan, which is an exercise in which one’s attention circulates through the

entire body in a non-judgmental way, focusing on the breath and acknowledging feelings that arise in the body.

- Diet session included review of content from the workbook developed in our pilot study of low-fat eating in an AA BC survivor population [19], containing principles of good nutrition and ways to modify high-fat ethnic foods for low-fat eating. Revisiting the body scan taught previously was also done.
- Mindful cooking session was conducted at the Hope Lodge kitchen. Demonstrations of healthy substitutions in traditional ethnic recipes and other techniques were done. Participants were involved in the cooking activities, while mindful cooking, the appreciation of the act of food preparation, was also discussed.
- Mindful eating: the main focus was on the actual process of eating a meal mindfully and this included application of mindful eating practices as dinner was served.
- Mindful meditation session included principles of mindful meditation, using the breath for focus. Applying mindfulness to difficult eating and social situations was also discussed. A mindful walking exercise, which is the concentration on physical and emotional sensations during routine walking, was demonstrated and included group participation.
- Moving into maintenance mindfully session focused on key techniques learned in previous sessions and how to apply them to weight maintenance, when staff support decreases and self-reliance must increase for continued weight loss success.

During the 12-week follow-up phase, bi-weekly telephone support was provided by study staff in which participant progress and questions about diet, exercise, and mindfulness were answered.

Measurement

Demographic and health characteristics (e.g., stage of cancer, hormonal therapy, and type of treatment) were obtained at baseline. Weight and mindful eating scores were obtained by survey at baseline, week 13, and end of study.

Mindful eating

Mindful eating was measured using the Mindful Eating Questionnaire (MEQ) [20], a 28-item questionnaire with a four-point Likert scale (1=almost always, 4=almost never) that assesses five domains of mindful eating: disinhibition, awareness, distraction, external cues, emotional response, and distraction. The disinhibition domain is comprised of eight questions asking about the ability to refrain from eating even when one is full. The awareness domain is composed of seven questions aiming to capture the capability to sense and appreciate the effects of the food on internal states. The external cues domain has six questions related to eating in response to the environment, while the emotional reaction domain has four questions related to eating in response to negative emotional states. The

distraction domain uses three questions to capture if one focuses on other activities while eating. Following calculation of the mean score for each domain, the summary score for mindful eating is determined by averaging means from the five domains. Higher scores reflect more mindful eating behaviors, including bodily sensations, emotions, and thoughts that (usually unconsciously) precede and influence eating behaviors (Cronbach's α=0.64).

Data analysis

The distribution of the outcome variable was checked prior to fitting the model. Linear mixed models (LMM) with random intercepts were used to evaluate the effects of time (the intervention) and the effects of baseline mindfulness on the weight change over time. LMM accounts for the intraindividual correlations across repeated assessments. Intraclass correlations (ICC) were over 0.01 (ICC=0.976), confirming the nesting within individuals and thus the appropriateness of LMM analysis. The interactions between time and baseline MEQ score, as well as between time and cancer stage, were examined to evaluate if the change in weight over time is different in each of the groups.

Weight change was further evaluated by stratifying participants by baseline MEQ as well as by cancer stage at diagnosis. The median baseline MEQ score was used to dichotomize the women into women with lower MEQ score at baseline or higher MEQ score at baseline (low, below 2.69; high, 2.69 and above). Because of the small sample size, stages I and II, which comprise early-stage BC, were separated in order to identify intervention differences between individual BC stages. All analyses were conducted using SPSS 21.

Results

A total of 26 women participated in the study. Four women were excluded because of missing outcome data, yielding 22 participants for data analysis. Participants ranged in age from 33 to 75 years with an average age of 50.14 (SD 9.0; see Table 1). More than half of participants (63.6 %) had Bachelor degrees or above. Cancer stage was distributed evenly over stage I (31.8 %), II (31.8 %), and III (27.3 %) (Table 1). Among cancer stages, there were no differences for age or history of treatment with chemotherapy, radiation, or hormonal therapy. As expected, there were differences by stage in surgical management of breast cancer, with 66.7 % of stage 1 having received breast conserving therapy, and 57.1 and 100 % of women with stages II and III having received mastectomies, respectively (p=0.01).

In the overall sample, the mean MEQ score was 2.87 (SD 0.40) ranging from 2.18 to 3.98 at baseline, with higher scores indicating more mindful eating. Weight and MEQ scores at three time points over the course of the study are provided in Table 2. MEQ scores increased significantly over time (p=0.001) while weight (p=0.015) and BMI (p=0.014) decreased significantly over time (Table 2).

The change in weight was not statistically significantly different by initial MEQ score, as shown by the non-significant interaction between time and the baseline mindful eating score (p=0.996). However, despite the low statistical power due to small sample size, change in weight over time was further explored in higher and lower baseline MEQ group to estimate

an effect size of weight change over time in each group. The decrease in weight over time was significant in the high mindful eating group (MEQ≥2.69; p=0.044) but not in the low mindful eating group MEQ<2.69) (Table 3).

The change in weight differed by cancer stage, as demonstrated by the interaction between time and stage of cancer (stage 3: β=2.605, p=0.005), where patients with stage III BC lost less weight over time (−0.97 kg, p=0.005) compared to patients with stage I BC (−3.58 kg, p=0.269). Similarly, patients with stage II BC lost less weight over time (−2.98 kg, p=0.479) compared to patients with stage I BC. When the weight change was compared among women diagnosed at different cancer stages, women diagnosed with BC at stage I significantly lost weight over time (β=−7.909, p=0.014, results not shown in table).

Discussion

The mindful weight loss intervention improved mindful eating in AA women with a history of BC and was associated with decreased weight over time. This finding was particularly clear for those with higher mindful eating patterns before the intervention began. Mean baseline weight of participants in the high mindful eating group decreased significantly over time, suggesting that women with initially higher mindful eating behaviors derive a significant weight loss effect from an intervention designed to increase these behaviors. The effect of the mindful weight loss intervention on weight and mindful eating suggests an extended behavioral effect of mindfulness training in maintaining achieved weight loss, an important and often overlooked component of weight loss interventions in cancer patients. With regard to cancer stage and weight loss, those with stage I lost more weight than women with stage II or III. Given that surgical management was the only difference noted between the three stages, one possible explanation may lie in previously reported improved cosmetic and body image of patients with breast conserving surgery [21], which in this study, may have served as a motivation catalyst for continuing to enhance these important indicators of posttreatment quality of life. Further exploration of the influence of cancer stage and treatment on weight loss outcomes is needed to better refine weight loss treatment in this population.

This is the first known study to evaluate a mindful eating intervention in BC survivors, and the focus on AA women is of particular importance, given their relatively higher BMI and obesity-related recurrence risk compared to Caucasians. Other strengths of the study include a strong group intervention component, which can be standardized for other programs of weight loss targeted to this population in need of weight management. The literature supports that AA women prefer an intervention for weight loss that combines individual counseling and group meetings [22]. Our study demonstrates successful weight loss and maintenance with such a combination, and we recommend that both components be retained for future intervention work.

Other, more intensive programs for weight loss have been evaluated in AA women with a history of BC, including a 6-month twice weekly group session approach with diet information and guided exercise (N=20), resulting in statistically significant mean weight loss (2.53 kg) and mean reduction in BMI (−1.00 kg/m^2) [23]. An 8-week study (N=24) of

group meetings and a walking intervention also demonstrated statistically significant reductions in both BMI (−0.38 kg/m^2) and percentage total body fat (−3.4 %) [24]. Each of these studies included frequent meetings, which are not readily adaptable to the general population of AA BC survivors because they are not feasible or affordable to do on a large scale. Our study results, on the other hand, demonstrate better weight loss results using a more moderate intensity approach. This approach was designed to change eating behavior as well as how one responds to cues about eating, which may be a critical element for long-term weight loss success.

Studies of mindfulness training as an adjunct to traditional weight loss methods in non-cancer populations have resulted in improved weight loss, and our findings underscore the growing importance of this approach. A randomized control trial (RCT) of a mindful weight loss intervention in women without cancer demonstrated a greater decrease in mean BMI in the intervention group [25], and in obese women who had completed 6 months or more of a weight loss program and received a mindfulness intervention during the weight maintenance period, lower BMI was observed at 3 months follow-up compared to controls [26]. Functional magnetic resonance image scanning has demonstrated superior global efficiency (an ability to dismiss food cues) in the precuneus, a primary area of the resting brain, when exposed to eating cues during scanning for obese participants scoring highest on mindfulness traits. This finding indicates participants' ability to dismiss food cues more easily than those with low mindfulness scores [27]. By contrast, the low mindful group had the greatest global efficiency in the auditory and insular cortices, indicating hyperresponsiveness of those areas in response to food cues.

Traditional cognitive behavioral approaches to weight loss in both the general population as well as in those with a history of cancer often fall short of the sustained weight loss goal. Our findings support the weight maintenance value of the intervention. Mindfulness is increasingly identified as an important adjunct to successful weight loss programs because it incorporates focused awareness of body signals of hunger and satiety, emotional triggers to overeating, and acceptance of the body in its current state. We believe that such novel concepts related to weight loss implementation also hold promise for enhancing weight loss, weight maintenance, and management of emotional eating etiologies in BC patients. For AA BC survivors, the potential for enhanced weight loss using mindfulness training is an easily incorporated technique that may be of great additional benefit during active weight loss as well as in reducing weight regain.

Limitations of this study include a small sample size and single group design, in which the intervention was provided to all participants and therefore lacked a control. The one-group design without a control group hinders the ability to assess the intervention effect; however, the longitudinal nature of the study enabled us to see the change over time. Moreover, given that weight has previously been shown to increase post-BC diagnosis and treatment in AA [9], the decreasing weight trend shown in this pilot study postmindful intervention is noteworthy. The small sample size would have an impact on the power of the intervention effect, but this study is meaningful as it provides the descriptive and directional information that may suggest the impact of mindful eating on weight loss in AA BC survivors. Results from this pilot study also enable us to calculate the effect size for a larger intervention study.

Although significant findings were identified in our analysis, it is possible that incremental improvement on other outcomes may have been discerned with more participants. This population of AA survivors was well-educated and did not represent the cross section of women with BC. This intervention, therefore, may not be generalizable to all AA BC survivors, and further investigation in a more variable socioeconomic population is warranted. In future studies, the effectiveness of the mindful eating intervention on weight while controlling for demographics, treatment, disease, and duration of the intervention should be evaluated with an RCT design in a larger study sample. Having a larger study sample will also strengthen the power to detect the moderating effect of or the interactions with the confounding variables. Even so, a definitive study will also be needed to test the intervention in AA BC survivors in a multiyear longitudinal study, where the impact of this intervention on actual recurrence and mortality could be assessed.

Weight maintenance is one of the most elusive achievements in weight loss science, likely because many people turn to entrenched eating behaviors in social situations as well as to manage emotional stress. Based upon this study, as well as the literature, we expect that mindfulness training works to disrupt those patterns that lead to the use of food for reasons other than hunger. Reducing the BC recurrence and survival disparity between AA and white women is possible with an appropriate weight loss intervention targeted to individual dietary and exercise needs and supported by principles of mindfulness and mindful eating delivered in a group setting. The value of mindfulness as an adjunct to cognitively based weight interventions is increasingly clear, especially in its potential to influence long-term maintenance of achieved weight loss, a persistently troubling problem reported in the literature. By reducing the risk factor of weight gain in the recurrence risk profile for AA women, we expect that study findings will provide a promising avenue for reduction of obesity-related conditions in AA BC cancer survivors.

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References

1. Boyd NF, Campbell JE, Germanson T, Thomson DB, Sutherland DJ, Meakin JW. Body weight and prognosis in breast cancer. J Natl Cancer Inst. 1981; 67(4):785–789. [PubMed: 6944548]
2. Chlebowski BRT, Aiello E, Mctiernan A. Weight loss in breast cancer patient management. J Clin Oncol. 2014; 20(4):1128–1143. [PubMed: 11844838]
3. Goodwin PJ, Ennis M, Pritchard KI, et al. Fasting insulin and outcome in early-stage breast cancer: results of a prospective cohort study. J Clin Oncol. 2002; 20(1):42–51. [PubMed: 11773152]
4. 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. 2005; 23(4):774–782. DOI: 10.1200/JCO.2005.04.036 [PubMed: 15681521]
5. Druesne-Pecollo N, Touvier M, Barrandon E, et al. Excess body weight and second primary cancer risk after breast cancer: a systematic review and meta-analysis of prospective studies. Breast Cancer Res Treat. 2012; 135(3):647–654. DOI: 10.1007/s10549-012-2187-1 [PubMed: 22864804]

6. Protani M, Coory M, Martin JH. Effect of obesity on survival of women with breast cancer: systematic review and meta-analysis. Breast Cancer Res Treat. 2010; 123:627–635. DOI: 10.1007/s10549-010-0990-0 [PubMed: 20571870]
7. Kroenke CH, Chen WY, Rosner B, Holmes MD. Weight, weight gain, and survival after breast cancer diagnosis. J Clin Oncol. 2005; 23(7):1370–1378. DOI: 10.1200/JCO.2005.01.079 [PubMed: 15684320]
8. Vance V, Mourtzakis M, McCargar L, Hanning R. Weight gain in breast cancer survivors: prevalence, pattern and health consequences. Obes Rev. 2011; 12(4):282–294. DOI: 10.1111/j.1467-789X.2010.00805.x [PubMed: 20880127]
9. 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. 1999; 99(10):1212–1221. [PubMed: 10524383]
10. Kabat-Zinn J. Mindfulness-based interventions in context: past, present, and future. Clin Psychol Sci Pract. 2003; 10:144–156.
11. Godsey J. The role of mindfulness based interventions in the treatment of obesity and eating disorders: an integrative review. Complement Ther Med. 2013; 21(4):430–439. DOI: 10.1016/j.ctim.2013.06.003 [PubMed: 23876574]
12. Katterman SN, Kleinman BM, Hood MM, Nackers LM, Corsica J. Mindfulness meditation as an intervention for binge eating, emotional eating, and weight loss: a systematic review. Eat Behav. 2014; 15(2):197–204. DOI: 10.1016/j.eatbeh.2014.01.005 [PubMed: 24854804]
13. O'Reilly GA, Cook L, Spruijt-Metz D, Black DS. Mindfulness-based interventions for obesity-related eating behaviours: a literature review. Obes Rev. 2014; 15(6):453–461. DOI: 10.1111/obr.12156 [PubMed: 24636206]
14. Woods-Giscombé CL, Gaylord SA. The cultural relevance of mindfulness meditation as a health intervention for African Americans: implications for reducing stress-related health disparities. J Holist Nurs. 2014; 32(3):147–160. DOI: 10.1177/0898010113519010 [PubMed: 24442592]
15. Carlson LE, Speca M, Faris P, Patel KD. One year pre-post intervention follow-up of psychological, immune, endocrine and blood pressure outcomes of mindfulness-based stress reduction (MBSR) in breast and prostate cancer outpatients. Brain Behav Immun. 2007; 21(8):1038–1049. DOI: 10.1016/j.bbi.2007.04.002 [PubMed: 17521871]
16. Witek-Janusek L, Albuquerque K, Chroniak KR, Chroniak C, Durazo-Arvizu R, Mathews HL. Effect of mindfulness based stress reduction on immune function, quality of life and coping in women newly diagnosed with early stage breast cancer. Brain Behav Immun. 2008; 22(6):969–981. DOI: 10.1016/j.bbi.2008.01.012 [PubMed: 18359186]
17. Henderson VP, Clemow L, Massion AO, Hurley TG, Druker S, Hébert JR. The effects of mindfulness-based stress reduction on psychosocial outcomes and quality of life in early-stage breast cancer patients: a randomized trial. Breast Cancer Res Treat. 2012; 131(1):99–109. DOI: 10.1007/s10549-011-1738-1 [PubMed: 21901389]
18. Academy of Nutrition and Dietetics Evidence Analysis Library. Adult weight management reduced calorie diets-recommendations. 2015. Available at: http://www.andeal.org/template.cfm?template=guide_summary&key=622&highlight=Adultweightmanagementevidence%2Dbased&home=1. Accessed 2 June, 2015
19. Griffith KA, Royak-Schaler R, Nesbitt K, et al. A culturally specific dietary plan to manage weight gain among African American breast cancer survivors: a feasibility study. Nutr Health. 2012; 21(2):97–105. DOI: 10.1177/0260106012459938 [PubMed: 23139389]
20. Framson C, Kristal AR, Schenk JM, Littman AJ, Zeliadt S, Benitez D. Development and validation of the mindful eating questionnaire. J Am Diet Assoc. 2009; 109(8):1439–1444. DOI: 10.1016/j.jada.2009.05.006 [PubMed: 19631053]
21. Pockaj B, AC D, Boughey JC, Gray RJ, McLaughlin S, Dueck AC, Perez E, Halyard MY, Frost MH, Cheville AL, Ja S. Quality of life after breast cancer surgery: what have we learned and where should we go next? J Surg Oncol. 2009; 99:447–455. [PubMed: 19418493]
22. Blixen CE, Singh A, Thacker H. Values and beliefs about obesity and weight reduction among African American and Caucasian women. J Transcult Nurs. 2006; 17(3):290–297. DOI: 10.1177/1043659606288375 [PubMed: 16757669]

23. Stolley MR, Sharp LK, Oh A, Schiffer L. A weight loss intervention for African American breast cancer survivors, 2006. Prev Chronic Dis. 2009; 6:A22. [PubMed: 19080028]

24. Wilson DB, Porter JS, Parker G, Kilpatrick J. Anthropometric changes using a walking intervention in African American breast cancer survivors: a pilot study. Prev Chronic Dis. 2005; 2:A16. [PubMed: 15888227]

25. Tapper K, Shaw C, Ilsley J, Hill AJ, Bond FW, Moore L. Exploratory randomised controlled trial of a mindfulness-based weight loss intervention for women. Appetite. 2009; 52(2):396–404. DOI: 10.1016/j.appet.2008.11.012 [PubMed: 19101598]

26. Lillis J, Hayes SC, Bunting K, Masuda A. Teaching acceptance and mindfulness to improve the lives of the obese: a preliminary test of a theoretical model. Ann Behav Med. 2009; 37(1):58–69. DOI: 10.1007/s12160-009-9083-x [PubMed: 19252962]

27. Paolini B, Burdette JH, Laurienti PJ, Morgan AR, Williamson DA, Rejeski WJ. Coping with brief periods of food restriction: mindfulness matters. Front Aging Neurosci. 2012 Jun.4:13.doi: 10.3389/fnagi.2012.00013 [PubMed: 22685430]

Table 1

Baseline demographics and health characteristics (*N*=22)

Characteristic	Number	Percent	Range	Mean (SD)
Age (years)	22		33–75	50.14 (9.00)
Cancer stage				
Stage 1	7	31.8		
Stage 2	7	31.8		
Stage 3	6	27.3		
Hormonal therapy				
Yes	12	54.5		
Education				
High school or less	4	18.2		
Some college	4	18.2		
Bachelor and above	14	63.6		
BMI (kg/m^2)	19		27.08–47.21	35.13 (3.97)
MEQ	22		2.18–3.15	2.71 (0.28)
Low MEQ at baseline	11		2.18–2.66	2.47 (0.15)
High MEQ at baseline	11		2.72–3.15	2.94 (0.13)

Totals vary due to missing data; Mindful Eating Questionnaire (MEQ) assessing mindful eating; score range is 1–4, higher is mindful; dichotomized MEQ at baseline (low, below 2.69; high, 2.69 and above)

BMI body mass index

Table 2

Changes in mindful eating assessment, weight, and BMI over time in African American women with treatment of breast cancer who participated in mindfulness eating intervention program for 6 months (*N*=22)

Characteristic	Baseline		Post-3 months		Post-6 months		β	Sig.
	Range	Mean (SD)	Range	Mean (SD)	Range	Mean (SD)		
MEQ	2.18–3.98	2.87 (0.400)	2.28–3.64	2.90 (0.44)	2.46–3.98	3.03 (0.405)	0.160	.001
Weight (kg)	59.87–142.30	92.44 (16.05)	59.87–136.26	91.53 (16.14)	63.59–142.30	92.00 (16.90)	−0.887	.015
BMI (kg/m^2)	27.08–47.21	35.13 (3.97)	25.10–47.75	34.30 (4.27)	26.66–49.87	34.47 (4.59)	−0.331	.014

Mindful Eating Questionnaire (MEQ) assessing mindful eating; score range is 1–4, higher is more mindful

BMI body mass index

Table 3

Summary of the results of the stratified linear mixed models analyses, stratified by mindful eating at baseline, to examine changes over time in weight of African American women with treatment of breast cancer who participated in mindfulness eating intervention program for 6 months (*N*=22)

MEQ group	Parameter	Estimate	SE	*df*	*t*	Sig.	95 % confidence interval	
							Lower bound	Upper bound
ALL (*N*=22)	Intercept	97.591	4.570	22.515	21.357	0.000	88.127	107.055
	Time	−0.607	0.491	44.000	−1.237	0.223	−1.597	0.382
	MEQ_B	−8.768	6.462	22.515	−1.357	0.188	−22.152	4.617
	MEQ_B*Time	−0.558	0.694	44.000	−0.804	0.426	−1.958	0.841
Low MEQ at baseline (*n*=11)	Intercept	97.591	5.234	11.148	18.644	<0.001	86.089	109.093
	Time	−0.607	0.428	22.000	−1.421	0.169	−1.494	0.279
High MEQ at baseline (*n*=11)	Intercept	88.824	3.790	11.471	23.437	<0.001	80.524	97.124
	Time	−1.166	0.547	22.000	−2.131	0.044	−2.300	−0.031

Outcome variable: weight (kg)

MEQ Mindful Eating Questionnaire assessing mindful eating, *MEQ_B* dichotomized MEQ at baseline (low, below 2.69; high, 2.69 and above)