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Effectiveness of a culturally tailored weight loss intervention for overweight and obese postpartum African American women

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EFFECTIVENESS OF A CULTURALLY TAILORED WEIGHT LOSS INTERVENTION FOR OVERWEIGHT AND OBESE POSTPARTUM AFRICAN AMERICAN WOMEN

by

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ABSTRACT

The prevalence of obesity in the United States continues to rise with African American women being disproportionally affected. For some, pregnancy may contribute to overweight and obesity. Providing an efficacious weight loss program for overweight and obese postpartum African American women has proven difficult. The study's aims were to pilot-test a culturally tailored weight loss intervention using a randomized control group design for overweight and obese postpartum African American women (n=20) and draw lessons from eating behavior and physical activity data. The intervention lasted either 8 or 12 weeks in conjunction with an assigned Birth Sister patient navigator at Boston Medical Center. Weight, eating behaviors, and physical activity data were collected at approximately 6 weeks and 15-20 weeks postpartum. Weight changes between the intervention and control groups were not significant. When compared to the control, the intervention did not have a significant average change in scores for the six categories of the Eating Behavior Patterns Questionnaire nor the active

living habits section of the Kaiser Physical Activity Survey. The control group had a significant larger reduction in average scores for emotional eating (p=0.028), haphazard planning (p=0.034), and cultural/lifestyle behaviors (p=0.003), and a significant increase in average scores for the household and family care activities (p=0.034). Correlations were found between low fat eating and haphazard planning (r=-0.82). The results indicated that the intervention was unsuccessful in promoting weight loss and behavior change in this population. Other more flexible, individualized weight loss programs may be more successful in this population. The postpartum period can lead to weight retention, but it remains a challenge to engage African American women during this important transitional phase of their life.

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ABBREVIATIONS

AA	African American
BMC	Boston Medical Center
BMI	Body Mass Index
DPP	Diabetes Prevention Program
EBPQ	Eating Behavior Patterns Questionnaire
KPAS	Kaiser Physical Activity Survey
PHQ-9	Patient Health Questionnaire

INTRODUCTION

Since the 1980s the prevalence of overweight and obesity defined as a body mass index (BMI) greater than or equal to 25 kg/m^2 and 30 kg/m^2 respectively, has continually increased (Flegal et al., 2002; Flegal et al., 2012). The rate of obesity has steadily increased from 23.3% in 1988-1994 to 35.7% in 2009-2010 (Flegal et al., 2002; Flegal et al., 2012). An alarming 68.8% of adults over 20 years were considered overweight or obese in 2009-2010 (Flegal et al., 2012). If trends continue, every single state in the United States could have obesity rates of 44% or greater by the year 2030, with 39 states consisting of obesity rates over 50% (Voelker, 2012). There are particular subgroups within the population that obesity effects to a greater extent. Mexican American and African American (AA) women have a higher rate of obesity than men and all other ethnic subgroups (Mitchell et al., 2011). AA women had the highest obesity rates at 58.6% as shown in Table 1 (Flegal et al., 2012). They are also 40% more likely than White women to have a major weight gain between the ages of 25 to 34 years (Williamson et al., 1990). It has been shown that obesity is linked to many chronic diseases such as type 2 diabetes, hypertension, cardiovascular disease, and certain cancers (Rooney et al., 2005; Mitchell et al., 2011; Wang et al., 2011). Close to two out of every ten deaths in the United States is a result of being overweight or obese and physical inactivity (Danaei et al., 2009). A study conducted by Manson et al. showed that middle aged women from the United States having a BMI greater than or equal to 27 or having gained 10 kg or more

from the age of 18 years had an overall mortality rate that is substantially higher than their counterparts with a BMI less than 27 (Manson et al., 1995). Reducing the rate of obese and overweight adults in this country is essential in combating the morbidity and mortality stemming from these chronic diseases before they occur.

Table 1. Obesity Rates. The prevalence of obesity (BMI≥30 kg/m^2) in adults 20 years of age and older.

	All Race/Ethnicity Groups	Non-Hispanic White	Non-Hispanic Black	Hispanic
All				
≥20 y	35.9	34.9	49.6	37.9
≥20 y (age adjusted)	35.7	34.3	49.5	39.1
Men				
≥20 y	35.5	36.4	38.8	35.5
≥20 y (age adjusted)	35.5	36.2	38.8	37.0
20-39 y	33.2	34.5	35.8	30.8
40-59 y	37.2	37.4	42.6	40.0
≥ 60 y	36.6	37.1	37.8	42.6
Women				
≥20 y	36.3	33.4	58.6	40.7
≥20 y (age adjusted)	35.8	32.2	58.5	41.4
20-39 y	31.9	26.9	56.2	34.4
40-59 y	36.0	31.8	62.7	48.0
≥ 60 y	42.3	41.8	55.5	42.8

Table amended from Flegal et al., 2012.

Not only does being overweight or obese increase the rate of comorbidities and mortality, it also places a huge economic burden on the United States healthcare system. With the current trends continuing there is estimated to be an additional $22 billion per year in 2020 spent on obesity related disorders in the United States and an additional $48 billion per year by 2030 (Wang et al.,

2011). Withrow and Alter found that obesity accounted for between 0.7% and 2.8% of a country's total health expenditures and those individuals that are obese have 30% higher medical costs than those individuals with normal weight (Withrow and Alter, 2011). The estimates in this study were very conservative and in a study by Finkelstein et al. found that obesity could account for as much as 9.1% of annual medical spending and that obese individuals spend roughly 42% more on medical costs than someone with a normal weight (Finkelstein et al., 2009). Obese individuals have been found to have 46% increased patient costs, 27% more physician visits and outpatient costs, and 80% increased spending on prescription drugs (Wang et al., 2011). In addition to these direct medical costs, there are also indirect costs incurred by society due to obesity from the decreased productivity from obese individuals taking more sick days, having increased mortality before retirement, and having decreased years of disability free life (Wang et al., 2011). Another indirect cost is the amount of time primary care physicians take to address obesity. A study by Tsai et al. conservatively estimated that about 8% of an 8 hour day of a primary care physician is used to evaluate and treat patients with weight related conditions (Tsai et al., 2011). This time amounts to about 40 minutes in which primary care providers could see two more patients or spend more time with each patient to improve the quality of care given. Addressing the obesity problem can not only help individuals improve their quality of life, but it can further reduce the economic burden of rising medical costs.

One challenge to combating obesity is the lack of awareness of obesity and its accompanying health risks. A cross-sectional self-administered survey found that participants that were AA were much more likely than White or Hispanic participants to not realize that obesity was a health problem, that it was treatable, and that it was associated with high blood pressure, heart disease, and early death (Sivalingam et al., 2011). It also showed that participants that were AA or Hispanic were significantly less likely to recognize their own obesity than Whites. Although 99% of AAs with a BMI over 35 kg/m^2 recognized their obesity, only 44% recognized their obesity when their BMI was between 30 and 35 kg/m^2, and this was significantly different than both Hispanic and White participants. In the group that identified themselves as obese, 87% expressed interest in treating their obesity. Awareness of obesity and its related health problems is an important factor in treating obesity (Sivalingam et al., 2011).

In many weight loss studies there is a discrepancy between the amount of weight lost and the rate of weight loss by AAs when compared to their White counterparts (Martin et al., 2006). One example shown by Anderson et al. looked at the outcomes of gastric bypass surgery, where White patients lost 12% more weight than AAs after one year (Anderson et al., 2007). In another study more AAs than Whites failed to lose 5% of their body weight when administered the appetite suppressant sibutramine (Early et al., 2007). These studies as well as others indicate that specific interventions tailored to the AA population may be needed to achieve the same weight loss as the White population.

An optimal time for a behavioral intervention for obese and overweight women may be during the postpartum period due to the increase in clinical care received and the motivation to lose weight (Devine et al., 2000). It has been shown that the average weight gain attributable to pregnancy is between 0.5 and 3 kg (Gore et al., 2003; Kuhlmann et al., 2008). Although this is only a modest weight gain, individual weight gain can vary markedly. For some individuals pregnancy is a major risk factor for weight gain and weight retention postpartum (29). Why some women retain more weight after pregnancy is not fully understood, but gestational weight gain over the recommended amounts, smoking, breast-feeding, and high pre-pregnancy weight have been determined to be the primary risk factors of postpartum weight retention (Gore et al., 2003; Nuss et al., 2007). A study by Lederman et al. examined weight gain during pregnancy of low-income AA women in New York City (Lederman et al., 2002). When comparing the obese and overweight participants' weight gained during pregnancy to the Institute of Medicine guidelines, all of them gained over the recommended amounts. The obese and overweight women were more likely to gain weight excessively when compared to the normal and underweight groups, and also had the highest mean weight gain of any of the groups despite the lower recommendations of weight gain from the Institute of Medicine (Lederman et al., 2002). Rooney et al. also found that the BMI for women considered obese at an average of 10.3 weeks gestation, increased at a significantly higher rate than women who were considered overweight, normal weight, or underweight over a

15 year follow-up time period (Rooney et al., 2005). The average weight gain per year for the women considered obese at baseline was 2.3 pounds per year compared to 1.2 pounds per year for normal weight women. In a study observing gestational weight gain and postpartum weight retention over 1 year in low-income, ethnic minority women found that 62% of the women exceeded the recommended amount of gestational weight gain and was significantly more likely to occur among overweight and obese women (Rothberg et al., 2010). At one year postpartum 52% of the women had gained ten or more pounds which resulted in more than a third of the women moving into a higher BMI category. At one year postpartum 68% were overweight or obese. Notably 5% of the women classified as normal weight prior to pregnancy and 53% classified as overweight were considered obese at one year postpartum.

Another factor that has been shown to affect postpartum weight retention is a woman's level of nutrition knowledge. It has been shown that low-income women with a greater nutrition knowledge immediately after delivery retained less weight one year postpartum than those with a lower level of knowledge (Nuss et al., 2007). In this same study it was demonstrated that White women had a significantly higher nutrition knowledge than AA women even when controlling for education levels. Women who utilized nutrition labels also retained significantly less weight one year postpartum than those who did not (Nuss et al., 2007). Thus providing information on nutrition during the early postpartum period may help AA women retain less weight.

It has been shown that AAs gain significantly more weight than White women during pregnancy and are more likely to retain this weight postpartum (Smith et al., 1994). A study by Rosenberg et al. examined pre-pregnancy weight and adverse outcomes among women that gave birth in New York City (Rosenberg et al., 2003). AA women consisted of 27.6% of the sample, yet they made up 49.8% of the women included in the 200-299 pounds weight category and 63.9% of the women in the greater than 300 pounds category. This study found that pre-pregnancy weight was significantly associated with gestational diabetes, preeclampsia, cesarean delivery, having a macrosomic infant, and having an infant admitted to the neonatal intensive care unit. Other studies have also shown that overweight and obesity can increase the likelihood of other adverse pregnancy outcomes such as maternal hypertension and stillbirths (Cedergren, 2004). The association between pre-pregnancy weight and adverse pregnancy outcomes shows the detrimental effect postpartum weight retention can have on subsequent pregnancies.

There are studies that have examined AA women's motivations to lose weight as well as some of the perceived barriers to weight loss. In one study AA pregnant women were interviewed and participants expressed a strong desire to lose weight, but doubted their ability to lose the weight without a structured program (Setse et al., 2008). They also expressed concern that their weight could negatively impact their health in the long run. Most of the women believed that if placed in a group oriented weight loss program with a mentor that taught

them how to eat healthier meals, they could be successful in losing weight. Some of the barriers mentioned by these same women included the cost of weight loss programs, childcare, postpartum depression, and lacking knowledge on the calorie content of food and how to cook healthy (Setse et al., 2008). Another study by Blixen et al. mailed surveys to women with a BMI over 30 kg/m^2 and their results indicated that AA women were more likely to believe their cultural background contributed to their weight gain than did White women (Blixen et al., 2006). The survey also found that AA women felt that having weight loss programs provide information on foods common to their culture was significantly more important than it was for White women. These studies indicate a need for an intervention that can improve physical activity and nutrition to promote weight loss in AA women during the postpartum period by overcoming perceived barriers. An intervention that helps women exercise regularly, provides healthy eating information, and helps facilitate a healthy weight postpartum could have a positive long-term effect on their health and later pregnancies.

There are only a few studies that have implemented successful weight loss interventions through diet and exercise for postpartum women (Kuhlmann et al., 2008; Tuomilehto et al., 2001). A study by Leermakers et al. showed a significantly higher number of women were able to attain their pre-pregnancy weight at 6 months postpartum when they went through a six month behavioral weight loss intervention when compared women receiving no treatment

(Leermakers et al., 1998). The weight loss intervention focused on promoting low-fat and low-calorie eating habits, as well as increasing physical activity. Another study by O'Toole et al. randomly assigned overweight postpartum women to either a self-directed intervention or to a structured diet and physical activity intervention (O'Toole et al., 2003). The self-directed intervention consisted of a single one hour session with a dietitian and exercise physiologist that discussed healthy diet and exercise practices. The structured diet and physical activity intervention met once a week for 12 weeks, twice a month the following 2 months, and then once a month after that up until 1 year postpartum. This group was given an individualized diet and exercise suggestions derived from their baseline measurements. The results showed that the structured intervention group lost more weight and percent body fat at 12 weeks and 1 year postpartum. Both of these studies looked specifically at postpartum women, but included all ethnicities.

Unfortunately there appears to only be one study that looked at weight loss interventions specifically for overweight or obese postpartum AA women. Walker et al. examined an ethnic specific weight loss programs for low-income White, Hispanic, and AA postpartum women with a BMI of 25 kg/m^2 or greater (Walker et al., 2012). Each group met for 2 hours once a week for 13 weeks. At baseline and at 7 and 13 weeks the women were weighed and filled out surveys assessing their health behaviors, perceived stress, self-efficacy, body dissatisfaction, and weight distress. The results showed that participants in the

ethnic-specific interventions did not lose significantly more weight when compared to those in the ethnic-specific control groups. There were also no significant psychosocial differences found between the intervention and control group for AA women.

To address the lack of weight loss studies on postpartum obese and overweight AA women we conducted a pilot and feasibility study to determine the effectiveness of a culturally tailored, weight loss program for this population at Boston Medical Center (BMC). The intervention materials used in this study were modified from the Diabetes Prevention Program (DPP) and were culturally tailored to postpartum AA women. We attempted to create a program for overweight and obese postpartum AA women at BMC that addressed many of the perceived barriers to weight loss such as childcare, the cost of weight loss programs, and the lack of knowledge on eating healthy. The first aim of the study was to evaluate the program's effectiveness on weight loss between 6 and 15 to 20 weeks postpartum in the intervention when compared to the standard of care. The second aim was to examine the change the intervention had on eating behaviors measured on the Eating Behavior Patterns Questionnaire (EBPQ), which includes low fat eating, snacking on sweets, emotional eating, haphazard planning, meal skipping, and cultural/lifestyle behaviors. The third aim was to determine whether there was a change in scores of the household and family care activities and active living habits sections of the Kaiser Physical Activity Survey (KPAS) survey between 6 weeks and 15 to 20 weeks postpartum. The

fourth aim was to determine whether there were any correlations observed between the participants' BMI, EBPQ scores, or KPAS scores. We hypothesized that the subjects enrolled in the intervention would lose significantly more weight than the control group and would have lower average scores in the snacking on sweets, emotional eating, haphazard planning, meal skipping and cultural/lifestyle behavior categories on the EBPQ, while having higher average scores in the low fat eating category. We postulated that the intervention subjects would also have higher average scores for the household and family care activities section and the active living habits section on the KPAS. We predicted that we would observe significant positive correlations between BMI and haphazard planning, emotional eating, snacking on sweets, and cultural/lifestyle behaviors. We also expected significant negative correlations between BMI and low fat eating, household and family care activities, and active living habits, as well as a significant negative correlation between low fat eating and haphazard planning.

METHODS

Design

We developed a culturally tailored, weight loss program for postpartum overweight and obese AA women receiving prenatal care at BMC, based on the DPP and combined with the use of the Birth Sisters as a patient support system. This pilot-test was composed of a non-blinded two arm randomized control trial in which participants received the standard of care or the weight loss intervention as seen in Figure 1. Subjects allocated to the control group had one meeting with a registered dietitian that covered healthy eating practices, limiting caloric intake, and the importance of physical activity. Subjects randomized to the intervention group participated in weekly group meetings for 8 or 12 weeks which consisted of lessons based on the DPP and physical exercise. Intervention subjects received a 25 dollar grocery gift card, exercise band, and water bottle. All participants received monetary incentive at the first and final study visit. Participants were reimbursed for parking or public transportation at the first visit, final visit, and the group sessions for the intervention. Taxi vouchers were also made available for subjects that preferred taking a taxi.

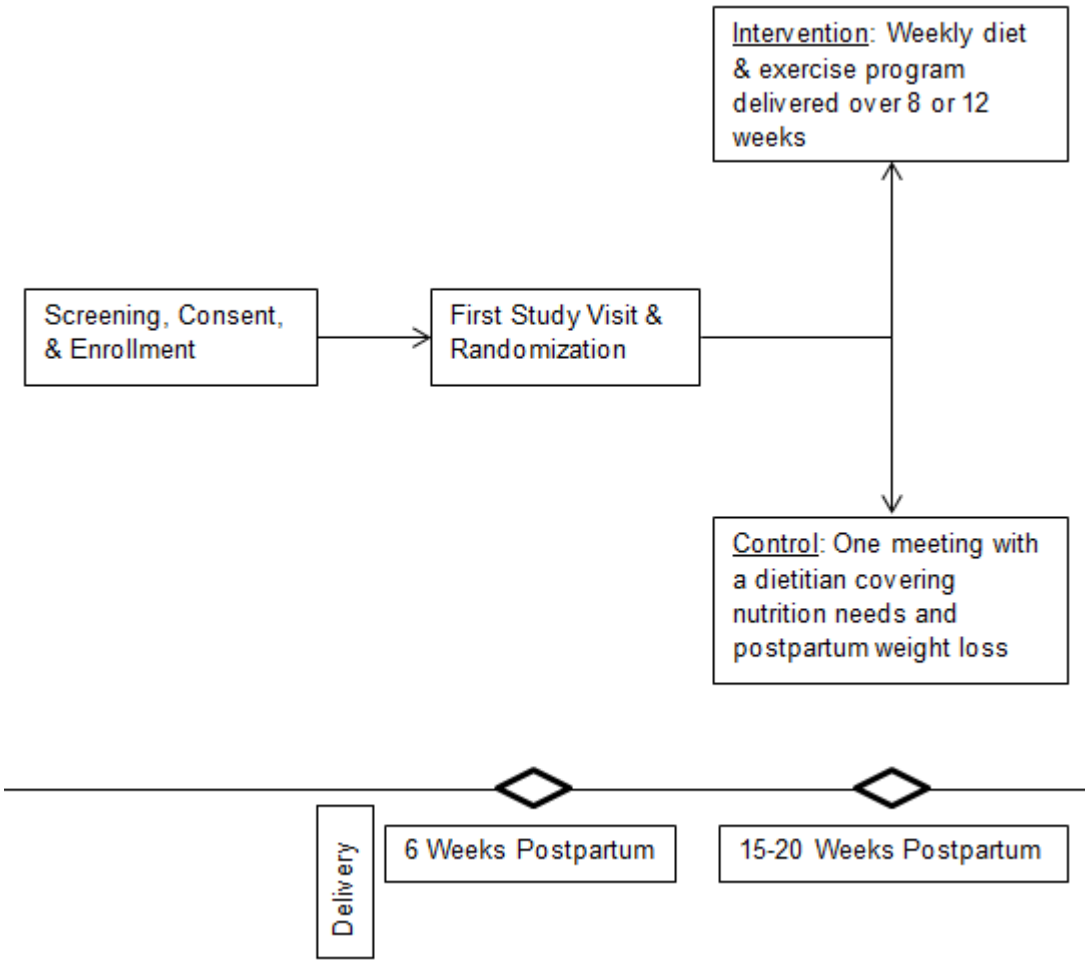

Figure 1. Flow Chart for the Study. Flow chart includes timing for each study visit for both the intervention and control groups.

Recruitment and Screening

To be eligible women had to receive prenatal care at BMC, be at least eighteen years of age, and have an intrauterine pregnancy with the intent to carry the pregnancy to term. Participants had to identify as AA and have a pre-pregnancy BMI of 25 kg/m^2 or greater, and have an interest in losing weight. Pre-pregnancy weight in kilograms and height in meters were recorded from the

patient's electronic medical record and used to calculate the pre-pregnancy BMI. Patients also had to be able to read and speak English. Patients with diabetes, with the exception of gestational diabetes, and HIV infection were excluded from the trial due differences in the nutritional needs of these populations (Kosmiski, 2011; Franz et al., 2010).

After obtaining written consent from the patient, further screening was conducted over the phone. Screening over the phone took place between 2 to 3 weeks prior to birth or 2 to 6 weeks postpartum. Basic demographic information and medical history were obtained as well as the participant's past medical history during the phone screen. The Patient Health Questionnaire (PHQ-9) was also administered at this time. The PHQ-9 is an effective screening measure for depressive disorders and if the participant's total score (9 or greater) indicated possible depression they were disqualified from the study and were referred for treatment (Wittkampf et al., 2009).

First Study Visit

Women meeting the eligibility criteria had their height, weight, BMI, pulse, and blood pressure measured and recorded by the study staff at approximately 6 weeks postpartum. Subjects completed surveys including the KPAS and EBPQ (Schlundt et al., 2003; Ainsworth et al., 2000). The EBPQ was specifically developed to measure dietary fat intake among AA women (Sims et al., 2008). It was developed by Schlundt et al. and includes the following six factors: a) low-fat

eating, b) snacking on sweets, c) emotional eating, d) haphazard planning, e) meal skipping, and f) cultural/lifestyle behaviors (Schlundt et al., 2003). There are a total of 51 statements which fall into one of the previous categories and uses a 5-point Likert scale with the response choices ranging from (1) Strongly Disagree to (5) Strongly Agree. An example of a statement in each category is shown in Table 2. This survey was not a substitute for traditional methods used to measure average intake of a specific nutrient but rather a measure of eating patterns (Schlundt et al., 2003).

Table 2. Example EBPQ statements. One statement from each of the six EBPQ categories.

Eating Behavior Category	Example of Statement
Low Fat Eating	"I am very conscious of how much fat is in the food I eat."
Snacking on Sweets	"Sometimes I eat dessert more than once a day."
Emotional Eating	"My emotions affect what and how much I eat."
Haphazard Planning	"When I don't plan meals, I eat fast food."
Meal Skipping	"If I at a larger than usual lunch, I will skip supper."
Cultural/Lifestyle Behaviors	"On Sunday, I eat a large meal with my family."

Data retrieved from Schlundt et al., 2003.

We also focused on the household and family care activities and active living habits section of the KPAS survey. The household and family care activities section has eleven questions with a four level categorical response from 1 for "none" to 4 for "20 hours or more per week" which demonstrates the time per week spent in caregiving activities (Ainsworth et al., 2000). The active living habits section has four questions with a five level categorical response from 1 for

"never" to 5 for "always." After the surveys were completed subjects were randomized into either the intervention or the standard of care group.

Standard of Care

The control group had an approximately one hour nutrition visit with a registered dietitian from the Nutrition and Weight Management Center in the Section of Endocrinology, Diabetes, and Nutrition at BMC. This meeting took place approximately 6 weeks postpartum and at the same meeting that the baseline measures were recorded. The nutrition visit included information on postpartum daily calorie needs, postpartum weight loss, and vitamin and mineral supplementation. A three day food diary and three day pedometer reading were also collected that had been mailed to participants one week prior to the meeting. Participants in the standard care had their final study visit with the research coordinator at approximately 15 to 20 weeks postpartum. Height, weight, BMI, pulse, and blood pressure were measured by the study staff and participants completed the KPAS and EBPQ surveys.

Intervention

The intervention included everything in the standard of care group in addition to a weekly one hour and thirty minute session that combined nutrition information, behavioral strategies, and physical exercise. These sessions consisted of a modified version of the DPP program, which has been proven

successful in promoting weight loss through a lifestyle intervention (Diabetes Prevention Program Research Group, 2002). The DPP was initially developed based on observational studies that showed a lifestyle intervention may reduce the risk of developing type 2 diabetes. It was designed to provide the lifestyle intervention to a very diverse group of people while having the same weight loss and activity goal, but allowing flexibility in the methods to attain these goals. The weight loss goal of the DPP was to lose 7% of initial body weight, which participants were encouraged to do the first 6 months of the program, and to maintain this weight loss through the trial. The physical activity goal for the DPP was to exercise at least 150 minutes per week at moderate intensity. The DPP lifestyle intervention was successful in reducing the development of type 2 diabetes by 58% and was similar in all racial and ethnic groups (Diabetes Prevention Program Research Group, 2002).

Our intervention was specifically adapted from the DPP Lifestyle Workbook and from the Adaption of the DPP for use with high risk minority patients with type 2 diabetes, and also included information specific for postpartum AA women (Diabetes Prevention Program Research Group, 2009; Intensive Nurse Case Management, 2009). Initially the 16 DPP sessions were modified into 12 sessions, but some of the mother's struggled to complete the program due to other obligations. The 12 sessions were then modified to 8 sessions with the main topics of each lesson listed below in Table 3. Eight of the ten intervention subjects completed the 12 week session intervention while two

others completed the 8 week session intervention. The additional topics we added to the traditional DPP program included lactation as an aid to weight loss, how to change recipes to lower calories and the amount of fat included, and information on postpartum depression and emotional eating. These topics were added to help adjust the DPP program for postpartum women. In addition to the handouts during the first session, the participants were given a food journal to help monitor their daily caloric intake and an exercise band, which was utilized in the physical activity component of the group session. The exercise components of each group session varied and included resistance training, a salsa dancing exercise video, or a hip-hop dancing exercise video.

After completion of the intervention program participants came in for their final study visit, which was between 15 to 20 weeks postpartum. Height, weight, BMI, pulse, and blood pressure were measured again by study staff and the KPAS and EBPQ surveys were completed.

Table 3. Lesson Plan Topics. Topics covered in the 8 week intervention.

Lesson	Material
1	-Getting Started Being Active -Lactation as an Aid to Weight Loss -Getting Started Losing Weight the US Soul Food Pyramid Way -Tip the Calorie Balance
2	-Being Active: A Way of Life -Move Those Muscles
3	-Healthy Eating -Taking Charge of What's Around You
4	-Be a Fat Detective -Three Ways to Eat Less Fat
5	-Cooking Demonstration: Recreating Traditional Recipes
6	-You Can Manage Stress -Talk Back to Negative Thoughts: Dealing with Postpartum Depression and Emotional Eating
7	-Four Keys to Healthy Eating Out
8	-Slippery Slope of Lifestyle Change -Make Social Cues Work For You -Ways to Stay Motivated

Lessons adapted from the Diabetes Prevention Program Research Group, 2002.

Birth Sisters

Patient navigator programs have improved clinical care utilization among underserved patients (Dohan and Schrag, 2005; Battaglia et al., 2007). Patient navigators help provide logistic and emotional support throughout the treatment and care of individuals (Dohan and Schrag, 2005). At BMC the Birth Sisters program provides social support through the prenatal period to early postpartum. Birth Sisters are women from the community who are trained, paid, and act as peer counselors. They help pregnant women by providing support,

encouragement, and assistance in accessing services at BMC. They normally make home visits, accompany patients to appointments, and assist them during childbirth. They also encourage breastfeeding which has been shown to increase energy demands and is considered important for postpartum weight loss (Nuss et al., 2007; Rothberg et al., 2011). Birth Sisters are free to the patient and are referred by the patient's primary care provider or obstetrician. Currently referrals are only accepted for the patient's that need it most, including those in domestic violence situations, who are socially isolated, who have infants with complex medical problems, or who have other complex issues. In our study, a Birth Sister was assigned postpartum to each participant randomized into the intervention group. They focused on assisting the participants through the group sessions, as well as provided childcare and emotional support for the mother over the duration of the intervention.

Statistical Analysis

All data was analyzed using SPSS for Windows version 21.0 (IBM SPSS Statistics, Chicago, IL 1990) and Excel for mean and standard deviation values. Subject characteristics were reported only for the participants that completed the study (n=20). Data collected from the 12 week group session intervention and the 8 week group session intervention was combined. Mean and standard deviations were used to summarize demographic and weight information at the first study visit. Differences between the groups for BMI, EBPQ scores, and

KPAS scores were analyzed using independent sample t tests. Differences for within group changes were analyzed using a single sample paired t test. To find correlations between BMI, EBPQ scores, and KPAS scores Pearson's correlation was utilized. An alpha level of 0.05 was considered statistically significant.

RESULTS

Sample Characteristics and Attrition

The mean baseline age, weight, height, and BMI for all participants are presented in Table 4. There were no significant baseline differences between the intervention and control groups. Of all the participants that completed the study, 90% had a high school diploma or equivalent and 40% had a college degree or higher as seen in Figure 2. The percent married was 50% and 60% of the women had other children. Only 50% of the women were employed at the time of the first study visit. Of the 32 women currently randomized in the study, 20 completed the 8 week program, which resulted in an attrition rate of 37.5%. Six women did not complete the intervention program, and six were lost to follow up in the control group. The average number of weeks postpartum that participants completed the first study visit was 6 weeks for the control group and 7 weeks, 1 day for the intervention group, which were not significantly different from one another. Overall for completers the first study visit occurred at an average of 6 weeks, 4 days. For completion of the final study visit the average number of weeks postpartum was 20 weeks, 1 day for the control group and 21

weeks, 1 day for the intervention group, which were not significantly different from one another. The final study visits occurred at an average of 20 weeks, 5 days for all completers.

Table 4. Baseline Characteristics of Intervention and Control Subjects. Mean and standard deviation values of the baseline characteristics for the intervention and control groups. Independent t-test was used with an alpha of 0.05.

	Intervention (n=10) Mean ± S.D.	Control (n=10) Mean ± S.D.	P value
Age (years)	31.1 ± 4.46	29.5 ± 6.52	.530
Weight (kg)	86.31 ± 18.07	82.35 ± 11.26	.564
Height (m)	1.61 ± 0.04	1.62 ± 0.07	.763
BMI (kg/m^2)	33.84 ± 9.18	31.51 ± 3.78	.467

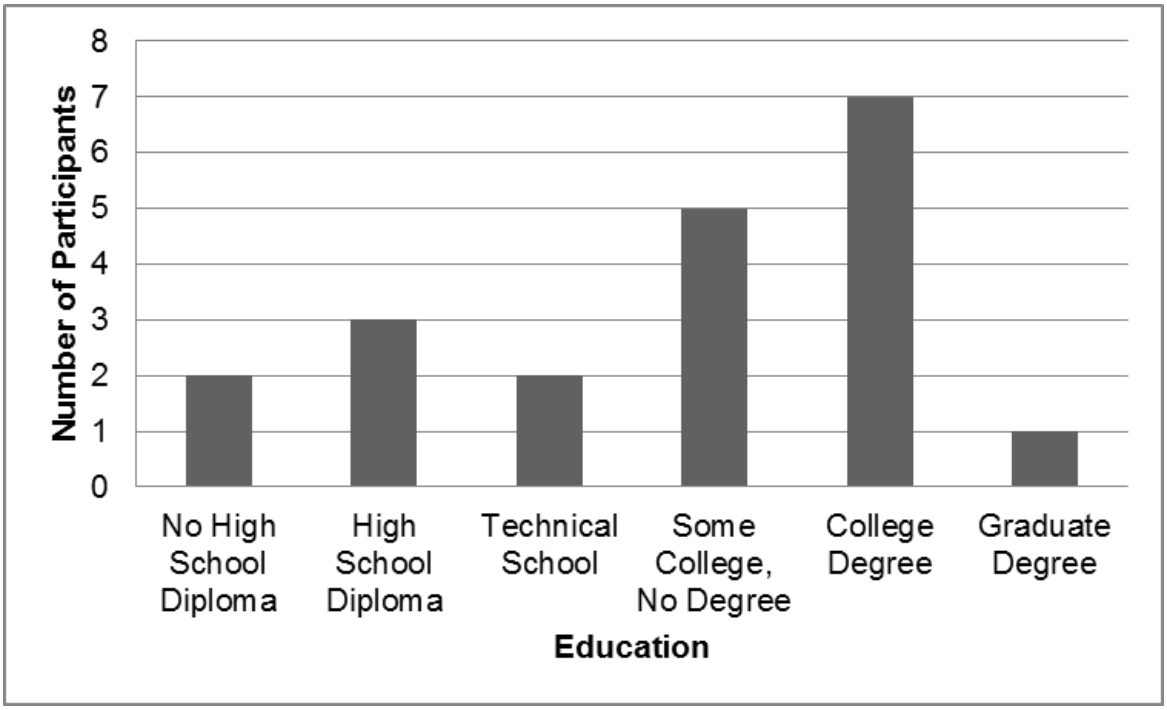

Figure 2. Education Level of Subjects. Highest education level attained by study participants.

Characteristics of the women who were enrolled and completed the study were compared to those that dropped out. The dropout baseline scores from the

six categories of the EBPQ and two categories from the KPAS were also compared with the completers There was no significant difference in age, weight, BMI, EBPQ baseline scores, or KPAS baseline scores between completers and non-completers as seen in Table 5.

Table 5. Baseline Characteristics of Completers vs. Non-Completers. Mean and standard deviation values of the baseline characteristics for completers and non-completers. Independent t-test was used with an alpha of 0.05.

	Completers Mean ± S.D.	Non-Completers Mean ± S.D.	P value
Age (years)	30.3 ± 5.5	34.4 ± 6.0	0.057
Weight (kg)	84.3 ± 14.8	95.9 ± 17.6	0.054
BMI (kg/m^2)	32.7± 6.9	34.0 ± 4.5	0.570
EBPQ			
Low Fat Eating	2.96 ± 0.63	2.69 ± 0.75	0.275
Snacking on Sweets	3.00 ± 0.79	3.03 ± 0.91	0.927
Emotional Eating	2.60 ± 0.62	2.79 ± 0.79	0.454
Haphazard Planning	2.75 ± 0.67	2.77 ± 0.67	0.929
Meal Skipping	3.09 ± 0.60	3.26 ± 0.78	0.487
Cultural/Lifestyle Behaviors	3.13 ± 0.55	3.13 ± 0.57	0.996
KPAS			
Household & Family Care Activities	2.80 ± 0.46	3.05 ± 0.68	0.230
Active Living Habits	2.56 ± 0.56	2.71 ± 0.92	0.578

Final Study Visit

The results indicated that the change in BMI from baseline to the final study visit at about 15 to 20 weeks postpartum was not significant for the intervention group or the control group as seen in Table 6. Using an independent samples t-test to compare the average percent weight change of the intervention to the average percent weight change of the control from the first visit to the final visit showed that the average change in the intervention was not significantly different than the average change in the control (p=0.304).

Table 6. Baseline and Final Visit BMI for Intervention and Control. Baseline BMI was measured at approximately 6 weeks postpartum and the final visit BMI was measured between 15-20 weeks postpartum for the intervention and control group. Independent t-test was used with an alpha of 0.05.

	Baseline BMI (kg/m^2) Mean ± S.D.	Final Visit BMI (kg/m^2) Mean ± S.D.	P value
Intervention	33.8 ± 9.18	34.0 ± 8.59	0.757
Control	31.5 ± 3.78	32.4 ± 4.18	0.060

Table 7 includes average scores in each of the different categories of the EBPQ including low fat eating, snacking on sweets, emotional eating, haphazard planning, meal skipping, and cultural/lifestyle behaviors. It displays the average scores at the first and final study visit for both the intervention and control. As seen below the groups that had a significant change from the first to final study visit included the control group for haphazard planning, meal skipping, and cultural/lifestyle behaviors, and the intervention group for emotional eating.

Table 7. Intervention and Control Average EBPQ Scores for First and Final Study Visit. Data represents mean and standard deviation for the intervention and control groups' scores on the EBPQ at the first and final study visit. A paired samples t-test was used with an alpha of 0.05 and (*) indicates $p<0.05$.

	First Study Visit Mean ± S.D.	Final Study Visit Mean ± S.D.	P value
Low Fat Eating			
Intervention	3.34 ± 0.37	3.43 ± 0.48	0.432
Control	2.59 ± 0.61	2.69 ± 0.46	0.654
Snacking on Sweets			
Intervention	2.85 ± 0.88	2.98 ± 1.08	0.494
Control	3.15 ± 0.72	2.80 ± 0.68	0.160
Emotional Eating			
Intervention	2.50 ± 0.48	2.90 ± 0.47	0.000*
Control	2.70 ± 0.77	2.57 ± 0.88	0.557
Haphazard Planning			
Intervention	2.40 ± 0.52	2.29 ± 0.52	0.469
Control	3.09 ± 0.64	2.50 ± 0.55	0.002*
Meal Skipping			
Intervention	3.22 ± 0.42	3.34 ± 0.34	0.509
Control	3.16 ± 0.69	2.86 ± 0.81	0.038*
Cultural/Lifestyle Behaviors			
Intervention	3.07 ± 0.54	3.37 ± 0.66	0.054
Control	3.19 ± 0.59	2.8 ± 0.83	0.024*

When comparing the average change in EBPQ scores between the first and final study visit for the intervention and control for each of the categories we found significant differences in the emotional eating, haphazard planning and cultural/lifestyle behavior sections as seen in Table 8. We also examined whether there were any differences in the baseline scores of each of the six categories. There was a significant difference between the control and intervention group baseline scores for low fat eating ($p=0.003$) and haphazard planning ($p=0.017$).

Table 8. Intervention and Control Average Score Change on the EBPQ from First to Final Study Visit. The change in scores was calculated from subtracting the final study visit score from the first study visit score. The data represents the mean and standard deviation for the average change in EBPQ scores for intervention and control groups. Independent t-test was used with an alpha of 0.05 and (*) indicates $p<0.05$.

	Intervention Mean ± S.D.	Control Mean ± S.D.	P value
Low Fat Eating	-0.09 ± 0.32	-0.10 ± 0.68	0.953
Snacking on Sweets	-0.13 ± 0.59	0.35 ± 0.72	0.119
Emotional Eating	-0.4 ± 0.18	0.13 ± 0.68	0.028*
Haphazard Planning	0.11 ± 0.48	0.59 ± 0.45	0.034*
Meal Skipping	-0.12 ± 0.55	0.3 ± 0.39	0.065
Cultural/Lifestyle Behaviors	-0.3 ± 0.43	0.39 ± 0.45	0.003*

We looked at the scores from two of the four sections on the KPAS survey, household and family care activities and active living habits. The average scores for the intervention and control group are seen in Table 9. The household and family care activities score did not significantly change from the first study visit to the final study visit for the intervention group, but the score increased significantly in the control group. For the active living habits section the intervention group changed significantly between the first and final visit, but not for the control group.

Table 9. Intervention and Control Average Scores for Household and Family Care Activities and Active Living Habits for First and Final Study Visit. Household and family care activities and active living habits scores were found from the KPAS survey. The data represents mean and standard deviation for the intervention and control groups. Independent t-test was used with an alpha of 0.05 and (*) indicates $p<0.05$.

	6 Weeks Postpartum Mean ± S.D.	15 Weeks Postpartum Mean ± S.D.	P Value
Household & Family Care Activities			
Intervention	2.97 ± 0.39	2.93 ± 0.35	0.738
Control	2.63 ± 0.49	2.98 ± 0.51	0.029*
Acting Living Habits			
Intervention	2.40 ± 0.52	2.88 ± 0.41	0.006*
Control	2.73 ± 0.57	2.73 ± 0.62	1.000

When examining the average change in scores between the intervention and control group for the two sections of the KPAS we discovered a significant difference in the household and family care activities section as seen in Table 10. We looked at the baseline scores obtained from the first study visit and discovered that there were no significant differences at baseline between the control and intervention groups for either household and family care activities or the active living habits section.

Table 10. Intervention and Control Average Score Change for Household and Family Care Activities and Active Living Habits. The average change was calculated from subtracting the final study visit score from the first study visit score. The data represents the mean and standard deviation for the average change in scores for intervention and control groups. Independent t-test was used with an alpha of 0.05 and (*) indicates $p<0.05$.

	Intervention Mean ± S.D.	Control Mean ± S.D.	P Value
Household & Family Care Activities	0.03 ± 0.31	-0.34 ± 0.42	0.034*
Active Living Habits	-0.48 ± 0.42	0 ± 0.94	0.162

Upon examining all subjects that completed the study we found that at the first study visit the low fat eating and the haphazard planning scores on the EBPQ were correlated to one another (r=-0.482, p=0.032). When all subjects were looked at together there were no correlations found between BMI, the EPBQ categories, or either of the two KPAS categories. When looking at the average change in scores in the intervention and control groups separately there was a correlation between BMI and the haphazard planning section of the EBPQ (r=0.664, p=0.036) in the intervention group, but no correlations were found in the change in scores within the control group.

DISCUSSION

This pilot and feasibility study addressed the racial and ethnic disparities in postpartum weight loss by focusing on overweight and obese postpartum AA women. Previous studies on non-pregnant women have shown that AA women lose less weight and at a slower rate than their White counterparts (Martin et al., 2006). Our participants had a high pre-pregnancy BMI which is known to be a risk factor for excessive weight retention postpartum (Gore et al., 2003). Our first expectation was that our culturally tailored program would facilitate weight loss among postpartum AA women. This study did not to show that the intervention for overweight and obese postpartum AA women was successful for losing weight between 6 weeks and 15 to 20 weeks postpartum when compared to the normal standard care. Only five of the ten subjects to complete the intervention

actually lost weight, although only one subject in the control group lost weight. We hypothesized that there would be a significant change in the percentage of weight loss with the intervention group and not the control group, similar to the significant changes Leermakers et al. and O'Toole et al. observed in their respective studies (Leermakers et al., 1998; O'Toole et al., 2003). Not finding a significant difference in BMI for the intervention group in our study may be partly due to the small sample size that completed the intervention (n=10), as well as the short follow up time. The major difference between the studies by Leermakers et al. and O'Toole et al. and our current study was that our intervention program and follow up time was shorter. The study by Leermakers et al. consisted of a six month weight loss program and measured weight before and after completion of the program (Leermakers et al., 1998). O'Toole et al. utilized a 12 week weight loss program and followed participants until 1 year postpartum (O'Toole et al., 2003). Our program was initially 12 weeks and was then shortened to 8 weeks. The time between our weight measurements was around 9-15 weeks which was much shorter than either study above. Another difference between our study and the studies by Leermakers et al. and O'Toole et al. was that ours was ethnic specific while theirs included a range of ethnicities (Leermakers et al., 1998; O'Toole et al., 2003).

We found no significant difference in the percentage of body weight loss in the intervention group, which agrees with other recent postpartum weight loss studies by Walker et al. and Ostbye et al. (Walker et al., 2012; Ostbye et al.,

2009). Walker et al. pilot-tested an ethnic specific weight loss intervention for White, AA, and Hispanic low-income postpartum women and found that the weight loss in both intervention and control groups of each ethnic group were not significant (Walker et al., 2012). The pilot-study consisted of an ethnic specific intervention for each ethnic group that had information on nutrition, physical exercise, and behavioral strategies. Ostbye et al. conducted a randomized control trial with 400 White and AA women (Ostbye et al., 2009). The intervention consisted of informational classes on eating healthy, exercise classes, and telephone support. They both found that there was no significant difference in weight lost between the intervention and control groups, and AA women in both of the studies were less likely to lose weight than the White participants. Both studies, as well as our own, struggled with the subjects' attendance at the intervention sessions and this may have had an effect on their weight loss.

The second aim of our study was to determine if our intervention modified eating behaviors as assessed by the EBPQ. The results showed that the intervention group EBPQ scores did not significantly change for low fat eating, snacking on sweets, haphazard planning, meal skipping, or cultural/lifestyle behaviors, and actually displayed a significant increase in scores for emotional eating on the EBPQ. In the control group there was a significant decrease in EBPQ scores for haphazard planning, meal skipping, and cultural/lifestyle behaviors. One of the main topics covered in the intervention was teaching

healthy eating behaviors so we expected the EBPQ scores to reflect this. The scores indicated that information taught during the intervention group sessions was not successfully put into practice by the participants. Perceived stress has been linked to the emotional eating score on the EBPQ and this may help explain the significant increase in emotional eating scores observed in the intervention group but not in the control group (Sims et al., 2008). Transportation to, and attendance of the intervention group sessions may have increased the perceived stress of the intervention group women.

The third aim of our study was to examine if our intervention led to a change in the household and family care activities or active living habits as measured by the KPAS survey. In the intervention group we observed a significant difference in the active living habits section of the KPAS between the first and final study visits. Seven out of the ten women in the intervention group increased their active living habits scores on the KPAS. There was not a significant difference seen in the control group. Being more active everyday was highly encouraged and discussed in the intervention lesson plans, and our results indicate the participants applied this knowledge. We also expected an increase in the scores of the household and family care activities section of the KPAS for both groups due to the addition of a newborn baby, but this was only seen in the control group. This result may be due to the small sample size.

Our fourth aim was to determine whether there were any correlations within or between the scores of the EBPQ categories, the two KPAS categories,

or with the BMI of the study participants. When examining the average change in scores of both the intervention and control combined, it was surprising to only find a significant negative correlation between low fat eating and haphazard planning on the EBPQ. When developing the EBPQ Schlundt et al. found that both low fat eating and haphazard planning were correlated with the percentage of energy obtained from fat, so it makes sense that we found the two to be correlated to one another and this is what we expected (Schlundt et al., 2003). Schlundt et al. also found that haphazard planning, cultural/lifestyle behaviors, and emotional eating were all positively correlated with BMI (Schlundt et al., 2003). We expected to see the same correlations between the participants' BMI and EPBQ categories as in that study, but we found no other correlations between BMI, the EBPQ categories, or the two KPAS sections. If just the intervention group subjects were examined there was a significant correlation between haphazard planning and BMI, which was also supported in the study by Schlundt et al. (Schlundt et al., 2003). When only looking at the control group, there were no correlations between participants' BMI, average scores in the six EBPQ categories, or the two KPAS categories. Not seeing the correlations we expected could be due once again to our small sample size in both the control and intervention groups.

An unexpected aspect of this study was the high dropout rate, which was 37.5% of subjects enrolled and randomized. In a weight loss study by Martin et al. looked at non-pregnant AA women and they had an attrition rate of 37%

(Martin et al., 2006). This study was conducted with AA women aged 18 to 65 years and used a primary care intervention. The postpartum weight loss studies mentioned previously by Leermakers et al. and another by O'Toole et al. that also used diet and exercise intervention programs, but with all ethnicities included, had dropout rates of 31% at six months postpartum and 43% at one year postpartum respectively (Leermakers et al., 1998; O'Toole et al., 2003). The pilot-test study by Walker et al. that examined ethnic specific interventions had an attrition rate of 30% by week 13 of the study (Walker et al., 2012). The study by Ostbye et al. had 30% not complete the final follow up after completing all three sets of previous measurements during the study (Ostbye et al., 2009). From these studies we were expecting an attrition rate around 30% rather than the 37.5% that we observed. It is clear from our study and previous studies that retaining postpartum women is a challenge.

Most dropouts could not be reached by phone and messages were never returned. If we were not able to contact the participants by phone, a letter was sent asking them to contact us, but most never did. Reasons for not attending the intervention group sessions were examined in the Walker et al. study and they included distance to the intervention group meetings, conflicts with work, transportation problems, infant illness, and being overwhelmed by the adjustment to motherhood (Walker et al., 2012). The drop out women we were able to contact had many of the same issues. The most common reasons included

transportation, maternity leave ending, and adjusting to the demands of motherhood.

Our intervention was designed to include strategies that were successful in other studies and to address some of the perceived limitations to postpartum weight loss, specifically in AA women. Some of these perceived limitations that were addressed in this study included the cost of weight-loss programs, childcare, postpartum depression, and the lack of nutrition knowledge and how to cook and eat healthy (Setse et al., 2008). The weekly group sessions were designed to provide both peer support from other group members, professional support from the group leader, and emotional support from the Birth Sister. However our attrition rate and results indicate that we did not successfully address the needs and barriers of the overweight and obese postpartum AA women appropriately in this study.

A strength of this study was the randomization process into the control and intervention groups, as there were only baseline differences observed in the low fat eating and haphazard planning categories of the EBPQ. Another strength was the scheduling flexibility for the intervention group meetings. Times were made available Monday through Friday in the morning, afternoon, or evening. The Birth Sister was also highly utilized as a childcare provider during the group sessions, allowing the mothers to focus on the material covered.

A major weakness of our study was the small sample size of participants that completed the study. Having more participants would increase the

significance of the results observed in this study. Another weakness was that the intervention program was changed from a 12 to 8 week group session intervention part way through the study. This resulted in the final study visit occurring around 20 weeks postpartum during the 12 week group session intervention to change to around 15 weeks postpartum for the 8 week group session intervention. This could potentially have a significant effect on the data collected due to the reduction of class and exercise time. This also reduced the number of weeks between the first and final measurements and gave a much shorter time span to observe a change in weight, changes in eating behaviors, and changes in physical activity habits. Our study would also be strengthened if there were enough women to be able to examine the 8 week group session and 12 week group session intervention participants separately. Also based on our results the group sessions themselves may need to be examined to improve this intervention for overweight and obese postpartum AA women.

Overall the findings of this study show the lack of efficacy this culturally sensitive, clinic based weight loss program has for postpartum overweight and obese AA women. It also shows the difficulty in retaining postpartum AA women as active participants in this study at BMC. Further research needs to be conducted on the perceived barriers to weight loss by postpartum AA women, and more specifically the barriers perceived by AA women who receive their care at BMC. These barriers may not be the same for AA women living in different cities throughout the country and those identified by Setse et al. (Setse et al.,

2008). Strategies to overcome known barriers and facilitate adherence to physical exercise and healthy diet practices also needs to be extensively examined for postpartum AA women.

Kuhlmann et al. suggested that a weight loss intervention that helps women gain weight appropriately during their pregnancy, helps them lose the proper amount of weight after pregnancy, and helps maintain a healthy weight afterwards may be beneficial to a substantial amount of women instead of only focusing on the postpartum period (Kuhlmann et al., 2008). A recent study by Reyes et al. used a qualitative approach to examine people that successfully lost weight and then either regained weight back or maintained that weight loss (Reyes et al., 2012). Both groups reported having setbacks and felt that there was a lack of support during the weight maintenance period, which supports Kuhlmann et al.'s idea of having a long term support system in place rather than focusing only on the postpartum period (Kuhlmann et al., 2008). The differences found between the groups included that weight maintainers continued eating and exercising habits developed during weight loss, weighed themselves regularly, applied more problem solving techniques, and used more positive self-talk. A program that helps develop and integrate these actions into everyday life, as well as promote them over a long period of time while helping women manage the competing obligations of motherhood, has the potential to be successful.

CONCLUSION

This was a very ambitious study in that our participants were not women who were currently highly motivated and seeking treatment for weight loss. Instead our participants were recruited at a challenging time of their life and asked to participate in our program that required much time and dedication. This led to difficultly retaining women in the study and very little if any weight loss and behavior change was achieved. To our knowledge this was the second study to test an ethnic specific intervention for overweight and obese postpartum AA women. Our results were similar to the first study and even with additional support from a Birth Sister, an ethnic specific weight loss program outside the home is not likely to affect postpartum weight loss and eating behaviors in this population. Individualized programs that are tailored to each woman's needs and have the flexibility to be group, telephone, email, or home based should be explored and have the potential to be more successful. The postpartum period is the time of dramatic change in lifestyle for women and for some an important time in the development of obesity later in life. It remains a challenge to promote a lifestyle change and adherence in overweight and obese postpartum AA women and other avenues for success need to be explored.

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