

# Results of a Faith-Based Weight Loss Intervention for Black Women

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Obesity is a risk factor for a variety of chronic diseases. Although weight loss may reduce these risks, weight loss programs designed for black women have yielded mixed results. Studies suggest that religion/spirituality is a prominent component of black culture. Given this, the inclusion of religion/spirituality as an active component of a weight loss program may enhance the benefits of the program. The role of religion/spirituality, however, has not been specifically tested as a mechanism that enhances the weight loss process. This paper presents the results of "Faith on the Move," a randomized pilot study of a faith-based weight loss program for black women. The goals of the study were to estimate the effects of a 12-week culturally tailored, faith-based weight loss intervention on weight loss, dietary fat consumption and physical activity. The culturally tailored, faith-based weight loss intervention was compared to a culturally tailored weight loss intervention with no active faith component. Fifty-nine overweight/obese black women were randomized to one of the two interventions. Although the results were not statistically significant, the effect size suggests that the addition of the faith component improved results. These promising preliminary results will need to be tested in an adequately powered trial.

## INTRODUCTION

Although the incidence of breast cancer is lower among black women than among white women in the United States, black women have mortality rates that are 29% higher than those of white women.<sup>1</sup> The prevalence of obesity among black women in the United States is also extremely high. Almost half (49%) of black women are obese, compared to 31% of white women.<sup>2</sup> Adult weight gain is also greater among black women than among white women.<sup>3,4</sup>

Few studies have specifically explored the relationship between obesity and breast cancer risk among black women. In most studies of primarily white women, obesity is associated with a lower risk of premenopausal and a higher risk of postmenopausal breast cancer.<sup>5-7</sup> In addition, weight gain throughout adult life may increase breast cancer risk,<sup>8-11</sup> and weight loss may decrease breast cancer risk.<sup>12-14</sup> It is not yet clear whether these associations also apply to black women. However, the association between obesity and increased morbidity and mortality is well established.<sup>15</sup>

Weight loss provides a potential strategy to reduce breast cancer risk as well as the risk of other conditions associated with obesity. Overall, weight loss studies that have focused specifically on black populations have shown mixed results.<sup>16,17</sup> Some of the disappointing results could be due to lack of attention to the cultural nuances inherent in both eating and activity patterns.<sup>18-21</sup>

Tailoring interventions or creating culturally sensitive interventions<sup>22</sup> that meet the needs of specific populations is a relatively new yet now widely accepted principle in public health.<sup>22</sup> Despite this, research examining the efficacy of culturally tailored interventions is minimal.<sup>22-25</sup> Recently, we conducted a randomized trial of a culturally tailored pilot weight loss intervention with overweight and obese black women.<sup>26</sup> Women who received the weight loss intervention lost significantly more weight than women in the control group. Our culturally tailored intervention did not include a formal

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faith/spirituality component, but a number of participants suggested that inclusion of a structured faith-based component could enhance the cultural sensitivity further.

Religion plays a major role in the lives of many black individuals. Blacks are more likely than whites to engage in prayer and religious rituals, to attend religious services frequently and to believe that the Bible is the word of God.<sup>27,28</sup> Although religious beliefs are often ignored or minimized in mainstream psychological research,<sup>29,30</sup> researchers have recently recognized the role that religion/spirituality plays in human behavior.<sup>29</sup> The literature in this area suggests that religion/spirituality is particularly prominent in black culture and potentially affects health decisions and overall health outcomes.<sup>31-33</sup>

The current pilot study estimates the effects of adding a formal faith-based component to a culturally tailored weight loss intervention. Thus, the comparison group was a culturally tailored weight loss intervention with no faith-based component,<sup>26</sup> rather than a standard control group.

**METHODS**

**Study Design**

The study used a randomized controlled design. Figure 1 illustrates the study design and participant flow from preeligibility through the 12-week follow-up.

**Setting**

Faith on the Move was conducted at the John H. Stroger, Jr. Hospital of Cook County in Chicago. The hospital employs 6,000 people and serves approximately 500,000 patients per year, most of

whom are minorities. Although churches are a well-accepted setting for faith-based health promotion interventions,<sup>34-39</sup> we chose to conduct our intervention outside of a church setting for two reasons. First, we sought to recruit a range of women who were interested in a faith-based intervention but who might not have a specific church affiliation. Second, church-based studies that compare a faith-based intervention to a standard behavioral intervention are not necessarily able to test the validity of the comparison because both groups may incorporate elements of religion/spirituality.<sup>40</sup>

**Recruitment**

Recruitment began in November 2003 and ended in January 2004. We recruited patients, staff and visitors in the hospital cafeterias and advertised the program via flyers and posters throughout the hospital.

**Interventions**

**Culturally Tailored Weight Loss Intervention.** The theoretical underpinning of the intervention was based on principles of Social Cognitive Theory (SCT).<sup>41</sup> As such, attention was paid to the cognitive, behavioral and environmental/cultural aspects of lifestyle changes in diet and physical activity that would lead to weight loss. For example, time was spent teaching and supporting the use of tools, such as daily self-monitoring of food intake and physical activity, reinforcement, modeling, stimulus control and social support. The intervention was delivered in a small group format and met twice weekly for 12 weeks. The first 90-minute weekly meeting was divided between a 45-minute interactive didactic component and a 45-minute exercise component

**Table 1. Overview of session content**

<b>Week</b>	<b>Weight Loss/Breast Health Topics</b>	<b>Scripture</b>
1	Intro to Program, Breast Cancer Risk Factors, Pros/Cons of Weight Loss	Hebrews 11:1
2	Self-Monitoring, Fruit & Vegetable Intake, High-Fat Foods	Matthew 26:41
3	Portion Control, Physical Activity	1 Kings 2:22, Jeremiah 52:34
4	Reading Food Labels	Matthew 6:25 and vs. 33
5	Program Review	Joshua 1:8
6	Meal Planning	1 Corinthians 6:12-13a
7	Physical Activity: Lifestyle versus Fitness Exercise	James 2:14 and vs. 17
8	Goal Setting	Habakkuk 2:1-4
9	Breast Health	3 John 1:2
10	Holiday Planning—Easter	Romans 12:1-2
11	Barriers to Making Healthy Changes	Matthew 17:20
12	Maintaining Behavior Changes	2 Corinthians 5:17

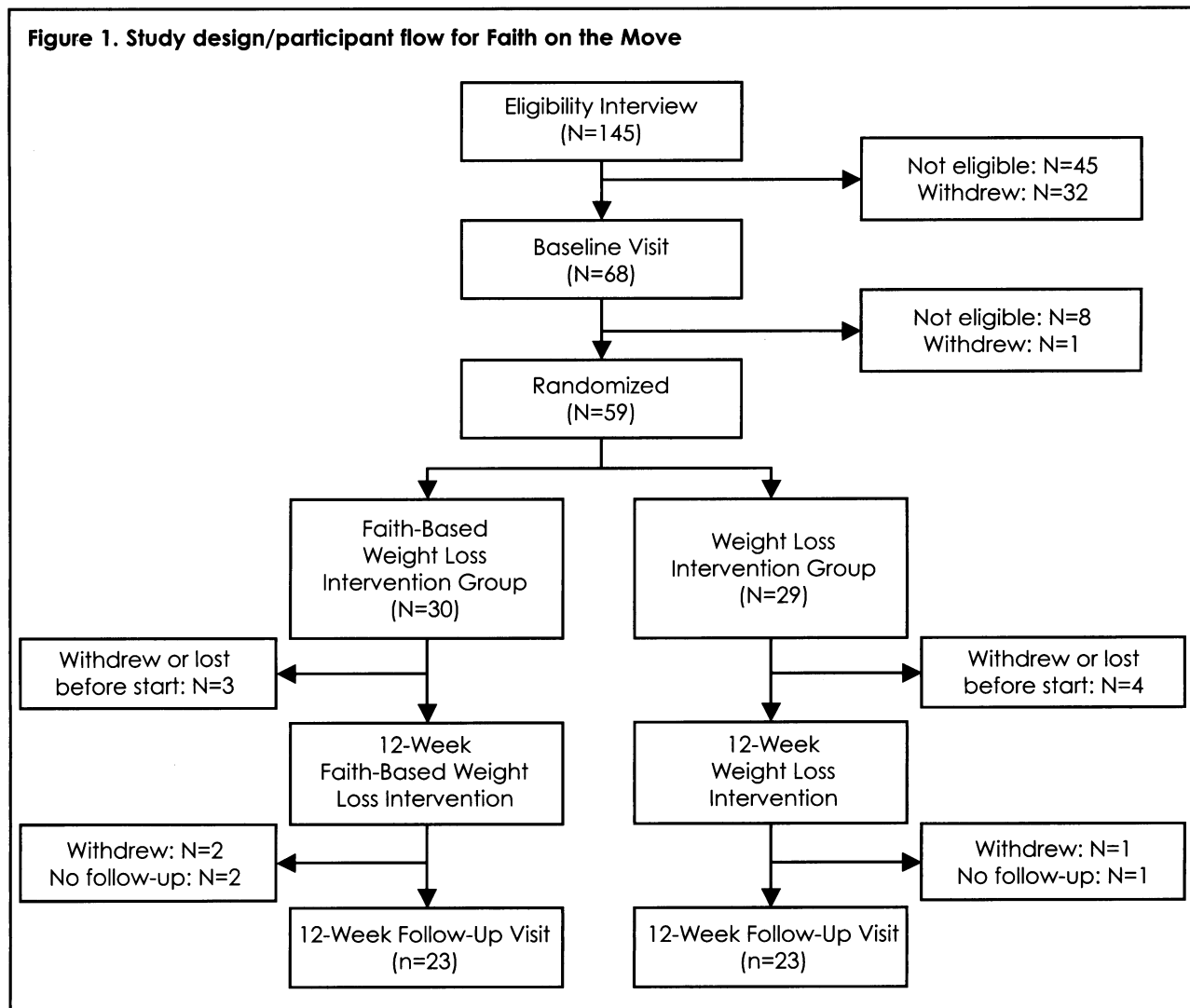
(structured aerobics). The second weekly meeting consisted of a 45-minute exercise session. Table 1 outlines the concepts for each session.

Cultural competency in research is a relatively recent concept that arose in response to the common practice of designing research studies and conceptualizing study populations with the beliefs, attitudes and behaviors consistent with those of European perspectives.<sup>42,43</sup> To conduct culturally competent research, investigators must also be aware of the diversity that exists in the beliefs and practices of persons from different ethnic and racial backgrounds.<sup>43</sup> In general, the recruitment and intervention protocol emphasized cultural tailoring and cultural sensitivity on two levels: surface and deep structure.<sup>25,44</sup>

Attention to surface structure involved devising recruitment and intervention materials and messages that were culturally appropriate to the social and behavioral preferences of blacks in terms of people, places, language and locations.<sup>25</sup> Sensitivity to deep

structure involved attending to cultural, social, historical, environmental and psychological factors that influence diet and physical activity among black women. For example, core cultural values that have been identified as important factors for black women include respect for verbal communication skills, connection to ancestors and history, and commitment to family and other obligations.<sup>25</sup> The intervention incorporated healthy ways of preparing traditional black food, emphasized family and social support, offered childcare, discussed multiple family obligations and provided advice on how to prepare healthy food when serving a large extended family.<sup>45,46</sup> Sharing medical anecdotes, also known as “stories,”<sup>25</sup> about the health consequences of unhealthy eating and physical inactivity that involved well-known or historical figures helped to convey the importance of this research to black women.

**Faith-Based Weight Loss Intervention.** The faith-based intervention was identical to the culturally tailored weight loss intervention but also



addressed faith/spirituality issues in a structured and systematic manner. This was done by incorporating a scripture each week into the content of the intervention. All scriptures were taken from the King James version of the Bible and were chosen to reflect the content of the material for a particular week. For example, in week 6, 1 Corinthians 6:12-13a was chosen to underscore the fact that individuals may choose a variety of foods but that some foods are less healthful.

The faith-based component of the intervention was delivered by a woman with extensive experience conducting health risk reduction interventions with minority populations and a thorough knowledge of the Bible and scripture readings. Table 1 gives an overview of the weekly topics for the weight loss intervention and the scripture reading for the faith-based weight loss intervention. Appendix I includes each scripture in its entirety.

**Overview of Data Collection.** All data were collected by data collectors who were trained and then certified by a master trainer. We followed the Guidelines for Cultural Proficiency in Research for Psychologists<sup>42</sup> for training in cultural competency. Data collection consisted of two sections: 1) anthropometry and 2) sociodemographic and health-related questionnaires. All questionnaires were interviewer-administered.

**Measures**

**Eligibility.** Eligibility criteria included: 1) self-identified as African-American or black, 2) female, 3) age ≥21 years, 4) BMI ≥25 kg/m<sup>2</sup>, 5) not currently pregnant or nursing, 6) no current illegal drug use, 7) reported consumption of no more than two alcoholic beverages per day, 8) no medical problems that would restrict or prohibit moderate physical activity, 9) no cancer that required treatment in the last five years (except skin cancers other than melanoma), 10) agreed to randomization, 11) not planning to move from the Chicago area within the time frame of the intervention, and 12) able to attend scheduled classes.

Eligibility was further assessed using the Physical Activity Readiness Questionnaire (PAR-Q).<sup>47</sup> The PAR-Q has been recommended as a screening tool for entry into low-to-moderate-intensity physical activity programs. Eligibility was questioned and medical approval required when a participant positively endorsed two or more questions on the PAR-Q, reported diabetes, reported serum cholesterol levels ≥300 mg/dL or had a systolic blood pressure ≥160 mmHg or a diastolic pressure ≥100 mmHg.

**Baseline Interviews.** Baseline interviews were scheduled for eligible participants and for those who were eligible pending medical approval.

**Demographic Information/Breast Health Behavior.** This information included name, address, phone number, date of birth, highest level of education, marital status, occupation and 12-month combined family income. We also asked whether participants had ever performed a breast self-exam and whether they had ever had a clinical breast exam or a mammogram.

**Body Mass Index (BMI, kg/m<sup>2</sup>).** BMI was computed from weight and height, with height measured using a stadiometer and weight measured using a Seca company digital scale with participants wearing light clothes and no shoes. Height and weight were measured twice. If the first two height measurements were more than 0.5 cm apart or if the first two weight measurements were more than 0.2 kg apart, a third measurement was taken and the two closest measurements were used. Height was only measured at baseline.

**Stanford Seven-Day Physical Activity Questionnaire.**<sup>48</sup> The Stanford Seven-Day Physical Activity Recall (7D-PAR) has been used as a primary outcome measure in randomized trials to evaluate the effectiveness of physical activity promotion strategies.<sup>48-50</sup> Studies comparing estimates of energy expenditure from the 7D-PAR with estimates from doubly labeled water, accelerometers, heart rate monitors and direct observation suggest that the 7D-PAR provides a useful measure of energy expenditure.<sup>50-52</sup>

**Percent Energy from Fat Screener.**<sup>53</sup> This meas-

**Table 2. Retention and attendance\***

	Randomized Women		Participating Women <sup>†</sup>	
	Faith-Based Weight Loss Intervention N=30	Weight Loss Intervention N=29	Faith-Based Weight Loss Intervention N=27	Weight Loss Intervention N=25
Retention (%)	76.7	79.3	85.2	92.0
Percentage of classes attended (mean [SD])	53.5 (39.7)	54.2 (41.3)	59.4 (37.3)	62.8 (37.7)
Percentage of classes attended (median)	70.8	75.0	83.3	79.2
Attended ≥25% of classes (%)	66.7	65.5	74.1	76.0
Attended ≥50% of classes (%)	56.7	65.5	63.0	76.0
Attended ≥75% of classes (%)	50.0	51.7	55.6	60.0

\* Classes met twice weekly for 12 weeks; † The seven women who withdrew or were lost before the start of the program are excluded.

ure was developed at the National Cancer Institute (NCI) to estimate an individual's usual fat intake as a percent of total energy. The measure asks how frequently a participant consumed 15 types of food over the past 12 months. These foods were chosen because they were the most important predictors of variability in percent energy from fat among adults in the USDA's 1989–1991 Continuing Survey of Food Intake of Individuals. The instrument is scored according to an age and gender specific algorithm (www.riskfactor.cancer.gov).

**Santa Clara Strength of Religious Faith Questionnaire (SCSORF).**<sup>54,55</sup> The SCSORF consists of 10 items and measures strength of religious faith independent of affiliation. An example of an item is: "My religious faith is extremely important to me." The items are scored on a four-point Likert scale format, ranging from 1 ("strongly disagree") to 4 ("strongly agree"). The total score can range from 10 to 40, with a higher score reflecting increased religious faith. Plante and Boccaccini<sup>54,55</sup> found that the SCSORF had high internal consistency, with Cronbach's alphas ranging between 0.94 and 0.97 and split-half reliability between 0.90 and 0.96.<sup>54</sup> For our sample, Cronbach's alpha was 0.88.

**Duke Religion Index (DUREL).**<sup>56</sup> The DUREL is a five-item scale that measures three major dimensions of religiousness: organizational (OR), nonorganizational (NOR) and intrinsic religiosity (IR). Items 1 and 2 measure OR and NOR, respectively, and were normed on 7,000 people ages 18–90

who participated in one of three separate studies.<sup>56</sup> Items 3, 4 and 5 were taken from a 10-item intrinsic religiosity scale by Hoge.<sup>57</sup> These three items had a Cronbach's alpha of 0.75; in our sample, Cronbach's alpha was 0.70. The score range is 5 to 27, with lower scores reflecting greater religiosity.

**Daily Spiritual Experience Scale (DSES).**<sup>58</sup> The DSES is a 16-item scale that measures an individual's perception of or interaction with God in daily life and has been used in multiethnic populations. It is designed to measure experiences rather than specific behaviors and is not based on any specific religion. The items were developed to assess day-to-day spiritual experiences for an ordinary person and are not meant to assess extraordinary experiences (e.g., mystical experiences). The first 15 items of the scale are scored using a six-point Likert scale, ranging from 1 ("many times a day") to 6 ("never or almost never"). Lower scores reflect more frequent daily spiritual experiences. The 16th question asks the respondent to indicate how close they feel to God, with scores ranging from 1 ("not at all close") to 4 ("as close as possible"). Internal consistency was estimated at 0.94 and 0.95 using two separate samples,<sup>58</sup> and Cronbach's alpha for our sample was 0.90.

**Randomization.** Following the baseline visit and receipt of medical approval, if necessary, women were randomized to either the weight loss or the faith-based weight loss intervention. The data manager generated the allocation sequence and assigned participants to groups. The sequence was concealed

**Table 3. Participant characteristics at baseline**

	Faith-Based		Weight Loss		p*
	N	Mean (SD)	N	Mean (SD)	
Age (years)	30	47.8 (10.3)	29	49.1 (11.6)	0.66
Education (years)	30	13.6 (2.3)	29	12.9 (2.2)	0.26
Income (\$, median)	29	20,500	29	20,500	0.81
Work full-time outside home (%)	30	56.7	29	37.9	0.15
Married/living as married (%)	30	23.3	29	20.7	0.81
BMI (kg/m <sup>2</sup> )	30	39.3 (7.4)	29	38.4 (7.3)	0.66
Weight (kg)	30	103.7 (20.6)	29	103.0 (18.5)	0.90
Dietary fat (% kCal)	30	35.8 (6.0)	28	34.7 (6.3)	0.51
Energy expenditure (kcal/kg per day)	29	35.6 (4.5)	28	33.9 (2.1)	0.07
Moderate activity (kcal/kg per day)	29	3.9 (4.3)	28	2.2 (2.4)	0.08
Vigorous activity (kcal/kg per day)	29	1.3 (2.6)	28	0.4 (1.2)	0.10
Duke Religion Index <sup>†</sup>	29	9.0 (3.7)	29	9.3 (3.4)	0.74
Santa Clara Strength of Religious Faith Questionnaire <sup>‡</sup>	30	36.2 (3.4)	29	35.4 (4.3)	0.40
Daily Spiritual Experience Scale <sup>§</sup>	28	32.2 (9.3)	26	31.8 (11.4)	0.88

\* From Chi-squared tests for categorical variables, Wilcoxon rank sum test for income and two-sample t tests for other continuous variables; † Theoretical range = 5 (high religiosity) to 27 (low religiosity). Observed range = 5 to 21; ‡ Theoretical range = 10 (low strength of religious faith) to 40 (high strength of religious faith). Observed range = 27 to 40; § Theoretical range = 16 (more frequent DSEs) to 94 (less frequent DSEs). Observed range = 16 to 61

until participants were assigned. Due to the nature of the study, neither the participants nor the interventionists were blinded.

**Statistical Analysis.** The primary aim of this pilot study was to estimate the efficacy of the 12-week faith-based culturally tailored weight loss intervention as compared to a culturally tailored weight loss intervention with no faith component. Efficacy was assessed based on reductions in BMI and percent of energy from fat and on increases in physical activity. For all randomized women and for the subgroup of women with follow-up data, differences in baseline characteristics between the groups were tested for significance using Student's t tests or Wilcoxon rank sum tests for continuous variables and Chi-squared tests for categorical variables. We also examined the Spearman correlations among the three measures of spirituality. T tests were used to compare changes from baseline to follow-up in the faith-based and weight loss groups. These analyses were repeated using the Wilcoxon rank sum test, and both tests generally gave similar results. We also computed 95% confidence intervals for the differences between the two groups and estimated the effect size as a percentage of the pooled within-group standard deviation of the change in the outcome variable. Finally, we tested whether changes from baseline to follow-up within each group were significantly different from 0 using one-sample t tests.

**RESULTS**

One-hundred-forty-five women completed an eligibility interview. Forty-five were ineligible, and 32 dropped out of the study prior to completing the baseline visit. Sixty-eight women completed the baseline visit, but eight were determined to be ineligible and one dropped out before randomization. The remaining 59 women were randomized (faith-based weight loss = 30; weight loss = 29). Seven withdrew or were lost to follow-up prior to the first intervention session but are included in the analyses wherever possible.

**Attendance**

Fifty percent of the women randomized to the faith-based weight loss intervention and 52% of the women randomized to the weight loss intervention attended  $\geq 75\%$  of the classes. When considering only those women who participated in the program (seven withdrew or were lost to follow-up before the start of the program), 56% in the faith-based group and 60% in the weight loss group attended  $\geq 75\%$  of the classes. (See Table 2 for Retention and Attendance data.) There were no significant differences between groups in attendance.

**Baseline Characteristics**

Table 3 shows the sociodemographic characteristics of the 59 randomized participants at baseline as well as anthropometrics, fat consumption and physical activity. At baseline, there were no statistically significant differences between the women randomized to the faith-based weight loss and weight loss intervention groups (i.e.,  $p > 0.05$ ). However, among the subgroup of women with follow-up data, mean baseline energy expenditure was somewhat greater in the faith-based group than in the weight loss group [35.9 (5.1) kcal/kg vs. 33.4 (1.8) kcal/kg,  $p < 0.05$ ]. The mean age (SD) of study participants was 48.4 (10.9) years. The mean level of education was slightly greater than high school (M=13.3 years, SD=2.3), and the median income was reported as \$20,500. The mean BMI (SD) was 38.8 (7.3) kg/m<sup>2</sup>. Twenty-two percent were married, and 47% worked full-time outside the home.

**Religiosity/Spirituality Characteristics**

Table 3 also shows the baseline scores for the measures of spirituality/religiosity. There were no differences between the weight loss and faith-based weight loss groups. As expected, this sample scored high on measures of religiosity, with a mean of 9.2 (3.5) on the DUREL, a mean of 35.8 (3.8) on the SCSORF and a mean of 32.0 (10.3) on the DSES. On the DUREL, the Spearman correlation between

**Table 4. BMI, weight, BMI change and weight change at baseline and 12-week follow-up**

	Baseline		12-Week Follow-Up		Difference (Faith-WL) (95% CI)	p <sup>†</sup>
	Faith-Based Weight Loss (N=23)	Weight Loss (N=23)	Faith-Based Weight Loss	Weight Loss		
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		
BMI (kg/m <sup>2</sup> )	39.9 (8.1)	39.3 (7.5)	39.0 (8.1)	38.7 (7.7)		
Weight (kg)	105.6 (20.7)	105.0 (18.2)	103.0 (20.7)	103.4 (19.0)		
BMI change (kg/m <sup>2</sup> )			-1.0 (1.3)**	-0.6 (1.2)*	-0.34 (-1.08 to 0.41)	0.37
Weight change (kg)			-2.6 (3.5)**	-1.6 (3.2)*	-0.95 (-2.94 to 1.04)	0.34
Weight change (%)			-2.4 (2.9)***	-1.7 (3.1)*	-0.73 (-2.52 to 1.06)	0.41

Significantly different from 0, from one-sample t test: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; † From two-sample t test, with change from baseline to follow-up (FU-BL) as the dependent variable.

IR and OR was 0.26 ( $p < 0.05$ ), the correlation between IR and NOR was 0.42 ( $p < 0.001$ ) and the correlation between OR and NOR was 0.34 ( $p < 0.01$ ). The Spearman correlation between the SCSORF and the DUREL was  $-0.50$  ( $p < 0.001$ ); for the SCSORF and the DSES,  $r_s = -0.55$  ( $p < 0.001$ ); and for the DUREL and DSES,  $r_s = 0.43$  ( $p < 0.01$ ).

Seventy-three percent of the women reported attending church services at least once a week, and only a very small minority never attended church (7%). Fifty-nine percent of the women engaged in private religious activities, such as prayer, meditation or Bible study, one or more times per day.

### Breast Health Behavior

All of the women reported that they had had at least one clinical breast exam. Forty-nine (92%) had performed a breast self-exam in the past six months, and 34 (64%) had done it at least once a month for the past 6 months. Nineteen of the 20 women  $> 50$  years old reported having had a mammogram.

### Weight Change

Table 4 shows postintervention BMI change and weight change (kilograms and percent) for the two groups. Both groups exhibited some prepost weight loss. Among the 46 women with follow-up data, 32 (70%) lost weight—18 (78%) in the faith-based group and 14 (61%) in the weight loss group. Specifically, women in the faith-based weight loss group lost an average of 2.6 (3.5) kg, and their BMI decreased by 1.0 (1.3)  $\text{kg}/\text{m}^2$ . Women in the weight loss group lost an average of 1.6 (3.2) kg, and their BMI decreased by 0.6 (1.2)  $\text{kg}/\text{m}^2$ . The estimated effect size for change in BMI was 0.27 (27% of the standard deviation of change in BMI), suggesting that the addition of a faith component could poten-

tially produce a clinically significant additional effect on weight loss. However, this would have to be tested in a fully powered trial.

### Dietary Fat Consumption

Table 5 shows fat consumption at baseline and follow-up. Fat consumption was lower at follow-up in both groups, but the change was not statistically significant based on t-test results. However, the Wilcoxon signed rank test did show a significant ( $p < 0.05$ ) decrease for both groups. The change in fat consumption was very similar in both groups.

### Physical Activity Characteristics

Table 5 also shows participants' physical activity at baseline and postintervention. Total energy expenditure and energy expended in moderate and vigorous activities increased significantly in the weight loss group, though not in the faith-based weight loss group.

### DISCUSSION

To date, no study has tested the efficacy of adding a formal faith component to an already successful culturally tailored weight loss intervention for black women. Growing evidence suggests that religious involvement has the potential to positively influence health behavior in black populations,<sup>59-64</sup> and spiritual/religious beliefs have been shown to play a central role in how blacks—particularly black females—structure their lives.<sup>32,65,66</sup> Faith on the Move was successful in recruiting and randomizing 59 black women to a previously tested culturally tailored weight loss intervention<sup>26</sup> or a faith-based culturally tailored weight loss intervention. However, two women (one from each group) could not be reached at randomization, and five women declined to participate after being randomized. In four of the five cases,

**Table 5. Diet and physical activity at baseline and 12-week follow-up**

	Baseline		12-Week Follow-Up		Difference (Faith-WL) (95% CI)	p <sup>‡</sup>
	Faith-Based Weight Loss (N=21 <sup>†</sup> ) Mean (SD)	Weight Loss (N=22 <sup>†</sup> ) Mean (SD)	Faith-Based Weight Loss Mean (SD)	Weight Loss Mean (SD)		
Dietary fat (% kCal)	36.1 (6.2)	35.4 (6.4)	33.3 (5.1)	32.7 (6.1)	-0.25 (-4.45 to 3.95)	0.91
Energy expenditure (kcal/kg per day)	35.9 (5.1)	33.4 (1.8)	36.2 (3.3)	37.0 (6.0)**	-3.26 (-6.91 to 0.40)	0.08
Moderate activity (kcal/kg per day)	3.9 (4.8)	1.7 (2.0)	2.8 (2.7)	3.4 (3.5)*	-2.80 (-5.69 to 0.09)	0.06
Vigorous activity <sup>§</sup> (kcal/kg per day)	1.8 (3.0)	0.4 (1.3)	3.0 (3.3)	3.0 (6.1)*	-1.42 (-4.54 to 1.69)	0.36

Change (FU-BL) significantly different from 0, from one-sample t test: \*  $p < 0.05$ , \*\*  $p < 0.01$ ; † For fat consumption, N=23 for both groups; ‡ From two-sample t test, with change from baseline to follow-up (FU-BL) as the dependent variable; § Vigorous activity is the total of hard and very hard activity from the Seven-Day Physical Activity Recall.

the women withdrew because they were no longer able to attend the intervention classes at the scheduled time. In future studies, we will attempt to reduce the number of randomized nonparticipants by delaying randomization until just before the start of the intervention and by calling all eligible subjects before randomization to ensure that they are still willing and able to participate in the study.

Overall, the results of this pilot study show that there may be benefit to adding a faith component to our previously tested culturally based weight loss intervention. Specifically, the women in the faith-based group reduced their BMI by an additional 0.34 kg/m<sup>2</sup> and their weight by an additional 0.95 kg, or about 2 lbs in 12 weeks. The observed effect size

of 0.27 (calculated as change in the faith-based intervention minus change in the weight loss intervention divided by the pooled standard deviation of change) for BMI was much smaller than the effect size for our previous study that tested a culturally tailored weight loss intervention compared to a standard control group (~116%).<sup>26</sup> However, given that we were testing two active interventions, we did not expect a difference as dramatic as that. Weight loss was also expected to be modest in both groups, given the relatively short duration of the pilot intervention. Overall, the magnitude of weight loss observed in our study in the faith-based intervention (2.6 kg) was comparable to or somewhat better than other interventions of similar length designed specifically

<b>Appendix I</b>		
<p><b>Week 1</b> Now faith is the substance of things hoped for, the evidence of things not seen. (Hebrews 11:1)</p> <p><b>Week 2</b> Watch and pray, lest you enter temptation. The spirit is willing but the flesh is weak. (Matthew 26:41)</p> <p><b>Week 3</b> And Solomon's provision for one day was thirty measures of fine flour, and threescore measures of meal, ... (1 Kings 2:22)</p> <p>And [for] his diet, there was a continual diet given him of the king of Babylon, every day a portion until the day of his death, all the days of his life. (Jeremiah 52:34)</p> <p><b>Week 4</b> Therefore I say unto you, Take no thought for your life, what ye shall eat, or what ye shall drink; nor yet for your body, what shall you put on. Is life more than meat, and the body than raiment?... But seek ye first the kingdom of God, and His righteousness; and all these things shall be added unto you. (Matthew 6:25 and vs. 33)</p>	<p><b>Week 5</b> This Book of the Law shall not depart from your mouth, but you shall meditate in it day and night, that you may observe to do according to all that is written in it. For then you will make your way prosperous, and then you will have good success. (Joshua 1:8)</p> <p><b>Week 6</b> All things are lawful unto me, but all things are not expedient: all things are lawful for me, but I will not be brought under the power of any. Meats for the belly, and belly for the meats: but God shall destroy both it and them. (1 Corinthians 6:12-13a)</p> <p><b>Week 7</b> What [doth it] profit, my brethren, though a man say he hath faith, and have not works? Can faith save him? (James 2:14)</p> <p>Even so faith, if it hath not works, is dead, being alone. (James 2:17)</p> <p><b>Week 8</b> Write the vision and make it plain on tablets, that He may run who reads it. For the vision is yet for an appointed time, but at the end it will speak, and will not lie. Though it tarries, wait for it, because it will surely come. It will not tarry. (Habakkuk 2:1-4)</p>	<p><b>Week 9</b> Beloved, I wish above all things that thou mayest prosper and be in health, even as thy soul prospereth. (3 John 1:2)</p> <p><b>Week 10</b> I beseech you therefore, brethren, by the mercies of God, that ye present your bodies a living sacrifice, holy, acceptable unto God, [which is] your reasonable service. And be not conformed to this world: but be ye transformed by the renewing of your mind, that ye may prove what [is] that good, and acceptable, and perfect, will of God. (Romans 12:1-2)</p> <p><b>Week 11</b> And Jesus said unto them, Because of your unbelief: for verily I say unto you, If ye have faith as a grain of mustard seed, ye shall say unto this mountain, Remove hence to yonder place; and it shall remove; and nothing shall be impossible unto you. (Matthew 17:20)</p> <p><b>Week 12</b> Therefore if any man [be] in Christ, [he is] a new creature: old things are passed away; behold, all things are become new. (2 Corinthians 5:17)</p>



for black populations.<sup>40,67-69</sup> For example, participants in the Healthy Eating and Lifestyle Program (HELP) study lost an average of 1.5–1.7 kg in the first phase of the study (10 weeks).<sup>67</sup> Agurs-Collins and colleagues<sup>68</sup> observed a net difference of 2.0 kg between the intervention and control group following an initial 12-week intervention. Additionally, the mean weight loss reported for the Pounds Off with Empowerment (POWER) intervention was 1.15 kg following the eight-week intervention.<sup>70</sup> Some culturally tailored interventions of longer duration have shown improved results.<sup>17,26</sup>

There are several limitations to this study. We did not include a standard control group. Instead, we chose a design that tested a faith-based weight loss program against a previously tested successful weight loss intervention (culturally tailored weight loss).<sup>26</sup> As to the generalizability of our sample, our study participants were overweight/obese, primarily middle-aged, low-income, black women with strong religious/spiritual beliefs. Thus, our findings may be less generalizable to younger, higher-income women without defined spiritual beliefs or religious affiliation. Another faith-based intervention that focused on changing dietary behavior (increasing fruit and vegetable intake) found the least improvement in younger women (18–37 years old).<sup>61</sup> Lastly, we relied on self-report information, which is inherently subject to recall bias, for both fat intake and physical activity.<sup>71,72</sup> For example, the weight loss group showed a significant prepost increase in physical activity, whereas the faith-based group did not. Since self-reported physical activity data are subject to bias, both self-report and objective measures should be utilized in future studies. This will allow investigators to assess the type, duration and intensity of activity more accurately.

In summary, this paper presents the results for Faith on the Move,<sup>3</sup> a pilot study with the primary aim of estimating the effectiveness of adding a faith-based component to a culturally tailored weight loss intervention. Other interventions that have attempted to test a spiritual component within a church setting have found it impossible to maintain a nonspiritual arm within the black church environment.<sup>40</sup> Our results demonstrate that the addition of a structured faith component may enhance the benefit of a culturally tailored weight loss intervention for black women. A future adequately powered trial can provide more definitive results.

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