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Motivational interviewing fails to improve outcomes of a behavioral weight loss program for obese African American women: a pilot randomized trial

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Abstract Compared to other racial/ethnic groups, African American (AA) women are more likely to be obese but less likely to participate in weight loss interventions or to successfully lose weight. Sustained motivation for weight loss may be especially difficult for AA women due to socioeconomic and cultural factors. The purpose of this study was to examine whether the addition of motivational interviewing (MI) to a culturally-targeted behavioral weight loss program for AA women improved adherence to the program, diet and physical activity behaviors, and weight loss outcomes. Forty-four obese (mean BMI = 39.4, $SD = 7.1$) AA women were randomized to receive a 16-week behavioral weight loss program plus four MI sessions, or the same behavioral weight loss program plus four health education (HE; attention control) sessions. Results showed that participants in both MI and HE conditions lost a significant amount of weight, reduced their energy intake and percent calories from fat, and increased their fruit and vegetable consumption ($ps < .05$). However, adherence to the behavioral weight loss program and changes in diet, physical activity, and weight did not differ across MI and HE conditions. Future research is warranted to determine the subpopulations with which MI is most effective.

Keywords African American · Obesity · Weight loss · Motivational interviewing · Behavioral treatment

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Introduction

African American (AA) women are more likely to be obese (body mass index [BMI]) > 30 (Ogden et al. 2006) and less likely to engage in regular physical activity (CDC 2005) compared to Caucasian women. As a result, AA women suffer from higher morbidity and mortality from numerous chronic diseases (Must et al. 1999). Although nearly two-thirds of obese AA women report that they want to lose weight and are attempting to do so (Clark et al. 2001), they are less likely to participate in weight loss interventions and to successfully lose weight than other racial/ethnic groups (McTigue et al. 2003; Wing and Anglin 1996). For example, in three randomized trials, AAs lost 1.9–2.7 kg compared to 4.7–5.9 kg among Caucasians, (Kumanyika et al. 2002; Kumanyika et al. 1991) and in the Diabetes Prevention Program (DPP), approximately half as many AA as Caucasian participants achieved the 7% weight loss goal at 6 months (Wing et al. 2004).

In response to the need to improve weight loss outcomes among AA women, several culturally-targeted interventions have been developed (Kreuter et al. 2002). These approaches match materials and messages to observable 'surface structures,' for example, by including pictures of AA women, and to 'deep structures' by addressing cultural and environmental factors, such as socioeconomic factors, dietary preferences, and values placed on religion/spirituality, collectivism, and family (Resnicow et al. 1999). The average weight loss in these programs has been modest, ranging from 1 to 4 kg over 2–12 months (Agurs-Collins et al. 1997; Fitzgibbon et al. 2005; Kanders et al. 1994; Karanja et al. 2002; Kennedy et al. 2005; Kumanyika and Charleston 1992; Kumanyika et al. 2005; McNabb et al. 1997; Walcott-McQuigg et al. 2002). In addition, several studies with AA women have reported poor adherence, with treatment session attendance ranging between 50 and

60% (Karanja et al. 2002; Kumanyika et al. 2005; Walcott-McQuigg et al. 2002). Because success in behavioral weight loss programs is highly dependent on attendance and completion of self-monitoring assignments, poor adherence among AA women is a likely contributing factor to their lower success rates (Karanja et al. 2002; Kumanyika et al. 2005; Walcott-McQuigg et al. 2002).

Inadequate or lack of sustained motivation may account for lower adherence among AA women. For example, in one multicenter weight loss trial, AAs were more likely than Caucasians to report lack of personal motivation to change their behavior (Mattfeldt-Beman et al. 1999). In another culturally-targeted weight loss program, one-third of AA women reported that they never developed sufficient motivation to change their behavior (Agurs-Collins et al. 1997). Sustained motivation for weight loss may be especially difficult for AA women due to socioeconomic and cultural factors, such as the high prevalence of obesity and acceptance of larger body sizes within the AA community (Flynn and Fitzgibbon 1998), lower levels of social support for weight loss (Wolfe 2004), family-centered food traditions (Hargreaves et al. 2002), and competing personal and financial stressors (Agurs-Collins et al. 1997).

Motivational interviewing (MI) is a counseling technique designed to address ambivalence and increase internal motivation and self-efficacy for behavior change (Miller and Rollnick 2002). MI has successfully been applied to a range of health behaviors, including dietary change (Ahluwalia et al. 2007; Resnicow et al. 2004), and has shown promise for improving adherence to a behavioral weight loss program (Smith et al.1997). The purpose of the current study was to examine whether the addition of MI to a culturally-targeted group-based behavioral weight loss program for AA women enhanced adherence to the group program. In addition, we explored the effect of MI on diet and physical activity behaviors and weight loss outcomes. Finally, we examined whether MI increased internal motivation for weight loss and self-efficacy for diet and exercise.

Method

Study design

Participants were randomized to receive four individual sessions of MI or health education (HE; attention control) as an adjunct to a 16-week culturally-targeted behavioral weight loss program.

Participants and randomization

AA women were recruited from a community health center serving predominantly lower-income AAs and the surrounding community in Kansas City, Missouri. Eligible participants were 18 years or older, obese (BMI = 30–50), not pregnant or intending to become pregnant within 6 months, not currently involved in other weight loss treatments, free from psychiatric illness or substance abuse, able to walk continuously for at least 10 min, not planning to move out of the area within 6 months, and able to obtain medical clearance from a primary care provider. Participants were recruited using flyers, a staffed table in the health clinic lobby, and by word of mouth. Participants were randomized sequentially using a closed envelope procedure that was created by the study statistician, concealed from the investigators and data collection staff, and allocated by the individual counselors. The study was approved by the Human Subjects Committee at the University of Kansas Medical Center.

Culturally-targeted behavioral weight loss program

The 16-session behavioral weight loss program was adapted from the "Lifestyle Balance" program of the DPP (DPP 2002) and emphasized gradual, sustainable lifestyle changes using goal-setting and self-monitoring. Treatment goals were 7% weight loss, decreased energy intake by 500–1000 kcal per day, 25% kcal from fat, 5–9 fruit and vegetable servings per day, and 150 min per week of physical activity. Participants received an individual calorie and fat gram goal using the Harris Benedict equation adjusted for light activity (Frankenfield et al. 2003). Participants charted weekly weights and were instructed to self-monitor daily food intake and physical activity. Self-monitoring logs included daily columns for tracking food types, amount, kcals, and fat grams as well as daily minutes of physical activity.

The program was administered in 90-min weekly sessions in groups of 12–14 participants. MI and HE participants were in the same groups to ensure comparable programs across conditions; group sessions did not address the content of the adjunct MI or HE sessions. A doctorate-level psychologist and a masters-level counselor or dietitian led each group following a treatment manual. During the first 30 min, participants weighed-in, reviewed weekly self-monitoring logs, and shared strategies with the group. The next 60 min addressed the weekly topic, which included nutrition and physical activity education and behavioral modification skill building (e.g., problem-solving, stimulus control, social skills, and relapse prevention).

Cultural adaptations were identified from previous work (Befort 2006; Kumanyika et al. 1992) and included the following: (1) social support was emphasized with dedicated sharing time and by addressing ways to build support among existing networks; (2) barriers related to transportation, neighborhood safety, literacy, and other stressors

were discussed, and childcare during meetings was provided when feasible; (3) guidance about food and physical activity were made relevant to cultural practices, e.g., by discussing alternatives to preferred high fat meats and highlighting existing physical activity programs in the community; (4) preferences for larger body sizes were recognized and the health benefits of 5–10% weight loss were highlighted; (5) AA community leaders who had succeeded at weight loss were invited as peer mentors; (6) participants developed group names for themselves (e.g., "Jazzy Women Taking It Off" and "Dedicated Divas") to increase program ownership; and (7) sessions were less didactic and more interactive in nature.

Randomized treatment conditions

Motivational interviewing

MI is a directive counseling method that elicits self-motivational statements ("change talk") and provides information only after the person has expressed an openness and readiness to change (Miller and Rollnick 2002). Participants randomized to MI received four 30-min individual MI sessions with an advanced doctoral clinical psychology student. The same individual counselor provided all four sessions for a given participant. Individual counselors did not facilitate group sessions with their given participants. We chose this design, as have other studies (e.g., West et al. 2007), because it ensured that that the group program was the same across conditions by allowing both MI and HE participants to be in a given group, while at the same time preventing contamination due to discussion of individual sessions during the group meetings. Individual counselors co-facilitated a group that did not include their individual participants so that they were up-to-date on the content of the group program.

MI sessions occurred at weeks 0 (in-person), 3 (by phone), 8 (in-person), and 13 (by phone). We chose a mixed in-person and phone delivery of MI sessions based on our previous experience (Ahluwalia et al. 2007; Ahluwalia et al. 2006) indicating that participants prefer some in-person contact but also like the reduced travel and time burden offered by phone sessions. MI sessions followed a semi-structured format. The first session focused on building motivation and commitment for attending the program and changing behaviors by discussing relevant past experiences and clarifying connections between core values and motivation to lose weight. The remaining three sessions focused on relevant target behaviors (e.g., problem foods, barriers to being physically active) that were identified by asking participants, "What would be the most helpful thing to focus on, perhaps something that you are struggling to change?" For participants who had not been attending the group program, counselors probed about attendance if the participant did not raise the issue first. Consistent with MI, the majority of each session was spent eliciting change talk by exploring participants' motivation and confidence for changing the target behavior, linking the behavior to core values, and/or discussing the pros and cons of change. Sessions ended with a global summary and, if appropriate, development of a behavioral action plan based on participants self-identified goals.

Counselors were extensively trained and supervised by a doctoral-level clinical psychologist. Training elements included reading the second edition of the seminal text on the topic (Miller and Rollnick 2002), watching MI training videotapes, participating in a 2-day training session, and conducting simulated counseling sessions. To maximize treatment fidelity, all counseling sessions were audiotaped, and 25% of tapes were randomly selected and reviewed during weekly supervision. A standardized checklist used in previous studies to assess MI fidelity (Ahluwalia et al. 2007; Ahluwalia et al. 2006) guided supervision and was used to rate the extent to which counselors captured the overall spirit of MI (e.g., expressing empathy, sharing of power) and adhered to MI strategies (e.g., asking permission, affirming and building self-efficacy, responding appropriately to client affect, and using simple and complex reflections).

Health education (attention control)

HE is a standard counseling technique which, contrary to MI, focuses on providing didactic information and advice. HE sessions were conducted by the same counselors who provided the MI sessions, were structured using handouts and flip-charts, occurred at the same study time points, were of the same duration, and followed the same in-person and phone delivery schedule. Because the HE sessions served only as an attention control, we intentionally avoided topics that were directly relevant to weight loss. Participants chose four topics from six options: breast, colon, or cervical cancer screening, smoking cessation, helping others quit smoking, and improving sleep. HE tapes were also reviewed in weekly supervision to ensure fidelity to the HE approach.

Measures

Program adherence and satisfaction

Program adherence was measured weekly by session attendance, number of self-monitoring logs turned in, and level of completion of self-monitoring logs scored from 0 to 2 by the group interventionists (0 = no log, 1 = log complete for $\leq$ 4 days, 2 = log complete for $\geq$ 5 days).

Satisfaction with the group program and the MI or HE sessions was measured post-treatment (week 16) using a 10 point scale (0 = 'not at all satisfied,' 10 = 'completely satisfied').

The following measures were collected at baseline and post-treatment (week 16).

Dietary intake

Three 24-h dietary recalls were conducted using the USDA multiple-pass approach (Conway et al. 2003). Trained data collectors recorded specific and quantitative detail of every food and drink consumed during the previous day and entered them into the Nutrition Data System for Research (NDS-R) software. The first recall occurred in-person and incorporated food models, containers, and charts to assist participants with estimating portion size. Participants received a copy of the food charts to take home, and the second and third recall occurred by phone. Data collectors aimed to complete the three recalls on non-consecutive days within a 7-day period, including two week days and one weekend day, but a 10-day period was allowed to make-up missed calls. Although the particular days of the second and third recalls were not randomly chosen, participants were not informed of when they would be called. Mean number of recalls completed at baseline and post-treatment were 2.5 ($SD = 0.8$) and 2.3 ($SD = 0.9$), respectively. One participant did not complete recalls at post-treatment. Outcome variables included daily kcals, percent kcals from fat, and daily fruit and vegetable servings (excluding fried potatoes and fruit juice).

Physical activity

The CHAMPS physical activity measure has been validated for AA populations (Resnicow et al. 2003) and assesses weekly frequency and duration of 32 planned physical and lifestyle activities (Stewart et al. 2001). Scoring yields minutes of physical activity per week and energy expenditure (kcal/kg/week) based on MET values (the ratio of work metabolic rate to resting metabolic rate) according to the Ainsworth compendium, (Ainsworth et al. 1993) with downward adjustments as recommended by Stewart (Stewart et al. 2001). Because the intervention targeted planned physical activity, lifestyle activities involving housework and gardening were not included in the scoring.

Weight and height

Participants were weighed without shoes to the nearest 0.1 pound using a digital scale (Tanita TBF-310). Weight was adjusted by two pounds (0.9 kg) to account for clothing. Height was measured without shoes and rounded to the nearest 0.25 inch. Height and weight measurements were used to calculate BMI.

Motivation

Internal motivation, or motivation that comes from the self rather than being externally imposed, was measured with the 6-item autonomous regulation scale of the Treatment Self-Regulation Questionnaire (TSRQ; Williams et al. 1996). The TSRQ has been used in previous MI-based dietary interventions targeted for AAs (Nollen et al. in press; Resnicow et al. 2004) and to assess motivational predictors of engagement in weight loss treatment (Williams et al. 1996). Items include the stem "I decided to enter this weight loss program because…" (baseline) or "I have stayed in this weight loss program because…" (post-treatment) followed by several reason that vary in the extent to which they represent internal motivation, e.g., "I really want to make some changes in my life" versus "I want others to see that I am really trying to lose weight." Response choices range on a 7-point scale from 'not at all true' to 'very true.' Internal consistency as measured by Cronbach's alpha was .69 for the current sample.

Self-efficacy for diet and exercise

This measure was adapted based on a measure developed by Bandura (2005) to assess confidence in ability to overcome common barriers to regulating healthy eating and exercise. Respondents rated their confidence on a 100-point scale, (1 = 'cannot do at all' to 100 = 'highly certain can do') for 22 items assessing dietary barriers (e.g. 'when feeling upset' or 'when you feel like celebrating') and 21 items assessing exercise barriers (e.g. 'during bad weather' or 'when you're feeling tired'). Adaptations included reducing the diet self-efficacy measure by 8 items that we deemed were less relevant for our sample (e.g., "when visiting a city" and "airplane meals") and adding 2 items for exercise self-efficacy to assess barriers reported by AA women ("when you don't want to get sweaty" and "when children or family need more time from you;" Wilcox et al. 2002). Cronbach's alpha was .97 for diet self-efficacy and .95 for exercise self-efficacy for our sample.

Statistical analyses

Baseline differences between MI and HE conditions and participants retained and those lost to follow-up were tested using two-sample *t* tests and chi-square analyses. Two-sample *t* tests were used to compare MI and HE conditions on satisfaction and adherence variables. Main effects of

treatment on pre- to post-treatment outcomes were analyzed using two-way repeated measures ANOVA with treatment condition as the between-group factor. Participants were analyzed in the condition to which they were randomized.

Results

Forty-four women were enrolled and randomized to the behavioral weight loss program plus MI ($n = 21$) or the behavioral weight loss program plus HE ($n = 23$). Thirty-four women (77.3%) returned for the post-treatment assessment; 6 women in MI and 4 women in HE were lost to follow-up. Women who were retained had higher education levels ($p = .02$) than women who were lost to follow-up. No other significant differences were found. One participant in the MI condition had a current major depressive disorder that was not detected during the eligibility screen. Because she did not meet eligibility criteria, her data have been excluded from analyses. The flow of participants through the study is presented in Fig. 1.

Baseline characteristics are displayed in Table 1. Participants were on average 44.3 ($SD = 11.6$) years old and had a mean BMI of 39.8 ($SD = 6.4$).

Completion of individual sessions (experimental treatment) did not differ across MI ($M = 3.2$, $SD = 0.8$) and HE ($M = 3.2$, $SD = 0.9$) conditions, $t(41) = -.25$, $p = .81$. Overall, 79.6% of individual sessions were complete. Satisfaction with individual sessions was higher among MI ($M = 9.2$, $SD = 1.2$) than HE ($M = 7.4$, $SD = 2.5$) participants, $t(28) = 2.32$, $p = .03$. MI and HE participants reported similar satisfaction with the group program ($M = 8.7$, $SD = 1.3$ and $M = 7.9$, $SD = 2.2$, respectively), $t(28) = 1.10$, $p = .28$.

Adherence

Adherence variables did not statistically differ across MI and HE (see Table 2). MI and HE participants attended a mean of 7.2 ($SD = 4.9$) and 9.4 ($SD = 4.7$) group sessions, respectively, $t(41) = -1.51$, $p = .14$, Cohen's $d = -.46$, for a 52% attendance rate overall. Out of 15 possible

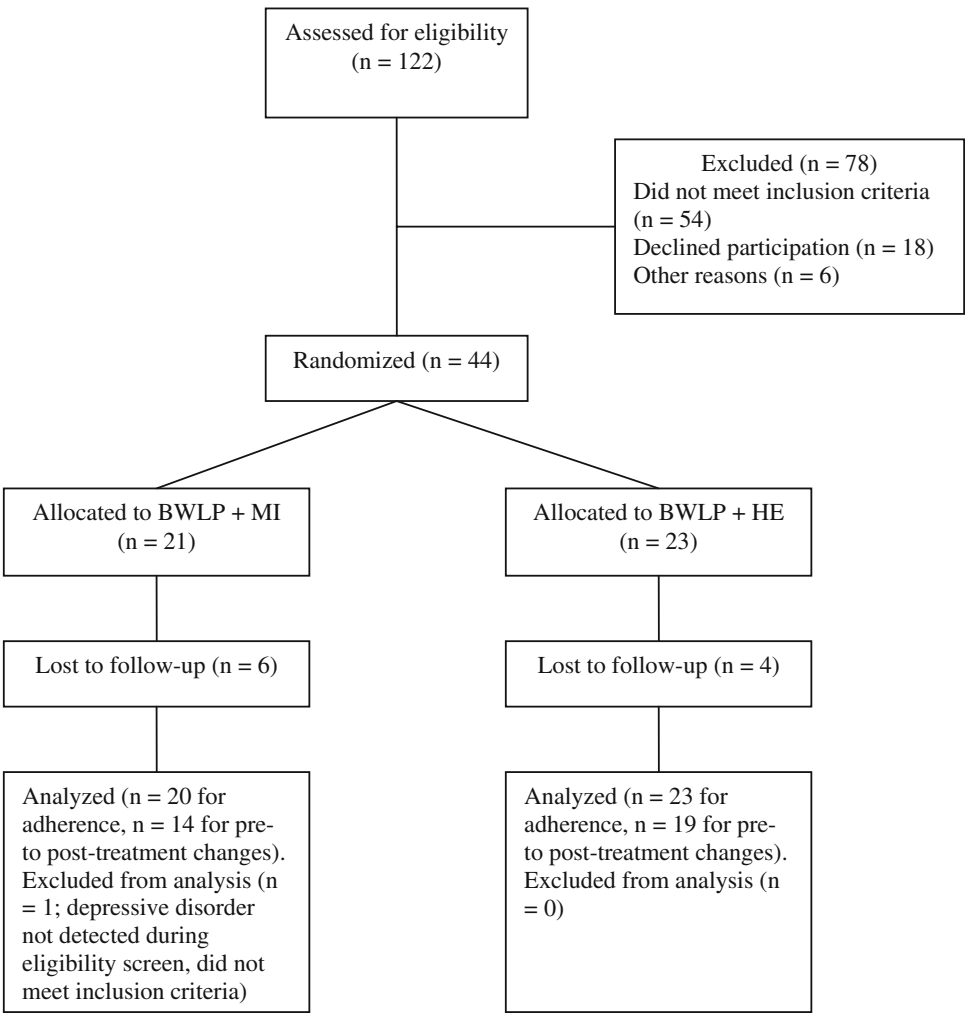

Fig. 1 Flow of participants. BWLP = behavioral weight loss program; MI = motivational interviewing; HE = health education. Recruitment was from April 2006 to June 2006. Treatment was from July 2006 to October 2006

Table 1 Baseline characteristics

Characteristic	MI ($n = 20$)	HE ($n = 23$)	Total ($n = 43$)
Age	41.6 (12.3)	47.2 (10.4)	44.3 (11.6)
Education			
GED or some H·S.	2 (10.0%)	1 (4.3%)	3 (7.0%)
H·S. graduate or some college	16 (80.0%)	16 (69.5%)	32 (74.4%)
College graduate	2 (10.0%)	6 (26.1%)	8 (18.6%)
Marital status			
Married	5 (25.0%)	3 (13.0%)	8 (18.6%)
Living with partner	4 (20.0%)	2 (8.7%)	6 (14.0%)
Divorced/widowed/never married	11 (55.0%)	18 (78.2%)	29 (67.4%)
Employment status			
Employed full-time	11 (55.0%)	15 (65.2%)	26 (60.4%)
Employed part-time	3 (15.0%)	2 (8.7%)	5 (11.6%)
Out of work	3 (15.0%)	2 (8.7%)	5 (11.6%)
Student/retired/homemaker	2 (10.0%)	2 (8.7%)	4 (9.3%)
Receives government assistance	1 (5.0%)	2 (8.7%)	3 (7.0%)
Co-morbid medical conditions			
Diabetes	4 (20.0%)	3 (13.0%)	7 (16.3%)
High blood pressure	9 (45.0%)	12 (52.2%)	21 (48.8%)
High cholesterol	1 (5.0%)	8 (34.8%)	9 (20.9%)
Asthma	3 (15.0%)	2 (8.7%)	5 (11.6%)
History of heart disease or cancer	1 (5.0%)	1 (4.3%)	2 (4.7%)
History of depression or anxiety	5 (25.0%)	8 (34.8%)	13 (30.2%)
Previous weight loss attempts, lost $\geq$ 10 lbs.	2.6 (3.3)	2.9 (2.5)	2.7 (2.9)
BMI	39.4 (7.1)	40.4 (5.8)	39.8 (6.4)
Weight (kg)	103.7 (20.8)	109.6 (18.2)	106.4 (19.6)
Baseline dietary intake			
Total kcal/day	1856 (726)	2080 (884)	1976 (813)
Percent kcal from fat	37.8 (39.0)	39.0 (8.4)	38.4 (8.0)
Fruit and vegetable servings/day	2.5 (2.3)	3.0 (1.6)	2.8 (2.0)
Baseline physical activity			
Kcal/week/kg	13.9 (18.4)	10.4 (11.3)	12.0 (15.0)
Activity minutes/week	178.5 (232.1)	153.9 (177.3)	165.3 (202.5)
Baseline psychosocial variables			
Motivation (max score = 42)	36.4 (5.7)	35.6 (4.1)	36.0 (4.9)
Diet self-efficacy (max score = 100)	71.0 (19.1)	62.5 (24.3)	66.5 (22.2)
Exercise self-efficacy (max score = 100)	66.7 (24.3)	64.4 (21.6)	65.5 (22.6)

Note: Values are Mean (*SD*) or N (%) and are not statistically different ($p > .05$) across conditions. H·S. = high school

Table 2 Means, standard deviations, and effect sizes for adherence variables

Variable	MI ($n = 20$) Mean (*SD*)	HE ($n = 23$) Mean (*SD*)	Total ($n = 43$) Mean (*SD*)	Cohen's *d*
Group sessions attended	7.15 (4.86)	9.35 (4.69)	8.37 (4.84)	−.46
Self−monitoring logs turned-in (range 0–15)	5.00 (4.93)	5.78 (3.85)	5.42 (4.35)	−.17
Log completion rating (range 0–2)	1.19 (0.69)	0.96 (0.56)	1.07 (0.62)	.37

Note: Values are not statistically different ($p > .05$) across conditions

weekly self-monitoring logs, MI and HE participants turned in a mean of 5.0 ($SD = 4.9$) and 5.8 ($SD = 3.9$) logs, respectively, $t(41) = -.58$, $p = .56$, Cohen's $d = -.17$, and on average their logs were partially complete ($M = 1.2$, $SD = 0.7$ and $M = 1.0$, $SD = 0.6$, respectively), $t(41) = 1.24$, $p = .22$, Cohen's $d = .37$.

Diet, physical activity, and weight

Table 3 displays change scores from pre- to post-treatment for outcome variables. A significant main effect for time was found for daily kcal, $F(1, 30) = 13.05$, $p = .001$, percent kcal from fat, $F(1, 30) = 8.84$, $p = .006$, fruit and vegetable servings, $F(1, 30) = 8.31$, $p = .007$, and weight, $F(1, 31) = 10.24$, $p = .003$. MI and HE participants, respectively, achieved significant decreases in daily kcal ($M = -434$, $SD = 538$ and $M = -486$, $SD = 801$) and percent kcal from fat ($M = -3.4$, $SD = 9.1$ and $M = -5.5$, $SD = 7.7$), significant increases in fruit and vegetable servings per day ($M = +1.2$, $SD = 2.8$ and $M = +2.0$, $SD = 3.2$), and they lost a significant amount of weight in kgs ($M = -2.6$, $SD = 4.2$ and $M = -3.2$, $SD = 5.7$). No significant change across time was found for physical activity ($p = .16$ and .14 for activity kcals and minutes, respectively).

Main effects for condition were not statistically significant for diet, physical activity, or weight outcomes, $p = .13$ to .95. Likewise, between-group effect sizes were trivial to small, Cohen's $d = -.04$ to $-.27$.

Motivation and self-efficacy

A significant main effect for time was found for motivation, $F(1, 31) = 13.18$, $p = .001$, and exercise self-efficacy, $F(1, 31) = 7.76$, $p = .01$. Both MI and HE participants reported a significant reduction in motivation ($M = -6.1$, $SD = 6.7$ and $M = -4.8$, $SD = 9.5$) and exercise self-efficacy ($M = -14.4$, $SD = 22.4$ and $M = -5.4$, $SD = 18.3$). Main effects for condition were not significant for motivation or self-efficacy, $p = .40$–$.87$ (see Table 3). To further explore the observed decreases in motivation and self-efficacy during treatment, correlations were run with their baseline scores, weight change, and significant dietary changes. Higher motivation and self-efficacy scores at baseline were associated with greater decreases in motivation ($r = -.50$; $p < .01$) and diet and exercise self-efficacy ($r = -.49$ and $-.58$; $ps < .01$), respectively, from pre- to post-treatment. A greater preservation of motivation over time (less decrease) showed small associations with greater decreases in dietary fat ($r = -.30$; $p = .10$). Similarly, greater preservation of diet self-efficacy showed small associations with greater decreases in total kcal ($r = -.35$; $p = .05$).

At post-treatment data collection, we added an ad hoc assessment of stressful life events to capture some of our observations during the course of the intervention. Participants were asked whether or not (yes/no) they had experienced 13 life events (e.g., job change, moving, death and sickness) in the last 4 months. Results revealed that 79% of

Table 3 Means, standard deviations, and effect sizes for change in diet, physical activity, weight, and psychosocial factors by total sample and treatment condition

Variable	MI ($n = 14$) Mean (*SD*)	HE ($n = 19$) Mean (*SD*)	Total ($n = 33$) Mean (*SD*)	Cohen's *d* BG
Diet				
Total kcal/day	−434 (538)	−486 (801)	−465 (696)	−.08
Percent kcal from fat	−3.4 (9.1)	−5.5 (7.7)	−4.6 (8.2)	−.25
Fruit and vegetable svgs/day	1.2 (2.8)	2.0 (3.2)	1.7 (3.0)	−.27
Physical activity				
Kcal/week/kg	5.4 (31.1)	8.3 (20.4)	7.0 (25.1)	−.11
Activity minutes	92 (435)	108 (282)	101 (350)	−.04
Weight				
Weight (kg)	−2.6 (4.2)	−3.2 (5.7)	−3.0 (5.1)	−.12
BMI	−1.0 (1.5)	−1.1 (2.0)	−1.1 (1.8)	−.06
Psychosocial factors				
Motivation	−6.1 (6.7)	−4.8 (9.5)	−5.3 (8.3)	−.16
Diet self-efficacy	−8.0 (24.4)	−2.0 (16.6)	−4.6 (20.2)	−.29
Exercise self-efficacy	−14.4 (22.4)	−5.4 (18.3)	−9.2 (20.3)	−.44

Note: Change scores = post-treatment score minus baseline score. BG = between group

participants experienced at least one major life event; 33% experienced the death of a close friend or family member, 18% experienced the death of an immediate family member, 24% changed jobs, 21% moved, 18% experienced a major change in caretaking responsibilities (e.g., grandchildren or older family members), and 12% experienced incarceration of a close family member or friend.

Discussion

The results of this study indicate that the addition of MI to a culturally-targeted behavioral weight loss program for AA women did not improve adherence or treatment outcomes. Despite being more satisfied with their individual sessions, women who received MI were no more likely to attend the group intervention, to change their dietary intake or physical activity, or to lose weight compared to women who received a HE attention control consisting of topics unrelated to weight loss. Furthermore, contrary to the expectation of MI, women across both conditions reported decreases in motivation and self-efficacy. Higher baseline values were associated with greater decreases suggesting that participants who were more confident or certain about their motivation at the beginning of treatment showed greater decreases in motivation and confidence from baseline to end-of-treatment. Other investigators have also found decreased self-efficacy during a weight loss intervention for many AA women (Martin et al. 2004) and compared to Caucasian women, AA women have reported higher self-efficacy at baseline but significantly greater reductions in self-efficacy over the course of an intervention (Wilbur et al. 2003). Thus, it may be particularly important for AA women to establish realistic expectations at the onset of treatment about the level of effort required and the anticipated results. In addition, it may be more effective to deliver higher doses of MI later in treatment when participants experience setbacks in the behavior change process, such as the stepped-care approach recently reported by Carels et al. (Carels et al. 2007) where only participants with poor progress received MI sessions.

West et al. (2007) also recently examined the impact of MI as an adjunct to a behavioral weight control program for AA and Caucasian women with Type 2 diabetes. Caucasian women lost more weight than AA women overall (4.5 ± 5.1 kg vs. 3.0 ± 3.9 kg at 6 months, and 3.3 ± 7.1 kg vs. 1.4 ± 4.7 kg at 18 months). Among AA women, those who received MI showed greater weight loss at 6 months than those who received HE, but by the final follow-up at 18 months, MI showed no benefit for AA women compared to a ~2.5 kg benefit for Caucasian women. Although West et al. found a benefit from MI at 6 months, compared to no benefit at 4 months in our study, the average weight loss for AA women across arms in both the West et al. and our study was nearly identical (3.0 kg), indicating that perhaps the benefit of MI is no greater than what might be achieved by culturally adapting the group program.

Recent investigations examining MI for other health behaviors among AAs have reported mixed findings. Ahluwalia et al. (2006) found that HE performed *better* than MI for smoking cessation among AA light smokers. Ahluwalia and colleagues also found that MI improved fruit and vegetable consumption (Ahluwalia et al. 2007) but not smoking cessation rates (Okuyemi et al. 2007) among predominantly AA public housing residents. Resnicow et al. (2004) found that a church-based effectiveness intervention that incorporated MI led to improved fruit and vegetable consumption among AAs, however, a process analysis revealed that intervention components other than MI were more significant contributors to outcome (Campbell et al. 2007).

Clearly, further research is needed to determine the subpopulations with which MI is most effective, including groups defined by race/ethnicity, culture, and socioeconomic status (SES). Although we did not fully measure SES, and participants reported a range of education levels and employment status, the site of our intervention was a health center serving a low-income population. In addition, AA women have lower SES, on average, than other racial/ethnic groups in the area and the country at large (DeNavas-Walt et al. 2005). Our findings and those of others (Ahluwalia et al. 2006; Okuyemi et al. 2007) suggest that MI may not be enough to facilitate behavior change among groups who face numerous socio-environmental barriers or life stressors. An underlying assumption of MI is that once sufficiently motivated and confident, individuals are able to find solutions to barriers encountered during the behavior change process (Miller and Rollnick 2002). Following from this assumption, MI counselors gave little attention to problem-solving around relevant barriers. However, the substantial barriers and stressors experienced by many of our participants may partially account for why they struggled to sustain their initially high levels of motivation and confidence, despite receiving an MI intervention that they found highly satisfactory. Stressful life events combined with poor coping resources is a known risk factor for weight regain (Elfhag and Rossner 2005), and future research may benefit from a formal assessment of life stress and barriers. In addition, a problem-solving approach that directly addresses barriers, such as the successful approach developed by Perri et al. (2001), may be more effective than MI for AA women. This may be particularly true for multifaceted lifestyle behaviors that are influenced by stress and coping, such as diet and exercise.

Although the MI intervention did not enhance outcomes of the behavioral weight loss program, the program resulted in significant changes in diet and weight that are

consistent with other culturally-adapted weight loss programs for AA women. Session attendance and retention in our study were also consistent with previous group-based obesity interventions for AA women (Karanja et al. 2002; Kumanyika et al. 2005; Walcott-McQuigg et al. 2002), indicating that the addition of individual MI was not sufficient for improving engagement in treatment. Our weight loss findings are below that reported for the DPP: 30% of AA participants in the DPP achieved 7% weight loss compared to 21% of our participants (Wing et al. 2004). This difference may be because the DPP results are for women and men combined (results by both race and gender are not reported) or because the DPP intervention was delivered individually and incorporated additional 'toolbox' resources, such as personal trainers, Slim Fast products, or grocery store vouchers (DPP 2002). Nonetheless, given the repeated finding of lower weight losses among AA women across numerous interventions, further research is needed. For example, evidence suggests that obese AA women may have lower resting energy expenditure (REE) and experience greater decreases in REE after weight loss compared to obese Caucasian women (Foster et al. 1999).

Loss to follow-up (23%) in the current study was consistent with other studies and did not differ by MI and HE conditions. Although the absence of significant differences across MI and HE conditions may reflect inadequate power, the differences did not approach significance, most between-group effect sizes were small to trivial, and we did not observe clinically meaningful trends in the expected direction. Women with lower education were less likely to be retained, which indicates that our intervention, which emphasized record keeping and self-monitoring, was less successful at reaching women with lower literacy levels. In addition, MI sessions may have been more effective if they were delivered by the group counselor in order to maximize continuity of care, although other investigators have used separate counselors for individual and group sessions with some success (Carels et al. 2007; West et al. 2007). We also cannot determine how much the mixed in-person and phone delivery of MI impacted its effectiveness (Ahluwalia et al. 2007; Resnicow et al. 2001; Resnicow et al. 2004). Another limitation was that the self-efficacy and motivation measures had not been previously validated among AA women. Finally, participants reported relatively high levels of physical activity and low energy intake at both baseline and post-treatment, a finding that is consistent with research indicating that obese women, and obese AA women in particular, under-report dietary intake (Samuel-Hodge et al. 2004) and over-report physical activity (Walsh et al. 2004). However, the measures we chose were well-suited for detecting *change* over time (Buzzard et al. 1996; Resnicow et al. 2003) thus minimizing the impact of self-report bias.

In conclusion, this study builds on new and accumulating evidence suggesting that MI may not be as effective with AA populations as Caucasians for weight loss and health behavior change. Further work is needed to replicate this finding and dismantle the socioeconomic barriers versus sociocultural factors that may limit the impact of MI. Additional work is also needed to develop and evaluate approaches to weight control among AA women that directly reduce barriers and competing stressors.

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