

# Motivational Interviewing Improves Weight Loss in Women With Type 2 Diabetes

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**OBJECTIVE** — We sought to determine whether adding motivational interviewing to a behavioral weight control program improves weight loss outcomes and glycemic control for overweight women with type 2 diabetes.

**RESEARCH DESIGN AND METHODS** — We conducted a randomized, controlled, clinical trial in which participants all received an 18-month, group-based behavioral obesity treatment and were randomized to individual sessions of motivational interviewing or attention control (total of five sessions) as an adjunct to the weight control program. Overweight women with type 2 diabetes treated by oral medications who could walk for exercise were eligible. Primary outcomes were weight and A1C, assessed at 0, 6, 12, and 18 months.

**RESULTS** — A total of 217 overweight women (38% African American) were randomized (93% retention rate). Women in motivational interviewing lost significantly more weight at 6 months ( $P = 0.01$ ) and 18 months ( $P = 0.04$ ). Increased weight losses with motivational interviewing were mediated by enhanced adherence to the behavioral weight control program. African-American women lost less weight than white women overall and appeared to have a diminished benefit from the addition of motivational interviewing. Significantly greater A1C reductions were observed in those undergoing motivational interviewing at 6 months ( $P = 0.02$ ) but not at 18 months.

**CONCLUSIONS** — Motivational interviewing can be a beneficial adjunct to behavioral obesity treatment for women with type 2 diabetes, although the benefits may not be sustained among African-American women.

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Individuals with type 2 diabetes frequently are overweight (1–3) and experience a range of obesity-related comorbidities (4). With every unit increase in BMI, direct medical costs associated with type 2 diabetes significantly increase (5). Weight loss has been shown to improve metabolic control and other health parameters among individuals with type 2 diabetes (6,7), with greater weight loss producing greater improvements in metabolic functioning (8). However, sustained weight loss can be challenging (9), particularly for individu-

als with diabetes (10). African-American women experience particular difficulties in achieving weight loss (11,12), a matter of concern given high rates of obesity (13) and diabetes (14) in this group. Therefore, improving obesity treatment outcomes for overweight individuals with comorbid diabetes has been identified as a research priority (15).

Motivational interviewing (16) is a brief intervention approach demonstrated to promote better long-term outcomes for a range of health outcomes (17,18), with preliminary support as an

adjunct to behavioral obesity treatment. Motivational interviewing produced significantly better glycemic control and treatment adherence and a trend toward greater short-term weight loss in a pilot study of overweight diabetic women (19). Furthermore, motivational interviewing interventions have been shown to be effective in promoting changes in diet and physical activity (20–22). Despite this promising foundation, there have been no controlled evaluations of the long-term efficacy of motivational interviewing for obesity treatment. The purpose of the current study was to determine whether the addition of motivational interviewing to a behavioral obesity treatment program for overweight women with type 2 diabetes enhances long-term weight loss and metabolic control.

## RESEARCH DESIGN AND METHODS

Volunteers were recruited from the Birmingham, Alabama, area between 2000 and 2002 using social marketing channels, direct mail solicitation, and physician referrals. Individuals were screened by phone and then invited to a group orientation where the study was described and informed consent obtained. Baseline data were collected on subsequent visits.

Women were eligible if they had type 2 diabetes treated by oral diabetes medications but not insulin, were overweight (BMI 27–50 kg/m<sup>2</sup>) but generally healthy otherwise, and could walk for exercise. Women with uncontrolled diabetes (A1C >12%) or hypertension (diastolic blood pressure >90 mmHg or systolic blood pressure >140 mmHg) were referred to their physicians for treatment and invited to rescreen. Exclusion criteria included pregnancy, recent significant weight loss ( $\geq 10$  lbs), or a severe debilitating disease that might interfere with study participation. Volunteers obtained a physician's consent for participation and successfully completed a 7-day diary monitoring dietary intake before randomization. A total of 561 women were screened, and 217 (38% African-American) women were randomized using a sequentially numbered, closed-envelope procedure.

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A table elsewhere in this issue shows conventional and Système International (SI) units and conversion factors for many substances.

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All research procedures were approved by the University of Alabama at Birmingham Institutional Review Board for Human Use and the University of Arkansas for Medical Sciences Institutional Review Board.

Participants were randomized to receive individual sessions of either motivational interviewing or an attention placebo as an adjunct to a group-based behavioral weight control program. Participants were classified as white or African American based on self-identification, and randomization was done within race to assure balanced representation across the experimental conditions. All participants received the same group-based weight control program delivered by interventionists masked to experimental assignment. Baseline data were obtained across two clinic visits and 6-, 12-, and 18-month follow-up data at a single clinic visit. Retention was encouraged by small incentives, but participants were not compensated.

### Group-based behavioral weight control program

All participants, regardless of experimental condition, received a 42-session weight management program, which met weekly for 6 months, biweekly for 6 months, and then monthly for 6 months. Weight loss induction was emphasized in the first 6 months and weight maintenance in the subsequent 12 months. Group size averaged 14 individuals, and sessions were delivered by a multidisciplinary team (behaviorist, nutritionist, exercise physiologist, and diabetes educator) blinded to experimental condition. Because the experimental treatment was delivered in adjunct individual sessions that were distinct from the group, it was possible to include participants from both experimental conditions within a given weight control group, increasing confidence that the group program was delivered comparably across the experimental conditions.

The behavioral group program focused on attainable and sustainable changes in dietary and physical activity habits, with a strong emphasis on goal setting and problem solving to achieve successful behavioral change. Caloric restriction was prescribed (1,200–1,500 kcal/day) with a fat intake goal of 33–42 g/day. Gradual increases in physical activity were promoted with an ultimate goal of at least 150 min/week. Self-monitoring diaries were a cornerstone of the program

and focused on recording dietary intake (including calories and fat gram intake) and physical activity (minutes and type of exercise). Diaries were reviewed weekly and returned with feedback. Goal setting and problem solving were introduced early on and figured prominently in weekly sessions. Other behavioral topics included stimulus control, developing social support, cognitive restructuring, and relapse prevention. Information about diabetes, obesity, and weight loss, as well as recommendations specific to individuals with diabetes (e.g., identifying and treating hypoglycemia, proper foot care while exercising, etc.), were also addressed.

### Experimental conditions

**Motivational interviewing.** Motivational interviewing is a client-centered approach to promoting behavioral change by exploring ambivalence in a nonjudgmental and supportive yet directive fashion (16,23). Meta-analyses have established the efficacy of motivational interviewing as a brief intervention to facilitate health behavioral changes across a range of domains (20,21). Key elements of motivational interviewing are the client-centered nature of eliciting change talk (the individual's own reasons and arguments for change) and exploring ambivalence about behavioral change while trying to examine discrepancies between the individual's current behavior and core values or personal goals. Reflective listening is a critical component of motivational interviewing, allowing clarification of goals and concerns and eliciting reasons for change in the individual's own words. Objective feedback presented in a neutral fashion is used to anchor discussions about personal goals and develop discrepancy between current behavior and personal aspirations. Central to the spirit of motivational interviewing are methods such as the strategic use of reflective listening to acknowledge both sides of ambivalence surrounding behavioral change, using open-ended questions to amplify client-generated reasons for change and resolve ambivalence, emphasizing personal choice for action, affirming self-confidence in ability to change, and supporting perceived importance of behavioral change. When resistance and defensiveness emerged, counselors used reflection to sidestep these responses because there is evidence that these reactions undermine progress toward behavioral change (24). Motivational interviewing sessions explored personally

relevant factors motivating a participant to lose weight and how weight loss fits into future goals. Sessions did not introduce new information about weight loss methods. When issues related to behavioral weight control strategies came up or participants made requests for weight control information (e.g., calories, exercise, etc.), the motivational interviewing counselor directed these questions back to the participant's group for discussion. The focus of the motivational interviewing session was on eliciting change talk and commitment language (24), engaging in discussions of what motivated change, the shifting landscape of ambivalence about changing eating and exercise habits, and how behavioral changes might be congruent with the individual's visions for the future and personal values.

Ongoing clinical supervision of motivational interviewing skills and intervention protocol fidelity monitoring were combined in weekly supervision sessions. Randomly selected audiotapes were reviewed weekly by two clinical psychologists using a standardized coding format modeled on other studies of motivational interviewing proficiency (25) that assessed overall motivational interviewing "spirit," the presence of specific behaviors that characterize motivational interviewing, the absence of specific behaviors antithetical to motivational interviewing, and the proportion of time the counselor spent talking (25).

Five individual motivational interviewing sessions were offered, with the first session before starting group therapy and then at 3, 6, 9, and 12 months. Sessions lasted ~45 min and were delivered by licensed clinical psychologists who had received structured training in motivational interviewing. Each session followed a semistructured interview format of motivational interviewing adapted for weight management (26).

**Attention control group.** Individual health education sessions served as an attention placebo, with session number and length matched to motivational interviewing to control for any impact that individual attention from a health care professional might produce. Masters degree-level health educators delivered sessions, which focused on women's health topics (e.g., breast self-care, skin care, dental health, food safety, sleep habits, etc.). Women were encouraged to pick topics of greatest personal interest from a menu to replicate the client-centered agenda setting of motivational interviewing.

## Measures

All assessments were conducted by trained interviewers blind to experimental condition. Measures were collected at baseline and at 6, 12, and 18 months unless otherwise specified. Body weight was measured without shoes using a calibrated balance beam scale. Height was measured without shoes using a wall-mounted stadiometer. BMI was calculated as weight in kilograms divided by the square of height in meters. Glycemic control was indexed by A1C, measured with a Bayer DCA 2000<sup>+</sup> Analyzer. Demographic information was obtained by self-report at baseline only.

Intervention process measures were also collected to determine engagement in the group weight loss program. Number of group sessions attended, number of self-monitoring diaries submitted, and average group leader rating of self-monitoring diary quality (on a 3-point scale) were assessed.

## Data analysis

Baseline comparisons between experimental conditions for study dropouts compared with completers were performed using two-sample Student's *t* tests and  $\chi^2$  tests for continuous and categorical measures, respectively. Primary outcomes were weight, BMI, and A1C. Analyses of weight and BMI yielded comparable results; therefore, only weight results are presented. The main effect of treatment on primary outcomes was analyzed using two-factor ANOVA with repeated measures on visit. The main effect of race was then added, extending the analysis to three-factor ANOVA with repeated measures on visit. Interactions were examined, and, when significant, the model was simplified by stratifying within treatment conditions. Changes in primary outcomes were further modeled using ANCOVA with adjustments for baseline weight or A1C, as appropriate. To account for the relationship between glycemic control and weight loss, weight change was added as covariate to the models where A1C change was the outcome. Multiple comparisons in ANOVA and ANCOVA were performed with Tukey-Kramer adjustments. For variables with unequal variances between conditions, Satterthwaite adjusted *P* values are presented. All treatment outcome variables were also examined using random-effects mixed models, which consider all available data. The pattern of results was similar to the ANCOVAs; therefore, these

are not reported here. Pearson correlation coefficients were used to assess the direction and magnitude of associations between weight loss and glycemic control and between adherence measures and weight and metabolic control. Two sample Student's *t* tests were used to examine adherence between treatment conditions. Multivariable regression models were used to test the mediational effect of behavioral adherence measures on weight change at 6 and 18 months. Treatment and baseline weight were forced in the models while adherence covariates were reduced to the most parsimonious subset using purposeful selection approach.

All analyses were conducted using SAS (version 9; SAS Institute, Cary, NC).  $\alpha = 0.05$  was established as a level of significance for all tests.

**RESULTS**— A total of 217 women (38% African American) were randomized. The majority were obese (BMI  $\geq 30$  kg/m<sup>2</sup>), had good metabolic control (A1C  $\leq 7\%$ ), and were middle-aged and well educated (Table 1). Experimental conditions did not differ significantly at baseline in sociodemographic characteristics or health parameters. Attrition in the sample was modest (93% retention at 18 months), and study dropouts did not differ on baseline demographic factors, initial weight, or diabetes control compared with study completers. The majority of individual sessions were attended by most participants in both conditions, with no differences between conditions in number of individual sessions received (Table 1).

## Weight loss

Participants in both conditions lost weight during the group program and weighed significantly less at each follow-up compared with baseline (Table 1), indicating that the group-based behavioral obesity program was effective in promoting weight loss. A main effect for treatment condition was also apparent, such that women in motivational interviewing had lost significantly more weight than control subjects at each visit. Repeated-measures ANOVA indicated a significant interaction between experimental condition and visit ( $P < 0.02$ ), which was further explored by examining weight loss at each visit within treatment condition using Tukey-Kramer adjustments for multiple comparisons. Weight loss within the conditions displayed dif-

ferent patterns. Both motivational interviewing and control subjects lost weight during weight loss induction (0–6 months), although the motivational interviewing subjects had significantly greater mean  $\pm$  SD weight loss ( $-4.7 \pm 5.4$  kg for motivational interviewing vs.  $-3.1 \pm 3.9$  kg for control subjects,  $P = 0.003$ ). Furthermore, average weight loss in the motivational interviewing condition remained stable during the first 6 months of weight maintenance with no regain observed by month 12. Regain occurred only after 12 months, when the maintenance-focused group meetings continued but the motivational interviewing sessions had ceased ( $+1.2$  kg between months 12 and 18). In contrast, the control group began to regain after 6 months despite ongoing weight maintenance group sessions ( $+0.3$  kg between months 6 and 12), and weight regain continued with an additional gain of  $+0.9$  kg between months 12 and 18. Total 18-month weight loss between conditions differed significantly, with a  $3.5 \pm 6.8$  kg loss in motivational interviewing and  $1.7 \pm 5.7$  kg in control subjects,  $P = 0.04$ .

**Weight loss by race/ethnic group.** Treatment outcome differed significantly by race, with African-American women losing less weight than white women regardless of treatment condition. At 6 months, African-American women lost  $3.0 \pm 3.9$  kg compared with white women, who lost  $4.5 \pm 5.1$  kg ( $P = 0.03$ ). A similar pattern was evident at both 12 months ( $2.3 \pm 4.4$  kg for African-American vs.  $4.6 \pm 6.8$  kg for white women,  $P = 0.009$ ) and 18 months ( $1.4 \pm 4.7$  vs.  $3.3 \pm 7.1$  kg, respectively,  $P = 0.04$ ). To further examine the impact of adding motivational interviewing to the behavioral program, repeated-measures analysis of weight was reexamined with race included as a factor in the model. The 2 (condition)  $\times$  2 (race)  $\times$  4 (time) repeated-measures ANOVA produced several significant interactions: race  $\times$  treatment condition ( $P < 0.0001$ ), treatment condition  $\times$  visit ( $P = 0.04$ ), and race  $\times$  visit ( $P = 0.01$ ). Therefore, the weight patterns over time by race were examined separately for each treatment condition using a two-factor repeated-measures ANOVA stratified by treatment condition.

Among women in the control group, there was an effect for visit ( $P < 0.0001$ ) and for race ( $P = 0.03$ ) such that body weight at each follow-up was significantly lower than baseline and African-

Table 1—Sample characteristics and outcomes

	Total sample	Motivational interviewing	Attention control	P for comparisons between conditions
n	217	109	108	
African American (%)	39	39	38	NS
Married (%)	54	47	61	NS
Age (years)	53 ± 10	54 ± 10	52 ± 10	NS
College education or higher (%)	35	36	34	NS
Employed (%)	68	67	69	NS
Weight (kg)	97 ± 16	97 ± 17	97 ± 15	NS
BMI (kg/m <sup>2</sup> )	36.5 ± 5.5	36.5 ± 5.5	36.5 ± 5.4	NS
Obese (BMI ≥30 kg/m <sup>2</sup> ) (%)	88	89	86	NS
A1C (%)	7.58 ± 1.4	7.54 ± 1.4	7.62 ± 1.4	NS
Diabetes medications (n)	1.4 ± 0.6	1.5 ± 0.6	1.4 ± 0.6	NS
Diabetes duration (years)	5 ± 5.8	5.8 ± 6.5	4.9 ± 5.0	NS
Retention rates				
6 months	210 (97)	107 (98)	103 (95)	NS
12 months	195 (90)	103 (94)	92 (85)	≥0.03
18 months	202 (93)	103 (94)	99 (92)	NS
Attendance at individual MI/AC sessions				
0–6 months (of 2)		1.9 ± 0.3	1.8 ± 0.4	NS
6–12 months (of 3)		2.3 ± 1.0	2.2 ± 1.2	NS
Total (of 5)		4.2 ± 1.2	4.0 ± 1.4	NS
Proportion attending ≥80% of sessions (%)		81	76	NS
Weight change (kg)*				
6 months	−3.9 ± 0.33	−4.7 ± 0.45	−3.1 ± 0.47	≥0.01
12 months	−3.8 ± 0.44	−4.8 ± 0.59	−2.7 ± 0.62	≥0.02
18 months	−2.6 ± 0.44	−3.5 ± 0.62	−1.7 ± 0.63	≥0.04
A1C (%)*				
6 months	6.9 ± 0.1	.8 ± 0.1	7.1 ± 0.1	≥0.02
12 months	7.0 ± 0.1	7.1 ± 0.1	7.0 ± 0.1	NS
18 months	7.4 ± 0.1	7.4 ± 0.11	7.4 ± 0.11	NS
Behavioral adherence measures				
Group sessions attended (%)				
6 months	72	79	71	0.006
12 months	57	62	52	0.02
18 months	48	52	43	NS
Diaries submitted (n)				
6 months	15 ± 8	17 ± 8	13 ± 8	0.003
12 months	7 ± 9	9 ± 10	5 ± 7	0.003
18 months	5 ± 9	6 ± 10	3 ± 7	0.005
Average diary rating (0–2 range)				
6 months	1.3 ± 0.6	1.4 ± 0.6	1.1 ± 0.6	0.002
12 months	0.6 ± 0.8	0.8 ± 0.8	0.5 ± 0.6	0.001
18 months	0.4 ± 0.7	0.5 ± 0.8	0.2 ± 0.5	0.002

Data are means ± SD or n (%) unless otherwise indicated. \*Presented as means ± SE and ANCOVA adjusted for baseline value of variable. AC, attention control; MI, motivational interviewing.

American women weighed more than white women at each assessment. Among African-American control subjects, weight was significantly lower at 6 months than at baseline ( $P = 0.002$ ), indicating successful initial weight loss. However, weight did not differ significantly from study entry at 12 or 18 months among African-American control subjects. Therefore, weight regain during maintenance had essentially returned Af-

frican-American women to baseline. In contrast, weight among white control subjects was significantly lower than baseline at 6 months ( $P < 0.0001$ ), 12 months ( $P < 0.0001$ ), and 18 months ( $P = 0.005$ ), indicating some enduring impact of the behavioral weight control program alone.

Within the motivational interviewing group, a different pattern of weight change was observed, with a significant

race × visit interaction in the treatment-stratified, two-factor, repeated-measures ANOVA ( $P = 0.02$ ). African-American women receiving motivational interviewing weighed less at 6 months ( $P = 0.0007$ ) and 12 months ( $P = 0.008$ ) but had regained such that, by 18 months, they no longer weighed significantly less than baseline. Thus, for African-American women with type 2 diabetes, the addition of motivational interviewing to the behav-

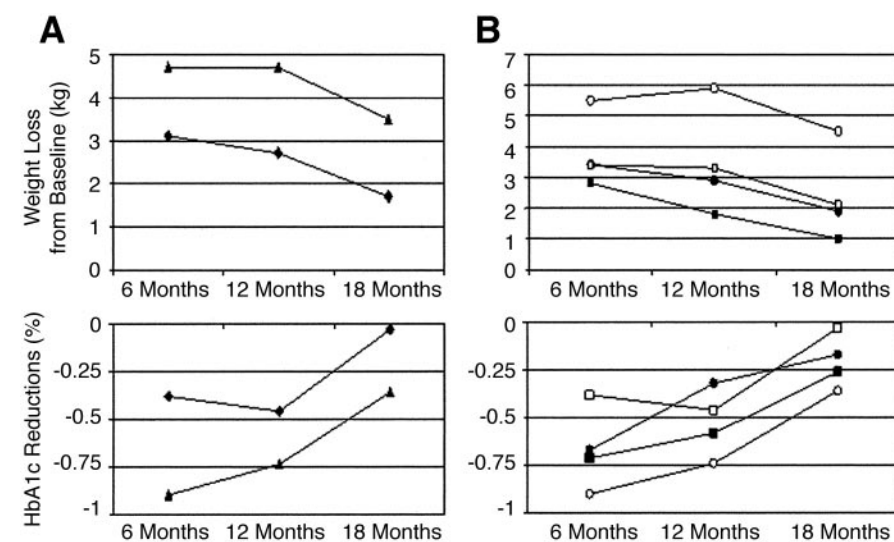
ioral weightcontrol program produced greater weight loss than seen in the control group; however, this additional benefit was not sustained after 12 months, when motivational interviewing sessions had been discontinued. By contrast, white women receiving motivational interviewing weighed significantly less than baseline at 6, 12, and 18 months (all  $P < 0.0001$ ). Therefore, the impact of motivational interviewing on weight control was more sustained for white women and was evident even after the motivational interviewing sessions had ceased. This extended 18-month benefit among white women receiving motivational interviewing contrasts with an apparent diminution of a motivational interviewing effect among African-American women by 18 months.

### Glycemic control

Glycemic control significantly improved in both conditions during the weightloss program ( $P < 0.0001$ ) despite fairly good glycemic control at baseline. Women in both conditions had significantly lower A1C values at 6 months ( $P < 0.0001$ ) and 12 months ( $P < 0.0001$ ). However, by 18 months, both conditions experienced increases in A1C such that they were no longer significantly lower than baseline and on average were slightly above the 7% treatment target recommended by the American Diabetes Association (27).

Women in motivational interviewing experienced significantly greater A1C decreases than control subjects ( $P = 0.002$ ). This difference was most pronounced at 6 months, when motivational interviewing had a mean A1C reduction of  $0.8 \pm 1.12\%$  compared with  $-0.5 \pm 1.12\%$  among control subjects. Further analyses added race to the model and demonstrated significant main effects for treatment ( $P = 0.002$ ), race ( $P < 0.0001$ ), and visit ( $P < 0.0001$ ) but no interactions. African-American women had higher A1C values each time regardless of treatment assignment (Fig. 1).

Greater reductions in A1C with motivational interviewing, when apparent, reflected greater weight loss in motivational interviewing. Improvements in glycemic control were strongly associated with weight loss ( $r = 0.44$ ,  $P < 0.0001$  for motivational interviewing and  $r = 0.28$ ,  $P = 0.004$  for control subjects). When weight loss was added to the model examining changes in A1C by experimental condition, condition was no longer signif-



**Figure 1**—A: Treatment outcomes for total sample.  $\blacktriangle$ , motivational interviewing subjects;  $\blacklozenge$ , control subjects. B: Treatment outcomes by ethnic group.  $\circ$ , white motivational interviewing subjects;  $\square$ , white control subjects;  $\bullet$ , African-American motivational interviewing subjects;  $\blacksquare$ , African-American control subjects.

icant but weight loss was significant at each visit (all  $P < 0.0001$ ).

### Treatment adherence

Analyses next explored possible mechanisms that may account for the superior weight loss and glycemic outcomes in motivational interviewing. Participants in motivational interviewing had significantly better engagement in the behavioral weight management program on all adherence measures (Table 1). Better attendance at group sessions was apparent in motivational interviewing subjects during the initial 6-month weight loss induction phase ( $P = 0.006$ ) and in the first 6 months of weight maintenance ( $P = 0.02$ ). By the final phase of weight maintenance, after motivational interviewing sessions had ceased, differences between conditions were no longer apparent, and attendance between the groups was comparable. In addition to better group attendance, motivational interviewing participants submitted significantly more self-monitoring diaries than control subjects during each phase. Further, the average rating of diary quality, an index of treatment engagement made by group leaders masked to experimental condition, indicated women in motivational interviewing submitted more comprehensive diaries. In aggregate, these adherence data indicate that women receiving motivational interviewing were more engaged in the behavioral weight loss program.

### Motivational interviewing increased weight loss by increasing treatment adherence

Multivariate models examining weight loss that included experimental conditions and adherence measures indicated that condition was not a significant factor explaining weight loss at either 6 or 18 months when adherence measures were included. However, adherence variables remained significant in the multivariate model, with group session attendance ( $P = 0.03$ ) and diary rating ( $P < 0.0001$ ) predicting weight loss at 6 months. At 18 months, diary rating was the most significant predictor of weight loss ( $P = 0.007$ ). A mediational model can be demonstrated when associations disappear with the addition of the mediating factor(s) into the model (28), as was the case in these analyses. Therefore, it would appear that treatment adherence mediated or explained the impact of motivational interviewing on weight loss. Specifically, attendance and quality of self-monitoring diaries emerged as the factors accounting for variation in weight loss.

**CONCLUSIONS**— Motivational interviewing as a brief adjunctive intervention significantly enhanced both weight loss and glycemic control among overweight women with type 2 diabetes enrolled in a behavioral obesity treatment program. The beneficial impact of motivational interviewing was apparent after only two sessions, with significantly

greater weight loss and improvement in metabolic control at 6 months. Continued superior weight loss was observed at 18 months. The additional long-term weight loss produced with the addition of motivational interviewing was modest: 1.6–1.8 kg more than weight loss achieved with standard behavioral intervention. This incremental benefit is comparable with short-term weight loss improvements in other controlled studies (19,29).

Increased weight loss and A1C reductions achieved with motivational interviewing were mediated by enhanced adherence to treatment recommendations, replicating a pattern of greater treatment uptake among problem drinkers receiving two sessions of motivational interviewing in addition to standard therapy (30). Motivational interviewing augmented weight loss by increasing attendance at group sessions and producing more frequent and more comprehensive self-monitoring. Previous obesity treatment research has demonstrated a strong association between self-monitoring and weight loss (12,31), and attendance at treatment sessions is consistently associated with better weight loss. Therefore, it is not altogether surprising that superior weight loss outcomes observed with the addition of motivational interviewing were mediated by enhanced adherence to the behavioral program.

Weight loss in the control group was smaller than that reported by some investigators implementing a similar behavioral intervention approach among predominantly white populations with diabetes (32–33) and was substantially smaller than that produced with behavioral programs that provide meal replacements (34). However, weight loss among control subjects was comparable with that reported in meta-analyses of behavioral therapies for diabetic patients (35) and long-term losses in other studies of diabetic patients (10,36), particularly studies including significant representation of African-American participants (37–38).

African-American women in both experimental conditions experienced significantly smaller weight loss than white women in the study, consistent with the results of other clinical trials of obesity treatment in diabetic populations (39) and in overweight people at risk for diabetes (12). The extended impact of motivational interviewing also differed by race, with greater long-term enhancement of weight loss with motivational in-

terviewing for white women than for African-American women. Increased weight loss with the addition of motivational interviewing was apparent among African-American women only until month 12 and dissipated by 18 months, while improved outcomes were still apparent for white women at the end of the program. Resnicow and colleagues (40,41) have shown that the addition of motivational interviewing to a culturally tailored program designed to promote fruit and vegetable consumption increased intake among African-American subjects by approximately one serving per day above that with self-help materials alone. However, another study of African-American female smokers failed to find an effect for motivational interviewing (42). The current study is the first to report the potentially attenuated impact of motivational interviewing among African-American women relative to white women. Project MATCH (Multisite Clinical Trial of Alcohol Treatment) examined whether there was differential impact by ethnicity to three approaches to treating alcoholism, including a motivational interviewing–derived therapy, in an ethnically diverse sample of problem drinkers and found no differential response to motivational enhancement therapy for Hispanic or non-Hispanic men (43). Although outcomes for African-American subjects or minority women receiving the motivational modality are not presented separately, thus precluding direct comparisons, ethnicity was not associated with poorer alcohol-related outcomes in African-American subjects across treatment conditions (44). However, African-American subjects reported significantly lower satisfaction with treatment (44). Clearly, further research is warranted to identify parameters that may be associated with or promote a positive response to motivational interviewing for weight management in ethnically diverse samples, as well as mechanisms responsible for facilitating behavioral change. Further evaluation of motivational interviewing for weight management among men and the nondiabetic population is also necessary.

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