

CULTURALLY-SENSITIVE WEIGHT LOSS PROGRAM PRODUCES SIGNIFICANT REDUCTION IN WEIGHT, BLOOD PRESSURE, AND CHOLESTEROL IN EIGHT WEEKS

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Dietary and behavioral needs of special populations are rarely considered in traditional weight loss programs. This study assessed the impact of culturally-sensitive modifications to the Duke University Rice Diet weight loss program for African-American dieters.

The study was a randomized modified cross-over study in which volunteers received either early or delayed weight loss intervention. Final outcomes were measured at 8 weeks. At the onset of the study, there were 56 African American participants, however, only 44 (79%) completed the study. The eight-week intervention was a modified 1000-calorie/day version of the Rice Diet. Modifications to the program included decreased cost, culturally-sensitive recipes, addressing attitudes about exercise, and including family members in weight loss efforts. Average weight loss for subjects completing the program was 14.8 pounds (SD = 6.8 pounds). BMI decreased from 37.8 kg/m² to 35.3 kg/m² ($p < 0.01$). Total cholesterol levels decreased from 199.2 mg/dL to 185.4 mg/dL ($p < 0.01$); systolic and diastolic blood pressure decreased by 4.3 mmHg ($p < 0.01$) and 2.4 mmHg ($p < 0.05$), respectively. The control group showed no significant change in any outcome measures. We found that diet programs can be successfully tailored to incorporate the needs of African-Americans. Most importantly, these dietary program changes can lead to significant improvement in clinical parameters. Additional studies are necessary to determine the permanence of these short-term changes. (*J Natl Med Assoc.* 2000; 92:515-523.)

Key words: weight loss ♦ ethnicity ♦ diets

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Obesity is common in the U.S., particularly among certain ethnic groups. Among African-Americans, the prevalence is 26% for men and 44% for women, compared with a prevalence of 24% among whites.¹ Statistically, African Americans suffer disproportionately from several diseases associated with obesity, including diabetes mellitus and hypertension.¹ A higher prevalence of obesity not only affects the health of African Americans but could also play a role in their socioeconomic status: negative attitudes towards obese people can lead to

decreased opportunities in education, employment, earnings, job promotions, and housing.²

Dietary therapy is commonly used to treat obesity, but many dietary programs are less successful among African Americans than whites.^{3,4} Frequently, weight control programs are geared toward the needs and values of whites. Therefore, they may be less functional for non-white populations.⁴ Given the inverse relationship of obesity with socioeconomic status, particularly for African-American women,^{5,6} many patients are unable to access diet programs because of the prohibitive cost. Even for those African Americans who are financially successful at accessing mainstream diet programs, many of the eating patterns and habits learned in behavior therapy must be adapted to fit within the individual's cultural context.^{7,8} Therefore, although African Americans suffer disproportionately from obesity, the diet programs that may be most beneficial are targeted to a different audience.

We have designed a culturally-sensitive diet intervention based on the Duke University Rice Diet that addresses these deficiencies. The Duke University Rice Diet was used as the diet intervention because it has been shown to produce significant weight loss in addition to providing tools for life-style modification.⁹ The Rice Diet uses staple foods found in the homes of most Americans. This allows for a very flexible program that can be easily adapted to most ethnic dietary patterns. Other key components of the Rice Diet program include daily dietary counseling, nutritional education and a recommended exercise regimen. The program is also physician-supervised, which has been shown to improve patient outcomes.¹⁰

Our specific research hypotheses were that this culturally-sensitive diet intervention would decrease weight, serum cholesterol, and blood pressure in African-American subjects. In addition, we hypothesized that the intervention would have a positive effect on the patient's health-related quality of life (HRQOL). Last, we assessed the effect of the intervention on patient's attitudes about their body image and their satisfaction with the modified diet intervention.

METHODS

Study Design

We utilized a randomized, modified-crossover study. The study and advertisements were approved

by the Institutional Review Board. Subjects were recruited from Durham, NC, and surrounding areas through advertisements in a Duke University employee newsletter. All African-American subjects interested in participating were considered eligible to enroll in the study if they received clearance from their primary physician. Informed consent was obtained from all subjects and medical records were reviewed for medications and illnesses. Using a computer-generated random number list, eligible, consenting subjects were randomly assigned to either receive the intervention immediately or receive the intervention after an eight-week delay.

Figure 1 shows the study design, group sizes and the outcome assessment schedule. Randomization to two groups was performed to allow assessment of the effect of systematically monitoring weight in a group of willing dieters. Therefore, the delayed intervention group had primary outcome measures assessed at enrollment and after 4 and 8 weeks. Subjects completing the delay component were then eligible to participate in the modified diet intervention. All measures at timepoint "B" constitute the baseline dataset, and all measures for timepoint "I" were pooled to form the follow-up dataset at 8 weeks.

Intervention

Modifications. The four culturally sensitive modifications included decreasing the direct and indirect cost of the diet program, using ethnic recipes in the cooking classes, changing ideas about exercise, and including patients' family members in the weight loss efforts. The cost of the eight-week program was decreased to \$106.00 for all Duke University employees and \$170.00 for all non-employees. This fee covered the cost of all food received during the first week of intervention as well as other program expenses. Class sessions were also held after work hours for most participants. Familiar foods were used during cooking classes; however, patients were instructed on how to prepare traditional African-American dishes using low-fat and low-salt cooking techniques. Patients were specifically educated on the usefulness of exercise in weight loss and maintenance of weight loss. Subjects were primarily advised to increase their activity above baseline levels by whatever means they felt comfortable (i.e., walking, jogging, aerobics, etc.). All patients were encouraged to share information with their fami-

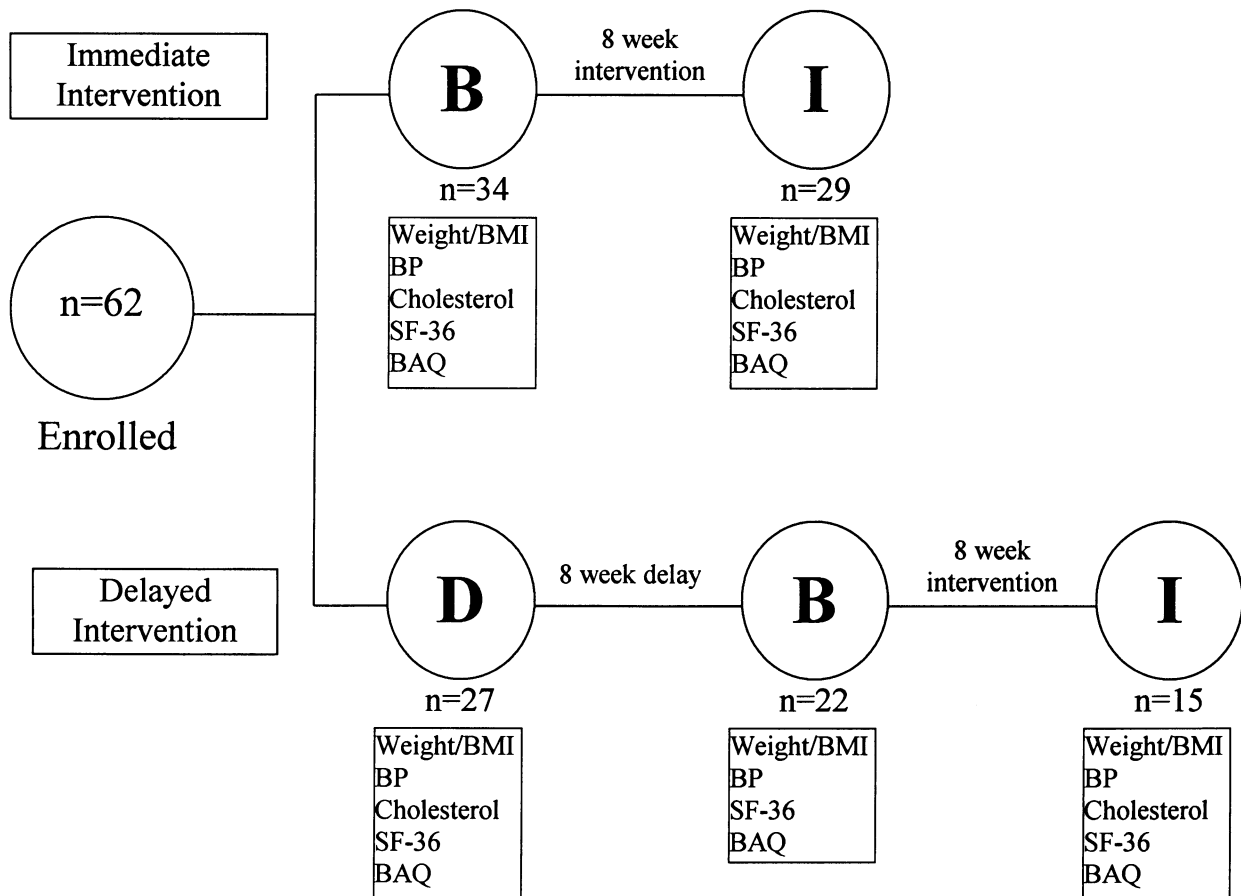


Figure 1. Study design and outcome measure assessment schedule. B = baseline; D = beginning of delay period; I = end of intervention.

lies. Family members also had an open invitation to participate in any of the weekly class sessions.

Dietary Intakes. The version of the Rice Diet Program used in this study consisted of a 1000-calorie, 7% fat, vegan vegetarian diet for the initial two weeks of the program. During the first week of intervention, all subjects were required to take their meals from the Rice Diet kitchen. This was done to acclimate the patient by example to the ideal type of food as well as allowing for time to instruct the patient on how to prepare similar food. However, after the first week, each subject was responsible for preparing his/her own meals according to the guidelines of the diet plan. Eggs, milk, and cheese were added to the diet at the beginning of week three. This was continued for another two weeks. At the beginning of week five, patients were allowed the addition of lean meats, primarily chicken and fish. The total caloric intake at that point was ap-

proximately 1200 calories, with a 14% fat intake. This phase was continued until completion at eight weeks.

Program Structure. Each patient met with his or her assigned class twice weekly for support and educational sessions. Lectures were conducted by the same African-American instructor (J.A.) except for two class sessions on stress management, which were conducted by a white staff member of the Rice Diet Program. Each session lasted approximately 30–60 minutes in length. Patients were educated on basic nutrition concepts and healthful eating. Low-fat and low-salt cooking techniques were demonstrated, and patients were taught how to modify recipes that they used at home. The educational topics for the didactic sessions are shown in Table 1. As part of a motivational approach, weight and blood pressure were measured during each session. Food intake and activity were assessed by self-report

Table 1. Topics for Didactic Sessions

WEEK	Session 1	Session 2
I	Orientation	Basic Nutrition
II	Cooking class—low fat techniques/recipes	Cooking class—low salt techniques, introduction to spices/recipes
III	Shopping tour; reading food labels	Cooking class—preparing vegetables
IV	Meal planning; counting calories	Stress Management*
V	Cooking class—preparing meat	Eating at restaurants; social eating
VI	Improving your health by improving your eating habits	Exercise options
VII	Cooking class—preparing breads	Stress Management II*
VIII	Recipe swap	Debriefing and exit questionnaires

*Sessions taught by white diet administrator; all other sessions taught by African-American diet administrator (JA).

at each session. Individual suggestions were made by diet administrators to participants about how to achieve personal weight loss goals. Adjustments in medication dosage were made at that time (e.g., lowering anti-hypertensive medications). Attendance at class sessions was recorded, and subjects were encouraged to report to a diet administrator at least once per week if unable to attend class sessions.

Measures

The main outcome measures were weight and body mass index (BMI), systolic and diastolic blood pressure, and total cholesterol. Blood pressure was measured as the average of four separate readings using the appropriate cuff size with the patient in the seated position. Fasting serum cholesterol levels were obtained and measured at Lab Corp. Chemical Laboratories. BMI was calculated based on the patient's height in meters and weight in kilograms (kg/m^2). Secondary outcome measures were HRQOL, measured by the Short Form 36-Item Health Survey (SF-36);¹¹ body attitude, measured by the Body Attitude Questionnaire (BAQ);¹² and subjective program satisfaction, measured by a series of questions designed for this study.

Statistical Analysis

Statistical analysis of the data was performed on all participants by intention to treat. For the delayed group, the measurements of weight, BMI, blood pressure, HRQOL, and body attitude were compared for changes from enrollment to the beginning of intervention. The measurements obtained after the eight week delay along with the original cholesterol level were then used as baseline mea-

asures for this group prior to the start of the intervention period. Cholesterol levels were not remeasured at the end of the delay period to avoid an additional blood draw. After eight weeks of the diet intervention, data from subjects in both groups were combined to analyze the within-subject change for the outcome variables. No comparisons were made between the immediate and delayed intervention groups. Changes in outcome variables were assessed using paired t-test or Wilcoxon rank sums, as appropriate.

RESULTS

All of the 62 African Americans who were interested in participating received clearance from their primary physician. Thirty-five were randomized to immediate intervention and 27 to delayed intervention. Five subjects from the delayed group did not begin the intervention phase because they were lost to follow-up during the delay period. One subject randomized to immediate intervention could not start because of a change in work schedule. Of the 56 subjects that began intervention, 54 were female, and the average age was 40.4 years. Forty-four of the 56 subjects that started intervention (79%) completed the study. Six of the 12 persons who did not complete the intervention had to drop out of the study because of conflicting work schedules. One subject was placed on bed rest due to medical problems that were unrelated to the diet program. The remaining five subjects were lost to follow-up. Average attendance at weekly class sessions for all subjects that began the intervention was 77%.

The pooled results for baseline clinical measures and eight-week follow-up are shown in Table 2. Mean baseline BMI was $37.8 \pm 7.9 \text{ kg}/\text{m}^2$. Patients

Table 2. Pooled Clinical Outcome Measures for Baseline and Eight-Week Follow-up

Outcome measures	Baseline Mean (SD)	8-Week F/U Mean (SD)	Change Mean (SD)
Weight (lbs)	225.3 (41.9)	210.5 (40.2)	-14.8 (6.8)†
BMI (kg/m ²)	37.8 (7.9)	35.3 (7.4)	-2.5 (1.2)†
Systolic BP (mmHg)‡	123.6 (14.3)	119.4 (14.0)	-4.3 (8.7)†
Diastolic BP (mmHg)‡	79.3 (10.6)	76.8 (9.2)	-2.5 (7.5)*
Cholesterol (mg/dL)	199.2 (44.0)	185.4 (45.6)	-13.7 (27)†

*p < 0.05.

†p < 0.01.

‡Value reported is the mean of four separate readings in a seated position.

F/U = follow-up.

Table 3. Health-Related Quality of Life Scores (SF-36)

Subscales	Baseline Mean (SD)	8-Week F/U Mean (SD)
Physical functioning	81 (25)	91 (12)*
Physical role limitation	84 (26)	96 (11)†
Emotional role limitation	89 (24)	94 (19)
Social functioning	82 (22)	89 (18)
Bodily pain	69 (26)	82 (18)*
Mental health	73 (18)	82 (13)*
Vitality	56 (18)	69 (15)†
General health perception	67 (19)	73 (17)

*p < 0.05.

†p < 0.01.

F/U = follow-up.

averaged 48% over ideal body weight. The average cholesterol was approximately 199 ± 44 mg/dL, with 13 subjects having cholesterol of ≥ 220 mg/dL. At baseline, there were 14 subjects with clinical hypertension, defined as a systolic blood pressure ≥ 140 or a diastolic blood pressure ≥ 90 mmHg or medical treatment for a diagnosis of hypertension. Five were medically untreated with blood pressure in the 152–142/104–91 mmHg range. The other nine hypertensives were medically treated with blood pressure ranging from 146–108/97–76 mmHg. Two patients had diabetes mellitus, both requiring insulin therapy.

After eight weeks of the modified diet intervention, participants lost an average of 14.8 ± 6.8 pounds ($p < 0.01$) or 6.5% of initial body weight. None of the subjects gained weight during the intervention. BMI decreased by 2.5 ± 1.2 kg/m² ($p < 0.01$). Cholesterol decreased by an average of 13.7 ± 27 mg/dL ($p < 0.01$). There were nine clinically hypertensive subjects after eight weeks of

the modified diet intervention. Five of the hypertensive subjects remained medically untreated, with blood pressure ranging from 149–139/99–87 mmHg. Four hypertensive subjects were treated with lower doses of medication, with blood pressure ranging from 135–112/90–74 mmHg. Six subjects who were hypertensive at baseline were normotensive without medication by the end of the eight-week diet therapy. At the end of the eight-week delay period, the subjects in the delayed intervention group had not shown any significant change in any of the outcome variables measured.

Table 3 shows the change in HRQOL measured by the SF-36. There was consistent improvement of scores in all eight categories. The vitality score increased the most, with a 23% improvement in postintervention scores. Bodily pain scores increased by 18%, indicating less bodily pain after the diet intervention. Other areas showing statistically significant improvement included physical functioning, physical role limitation, and mental health.

Table 4. Perception of Body Image Using Scores from the Body Attitudes Questionnaire *

Subscales	Baseline Mean (SD)	8-Week F/U Mean (SD)
Attractiveness	13.8 (3.2)	14.6 (3.2)
Disparagement	17.2 (4.9)	16.5 (4.2)
Feelings of fatness	33.8 (8.7)	32.5 (7.2)
Saliency	10.2 (3.6)	9.7 (3.2)
Lower body fatness	10.1 (2.7)	10.0 (2.3)
Strength	9.4 (2.6)	10.7 (2.1)†

*The BAQ is a validated questionnaire that measures perception of body image.¹²

† $p < 0.01$.

The results of the BAQ are presented in Table 4. The strength subscale was the only subscale to show significant improvement by the end of intervention. Attractiveness scores trended upward while disparagement and saliency scores trended downward; however, these changes were not statistically significant. In terms of comparing our subjects to a group of Australian women with a BMI over 30, this group had lower scores in the subscales of feelings of fatness, lower body fatness, saliency, and strength. Attractiveness and disparagement subscale scores were similar.¹³

Subjective satisfaction with the program was measured using a series of questions scored using a five-item Likert-type response format. Ninety-six percent of those completing the questionnaire ($n = 39$) responded that they were very satisfied with the diet therapy. When asked if they thought the modified diet therapy was suited for their needs as African Americans, 90% responded that they agreed or strongly agreed.

DISCUSSION

Through use of a culturally-sensitive diet therapy, we have demonstrated effective weight loss and risk factor modification on a sample of African Americans. Weight decreased approximately 15 pounds, while blood pressure and cholesterol measures also decreased significantly. Furthermore, several quality of life measures were improved after only eight weeks of this diet intervention. Only one subscale of the BAQ showed any significant change after intervention. With a 79% completion rate and 96% of participants reporting satisfaction with the diet therapy, it appears as though the intervention is feasible as well as effective.

Epidemiological studies have demonstrated that obesity is more common among African Americans.^{14,15} A variety of factors contribute to this higher prevalence. One reason is that there may be different cultural perceptions of body size and image. Many African Americans are generally more accepting of higher body weight and consider this to be healthy and attractive.¹⁶⁻¹⁸ Two studies of African-American women showed that the majority of the overweight subjects perceived themselves as such, but nearly 40% of those subjects considered their figures to be attractive or felt it unnecessary to attempt to lose weight.^{14,19} Our results from the baseline BAQ scores also demonstrate that African Americans have different attitudes about their body image compared with whites of similar BMI. For example, the feelings of fatness scores are lower for this group of African-American volunteers when compared with a group of Australian women used to develop the BAQ: the mean score for the Australian group was 45.2, while our group's mean score was only 33.8 at baseline. With this type of perception of body image, there may be less motivation to lose weight for aesthetic purposes.

The lack of successful diet therapies for African Americans may also be a factor in ethnic differences in obesity. When African Americans are motivated to lose weight through diet therapy, they have difficulty complying with recommended dietary guidelines when the changes in diet are alien to their lifestyle and contain unfamiliar foods.^{7,8} Because of this difficulty in fully applying the information available through mainstream weight loss programs, many African Americans are not as successful in their weight loss efforts as white dieters.^{3,20,21} Given the high cost of some commercial programs²² and

the inverse relationship of socioeconomic status and obesity,²³ many obese persons are also limited in their choice of diet therapy.

Other key areas to consider when explaining the higher proportion of obesity include nutrient and caloric content of traditional African-American food. A scarcity of food and utensils combined with African and southern U.S. cultural influences led to the development of a unique group of foods and style of preparation, now referred to as "soul food."⁷ Traditionally high in fat and sodium, this style of cooking and pattern of eating has been passed down for several generations and is still prominent in many African-American homes. Furthermore, African Americans have been noted to have different attitudes about exercise, viewing it as a means for recreation rather than a method by which to lose weight or maintain weight loss.⁴ There are studies of African Americans that document lower activity levels compared with other ethnic groups.^{19,24} While these are issues that may or may not be unique to the African-American culture, the data suggest that these are some of the circumstances, beliefs, and practices that are dominant within this ethnic group, all of which foster a higher rate of obesity.

In efforts to address this disparity, several authors have called for the development of new diet programs or the restructuring of existing programs. The causes of the higher rates of obesity highlight the perspective by which diet therapies should approach obesity in African Americans. Recommendations for these programs included allowances for greater access, easier utilization and application, and better education.^{4,17,25} However, in restructuring or creating these programs, one should not lose sight of the main goal of helping patients lose weight in a safe manner and maintain that weight loss.

Through the use of four culturally-sensitive modifications, we have attempted to make the Duke University Rice Diet a more culturally-sensitive diet program for African Americans. The first modification was to decrease the direct and indirect cost for patients participating in the intervention. This allowed us to recruit the needed volunteers to study the diet intervention. Prior to this program, only 10 African Americans per year participated in the Rice Diet Program. The next modification dealt with the use of culturally-sensitive recipes and foods. By using familiar foods, patients were able to more easily comply with dietary guidelines. The third modifica-

tion included changing ideas about exercise. Specific steps were taken to educate subjects about the role of increased activity in weight loss. This modification helped to increase compliance with exercise recommendations. Lastly, efforts were made to involve family members in the support group which has traditionally consisted of peers. This gave subjects the opportunity to involve family members firsthand, who otherwise may not have been supportive given their beliefs about body size and weight loss.

Our results indicate that the modified weight loss program was effective and safe. The average weight loss in this group is higher than that of several other studies of African Americans or weight loss programs that targeted this group, which have ranged from 0.4 to 10.9 pounds for an 8–18-week intervention period.^{25–28} Patients in this study had an average weight loss of 15 pounds after eight weeks of intervention, falling within the current recommendations for a safe rate of weight loss.^{29,30} Blood pressure and serum cholesterol, which are closely associated with weight, were significantly improved by this program as well. Most literature suggests that a reduction in health risks associated with diabetes, hypertension, and hypercholesterolemia will occur with modest amounts (10%–15%) of weight loss in obese patients.²³ However, with the modified diet intervention, a significant decrease in blood pressure and a 7% decrease in cholesterol levels occurred with only a 6.5% decrease in body weight.

Patients also reported clinically and statistically significant improvements in their quality of life. We used the SF-36 to assess quality of life because it is a standardized questionnaire that has been well tested in other groups of patients. It also examines several categories of HRQOL that are directly affected by obesity. Our main results from the questionnaire indicate that a modest amount of weight loss can produce a significant improvement in HRQOL.

While only one subscale of the BAQ showed any significant change, valuable information may be inferred from these results with regard to motivation for weight loss among African Americans. As pointed out, a higher body weight for African Americans is less likely to be thought of as unattractive. Therefore, one might assume that attempting to change African Americans ideas about acceptable body images could be helpful in motivating more

African Americans to lose weight. However, our results suggest that changes in body image attitude may not be necessary to motivate African Americans to enroll in diet programs and be successful at weight loss. Despite the more positive body image perception held by these participants, they were willing to enroll into a diet program to lose weight, implying that there were other motivating factors involved such as medication reduction, increased vitality, and better mobility. Education about risk factor modification and management of diseases associated with obesity through dietary changes may be the proper motivational technique for diet counselors. In other words, an improvement in health may hold more value than the hope of a slimmer figure for many African Americans. Another explanation for the lack of significant changes in BAQ scores deals with the design and purpose of the questionnaire. It is possible that the questionnaire was not designed to detect change within subjects over a period of time, and it must only be used as a discriminative instrument, distinguishing between individuals or groups with different body attitudes at one point in time.

This study has three potential limitations. First, the low cost of the program, which was helpful in recruiting African-American volunteers, may not be adequate to cover the expenses of sustaining such a program. Economic feasibility may prevent subsidizing the low cost of this program; yet in these days of cost-containment and emphasis on primary prevention, many large insurers may see the benefit of funding such programs. A minimal investment in risk factor modification yielding significant short-term results may considerably lower long-term health care expenses. Second, we only monitored outcomes for eight weeks. This study was particularly designed to address the short-term effects of the modified diet therapy. Further studies of long-term, maintenance programs will be needed as adjuncts to this intensive short-term weight loss intervention to determine if these successes are sustained. Third, we may have selected a highly motivated group of patients, many of whom were employees at an academic institution or medical center. However, observation of the delayed treatment group demonstrated that many of the volunteers were motivated enough to seek out a weight loss program, but they were unable to lose weight on their own during the two-month delay.

CONCLUSION

The disproportionate rate of obesity in African Americans is a major health issue within the U.S. Until this problem is adequately addressed, many African Americans will suffer associated morbidity and mortality while the health care system bears the enormous cost. Culturally-directed diet therapy may help to decrease the number of overweight African Americans. These types of therapies are necessary given cultural differences in perception of weight and dietary patterns. A culturally appropriate approach to weight loss for African Americans can lead to safe weight loss and risk factor modification.

ACKNOWLEDGMENTS

We thank Bob Horn, PA, Carol Blessing-Feussner, PA, Stan Levison, MD, Francis Neelon, MD, and Andrea Beckley, MS, for their assistance in patient counseling and outcome assessment, Ann Gravitte and the kitchen staff of the Rice Diet Program for providing food; and Annie King for teaching classes on stress management. We also thank Sallie West for editorial assistance and Laura Svetkey, MD, for her critical review of this manuscript.

This study was supported by a grant from the Rice Diet Program and by the Va Career Development Program in Health Services Research and the Robert Wood Johnson Generalist Physicians Faculty Scholars Program (EZD).

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