A Pilot Church-Based Weight Loss Program for African-American Adults Using Church Members as Health Educators: A Comparison of Individual and Group Intervention

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Objective: The purpose of this study was to examine a church-based intervention employing a 6-month pilot weight loss program as a strategy to improve health of African-American adults.

Design: A randomized trial design was used without a control group. Eligible church members were randomized into two groups: an intervention delivered in the group setting and an intervention delivered in the individual setting.

Setting: The study was conducted at an African-American church in Baton Rouge, Louisiana.

Participants: Forty church members were enrolled in the study. Two trained church members without specialization in obesity treatment conducted the study.

Main Outcome Measures: The primary outcome measure was weight loss.

Results: The program retention rate was 90%. After six months, a modest but significant mean weight loss was seen in all participants of 3.3 kg. The mean weight losses in the individual and group interventions were 3.4 kg and 3.1 kg, respectively. The mean body fat loss was 2.1 kg and 1.9 kg, respectively. The difference in weight loss and fat loss between the individual and group interventions was not statistically significant. An improvement in the quality of life and an increase in physical activity were reported by the program participants.

Conclusions: A church setting may provide an effective delivery mechanism for a health and nutrition program. Church members may be trained to conduct a weight control program. Both interventions (individual and group) were effective in inducing weight loss. (*Ethn Dis*. 2005;15:373–378)

Key Words: Diet, Intervention Study, Lifestyle, Obesity, Weight Loss

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Introduction

The prevalences of overweight and obesity in the United States in 1999 were estimated at 35% and 27%, respectively.[1] The prevalence is particularly high among racial and ethnic minority populations. For example, data from the third National Health and Nutrition Examination Survey (1988–1994) showed that approximately 66% of African-American women were either overweight or obese compared to 45% in White women.[2] The need to address this chronic health problem was emphasized in the US Surgeon General's call to action to control obesity, with recommendations to increase research on racial and ethnic disparities and the identification of culturally appropriate interventions.[3] However, weight loss and maintaining weight loss are difficult. An evidence-based report concluded that successful weight loss and maintenance requires a multimodal strategy to be followed by behavioral changes that should be continued indefinitely.[4]

Environmental factors influence behaviors such as diet and physical activity, and the attempt to change these behaviors may be made in various settings such as home, workplace, community group, and religious organization.[5] Church is a potentially effective setting because the church's mission commonly emphasizes health promotion, and it offers convenience in program participation and dissemination.[6,7] In this study, the results from a six-month church-based intervention are reported. The purpose of this study was to evaluate the effectiveness of a peer-educator delivered weight loss program and to compare the effectiveness of two program delivery methods: an intervention in the individual setting and an intervention in the group setting. This study was part of an initiative to improve diet and health in residents living in the lower Mississippi Delta region, Arkansas, Louisiana, and Mississippi. This area is predominantly rural, sparsely populated, and has high rates of poverty and chronic health conditions. In a previous survey of the region, a large number of survey respondents reported attending church on a regular basis.[8] A church-based intervention was explored as a potential strategy to improve health in this population, especially among African Americans who are at high risk of obesity.

Research Methods and Procedures

Participants

Because of the pilot nature of this study, power analysis was not conducted and a convenience sample of 40

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overweight or obese individuals (37 women and 3 men, with a body mass index [BMI] range of 28.8 to 56.5 kg/m^2; age range of 26–71 years) were enrolled in the study. All participants were members of an African-American church in Baton Rouge, La. Recruitment was accomplished by using posters, flyers, and personal communication from the church leaders and church members. Overweight (defined as BMI $\geq$27 kg/m^2) or obese (BMI $\geq$30 kg/m^2) African-American adults 20 years and older who were otherwise healthy were eligible to participate in the study. All participants except one had BMI $>$30 kg/m^2. Exclusion criteria included recent and serious medical conditions, medications such as diabetes drugs and lipid-lowering agents, persons on a medically supervised diet, diagnosed eating disorders, pregnancy, and participation in another lifestyle modification program. The complete list of inclusion and exclusion criteria was provided during recruitment. Upon agreeing to participate in the study, eligible participants were given a consent form describing details of the study and were scheduled to visit the Pennington Biomedical Research Center for screening. The written informed consent was obtained at this visit. The study protocol, procedures, and consent form were reviewed and approved by the Pennington Biomedical Research Center's Institutional Review Board.

Measurements

All tests and measurements were conducted at the Pennington Biomedical Research Center by trained staff not directly involved in the study. All of the measurements were conducted at baseline and repeated at the end of the study. These included anthropometry, body composition, laboratory tests, and the assessment of physical activity and quality of life. Height was measured without shoes to the nearest centimeter by using a stadiometer. Although the difference in weight measurements at baseline versus the end of study were used in the analysis, to provide instant feedback to participants, weight was formally measured in kilograms at the church-site each month for six months for participants in both group and individual interventions. Body composition was measured by duel emission x-ray absorptiometer (DEXA, Hologic 2000), from which the total body mass, body fat mass, and fat-free mass in kilograms were calculated. Body mass index (BMI) was calculated as the weight in kilograms divided by height in meters squared (kg/m^2). Blood pressure was obtained as the average of three measurements obtained with a sphygmomanometer. Blood samples were obtained and analyzed for total serum cholesterol, triglyceride, low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol, and overnight fasting blood glucose by using a Beckman Coulter Synchron analyzer (Brea, Calif).

Physical activity was assessed with a physical activity questionnaire. This questionnaire was previously used at the Pennington Biomedical Research Center. However, it has not been formally validated. It contained questions about the type and frequency of leisure time and sport activity (10 items) and physical inactivity and television viewing (6 items). The leisure time and sport activity was assessed as the frequency of a given activity per week. Physical inactivity and television viewing were assessed separately in six categories ranging from 0–2, with 2-hour increments, to 11 or more hours per day. The quality of life (in the past week) was assessed by using the Impact of Weight on Quality of Life questionnaire.[9] It contains questions about physical function (11 items), self-esteem (7 items), sexual life (4 items), public distress (5 items), and work (4 items). An example of these questions is "because of my weight, I am embarrassed to be seen in public places." For each item, the Likert-type responses range from 1 (never true) to 5 (always true). The lower score indicated better quality of life and the decrease in score indicated improvement in quality of life. The total quality of life score may range from 31 to 155.

Intervention

A randomized trial design was used without a control group. Forty participants were randomized into two treatment groups: the group intervention (n=20) and the individual intervention (n=20). The group intervention consisted of nutrition education delivered in six monthly group meetings and included group discussion. The individual intervention consisted of similar nutrition education delivered in 15 individual meetings, record keeping (a seven-day food diary each month), and basic dietary assessment using a commercial nutrition computer software program (Total Nutrition version 4.8; NutriGenie, Stanford, Calif). An increase in physical activity was emphasized in both intervention groups.

The length of the program was six months and was conducted entirely at the church-site by two trained church members (the health educators) without any specialization in obesity treatment. However, both individuals had some background in nutrition and/or health education. The selection of health educators was based on the first two persons

who signed up for the program. Each health educator worked exclusively with randomly assigned participants, 10 in each intervention group. They received two days of specific and intensive training at the Pennington Biomedical Research Center. This training included study protocol, motivational interviewing technique, behavioral modification technique, and basic dietary assessment using a nutrition computer software program. The health educators conducted the program for the entire study period. The investigators were not directly involved in the delivery of the intervention. A stipend was provided to the health educators, and each participant received $100 incentive for participating in the study.

All of the study materials were provided by the investigators, although innovation by the health educators and the program participants was encouraged. Nutrition education materials currently available at the Pennington Center were selected by the study investigators and were divided into six separate lesson plans. At each monthly visit to the church site, the health educators reviewed each of these lesson plans with the participants. The following is the nutrition education schedule and proposed topics for both intervention groups:

Lesson Plan # 1. Introduction
Lesson Plan # 2. Ideal body weight and maintaining healthy weight
Lesson Plan # 3. Diet and exercise. Energy intake vs energy expenditure
Lesson Plan # 4. Limiting fat and salt intake
Lesson Plan # 5. Food groups: eating a variety of foods
Lesson Plan # 6. Choosing a diet with plenty of fruits, vegetables, and grain products

For the participants in the individual intervention, an additional nine lesson plans were developed and provided at their visits to the church site. These plans focused on behavioral aspects of the study, ie, diet and physical activity self-monitoring and self-assessment, and included:

Lesson Plan # 1. Record keeping: food and exercise diary
Lesson Plan # 2. Developing individual weight loss, caloric, and exercise goals
Lesson Plan # 3. Modification of dietary and exercise habits
Lesson Plan # 4. Conducting self assessment and developing an individual plan
Lesson Plan # 5. Social support of behavior change
Lesson Plan # 6. Review of change and cognitive restructuring
Lesson Plan # 7. Stress management
Lesson Plan # 8. Relapse prevention
Lesson Plan # 9. Program evaluation

Statistical Analysis

The anthropometric and laboratory measurements at baseline and the change in these measures at the end of study were examined in all participants and among participants in each treatment group. The difference between the treatment groups was compared by using two-sample *t* test. The within-individual change from baseline in all participants and among participants in each study group was evaluated by using paired *t* test. The change in physical activity was assessed by calculating the percentage of individuals who reported an increase or decrease in leisure time activity, physical inactivity, and television viewing time. The change in physical activity between the two treatment groups was compared by using two-sample Wilcoxon rank-sum test, and the change in physical activity within the individuals was compared by using matched-pairs Wilcoxon signed-ranks test. The quality of life scores were summarized into the total score and six subtotal scores. The change in quality of life scores between the study groups and the within-individual change in these scores from baseline was compared by using two-sample *t* test and paired *t* test, respectively. All analyses were done using Stata release 7 (Stata Corporation, College Station, Tex).

RESULTS

Of the 40 participants randomized, 36 (90%) completed the study. Of the four not completing the study, three were from the same health educator, and two of the four participants never started the study after randomization. The anthropometric and laboratory measurements at baseline and the change in these measurements at the end of study are shown in Table 1. In Table 1, the mean BMI of all participants (38.5 kg/m^2) was higher than the BMI definition of obesity class I (BMI 30.0–34.9 kg/m^2). The baseline measurements of the two treatment groups were comparable. However, participants in the individual intervention group had significantly lower mean HDL cholesterol and higher mean LDL cholesterol than the participants in the group intervention.

Table 1 shows the mean change in anthropometric and laboratory measurements at the end of the 6-month study period. For all participants, a significant decrease was seen in body weight, BMI, body fat mass (FM), and fat-free mass (FFM) from the baseline values. The mean weight loss and mean fat loss in all participants were 3.3 kg and 2.0 kg, respectively. Weight loss ranged from +4.6 to −10.4 kg, and fat loss ranged from +1.7 to −9.0 kg. Overall, 28 (18 individual intervention, 10 group intervention) participants lost weight (10 lost more than 5.0 kg), 8 (4 individual intervention, 4 group intervention) participants gained weight (average 2.0 kg). The body weight, FM, and FFM in both study groups were significantly lower than the baseline values, although the differences between the two treatment groups were not significant. A significant but slight decrease was seen in HDL cholesterol and plasma triglycer-

Table 1. Anthropometric and laboratory measurements at baseline and change at 6-months*

	All subjects Baseline (*N* = 36)	All subjects 6 months (*N* = 36)	Group Assignment				*P*† Baseline	*P*† 6 months
			Group Baseline (*n* = 16)	Group 6 months (*n* = 16)	Individual Baseline (*n* = 20)	Individual 6 months (*n* = 20)		
Age (years)	44 (10)	44 (10)	44 (10)		44 (10)			.8
Weight (kg)	103.6 (21)	−3.3 (3.5)‡	103.7 (17.5)	−3.1 (3.5)‡	103.4 (24)	−3.4 (3.5)‡	.09	.8
BMI (kg/m²)	38.5 (7)	−1.2 (1.3)‡	37.5 (6)	−1 (1)	39.3 (7.8)	−1.3 (1.3)‡	.5	.7
Body fat (%)	48.2 (7.2)	−.5 (1.4)‡	47.4 (8.1)	−.4 (1.1)	48.8 (6.6)	−.5 (1.6)	.5	.9
Body fat (kg)	5.7 (16)	−2.0 (2.7)‡	49.7 (14.3)	−1.9 (2.4)‡	51.4 (17.5)	−2.1 (3)‡	.8	.9
Fat free mass (kg)	53 (9.3)	−1.3 (1.6)‡	54 (9.3)	−1.2 (1.3)‡	52 (9.5)	−1.4 (1.8)‡	.5	.8
Total cholesterol (mg/dL)	197 (29)	−5 (19)	192 (29)	−8 (21)	202 (29)	−3 (18)	.3	.4
HDL cholesterol (mg/dL)	55 (11)	−3 (7)	60 (12)	−4 (7)‡	51 (9)	−2 (6)	.02	.3
LDL cholesterol (mg/dL)	125 (27)	−4 (17)	115 (26)	−6 (19)	134 (26)	−3 (16)	.04	.6
Triglyceride (mg/dL)	86 (39)	9 (18)	85 (37)	10 (22)	86 (42)	8 (15)‡	.9	.8
Blood glucose (mg/dL)	104 (11)	−1 (9)	101 (10)	−2 (7)	106 (12)	1 (11)	.2	.3
Systolic blood pressure (mm Hg)	125 (12)	−2 (11)	128 (13)	−5 (12)	123 (12)	1 (10)	.2	.1
Diastolic blood pressure (mm Hg)	79 (8)	−2 (8)	79 (8)	−2 (8)	79 (9)	−2 (9)	.9	.9

* Data are presented as mean (SD) unless noted.
† *P* value for the difference between subjects in the group and the individual assignment.
‡ Indicates significant change from baseline value, $P<.05$.

ide. The HDL cholesterol declined among participants in the group intervention, while triglyceride increased among participants in the individual intervention.

The quality of life and physical activity measurements at baseline and the change in these measures at the end of study are presented in Table 2. Four participants did not complete all of the items of the quality of life questionnaire and were excluded. Table 2 shows that the mean quality of life scores among the study groups at baseline were comparable. Thirty-six participants completed the physical activity questionnaire. For all participants, approximately 19% reported no leisure time or sport activity at baseline, and about 81% and 58% reported three or more hours of physical inactivity and television viewing per day, respectively.

At the end of the study, and as shown in Table 2, a decrease was seen in the quality of life scores, except for the sexual life and work scores. However, these changes were not significant. Approximately 83% of all participants reported an increase in leisure time and sport activity, and approximately 33% and 17% reported a decrease in physical inactivity and television viewing, respectively. The decrease in physical inactivity

Table 2. Quality of life and physical activity measurements at baseline and change at 6 months*

	All Subjects Baseline	All Subjects 6 months	Group Assignment				*P*† Baseline	*P*† 6 months
			Group Baseline	Group 6 months	Individual Baseline	Individual 6 months		
Quality of life‡								
Physical function score	25.5 (9.5)	−3.7 (6.8)§	24.1 (1.8)	−1.9 (7)	26.6 (8.5)	−5.2 (6.5)§	.05	.2
Self-esteem score	15.2 (7.3)	−1.1 (4.5)	14.6 (6.4)	−.3 (3.7)	15.7 (8.1)	1.7 (5)	.7	.4
Sexual life score	5.5 (7.3)	.7 (2.8)	5.4 (2.3)	1.1 (3.3)	5.6 (3.8)	.4 (2.5)	.9	.5
Public distress score	7.9 (4.2)	−.4 (2.2)	7.4 (3.5)	−.1 (1.6)	8.3 (4.7)	−.6 (2.6)	.5	.6
Work score	5.2 (2)	.3 (1.5)	4.9 (1.5)	.1 (1.4)	5.4 (2.4)	.6 (1.6)	.4	.2
Total score	59.3 (20)	−4.3 (12.1)	56.4 (20)	−1.4 (12.7)	61.7 (21)	−6.6 (11.5)§	.5	.2
Physical activity								
Reported no leisure time activity (%)	19.4	83.3§	25.0	81.3§	15.0	85.0§	.5	.8
Reported >2 hours of physical inactivity/day (%)	8.6	33.3	75.0	31.3	85.0	35.0	.5	.1
Reported >2 hours of TV viewing/day (%)	58.3	16.7	62.5	31.3	55.0	5.0	.7	.8

* Data are presented as mean (SD) unless noted.
† *P* value for the difference between subjects in the group and the individual assignment.
‡ Excluding four subjects who did not complete all items of the quality of life questionnaire. Decrease in score indicates improvement in quality of life.
§ Indicates significant change from baseline value, $P<.05$.

and television viewing from baseline was not significant.

DISCUSSION

This study showed that a weight loss program can be successfully implemented at the church, in this case an African-American church. The participant recruitment was accomplished within a relatively short period (less than two months), and the retention rate was high (approximately 90%). A modest weight loss was achieved in both treatment groups, but the difference between study groups was not significant. A decrease in both body fat mass and fat-free mass was observed, along with changes in serum lipid profile, blood glucose, and blood pressure. However, the changes in laboratory measures and blood pressure were small and not clinically significant. In general, the program participants reported an improvement in physical functioning and an increase in physical activity.

The mean weight loss achieved in this study was 3.3 kg. In a previous study of a 14-week church-based program, the mean weight loss of approximately 4.5 kg was obtained while the control participants experienced mean weight gain of about 0.9 kg.[10] Our results are comparable to those of other low-intensity interventions, which usually produce mean weight loss of 1 to 5 kg over six months.[11] The more intensive programs produce larger weight loss, but they were associated with attrition rates of about 15% to 20%.[11] Small changes in the serum lipid profile, blood glucose, and blood pressure were observed. These changes were not clinically significant. Similar changes were reported in previous studies using lifestyle interventions.[12,13]

In general, the study participants reported an improvement in weight-related quality of life and an increase in physical activity. The quality of life scores at baseline were similar to those reported in a study of 199 obese individuals assessed by the same questionnaire.[14] However, the improvement in quality of life in our study was much smaller than was seen in that study, which combined drug therapy and lifestyle modification. In the current study, only the physical function aspect of the quality of life was significantly improved. An increase in leisure time physical activity was reported by study participants. However, the physical activity questionnaire used in this study has not been validated and has limitations. For example, this questionnaire did not permit the calculation of mean physical activity score in metabolic equivalent tasks (METs). Therefore, the reported increase in physical activity in this study is subject to error and bias.

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One of the main objectives of this study was to evaluate the effectiveness of a church-based weight loss program conducted by trained health educators, who were themselves members of the church. This objective was based on the expert panel's guidelines and recommendations on obesity treatment and prevention strategy, which concluded that a weight loss program can be conducted by a person without specialization in weight loss as long as that person has the requisite interest and knowledge.[4] As shown in a previous report, this study demonstrated that a weight loss program may be successfully conducted at an African-American church by trained lay persons.[10] The study investigators were not directly involved in the intervention program during the entire study period. The health educators independently conducted the program at the church, and the study protocol did not include monitoring their performance or other evaluation measures.

Results from this study suggest that the church may provide an effective delivery mechanism for a weight loss program and that such a program may be conducted by trained church members. Although a modest amount of weight loss was achieved, such reduction may be associated with several health benefits.[4] As mentioned above, the more intensive programs may produce greater weight loss, but they are often associated with high attrition rates. The results of the current study also suggest that the intervention delivered in the group setting may be as effective as that delivered in the individual setting. This finding may be attributed in part to factors such as the social support in the group setting. However, more data are needed to support this finding. Lastly, the scope of this study did not permit evaluating the program's effectiveness in preventing weight gain. Likewise, the extent of weight regain that might have occurred after the program completion cannot be determined.

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