
A Health Education Program for Weight Reduction in a Hypertension Clinic

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OBESITY is a well-recognized factor in the pathogenesis of diseases known to increase the probabilities of death in the middle decades of life (1,2). The results of several studies indicate that most obese persons will not enter treatment—of those who do, the majority do not lose weight, and most of those who do lose weight regain it (1-4). Therefore, health educators are continually faced with a seemingly insoluble problem (5).

Since it has been suggested that weight control is a learning process, it is reasonable to assume that education may be an essential ingredient in any effort to promote and maintain weight reduction (6). Educational techniques can help to build skills for the management of various conditions (4). However, patients' receptiveness to health education is influenced by the way in which information is conveyed to them. Thus, a long-term management plan for the obese should not only impart information at the outset but also provide continuously available information to help patients learn how to achieve and maintain a level of health appropriate for themselves and their families (7,8).

Because of the paucity of literature on studies of education programs for promoting and maintaining weight reduction, we conducted a pilot education program at a hypertension clinic in southern Arizona to determine if such a program could be effective for overweight and obese persons. The clinic administrators had been con-

sidering a weight reduction program, and they approved an 8-month study. The study was not designed to obtain data on blood pressure changes.

For this study, we defined overweight as no less than 10 percent and less than or equal to 19 percent above maximum desirable weight, based on body build (9). For example, the maximum desirable weight for a medium-framed 69-inch man is 156 pounds; overweight for this type of man is between 172 and 185 pounds. We defined obese as no less than 19.1 percent and less than or equal to 30 percent above the desirable weight, based on body build (9). Thus, a 69-inch medium-framed man was considered obese if he weighed between 185.1 and 203 pounds. Because the chance of losing a lot of weight in a short time is known to be very low, we did not use the criterion of 30 percent or more above desirable weight.

Methods

Selection of subjects. The clinic staff regularly follows approximately 175 hypertensive outpatients, many of whom are also obese or overweight. We reviewed the charts of all patients, and 64 men and women met the following criteria for inclusion in the study: (a) consistently followed by the clinic for a minimum of 1 year, (b) between 30 and 65 years old, (c) had not attended or participated in a weight reduction or dietary health education program under the care of a physician within the past 5 years, and (d) was overweight or obese for a minimum of 1 year.

To eliminate the problem of different medications as a factor in weight reduction, subjects who were prescribed approximately the same dosages of similar diuretics were selected. Therefore, weight reduction could not be attributed to an initial loss of body fluids.

The subjects were assigned randomly to an experi-

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Table 1. Means, standard deviations, and *t* test values for continuous variables measured on control and experimental groups

Variable	Control group (N=32)		Experimental group (N=28)		<i>t</i> test value
	Mean	SD	Mean	SD	
Age	51.00	8.08	50.50	9.48	0.22
Height, inches	67.08	3.25	67.75	4.31	-0.68
Years overweight	13.03	7.17	14.93	8.60	-0.93
Initial weight	176.56	28.32	184.64	32.39	-1.03

NOTE: None of the differences were significant.

mental or a control group; each group consisting of 32 persons. Four persons in the experimental group had to leave the study shortly after the first class session because of family problems, and they are not considered in the analyses. The weight categories of the 60 remaining persons were as follows.

Weight category	Men		Women	
	Number	Percent	Number	Percent
Control group:				
Overweight	7	0.37	8	0.62
Obese	12	0.63	5	0.38
Experimental group:				
Overweight	6	0.50	5	0.31
Obese	6	0.50	11	0.69

Study design. During the week of August 19, 1978, all subjects were telephoned and clinic appointments for measuring their weight were scheduled. The control subjects were requested only to have their weight checked, but the experimental subjects were also asked to set aside two dates for weight-control classes, August 25 and September 20 from 4:30 to 5:30 pm. All consented to attend these classes. Before each patient's appointment time, we reviewed his or her clinic record for age, height, and years overweight.

Each patient's weight was measured three times—during the weeks of August 23 and October 16, 1978, and March 19, 1979. Only the weights taken at the initial and final visits are reported here. Although in

Table 2. Frequency and percentage of weight change between August 1978 and March 1979 for control and experimental groups

Weight change ¹	Control group		Experimental group	
	Frequency	Percent	Frequency	Percent
Weight loss	11	34.4	20	71.4
No change	3	9.4	..	0.0
Weight gain	18	56.2	8	28.6
Total	32	100.0	28	100.0

¹ $\chi^2 = 2$ df, $P < 0.025$.

the sixth month of this study the clinic initiated weight reduction classes and inadvertently included some of the control subjects from our study population, we have included their weights in the data analyses.

The experimental subjects attended two 1-hour class lectures presented by one of the investigators on risk factors related to overweight and obesity, with specific dietary information for promoting and maintaining weight reduction. The information presented in the lectures was tailored by the investigators and nutrition experts to meet the needs of the study population. An abbreviated version of the lesson plans appears in the box on page 274.

To analyze mean differences between continuous variables, *t* tests were used, and chi-square tests were used to analyze proportional results.

Results

Data on age, height, years overweight, and initial weight were tabulated and compared by *t* tests to determine if the experimental and control groups were similar. The means, standard deviations, and *t* values for these factors are shown in table 1. Initially, the experimental subjects, on the average, were overweight for a longer time and weighed more than the control subjects. However, these differences were not significant.

To test the effectiveness of dietary information on weight reduction over the 8 months, we calculated weight changes for each person and tabulated them as either weight loss, no change, or weight gain (table 2). More than 71 percent of those who received dietary information had lost weight, in contrast to 34.4 percent in the control group. Only 8 (28.6 percent) of the experimental subjects had gained weight, whereas 18 (56.2 percent) of the control group had gained weight. This difference was highly significant, $P < 0.025$, suggesting that weight change in the experimental group was related to their learning experience. The mean weight changes for the experimental and control groups are compared in table 3.

Although, on the average, the experimental subjects

Table 3. *t* test values for mean weight differences and standard deviations between control and experimental groups, by sex of patients

Sex	Control group			Experimental group			<i>t</i> test value
	Number persons	Mean	SD	Number persons	Mean	SD	
Women	13	1.58	2.77	16	-1.17	6.4	1.45
Men	19	0.76	12.41	12	-2.66	9.73	0.826
Total	32	1.09	9.62	28	-1.81	7.87	1.27

NOTE: None of the differences were significant.

lost weight, their mean weight differences were not significantly different from those of the control subjects. The inadvertent inclusion of some control subjects in the clinic's weight reduction classes during the study period may account for this lack of difference. Also, the higher percentage of obese persons in the experimental group may be related to the lack of difference. To assess whether weight change in the comparison groups depended on weight category (overweight or obese) and sex, *t* tests were performed on the mean differences (table 4).

The mean weight loss for the overweight experimental subjects was significantly greater than that for the overweight control subjects, $P < 0.005$. The overweight, experimental-group men and women, independently, also had significantly greater mean weight losses than their counterparts in the control group ($P < 0.05$ versus $P < 0.01$). Such differences were not evident among the obese subjects. These findings indicate that weight reduction was associated with weight category rather than sex of the subjects; also, obese persons encounter more difficulty in weight reduction or maintenance, or both, than do overweight persons. The ranges of weight loss for the comparison groups were as follows.

Weight category	Range of weight loss (pounds)	
	Control group	Experimental group
Overweight:		
Men	-1.5 to -4.25	-1.0 to -11.0
Women	0.0 to -3.00	-0.5 to - 6.0
Obese:		
Men	-1.0 to -23.0	-2.5 to -20.0
Women	-0.5 to - 2.0	-0.5 to - 9.0

Discussion

The results of this study indicate that a health education program for weight reduction is a useful method for helping overweight people to reduce and to maintain their weight reduction. Moreover, if a well-organized dietary program designed to meet the specific needs of an overweight population is presented properly, weight loss can be maintained with minimal reinforcement. However, this latter finding did not hold for the obese subjects in our study population. This result correlates well with the results of studies which suggest that obese persons have greater difficulty in trying to lose weight (1,10).

It is possible that long-term management, including dietary information, basic health education, and extensive, continuous reinforcement may be effective for promoting weight reduction in obese people. In fact, Howard (11) suggested that long-term treatment of

Table 4. *t* test values for mean weight differences and standard deviations in weight change for control and experimental patients, by sex and weight category

Sex and weight category	Control group			Experimental group			<i>t</i> test value	Significance
	Number persons	Mean	SD	Number persons	Mean	SD		
Women								
Overweight	8	1.63	2.40	5	-2.50	3.50	3.13	$P < 0.01$
Obese	5	1.15	3.60	11	-0.57	7.44	0.48	NS
Men								
Overweight	7	3.07	6.50	6	-4.0	4.86	2.18	$P < 0.05$
Obese	12	-0.58	14.90	6	-1.33	13.43	0.10	NS
Total overweight	15	2.30	4.66	11	-3.32	4.16	3.18	$P < 0.005$
Total obese	17	0.03	12.56	17	-0.84	9.54	0.23	NS

NS = not significant.

Lesson Plans for Weight Reduction Program in Hypertension Clinic

PLAN 1

Topic 1: Definitions and discussion of risk factors.

Concept: Risk factors such as overweight, obesity, and hypertension can affect a person's physical health.

Objectives: After instruction, patients should be able to (a) name two specific risk factors of overweight, obesity, and hypertension and (b) explain how the risk factors of these conditions affect a person's well-being.

Content: Definitions of hypertension and of overweight and obesity, including similarities (fat cells) and differences (eating habits), and risk factors (heart disease, stroke, and diabetes) and their effects on physical health.

Learning opportunities: Instructor will open the lesson by expressing her concern for overweight, hypertensive persons. In lecture fashion, she will examine the effects of hypertension on the blood vessel wall and will use the chalkboard to elaborate on each point made. She will present a chart that shows the deposits of adipose tissue in overweight and obese patients, and, in addition to stressing the similarities of adipose tissue deposits, she will discuss eating patterns as a means of differentiating and classifying between overweight and obesity. She will also explain and diagram on the chalkboard the effects of overweight, obesity, and hypertension on the heart, vascular system, and metabolism. Selected patients will be asked to recall verbally at least two of the risk factors discussed and to give an example of how each risk factor recalled could affect their health. A question and answer period will follow.

Topic 2: Food preparation and caloric intake.

Concept: Proper food preparation and a reduction in caloric intake can be effective in facilitating weight loss.

Objectives: After instruction, patients will be able to (a) discuss why a reduction in caloric intake is effective for weight loss, (b) select from a list of foods those that would better promote weight reduction, and (c) compare and contrast two of four methods of food preparation with respect to a reduction in caloric intake.

Content: Calories—number per pound of weight, daily requirements, and amount of caloric reduction needed for 1 pound of weight loss; types of food—fats, proteins, and carbohydrates; and food preparation—frying, boiling, broiling, and baking.

Learning opportunities: Instructor will write the three basic types of food on the chalkboard and discuss the caloric content per gram of each. She will then list several foods and differentiate the categories of each, and she will ask the patients to designate which foods would be best to eat for weight reduction. The instructor will discuss and illustrate on the chalkboard the caloric values of four meth-

ods of food preparation, stressing the importance of eliminating excessive fats from the diet. After a question and answer period, each patient will be given a chart that shows the effects of excessive adipose tissue on various organs of the body.

PLAN 2

Topic 1: Individual factors in weight loss.

Concept: Environmental factors greatly influence each person's ability to lose weight.

Objective: After instruction, patients will be able to cite at least two environmental factors that influence their diet patterns and give an example of the significance of each factor in affecting their weight.

Content: Review of food preparation; environmental factors influencing weight—age, culture (social beliefs and eating patterns), sex, and other.

Learning opportunities: To review the topics of caloric values and food preparation, the instructor will display foods and discuss the caloric values of each, stressing the importance of substituting lower calorie for high calorie ones. She will ask the patients "What factors in your life contribute to your present weight?" From their answers, the instructor will prompt discussion on the topic. A question and answer period will follow.

Topic 2: Review of food preparation, caloric values, and weight loss.

Concept: Responsible patients in the experimental group can promote weight reduction by familiarization with and use of various methods of food preparation and lowered caloric intake.

Objective: After instruction, patients should be able to explain to others the methods necessary for fostering weight loss through food preparation and calorie reduction.

Content: Review of previous materials—risk factors, caloric values, food preparation, and factors in weight loss (environmental and individual).

Learning opportunities: The instructor will select two patients to tell the class two specific methods of food preparation or caloric intake, or both, used in promoting weight loss, and the class will be asked to evaluate these methods or elaborate on them. As a summation of the total class experience, the instructor will ask the patients to state their likes, dislikes, and general outlook concerning the classes. Each patient will be given a chart for calculating the number of pounds one can lose by eliminating certain foods from the diet and a copy of a food substitution guide for calorie reduction. A post-class questionnaire will be administered to each patient.

obesity can be achieved best by re-educating the patient with respect to his or her dietary habits. Howard found that group education was an effective method for promoting weight loss. In his study a comparison was made between 18 obese patients attending an outpatient clinic monthly and 18 people, with comparable initial weights, meeting weekly in a group; all were given the same dietary instructions. The weight loss over 14 weeks in the group that met weekly was almost double that of the outpatients.

Health education as an effective method for promoting weight reduction in an obese population was supported further by Kopelke (12). From a group education program for weight reduction, Kopelke concluded that discussion of diet plans, knowledge of the physiological effects of obesity, and basic health education were responsible for the program's success.

In contrast to our study results and those cited by Howard and Kopelke, the results of a 2-year study at New York Hospital (13), in which only scheduled clinic visits were used, revealed that only 12 of 100 obese patients succeeded in losing more than 20 pounds during the 2 years. Of these 12, only 1 patient was able to lose more than 40 pounds. After their first visit, 67 patients did not return to the Nutrition Clinic nor to any other clinic in the hospital.

It has been theorized that the pathogenesis of obesity is related to dietary habits in which the energy intake is greater than the energy expenditure, and it is never caused directly by abnormal metabolism. This theory leads to the recognition that many complex factors may be involved in weight reduction among obese persons (4,14). On the other hand, overweight usually results from less complex factors that can be overcome by health education programs. The overweight patients in our study did respond to the health education program.

Kahn (15) noted that group education had been conducive to providing mental nourishment and mutual nurturing for her overweight study subjects. Even more important was the function of a mutually supportive group to deal with the specific problem of overweight, periods of stress, and education that gave the subjects a more realistic perspective on the need to lose weight.

In a weight control program at the University of Maine, 13 selected overweight subjects attended a group dietary instructional meeting weekly during the school year (16). Weight loss in this group ranged from 2 to 31.5 pounds. However, a guideline could not be determined because recordkeeping was not required, nor was there a control group.

In our study, the weight loss for the overweight experimental-group subjects ranged from 1.0 to 11.0

pounds and for the overweight control group it was 0.0 to 4.25 pounds. Although the range of weight loss among our overweight subjects was not as great as in the University of Maine study, the age and health status of the persons in the two studies were not comparable. We recognize that other factors could have contributed to the success of our study. Personal interest and concern was afforded the experimental-group subjects, whereas an investigator weighed the members of the control group but did not establish a rapport with them.

Our study findings suggest that further long-term follow-up investigations using health education, with both minimal and continuous reinforcement, are necessary to resolve the problems of obese persons. It seems that effective education and pertinent dietary information can help overweight persons acquire the knowledge, attitudes, and skills that promote and maintain weight reduction.

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