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A COMPARISON OF TWO NUTRITION EDUCATION PROGRAMS FOR WEIGHT CONTROL

The University of North Carolina at Greensboro PH.D. 1983

A COMPARISON OF TWO NUTRITION EDUCATION PROGRAMS FOR WEIGHT CONTROL

By

Elizabeth Ann Quinn Tyndall

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Approved by

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APPROVAL PAGE

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An evaluation of two nutrition education programs for weight control was conducted by comparing a 3-day weight control seminar with a 6-week weight control series. Criteria used in judging the effectiveness of each method included skinfold measurements, mid-arm circumference measurements, weight, and change in eating and exercise habits. Subjects were measured at the beginning of each of the programs and again four months later to see if there were any lasting changes.

Analysis of the data revealed that individuals in the 6-week series program apparently changed their eating habits after the program and consumed more low-calorie foods that were high in nutritive value. There was no apparent change in eating habits of the individuals completing the 3-day seminar.

There were no significant differences in weight loss, triceps skinfolds, or mid-arm circumferences between the groups. Individuals in the 6-weeks series program, however, lost an average of one pound per month. Individuals in the 3-day seminar program had a mean weight loss of only 1.7 pounds over the four months. It was concluded that the longer duration program, the 6-weeks series, was a more effective method of nutrition education to implement changes in eating habits than the 3-day seminar.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDIX TABLES

CHAPTER I

INTRODUCTION

The Problem of Obesity

Between one-third and one-half of all Americans are overweight, and weight control is a problem for 20-40 million Americans today. A recent study involving seven countries revealed that Americans and Italians had the greatest prevalence of men 10 percent or more above standard weight (Bray, 1980). Americans had double the prevalence of obesity, as defined by a sum of subscapular and triceps skinfold thicknesses greater than 29 millimeters, compared to subjects in the other countries.

Obesity is the major form of malnutrition in the United States and has been associated with increased incidence of diabetes, hypertension, hyperlipidemia, gout, arteriosclerosis, arthritis, hernia, and gallbladder disease. The incidence of hypertension may be increased three to five times in individuals who are 50% or more above desirable weight. Obese individuals have a higher risk of developing endometrial carcinoma, and the aggravation of degenerative joint diseases appears to be more prevalent in obese individuals (Bray, 1980). An obese person has an average life expectancy of 13 years less than a normal weight individual. Obesity is reversible, however; mortality rates are no higher for the formerly obese than for one who was never obese (Holberg & Berard, 1980; Whitney & Hamilton, 1980). Significant weight reduction in an individual is associated with lower blood pressure, lower blood cholesterol and blood glucose levels, and reduced uric acid concentrations, and thus,

the risks of cardiovascular disease and diabetes mellitus are reduced (Bray, 1980). From data collected in the Framingham Study, it is estimated that "if everyone were at optimum weight, there would be 25 percent less coronary heart disease, and 35 percent less congestive heart failure and brain infarctions" (Bray, 1980).

Obesity causes physiological changes as well as changes in outward appearance. Hafen (1981), reported that obese subjects in their thirties had psycho-physiological profiles which were very similar to those of healthy 71-year-old men. The average life expectancy of these obese persons was estimated to be 13-15 years less than that of normal-weight persons. In this respect, obesity may be regarded as a form of premature aging.

Being overweight may be a social and economic disadvantage. Overweight individuals may be less sought after for marriage, less likely to get into the college of their choice, and are often discriminated against when applying for jobs and promotions (Bazzarre, 1978). Bazzarre (1978) reported that an obese male could lose $279,050 in lifetime earnings compared to normal weight males, as a result of failure to gain admission to a four-year college. The cost of food for maintaining 100 pounds of extra weight could add an average of $400 to the yearly grocery bill. Ten million Americans spend at least half a billion dollars annually on diet books, reducing aids, and unnecessary diet supplements (Hafen, 1975).

Resistance of Obesity to Treatment

Obesity is difficult to treat. Albert Stunkard stated in the foreword to Slim Chance in a Fat World, "Most obese persons will not remain in treatment. Of those who do remain in treatment, most will not lose

much weight, and of those who do lose weight, most will regain it" (Stuart & Davis, 1972). Bray (1980) reported a small percentage (5-25) of patients maintaining long-term weight loss after a course of treatment. A majority of obese patients (75-95 percent), however, regained some or all of the weight they lost. With the difficulty in obtaining lasting weight loss, it is important to identify factors that make weight control successful. A recent review (Wilson & Brownell, 1980) cited eleven studies that reported sustained weight loss at the one-year follow-up with the use of behavior modification. The review also indicated that including physical activity in the program significantly enhanced weight loss by increasing calories burned, increasing the basal metabolic rate, and decreasing appetite. The positive aspects of the three-pronged approach of weight reduction involving diet modification, exercise, and behavior modification have been reported in numerous studies.

Purpose of Study

The purpose of this study was to compare two different nutrition education methods for weight control. A 3-day seminar was compared with a 6-week series to see if there were differences in weight loss, triceps skinfold thicknesses, mid-arm circumferences, and change in eating and exercise habits from the beginning of treatment until the follow-up, four months later. The 3-day seminar was much more expensive to conduct; therefore, it was useful to evaluate its effectiveness and compare the results of the two methods for decision making in future program development.

Hypotheses

The hypotheses, stated in the null, were as follows:

Hypothesis I: There is no statistically significant difference in change in eating habits between subjects who participated in a 3-day weight control seminar and a 6-week Extension-sponsored weight control series.

Hypothesis II: There is no statistically significant difference in weight, triceps skinfold, or mid-arm circumference between subjects who participated in a 3-day seminar and a 6-week Extension-sponsored weight control series.

Definition of Terms

Behavior modification: a technique in which the subject identifies inappropriate behavior and replaces it with more appropriate behavior, based on learning theory.

Obesity: excessive body fatness; often loosely defined as a condition of being overweight by 15 or 20 percent or more.

Overweight: body weight more than 10 percent above "ideal" weight.

Limitations of the Study

Randomization was not possible, since the subjects volunteered for treatment. The home economist from Davie County volunteered to conduct the series, so the groups were neither randomized in selection of subjects nor in assignment of treatment. There may have been a difference in motivation of the subjects since those attending the 3-day seminar paid $60 to participate, while those in the 6-week series attended free of charge.

Because of time constraints and scheduling problems of the agent who taught the series, the experiments were conducted at different times of the year. The 3-day seminar was done in April, 1982, and the 6-week series was done in November and December, 1982. There could have been a threat to internal validity if there had been a difference in response to treatment as a result of the timing of the experiments. This was not a problem in this study, however, since multivariate analysis of covariance showed no significant differences between the groups on the variables studied.

The small sample size (n=11 in each group) limited the generalizability of this study.

CHAPTER II

REVIEW OF LITERATURE

A search of the literature was conducted to determine the most appropriate methods and procedures for conducting nutrition education programs for weight reduction. This review included the pertinent literature concerning reducing diets, physical activity, behavior modification, methods of assessing nutrient intake, and anthropometric measurements.

Reducing Diets

Several studies have demonstrated that fasting can be well tolerated by obese humans even for prolonged periods of time. The most obvious limitation of this method of weight reduction is the loss of body protein during starvation and the resulting implications for vital functions. In short-term starvation, more lean tissue is lost than fat. One study showed that 59-66 percent of the weight loss was from lean tissue (Scharf, 1975).

Extreme caloric restriction causes a reduction in basal metabolic rate, making effective weight reduction even more difficult than a diet when one is on a moderately caloric-restricted diet (1000-1200 calories). The most frequent side effects during total starvation are orthostatic hypotension and transient phases of fluid retention (Van Itallie, 1980). Severe complications due to cardiovascular disturbances have occurred during prolonged therapeutic starvation, reported Van Itallie (1980). Electrolyte imbalances, vitamin deficiencies, emotional disturbances, neutropenia and ketoacidosis have also been reported (Van Itallie, 1980).

A few deaths have occurred in obese patients on starvation regimens. Because of such complications, all fasting patients should be hospitalized during prolonged starvation to monitor bodily functions and regulate fluids, electrolytes, and vitamins. Fasting is not recommended as a routine treatment for obesity because of the excessive loss of lean tissue and the prohibitive cost of hospitalized treatment. After two years, only one-third of the patients had maintained their lowered body weight, reported Van Itallie (1980). This outcome was independent of age, sex, degree of original overweight, age of onset of obesity, or physical activity level.

Bistrian (1978) described the protein-sparing modified fast (PSMF) as the most innovative and promising dietary treatment for obesity. The program was an outpatient fasting regimen supplemented with small amounts of high protein foods. He suggested that this exogenous protein "spares" the body's protein that is lost during complete fasting. Wilson and Brownell (1980) reported weight losses of 50-100 pounds using the PSMF. The mean weight loss after one year was 40 pounds, and most patients were said to have maintained their weight losses. The PSMF must be used only under tightly controlled conditions and under the care of a physican. It would not be appropriate for use in a community-based nutrition education program. Van Itallie (1980) suggested that a balanced hypocaloric diet (400 calories per day) is as safe and as effective as the PSMF.

A more conservative approach to the treatment of obesity is needed for a community-based weight control program. Results of a survey of more than 2000 obese persons indicated that these individuals preferred to receive a specific diet rather than merely to be given instructions

to limit food intake (Van Itallie, 1980). When asked to rate the various weight-reduction programs they tried, women rated group treatment as the best for permanent weight loss. Men rated diet alone as the best method when asked the same question. When asked to rate the best methods of dieting they had tried, the respondents listed calorie counting, carbohydrate counting, and following a diet that listed foods under different categories. The least popular diets were starvation and diets that dictated "set menus". Men tended to prefer carbohydrate-restricted diets, and women tended to prefer caloric-restricted diets (Van Itallie, 1980).

A well-balanced, low-calorie diet is needed for nutritional adequacy, palatability, and convenience of the dieter. Hafen (1975) indicated that the diet should be as close as possible to the patient's usual food pattern and should include the patient's favorite foods, though in limited amounts. The preparation of a "diet meal" separate from the family's usual fare should not be a requirement of an acceptable weight control diet. Thus, the patient could eat without feeling set apart from other people, either at home or away from home, and could have a better sense of well-being. This type of diet is also more appropriate for maintaining the reduced weight. It is important for the patient to count calories, particularly in the beginning of the weight control program, in order to give feedback on his usual intake. It is also helpful for the patient to know the caloric content of foods in order to make better food choices (Hafen, 1975).

Behavior Modification

Behavior modification is the process by which undesirable behaviors are identified and more desirable behaviors are adopted in their place.

This concept was first applied to weight reduction in 1972 (Stuart & Davis, 1972). Numerous studies have shown that obese persons respond to different stimuli for eating than do normal-weight persons. Van Itallie and Campbell (1972) reported a feeding experiment in which obese and non-obese subjects ate all of their food as a nutritionally balanced, bland liquid from a feeding machine. Obese subjects ate significantly less than was needed to maintain their weight, while non-obese subjects ate the proper amount for weight maintenance. These results suggested that appetite or eating behavior is controlled differently for obese and non-obese individuals. Since appetite was apparently not controlled internally in obese subjects, then external factors must control eating behavior.

External cues, such as time of day and the sight or smell of food, were reported to be the primary initiators of eating behavior in obese subjects, according to Stuart and Davis (1972). These authors reported a gastric contraction study in which subjects swallowed a gastric balloon which could respond to stomach contractions and be monitored. Normal-weight subjects reported hunger significantly more often when they had stomach contractions than did obese subjects. Apparently, obese subjects do not perceive gastric contractions as a hunger signal. Studies such as these focused attention on stimulus control or elimination of external cues as a technique of behavior modification.

If eating is externally initiated, it is important to keep records of what things in the environment (or events) cause inappropriate behavior. Self-monitoring is an important aspect of behavior modification

because it identifies problem behaviors and the conditions that surround those events. Stimulus control can then be exercised, based on behavior modification, to eliminate those conditions.

Behavior modification is widely used in group weight control programs. Wilson and Brownell (1980) reported at least 30 controlled clinical studies which were consistent in showing that behavioral treatment resulted in greater weight loss than traditional medical treatment, nutrition education alone, or relaxation training. This report indicated that results have not been dramatic, however, with a mean weight loss of eleven pounds. Though short-term weight loss was greatest in programs emphasizing behavior modification, long-term results in most studies showed no difference between the behavioral group and the control group. Most subjects gained weight over time. Eleven studies showed that weight loss was maintained but subjects did not continue to lose after treatment. If they are grossly obese, eleven pounds is an unimpressive weight loss, compared to what they need to lose. The major weakness of most weight control programs is that they are too short in duration for appreciable weight loss and they need long-term follow-up (Wilson & Brownell, 1980).

Paulsen and Beneke (1979) reported the long-term results from a weight loss program with eight extension home economists as instructors. The program emphasized nutrition education and behavior modification. The mean weight loss in the 20-week program was 17.3 pounds. At the eight-month follow-up, 80 percent of the weight lost was maintained. This study showed that extension home economists could utilize behavioral

techniques to produce weight losses and maintenance of losses comparable to nutrition researchers and behavioral psychologists.

Physical Activity

Activity level can play an important role in weight control and in the maintenance of general health. There is considerable research suggesting that people who have weight problems tend to be much less active than those who do not have weight problems. Nash (1978) had normal and overweight people wear pedometers to measure their daily walking activity. They found that the normal weight people were more than twice as active as the obese subjects. One study of obese housewives revealed that they spent more of their time in light activities such as sitting, sleeping, and watching television than a matched group of thin women. The thin subjects used one-sixth more energy than the overweight women, despite the fact that obese people use more calories per movement because of the extra work involved in moving their extra weight (Ferguson, 1976). Photographic time-motion studies showed that the average obese adolescent girl expends far less energy than the average non-obese adolescent during scheduled exercise periods (Carrera, 1967).

Carrera (1967) compared 28 obese high school girls with 28 average-weight controls and reported that the obese girls ate less than the controls, but they spent two-thirds less time than the controls in physically active pursuits.

Bray (1980) indicated that the average caloric intake of Americans has decreased since 1900, though the incidence of obesity and overweight has increased. Changes in lifestyle, such as the replacement of walking

with the automobile, numerous labor-saving devices for work and home, and the proliferation of sedentary leisure-time activities, such as spectator sports and television viewing, have greatly reduced energy expenditures in many people.

Since research has shown that most obese individuals do not eat appreciably more than their normal-weight counterparts, severe calorie restriction could result in an inadequate intake of essential nutrients. Increased physical activity is the logical way to facilitate weight loss, along with a reasonable reduced-calorie diet. When exercise programs are suggested, the first obstacle encountered is the failure of the overweight person to realize how much exercise is necessary to produce a useful effect. Stuart and Davis (1972) asked a group of obese women to estimate the amount of exercise required to consume the caloric value of foods such as doughnuts, ice cream, and potato chips. These women underestimated the true amount of work required by 200 to 300 percent. Perhaps this is a reflection of the American culture which prizes convenience and expects vast return for very moderate exertion.

Schultz (1980) conducted a study of obese males in which they walked 1.5 - 3.2 miles per hour with a constant ten percent grade for 15 - 90 minutes for six weeks. They lost 11 - 13 pounds, increased high-density lipoprotein levels, and decreased fasting plasma glucose levels. The weight reduction was apparently accomplished with no change in diet.

Running is recommended as an excellent aerobic exercise for cardiovascular fitness and weight control. Running uses most of the larger muscles and expends more energy than pushups or driving a golf ball. Individuals in low fitness categories can expend almost as much energy as

a similarly sized, conditioned person for a given distance (Harger, 1974).

The caloric expenditure of running (approximately 100 calories per mile) seems small when compared to the calorie deficit of 3500 needed to lose one pound of fat. If exercise is made a part of one's lifestyle, however, one could lose ten pounds a year by exerting only one hundred extra calories daily with no change in food intake. Evidence suggests that exercise is not only necessary for an energy deficit, but it is also essential for proper appetite regulation (Bray, 1972). Continued physical activity is also necessary for proper weight maintenance because a reduction in weight reduces energy needs. The lower energy requirement may account for the frequent relapse in the treatment of obesity and the tendency to regain the lost weight (James & Trayhurn, 1977). This could be offset by greater energy expenditure with a change in lifestyle to more activity.

Exercise is beneficial for cardiovascular fitness. One survey showed that men who engaged in regular vigorous sports has less than one-half the incidence of coronary heart disease over an 8.5 year period, compared with sedentary controls (Morris, 1977). The American Heart Association has identified lack of exercise as one of the most significant risk factors in coronary heart disease, based on epidemiological studies (Majonnier, 1968). Proof of a direct relationship is difficult, however, because of the difficulties in isolating the influence of other factors. It is important that exercise be continued throughout life. Longevity of athletes is not greater than that of non athletes unless they exercise throughout life (Meyer, 1979).

Jokyl (1963) reported that at the age of 30, a person's basic energy needs are 10% less than that of a 15-year old. After the age of 30, one needs 7% fewer calories for each decade of life. Because decreased energy requirements can produce weight gain even if the person reduces caloric intake, daily exercise, in addition to decreasing food consumption, becomes important as a measure to counterbalance the decrease in basal energy requirements.

Methods of Assessing Intake

Two steps in measuring dietary adherence are to determine what is eaten and to assess how closely this amount approximates the dietary recommendation. An appropriate method for measuring food intake should be reporducible, valid, representative, and should reflect habitual food intake. Such a method should be feasible within the limitations of time and space imposed by the situation. Direct measurement of food intake is expensive, time-consuming, and is feasible only for small groups.

There are several problems with reproducibility. It is difficult to collect data frequently enough from a subject to account for the effects on food intake of the season, holidays, and other factors. Subjects also can have difficulty in estimating portion sizes accurately and in estimating the content of mixtures. Reliability denotes repeatability, or the degree of agreement between the data from repetitions of the dietary survey on the same persons or on random samples of the same population. Repeatability in surveys depends on intraindividual variation and on variability of measurement. If intraindividual variation and measuremeth error are random, there could be less chance of introducing bias in the mean value.

Methods of assessing food intake include the 24-hour recall, 7-day records, diet histories, food frequency lists, questionnaires, personal interviews, and government statistics of food consumption of large population groups.

Food records are often considered to be one of the most accurate methods for determining individual food intake, but they are also extremely time-consuming and expensive. Food recalls are shorter, faster, and less expensive. They are easier to administer and can be used with a larger number of individuals. Garn (1979) indicated that food records and dietary recalls generally give figures for group intakes within 10% of each other, and Gussovitz, Madden, and Wright (1978) considered the two methods to be comparable.

Bazzarre and Myers (1979) reported several studies in which the correlation coefficient between 7-day records and food frequency questionnaires was quite high, ranging from a low for some foods of .47 to .99 for other foods. They concluded that the correlation coefficient between nutrient scores for the two methods is "an encouragement in placing confidence in the short questionnaire" (p. 30).

Browe and Gofstein (1966) suggested the use of a questionnaire instead of a food record because a more accurate record of customary food intake is likely since there is no reason to alter food patterns if a day-to-day record is not involved. They also listed the advantages of using a questionnaire as ease of administration, relatively low cost, minimum need for specially trained personnel, and ease of application to large-scale surveys. Another advantage of a questionnaire over an interview, according to Browe and Gofstein, is that it reduces the bias

inherent in an interview; moreover, the time required to process a questionnaire is less.

Anthropometric Measurements and Body Composition

Several methods have been used to determine body composition, including body diameters and circumferences (Behnke, 1963), radioactivity to measure lean body mass (Roessler & Dunavant, 1967; Barter & Forbes, 1964), and water displacement to measure body density. Complicated and cumbersome techniques such as densitometry, hydrometry, and whole body potassium-40 methods are generally impractical except in experimental laboratory conditions. For population studies, estimation of body density and percentage of body fat have been done by a number of investigators through the use of predictive equations based on skinfolds and classical anthropometric measurements (Seltzer, Goldman & Mayer, 1965). These fat-predicting equations have the advantage of being based on measurements which are relatively easily done in the clinic or in large-scale field surveys. Seltzer et al. (1965) explored the relationship of body density to skinfolds and anthropometric measurements. Of the anthropometric measurements used in adolescent females, arm circumference had the highest correlation (-.632) with body density. Gross body weight had the next highest value (-.527). The highest correlation with weight was the triceps skinfold measure ($r = .795$). Body weight variation in the obese is apparently reflected more heavily in the upper arm and upper torso than in the abdomen and lower extremities, according to Seltzer et al. (1965). They found that the triceps skinfold is the best predictor of body density in obese adolescent girls. Triceps skinfold was found to give the highest correlation value with body density, which was determined by underwater weighing.

The upper arm is apparently the most representative site for the over-all deposition of fat in the obese. Not only did the triceps skinfold show the highest correlation with body density, but the upper-arm circumference was the anthropometric measure most highly correlated with body density and body weight in adolescent girls, according to the study conducted by Seltzer et al. (1965).

Edwards (1956) found that different observers tended to give slight but consistent differences in readings from one subject to another. Montase (1965) measured the body fat of 90% of a community of 9,500 people and found that skinfold measurements gave the best estimate of total body fat.

After consideration of the findings in this review of literature, the researcher decided to measure weight, triceps skinfolds, and mid-arm circumferences to assess changes in anthropometric measurements. Changes in eating and exercise habits were assessed by a lifestyle questionnaire and food frequency checklist.

CHAPTER III

METHODS AND PROCEDURES

The purpose of this research was to determine whether there were any differences in weight loss, triceps skinfolds, mid-arm circumferences, and change in eating and exercise habits between individuals who participated in a 3-day seminar and those who participated in a 6-week series of classes on weight control.

Research Design

The two groups compared were the 3-day seminar group and the 6-week series group. The format, or method of nutrition education, was the variable that was manipulated. Because the groups were nonrandomized, a quasi-experimental design was used. The independent variable, method of nutrition education, had two levels: 3-day seminar group and the 6-week series group.

The 3-day weight control seminar was conducted by the North Carolina Agricultural Extension Service in April, 1982. This seminar was an intensive program with emphasis on behavior modification, exercise, nutrition education using exchange lists, low-calorie cooking, clothing selection, hair styles, and make-up. At the end of the three days, the seminar participants signed a contract for the new behaviors they would adopt until they reached their goal. They were followed up monthly for three months with a letter from a home economics extension agent inquiring about their progress. Participants paid $60 each to attend. For this nutrition education program, 23 individuals were recruited to participate.

The second nutrition education program used in this study, a 6-week weight control series, was conducted in Davie County by a county home economics extension agent. The agent was trained by the researcher in the teaching methods and program content for this study. The program content was the same as in the 3-day series, including nutrition education, behavior modification, exercise, low-calorie cooking, and clothing selection. The major differences between the two methods were the program formats and the cost. The 6-week series consisted of weekly one-hour lectures followed by 30 minutes of exercise. There were 13 participants in this group who attended free of charge. (See Appendix B for a complete outline of both of the programs and information on procuring the teaching materials.)

The dependent variables, weight, triceps skinfolds, mid-arm circumferences, and change in eating and exercise habits, were measured in the beginning and at the end of four months after the beginning of treatment. Overall weight reflects total body weight, which includes both lean and fat tissue. Anthropometric measures were used to indicate changes in body composition. For weight loss to be maintained, eating and activity patterns need to be modified. A successful program generally results in the modification of lifestyle for more desirable eating and activity habits. An evaluation of these changes is important in determining the overall effectiveness of a program.

Selection of Subjects

The subjects in the study were 22 overweight Caucasian women from northwestern North Carolina who volunteered for an Extension-sponsored

weight control program. They were at least 18 years of age and had no medical problems that would have prevented them from participating in a diet and exercise program. Participants in the 3-day seminar group were volunteers from 15 different counties who paid $60 each to attend. Baseline data were collected on 23 subjects. Twelve subjects did not participate in the follow-up data collection. Some of the reasons for their non participation were dissatisfaction with the 3-day seminar, work commitments that did not permit them to take the time for this study, failure to lose weight, and being out of town at the time of final data collection. Final data were collected on 11 subjects at the end of the four months.

The 6-week series was held in Davie County because the agent volunteered to teach the program there. The subjects were local Caucasian women from Davie County who volunteered to participate in the program (free of charge). Baseline data on the 6-week series were collected from 13 subjects. Final data were collected on 12 subjects. The statistical treatment used in this study required that there be equal numbers of subjects in each group; therefore, one subject was randomly selected out of the 6-week series group to give two equal groups of 11.

Instrumentation and Procedure for Data Collection

The dependent variables were weight, triceps skinfold, mid-arm circumference, and change in eating and exercise habits. Weight was measured in pounds on a waist-level balance beam scale (see Appendix E for source). The same scale was used before and after treatment in each group. Triceps skinfolds were determined by using Lange calipers (see Appendix E for

source). The average of three readings was used. The agent performing the measurements in Davie County was trained in the use of the instruments by the researcher. The researcher collected all of the data on the subjects in the 3-day seminar group.

A food frequency checklist was administered, giving the average dietary intake, which was of interest in this study. The list was not exhaustive, but included the usual problem foods for dieters and those foods that should optimally be included in a prudent diet. The instrument was scored by subtracting the frequency score of each subject in the beginning of the program from the score at the end of the program. The individual scores were summed to give a group score which was then evaluated using the Wilcoxin matched-pairs signed-ranks test, which is a non parametric test that determines the amount of difference between pairs of observations and the direction of that difference. Separate tests were done on each of the two groups of foods. The first group of foods, which was to be increased in the weight reduction diet, included fruits, vegetables, eggs, skim milk, poultry, fish, and complex carbohydrates, such as cereals, potatoes, rice, and pasta. The second group of foods, which was to be decreased in the weight reduction diet, included whole milk, fried foods, fats, salad dressings, sauces, gravies, candy, sugar, carbonated beverages, alcoholic beverages, nuts, high-fat, salty snacks, beef, bacon, and sausage. The intent of the nutrition education program was for subjects to decrease significantly consumption of the problem foods and to increase consumption of the lower-calorie foods with high nutritive value.

A self-administered 10-item questionnaire that asked about usual eating and exercise habits was answered with the food frequency checklist. The questionnaire was pilot tested with a group of six graduate students in nutrition. It was also reviewed by two professionals who were experienced in nutrition research (see Appendix D for the Lifestyle Questionnaire and Food Frequency Checklist). The questionnaire was scored by comparing the response of each subject in the beginning of the experiment with her response at the end of the experiment. The responses were compiled, to give a group score. Percentage of change was calculated for each group in eating and exercise habits.

The agent involved in conducting the 6-week weight control program participated in a 1-day training program where she was trained in the use of the materials and procedures to be used in this study. The researcher developed the teaching materials and conducted the training session. All of the data were collected at the first meeting of each of the programs and again four months later, giving follow-up results of the two different methods.

Statistical Treatment

Data were analyzed to determine whether the two methods of nutrition education, the 3-day seminar and the 6-week series, resulted in significant differences in weight loss, triceps skinfold measures, mid-arm circumferences, or change in eating and exercise habits. Change in eating and exercise habits was analyzed descriptively and qualitatively, using the Lifestyle Questionnaire. Analysis of covariance was used to test hypotheses for weight, triceps skinfolds, and mid-arm circumferences where

age and beginning weights were covariates and changes in weight, triceps skinfolds, and mid-arm circumferences were dependent variables. The Wilcoxin matched-pairs signed-ranks test was used to analyze the change in eating habits reported on the food frequency checklist.

CHAPTER IV

RESULTS AND DISCUSSION

Description of Sample and Lifestyle

Baseline data were collected on 23 subjects in the 3-day seminar group and 13 subjects in the 6-week series group. Final data were collected on 22 female Caucasian subjects, with 11 subjects in each group. This sample was composed of subjects who chose to attend either a 3-day weight control seminar or a 6-week weight control series. A description of the subjects is summarized in Table 1.

Table 1

Description of Subjects

	6-weeks	3-days
Number in program	13	44
Number on which baseline data were collected	13	23
Number on which final data were collected	12	11
Mean age	61	52
Mean age subjects became overweight	42	36
Mean attempted diets last year	1.8	3
Number working outside the home	4	7

In the 3-day seminar group, 64% of the subjects worked outside of the home, with only 36% of the subjects from the 6-week series working outside of the home. The mean age of individuals in the 3-day seminar was 52, while the mean age of individuals in the 6-week series was 61. The mean age that the subjects became overweight was also different for the two groups. Individuals in the 6-week series group became overweight at the

mean age of 42, while those in the 3-day seminar group became overweight at the mean age of 36. Subjects in the 3-day seminar group had started on a diet an average of three times in the past year. The 6-week series subjects reported having started on a diet an average of 1.8 times in the past year.

The Lifestyle Questionnaire revealed that both groups had similar eating and exercise habits. Of the entire sample, 96% reported their daily activity level to be mildly active to very active; however, 50% of the total sample reported that they exercised less than one hour a week. Neither group reported any change in that pattern. Individuals in the 3-day seminar group reported skipping only breakfast, while the 6-week series group was evenly divided between skipping breakfast and lunch. In the 6-week series, 18% reported that they stopped skipping meals. There was no change in the 3-day seminar group. Only one subject in the 6-week series group initially reported planning ahead for what she would eat, while four subjects in the 3-day seminar group initially reported planning ahead for meals and snacks. Neither group reported any change in menu planning or advance planning of meals and snacks after the nutrition education program. Seventy-two percent of the subjects in the 6-week series reported that they were fast eaters, compared to 36% in the 3-day seminar group. Neither group reported any post-treatment change. Watching television was the activity during which 88% of the subjects regularly ate. There was no change reported there, so it is presumed that television snacking is a continual problem for the subjects in this study. The 6-week series resulted in an 18% decrease in subjects eating at fast-food

restaurants. There was no change in the 3-day seminar group. The lifestyle changes are summarized in Table 2 (see Appendix C for raw data).

Table 2

Lifestyle Changes

Change	Nutrition education program	
	6-week series	3-day seminar
	Percentage of participants	
Stopped skipping meals	18	0
Increased exercise	36	27
Began an active sport	18	9
Decreased eating at fast food restaurants	18	0

Note: N = 11 in each group

In every case where change in habits was reported, the 6-week series reported more change than did the 3-day seminar group.

Change in Eating Habits

The Wilcoxin matched-pairs signed-rank test was used to test hypothesis I.

Hypothesis I: There is no statistically significant difference in change in eating habits between subjects who participated in a 3-day seminar and a 6-week Extension-sponsored weight control series.

A two-tailed test was done and this hypothesis was rejected. The 6-week series group reported a significant increase in consumption of low-calorie foods that were high in nutritive value (p-value = .01). The foods that were increased most were fruits and fruit juices, green and yellow vegetables, poultry, and fish. There was no significant change (at the .05 level) in eating habits reported by the 3-day seminar group. The change that was reported, however, was negative. The subjects

decreased consumption of low-caloric foods that were high in nutritive value (p-value = .06). The foods that were consumed less were fruits and fruit juices and green and yellow vegetables (Appendix C).

Food frequency data were compiled on the four subjects who had lost at least eight pounds over the four months to see if there was any trend in eating habits. Three of those four subjects decreased consumption of fried foods, candy, sugar, bacon, sausage, potatoes, rice, and pasta. All four of the subjects decreased consumption of salty snacks such as potato chips and corn chips. Three of the four subjects increased consumption of poultry (Appendix C).

Anthropometric Measurements

Multivariate analysis of covariance was done on the three dependent variables, the differences in weight, triceps skinfolds, and mid-arm circumferences to test for hypothesis II.

Hypothesis II: There is no statistically significant difference in weight, triceps skinfolds, or mid-arm circumferences between subjects who participated in the 3-day seminar and a 6-week Extension-sponsored weight control series.

Age and beginning weight were the covariates. Table 3 lists the means of the anthropometric measurements. The difference in the beginning weights was a factor in selecting beginning weight as a covariate. There was little difference in mean weight loss between the two groups, with a weight loss of 4.46 pounds in the 6-week series group and a weight loss of 1.73 pounds in the 3-day seminar group.

Table 3

Means of Anthropometric Measurements

	6-week series	3-day seminar
Beginning weight (in lbs.)	162.73	146.73
Ending weight	158.27	145.00
Difference	4.46	1.73
Beginning MUAC (in cm)	31.2	28.9
Ending MUAC	31.0	29.0
Difference	.2	.9
Beginning TSF (in mm)	35.2	25.0
Ending TSF	35.5	23.0
Difference	-.3	2.0

NOTE: n = 11 in each group
MUAC = mid-upper arm circumference
TSF = triceps skinfolds

Multivariate analysis of covariance yielded a Wilks' lambda of .88, which corresponds to an F value of .66 with 3 and 15 degrees of freedom. This was not significant at the .05 level. Separate univariate analyses of covariance were done for each dependent variable, and none of the three analyses gave any significant differences between the groups. (See Appendix E.) Hypothesis II could not be rejected; therefore, there was no statistically signigicant difference in weight, triceps skinfolds, or mid-arm circumferences between subjects who participated in the 3-day seminar and a 6-week Extension sponsored weight control series.

Cost of Weight-Control Programs

The cost of the two weight-control programs was computed by figuring the salary and travel expenses for the professionals involved. It was found that the 3-day seminar cost $5154 for 44 participants. The 6-week

series cost only $450. Though this series only reached 13 participants, it could be conducted for a group of 50 at no extra cost in professional salary. Appendix A includes the procedure for computing the cost of these two programs.

Discussion

There was a great deal of variability between subjects in each group, which could account for there being no statistically significant differences in the anthropometric measures. Beginning weights ranged from 125 pounds to 210 pounds and the weight loss ranged from 23 pounds to a gain of seven pounds. The variability of the anthropometric measurements is summarized in Table 4.

Though the weight loss was not significant for the 6-week series, the subjects did lose four pounds in four months. They also significantly improved their eating habits. If this pattern were to continue, the subjects would have lost 12 pounds in a year and may eventually achieve normal weight. Changing eating patterns to lose weight is a slow process, but this kind of slow weight loss on a nutritious diet should be encouraged.

Where changes were reported, the 6-week series resulted in more favorable results than the 3-day seminar group in every case. The difference in the cost between the two programs ($4704) indicated that the 6-week series is a more cost-effective nutrition education method for change in eating habits.

Table 4

Variability of Anthropometric Measurements

	6-week series	3-day seminar
Beginning weight (in lbs.)		
Range	125-210	133-171
Standard deviation	23.58	12.07
Weight loss (in lbs.)		
Range	-7.0-23.0	-6.0-10.0
Standard deviation	8.75	4.40
Beginning MUAC (in cm)		
Range	27.0-45.0	24.0-32.0
Standard deviation	5.1	2.3
MUAC difference (in cm)		
Range	-1.0-1	-1.0-1
Standard deviation	.75	.60
Triceps skinfolds (in mm)		
Range	26.0-44.0	18.0-31.0
Standard deviation	6.32	4.44
TSF difference (in mm)		
Range	-10.0-4.0	-14-15
Standard deviation	4.0	7.3

NOTE: n = 11 in each group
MUAC = mid-upper arm circumference
TSF = triceps skinfolds

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this experimental study was to compare two nutrition education methods, a 3-day seminar and a 6-week series, to see if there were differences in changes in weight, triceps skinfolds, mid-arm circumferences, and eating and exercise habits. Data were collected at the beginning of each of the weight control programs and again four months later.

The sample consisted of 22 Caucasian women, with a mean age of 56 years, from northwestern North Carolina, who volunteered to participate in an Extension-sponsored program. Eating habits were evaluated by a 10-item questionnaire and food frequency checklist. Anthropometric measurements tested were weight, triceps skinfolds, and mid-arm circumferences.

A significant difference in eating habits was found in the 6-week series, with those subjects consuming significantly more low-caloric foods that were high in nutritive value (p-value = .01). There was no significant difference in habits reported by the 3-day seminar group, though there was negative change. The 3-day seminar subjects reported that they were eating fewer low-caloric foods that were high in nutritive value (p-value = .06).

No significant difference was found between the two groups on the anthropometric measurements that were investigated. Though not

statistically significant, the weight loss of four pounds in the 6-week series group was encouraging and, in the long term, could give desired results.

Conclusions

The following conclusions were drawn:

1. Neither method was effective in promoting significant long-term weight loss.

2. The 6-week series resulted in a significant increase in the consumption of low-caloric foods with high nutritive value (p-value = .01).

3. The 6-week series, costing approximately $450, was a more cost-effective method of nutrition education than the 3-day seminar, which cost $5154.

Recommendations

After consideration of the findings of this study, the writer offers these recommendations for development and study:

1. Follow up the subjects in the 6-week series for one year after the beginning of treatment to see if they have maintained the improved eating habits and if they continue to lose weight.

2. The use of an interactive computer program should be compared with a 6-week series to see if desired results can be obtained cost-effectively.

3. There seems to be some support for recommending the 6-week series as the preferred method for nutrition education, but more evaluation is needed before a final decision is made.

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APPENDIX A

COST OF WEIGHT CONTROL METHODS

COST OF WEIGHT CONTROL METHODS

THREE-DAY SEMINAR

Salary

Six professionals at $75 per day for three days at the seminar, three days planning, and one day for a reunion (based on salaries of $18,000 per year) = $3150.

Travel Expenses

Five trips to Camp Caraway (three planning sessions, one trip to the seminar and one trip for the reunion) for six agents to travel an average of 200 miles at $.25 per mile = $1500.

Overnight Expenses

Six agents spent three days at Camp Caraway at $28 per day = $504.

Summary of Expenses

Salary for six professionals	$3150
Travel expenses	1500
Overnight expenses	504
Total	$5154

NOTE: This estimate of expenses does not take into account the cost of the meeting place, honorariums paid to speakers or teaching materials used, since these costs were paid for in the fee charged the participants.

COST OF THE SIX-WEEK SERIES

Salary

One professional working six days (assuming each of the six classes took one full day to prepare for and to present) at $75 per day = $450.

Cost Comparison of the Two Methods

Three-day seminar	$5154
Six-week series	450

APPENDIX B

OUTLINE OF NUTRITION EDUCATION PROGRAMS

SLIM & SASSY

A SIX-WEEK WEIGHT CONTROL SERIES

Objectives

--To analyze fad diets and food fallacies.

--To outline a nutritious, low-calorie diet for oneself.

--To identify causes of overeating.

--To develop a physical fitness program for oneself.

Outline of Classes

1. Slim & Sassy--An Introduction to Weight Control
2. Vinegar, Grapefruit Juice, and Rolling Pins--A Look at Fad Diets and Food Fallacies
3. From Rabbit Food to Haute Cuisine--Low Calorie Cooking
4. Head Tricks--Psychological Aspects of Losing Weight
5. The Truth about Exercise--What It Will and Won't Do
6. Teach an Old Dog New Tricks--Behavior Modification

For a complete list of program materials, write to:

Specialist in Charge
Foods & Nutrition
N. C. Cooperative Extension Service
Ricks Hall Annex
North Carolina State University
Raleigh, North Carolina 27607

POUNDS AWAY AT CARAWAY

THREE-DAY SEMINAR

Objectives

--To analyze fad diets and food fallacies.

--To outline a nutritious, low-calorie diet for oneself.

--To identify causes of overeating.

--To develop a physical fitness program for oneself.

Outline of Classes

1. Customizing Your Meal Planning--Weight Reduction Diet
2. Make a Pretty Picture--Skin Care and Make-up
3. No-Body's Perfect--Aesthetics for Clothing Selection
4. Behavior Modification
5. Dancercise and Exercise
6. Feeling Good about Yourself--Enhancing Self-Concept
7. Fad Diets
8. Low Calorie Cooking
9. Your Crowning Glory--Hair Care
10. The Lunch Dilemma

For a complete list of program materials, write to:

Specialist in Charge
Foods & Nutrition
N. C. Cooperative Extension Service
Ricks Hall Annex
North Carolina State University
Raleigh, North Carolina 27607

APPENDIX C

TABLES

Table A

Lifestyle Questionnaire Results

	6-weeks		3-days	
	Before	After	Before	After
1. Number who planned weekly menus	0	0	4	4
2. Number planning ahead for what they would eat	1	1	4	4
3. Frequency of meal skipping				
Breakfast	3	3	7	7
Lunch	3	1	0	0
Dinner	0	0	0	0
Hardly ever skip meals	5	7	4	4
4. Daily physical activity				
Mostly sedentary	0	0	1	1
Mildly active	7	7	5	5
Very active	4	4	5	5
Heavy physical activity	0	0	0	0
5. Number participating in sports	1	3	2	3
6. Time spent exercising				
Less than 1 hr. per week	5	1	6	3
1-3 hrs. per week	4	8	4	7
Over 3 hrs. per week	2	2	1	1
*7. Activities accompanied by eating				
Watching TV	9	9	9	9
Talking on the phone	0	0	0	0
Reading or writing	1	1	1	1
Riding in the car	1	1	0	0
Visiting with friends	0	0	3	3
8. Number of fast eaters	8	8	4	4
9. Frequency of eating at fast food restaurants				
Almost never	6	8	4	4
1-2 times a week	4	2	5	5
3-5 times a week	1	1	2	2
More than 5 times a week	0	0	0	0

*More than one answer could be chosen, resulting in a sum that may not add up to 11.

	6-weeks		3-days	
	Before	After	Before	After
10. Frequency of taking lunch to work:				
Almost never	4	4	4	4
1-2 times a week	1	1	0	0
3-5 times a week	0	0	2	2
More than 5 times a week	0	0	0	0
Not applicable	6	6	5	5

NOTE: n = 11 in each group (before and after)

Table B

Food Frequency Questionnaire Results

Six-Week Series

The eating frequency is:

1. Eaten daily or almost every day
2. Eaten 3-4 times a week
3. Eaten approximately once per week
4. Eaten once or twice a month
5. Seldom or never eaten (less than once a month or not at all)

Foods	Frequency Before					After				
	1	2	3	4	5	1	2	3	4	5
Fruits or fruit juice	10	0	1	0	0	11	0	0	0	0
Green & yellow vegetables	1	5	3	2	0	3	4	4	0	0
Other vegetables	4	4	3	0	0	5	4	2	0	0
Breakfast cereals	1	4	2	1	3	1	2	5	2	1
Potatoes, rice, pasta	1	5	3	2	0	0	4	4	1	2
Eggs	2	5	1	3	0	3	2	3	3	0
Skim milk	4	2	1	0	4	4	0	1	1	5
Whole milk	0	2	3	0	6	0	3	1	0	7
Fried foods	1	4	3	1	2	0	2	5	1	3
Butter or margarine	6	3	2	0	0	3	4	2	2	0
Oils & other fats	2	5	3	1	0	2	1	5	2	1
Salad dressings	0	7	2	2	0	0	5	1	4	1
Sauces & gravies	0	1	3	4	3	0	0	3	2	6
Candy, sugar	4	2	2	0	3	2	2	1	2	4
Carbonated beverages	1	2	3	0	5	0	0	2	3	6
Alcoholic beverages	0	0	0	1	10	0	0	0	0	11
Nuts	0	1	0	4	6	0	1	0	3	7
Salty snacks*	1	2	1	2	4	0	1	0	6	4
Beef or pork	1	3	6	1	0	0	2	7	1	1
Bacon or sausage	0	4	5	1	1	0	2	3	2	3
Chicken or turkey	0	4	5	2	0	0	6	1	4	0
Fish	1	0	7	3	0	1	2	7	1	0

NOTE: n = 11 in each group (before and after)

*salty snacks refers to potato chips, corn chips, etc.

Table C

Food Frequency Questionnaire Results

Three-Day Seminar

The eating frequency is:

1. Eaten daily or almost every day
2. Eaten 3-4 times a week
3. Eaten approximately once per week
4. Eaten once or twice a month
5. Seldom or never eaten (less than once a month or not at all)

Foods	Frequency									
	Before					After				
	1	2	3	4	5	1	2	3	4	5
Fruits or fruit juice	10	0	0	1	0	7	3	0	1	0
Green & yellow vegetables	5	3	2	1	0	4	5	0	2	0
Other vegetables	3	6	1	0	1	2	6	3	0	0
Breakfast cereals	4	1	4	1	1	4	1	4	1	1
Potatoes, rice, pasta	1	4	4	1	1	1	4	3	2	1
Eggs	2	5	2	1	1	1	6	3	0	1
Skim milk	2	2	3	1	3	3	1	3	0	4
Whole milk	4	0	0	0	7	3	1	0	0	7
Fried foods	3	2	3	1	2	4	1	3	1	2
Butter or margarine	9	0	2	0	0	6	2	2	0	1
Oils & other fats	3	2	2	2	2	3	1	3	1	3
Salad dressings	1	5	2	1	2	2	3	2	1	3
Sauces & gravies	0	2	3	3	3	0	1	3	4	3
Candy, sugar	2	1	1	3	4	2	1	3	3	2
Carbonated beverages	0	3	0	1	7	3	1	0	1	6
Alcoholic beverages	0	1	2	1	7	0	2	1	1	7
Nuts	0	0	2	4	5	0	2	1	2	6
Salty snacks*	0	0	2	4	5	0	2	1	2	6
Beef or pork	3	4	3	1	0	0	6	4	1	0
Bacon or sausage	0	3	4	2	2	0	3	5	1	2
Chicken or turkey	1	6	3	1	0	0	8	3	0	0
Fish	1	6	3	1	0	0	8	3	0	0

NOTE: n = 11 in each group (before and after).

*salty snacks refers to potato chips, corn chips, etc.

Table D

Food Frequency Results of Subjects Who Lost

Eight Pounds or More

The eating frequency is:

1. Eaten daily or almost every day
2. Eaten 3-4 times a week
3. Eaten approximately once per week
4. Eaten once or twice a month
5. Seldom or never eaten (less than once a month or not at all)

	Frequency									
	Before					After				
Foods	1	2	3	4	5	1	2	3	4	5
Fruits or fruit juice	4	0	0	0	0	4	0	0	0	0
Green & yellow vegetables	0	2	1	1	0	1	2	1	0	0
Other vegetables	0	3	1	0	0	2	1	1	0	0
Breakfast cereals	1	3	0	0	0	1	1	1	1	0
Potatoes, rice, pasta	0	2	1	1	0	0	0	3	0	1
Eggs	0	2	2	0	0	0	3	1	0	0
Skim milk	2	2	0	0	0	3	0	0	0	1
Whole milk	0	0	0	0	4	0	0	0	0	4
Fried foods	0	3	1	0	0	0	1	2	0	1
Butter or margarine	2	0	2	0	0	1	2	1	0	0
Oils & other fats	1	2	0	1	0	1	0	3	0	0
Salad dressings	0	1	2	1	0	0	1	2	1	0
Sauces & gravies	0	0	3	1	0	0	0	2	1	1
Candy, sugar	3	1	0	0	0	0	1	0	2	1
Carbonated beverages	0	3	0	0	1	0	1	1	1	1
Alcoholic beverages	0	0	0	0	4	0	0	0	0	4
Nuts	0	0	0	2	2	0	0	0	1	3
Salty snacks*	1	2	0	1	0	0	0	0	3	1
Beef or pork	1	2	1	0	0	0	2	2	0	0
Bacon or sausage	0	1	2	1	0	0	0	3	0	1
Chicken or turkey	0	1	3	0	0	0	3	0	1	0
Fish	0	0	3	1	0	0	1	3	0	0

NOTE: n = 4 (3 were from the 6-week series and 1 was from the 3-day seminar)

*salty snacks refers to potato chips, corn chips, etc.

Table E

Analysis of Covariance for Pounds Difference

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F	p-value
Age of subjects	1	67.03	67.03	1.60	
Beginning weight	1	176.62	176.62	4.20	
SS Between	1	12.29	12.29	0.29	.60
SS Within (Error)	17	712.91	41.94		
SS Total	20	999.81			

NOTE: SS = sum of squares

n = 11 in each group

Table F

Analysis of Covariance for Mid-Arm

Circumference Difference

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F	p-value
Age of subjects	1	.15	.15	0.30	
Beginning weight	1	.22	.22	0.42	
SS Between	1	1.13	1.13	2.18	.16
SS Within (Error)	17	8.86	.52		
SS Total	20	10.00			

NOTE: SS = sum of squares

n = 11 in each group

Table G

Analysis of Covariance for Triceps

Skinfold Difference

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F	p-value
Age of subjects	1	66.05	66.05	1.83	
Beginning weight	1	9.24	9.24	0.26	
SS Between	1	0.03	0.03	0.00	.10
SS Within (Error)	17	613.29	36.07		
SS Total	20	712.28			

NOTE: SS = sum of squares

n = 11 in each group

APPENDIX D

LIFESTYLE QUESTIONNAIRE

AND

FOOD FREQUENCY CHECKLIST

LIFESTYLE QUESTIONNAIRE

Directions: Choose the appropriate answer and write the number of the answer in the blank provided.

1. Do you plan your weekly menus?
   ____1. Yes ____2. No

2. Do you plan what you will eat each day before you eat it:
   ____1. Yes ____2. No

3. I often skip the following: (Choose as many as necessary.)
   ____1. Breakfast
   ____2. Lunch
   ____3. Dinner
   ____4. I hardly ever skip meals

4. Describe your daily physical activity: (Choose one.)
   ____1. Mostly sedentary
   ____2. Mildly active. Some walking, moving about.
   ____3. Very active. Little sitting.
   ____4. Much heavy physical activity. Lifting, moving heavy objects.

5. How much do you exercise? (Choose one.)
   ____1. Less than one hour a week.
   ____2. 1 - 3 hours a week.
   ____3. Over 3 hours a week.

6. Do you participate in any sports regularly (including jogging)?
   ____1. Yes ____2. No

7. Check the activities during which you often eat (at least once a week).
   ____1. Watching TV
   ____2. Talking on the phone
   ____3. Reading or writing
   ____4. Riding in the car
   ____5. Visiting with friends

8. I am a fast eater. (Choose one.)
   ____1. True ____2. False

9. How often do you eat at a fast food restaurant?
   ____1. Almost never
   ____2. One or two times a week
   ____3. Three to five times a week
   ____4. More than five times a week

10. How often do you take your lunch to work:
    ____1. Almost never
    ____2. One or two times a week
    ____3. Three to five times a week
    ____4. More than five times a week
    ____5. Not applicable

FOOD FREQUENCY

Directions: Write the number in the blank beside the food that corresponds to the frequency that you eat it.

The eating frequency is:

1. Eaten daily or almost every day
2. Eaten 3-4 times a week
3. Eaten approximately once per week
4. Eaten once or twice a month
5. Seldom or never eaten (less than once a month or not at all)

1. ____Fruits or fruit juice
2. ____Dark green & yellow vegetables (squash, broccoli, carrots, etc.)
3. ____Other vegetables (corn, peas, beans, cabbage, beets, lettuce, etc.)
4. ____Breakfast cereals
5. ____Potatoes, rice, pasta
6. ____Eggs
7. ____Skim milk
8. ____Whole milk
9. ____Fried foods
10. ____Butter or margarine
11. ____Oil or shortening, sour cream
12. ____Salad dressings
13. ____Sauces & gravies
14. ____Candy, sugar
15. ____Carbonated beverages (not diet drinks)
16. ____Beer, wine, liquor
17. ____Nuts
18. ____Salty snacks (corn chips, potato chips, etc.)
19. ____Beef or pork
20. ____Bacon or sausage
21. ____Fish, including tuna and shellfish
22. ____Chicken or turkey

Name_____County_____Phone_____

Address_____

Do you work outside the home?_____What is your age?_____

At what age did you first become overweight?_____

How many times have you started on a diet in the past year?_____

Weight_____ Triceps Skinfold_____ MUAC_____

NOTE: Foods 1-7 and 21 & 22 were the low-calorie foods with high nutritive value.

APPENDIX E

SOURCES OF MEASUREMENT INSTRUMENTS

Sources of Measurement Instruments

Lange Calipers, No. HH4-8

Cambridge Scientific Industries
P. O. Box 265
Cambridge, Maryland 21613

Waist-Level Balance Beam Scale No. 96 A 645 ON

Sears Catalog Distribution Center
Greensboro, North Carolina 27408