1988


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Effectiveness of the healthy weight workshop on weight management practices of paraprofessional personnel of the Cooperative Extension Service

Reames, Elizabeth S., Ph.D.
The Louisiana State University and Agricultural and Mechanical Col., 1988
EFFECTIVENESS OF THE HEALTHY WEIGHT WORKSHOP ON WEIGHT MANAGEMENT PRACTICES OF PARAPROFESSIONAL PERSONNEL OF THE COOPERATIVE EXTENSION SERVICE

A Dissertation

Submitted to the Graduate Faculty of the Louisiana State University and Agricultural and Mechanical College in partial fulfillment of the requirements for the degree of Doctor of Philosophy in The School of Vocational Education

by

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ABSTRACT

This study was designed to investigate the effects of participation by black female paraprofessionals in a weight management workshop on selected indices including dietary intake, nutrition knowledge, exercise practices, eating behaviors, anthropometric measurements and sick leave hours used. Nineteen subjects from one urban site were selected to participate in the workshop and 18 subjects from another urban site served as the comparison group. Data were collected from both groups one week before, one week after and six months following the workshop.

Measurements obtained before the workshop showed that the two groups had similar characteristics and pretest scores. Anthropometric measurements indicated that both groups were obese, with an average weight of 185 pounds for the comparison group and 190 pounds for the treatment group.

Immediately following the workshop, significant improvements were noted for the treatment group in dietary intake, nutrition knowledge, exercise practices and eating behaviors. No significant changes were noted for the comparison group. Comparison of measurements between the two groups indicated that the treatment group's dietary intake, nutrition knowledge and exercise practices were significantly better than those of the comparison group.

The treatment group showed several significant improvements including dietary intake, nutrition knowledge, weight and BMI when measurements at six months were compared to those immediately following the workshop. When measurements at six months were compared to those immediately preceding the workshop, significant improvements were noted.
for the treatment group on seven of the eight measurements including dietary intake, nutrition knowledge, exercise practices, eating behaviors, weight, BMI and sick leave hours used. No significant improvements were found for the comparison group at either measurement period.

Comparison of the two groups six months after the workshop indicated that the treatment group had significantly better measurements for dietary intake, nutrition knowledge, exercise practices, eating behaviors, weight and BMI than the comparison group.

Based on these findings, it was concluded that participation in the workshop resulted in improvement of selected indices related to weight management for these subjects.
Chapter 1
INTRODUCTION

Justification

One of the Dietary Guidelines for Americans published by the United States Department of Agriculture and the United States Department of Health and Human Services is "Maintain Desirable Weight" (1). Obesity (greater than 20 percent above desirable weight) has long been related to poor health and is a potential killer (2). Obesity is now considered to be a chronic disease and is also either a direct cause of or risk factor for many other major chronic diseases, including heart disease, high blood pressure, diabetes, stroke and cancer (3).

Estimates from nutrition surveys suggest that about 25 percent of Americans are obese (20 percent or greater than desirable weight) and half probably weigh more than they should for optimal health (3). The National Center for Health Statistics indicates that 39 percent of men and 50 percent of women are 10 percent or more overweight after age thirty (4).

Obesity occurs in all strata of the population. In industrialized countries the prevalence of obesity increases with decreasing socioeconomic status (5). Obesity is reported to be six times more common among members of the lowest socioeconomic class as compared to the highest (2). National Health and Nutrition Examination Survey (NHANES) data have shown that the prevalence of obesity in American women is much higher among those below the poverty line (6). There is also a virtual epidemic of obesity among middle-aged black women; 60 percent between the ages of 45 and 55 years are obese as compared with
30 percent of white women in the same age range and 25 percent of the population as a whole (2).

A study of the literature from 1960-1984 reported that nutrition education needs of blacks were greater than those of non-blacks in relation to the dietary guidelines. This study also reported that blacks had significantly more diet-related health problems, including obesity, heart disease, diabetes and high blood pressure than non-blacks (7).

A division of the Louisiana Cooperative Extension Service that employs primarily low-income women is the Expanded Food and Nutrition Education Program (EFNEP). Approximately 150 nutrition aides (98 percent of whom are black) are employed to work with low-income homemakers and youth in Louisiana. Nutrition aides are generally indigenous to the population with whom they work and serve as role models for homemakers participating in the program (8). They demonstrate principles and techniques to guide program participants in sound nutritional practices that will lead to improved quality of diets.

Women in lower income levels who have been reported to have increased incidence of overweight may lack resources to participate in community-based or private ownership weight control programs. Traditionally weight control programs of the Louisiana Cooperative Extension Service have been targeted for homemaker club members and middle-income groups. Therefore, a weight control program designed for low-income women and presented to EFNEP nutrition aides may help to promote achievement of desirable weight, improved dietary and exercise habits, reduced incidence of chronic disease and decreased absenteeism from work because of illness by these paraprofessionals. Subsequently the benefits may be seen in the EFNEP homemakers themselves.
Problem Statement

The purpose of this study was to investigate the effects of participation in the Louisiana Cooperative Extension Service Healthy Weight Workshop on the diet, eating behaviors, exercise practices, anthropometric measurements, nutrition knowledge and absenteeism from work of EFNEP nutrition aides.

Objectives:

Specific objectives formulated for the study included:

1. To describe EFNEP nutrition aides on the characteristics of length of service, educational level, age and prior participation in a weight control program.

2. To compare the PRE and POST measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop on the following variables:
   (a) conformity to optimal dietary intake
   (b) nutrition knowledge
   (c) weight
   (d) body mass index
   (e) percent body fat
   (f) exercise
   (g) eating behaviors.

3. To compare the PRE and POST measurements of EFNEP nutrition aides who did not participate in the Healthy Weight Workshop on the following variables:
   (a) conformity to optimal dietary intake
   (b) nutrition knowledge
(c) weight
(d) body mass index
(e) percent body fat
(f) exercise
(g) eating behaviors.

4. To compare the POST and DELAYED measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop on the following variables:
(a) conformity to optimal dietary intake
(b) nutrition knowledge
(c) weight
(d) body mass index
(e) percent body fat
(f) exercise
(g) eating behaviors.

5. To compare the POST and DELAYED measurements of EFNEP nutrition aides who did not participate in the Healthy Weight Workshop on the following variables:
(a) conformity to optimal dietary intake
(b) nutrition knowledge
(c) weight
(d) body mass index
(e) percent body fat
(f) exercise
(g) eating behaviors.

6. To compare the PRE and DELAYED measurements of EFNEP
nutrition aides who participated in the Healthy Weight Workshop on the following variables:
(a) conformity to optimal dietary intake
(b) nutrition knowledge
(c) weight
(d) body mass index
(e) percent body fat
(f) exercise
(g) eating behaviors
(h) hours of sick leave used.

7. To compare the PRE and DELAYED measurements of EFNEP nutrition aides who did not participate in the Healthy Weight Workshop on the following variables:
(a) conformity to optimal dietary intake
(b) nutrition knowledge
(c) weight
(d) body mass index
(e) percent body fat
(f) exercise
(g) eating behaviors
(h) hours of sick leave used.

8. To compare the POST measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop with those who did not participate on the following variables:
(a) conformity to optimal dietary intake
(b) nutrition knowledge
9. To compare the DELAYED measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop with those who did not participate on the following variables:
(a) conformity to optimal dietary intake
(b) nutrition knowledge
(c) weight
(d) body mass index
(e) percent body fat
(f) exercise
(g) eating behaviors
(h) hours of sick leave used.

Significance

Since the incidence of obesity is a tremendous problem in lower income women, especially black women, a workshop designed to help low-income, paraprofessional women achieve desirable weight through eating nutritious, low-calorie foods, increasing physical activity and making changes in habits leading to obesity could be of significance for the following reasons:

The series would give a previously unreached audience the opportunity to participate in a program designed to achieve desirable weight.
Participation in the program may help to decrease incidence of chronic diseases and, concomitantly, health care costs and absenteeism from work.

The program conforms with guidelines from recognized health organizations and institutions in promoting achievement and maintenance of desirable weight.

Participation may help to improve dietary intake of essential nutrients by EFNEP nutrition aides.

Participation by EFNEP nutrition aides in the program would follow national EFNEP leadership guidelines which recommend providing training to improve dietary intake of the paraprofessionals including optimal caloric level and special nutrient needs. This training would result in increasing nutrition knowledge and improving dietary and exercise practices of the nutrition aides.

The program series could be used with similar groups such as teachers' aides, nurses' aides and other paraprofessionals. The program could also be used with EFNEP program participants.

Participation in the series may improve EFNEP nutrition aides' effectiveness in working with client groups. Intensive training on the subject of weight control will enable nutrition aides to better understand, practice and teach the concepts of maintaining desirable weight. EFNEP nutrition aides serve as role models for the low-income homemakers with whom they work (8). Compliance with recommended practices for maintaining desirable weight by the nutrition aides would help to set an example for their homemakers to follow and might lead to changes in the homemakers themselves.
**Definitions**

**EFNEP** - Expanded Food and Nutrition Program - a federally funded program designed to help low income groups achieve better nutritional status.

**Nutrition aides** - paraprofessionals, indigenous to clientele served, employed by the Louisiana Cooperative Extension Service to work with low-income homemakers and youth in promoting good nutrition.

**PRE** - Designated as the week immediately preceding the beginning of the Healthy Weight Workshop in which measurements were obtained for the experimental and comparison groups.

**POST** - Designated as the week immediately following the last session of the Healthy Weight Workshop in which measurements were obtained for the treatment and comparison groups.

**DELAYED** - Designated as the week occurring six months after the last session of the Healthy Weight Workshop in which measurements were obtained for the treatment and comparison groups.
Chapter II
REVIEW OF RELATED LITERATURE

Introduction

Obesity is reported to be the most common form of malnutrition in the developed countries of the world and America's number one health problem (2). Obesity, a declared disease, is a major public health problem because of its association with many chronic degenerative diseases, including heart disease, high blood pressure, diabetes, stroke and cancer (2,3,4). Along with increased health risks, psychological disorders and social discrimination are associated with obesity (5).

Hegsted (3), in the 1985 W.O. Atwater Memorial Lecture, challenged nutrition researchers to look for findings that would promote better control of the serious chronic diseases, including obesity. Other researchers have called for research in the relationship of diet to the treatment of obesity (2,9).

Definition of Obesity and Overweight

Obesity is defined as the excessive storage of adipose tissue and is usually considered to be 20 percent or greater above desirable weight as designated by the 1959 and 1983 Metropolitan Life Insurance Tables (10). This weight correlates with a body mass index (BMI = body weight in kg divided by height in m$^2$) of 27.8 for men and 27.3 for women (11, 12). BMI is a useful tool because it has a high correlation with body weight and almost no correlation with height (13). Overweight has been defined as 10 to 20 percent above desirable weight (14).

Adipose tissue is a normal constituent of the human body that serves the important function of storing energy as fat for mobilization in
response to metabolic demands. Excess fat accumulation is associated with increased fat cell size, and in individuals with extreme obesity, fat cell numbers are also increased. The net effect of etiologic mechanisms leading to obesity, although still not fully clarified, leads to an imbalance between energy intake and expenditure. Both genetic and environmental factors are thought to be involved in the pathogenesis of obesity. These include excess caloric intake, decreased physical activity, and metabolic and endocrine abnormalities (11).

Health Implications of Obesity

Panelists of the National Institutes of Health Consensus Development Conference on Health Implications of Obesity (11) stated that an increase in weight of 20 percent or more above desirable body weight constitutes an established health hazard. Significant health risks at levels of overweight less than the 20 percent above desirable weight defined as obesity can also present hazards, especially in the presence of diabetes, hypertension, heart disease and other chronic conditions.

Cardiovascular Disease. Heart disease and cerebrovascular disease rank first and third, respectively, in leading causes of death in the United States (15). Obesity has been shown to be a significant independent predictor of cardiovascular disease (16). Weight gain has been reported to be the first step in a chain of events that leads to increased morbidity and mortality from cardiovascular disease (17). Intervention studies confirm that high blood pressure and elevated levels of serum cholesterol, risk factors associated with cardiovascular disease, can be decreased by weight reduction (11).

The most comprehensive data on prevalence of cardiovascular disease risk factors and obesity are the National Health and Nutrition
Examination Surveys (NHANES I, 1971-1974, and NHANES II, 1976-1980) (6). Analysis of data from NHANES II showed a strong association between the prevalence of obesity and cardiovascular risk factors. The prevalence of hypertension (blood pressure higher than 160/95) was 2.9 times higher for the overweight than for the nonoverweight. The prevalence was 5.6 times higher for young overweight persons (20 through 44 years old) than for nonoverweight subjects in this age group. The prevalence was twice as high for obese older adults (45 through 74 years old) than it was for nonoverweight subjects of the same age. The incidence of hypercholesterolemia (blood cholesterol over 250 mg/dl) in the young overweight age group was 2.1 times that of the nonoverweight group. A similar prevalence of hypercholesterolemia after age 45 was also shown for overweight subjects as compared to nonoverweight subjects (11).

Data from the Framingham Study, a large, general population-based study having long duration follow-up data, showed an increasing risk of coronary artery disease with increasing levels of obesity, independent of other risk factors (11).

Other recent studies indicate that the patterning of fat deposits may be a better predictor of coronary artery disease than the degree of obesity. Excess abdominal or upper body fat is more active metabolically and more often related to disease than are fat deposits in the thigh or gluteal areas. Risk increases sharply with waist to hip circumference ratios more than 1 for men and 0.8 for women (14).

Diabetes. Diabetes is the disease most closely associated with obesity. The prevalence of reported diabetes is 2.9 times higher in overweight than nonoverweight persons according to NHANES data.
Noninsulin-dependent diabetes mellitus appears to be an inherited disease; however, studies clearly show that weight reduction can reverse the abnormal biochemical characteristics of noninsulin-dependent diabetics (11). These include impaired glucose tolerance and decreased cell sensitivity to insulin (15).

Cancer. Numerous epidemiological studies (11) have linked obesity and site-specific malignancies. One of the largest, the American Cancer Society Study involving more than 1 million men and women, showed increased mortality for obese persons with cancer. Obese males, regardless of smoking habits, had a higher mortality from cancer of the colon, rectum and prostate. Obese females had a higher mortality from cancer of the gallbladder, biliary passages, breast (post-menopausal), uterus (including both cervix and endometrium) and ovaries. In the case of endometrial cancer, women with marked obesity showed the highest relative risk (5.4 times as great) compared to the nonobese.

Longevity. Panel participants involved in a workshop sponsored by the National Institutes of Health Nutrition Coordinating Committee and the Centers for Disease Control concluded that in the United States below average weights tend to be associated with the greatest longevity, if such weights are not associated with history of concurrent illness, malnutrition, smoking, alcoholism or drug abuse (9). Significant evidence showed that body weights in excess of those listed in the 1959 Metropolitan Life Insurance Tables are associated with increased mortality (14). Concern has also been expressed about more moderate degrees of overweight, even five to ten pounds (2).

Evidence has been evaluated from four longitudinal insurance studies, the Framingham 30-year Follow-up Study and the American Cancer
Society Study which showed the greater the degree of overweight, the higher the mortality ratio. Mortality ratio was also found to increase with length of follow-up for obese persons (11).

A recent review of 25 major studies (18) showed that minimum mortality in the United States occurs at weights 10 percent or less than average. Previous reports from these studies had underestimated the impact of obesity on death rates. Each study was said to have had at least one of three biases which led to this underestimation of obesity's impact on increased death rates including smoking, loss of weight from illness or disease and other factors such as hypertension and hyperglycemia.

**Gallbladder Disease.** There is considerable evidence linking gallbladder disease with obesity at all age levels. The prevalence of the disease seems to rise with increasing obesity and age. However, according to data, even relatively young women, ages 25 to 34, have shown a strong positive correlation between degree of overweight and prevalence of gallbladder disease (19).

**Osteoarthritis.** Obesity increases stress on weight-bearing structures of the body, and degenerative joint disease is more common among obese persons than among nonobese persons. Obesity has been associated with osteoarthritis of the knees, hips, feet and lumbar spine. Additional findings showed an association of obesity with osteoarthritis in the fingers and/or the sternoclavicular joint (20).

Data from the National Health and Nutrition Examination Survey (20) were reviewed to determine whether obesity is associated with osteoarthritis. The results suggested that the additional mechanical stress resulting from obesity is the principal reason for the association
between obesity and osteoarthritis. Data obtained from women in the Framingham Study (19) indicated that the crude relative risk for osteoarthritis in women was 55 percent greater in the severely obese group (85 percent above desirable weight) than in the group with the lowest weight (10 percent overweight).

**Menstruation and Pregnancy.** Rimm and White (19) reported findings of a study involving 36,081 women that associated obesity with heavy menstrual flow, excess facial hair, irregular length of menstrual cycles and longer than average menstrual cycles. They also presented evidence that associated obesity with impaired ovarian function, showing pathologic changes in the ovaries of women with morbid obesity.

Obesity in pregnant women often increases the risk of complications during pregnancy (21). Peckenham and Christiansen (22) investigated the influence of body weight before pregnancy and weight gain during pregnancy on the course of labor. Toxemia and hypertension were more prevalent in the most overweight group of women.

Garbaciak (23) reported that obesity did not affect the perinatal mortality rate but did increase the likelihood of Cesarean delivery. In addition, Garbaciak reported that obese and morbidly obese women were at a significantly higher risk for hypertension, preeclampsia, diabetes mellitus and urinary tract infections.

**Anesthesia.** Obese patients may also face a greater risk of morbidity and mortality during surgery than patients of normal weight. Four main problems which may occur in obese patients during surgery include the following:

1. problems related to airway management and vascular access;
2. increased risk of aspiration pneumonitis because of lower than normal pH of gastric fluid in the fasting obese patient, increased intraabdominal pressure, and a higher incidence of hiatal hernia with reflux of gastric contents;

3. alterations in drug metabolism and

4. oxygenation (24).

**Psychological Consequences.** Obesity creates an enormous psychological burden which, in terms of suffering, has been reported to be possibly the greatest adverse effect of obesity (11). Measurements of obese patients using the Minnesota Multiphasic Personality Inventory had suggested mild elevations in depression, hypochondriasis, hysteria and impulsiveness as reported by Wadden and Stunkard (25) Because control groups were not included for comparison, however, the researchers reported that the degree of psychologic disturbance in obese patients may have been misrepresented.

Although emotional disturbances have been associated with obesity, recent reports (25,26) suggest that these emotional disturbances are most likely the consequence and not the cause of obesity, and that discrimination directed at overweight persons may lead to the disturbance. Stewart and Brook (26) in a study of 5,817 persons found that obese persons were less anxious and depressed than normal-weight persons. Wadden and Stunkard (25) concluded that results of objective testing and psychiatric interviews indicated that obese patients generally reported no greater degree of psychiatric disturbance than nonobese control subjects refuting the long-standing belief that overweight persons suffer from serious emotional disturbances.
The conclusion cannot be made, however, that obese persons are free from psychologic problems. Many overweight persons may experience adverse emotional effects that cannot be measured using standard personality and psychopathology inventories. These effects are likely to involve weight-specific problems including a lack of confidence caused by the inability to maintain weight loss or a sense of isolation caused by the failure of family and friends to understand the frustration of a weight problem. Clinicians believe women, adolescent girls and morbidly obese persons suffer the most (25).

Strong prejudice against obese persons exists in this country, regardless of their age, sex, race or socioeconomic status. According to Wadden and Stunkard (25) children and adults rate the obese child as the least likable. The obese person is discriminated against in many settings, including college, the work place, the armed services, and police and fire departments (25). A person who is obese is perceived to be less desirable as an employee by prospective employers even if he or she is acknowledged to have the same ability as a normal-weight person. Male graduates of Pittsburgh's Graduate School who were 20 percent or more overweight were found to earn $4000 less than their normal weight counterparts (27). The obese person also may have to confront discrimination in everyday social interactions including, possibly, even marriage (25).

Economic Implications

Business and industry spent $97 billion for national health care in 1984. That same year $387 billion ($1,584 per capita), about 12 percent of the Gross National Product, was spent on health and medical care by
individuals in the United States. By the year 2000, health and medical care costs are estimated to be about $4000 per capita (28).

The major cause of serious illness and death in adult Americans is cardiovascular disease. According to the American Heart Association, in 1986 it accounted for about $78.6 billion of the annual medical costs in the United States (29).

In addition to health care costs, there are other hidden or forgotten items related to poor health that affect the economic situation. These include the following: absenteeism, disability, turnover, decreased productivity and costs of replacement and recruiting (29).

Each year, 500 million workdays are lost because of illness or disability - 26 million of them because of heart disease and hypertension and 93 million because of lower back problems, which may often be related to obesity (29). Additionally, people who are 40 percent overweight visit their doctors and miss work twice as often as the normal-weight individual. This has been reported to cost the average employer an extra $4000 per year for each such overweight worker (28). Results from a study by Epstein et al. (30) found that patients who were extremely overweight had increased hospital stays for hip and knee surgery compared to those of normal weight or moderate overweight. Extremely overweight patients (greater than 180 percent of ideal weight) had average hospital stays of 35 percent longer and costs 30 percent higher than did patients of normal weight.

Many authorities agree that personal initiative can reduce or eliminate many of the risk factors, such as obesity, associated with the chronic diseases that contribute to escalating health care costs and decreased productivity (29).
Incidence of Obesity

**United States.** The National Center for Health Statistics reported that about 34 million adult Americans, or 26 percent of people ages 20 to 75 years, were obese (31). Severely overweight people numbered about 12 million. Data also indicated that the prevalence of excessive weight rises sharply after age thirty, reaching a peak of 39 percent of men and 50 percent of women who are 10 percent or more overweight (4). Ten to 15 percent of the United States population has been reported to be on a weight reduction program at any given time (32).

**Low-Income Women.** In industrialized countries, the prevalence of obesity among women decreases with increasing socioeconomic status (5). Obesity has been reported to be six times more common among members of the lowest socioeconomic class than among the highest (2). Results from the second National Health and Nutrition Examination Survey showed that if American women were divided into two groups according to economic status, the prevalence of overweight would be much higher among those below the poverty line (6).

**Black Women.** Obesity among middle-aged black women is reported to be of epidemic proportions. Sixty percent of black women between the ages of 45 and 55 years are obese as compared with 30 percent of white women of the same age range and 26 percent of the population as a whole (6).

A study by McGee (33) of 100 obese black women showed that 90 percent had a history of unsuccessful weight loss. Subjects reported spending most of their leisure time in sedentary activities. Hypertension, cardiovascular problems, menstrual irregularities and breathing difficulties were major health problems seen in these females.
Determination of Obesity

Several indices are currently used to determine overweight in adults. Measurements above desirable levels using these indices have been shown to correlate with the risk of adverse effects on health and longevity.

Tables of Desirable Weights by Height. Tables of desirable weight are based on weights associated with the lowest mortality rate among insured populations of adults. Two versions are in current use: the 1959 Metropolitan Life Insurance Company Table and the 1983 revision (11).

Controversy exists because of the increases in desirable weights in the 1983 tables above those listed in the 1959 tables. In the 1983 tables, desirable weights for men and women in the shortest stature groups were 12 and 14 pounds higher respectively than they were in 1959 (11).

Uses of the height-weight tables include the following:

1. Clinical: To establish the presence of obesity, the approximate degree of risk and to guide treatment.
2. Educational and informational.
3. Research (11).

Limitations for the tables include the following:

1. Because tables are formulated on specific populations, they may not be applicable to an entire population, particularly those of lower socioeconomic and some ethnic groups.
2. The mortality and morbidity related risks of obesity are influenced by concurrent risk factors such as smoking.
3. Tables do not provide information on body fat distribution or degree of obesity.

4. Frame size as used for estimation of lean (fat-free) body mass is subjectively determined in the 1959 tables. The use of elbow width to judge frame size, as suggested in the 1983 tables, may or may not eliminate the problem.

5. Age is not taken into account (11).

**Body Mass Index:** The body mass index (BMI) is calculated using the formula \[ \text{BMI} = \frac{\text{body wt in Kg}}{\left(\text{Ht in m}\right)^2} \]
and is a simple measurement highly correlated with other estimates of fatness which minimizes the effect of height. BMI is useful for descriptive or evaluative purposes and has the advantage of permitting comparison of populations. The major limitation of BMI is that it is difficult to interpret this mathematical index to patients and to relate it to weight that must be lost. A BMI of 27.8 for men and 27.3 for women correlates with weights for height that are 20 percent above desirable weight using height-weight tables (11).

**Percent Body Fat.** Skinfold thickness measurements are used to give an indication of percentage of body fat. Measurements are taken on various body sites using standardized, springloaded calipers. Age adjusted tables are used for translating the skinfold measures to percent body fat. Body fat percentage goals suggest an average percentage body fat of 15 percent for men and 25 percent for women (34).

Validity for skinfold measures is based on the assumptions that the thickness of subcutaneous fat is consistent with total body fat and that the thickness of the subcutaneous layer can be estimated by a few site measurements. Range of error with skinfold measurements is about 3 percent, with higher error in the extremely obese. There are problems...
associated with estimating body fat percentages of severely obese persons using skinfold measurements. Many fatfolds are too large to be measured by calipers, and it is often difficult to separate folds of skin and fat from muscle. Also, subcutaneous fat varies not only with adiposity but with sex and age as well (34).

**Causes of Obesity**

The exact etiology of excessive weight gain is still not clearly understood. The statement that ingestion of more calories than are expended leads to overweight is factual but relates more to conditions required for deposition of lipids in fat cells rather than to causes of deposition. Many factors including neurohumoral, metabolic, psychological and sociological factors are involved in the development of excessive weight (4).

**Fat Cell Theory.** The fat cell theory, one of the two main theories of the etiology of obesity, postulates that nutrition and genetic influences early in life lead to fat cell hyperplasia. The number of fat cells is thought to stabilize in adolescence so that weight gain and weight loss in adults occur as changes in cell size but not cell number. Current research indicates that cell number can increase in adults during periods of prolonged positive energy balance, however, perhaps caused by stimulation as cell size reaches an upper limit (36).

**Set Point Theory.** The body set point theory, the other major theory behind weight gain, is controversial and proposes that there is an ideal biological weight, or setpoint, for an individual. Because the body defends against any changes above or below the set point, this theory contends that obese persons have difficulty losing weight suc-
cessfully (36). Some advocates of this theory suggest that exercise promotes lowering of body set point (24).

**Age of Menarche.** A biological factor that relates to fatness in both women and their offspring is the age of menarche. Early maturing women weigh more and are fatter by the third decade becoming, on the average, 9.8 pounds heavier and 30 percent fatter by the fourth decade than average or late maturers. Progeny of these early maturing women are more likely to be obese than those of late maturing mothers. The cause of this is not clear, but it may be that maturity timing is one expression of the genetic variance of fatness (32).

**Genetic Factors.** Above average fatness and obesity seem to run in families. A child of an obese parent is more likely to be obese if one parent is obese (40 percent), increasingly so if both parents are obese (80 percent) and even more so if grandparents are obese (32). Studies of twins separated at birth show that genetic makeup is more important in determining obesity than environment (17).

Both decreased metabolic rates and spontaneous physical movement have been reported to be genetic factors that influence the development of obesity. Ravussin et al. (37) reported that persons who burned calories slower were four times as likely to gain more than 15 pounds during a two-year study as compared to those of normal metabolic rate.

Increased activity of spontaneous movements (fidgeting) may also be an inherited characteristic which reduces the tendency toward obesity by increasing caloric expenditure (38). The inherited tendency toward obesity first appears in infancy. A study conducted by Roberts et al. (38) found that half of infants born to overweight mothers were overweight by one year of age. None of the infants of lean mothers
participating in the study became obese. The metabolic rate of the overweight babies was shown to be 21 percent less than that of normal weight infants.

**Environmental Factors.** A predisposition to fatness seems to be inherited, but exposure to a faulty nutritional environment is needed for the obesity to develop, according to Dietz (38). In earlier times during periods of cyclical famine and starvation, having a slow metabolism and an inherited tendency to gain weight was a positive. A year-round abundance of food in the American society now makes this metabolic compensation obsolete (39).

Family members, including spouses, who live together show tendencies to resemble each other in fatness perhaps because of years of living and eating together. The correlation of overweight in parents and their children also tends to diminish when the child is no longer living with the parent (32).

Another environmental risk factor is television viewing habits of children. Time spent in front of the television set has been shown to be the most significant predictor of obesity development in adolescence. The reason given for this is that watching TV encourages inactivity and increased food intake (40).

**Socioeconomic Status.** Socioeconomic status has also been shown to have an effect on weight. In the United States, although poorer children of both sexes are leaner than their more affluent peers, probably because of decreased availability of food and medical care, by age 15 there is an inverse relationship of socioeconomic status to weight among females. This continues through adulthood and by age 50, the impover-
ished woman averages 17.6 pounds more in weight than the higher income woman, although the poorer woman is shorter (32).

A French study by Cachera and Bellisle (41) reported that children from lower socioeconomic groups tend to be more overweight than those from higher income groups. They attributed this to the fact that this culture group consumed more calories, 2463 calories, compared to 2282 calories for children of skilled workers and 2100 calories for children of professionals. The researchers concluded that the higher calorie diet would lead to a higher proportion of obese individuals since those who are predisposed to obesity because of genetics or lifestyle would more likely become obese in a culture with high calorie intake.

Importance of Weight Loss

In view of the increased mortality and morbidity associated with obesity, weight reduction should be recommended to persons with excess body weight of 20 percent or more above desirable weight for height as listed in the Metropolitan Life Insurance Company tables (using the midpoint of the range for a medium-build person). In the 1983 tables, 20 percent over desirable weight is higher than in the 1959 tables. Use of the lower weights as goals would be advisable in the presence of any other risk factors (6).

According to the National Institutes of Health Consensus Panel on Obesity (6) weight reduction in patients with lesser degrees of overweight is desirable in many other circumstances, including the following:

Noninsulin-dependent diabetes mellitus, a family history of diabetes mellitus, women with a history of gestational diabetes or history of birth of an infant large for gestational age.
Hypertension.
Hypertriglyceridemia or hypercholesterolemia.
Coronary artery heart disease.
Heart disease of other types.
Chronic obstructive pulmonary disease.
Osteoarthritis of the spine, hips or knees.

Strategies to Achieve and Maintain Desirable Weight

Innumerable weight control therapies and programs utilizing a variety of approaches and techniques have been described in the literature. Recent recommendations for weight control therapy that seem to offer the best format for successful weight control were reported by a panel organized by the International Congress on Obesity. They include three components - diet, exercise and behavior/psychological support (42). Many weight control programs are comprised of a series of lessons or programs which present information on nutrition and calorie restriction, increased activity within physical limitations, behavior therapy and cognitive modification techniques (43).

Brownell (44) has packaged a weight control program called "LEARN." The name is an acronym for a program which includes lifestyle changes in the areas of exercise, attitudes, relationships and nutrition.

Diet. There are many widely accepted, nutritionally sound diets available to accomplish weight control through fat loss and establishment of lasting healthful eating patterns. These diets, recommended by many nutrition and medical experts, include caloric restriction of no fewer than 1,000 kilocalories per day, decreased fat intake and adequate intake
of other nutrients. Exchange lists are often used to provide flexibility in food choices (45).

The 24-hour dietary recall and food frequency questionnaire are tools used to assess nutrient intake in weight control programs. Both have been shown to give reliable estimates of an individual's nutrient intake (46).

The Dietary Guidelines for Americans (47,48) represent current, research-based information to promote good health and prevent disease. The U.S. Department of Agriculture has estimated that implementation of the guidelines has the potential for reducing the incidence of cardiovascular disease by 25 percent, dental problems by 50 percent, obesity by 80 percent and cancer by 20 percent (49).

Several of the Dietary Guidelines for Americans are related to the achievement and maintenance of the best weight for optimum health. One of the guidelines states, "Maintain Desirable Weight." Related to this guideline are other specific recommendations including the following:

"Eat a variety of foods that are low in calories and high in nutrients.

Eat more fruits, vegetables and whole grains.

Eat less fat and fatty foods.

Eat less sugars and sweets.

Drink less alcoholic beverages.

Increase physical activity" (48).

Exercise: Moderate exercise on a consistent basis is essential for any weight maintenance program. The exercise program should include activities involving continuous use of large muscle groups such as walking, swimming or bicycling which will increase energy expenditure
causing fat loss while maintaining lean body mass (45). Several studies (50,51) have reported that a walking program which requires no training or special equipment promotes weight loss and maintenance.

**Behavior Modification:** Behavior modification has been reported to be an effective, widely used treatment of overweight (52,53,54, 55,56,57,58). Wilson (59) reported that behavioral treatments seem to be the best available method for providing weight loss in that they produce the best results at one year, are relatively cost-effective, efficient and readily taught. Another important feature is that behavioral techniques lack undesirable side effects. Principles of behavior modification in weight control involve the following: stimulus control (meal planning, shopping, activities, social eating); eating behavior; rewards; self-monitoring, nutrition education; physical activity and cognitive restructuring (55). The strength of the behavioral approach lies in the implication for maintaining compliance and maturation in adherence to dietary and exercise programs (36). Maintenance of weight loss requires major changes in an individual's lifestyle, including eating habits, activity levels and psychological factors which must be changed over time (56).

Almost all behavioral treatment programs use group treatment (60). The social context in which a weight control program is conducted may be as important as the program itself. The social ties which develop between participants, the support they offer to each other and the strategies learned from one another seem to favor group treatment. The group approach also makes treatment more cost effective (36). Several studies (56, 61, 62, 63) have reported the success of group therapy sessions in weight management.
A few studies have compared group and individual weight management programs. Kingsley and Wilson (61), in a study of 78 women, found that on long-term follow-up, average weight loss with group intervention was significantly greater than with individual intervention. Initial losses had been slightly more for individuals than groups. Jeffrey et al. (64) and Adams et al. (65) found that women lost more weight when participating in group weight control sessions and men in individual settings.

Wilson (59) has suggested combining individual and group treatment in a joint approach to ensure an individualized approach to each person’s particular needs, while taking advantage of group support and motivation.

**Standards for Treatment Programs**

Members of the Panel of Energy, Obesity and Body Weight Standards, American Society for Clinical Nutrition recommend the following standards for weight control programs:

1. that treatment programs provide at least one-year follow-up after end of the program, and strive for even longer follow-up.

2. that treatment reports contain more information than most do at present; to include the number of patients considered for treatment, number accepted, number of dropouts, age, sex, BMI of patients, range, standard deviation, mean and median of BMI, hip and waist ratio, duration of treatment, number in follow-up, weight changes during follow-up and cost effectiveness.
3. that validation be given for estimating food intake (66).

Success of Weight Control Programs

Although many weight management programs promise quick and lasting weight loss, long-term weight loss success has been reported to be disappointingly low, even on the most optimistic of programs. Follow-up at three to five years of weight loss often finds the average participant at or near initial weight (67).

Weight control approaches associated with the most favorable outcome include a diet based on usual food intake patterns to meet nutrient needs, promotion of regular exercise and behavioral strategies. Characteristics of programs that are associated with poor outcome include very-low-calorie diets which promote rapid weight loss, extreme restriction of certain nutrients and reliance on formula or special products (68).

Weight Management at the Worksite

Several studies (68,69,70,71,72) provide evidence that the worksite has potential for employee weight management and wellness programs. Fielding and Breslow (73) reported that employers have instituted worksite wellness programs for many reasons including attaining target behaviors, such as weight control, and improving employee morale, productivity, absenteeism and employee relations. Brownell et al. (74) evaluated three worksite weight reduction programs involving female union members and found these were effective in promoting weight control.

Weight Management for Low-Income Groups

Batiste (7) reported that nutrition education needs of low-income blacks were greater than for non-blacks in relation to most of the
dietary guidelines, including weight management. Blacks also were reported to have more diet-related health problems such as iron deficiency anemia, obesity, diabetes, heart disease, high blood pressure and gastrointestinal cancer than non-blacks.

Results from a pioneer longitudinal study initiated in 1965 in Alameda County, California, showed that black women were most likely to have lifestyles considered to be unhealthy. The criteria for making this assessment included maintaining desirable weight and exercising regularly (75).

Helm et al. (76) reported a successful weight control program for low-income, predominantly black women in an inner-city population using behavioral modification. Weight changes were reported to be comparable to similar programs among middle-class participants.

A weight management program for low-income, overweight blacks was reported by Schmidt (77). Weight control sessions for groups of about 10 persons were conducted for 6 weeks. The group technique of weight control was deemed therapeutic and productive within this low-income population with an average weight loss of 4 pounds.

Shook (78) has reported a program in which the Virginia Cooperative Extension Service tailored its Diet, Exercise and Behavior Modification program for low-income clients. Seventeen women participated in the 11-week course. The average weight loss was 3 pounds. Decreased percentages of body fat were reported in 36 percent of the women along with a 3 percent decrease in dietary fat consumption.

Kaul et al. (79) reported results from a weight control program for low-income black women in Washington, D.C. After three months of
participation in the program, the mean weight of patients was 213.8 pounds compared to 218 pounds initially.

Brownell (36) reported that professionals working with low-income, obese women should be aware that it is a special challenge. Counseling should be undertaken only with an understanding of the background of cultural factors which influence food intake and physical activity.

**EFNEP Nutrition Aides and Weight Management**

Nutrition aides are paraprofessionals employed by the Louisiana Cooperative Extension Service Expanded Food and Nutrition Education Program to teach low-income homemakers and youth how to select and eat nutritious diets for better health. Many of the nutrition aides are indigenous to the population they serve. In Louisiana, 98 percent of nutrition aides are black.

According to Wang and Ephross (80), nutrition aides have established relationships and helped improve diets of homemakers who were hard to reach. Data from Louisiana have shown that dietary habits of homemakers have improved after participating in the EFNEP program. Dietary recalls of EFNEP participants indicated increased consumption of fruits, vegetables and milk which are typically low in this population (8,81). Stewart (82) reported that the food and nutrition knowledge of the nutrition aides has significantly increased through their participation in EFNEP (82).

Maintenance of desirable weight has been a concern of EFNEP administrators by the nutrition aides because of the prevalence of overweight in lower socioeconomic groups, especially in low-income blacks. Because they are responsible for teaching low-income homemakers how to
select and prepare nutritious diets for optimum health, the practices of
the nutrition aides in the area of weight control are important (67).

Carruth (83) reported a study in which EFNEP nutrition aides' levels of nutrition knowledge regarding weight modification were determined. Five training sessions on weight modification resulted in significant cognitive gain for those receiving the training.

Recommendations for nutrition aide training have been made at both the national and state levels. The EFNEP Evaluation Studies Plan (84) specifies the importance of evaluating means of improving nutrition aides' diets including calorie level and special nutrient needs. Linder (8) recommended that nutrition aides in Louisiana receive more training in nutrition to strengthen food behaviors not practiced and emphasize single nutrition concepts for greater impact and understanding.

Santopolo and Kell (85) reported that training for nutrition aides should be conducted on a one-to-one or very small group basis. They also reported that any training program for nonprofessionals should focus attention on involving the trainees.

Anderson (86) reported that aides should be involved in the identification of in-service training needs. Rountree (87) found that aides needed more training in nutrition areas other than recipes and food preparation.
Chapter III

METHODOLOGY

Study Design

The study design was most appropriately characterized as a pre-experimental design diagrammed using configurations from Campbell and Stanley (93) as follows:

\[
\begin{array}{c}
0_1 \quad X_1 \quad 0_2 \quad 0_3 \\
0_4 \quad X_C \quad 0_5 \quad 0_6 \\
\end{array}
\]

Pretest - Posttest Nonequivalent Comparison
Group Design

According to Campbell and Stanley (93), the major potential threats to internal validity in a study of this design include the following:

Intrasession History - Intrasession history was a possible threat to internal validity since the measurements were made at different sites and times. Variables other than the treatment may have affected the outcome of the study.

Testing - Testing was a possible threat to internal validity because the same test was used at PRE, POST and DELAYED measurement sessions. The six month DELAYED test was employed as an attempt to control for testing effects.

Selection - Selection was a possible threat to internal validity because random assignment was not employed. The groups were compared on numerous, relevant pretest measurements as an attempt to control for this threat.

Population and Sample

Target Population. The target population was EFNEP nutrition aides in Louisiana. The frame for the population was determined from
the Louisiana Cooperative Extension Service EFNEP staff roster and included 152 EFNEP nutrition aides in 14 parishes.

**Sample.** Two urban EFNEP sites, Orleans Parish and Caddo-Bossier parishes, were selected for the study. Urban sites were selected because of the priority placed by EFNEP on urban sites due to the greater number of disadvantaged families in these areas as compared to rural areas. The two urban sites, Orleans Parish and Caddo/Bossier parishes, were selected because the largest numbers of nutrition aides were employed there.

The Orleans site was purposively assigned to receive the treatment and the Caddo/Bossier site was assigned as the comparison group. The basis of assignment was on accessibility of the sites to the researcher.

Nineteen nutrition aides from Orleans Parish comprised the treatment group and 18 nutrition aides from Caddo/Bossier parishes comprised the comparison group. Similarity of the groups was established by recruitment from the same population and pretesting.

**Instrumentation**

**Personal Form.** A form was developed by the researcher to include the following information for each subject: name, workshop attendance, age, educational level, years in EFNEP, prior participation in a weight control program, height, weight, body measurements, percent body fat, BMI, nutrition knowledge score, eating behaviors score, exercise practices score, dietary score and hours of work missed because of illness six months preceding and six months following the workshop. A folder was established for each subject to include the personal form and instrument forms.
Dietary Score. A dietary score for each participant was calculated from responses to the food frequency checklist (Appendix A) developed by the researcher. The food frequency checklist which consisted of a list of 39 food groupings was developed using the USDA Daily Food Guide (48), the EFNEP List of Commonly Used Foods in Four Food Groups (8) and other listings of foods from dietary recalls of low-income families (88, 89, 90). The food frequency questionnaire has been shown to be useful in evaluating dietary intakes and showing changes or trends in food consumption (46).

Respondents were asked to check their responses on the food frequency checklist in one of five response categories for each of the 39 food groupings including: at least once a day, 5-6 times a week, 3-4 times a week, 1-2 times a week and seldom or never.

Scoring of the food frequency checklist (Appendix B) to obtain the dietary score was achieved through a careful validation process, as follows, since documentation for this process was not found in the literature:

Optimal consumption of each of the 39 food groupings was determined by the researcher and a faculty member from the Louisiana State University School of Home Economics using the USDA Daily Food Guide (48) and the USDA Dietary Guidelines (1) which contain recommendations for eating a variety of foods from the basic food groups to meet nutrient needs. The optimal dietary score for each food grouping was designated 0. A numerical score was assigned to each deviation from the designated optimal intake in each food grouping. For example, optimal consumption of the skim milk, lowfat milk or plain yogurt grouping was the response category "at least once a day." If 5-6 times week were checked, the
dietary score would have been "1", if 3-4 times a week, "2", if 1-2 times a week, "3", and if seldom or never, "4".

Subject responses were compared to the optimal consumption response in each food grouping, given the appropriate numerical score and added to obtain a total score. The total score of the food frequency checklist reflecting optimal consumption was 0.

The scoring process was validated through review by a panel of experts consisting of faculty members from the Foods and Nutrition Section, School of Home Economics, Louisiana State University and nutrition specialists from the Louisiana Cooperative Extension Service.

NUTRITION KNOWLEDGE ASSESSMENT. An instrument consisting of 20 statements to assess nutrition knowledge regarding weight control (Appendix A) was developed by the researcher using lesson material from the Louisiana Cooperative Extension Service Healthy Weight Workshop (91). Respondents were asked to place a check in one of three response categories, agree, disagree or undecided, for each statement. The instrument also included five questions concerning the best food sources of vitamins A and C, calcium and iron. Subjects were asked to choose the best food source of each nutrient from a list of foods.

EATING BEHAVIORS ASSESSMENT. An instrument to assess eating behaviors related to weight control (Appendix A) was developed by the researcher using lesson material from the Louisiana Cooperative Extension Service Healthy Weight Workshop (46). Eight statements were listed, and subjects were asked to check the response most indicative of their usual practices. Response categories included always, usually, occasionally, seldom and never. Statements were scored on a 5-point
scale with the most desirable response coded 5 and the least desirable response coded 1.

Exercise Practices Assessment. An instrument to assess exercise practices (Appendix A) was developed by the researcher using lesson material from the Louisiana Cooperative Extension Service Healthy Weight Workshop (91). Five statements related to exercise were listed, and subjects were asked to check the response most indicative of their usual practices. Response categories included always, usually, occasionally, seldom and never. Statements were scored on a 5-point scale with the most desirable response coded 5 and the least desirable response coded 1.

Anthropometric Measurements.

Height. Each subject’s height was measured using a steel measuring tape which had been taped to a wall from the floor to a height of 7 feet. Each subject was asked to stand against the wall in her stocking feet, and a flat surface was placed on the top of the head. Height was read by the researcher from the tape and recorded on the personal form.

Weight. Weight was measured using a standardized scale. The same scale was used at each measuring period. The scale was calibrated and set at 0 before each session. The scale was positioned on a flat floor surface. Each subject was weighed in street clothes without shoes.

Waist to Hip Ratio. Body measurements, including bust, waist and hip, were obtained for each subject. The researcher measured the site on each subject over street clothes using a fiberglass
measuring tape. The waist measurement for each participant was divided by the hip measurement to obtain the waist to hip ratio.

**Percent Body Fat.** Triceps skinfold measurements were made by the researcher on each subject using both Lange and Slim-Guide Skinfold Calipers. The Slim-Guide Calipers were purchased by the Louisiana Cooperative Extension Service to be used with weight control classes. The calipers are relatively inexpensive and appear to be satisfactory in evaluating body fat. Lange calipers are expensive and are designed for testing centers and research labs. These were used as a check for the measurements obtained from the Slim-Guide Calipers.

The triceps measurement is reported to provide a reasonably accurate measure of body fat percentage for most people (92). A chart containing calculations of percent body fat by age groupings which accompanied the Slim-Guide Calipers was used to determine percent body fat from the single triceps measurement. This was recorded on each subject's personal form by the researcher.

**Body Mass Index (BMI).** This was determined by the researcher using a nomograph (Appendix C) adapted from Burton *et al.* (93) and Burton and Foster (94). The index was read from a scale after placing a straight edge on the nomograph connecting the height and body weight of each subject (95). BMI was recorded on each subject's personal form by the researcher.

**Validity of Instruments**

Validity of the nutrition knowledge assessment, food frequency checklist, eating behaviors assessment, exercise practices assessment and scoring process for the food frequency checklist to determine dietary
score was assessed through review by a panel of experts consisting of faculty members from the Foods and Nutrition Section, School of Home Economics, Louisiana State University and nutrition specialists from the Louisiana Cooperative Extension Service.

**Reliability of Instruments**

The nutrition knowledge assessment, food frequency checklist, eating behaviors assessment and exercise practices assessment were field-tested by 10 nutrition aides in one EFNEP parish not participating in the study. Slight changes were made in the instruments to facilitate completion by respondents.

Reliability of statements for the eating behaviors and exercise practices instruments was assessed for internal consistency using Cronbach’s Alpha reliability coefficient. The eating behaviors scale yielded a reliability coefficient of \( a = 0.88 \) and the exercise practices scale yielded a reliability coefficient of \( a = 0.84 \).

The test-retest method of determining internal consistency was employed for the nutrition knowledge instrument using the POST and DELAYED scores of the comparison group. Reliability of the instrument was determined to be \( r = 0.83 \).

**Data Collection**

Initial contacts were made with the EFNEP administrator by the researcher to secure permission to involve the nutrition aides in this research study. Meetings with the parish EFNEP home economists, district agents and EFNEP administrator were then conducted by the researcher to explain the purpose of the study, discuss the workshop format and to secure their support of the project. Workshops and testing dates were set at this meeting.
**PRE Treatment.** One week before the first workshop session, initial data from nutrition aides at each of the two sites were collected. This initial collection period was designated PRE.

Demographic data, including age, educational level, years in EFNEP and prior participation in a weight control program, were recorded on individual personal forms by each nutrition aide. Anthropometric measurements, which included height, weight, percent body fat and BMI, were determined by the researcher and recorded on the personal forms. The food frequency checklist, exercise practices assessment, eating behaviors assessment and nutrition knowledge instrument were administered to participants who recorded their own responses. Scores were determined for each instrument and recorded on the personal form by the researcher.

The number of sick leave hours used during the period six months prior to the first workshop was obtained for each nutrition aide from the Louisiana Cooperative Extension Service Personnel Division and recorded on each personal form by the researcher.

**Treatment.** The Healthy Weight Workshop (Appendix D), consisting of 6 weekly, 3-hour sessions, was presented by the researcher to the treatment group, nutrition aides from Orleans Parish, during the months of January and February. Sessions were conducted from 9 a.m. to noon on Thursdays in a New Orleans neighborhood community center. There were no absences from any of the six workshop sessions. The sessions encompassed the four recommended components of a good weight comparison program: diet, exercise, behavior modification and follow-up.
The workshop emphasized making changes in lifestyles including diet, exercise and eating behaviors to control and/or maintain desirable weight. Weight loss was not the primary emphasis. Weight measurements were made only two times during the six-weeks session, immediately before and immediately following the workshop.

**Diet.** Each participant was given a meal plan in the form of a checklist (Appendix E). The meal plan followed recommendations for types and servings of foods from the basic food groups. Although calorie level was not specified, the basic meal plan provided about 1200 calories. Each participant covered her checklist with contact paper and was encouraged to put this on her refrigerator or in her kitchen. She was also given a crayon to check off the servings of foods eaten each day. After one week, the crayon could be erased with a soft cloth and the checklist reused.

Portion control and selecting foods with less fat were emphasized at each session. Participants spent time in small groups during one session planning menus using the meal plan. These menus were compiled, typed and distributed to each nutrition aide.

**Exercise.** Participants were encouraged to begin a program of regular exercise. Walking was suggested as the most convenient exercise for these individuals. A discussion of the Louisiana Cooperative Extension Service Walking Program was presented at the second session.

**Behavior Modification.** Participants were asked to keep a food diary of the types of foods eaten and the place, time and their mood when eating these foods. Information on stimulus control, goal setting, self-monitoring and rewards was presented. Group discussion and role playing were used to help participants understand this approach to
changing lifestyles for successful weight management. Participants were also asked to set personal goals regarding weight management in terms of changes in dietary intake, exercise practices and eating behaviors.

**Follow-up.** Members of the panel on Energy, Obesity and Body Weight Standards, American Society for Clinical Nutrition, recommended that treatment programs provide for long-term follow-up (66). Follow-up of participants at six months and one year was planned as part of the study.

**POST Treatment.** One week following the sixth workshop session, the researcher collected data from nutrition aides at each of the two sites. This data collection period was designated POST.

Anthropometric measurements, which included weight, percent body fat and BMI, were determined and recorded on the personal form by the researcher. The food frequency checklist, exercise practices assessment, eating behaviors assessment and nutrition knowledge instrument were administered to participants who recorded their own responses. Scores were determined for each instrument and recorded on the personal form by the researcher.

**DELAYED Treatment.** Six months following the sixth workshop session, the researcher collected data from nutrition aides at each of the two sites. This data collection period was designated DELAYED.

Anthropometric measurements, including weight, body measurements, percent body fat and BMI, were determined and recorded on the personal form by the researcher. The food frequency checklist, exercise practices assessment, eating behaviors assessment and nutrition knowledge instrument were administered to participants who recorded their
own responses. Scores were determined for each instrument and recorded on personal form by the researcher.

The number of sick leave hours used during the period six months following the workshop was obtained for each nutrition aide from the Louisiana Cooperative Extension Service Personnel Division and recorded on each personal form by the researcher.

**Data Analysis**

The following statistics were used to assess the objectives established for the study:

**Objective 1** - EFNEP nutrition aides were described by the characteristics of age, educational level and length of service using means and standard deviations. Frequencies and percentages were used to describe the nominal characteristic, prior participation in a weight control program. Independent t-tests were used to determine differences between groups on the characteristics of age, educational level and length of service. Chi square analysis was employed to determine differences in prior participation in a weight control program.

**Objective 2** - Correlated t-tests were employed to determine if there were differences in PRE and POST measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop on the following variables: conformity to optimal dietary intake, nutrition knowledge, weight, percent body fat, BMI, exercise practices and eating behaviors.

**Objective 3** - Correlated t-tests were employed to determine if there were differences in PRE and POST measurements of EFNEP nutrition aides who did not participate in the Healthy Weight Workshop on the following variables: conformity to optimal dietary intake, nutrition
knowledge, weight, percent body fat, BMI, exercise practices and eating behaviors.

Objective 4 - Correlated t-tests were employed to determine if there were differences in POST and DELAYED measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop on the following variables: conformity to optimal dietary intake, nutrition knowledge, weight, percent body fat, BMI, exercise practices and eating behaviors.

Objective 5 - Correlated t-tests were employed to determine if there were differences in POST and DELAYED measurements of EFNEP nutrition aides who did not participate in the Healthy Weight Workshop on the following variables: conformity to optimal dietary intake, nutrition knowledge, weight, percent body fat, BMI, exercise practices, and eating behaviors.

Objective 6 - Correlated t-tests were used to determine if there were differences in the PRE and DELAYED measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop on the following variables: conformity to optimal dietary intake, nutrition knowledge, weight, percent body fat, BMI, exercise practices, eating behaviors and absence from work.

Objective 7 - Correlated t-tests were used to determine if there were differences in PRE and DELAYED measurements of EFNEP nutrition aides who did not participate in the Healthy Weight Workshop on the following variables: conformity to optimal dietary intake, nutrition knowledge, weight, percent body fat, BMI, exercise practices, eating behaviors and absence from work.

Objective 8 - Analysis of covariance (ANCOVA) was used to determine if differences existed in the POST measurements of EFNEP
nutrition aides who participated in the Healthy Weight Workshop with those who did not participate on the following variables: conformity to optimal dietary intake, nutrition knowledge, weight, percent body fat, BMI, exercise practices, and eating behaviors. The covariate utilized was the premeasurement for each respective POST measurement. ANCOVA was chosen since any differences in pretest measurements, even those that were not statistically significant, may have "tipped the statistical scales" (96,p.340) in favor of one of the groups being compared. ANCOVA uses sums of squares and mean squares that are not influenced by pretest measurements.

Objective 9 - Analysis of covariance (ANCOVA) was used to determine if differences existed in the DELAYED measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop with those who did not participate on the following variables: conformity to optimal dietary intake, nutrition knowledge, weight, percent body fat, BMI, exercise practices eating behaviors and absence from work. The covariate utilized was the premeasurement for each respective POST measurement. ANCOVA was chosen since any differences in pretest measurements, even those that were not statistically significant, may have "tipped the statistical scales" (96,p.340) in favor of one of the groups being compared. ANCOVA uses sums of squares and mean squares that are not influenced by pretest measurements.
Chapter IV

FINDINGS AND DISCUSSION

The findings of this study are presented and organized according to the research objectives.

Objective 1: Characteristics of EFNEP Nutrition Aides

Demographic Characteristics. All of the EFNEP nutrition aides in both the treatment and comparison groups were black females residing and working in one of two urban sites in Louisiana, Orleans Parish or Caddo/Bossier parishes.

Table 1 presents demographic characteristics, including age, educational level and years of employment in EFNEP, reported by EFNEP nutrition aides participating in the study. Ages of the nutrition aides ranged from 26 to 54 years with an average age of 46.6 years.

The average educational level of the aides was 12.5 years, with a range of 10 to 16 years. Aides are required to have a high school diploma or equivalent in order to be employed.

The average length of employment in EFNEP for the nutrition aides was 9.5 years, with a range of 1 to 18 years. Nutrition aides are recruited from the EFNEP homemaker population and turnover is reported to be low (8).

Table 2 presents data regarding prior participation of the nutrition aides in a weight comparison program. Fifty-four percent of aides reported having participated previously in a weight comparison program while 46 percent reported no previous participation.
Table 1

Personal Characteristics of EFNEP Nutrition Aides

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total a</th>
<th>Treatment b</th>
<th>Comparison c</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>Age</td>
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<td>9.72</td>
<td>43.16</td>
<td>10.18</td>
</tr>
<tr>
<td>Education</td>
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<td>1.22</td>
<td>12.58</td>
<td>1.17</td>
</tr>
<tr>
<td>Years in EFNEP</td>
<td>9.46</td>
<td>5.49</td>
<td>9.11</td>
<td>5.57</td>
</tr>
</tbody>
</table>

* p < .05

a n = 37
b n = 19
c n = 18

Table 2

Cross-Classification of EFNEP Nutrition Aides by Prior Participation in a Weight Control Program and Treatment Group

<table>
<thead>
<tr>
<th>Groups</th>
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<th>Yes</th>
<th>n</th>
</tr>
</thead>
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<td>Number</td>
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<td>Number</td>
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<tr>
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<td>6</td>
</tr>
<tr>
<td>Comparison</td>
<td>4</td>
<td>22.2%</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>46%</td>
<td>20</td>
</tr>
</tbody>
</table>

\( X^2 (1) = 6.192, p < .05 \)
The two groups were compared on the four demographic characteristics to determine whether or not they were equivalent with the following results:

The two groups of nutrition aides were found to be equivalent on the characteristics of educational level and length of employment, but significantly different on age and prior participation in a weight control program. The comparison group had an average age of 50.2 years while the treatment group averaged 43.2 years ($t_{(35)} = 2.34$, $p<.05$). The comparison group also reported having participated previously in a weight control program more often than the treatment group. Previous participation in a weight control program was reported to be 78.8 percent of the control group as compared to 31.6 percent of the experimental group ($X^2_{(1)} = 6.19$, $p<.05$). Since the comparison group was significantly older than the treatment group, these aides may have had more opportunities to participate in a weight control program.

**PRE Measurements of Treatment and Comparison Groups.**

Table 3 presents measurements of the treatment and comparison groups immediately preceding the workshop. No statistically significant differences were found between the two groups before the treatment on any of the PRE test scores or measurements, including dietary score, nutrition knowledge, exercise practices, eating behaviors, weight, BMI, percent body fat and sick leave hours used.

The dietary scores for both groups were fairly high, 45 for the treatment group and 43 for the comparison group. A dietary score of 0 signified optimal dietary intake for the food checklist.
Table 3
Comparison of PRE Measurements of Treatment and Comparison Groups

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Treatment Mean a S.D.</th>
<th>Comparison Mean b S.D.</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary Score</td>
<td>45.05 16.22</td>
<td>43.00 9.96</td>
<td>0.47</td>
</tr>
<tr>
<td>Nutrition Knowledge</td>
<td>15.68 2.93</td>
<td>14.78 2.90</td>
<td>0.95</td>
</tr>
<tr>
<td>Exercise Practices</td>
<td>2.93 0.92</td>
<td>3.32 0.77</td>
<td>1.38</td>
</tr>
<tr>
<td>Eating Behaviors</td>
<td>3.40 0.86</td>
<td>3.68 0.74</td>
<td>1.06</td>
</tr>
<tr>
<td>Weight</td>
<td>190.26 45.75</td>
<td>185.39 44.99</td>
<td>0.33</td>
</tr>
<tr>
<td>BMI</td>
<td>32.26 7.30</td>
<td>32.11 7.64</td>
<td>0.06</td>
</tr>
<tr>
<td>Percent Body Fat</td>
<td>42.26 5.43</td>
<td>42.17 8.95</td>
<td>0.04</td>
</tr>
<tr>
<td>Sick Leave Hours</td>
<td>28.74 17.86</td>
<td>23.50 26.64</td>
<td>0.70</td>
</tr>
</tbody>
</table>

a n = 19
b n = 18
instrument which consisted of a list of 39 food groupings to which participants were asked to respond as to frequency of consumption.

The treatment group's nutrition knowledge mean score was 15.7 while that of the comparison group was 14.8. The nutrition knowledge instrument was composed of 25 statements to assess nutrition knowledge regarding weight control based on information from the Louisiana Cooperative Extension Service Healthy Weight Workshop (91). The similarity in nutrition knowledge was to be expected since all nutrition aides received the same nutrition training in preparation for their work with EFNEP homemakers. Training involved participation in a series of lessons on basic nutrition, food selection and food preparation emphasizing low-cost food items, as well as regularly scheduled in-service programs (8).

Exercise practices for the two groups at PRE test were also similar. Exercise practices scores, which were determined from responses to four statements related to participants' exercise habits, averaged 3.3 for the comparison group and 2.9 for the experimental group on a 5-point scale.

Eating behaviors scores were also similar with a mean score of 3.7 for the comparison group and 3.4 for the treatment group based on a 5-point scale. These scores were determined from an instrument consisting of statements regarding eating habits related to weight control.

Weight, BMI and percent body fat of the nutrition aides were extremely elevated, but not different between groups, with an average weight of 187.9 pounds for the total group. Weights ranged from
115 pounds to 293 pounds. The average initial weight of the experimental group was 190.3 pounds while that of the comparison group was 185.4 pounds but this was not a statistically significant difference.

A simple method that is often used to determine desirable weight is the following: 100 pounds for the first 5 feet in height with 5 pounds added for each additional inch. Using this method, a woman 5 feet 4 inches tall should weigh 120 pounds. The nutrition aides ranged in height from 5 feet 0 inches to 5 feet 9 inches. According to this rule, the average weight, even for the tallest aide should have been no more than 145 pounds.

The mean BMI of the treatment group was 32.3 and of the control group, 32.1. The benchmark BMI that is normally associated with obesity (20 percent above desirable weight based on height/weight tables) is 27.3 (11,12). Both groups exceeded this figure which may have indicated even higher percentages above desirable weight.

The mean body fat percentage of the treatment group was 42.3 and of the comparison group, 42.2. The average body fat percentage for females has been reported to be 25 percent (34).

Obesity in middle-aged black women is reported to be of epidemic proportions. Sixty percent of black women between the ages of 45 and 55 years are obese as compared with 30 percent of white women and 26 percent of the population as a whole (6). The EFNEP nutrition aides seemed to show a similar prevalence toward obesity as indicated by weight, BMI and percent body fat. The
health risks associated with obesity have been well-documented in the literature (6,11,16,17).

Objective 2: Comparison of PRE and POST Measurements of Treatment Group

Significant improvements in several measurements were found for the treatment group immediately following their participation in the Healthy Weight Workshop. See Table 4.

The mean dietary score was significantly improved following the treatment group's participation in the workshop. The average dietary score preceding the workshop was 45.0, and immediately following the workshop it had changed to 34.4 ($t_{(18)} = 3.72, p<.05$). The smaller score after the workshop represented closer conformity to the optimal dietary score of 0. The dietary score reflected consumption of a variety of foods in recommended amounts emphasizing preparation methods compatible with reduced fat and calories. Previous studies (8,80,81) have indicated that participation in EFNEP nutrition education programs resulted in participants' improved dietary intake.

Nutrition knowledge of the treatment group also showed a statistically significant improvement following the workshop. The mean score for nutrition knowledge preceding the workshop was 15.7 which improved to 22.3 ($t_{(18)} = 11.37, p<.001$) after the workshop. The nutrition knowledge assessment instrument had a possible score of 25 and was designed to determine participants' understanding of the principles of weight management. Carruth (83) reported that EFNEP nutrition aides demonstrated significant cognitive gain in
Table 4

PRE and POST Measurement Comparisons of Treatment Group

<table>
<thead>
<tr>
<th>Measurements</th>
<th>PRE</th>
<th>POST</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>S.D.</td>
<td></td>
</tr>
<tr>
<td>Dietary Score</td>
<td>45.05</td>
<td>34.37</td>
<td>3.72*</td>
</tr>
<tr>
<td></td>
<td>16.22</td>
<td>11.64</td>
<td></td>
</tr>
<tr>
<td>Nutrition Knowledge</td>
<td>15.68</td>
<td>22.32</td>
<td>11.37***</td>
</tr>
<tr>
<td></td>
<td>2.93</td>
<td>1.70</td>
<td></td>
</tr>
<tr>
<td>Exercise Practices</td>
<td>2.93</td>
<td>3.82</td>
<td>4.77***</td>
</tr>
<tr>
<td></td>
<td>0.92</td>
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<tr>
<td>Eating Behaviors</td>
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</tr>
<tr>
<td></td>
<td>0.86</td>
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<tr>
<td>Weight</td>
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<td></td>
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<td>BMI</td>
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<td></td>
<td>7.30</td>
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<tr>
<td>Percent Body Fat</td>
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<tr>
<td></td>
<td>5.42</td>
<td>5.58</td>
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</tr>
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</table>

*p<.05

***p<.001
nutrition knowledge regarding weight modification after participating in EFNEP training.

Statistically significant improvements in exercise practices and eating behaviors were found in the treatment group after the workshop. Exercise practices scores improved from a mean of 2.9 before the workshop to 3.8 ($t_{(18)} = 4.77, p<.001$) following the workshop. Eating behaviors scores also improved from a mean of 3.4 to 3.9 ($t_{(18)} = 2.44, p<.05$) during this period.

An integral part of the Healthy Weight Workshop consisted of weight management techniques to help participants make lifestyle changes such as participation in a program of regular exercise or altering eating habits. During the workshop, the nutrition aides were given information about the benefits of exercise and how to start an exercise program, particularly walking. They were also presented with information on strategies for making changes in eating habits to control weight, as well as how to set up a system of self-selected goals related to weight control with appropriate rewards.

There were no significant changes in the obesity indicators including weight, BMI and percent body fat. This was not unexpected since the primary emphasis of the workshop was placed on making lifestyle changes related to diet, exercise and eating behaviors that might lead to decreased weight over time rather than on losing weight. The aides were given a food plan consisting of about 1200 calories based on the USDA Daily Food Guide. They were encouraged to follow this plan and not to eat less than the amounts and types of foods suggested by the plan. The dangers of very low calorie and starvation diets were discussed. Measurements of weight,
BMI and percent body fat were determined only two times during the six weeks of workshop sessions, before the first session and after the sixth session.

Objective 3: Comparison of PRE and POST Measurements of Comparison Group

Although no significant changes were noted for the comparison group in dietary score, nutrition knowledge, exercise practices, eating behaviors, weight, BMI or percent body fat during the six weeks between PRE and POST measurements (see Table 5), there were some changes worth noting. Dietary score improved from a mean of 43.0 to 39.4. The mean weight of the comparison group increased from 185.4 pounds to 189.2 pounds during the six weeks period.

Objective 4: Comparison of POST and DELAYED Measurements of EFNEP Treatment Group

A comparison of the POST and DELAYED measurements was made to ascertain if the improvements and changes in the participants' scores and measurements immediately following the workshop would be apparent at follow-up six months later. Several measurements of the treatment group improved significantly from the measurement session immediately following the workshop to the one six months later. (See Table 6.)

There was a statistically significant improvement in dietary score from a mean of 34.4 to a mean of 30.0 ($t_{(18)} = 3.38, p<.01$). The lower dietary mean score at six months as compared to that at six weeks indicated closer adherence to the optimal dietary score of 0 established for the food checklist instrument.
Table 5
PRE and POST Measurement Comparisons of Comparison Group

<table>
<thead>
<tr>
<th>Measurements</th>
<th>PRE</th>
<th>POST</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
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<tr>
<td></td>
<td>S.D.</td>
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<tr>
<td>Dietary Score</td>
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<td></td>
<td>9.96</td>
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<tr>
<td>Nutrition Knowledge</td>
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<td></td>
<td>2.90</td>
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<tr>
<td>Exercise Practices</td>
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<td>0.74</td>
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Table 6
POST and DELAYED Measurement Comparisons of Treatment Group

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<tr>
<td>Dietary Score</td>
<td>34.37</td>
<td>30.00</td>
<td>3.38**</td>
</tr>
<tr>
<td></td>
<td>11.64</td>
<td>8.21</td>
<td></td>
</tr>
<tr>
<td>Nutrition Knowledge</td>
<td>22.32</td>
<td>24.21</td>
<td>4.97***</td>
</tr>
<tr>
<td></td>
<td>1.70</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td>Exercise Practices</td>
<td>3.82</td>
<td>4.05</td>
<td>1.88</td>
</tr>
<tr>
<td></td>
<td>1.02</td>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td>Eating Behaviors</td>
<td>3.93</td>
<td>4.17</td>
<td>1.79</td>
</tr>
<tr>
<td></td>
<td>0.81</td>
<td>0.49</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>189.47</td>
<td>186.89</td>
<td>3.84**</td>
</tr>
<tr>
<td></td>
<td>45.47</td>
<td>45.81</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>32.10</td>
<td>31.63</td>
<td>2.28*</td>
</tr>
<tr>
<td></td>
<td>7.46</td>
<td>7.61</td>
<td></td>
</tr>
<tr>
<td>Percent Body Fat</td>
<td>41.74</td>
<td>41.21</td>
<td>1.76</td>
</tr>
<tr>
<td></td>
<td>5.58</td>
<td>5.58</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05
**p<.01
***p<.001
The nutrition knowledge score also improved significantly from a mean of 22.3 to 24.2 ($t_{(18)} = 4.97, p<.001$) six months after the workshop.

There were statistically significant improvements in two of the obesity indicators, weight and BMI. There was a mean weight loss of 2.6 pounds by the EFNEP aides during the six month period which followed the workshop. The average weight immediately following the workshop was 189.5 pounds which then decreased significantly to 186.9 pounds ($t_{(18)} = 3.8, p<.01$) six months later. Concomitantly, BMI decreased significantly from a mean of 32.1 to 31.6 ($t_{(18)} = 2.28, p<.05$) during this period.

The treatment group had been given the Healthy Weight Workshop materials at the end of the six-week session, and asked to begin presenting the information to interested EFNEP clientele in small group settings. Using this material to present to others may have had a pronounced effect, not only in sustaining those improvements seen at six weeks following the workshop, but resulting in even greater improvements six months later.

No statistically significant changes were noted for any of the other measurements or scores including exercise practices, eating behaviors or body fat percentages.

Objective 5: Comparison of POST and DELAYED Measurements of Comparison Group

Both dietary score and nutrition knowledge were significantly poorer at the DELAYED measurement session compared to the POST measurement session as shown in Table 7. The mean dietary score showed a significant change during the six month period from 39.4
Table 7

POST and DELAYED Measurement Comparisons of Comparison Group

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Post</th>
<th>Delayed</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
<td>Mean</td>
</tr>
<tr>
<td>Dietary Score</td>
<td>39.39</td>
<td>8.53</td>
<td>40.94</td>
</tr>
<tr>
<td>Nutrition Knowledge</td>
<td>15.50</td>
<td>3.28</td>
<td>14.44</td>
</tr>
<tr>
<td>Exercise Practices</td>
<td>3.47</td>
<td>0.75</td>
<td>3.36</td>
</tr>
<tr>
<td>Eating Behaviors</td>
<td>3.97</td>
<td>0.6</td>
<td>3.94</td>
</tr>
<tr>
<td>Weight</td>
<td>189.22</td>
<td>47.40</td>
<td>192.50</td>
</tr>
<tr>
<td>BMI</td>
<td>33.00</td>
<td>7.98</td>
<td>33.61</td>
</tr>
<tr>
<td>Percent Body Fat</td>
<td>42.44</td>
<td>9.97</td>
<td>41.78</td>
</tr>
</tbody>
</table>

*p<.05
to 40.9 \( t(17) = 2.28, p<.05 \). The smaller score at the POST measurement reflected dietary intake that was closer that of the optimal dietary intake than the larger score six months later.

The mean nutrition knowledge score decreased significantly from 15.5 at the POST measurement to 14.4 \( t(17) = 2.41, p<.05 \) six months later. The total possible score for the nutrition knowledge instrument was 25.

There were no statistically significant changes in any of the other measurements between the POST and DELAYED measurement sessions although weight did show a nonsignificant increase from 189.2 pounds to 192.5 pounds.

**Objective 6: Comparison of PRE and DELAYED Measurements of EFNEP**

**Treatment Group**

A comparison of the PRE and DELAYED measurements was made because this may provide a more accurate measurement of the long-term effectiveness of the Healthy Weight Workshop. Changes and improvements are commonly found immediately following presentation of information or participation in a program but these are not often sustained over time.

There were significant improvements in seven of the eight measurements of the treatment group when comparing measurements immediately preceding the workshop to those at follow-up six months later. This information is presented in Table 8.

Dietary score showed a significant change toward the optimal score of 0. The mean dietary score before the workshop was 45.0 and was 30.0 \( t(18) = 5.65, p<.001 \) six months later. Nutrition
Table 8
PRE and DELAYED Measurement Comparisons of Treatment Group

<table>
<thead>
<tr>
<th>Measurements</th>
<th>PRE</th>
<th>DELAYED</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>t</td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>S.D.</td>
<td></td>
</tr>
<tr>
<td>Dietary Score</td>
<td>45.05</td>
<td>30.00</td>
<td>5.65***</td>
</tr>
<tr>
<td></td>
<td>16.22</td>
<td>8.21</td>
<td></td>
</tr>
<tr>
<td>Nutrition Knowledge</td>
<td>15.68</td>
<td>24.21</td>
<td>12.93***</td>
</tr>
<tr>
<td></td>
<td>2.93</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td>Exercise Practices</td>
<td>2.93</td>
<td>4.05</td>
<td>6.83***</td>
</tr>
<tr>
<td></td>
<td>0.92</td>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td>Eating Behaviors</td>
<td>3.40</td>
<td>4.17</td>
<td>4.56***</td>
</tr>
<tr>
<td></td>
<td>0.86</td>
<td>0.49</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>190.26</td>
<td>186.89</td>
<td>3.33**</td>
</tr>
<tr>
<td></td>
<td>45.75</td>
<td>45.81</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>32.26</td>
<td>31.63</td>
<td>2.88**</td>
</tr>
<tr>
<td></td>
<td>7.30</td>
<td>7.62</td>
<td></td>
</tr>
<tr>
<td>Percent Body Fat</td>
<td>42.26</td>
<td>41.21</td>
<td>1.92</td>
</tr>
<tr>
<td></td>
<td>5.43</td>
<td>5.58</td>
<td></td>
</tr>
<tr>
<td>Sick Leave Hours</td>
<td>28.74</td>
<td>21.26</td>
<td>2.79*</td>
</tr>
<tr>
<td></td>
<td>17.86</td>
<td>11.79</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05
**p<.01
***p<.001
knowledge improved significantly from a mean of 15.7 to 24.2 \( t(18) = 2.88, \ p<.001 \) between these two measuring sessions also.

The mean exercise score improved significantly from 2.9 to 4.0 \( t(18) = 2.9, \ p<.001 \). The eating behaviors score improved significantly from a mean of 3.4 to 4.2 \( t(18) = 4.56, \ p<.001 \).

Weight and BMI also showed statistically significant improvements. Immediately preceding the workshop the mean weight was 190.3 pounds which decreased to 186.9 pounds \( t(18) = 3.33, \ p<.01 \) six months following the workshop, a weight loss of 3.4 pounds. There was a significant decrease in BMI from a mean of 32.3 to 31.6 \( t(18) = 2.88, \ p<.01 \).

Results of participation in weight control programs by low-income black women have been reported by several researchers. Schmidt (77) reported a program in which average weight loss by participants was 5 pounds, Shook (78) reported a study with average weight loss of 3 pounds and Kaul et al. (79), a program with average weight loss of 4 pounds. A study by Carruth (83) reported that EFNEP nutrition aides who participated in training on weight modification showed significant cognitive gain in the area of nutrition knowledge related to weight control.

Obesity has been reported to be associated with absenteeism from work because of illness or disability resulting in increased costs for businesses and organization (28,29,30). In order to improve absenteeism from work, employers have instituted worksite wellness programs which include weight control components (73).

As a measure of absenteeism from work because of illness or disability in this study, sick leave hours were obtained from each
aide's personnel record for the period six months prior to and the period six months following the workshop. The number of sick leave hours taken showed a significant change, decreasing from a mean of 28.7 hours during the six months before the workshop to 21.3 hours \((t_{(18)} = 79, p<.05)\) during the six months following the workshop.

**Objective 7: Comparison of PRE and DELAYED Measurements of**

**Comparison Group**

The comparison group's measurements showed only one statistically significant change between the PRE and DELAYED measurement periods as shown in Table 9.

BMI increased significantly from a mean of 32.1 to a mean of 33.6 \((t_{(17)} = 2.15, p<.05)\). Higher BMI levels are associated with higher weights \((11,12)\). Body weight increased from a mean of 185.4 pounds preceding the workshop to 192.5 pounds six months later, but this was not a statistically significant change.

**Objective 8: Comparison of POST Measurements of Treatment and Comparison Groups**

Analysis of covariance (ANCOVA) was used to determine if differences existed between POST measurements of the treatment and comparison groups. The covariate utilized was the PRE measurement for each respective POST measurement. ANCOVA was chosen because, although the groups were not statistically different on any of the premeasurements, there were numerical differences which, according to Kerlinger \((96,p .340)\), may have "tipped the statistical scales" in favor of one of the groups. ANCOVA uses sums of squares and mean squares purged of the influence of the pretest measurements.
Table 9
PRE and DELAYED Measurement Comparisons of Comparison Group

<table>
<thead>
<tr>
<th>Measurements</th>
<th>PRE</th>
<th>DELAYED</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S.D.</td>
<td>S.D.</td>
<td></td>
</tr>
<tr>
<td>Dietary Score</td>
<td>43.00</td>
<td>40.94</td>
<td>1.29</td>
</tr>
<tr>
<td></td>
<td>9.96</td>
<td>7.45</td>
<td></td>
</tr>
<tr>
<td>Nutrition Knowledge</td>
<td>14.78</td>
<td>14.44</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td>2.90</td>
<td>3.15</td>
<td></td>
</tr>
<tr>
<td>Exercise Practices</td>
<td>3.32</td>
<td>3.36</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>0.77</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>Eating Behaviors</td>
<td>3.68</td>
<td>3.94</td>
<td>1.67</td>
</tr>
<tr>
<td></td>
<td>0.74</td>
<td>0.51</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>185.39</td>
<td>192.50</td>
<td>2.05</td>
</tr>
<tr>
<td></td>
<td>44.99</td>
<td>43.94</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>32.11</td>
<td>33.61</td>
<td>2.15*</td>
</tr>
<tr>
<td></td>
<td>7.64</td>
<td>7.07</td>
<td></td>
</tr>
<tr>
<td>Percent Body Fat</td>
<td>42.17</td>
<td>41.78</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>8.95</td>
<td>9.53</td>
<td></td>
</tr>
<tr>
<td>Sick Leave Hours</td>
<td>23.50</td>
<td>26.22</td>
<td>0.40</td>
</tr>
<tr>
<td></td>
<td>26.64</td>
<td>21.89</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05
The comparison of POST dietary scores by treatment group is presented in Table 10. Results obtained from the analysis of covariance \((F_{(1,34)} = 4.95, p<.05)\) indicated that the groups were different. The nature of this difference in the two groups' scores can be seen in the adjusted POST test means. These means revealed that the treatment group had a mean dietary score (adjusted mean = 33.9) that was lower than that of the comparison group (adjusted mean = 39.9) when PRE test scores were used as a covariate.

The lower mean dietary score at POST test for the treatment group as compared to the comparison group indicated closer adherence to the optimal dietary score of 0 established for the food checklist instrument. The treatment group, after having participated in six sessions of the Healthy Weight Workshop, reported being closer to having dietary intakes based on the Dietary Guidelines for Americans and the Daily Food Guide than the comparison group. Eating a variety of foods in recommended amounts and restricting fat intake have been shown to be a healthful approach to weight comparison and maintenance.

POST nutrition knowledge scores compared by treatment group are presented in Table 11. Results from the ANCOVA \((F_{(1,34)} = 88.4, p<.001)\) indicated that the groups' knowledge scores were different. The nature of this difference can be seen in the adjusted POST test means. These means revealed that the treatment group had higher mean nutrition knowledge scores (adjusted mean = 22.0) than that of the comparison group (adjusted mean = 15.8) when the PRE test scores were used as a covariate.

After six weeks of participation in the Healthy Weight Workshop, the treatment group showed significant cognitive gain as related
Table 10

Analysis of Covariance
POST Dietary Scores by Treatment Controlling for PRE Dietary Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary Score</td>
<td>1</td>
<td>1319.423</td>
<td>19.84***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>328.98</td>
<td>4.95*</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>66.51</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a* unadjusted means: treatment = 34.37, comparison = 39.39

*b* adjusted means: treatment = 33.90, comparison = 39.88

*p*<.05

***p***<.001

Table 11

Analysis of Covariance
POST Nutrition Knowledge Scores by Treatment Controlling for PRE Nutrition Knowledge Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Score</td>
<td>1</td>
<td>169.05</td>
<td>41.81***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>357.46</td>
<td>88.40***</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>4.04</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a* unadjusted means: treatment = 22.32, comparison = 15.50

*b* adjusted means: treatment = 22.06, comparison = 15.77

***p***<.001
to weight control reflected by their higher mean nutrition knowledge score at posttest. Questions on the nutrition knowledge instrument were derived from information presented and distributed at the workshop.

The comparison of POST exercise scores by treatment group is presented in Table 12. Results from the ANCOVA ($F_{1,34} = 7.5$, $p<.01$) indicated that the groups' exercise scores were different. The nature of this difference can be seen in the adjusted POST test means. These means revealed that the treatment group had a POST mean exercise score (adjusted mean = 4.0) that was higher than that of the comparison group (adjusted mean = 3.3) when the PRE test scores were used as a covariate.

The increased exercise scores of the treatment group after participation in the Healthy Weight Workshop indicated that subjects reported adopting practices of increased physical exercise as recommended in the workshop. During the course of the workshop, several nutrition aides had reported forming walking groups within their neighborhood settings. They also reported other activities of increased exercise such as walking to work or walking to make home visits to EFNEP clientele. Increased exercise has been reported to help individuals lose weight and has been recommended as an integral part of successful weight control programs (45).

No statistically significant differences were found between the two groups at POST test for any other measures including eating behaviors (Table 13), weight (Table 14), BMI (Table 15) or body fat percentages (Table 16).
Table 12
Analysis of Covariance
POST Exercise Scores by Treatment Controlling for PRE Exercise Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise Score</td>
<td>1</td>
<td>10.85</td>
<td>24.06***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>3.38</td>
<td>7.50**</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a unadjusted means: treatment = 3.82, comparison = 3.47
b adjusted means: treatment = 3.95, comparison = 3.33
**p < .01
***p < .001

Table 13
Analysis of Covariance
POST Eating Behaviors Scores by Treatment Controlling for PRE Eating Behaviors Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating Behaviors Score</td>
<td>1</td>
<td>2.94</td>
<td>6.16*</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>0.03</td>
<td>0.06</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>0.48</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a unadjusted means: treatment = 3.93, comparison = 3.97
b adjusted means: treatment = 3.98, comparison = 3.92
*p < .05
Table 14

Analysis of Covariance
POST Weight by Treatment Controlling for PRE Weight

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>1</td>
<td>71,841.96</td>
<td>708.90***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>196.82</td>
<td>1.94</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>101.34</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*unadjusted means: treatment = 189.47, comparison = 189.22
*b adjusted means: treatment = 187.10, comparison = 191.72

***p<.001

Table 15

Analysis of Covariance
POST BMI by Treatment Controlling for PRE BMI

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>1</td>
<td>1986.91</td>
<td>717.76***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>10.16</td>
<td>3.67</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>2.77</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*unadjusted means: treatment = 32.10, comparison = 33.00
*b adjusted means: treatment = 32.03, comparison = 33.08

***p<.001
Table 16

Analysis of Covariance

POST Body Fat Percentages by Treatment Controlling for PRE Body Fat Percentages

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Body Fat a,b</td>
<td>1</td>
<td>2004.10</td>
<td>280.82***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>6.02</td>
<td>0.84</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>7.14</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a unadjusted means: treatment = 41.74, comparison = 42.44
b adjusted means: treatment = 41.69, comparison = 42.49

***p<.001
Objective 9: Comparison of DELAYED Measurements of Treatment and Comparison Groups

Analysis of covariance (ANCOVA) was used to determine if any differences existed between the DELAYED measurements of the experimental and comparison groups. The covariate utilized was the pre-measurement for each respective DELAYED measurement. ANCOVA was chosen because, although the groups were not statistically different on any of the PRE measurements, there were numerical differences which, according to Kerlinger (96,p.340), may have "tipped the statistical scales" in favor of one of the groups. ANCOVA uses sums of squares and mean squares purged of the influence of the pretest measurement.

The comparison of DELAYED dietary scores by treatment group is presented in Table 17. Results of the ANCOVA \( F(1,34) = 42.12, \quad p<.001 \) indicated that the groups' dietary scores were different. The nature of this difference can be seen in the adjusted DELAYED means. These means revealed that the treatment group had DELAYED dietary scores (adjusted mean = 29.6) that were nearer the optimum than the comparison group (adjusted mean = 41.4) when PRE test scores were used as a covariate.

The treatment group's lower dietary mean score at six months as compared to the comparison group's mean score indicated that gains made in improved dietary intake during the Healthy Weight Workshop continued throughout the follow-up period. Eating a variety of foods in recommended amounts is an integral part of most weight control programs and had been stressed during each workshop session.

DELAYED nutrition knowledge scores compared by treatment group are presented in Table 18. Results of the ANCOVA \( F(1,34) = 207.2, \)
### Table 17

Analysis of Covariance
DELAYED Dietary Scores by Treatment Controlling for PRE Dietary Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELAYED Dietary Score</td>
<td>1</td>
<td>951.00</td>
<td>31.30***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>1279.90</td>
<td>42.12***</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>30.39</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*unadjusted means: treatment = 30.00, comparison = 40.94

*adjusted means: treatment = 29.58, comparison = 41.38

***p<.001

### Table 18

Analysis of Covariance
DELAYED Nutrition Knowledge Scores by Treatment Controlling for PRE Nutrition Knowledge Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition Knowledge Score</td>
<td>1</td>
<td>123.30</td>
<td>31.91***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>800.52</td>
<td>207.19***</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>3.86</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*unadjusted means: treatment = 24.21, comparison = 14.44

*adjusted means: treatment = 24.04, comparison = 14.62

***p<.001
p<.001) indicated that the two groups' scores were different. The nature of this difference can be seen in the adjusted DELAYED means. These means revealed that the treatment group had DELAYED scores (adjusted mean = 24.0) that were higher than that of the comparison group (adjusted mean = 14.6) when the PRE test scores were used as a covariate.

The higher mean nutrition knowledge score of the experimental group at six months following the workshop indicated significant cognitive gain in the area of nutrition as related to weight control. Several of the nutrition aides had been presenting the Healthy Weight Workshop material to EFNEP clientele in small group settings during the six month period and, therefore, had been exposed to the nutrition information on a continuing basis.

The comparison of DELAYED exercise scores by treatment group is presented in Table 19. Results of the ANCOVA \((F_{(1,34)} = 32.7, p<.001)\) indicated that the groups' exercise scores were different. The nature of this difference can be seen in the adjusted DELAYED means. These means revealed that the treatment group had DELAYED exercise scores (adjusted mean = 4.2) that were higher than that of the control group (adjusted mean = 3.3) when the PRE test scores were used as a covariate.

The higher mean exercise score of the treatment group at six months following the Healthy Weight Workshop as compared to the comparison group's score indicated that the group reported adopting exercise practices as had been encouraged in the workshop sessions. An active lifestyle, including a program of regular exercise, is reported to be essential for weight control and maintenance (45).
Table 19

Analysis of Covariance
DELAYED Exercise Scores by Treatment Controlling for PRE Exercise Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise Score</td>
<td>1</td>
<td>3.91</td>
<td>18.63***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>6.86</td>
<td>32.69***</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a unadjusted means: treatment = 4.06, comparison = 3.36
b adjusted means: treatment = 4.15, comparison = 3.27

***p < .001

Table 20

Analysis of Covariance
DELAYED Eating Behaviors Scores by Treatment Controlling for PRE Eating Behaviors Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating Behaviors Score</td>
<td>1</td>
<td>1.88</td>
<td>9.93***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>0.93</td>
<td>4.92*</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a unadjusted means: treatment = 4.17, comparison = 3.94
b adjusted means: treatment = 4.22, comparison = 3.89

*p < .05
***p < .001
The comparison of DELAYED eating behaviors scores by group is presented in Table 20. Results of the analysis of covariance ($F(1,34) = 4.92, p<.05$) indicated that the two groups were different. The nature of this difference in eating behaviors can be seen in the adjusted DELAYED means. These means revealed that the treatment group had DELAYED scores (adjusted mean = 4.2) that were higher than the comparison group (adjusted mean = 3.9) when the PRE test scores were used as a covariate.

The higher mean eating behaviors score found for the treatment group at six months following the Healthy Weight Workshop as compared to the comparison group indicated that the group reported adopting eating practices related to weight control. Behavior changes, such as learning to differentiate between eating to satisfy real hunger and eating to pacify emotional and psychological needs, were stressed in the workshop. Participants had been asked to keep food diaries during the first weeks of the workshop in which they listed what, when, and where they ate and how they felt when they ate. The emotional aspects related to eating and suggested alternatives were discussed. Goals were also set by the participants for achievement of specific objectives related to weight control such as not eating between meals or avoiding grocery shopping when hungry, and rewards were specified.

The comparison of DELAYED weight by treatment group is presented in Table 21. Results obtained from the ANCOVA ($F(1,34) = 8.44, p<.01$) indicated that the two groups differed on this measure. The nature of this difference can be seen in the adjusted DELAYED means. These means revealed that the treatment group had weights
Table 21
Analysis of Covariance
DELAYED Weight by Treatment Controlling for PRE Weight

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>1</td>
<td>65,972.16</td>
<td>570.42***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>976.25</td>
<td>8.44**</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>115.66</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a unadjusted means: treatment = 186.89, comparison = 192.50
b adjusted means: treatment = 184.61, comparison = 194.91
**p<.01
***p<.001

Table 22
Analysis of Covariance
DELAYED Body Mass Index (BMI) by Treatment Controlling for PRE Body Mass Index (BMI)

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>1</td>
<td>1730.64</td>
<td>370.95***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>41.65</td>
<td>8.93**</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>4.66</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a unadjusted means: treatment = 31.63, comparison = 33.61
b adjusted means: treatment = 31.56, comparison = 33.68
**p<.01
***p<.001
(adjusted mean = 184.6) that were lower than the comparison group (adjusted mean = 194.9) when the PRE weights were used as a covariate in the analysis.

The decreased mean weight of the treatment group six months following the Healthy Weight Workshop as compared to the comparison group indicated that some positive changes in dietary habits, exercise practices and/or eating behaviors had occurred. Weight loss was not the primary focus of the workshop. However, helping participants to recognize areas in their lives that might be contributing to obesity and helping them to understand recommendations for attaining desirable weight were the primary emphases.

The comparison of DELAYED BMI by treatment group is presented in Table 22. Results obtained from ANCOVA ($F_{(1,34)} = 8.93$, $p<.01$) indicated that measurements for the two groups were different. The nature of this difference can be seen in the adjusted DELAYED means. These means revealed that the treatment group had DELAYED BMI's (adjusted mean = 31.6) that were lower than those of the comparison group (adjusted mean = 33.7) when PRE BMI's were used as a covariate.

The decreased mean BMI of the treatment group six months following the Healthy Weight Workshop as compared to the comparison group's measurement was correlated with their decreased mean weight. BMI is used in clinical settings to establish the presence of obesity using body weight irrespective of height (93).

No statistically significant differences were found for DELAYED body fat percentages (Table 23) and DELAYED absence from work (Table 24).
Table 23

Analysis of Covariance
DELAYED Body Fat Percentages by Treatment Controlling for PRE Body Fat Percentages

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Fat Percentage</td>
<td>1</td>
<td>1830.43</td>
<td>226.50***</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>4.05</td>
<td>0.50</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>8.08</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a* unadjusted means: treatment = 41.21, comparison = 41.78  
*b* adjusted means: treatment = 41.17, comparison = 41.83  
***p<.001

Table 24

Analysis of Covariance
DELAYED Sick Leave Hours by Treatment Controlling for PRE Sick Leave Hours

<table>
<thead>
<tr>
<th>Source</th>
<th>d.f.</th>
<th>M.S.</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELAYED Sick Leave Hours</td>
<td>1</td>
<td>1824.75</td>
<td>7.18*</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>411.32</td>
<td>1.62</td>
</tr>
<tr>
<td>Error</td>
<td>34</td>
<td>254.00</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a* unadjusted means: treatment = 21.27, comparison = 26.23  
*b* adjusted means: treatment = 20.41, comparison = 27.13  
*p<.05
A comparison of the waist to hip circumference ratios of the experimental and comparison groups six months after the workshop is presented in Table 25. The mean waist to hip circumference ratio of the treatment group was 0.79 and 0.82 for the comparison group. Although this difference was not statistically significant, a waist to hip circumference ratio greater than 0.8 for women has been found to be related to increased risk for heart disease and diabetes (14).

### Table 25
Comparison of Waist to Hip Ratios of Treatment and Comparison Groups

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Treatment</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (a)</td>
<td>Mean (b)</td>
</tr>
<tr>
<td>Waist to Hip Ratio</td>
<td>0.79</td>
<td>0.82</td>
</tr>
<tr>
<td></td>
<td>0.04</td>
<td>0.07</td>
</tr>
</tbody>
</table>

\(a_n = 19\)
\(b_n = 18\)
Chapter V
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Statement of the Problem

Obesity is a major health problem of low-income black women. Sixty percent of black women in the United States are reported to be obese (2). Data from the National Health and Nutrition Examination Survey (NHANES) have shown that the prevalence of obesity in American women is much higher among those in lower socioeconomic groups (6). Obesity is now considered to be a chronic disease and is either a direct cause of or a risk factor for many other major chronic diseases, including heart disease, hypertension, diabetes, stroke and cancer.

EFNEP nutrition aides are paraprofessionals employed by the Louisiana Cooperative Extension Service to provide nutrition information to low-income families. Ninety-eight percent of nutrition aides are black females and most are indigenous to the low-income population with whom they work, serving as role models for homemakers participating in the program.

This group of women, primarily low-income and black, may be at risk for developing health problems associated with obesity. In addition, the weight management practices of the nutrition aides are important since they serve as role models for their homemaker clientele.

Purpose of the Study

This study was designed to investigate the effects of participation in the Louisiana Cooperative Extension Service Healthy Weight Workshop on the dietary intake, nutrition knowledge, exercise practices, eating behaviors, anthropometric measurements and number of sick leave hours used of EFNEP nutrition aides.
**Objectives**

Specific objectives formulated for the study included:

1. To describe EFNEP nutrition aides on the characteristics of length of service, educational level, age and prior participation in a weight control program.

2. To compare the PRE and POST measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop on the following variables:
   (a) conformity to optimal dietary intake
   (b) nutrition knowledge
   (c) weight
   (d) BMI
   (e) percent body fat
   (f) exercise
   (g) eating behaviors.

3. To compare the PRE and POST measurements of EFNEP nutrition aides who did not participate in the Healthy Weight Workshop on the following variables:
   (a) conformity to optimal dietary intake
   (b) nutrition knowledge
   (c) weight
   (d) BMI
   (e) percent body fat
   (f) exercise
   (g) eating behaviors.
4. To compare the POST and DELAYED measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop on the following variables:
(a) conformity to optimal dietary intake
(b) nutrition knowledge
(c) weight
(d) BMI
(e) percent body fat
(f) exercise
(g) eating behaviors.

5. To compare the POST and DELAYED measurements of EFNEP nutrition aides who did not participate in the Healthy Weight Workshop on the following variables:
(a) conformity to optimal dietary intake
(b) nutrition knowledge
(c) weight
(d) BMI
(e) percent body fat
(f) exercise
(g) eating behaviors.

6. To compare the PRE and DELAYED measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop on the following variables:
(a) conformity to optimal dietary intake
(b) nutrition knowledge
(c) weight
(d) BMI
(e) percent body fat
(f) exercise
(g) eating behaviors
(h) hours of sick leave used.

7. To compare the PRE and DELAYED measurements of EFNEP nutrition aides who did not participate in the Healthy Weight Workshop on the following variables:
(a) conformity to optimal dietary intake
(b) nutrition knowledge
(c) weight
(d) BMI
(e) percent body fat
(f) exercise
(g) eating behaviors
(h) hours of sick leave used.

8. To compare the POST measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop with those who did not participate on the following variables:
(a) conformity to optimal dietary intake
(b) nutrition knowledge
(c) weight
(d) BMI
(e) percent body fat
(f) exercise
(g) eating behaviors.
9. To compare the DELAYED measurements of EFNEP nutrition aides who participated in the Healthy Weight Workshop with those who did not participate on the following variables:
   (a) conformity to optimal dietary intake
   (b) nutrition knowledge
   (c) weight
   (d) BMI
   (e) percent body fat
   (f) exercise
   (g) eating behaviors
   (h) hours of sick leave used.

Methodology

The Louisiana Cooperative Extension Service Healthy Weight Workshop, a series of six sessions on weight management, was presented to 19 EFNEP nutrition aides in an urban area, Orleans Parish. Eighteen nutrition aides from another urban area, Caddo/Bossier parishes, served as the comparison group.

Instruments to assess nutrition knowledge related to weight management, dietary intake, exercise practices and eating behaviors were developed by the researcher. Anthropometric measurements including weight, BMI and percent body fat were selected as obesity indicators for the study. Personnel records were used to determine hours missed from work because of illness.

Three data collection periods were designated for the study: PRE - one week before the workshop; POST - one week following the workshop; and DELAYED - six months following the workshop. PRE data were collected for both groups one week before the workshop. The
eight weeks workshop was presented to the nutrition aides from Orleans Parish by the researcher. One week after the workshop, POST data were collected from both groups. Six months after the workshop, DELAYED data were collected from both groups.

The number of sick leave hours used was obtained from personnel records for the six month period prior to the workshop and for the six month period following the workshop for each nutrition aide.

Data were coded and analyzed at the Louisiana State University System Network Computer Center.

Findings

Demographic Data: All of the nutrition aides in both the treatment and comparison groups were black females residing and working in one of two urban areas in Louisiana. The nutrition aides in both groups were equivalent on educational level (12.5 years) and length of employment (9.5 years). The comparison group was significantly older (p<.05) than the experimental group, 50.2 years as compared with 43.2 years. The control group (78.8 percent) also reported having participated previously in a weight control program significantly more often (p<.05) than the treatment group (31.6 percent).

PRE Measurements: No statistically significant differences were found between the two groups before the treatment on any of the pretest scores or measurements including dietary score, nutrition knowledge, exercise practices, eating behaviors, weight, BMI, percent body fat and sick leave hours used.

The dietary mean score for both groups was fairly high, 45 for the experimental group and 43 for the comparison group. A dietary score of 0 reflected optimal dietary intake.
Of a possible 25 points on the nutrition knowledge assessment, the experimental group had a mean score of 15.7 while the comparison group's mean score was 14.8.

Exercise practices mean scores for both groups were not significantly different, 3.3 for the comparison group and 2.9 for the treatment group, on a 5-point scale. Eating behaviors mean scores were 3.7 for the comparison group and 3.4 for the treatment group on a 5-point scale.

The obesity indicators were extremely elevated for both groups. The comparison group's average measurements were as follows: 185.4 pounds, BMI = 32.1 and 42.2 percent body fat. The treatment group's average measurements were as follows: 190.3 pounds, BMI = 32.3 and 42.3 percent body fat.

**POST Measurements:** Significant improvements in several measurements were found for the treatment group immediately following their participation in the Healthy Weight Workshop. The mean dietary score decreased significantly (p<.05) from 45.0 to 34.4. Nutrition knowledge increased significantly (p<.001) from a mean of 15.7 to 22.3. Exercise practices mean scores improved significantly (p<.001) from 2.9 to 3.8 and eating behaviors improved significantly (p<.05) from a mean of 3.4 to 3.9. There were no statistically significant changes in any of the obesity indicators, including weight, BMI or percent body fat for the experimental group.

The comparison group's scores and measurements did not change significantly during this period.

Comparison of the treatment and control groups' POST measurements using analysis of covariance indicated that the dietary adjusted mean
score of the treatment group, 33.9, was significantly lower (p<.05) than the comparison group's score, 39.9. The treatment group's nutrition knowledge adjusted mean score, 22.1, was also significantly higher (p<.001) than the comparison group's score, 15.8, as was the experimental group's exercise score, 4.0, compared to the comparison group's score, 3.3 (p<.01).

**DELAYED Measurements**: A comparison of the POST and DELAYED measurements of the treatment group showed several significant improvements. At six months follow-up, the dietary score had decreased significantly (p<.01) from a mean of 34.4 to 30.0. Nutrition knowledge improved significantly (p<.001) from a mean of 22.3 to 24.2.

Weight decreased significantly (p<.01) from a mean of 189.5 pounds to 186.9 pounds. Concomitantly, the mean BMI decreased significantly (p<.05) from 32.1 to 31.6.

A comparison of the PRE and DELAYED measurements was made because this may provide a more accurate measure of the long-term effectiveness of the Healthy Weight Workshop. There were significant improvements in seven of the eight measurements of the treatment group when comparing measurements immediately preceding the workshop to those at follow-up six months later.

Dietary score decreased significantly (p<.001) toward the score of 0 from a mean of 45.0 before the workshop to 30.0 six months later. Nutrition knowledge improved significantly (p<.001) from a mean of 15.7 to 24.2. The mean exercise score improved significantly (p<.001) from 2.9 to 4.0. The eating behaviors mean score also improved significantly (p<.001) from 3.4 to 4.2.
Weight decreased significantly ($p < .01$) from a mean of 190.3 pounds before the workshop to 186.9 pounds six months later. There was a concommitant significant decrease ($p < .01$) in BMI from a mean of 32.3 to 31.6.

The number of sick leave hours taken showed a significant change ($p < .05$), decreasing from a mean of 28.7 hours during the six month period prior to the workshop to 21.3 hours during the six month period after the workshop.

The comparison group had only one significant change between the PRE and DELAYED measurement sessions. BMI increased significantly ($p < .05$) from a mean of 32.1 to 33.6. Weight increased from a mean of 185.4 pounds to 192.5 pounds but this was not a statistically significant change.

Comparisons of the DELAYED measurements which used analysis of covariance with PRE measurements as the covariates indicated several significant differences between the treatment and comparison groups. The DELAYED dietary adjusted mean score of the treatment group, 29.6, was significantly lower ($p < .001$) than the comparison group's score, 41.4. The treatment group also had a significantly higher ($p < .001$) nutrition knowledge adjusted mean score, 24.0, than the comparison group, 14.6.

The exercise adjusted mean score of the treatment group, 4.2, was significantly higher ($p < .001$) than the comparison group's score, 3.3. Comparison of the eating behaviors adjusted mean scores of the two groups showed that the treatment group's score of 4.2 was significantly higher ($p < .05$) than the comparison group's score of 3.9.
The treatment group had an adjusted mean weight of 184.6 pounds that was significantly lower \((p<.01)\) than the comparison group's weight of 194.9 pounds. The adjusted mean BMI of the treatment group, 31.6, was significantly lower \((p<.01)\) than the comparison group's BMI of 33.7.

Conclusions

1. The EFNEP nutrition aides participating in the study were obese.

Findings on which this conclusion was based include the following: The mean weight for the total group of 37 EFNEP nutrition aides was 187.9 pounds. The mean BMI of the total group was 32.2. A BMI of 27.3 is the benchmark figure which corresponds to 20 percent above desirable weight according to height/weight tables (11). The mean body fat percentage was 42.3 percent. The average body fat of women is reported to be 25 percent (34).

This is consistent with the literature in that obesity has been reported to be six times more common among members of the lowest socioeconomic group than among the highest (2). In industrialized countries, the problem of obesity has been found to decrease with increasing socioeconomic status (5). Over half of the middle-aged black women in the United States are reported to be obese, having weights greater than 20 percent above desirable weight (6). Nutrition education needs of low-income black women have been reported to be greater than for non-blacks in relation to weight management (7).

2. Participation in the Healthy Weight Workshop resulted in improvement in reported lifestyle patterns influencing weight management including diet, exercise and eating behaviors.
Findings on which this conclusion was based included the following: The dietary score of the treatment group improved from a mean of 45.0 preceding the workshop to 34.4 (p<.05) immediately following the workshop to 30.0 (p<.001) six months later. The lower scores at six weeks and six months reflected closer conformity to the dietary score of 0.

Exercise practices scores improved from a mean of 2.9 initially to 3.8 (p<.001) immediately following the workshop to 4.1 (p<.001) at the DELAYED measurement session six months later. Eating behaviors scores improved from a mean of 3.4 before the workshop to 3.9 (p<.05) at the six weeks POST measurement session to 4.2 (p<.001) six months later.

These findings are consistent with the literature in that most successful weight control programs have been reported to include the following three components: diet, exercise and behavior modification (68). The improved dietary score of the treatment group indicated consumption of a variety of foods in recommended amounts as suggested by the Dietary Guidelines for Americans and the USDA Daily Food Guide emphasizing preparation methods compatible with reduced fat and calories (47,48). Several researchers have indicated that participation in nutrition education programs by EFNEP nutrition aides resulted in improved dietary intake (8,80,81).

Exercise has been recommended as an integral part of successful weight management programs (45). Lack of exercise and a sedentary lifestyle were reported by McGee (33) as a major contributor to the obesity problems of black women.

Behavior modification has been reported to be an effective, widely used treatment in weight management programs (52,53,54,55,56,57,58).
Maintenance of weight loss is reported to require major changes in an individual's lifestyle which must be changed over time (56). Changing behaviors and practices related to weight comparison have been found to help prevent recidivism (54,55).

As part of the Healthy Weight Workshop, the nutrition aides were given a food plan utilizing recommendations from the USDA Daily Food Guide and the Dietary Guidelines for Americans. The benefits of exercise were discussed and participants were encouraged to start an exercise program, especially walking. Strategies to combat eating problems were presented and discussed in relation to the food diaries kept by participants.

3. Participation in the Healthy Weight Workshop resulted in improvement in nutrition knowledge related to weight management.

Findings on which this conclusion was based include the following: The nutrition knowledge score improved significantly during the study from a mean of 15.7 preceding the workshop to 22.3 (p<.001) immediately following the workshop to 24.2 (p<.001) six months later.

This is consistent with the literature in that Carruth (83) reported that nutrition aides demonstrated immediate and long-term significant cognitive gain in nutrition knowledge related to weight control after participating in five training sessions on weight modification. Other researchers (8,80,81,82) have reported that the food and nutrition knowledge of nutrition aides has significantly increased through their participation in EFNEP.

Nutrition information regarding weight management was an integral part of the Healthy Weight Workshop. The sessions included information on a nutritious diet for weight management based on the USDA Daily
Food Guide and Dietary Guidelines for Americans. Emphasis was placed on selecting and preparing foods to lower fat in the diet. Discussion included the dangers of very low calorie and starvation diets to achieve and maintain desirable weight. Workshop materials were presented to the nutrition aides for their own use or for presentation to their EFNEP homemakers.

4. Participation in the Healthy Weight Workshop resulted in improvement of obesity indicators including weight and BMI.

Findings on which this conclusion was based include the following: The weight of the treatment group decreased from a mean of 190.3 pounds before the workshop to 189.5 pounds six weeks later, a decrease which was not statistically significant. However, at six months following the workshop, the mean weight had decreased significantly (p<.01) to 186.9 pounds. Concomitantly, BMI decreased from a mean of 32.3 preceding the workshop to 32.1 immediately following the workshop (a statistically nonsignificant difference). There was a significant decrease (p<.01) in BMI to 31.6 six months later.

The findings are consistent with the literature in that several researchers have reported weight loss by low-income black women participating in weight comparison programs. Schmidt (77) reported a program in which the average weight loss by participants was 5 pounds. Shook (78) reported a study with an average weight loss of 3 pounds and Kaul et al. (79), a program with an average weight loss of 4 pounds.

Weight is used in the calculation of BMI and, therefore, reflects changes in weight. The benchmark BMI for obesity (20 percent above desirable weight using height/weight tables) is 27.3 for women (11,12).
Emphasis on pounds lost was not a major focus of the workshop but rather making changes in lifestyle patterns related to diet, exercise and eating behaviors that might produce weight loss over time. Weight and BMI were measured only three times during the course of the study – immediately preceding the workshop, immediately following the workshop and six months after the workshop.

5. Participation in the Healthy Weight Workshop resulted in reduction of number of hours of sick leave used.

Findings on which this conclusion was based include the following: The number of sick leave hours used by the treatment group for the period six months before the workshop was 28.7 hours. The number of sick leave hours decreased significantly to 21.3 hours during the six month period following the workshop.

These findings are consistent with the literature in that obese persons are reported to have increased health problems compared to those of normal weight. Poor health has been reported to result in increased absenteeism, increased turnover and decreased productivity (29). Fielding and Breslow (73) reported that employers have instituted worksite wellness programs, including weight control components, to improve absenteeism and employee productivity.

6. The Healthy Weight Workshop participants demonstrated better lifestyle patterns on factors shown to influence weight management including diet, exercise practices and eating behaviors than the comparison group.

Findings on which this conclusion was based include the following: The adjusted dietary mean score of the treatment group (33.9) was significantly better (p<.05) than the comparison group's mean score
(39.9) immediately following the workshop. At six months following the workshop, the adjusted dietary mean score of the treatment group was 29.6 compared to 41.4 (p<.001) for the comparison group. The lower score of the treatment group indicated closer adherence to the dietary score of 0.

Immediately following workshop participation, the adjusted exercise mean score of the treatment group was 4.0 compared to 3.3 (p<.01) for the comparison group. Six months later the treatment group's adjusted exercise mean score was 4.2 compared to 3.3 (p<.001) for the comparison group.

Immediately following the workshop, the adjusted eating behaviors mean score of the treatment group was 4.0 compared to 3.9 for the comparison group indicating no difference. However, six months later there was a significant difference (p<.05) between the treatment group's adjusted eating behaviors mean score of 4.2 compared to the comparison group's score of 3.9.

The literature offers evidence that many low-income black women often have lifestyle patterns, including diet and exercise habits, which are considered to be unhealthy (75). Poor dietary intakes of low-income blacks have been reported to be associated with increased risk of development of many chronic diseases including obesity, heart disease, diabetes and cancer (7).

Nutrition education programs designed to promote weight management are reported to result in all or part of the following outcomes by program participants:

1. Adherence to the Dietary Guidelines for Americans.
2. Achievement and maintenance of desirable weight.
3. Acquisition or strengthening of knowledge about basic nutrition concepts.
4. Improved nutritional status.
5. Increased activity levels.
6. Improved health status and physical condition (10,24,25).

Participation in EFNEP nutrition education programs has been reported to result in improved dietary intake of participants (8,81,82). Previous studies (77,78,79) have also indicated that participation by black females in weight management programs resulted in improved dietary intake leading to weight loss. The EFNEP Evaluation Studies Plan (84) specified the importance of improving nutrition aides' diets to meet recommended calorie levels.

A program of regular exercise has been reported to be an essential component of successful weight management programs (45). Exercise on a consistent basis has been shown to be effective in promoting weight loss and increasing lean body mass (45). Walking has been recommended as a convenient, beneficial, non-injurious form of exercise (50,51). The Healthy Weight Workshop participants were encouraged to establish a walking program.

Helping workshop participants recognize and change eating behaviors that may lead to obesity was a component of the Healthy Weight Workshop. Studies have linked changes made in lifestyle patterns to successful weight management (57,58,59). Helm et al. (76) reported a successful weight control program for low-income black women in an inner-city population using behavior modification.
7. The Healthy Weight Workshop participants demonstrated a higher level of nutrition knowledge related to weight management than the comparison group.

Findings on which this conclusion was based include the following: The treatment group's adjusted nutrition knowledge mean score immediately following the workshop was 22.1 compared to the comparison group's score which was 15.8 (p<.001). Six months later, the treatment group's adjusted mean score was 24.0 compared to the comparison group's score of 14.6 (p<.001).

These findings are consistent with those of Carruth (83) who reported that EFNEP nutrition aides participating in EFNEP training demonstrated immediate and long-term significant cognitive gain in nutrition knowledge related to weight control. Stewart (82) reported that the food and nutrition knowledge of nutrition aides has significantly increased through their participation in EFNEP.

8. The Healthy Weight participants demonstrated better measurements of the obesity indicators weight and BMI than the comparison group.

Findings on which this conclusion was based include the following: Although there were no differences in weight or BMI immediately following the workshop, at the DELAYED measurement session there were significant improvements (p<.01) in both measurements for the treatment group as compared to the comparison group. The adjusted mean weight of the treatment group was 184.6 pounds and 194.9 pounds for the comparison group six months following the workshop. The adjusted mean BMI for the treatment group was 31.6 compared to 33.7 for the comparison group.
These findings are consistent with evidence from the literature in that obesity is reported to be of epidemic proportions in middle-aged black women (6). Obesity is also reported to be six times more common among women in the lowest socioeconomic group as compared to the highest (2). McGee (33) reported that of 100 obese black women studied, 90 had a history of unsuccessful weight loss. A few researchers have reported results of successful weight loss programs for low-income black women (77,78,79).

Because weight is used to calculate BMI, the measurement corresponds to changes in weight. BMI is highly correlated with weight but minimizes the effect of height (11).

9. The Healthy Weight Workshop participants did not demonstrate fewer sick leave hours used than the comparison group.

This conclusion was based on the finding that there was no significant difference between sick leave hours used by the treatment group (adjusted mean = 20.4 hours) and the comparison group (adjusted mean = 27.1 hours) during the six month period following the workshop.

10. No recidivism in the Healthy Weight Workshop participants' scores and measurements related to weight management occurred at six months follow-up.

Findings on which this conclusion was based include the following: Several measurements showed significant improvement between the measurement session preceding the workshop and the session immediately following the workshop including dietary score (p<.05), nutrition knowledge (p<.001), exercise practices (p<.001) and eating behaviors (p<.05).

At the six month DELAYED measurement session, the following measurements showed significant improvement compared to those preceding
the workshop: dietary score ($p<.001$), nutrition knowledge ($p<.001$), exercise practices ($p<.001$), eating behaviors ($p<.001$), weight ($p<.01$) and BMI ($p<.01$).

In addition, there was even greater improvement for the following measurements six months after the workshop compared to those immediately after the workshop: dietary score ($p<.01$), nutrition knowledge ($p<.001$), weight ($p<.01$) and BMI ($p<.05$).

These findings are consistent with those of Carruth (83) who reported that five training sessions on weight modification resulted in significant cognitive gain for participants. Stewart (82) reported that the food and nutrition knowledge of nutrition aides has significantly increased through their participation in EFNEP. Other researchers (8,80,81) have reported improvements in dietary intake for EFNEP participants. Several researchers (77,78,79) have reported successful weight loss programs for low-income black females.

The EFNEP nutrition aides participating in the Healthy Weight Workshop were given the workshop materials to use for their own information and presentation to their homemakers. The nutrition aides were encouraged to begin presenting the information to their homemakers in small group settings. Several nutrition aides reported the formation of groups to discuss weight management and to participate in walking programs.

**Recommendations**

The following recommendations were based on findings from the study:
1. The Louisiana Cooperative Extension Service should arrange for the Healthy Weight Workshop to be presented to all nutrition aides currently employed in the EFNEP program.

2. The Louisiana Cooperative Extension Service should include the Healthy Weight Workshop in the orientation training program of all new EFNEP nutrition aides.

3. Time should be allocated during work for participation by the EFNEP nutrition aides in a worksite wellness program, including exercise and other activities related to weight management.

4. The Healthy Weight Workshop should be developed and presented to other black female paraprofessional employees of the Louisiana Cooperative Extension Service.

5. Further research should be conducted to follow those individuals participating in the treatment group at one year intervals to ascertain the long-range benefits of the Healthy Weight Workshop.

6. The EFNEP nutrition aides participating in the Healthy Weight Workshop should be encouraged to present information from the workshop to their EFNEP homemakers.
REFERENCES


APPENDIX A

Instrument to Assess Dietary Intake, Nutrition Knowledge, Exercise Practices and Eating Behaviors
## FOOD CHECKLIST

**Directions:** Please place a check in the square that indicates how often you usually eat these foods.

<table>
<thead>
<tr>
<th>Foods</th>
<th>Frequency of Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef or pork (including hamburger and ham)</td>
<td>At least once a day</td>
</tr>
<tr>
<td>Chicken or turkey</td>
<td>5-6 times a week</td>
</tr>
<tr>
<td>Fish, shellfish, tuna</td>
<td>3-4 times a week</td>
</tr>
<tr>
<td>Dried peas or beans</td>
<td>1-2 times a week</td>
</tr>
<tr>
<td>Peanut butter or nuts</td>
<td>Seldom or never</td>
</tr>
<tr>
<td>Eggs</td>
<td></td>
</tr>
<tr>
<td>Hot dogs or lunch meats</td>
<td></td>
</tr>
<tr>
<td>Bacon</td>
<td></td>
</tr>
<tr>
<td>Whole milk</td>
<td></td>
</tr>
<tr>
<td>Skim, lowfat milk or plain yogurt</td>
<td></td>
</tr>
<tr>
<td>Cheese, including cottage cheese</td>
<td></td>
</tr>
<tr>
<td>Vegetables - raw or salads</td>
<td></td>
</tr>
<tr>
<td>Vegetables - cooked</td>
<td></td>
</tr>
<tr>
<td>French fried potatoes</td>
<td></td>
</tr>
<tr>
<td>Fruit - fresh</td>
<td></td>
</tr>
<tr>
<td>Fruit - frozen, canned or juice</td>
<td></td>
</tr>
<tr>
<td>White bread, rolls, buns, cornbread</td>
<td></td>
</tr>
<tr>
<td>Whole-grain bread</td>
<td></td>
</tr>
<tr>
<td>Cereals - unsweetened, ready-to-eat, or hot</td>
<td></td>
</tr>
<tr>
<td>Cereals - pre-sweetened</td>
<td></td>
</tr>
<tr>
<td>Spaghetti, macaroni, noodles or rice</td>
<td></td>
</tr>
<tr>
<td>Butter</td>
<td></td>
</tr>
<tr>
<td>Margarine</td>
<td></td>
</tr>
<tr>
<td>Chips (potato and other)</td>
<td></td>
</tr>
<tr>
<td>Sweetened drinks (cola, other)</td>
<td></td>
</tr>
<tr>
<td>Sugar added to beverages or foods</td>
<td></td>
</tr>
<tr>
<td>Jellies, jams, preserves, honey, syrup</td>
<td></td>
</tr>
<tr>
<td>Candy</td>
<td></td>
</tr>
<tr>
<td>Doughnuts, cookies, cakes &amp; pies</td>
<td></td>
</tr>
<tr>
<td>Gravy &amp; sauces</td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
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</tr>
</tbody>
</table>

Beth Reames, R. D.  
Associate Specialist/Nutrition
Directions: Please place a check in the column that indicates how often you usually eat these foods.

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<tbody>
<tr>
<td></td>
<td>At least once a day</td>
</tr>
<tr>
<td>Fried or breaded?</td>
<td></td>
</tr>
<tr>
<td>Bacon, sausage, lunch meat and heavily marbled steaks and roasts?</td>
<td></td>
</tr>
<tr>
<td>Ice cream, ice milk, sherbet or frozen yogurt?</td>
<td></td>
</tr>
<tr>
<td>Regular salad dressings and mayonnaise?</td>
<td></td>
</tr>
<tr>
<td>Whipped cream, table cream, sour cream and cream cheese?</td>
<td></td>
</tr>
<tr>
<td>Cheddar, American or processed cheeses?</td>
<td></td>
</tr>
<tr>
<td>Salt meat, bacon or drippings added to vegetables?</td>
<td></td>
</tr>
<tr>
<td>Fast foods?</td>
<td></td>
</tr>
</tbody>
</table>

EATING HABITS

Directions: Please place a check in the square that indicates how often you do these.

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Usually</th>
<th>Occasionally</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>I eat when I'm bored, depressed, tense, afraid or frustrated.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I eat at irregular times and seem to snack a lot.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I seem to eat too fast and too much.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>I taste or eat food as I prepare meals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can't resist buying snacks such as cakes, cookies, candy or chips when I grocery shop.</td>
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<td></td>
</tr>
</tbody>
</table>
EXERCISE HABITS

Directions: Please place a check in the column that indicates how often you do these.

<table>
<thead>
<tr>
<th>Exercise Habit</th>
<th>Always</th>
<th>Usually</th>
<th>Occasionally</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do vigorous exercises for 20-30 minutes at least 3 times a week (examples include running, swimming, brisk walking).</td>
<td></td>
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</tr>
<tr>
<td>I put lots of energy into everyday activities—bending, stooping, stretching, reaching and moving as much as I can.</td>
<td></td>
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</tr>
<tr>
<td>When I can, I walk instead of drive, use the stairs instead of the elevator and stand rather than sit.</td>
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</tr>
<tr>
<td>I spend most of my leisure time watching TV.</td>
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</tbody>
</table>

NUTRITION KNOWLEDGE ASSESSMENT

Answer the following by placing an X in the appropriate response: A = AGREE, D = DISAGREE, U = UNCERTAIN

A healthy weight for a medium frame adult female 5'4" tall is 120 pounds. A D U
Healthy, active children require some concentrated sweets, such as candy, for energy needs. A D U
Toast has fewer calories than bread. A D U
Acidic foods, such as grapefruit, are of special value in reducing diets because they burn body fat. A D U
A weight loss of 5 pounds per week is a good recommendation for a healthy weight loss. A D U
A diet low in cholesterol and saturated fats will aid in the prevention of heart disease. A D U
Vitamin pills are not needed by most people to ensure good health if a well balanced diet is consumed. A D U
Potatoes should not be included on a weight control diet. A D U
Butter has more calories than margarine. A D U
Carbohydrate foods, such as bread, rice and potatoes, provide few nutrients other than calories. A D U

Lack of exercise often leads to overweight in both adults and children. A D U
An adult female needs about 1,000 calories per day to maintain her weight. A D U
A teaspoon of margarine has more calories than a teaspoon of sugar. A D U
High blood pressure, high blood cholesterol levels and diabetes are often associated with obesity. A D U
There are 1,500 calories in one pound of body fat. A D U
Most Americans do not get enough protein in their diets. A D U
To lose weight, it would be wise to decrease carbohydrates in the diet since carbohydrates have more calories than fats or proteins. A D U
A high protein diet is the best diet for weight loss. A D U
If a food is labeled "dietetic," you can be sure it is very low in calories. A D U
Adults may be overweight because food was used as a reward for good behavior when they were children. A D U

Place an X by the response you think is best. (Choose only one answer.)

Which one of these foods is the best source of vitamin C? cereals citrus fruits liver eggs
Which one of these foods is the best source of iron? milk hamburger cheese applesauce
Which of these is the best source of vitamin A? cereals nuts dark green vegetables citrus fruit
Which of the following is the best source of calcium? spinach cheese cereals apples
APPENDIX B

Scoring of Dietary Intake Instrument
FOOD CHECKLIST

Directions: Please place a check in the square that indicates how often you usually eat these foods.

<table>
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<tbody>
<tr>
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<td>At least once a day</td>
</tr>
<tr>
<td>hamburger and ham)</td>
<td>5-6 times a week</td>
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<td>Chicken or turkey</td>
<td>3-4 times a week</td>
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<td>Fish, shellfish, tuna</td>
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<td>Seldom or never</td>
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<td>Eggs</td>
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<td>Hot dogs or lunch meats</td>
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<td>Whole milk</td>
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<tr>
<td>Skim, lowfat milk or</td>
<td></td>
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<tr>
<td>plain yogurt</td>
<td></td>
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<tr>
<td>Cheese, including</td>
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<tr>
<td>cottage cheese</td>
<td></td>
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<tr>
<td>Vegetables - raw or</td>
<td></td>
</tr>
<tr>
<td>salads</td>
<td></td>
</tr>
<tr>
<td>Vegetables - cooked</td>
<td></td>
</tr>
<tr>
<td>French fried potatoes</td>
<td></td>
</tr>
<tr>
<td>Fruit - fresh</td>
<td></td>
</tr>
<tr>
<td>Fruit - frozen, canned</td>
<td></td>
</tr>
<tr>
<td>or juice</td>
<td></td>
</tr>
<tr>
<td>Whole bread, rolls, buns,</td>
<td></td>
</tr>
<tr>
<td>cornbread</td>
<td></td>
</tr>
<tr>
<td>Whole-grain bread</td>
<td></td>
</tr>
<tr>
<td>Cereals—unsweetened,</td>
<td></td>
</tr>
<tr>
<td>ready-to-eat, or hot</td>
<td></td>
</tr>
<tr>
<td>Cereals—presweetened</td>
<td></td>
</tr>
<tr>
<td>Spaghetti, macaroni,</td>
<td></td>
</tr>
<tr>
<td>noodles or rice</td>
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<td>Butter</td>
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<td>honey, syrup</td>
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LOUISIANA COOPERATIVE
EXTENSION SERVICE
LOUISIANA STATE UNIVERSITY AGRICULTURAL CENTER

Eith Roames, R. D.
Associate Specialist/Nutrition

Bringing the University to You
### Food Frequency of Consumption

<table>
<thead>
<tr>
<th>Foods</th>
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<td>Fast foods?</td>
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</table>

### Eating Habits

#### Directions: Please place a check in the square that indicates how often you do these.

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</tbody>
</table>
APPENDIX C

Nomograph
### Nomograph for Body Mass Index (kg/m²) and Weight Goals

The ratio weight/height² (metric units) can be read from the central scale after a straight edge has been placed between height and body weight. Weights and heights are without clothing. The bottom of each range should be emphasized for individuals with a family history or current indications of diseases or risk factors complicated by obesity. (Adapted from Burton et al. [2] and Burton and Foster [3].)

Reprinted from Journal of American Dietetic Association 86:1704, 1986
Made available by Beth Reames, R.D., Associate Specialist (Nutrition)
APPENDIX D

Healthy Weight Workshop Outline
HEALTHY WEIGHT WORKSHOP

Session 1

Introduction to Workshop

Supplemental Materials Include: "Nutrition Knowledge Assessment"
"Background Information and Objectives"
Personal Card
"Your Eating Habits and Extra Calories"
"Are You Fit?"
"Weighing and Measuring Instructions"
"Body Mass Index Chart"
"Understanding Why You Eat As You Do - Food Diary"
"Getting to Know Yourself"
Doctor's Certificate

Supplemental Materials Needed: "Eating Disorders" - Slides (optional) - order from Nutrition/Health Project Secretary

Equipment Needed: Ruler
7' Steel Tape Measure
Skinfold calipers (optional)
Scale
Pencils
Slide Projector (optional)

Outline

1. Introduction to Healthy Weight Workshop
   A. Administer "Nutrition Knowledge Assessment" - Record score
   B. Use "Background Information and Objectives" and Workshop Format
   C. Distribute Personal Card - Have participants fill in information

II. Discussion of Diet, Exercise and Behavior as Related to Weight Loss and Maintenance.
   A. Administer "Your Eating Habits and Extra Calories"
   B. Administer "Are You Fit?"
   C. Discuss participants' answers to A and B
   D. Show "Eating Disorders" slides (optional)
III. Weight Maintenance Goals

A. Measure, Weigh and Determine Body Frame using Weighing and Measuring Instructions - Record Height, Weight and Body Frame on Personal Card

B. Determine desirable Weight from Metropolitan Height/Weight Tables (optional: Body Mass Index Chart)

C. Personal Weight Reduction or Weight Maintenance goals to be decided by next week's session and recorded on personal card. Examples of personal goals:
   1. If above desirable weight, lose 1 or 2 pounds a week.
   2. Eat a variety of nutritious foods to meet caloric needs.
   3. Eat less fat.
   4. Eat fewer sweets.
   5. Eat more fruits, vegetables and whole grains.
   6. Drink less alcohol.
   7. Increase physical activity.
   8. Change psychological/social habits leading to overeating or inactivity.

D. Distribute "Getting to Know Yourself"
   1. Have participants complete "Nutrition Questionnaire"
   2. Distribute and Discuss Food Diary.

E. Distribute and Discuss Doctor's Certificate

IV. Summary and Preview of Next Session

Beth Reames, R.D.
Associate Specialist/Nutrition
HEALTHY WEIGHT WORKSHOP
Session 2
"Your Weight to Good Health"

Supplemental Materials Included:

"The Relationship of Diet and Exercise to Healthy Weight"
"Calories and Calorie Requirements"
"The Basics"
"Determining Your Caloric Needs: 10 Steps to Setting Your Goal" and Tables 1, 2 and 3
"Don't Forget Exercise"
"Energy Expenditure Table"
"Calories and Energy: The Delicate Balance Between" (optional)
"Walking Program"
"Maintain Desirable Weight" booklet
"Saving Calories: Some Ideas to Get You Started"
"Calorie Cutting Tips"
"What Can I Eat?"
"General Suggestions for Weight Control"
"Food Record" - 1200, 1600, 1800 Calories
"Diet Cautions"

Equipment Needed:

Food Models
Scale
Skinfold Calipers (optional)
Steel Measuring Tape
Ruler
Outline

I. Weigh-in

II. Review and discussion of Food Diaries which were completed by participants.

III. Discuss relationship of diet and exercise to maintenance of desirable weight.
   A. Use "Relationship of Diet and Exercise to Desirable Weight"
   B. Use "Calories and Calorie Requirements" and "The Basics"

IV. Determine individual calorie needs for weight loss and maintenance.
   A. Use "Determining Your Caloric Needs: 10 Steps to Setting Your Goal" and Tables 1, 2 and 3

V. Discuss exercise as related to energy expenditure.
   A. Use "Don't Forget Exercise" and "Energy Expenditure Table" and (Optional: "Calories and Energy: The Delicate Balance Between"
   B. Present and Discuss "Walking Program" briefly - Session 4 on Exercise will present "Walking Program" in depth

VI. Personal Goal Setting
   A. Decide on personal goals - record on personal card
      (Examples of goals are listed on Session 1 outline)
   B. Distribute and discuss suggested meal-plans according to individual calorie needs (1200-2000 calories),
      (Maintain Desirable Weight" booklet)
   C. Discuss food preparation techniques - Use: Saving Calories," "Calorie Cutting Tips," "What Can I Eat?" and "General Suggestions for Weight Control"
E. Distribute "Food Plan Record Card" - Explain Use

F. "Diet Cautions" (from fact sheet)

VII. Record Personal Goals on Personal Card

VIII. Summary and Preview of Next Session.

Beth Reames, R.D.
Associate Specialist/Nutrition
HEALTHY WEIGHT WORKSHOP

Session 3

Eat A Variety of Foods to Maintain Desirable Weight

Supplemental Materials Included:

"How Does Your Diet Rate for Variety?"
"What Do We Mean By Variety."
"Nutrients - What Are They?"
"Hassle-Free Daily Food Guide"
"The Breads and Cereals Connection"
"Starch and Fiber Fact Sheet"
"Check Your Diet for Starch and Fiber"
"Milk Group Fact Sheet"
"Vegetable Fact Sheet"
"Fruit Fact Sheet"
"Meat, Poultry, Fish and Beans Fact Sheet"
"Fats, Sweets and Alcohol Fact Sheet"
"What Can I Eat?" and "Potato Topper"
"What Counts As A Serving?"
"Portion Control Exercises"
"Understanding Food Labels"
"Menu Plan Form"
"Shopping to Cut Calories"
"Guide to Wise Buying"
Equipment and Supplies Needed:

Food Models

Scale

Nutrition labels from various foods

Potatoes, cottage cheese and lemon juice for Potato Topper (optional)

Slides: "Food Buying for Low Calorie Diets" (optional) (order from Nutrition Project)

Slide projector (optional)
Outline

I. Weigh-in

II. Review and Discussion of Participants' Food Records

III. Variety In Our Diets

A. Administer "How Does Your Diet Rate for Variety" (Save to discuss after presentation)

B. Variety - Use What Do We Mean By Variety?"

C. Nutrients

1. List and Define - (Protein, Carbohydrates, Fats, Vitamins, Minerals, Water. Use "Nutrients: What Are They?")


2. Milk and Cheese
   a. "Calcium and Osteoporosis" - Use "Milk Group Fact Sheet"
   b. "What If You Can't Drink Milk" - Use Milk Group Fact Sheet.

3. Vegetables
   b. "Ideas for Serving" - Use "Vegetable Fact Sheet"

4. "Fruits - Nature's Sweets" - Use "Fruit Fact Sheet"
5. Meat, Poultry, Fish and Beans - Use "Meat, Poultry, Fish and Beans Fact Sheet."
   a. Meat Alternates - Use "Meat, Poultry, Fish and Beans Fact Sheet."

6. Fats, Sweets and Alcohol - "Use Fats, Sweets and Alcohol Fact Sheet."

E. Discuss "How Does Your Diet Rate for Variety?" (Completed previously)

IV. Variety in Meal Planning

A. Choosing a variety of foods for Weight Control - Use "What Can I Eat?" and "Potato Topper."

B. Portion Control - Use food models emphasizing economical food choices, "What Counts As A Serving?" and "Portion Control Exercises."

C. Labeling Information - Use "Understanding Food Labels" - Have some product labels for participants to see.

V. Meal Planning Session

A. Plan a week’s menus using a variety of foods to meet individual caloric needs (Use Menu Planning Forms).

B. Evaluate variety and economy through discussion of individual meal plans.

C. Shopping to Cut Calories - Use "Shopping to Cut Calories" and "Wise Food Buying." (Slides - "Food Buying for Low Calorie Diets" - optional - order from Nutrition Project)

VI. Summary and Preview of Next Session

Beth Reames, R.D.
Associate Specialist/Nutrition
HEALTHY WEIGHT WORKSHOP

Session 4
Exercise and Weight Maintenance
Behavior Modification

Supplemental Materials Included:

- Potato Chip Game
- "Exercise/Fitness Quiz"
- "Benefits of Exercise"
- "Types of Exercise"
- "Walking Your Way to Fitness"
- "Use It or Lose It"
- "Exercise Program Plan"
- "Exercise Precautions"
- "Change Your Behavior to Control Your Weight"

Equipment and Supplies Needed:

- Scale
- Stopwatch or clock with second hand
- Potato Chips
- Slides - "Change Your Behavior to Control Your Weight"
- Slide Projector

Outline

I. Weigh-In
II. Review of Food Record
III. Exercise

A. Potato Chip Game
B. Administer "Exercising/Fitness Quiz"
C. Use "Benefits of Exercise"
D. Use "Types of Exercise"
   1. "Use It or Lose It" - review and discuss as needed
   2. "Walking Your Way to Fitness" - review and discuss as needed
   3. Exercise Demonstration by qualified person with audience participation (optional)
E. Setting Realistic Exercise Goals - "Exercise Program Goals"
F. "Exercise Precautions"

IV. Behavior Modification

A. Slides - "Change Your Behavior to Control Your Weight"
B. Habits Leading to Overeating and Inactivity - Use Food Diaries to Discuss Habits
C. Fact Sheet - "Change Your Behavior to Control Your Weight"
D. Suggestions to Change Eating and Exercise Habits
   (Reward systems based on established personal goals)

V. Summary and Preview of Next Session

Beth Reames, R.D.
Associate Specialist/Nutrition
POTATO CHIP GAME

This learning activity helps participants see how much of certain exercises are required to utilize the calories in one potato chip.

Pass around bag of potato chips. Have each person take one chip and hold it until told to eat.

Assign or ask for volunteers to run in place, walk briskly in place, stroll in place or stand in place.

Have participants eat chips and then begin assigned exercise. Time with a watch. As participants finish their exercise assignments, have them sit.

Time Procedure:

Running in place - 1 minute
Brisk Walking in place - 2 minutes
Strolling in place - 4 minutes
Standing - .10 minutes

Beth Reames, R.D., Associate Specialist (Nutrition)
Outline

I. Weigh-In

II. Review and Discuss Food Records

III. Avoiding Too Much Fat, Saturated Fat and Cholesterol
   A. Administer - "How Do You Score on Fat?" and "Fat and Cholesterol - True or False?"
   B. Fat in the Diet Related to Health - Use "Fat, Cholesterol and Your Health"
   C. Explanation and Food Sources of Fat, Saturated Fat and Cholesterol
      Use "Fat and Cholesterol - What Are They? Where Are They Found?" and "Fat Facts" (Polynesian Fat Charts - optional - available from Diane Linder)
   D. Food Preparation Methods to Lower Fat
      (1) Use "I'd Avoid Too Much Fat, Saturated Fat and Cholesterol."
         "Trading Off," Modifying Your Recipes - "Life Beef Stroganoff" - Discuss how recipe is modified, and "What's On A Label?"
      (2) Optional - "The Fats of Life" (demonstration lesson plan available from Beth Reames)

IV. Avoid Too Much Sugar
   A. Administer "Sugar: Fact and Fiction" "Rating Your Diet: How Sweet Is it?"
   C. Administer - "Word Find - Terms That Mean Added Sugar"
   D. Use Ingredient Labels to Find Sources of Sugar
   E. "Make A Soda Pop"
   F. "What About Artificial Sweeteners?"

V. Avoiding Too Much Sodium - Use "Test your Sodium Knowledge."

VI. "Put It All Together"
   A. Use "Altering Recipes for Health"
   B. Purchase frozen foods with limited calories to determine calories, fat and sodium. Taste foods and discuss.
   C. Purchase a variety of available foods limited in calories, salt, fat or sugar ("light" foods, foods canned without salt, etc.) Taste foods and discuss.
   D. Have a demonstration on preparing and tasting recipes which have been altered in fat, sodium or sugar. Use "Altering Recipes for Health."
   E. Allow members of class to have input on what they would like to include in this session. Food preparation and tasting are always popular. Make it a fun time!

Beth Reames, R.D.
Associate Specialist/Nutrition
HEALTHY WEIGHT

SESSION 5

CHOOSING FOODS FOR GOOD HEALTH
(Avoid Too Much Fat, Saturated Fat, Cholesterol, Sodium and Sugar)

Supplemental Materials Included:

"How Do You Score on Fat?"
"Fat and Cholesterol - True or False?"
"Fat, Cholesterol and Your Health"
"Fat and Cholesterol - What Are They? Were Are They Found?"
"Fat Facts"
"To Avoid Too Much Fat, Saturated Fat and Cholesterol"
"Trading Off"
"Light Beef Stroganoff - Modifying Your Recipes"
"What's On A Label?"
"Sugar Fact or Fiction?"
"Rating Your Diet: How Sweet Is It?"
"Sugar: The Basic Facts"
"Sugar and Your Teeth"
"Avoiding Too Much Sugar - Some Suggestions"
"Terms that Mean Added Sugar - Word Find"
"Make a Soda Pop"
"What About Artificial Sweeteners?"
"Test Your Sodium Knowledge"
"Estimating the Sodium in Your Diet"
"Sodium Facts"
"Avoiding Too Much Sodium - Some Suggestions"
"Altering Recipes for Health"

Equipment and Supplies Needed:

Scale
5 pound bag of sugar
Club Soda
Can of Orange Soda Pop
Teaspoon of red and yellow food coloring
Paper cups
Ingredient labels listing sweetener
Variety of low calorie foods
HEALTHY WEIGHT WORKSHOP

Session 6

Evaluating Fad Diets

Eating Out on a Diet - Fast Foods

Review - Maintaining Desirable Weight for the Long Term

Supplemental Materials Included:

"Evaluating Fad Diets and Claims"
"Food Myths: Bursting the Bubble"
"Eating Out"
"Fast Foods - Here To Stay?"
"Nutrition Knowledge Assessment"

Certificates of Achievement

Supplies Needed:

Slides: "Winning at Losing" - order from Nutrition Health Project

Optional Slide Sets: "The Fast Food Phenomena"
"Beware Fad Diets and Diet Aids"
"Gimmicks, Gadgets and Devices"
"Myth or Truth"
(Order from Nutrition/Health Project)

Slide Projector

Equipment:

1. Weigh-In and Record

II. Fad Diets
   A. Slides - "Winning at Losing"
   B. Discuss "Evaluating Fad Diets and Claims"
   C. Food Myths - Use "Bursting the Bubble"
III. Eating Away from Home
   A. Use "Eating Out on a Diet"
   B. Use "Fast Foods - Here to Stay"

IV. Review of Program
   A. Administer "Nutrition Knowledge Assessment"
   B. Review and discuss personal goal, accomplishments
   C. Discuss Importance of Weight Maintenance
   D. Discuss plans for follow-up session(s)

V. Conclusion - Present certificates

Beth Reames, R.D.
Associate Specialist/Nutrition

Louisiana State University Agricultural Center, 4-H, Home Coffee, Community
Louisiana Cooperative Extension Service, Denney F. Long, Vice-Chancellor
and Director
Issued in furtherance of Cooperative Extension work, Acts of Congress of May 8
and June 30, 1914, in cooperation with the United States Department of Agriculture.
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program and employment.
APPENDIX E

Build A Better Body Food Plan
**Build a Better Body!**

*Track each week’s food intake with crayon or grease pencil; wipe clean and erase.*

1. Choose foods from the basic food groups.
2. Check off your choices in the squares, as you eat them, daily.
3. Check additional foods eaten from the food groups and check off the circles.
4. Eat “extras” in moderation.

Results? Better You, Better Body!

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<th>Milk/Cheese Group*</th>
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<th>Vegetable and Fruit Group</th>
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<td><strong>2-3 servings</strong></td>
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1 serving is . . .
1 cup milk or yogurt
1-1/2 ounces Swiss or Cheddar cheese

1 serving is . . .
2-3 ounces cooked lean meat, poultry, or fish
1 cup cooked dry beans or peas
2 eggs

1 serving is . . .
1 orange or apple
1/2 cup fruit or vegetable
1/2 grapefruit
1 small salad
1 medium potato

1 ounce ready-to-eat cereal

*Skim, nonfat and lowfat milk provide calcium and protein but keep fat intake down.

*Include 1 good source of Vitamin A and C every day.

Better, margarine, salad dressings, vegetable oils, sugar, honey, syrup, candy, sugar-sweetened beverages, etc.
VITA

Elizabeth (Beth) Reames was born in Eglin Field, Florida. She graduated from DeQuincy High School, DeQuincy, Louisiana. She received a Bachelor of Science degree in Home Economics from Louisiana State University, Baton Rouge, Louisiana in May, 1968.

She completed a dietetic internship at the Veteran's Administration Hospital, Houston, Texas, in August, 1969. She was graduated from Louisiana State University with a Master of Science degree in Foods and Nutrition in the School of Home Economics in May, 1973. She received a Doctor of Education degree in Extension Education in December, 1982.

Her parents are Mr. and Mrs. Samuel E. Snider of DeQuincy, Louisiana. She is married to Louis E. Reames, Jr., and they live in Baton Rouge where he is an architect in private practice.
DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate: Elizabeth S. Reames

Major Field: Vocational Education

Title of Dissertation: Effectiveness of the Healthy Weight Workshop on Weight Management Practices of Paraprofessional Personnel of the Cooperative Extension Service

Approved:

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Major Professor and Chairman

[Signature]
Dean of the Graduate School

EXAMINING COMMITTEE:

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Edward W. Sasse

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Billy M. Dean

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Margaret P. Yorath

Date of Examination:

November 17, 1988