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EFFECTS OF A NUTRITION-BASED HEALTH PROMOTION PROGRAM ON STRESS, CHRONIC DISEASE RISK FACTORS, MEAL PATTERNING, AND JOB SATISFACTION AMONG FEMALE AIRLINE RESERVATIONISTS

The University of North Carolina at Greensboro PH.D. 1985

EFFECTS OF A NUTRITION-BASED HEALTH PROMOTION PROGRAM ON STRESS, CHRONIC DISEASE RISK FACTORS, MEAL PATTERNING, AND JOB SATISFACTION AMONG FEMALE AIRLINE RESERVATIONISTS

by

Ruby Hurley Cox

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Approved by

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COX, RUBY HURLEY, Ph.D. Effects of a Nutrition-based Health Promotion Program on Stress, Chronic Disease Risk Factors, Meal Patterning, and Job Satisfaction Among Female Airline Reservationists. (1985)
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A quasi-experimental, nonequivalent control group, pretest-posttest study was conducted with 84 female reservation employees of Piedmont Airlines in Winston-Salem, North Carolina, and Nashville, Tennessee. The purpose was to investigate the relationship between anxiety and depression and various other nutrition and health-related factors using baseline data and to assess the effectiveness of a health promotion program in achieving improvements on measures of anxiety, depression, job satisfaction, and certain nutrition and health factors. The subjects included only full-time employees, ranging in age from 19 to 60 years. The Winston-Salem group served as the experimental group and were involved in a seven-month, work site health promotion program which emphasized basic nutrition, the dietary guidelines, stress control, and exercise. The Nashville group served as controls and were not exposed to the health promotion program. Data collection included self-completion anxiety, depression, and job satisfaction scales, a nutrition and health habits inventory, a food questionnaire and frequency checklist, a 24-hour recall, and 3-day food record. Other measures included blood pressure and assessment of percentage of body fat, using four skinfolds.

On initial tests, subjects exhibited low mean levels of depression, moderate levels of anxiety, and generally high levels of job satisfaction. A majority had a percentage of body fat in the "high

fat" range and consumed diets most often below 75% of the RDA in iron, calcium, and calories. The mean intake of fiber was 15 grams, with intakes of sugar, total fat, saturated fat, and cholesterol ranging above the dietary goals. Using only pretest data, relationships were found between meal patterning and level of anxiety and between iron adequacy of the diet and level of anxiety. A significantly higher anxiety level existed among subjects in the poorest meal patterning category and among subjects with the highest and the lowest iron intakes. No significant relationship was found between either anxiety or depression and any of the following variables: dietary adequacy of protein, calcium, vitamin A, and vitamin C (based on percentage of the RDA), intake of sugar, sodium, fat, calories, alcoholic beverages, caffeine, percentage of body fat, and level of participation in physical and recreational activity.

Using pre- and posttest data, participation in the health promotion program did not result in improvement on anxiety, depression, job satisfaction scores, or in desired changes in intake of the selected nutrients and dietary components. However, experimental subjects did make significant improvement, as compared to control subjects, on general meal patterning.

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CHAPTER I

INTRODUCTION

Since the early 1970's there has been a rapidly growing interest in work site health promotion programs in business and industry in the United States. The reasons for this expanding interest are varied, but foremost is the need to curb soaring health costs (Beck, 1982; Brennan, 1982a; Roccella, 1982). In 1978, the U.S. Chamber of Commerce's Foundation for Public Policy issued a report to businesses that gave three reasons for establishing work site health promotion programs:

1. Health costs are soaring so high that the Foundation sees the most realistic target as simply slowing the rate of cost escalation;
2. the increased expenditures in health care in this country have not resulted in improved health status;
3. health promotion places much of the responsibility for good health on the individual, where it belongs.(p.20)

The cost to industry for health care, lost employee work days, and loss of lives of employees due to cardiovascular disease alone is staggering. For one year alone (1978), the cost to industry amounted to an estimated $11.2 billion. Worker deaths from cardiovascular disease are three times greater than deaths from industrial accidents (Roccella, 1982). Hypertension, an important factor in cardiovascular disease, cost industry an estimated $8 billion dollars in 1980. Fifteen to 30 percent of Americans suffer from hypertension and it is estimated that there are 30 to 35 million workers with the disease (Cunningham, 1982; Kristein, 1982).

Maladaptation to stress has been identified as one of the factors contributing to hypertension and cardiovascular disease (Cunningham, 1982; Glass, 1977; Jenkins, 1978), as well as many other diseases and conditions including "diseases of the kidney, eclampsia, rheumatic and rheumatoid arthritis, inflammatory diseases of the skin and eyes, infections, allergic and hypersensitivity diseases, nervous and mental diseases, sexual derangements, digestive diseases, metabolic diseases, cancer, and diseases of resistance in general" (Selye, 1978, pp. 169-170). There is overwhelming evidence that psychological stress and its ill effects on health have increased rapidly in the past 20 to 30 years within the general U.S. population, as well as the workforce (Sehnert, 1981; Selye, 1978). The management in business and industry has become increasingly interested in ways to decrease psychological stress among employees (Cunningham, 1982).

Results of extensive research indicate that women suffer significantly more mental illness, including symptoms of severe stress (anxiety, depression, disorientation) than men (Gove, 1980). Fifty-two percent of all women over age 16 are now employed (Daly, Tanner, & Richards, 1980) with the total workforce being 42 percent female (U.S. Bureau of the Census, 1982). At least one extensive study has indicated that female workers have a generally poorer health condition than men (Agassi, 1982). There is evidence that psychological stress (anxiety and depression) affects and is affected by nutritional status (Baird & Schutz, 1980; Bruch, 1955; Simon, 1963). More research needs to be done

regarding the level and effects of psychological stress among female employees and the relationship of stress to nutritional status, diet, and health.

It is believed that self-destructive behaviors practiced by individuals account for a large share of the nation's health bill (Roccella, 1982). In the past ten years, a growing body of data from many sources has indicated that there would be a significant potential for savings in health care cost, if Americans would adopt more healthful lifestyles (Brennan, 1982a). In addition to the savings in health care costs, there are potential benefits to industry of improved worker morale and productivity due to participation of employees in health promotion programs. Furthermore, employers and employees alike are seeking new ways to improve quality of worklife (Norvelli & Ziska, 1982). Health promotion programs offer a means by which employers can improve the quality of life of their employees, as well as achieve significant financial benefits.

The scope and content of the work site health promotion programs now in existence range from simple, one-time health screenings to comprehensive education and counselling programs with elaborate fitness facilities. One emphasis found in most programs is high blood pressure control, through screening and education. A large number of companies report educational efforts on weight control and nutrition, reduction of plasma cholesterol and other cardiovascular risk factors, smoking cessation, reduction of alcohol and drug use, diabetes screening and

control, early detection and reduction of cancer risk. Many companies report major emphases on stress management and improving the fitness level of employees. A few companies have reported programs on budgeting and marriage and family counselling (Beck, 1982; Brennan, 1982a; Foreyt, Scott, & Gotto, 1980; Karson, 1982; Roccella, 1982).

It is difficult to estimate how many companies now offer some type of health promotion program. One report in Nation's Business (Staying trim, productive and alive, 1974) estimated that 50,000 companies had installed physical fitness facilities, but these were mostly available to executives. Three hundred companies were reported to have full-time recreational directors. By early 1982, reports in the literature of workplace health promotion efforts dealt with programs in large employment settings where there are relatively sophisticated personnel management functions, medical departments, and active occupational health and safety programs (Merwin & Northrop, 1982).

Concern has been expressed by health professionals that, due to cost and lack of available resources, most small businesses and industries will be discouraged from establishing health promotion programs (Merwin & Northrop, 1982). There is a need for development and testing of low-cost health promotion programs that make more effective use of resources and services of the surrounding community. The present study is directed toward the development and testing of a nutrition-based health promotion program which would be affordable and feasible for smaller companies of 500 or fewer employees.

There are several important factors that justify nutrition education as the basis for a low-cost health promotion program. There is considerable interest within the workforce in nutrition information as evidenced by the fact that a large percentage of the health promotion programs, described in the literature, contain some nutrition education. However, very few of the reports mentioned the use of trained nutrition professionals as counselors or educators in the work site health programs (Murphy, 1983). One study of four companies in Columbus, Ohio, which had health promotion programs, revealed that employees and fitness directors recognized the need and desired nutrition education. However, only a minor amount of nutrition education was provided. Reasons given by the fitness directors for this omission were lack of funds to hire nutrition professionals and beliefs of the directors that they were unqualified to provide in-depth nutrition education themselves (Clapp, 1978). There is clearly a need for nutrition professionals to demonstrate their qualifications and willingness to serve as potential health promotion educators in the work place.

A second factor that justifies the need for a nutrition based, health promotion program is the fact that a large percentage of the health problems frequently addressed in such programs are partly related to the dietary practices and nutritional status of the individual. An overwhelming amount of evidence points to diet as one of the causal factors in hypertension, cardiovascular disease, obesity, certain types of cancer, and low resistence to colds and infections

(Darby, 1977; Foreyt et al. 1980; Senate Select Committee on Nutrition and Human Needs, 1977). There is also evidence to support an interaction between diet and susceptibility to the harmful effects of stress (Baird & Schutz, 1980; Brozek, 1957; Coppen & Wood, 1978; Selye, 1978).

Diet may also be related to worker productivity and morale. There is a need to test the effectiveness of a nutrition-based, health promotion program in reducing hypertension and other coronary artery disease risk factors, obesity and related illnesses, worker absenteeism, stress, and improving worker morale and productivity.

A nutrition-based program might also be advantageous in convincing workers to reduce consumption of certain harmful substances such as alcohol, certain medications, excess caffeine, and cigarette smoking. All of these substances are related in various ways to eating practices and nutritional risk factors and are legitimate concerns for the nutrition professional (American Dietetic Association, 1982; Goodhart & Shils, 1980; Hamilton & Whitney, 1982; Loebl & Spratto, 1980). Because of their training in physiology and biochemistry, nutrition professionals would be in excellent positions to communicate the message as to how these substances harm the human body.

If a company cannot afford or does not wish to initially hire full-time professionals to plan and implement a health promotion program, there are several possible methods of obtaining assistance from local nutrition professionals at low or no cost. Many health departments have government-funded nutritionists. Furthermore, all states in

the U. S. have local Cooperative Extension home economists with special training in foods and nutrition, stress management, and other areas of human wellbeing that could be utilized in planning and implementing industry health promotion programs. There is a need for objective data to support the feasibility of using local health department and Cooperative Extension nutrition professionals in planning and implementing health promotion programs in small businesses and industries.

Background of the Study

This study evolved from a request made by a Piedmont Airline personnel officer to obtain assistance in planning and implementing a pilot nutrition based, health promotion program for a group of 650 Piedmont Airline reservation workers in Winston-Salem, N.C. The group was composed mostly of women. The company was interested in testing the effectiveness of such a program among its Winston-Salem reservation employees before investing funds in wide-scale health promotion efforts in its reservation offices in other locations. Personnel records had indicated a higher-than-average rate of absenteeism among this group of employees. It was believed by personnel officers that effects of psychological stress, improper eating habits, and physical inactivity had greatly contributed to absenteeism and morale problems among these employees.

Six major questions were identified to be answered by the study:

1. What is the level of anxiety, depression, intake of certain dietary components, hypertension, use of certain stress-related medications, and job satisfaction among female airline reservation employees?

2. Is there a relationship between either levels of anxiety or levels of depression and any of the following variables: percentage of body fat, general meal patterning, intake of total calories, selected nutrients, and certain food components, physical activity, blood pressure, and use of alcohol and certain stress-related medications among female reservation employees?

3. What is the level of adequacy of nutrient intake, physical activity, normality of iron status, and body composition among female airline reservation employees?

4. Is there a relationship between nutrient intake, physical activity, iron status, and body composition and measures of absenteeism and job performance of airline reservation employees?

5. Will a nutrition-based health promotion program result in desired changes in nutritional status, level of physical activity, body composition, certain chronic disease risk factors, anxiety, depression, absenteeism, job performance, and job satisfaction among female reservation employees?

Because of the wide variety of questions to be answered by the overall study, a decision was made to address the study in two parts using two doctoral students as researchers. The present study addressed questions #1 and #2 above and portions of #5, dealing with whether a nutrition-based health promotion program would result in desired changes in certain chronic disease risk factors, anxiety, depression, and job satisfaction among female reservation employees? A later study will deal with questions #3 and #4 and the part of #5 dealing with changes in nutritional status, level of physical activity, body composition, and job absenteeism and performance as a result of the health promotion program.

Purposes of the Study

The purposes of this study were to assess levels of anxiety, depression, and job satisfaction among female airline employees, to evaluate the relationship of these factors to chronic disease and nutrition-related health risk factors, and to develop and test the effectiveness of a nutrition-based health promotion program in producing desired changes in these factors.

The specific objectives of this study were the following:

1. To measure the levels of anxiety, depression, and job satisfaction, and intake of stress-related medications among female airline reservation employees.

2. To assess prevalence of certain nutrition and chronic disease risk factors among female airline employess, to include intake of certain dietary components (alcohol, caffeine, sugar, fiber, fat, cholesterol, sodium, and percentage of calories as fat and sugar), general meal patterning, high blood pressure, level of planned physical and recreational activities.

3. To analyze the relationship between levels of anxiety and percentage of body fat, general meal patterning, intake of total calories and certain dietary components, level of planned physical and recreational activity, blood pressure, and intake of alcoholic beverages among female airline reservation employees.

4. To analyze the relationship between levels of depression and degree of body fatness, general meal patterning, intake of total calories and certain dietary components, level of planned physical and recreational activity, blood pressure, and intake of alcoholic beverages among female airline reservation employees;

5. To evaluate the relationship between nutritional adequacy of the diet and levels of anxiety and depression;

6. To assess the effectiveness of a nutrition-based, health promotion program in producing desired changes in levels of anxiety, depression, job satisfaction, and certain chronic disease and nutrition risk factors among female airline reservation employees.

Statement of Hypotheses

The following hypothesis were presented for the study:

H1:There is no relationship between female reservation employees' scores on either anxiety or depression tests and the following variables:

A. General meal patterning

B. Nutrient adequacy of the diet

C. Level of intake of certain dietary components (sugar, sodium, fat, total calories, and alcoholic beverages).

H2:There is no relationship between female reservation employees scores on either anxiety or depression tests and the following variables:

A. Percentage of body fat

B. Presence of elevated blood pressure

C. Level of participation in planned physical and recreational activities.

H3:Participation in a nutrition-based, health promotion program will result in no reductions in scores on anxiety and depression tests among female airline reservation employees.

H4:Participation in a nutrition-based, health promotion program will result in no increases in measures of job satisfaction.

H5:Participation in a nutrition-based, health promotion program will not result in the following improvements:

A. Reduced weekly intake of alcoholic beverages and certain stress-related medications reduced daily intake of sugar, saturated fat, cholesterol, sodium, and caffeine

B. Increased intake of fiber

C. Decreased number of employees with elevated blood pressure.

H6:Participation in a nutrition-based, health promotion program will result in no inprovement of general meal patterning.

Definition of Terms

Stress: for the purposes of this study (unless otherwise specified) generally refers to the type of stress defined by Selye (1978) as "distress" which is unpleasant or disease producing stress includes the body's physiological and psychological responses to circumstances which frighten, irritate, confuse, endanger, or excite the individual.

Anxiety: a basic human emotion that accompanies stress and generally described as a syndrome consisting of uncomfortable feelings of apprehension, tension, and dread, which are associated with increased activity of the autonomic nervous system; the score on the Self-Rating Anxiety Scale.

Depression: a syndrome characterized by general loss of interest, energy, and drive, insomnia, early morning wakings, sadness, crying spells, inordinate guilt, and feelings of self-deprecation; the score on the Beck Depression Inventory.

Job satisfaction: overall attitudes and feelings (likes and dislikes) about one's job; the score on the Job Satisfaction Index.

General meal patterning: for the purposes of this study, was the dietary score based on numbers of servings from the USDA

Basic-4 Food Groups using a scoring method developed for the Expanded Food and Nutrition Education Program of the Cooperative Extension Service and whether the average daily intake of sugar and total calories were above or below the levels of 10% of calories as sugar and/or 35% of calories as fat.

Nutritional adequacy: intake of certain nutrients (protein, calcium, iron, vitamin A, vitamin C, as compared to the Recommended Dietary Allowances (1980). The following levels of adequacy were used: (a) less than 50% of the RDA, (b) 50 to 75% of the RDA, (c) greater than 75% of the RDA.

Hypertension: elevated blood pressure above 140/90 mm Hg

Planned physical and recreational activities: involving considerable aerobic muscle activity performed in a conscious effort by the individual to get adequate physical exercise or for competition; sections D, E, F, and G of Part II of Nutrition and Health Habits Inventory (see Appendix A).

Nutrition related chronic disease factors: emphasized in the Dietary Goals for the United States (2nd ed., Senate Select Committee on Nutrition and Human Needs, 1977); average daily intake of calories, refined sugar, total fat, saturated fat, cholesterol, sodium, dietary fiber, caffeine, and alcohol.

Nutrition-based, health promotion program: a 7-month education program at the work site emphasizing nutrition principles included in the U.S. Dietary Guidelines, information on the importance of physical activity, and stress management.

Degree of body fatness (percentage of body fat): the percentage of

total body mass which is adipose tissue, determined in this study by the Durnin method (Durnin & Womersly, 1973; see description in Appendix A).

Limitations of the Study

Several limitations of the study were acknowledged. The study was limited to full-time, female employees, and results cannot be generalized to part-time or to male employees. The sampling frame was limited to those employees who responded to recruitment procedures, indicating that they were interested in a health promotion program and would be willing to serve as subjects. Representativeness was a concern since true random sampling was not used. Results cannot be generalized to the general population of adult females. Subjects could not be randomly assigned to either the control or experimental group; therefore, pretest equivalence could not be assmed However, statistical procedures were used to account for this nonequivalence.

One serious problem that developed was that subjects did not attend seminars as frequently as desired by the researcher. This was partially due to an unexpected increase in workload on all employees which required much overtime work. Futhermore, the company was unwilling to give employees any time during working hours to attend seminars because of the increased work load. Several methods were used to disseminate health and nutrition imformation, in addition to seminars.

Other possible limitations include the difficulty in obtaining reliable dietary information, errors in coding of food, and errors in collecting other types of information, such as activity level and skin fold measurements. There may have been a bias in posttest dietary information due to the time of collection which was just before and just after the Christmas holidays.

There may have been biases in the anxiety, job satisfaction, and depression scores because of the fear of employees that their supervisors might be able to trace completed forms back to them. However, a coding system was used instead of names, to avoid this type of problem. Subjects were assured many times that individual information would be kept confidential.

CHAPTER II
REVIEW OF LITERATURE

Development of Interest in Work Site Health Promotion Programs

Health education programs and activities in occupational settings existed and sometimes flourished for a while as early as 30 years ago, but did not survive. Klerman (1965) reported that a study of health education activities in eight plants indicated that health counseling, on a personal basis, by the industrial nurse or physician resulted in more knowledgeable employees than using posters, pamphlets, and films alone. The study concluded that health education programs at the work site could be effective, but must be based on interpersonal and interactive methods rather than impersonal dissemination of imformation. However, another study about the same time revealed that company interest in such extensive programs was minimal. The few health education programs that were conducted were "one shot" efforts with little apparent effect (Ware, 1982).

Sustained concern with health promotion at the industry level did not occur until 1977 and after. One factor that focused industry attention on the need for health education at the work site was the beginning of an intensive campaign by insurance companies to promote the dissemination of information on disease and illness prevention among its own as well as other industries. Life insurance companies were leaders in dissemination of health information long before 1977. However, in the spring of that year, insurance industry leaders took a

new look at their roles in health promotion and passed a resolution to take a more active part (Karson, 1982). Some of the most comprehensive and effective health promotion programs in existence today are those developed by insurance companies (Brennan, 1982a; Building a Healthier Company; Cunningham, 1982; Karson, 1982).

Another factor which encouraged health promotion programs was the rise in employee expectations and demands in the 1960's and 70's. These demands paralleled a general movement in the U.S. toward interest in better health, fitness, and disease prevention. Employees and their unions began to claim the right to health and a healthy environment as a part of employee benefits (Novelli & Ziska, 1982).

The two most important factors contributing to the burgeoning interest in health education in the past few years have been the continually rising costs to industry of health care and the increasing awareness among management of the high cost associated with premature mortality, disability, excess absenteeism, and lost productivity of employees due to preventable health conditions (Brennan, 1982a; Kristein, 1982; Novelli & Ziska, 1982; Roccella, 1982; Seidel, 1983; Ware, 1982). Medical care expenditures in the U.S. in 1960 totaled $27 billion or 5.3 percent of the Gross National Product (GNP). By 1981, expenditures had risen to $275 billion or almost 10 percent of the GNP, with business and industry paying over half of the bill (Brennan, 1982a; Seidel, 1983).

Chronic diseases, such as cancer, hypertension, heart disease, and stroke, are the leading causes of death in the U.S. today. These

diseases, as well as others, are thought to stem partially from habits and behavior developed before the symptoms of illness appear (Kristein, 1982). Large companies can expect their employee personnel health statistics to parallel national epidemiological data which means that one of every four employees will get cancer, one of every ten will suffer an emotional problem, over half will die of some form of heart disease, and one of every eleven women will get breast cancer. Much of this will occur during the most productive years, ages 45-60 (Brennan, 1982a). Atherosclerosis and stroke alone are reported to cause one-third of the lost working years and earnings in this country (Seidel, 1983).

The National Heart, Lung, and Blood Institute reports that 34.5 percent of the nation's workforce already has high blood pressure. Hypertension disease costs $8 billion a year in medical care, illness, and disability. Each hypertensive employee is estimated to cost $170 to $300 per year in excess medical bills (Brennan, 1982a; Kristein, 1982; Roccella, 1982).

In 1980 an estimated 339 million work days were lost, at a cost of over $19 billion dollars, as a result of health conditions, most of which may be preventable (Brennan, 1982a). More than 52 million working days are lost yearly due to cardiovascular disease alone. Futhermore, the average absenteeism for short-term illness is estimated to be 3.1 days for every male employee and 4.1 days for every female employee each year. It is believed that health education, with resulting improvements in nutrition and other preventive health measures, will

greatly reduce short-term as well as long-term illness and absenteeism (Brennan, 1982b; Cunningham, 1982; Kristein, 1982; Novelli & Ziska, 1982; Roccella, 1982; Seidel, 1983; Ware, 1982).

Health Promotion Programs Now in Existence

Due to the expected benefits of reduced medical cost, decreased premature death, illness, suffering, and absenteeism, and increased worker morale and productivity, many larger companies have begun work site health promotion programs. Though no exact count is available, a survey in 1982 of over 800 companies revealed that about 34 percent were conducting such programs (Brennan, 1982b). Nation's Business (Staying trim and alive, 1974) reported that 50,000 companies had installed physical fitness facilities with at least 300 employing fulltime recreational directors. The fundamental goal underlying most of the programs is disease prevention (Beck, 1982; Brennan, 1982b; Norvelli & Ziska, 1982; The new Rx for better health, 1974).

The subject matter and scope of the existing work site health promotion programs vary widely; however, Novelli and Ziska (1982) report that most health promotion programs may be classified into four categories:

1. "One-shot activity" frequently consists of a single screening effort, with little or no attendant counselling or follow-up referral and education;
2. In the "fitness first" program, a company first becomes interested in promoting wellness, probably because it is highly visible and enjoyable and has little association among management or employees with illness and disease. "Fitness first" programs often are centered on an individual's physical well-being and improvement through nutrition counseling, weight control and cardiovascular fitness. Sports and exercise are included.

3. A "mixed bag" is one which involves a variety of programs, but which lacks cohesion or overall health promotion objectives.
4. A "comprehensive approach" consists of a well-planned, well-funded program with long-ranged objectives, broadbased participation and both cost and behavioral assessments. (pp. 21-22)

Currently, exercise programs predominate as the preventive health approach used by corporations (Seidel, 1983); however, use of other intervention efforts continue to increase. Besides fitness and exercise, the most frequently reported intervention efforts are those associated with high blood pressure control and smoking cessation. Other popular subjects include nutrition education and weight control, stress management, breast cancer education, prevention of heart disease and stroke, and safety. Many companies have had educational programs on use of legal and illegal drugs and alcohol abuse. Some companies have made available in cafeterias and vending machines low-sodium, low-fat, and low-calorie food selections. Some companies offer periodic health inventories or comprehensive physical examinations for their employees, then provide follow-up individual counselling, as well as group health education (Brown, 1981; Dedmon, 1979; Dedmon, Gander, O'Connor, & Paschke, 1979; Cook, Walden, & Johnson, 1979; Martin, 1978a; Novelli & Ziska, 1982; Yarvote, McDonagh, Goldman, & Zuckerman, 1974).

The educational methods reported in the literature as being used in health promotion programs include seminars, films, newsletters and mailouts, handouts, posters, individual counselling, and demonstrations. Comprehensive minicourses, weight control series, and "theme days" have been conducted by many companies. The nutrition education efforts have most commonly consisted of posters, articles in the

company newsletter, and alternative foods made available in the company caferteria. However, only a limited number of companies have initiated more comprehensive nutrition programs and recruited nutritionists to implement the program (Seidel, 1983).

Incentives to employees to participate in educational and fitness activities have been provided by some companies, including reimbursement for tuition in community courses, money and achievement awards, health hazzard appraisals, insurance premium reductions, and credits toward free trips and vacations (Beck, 1982; Brown, 1981; Cook et al., 1979; Dedmon, 1979; Dedmon et al., 1979; Martin, 1978a; Martin, 1978b; Yarvote et al., 1974.

Company fitness programs have ranged from those with elaborate facilities and costing millions of dollars down to those with modest efforts to encourage employees to use local YMCA's or other community facilities. Several large corporations (Exxon, Kimberly-Clark, Sentry) have built extensive fitness facilities including swimming pools, gyms, jogging tracks, etc., and provide trained exercise physiologists and physicians to run their fitness program (Cook et al., 1979; Dedmon, 1979; Yarvote et al., 1974). On the other hand, some other companies (IBM, Davidson Louisiana, Inc.) have elected to encourage the use of community facilities, with the idea that there are many such fitness facilities available which are unde used (Beck, 1982; Brown, 1981).

In some companies the existing medical department has planned and administered the health promotion and fitness program. In those cases, several staff members are usually involved, including one or more physicians, nurses, dietitians, and exercise physiologists. In some companies one or two health educators or physical fitness specialists have been hired to run the program. By December, 1974, 300 companies had employed fulltime recreational directors. A few companies have implemented a program without hiring additional staff, but have used local professionals as consultants (Brown, 1981; Cunningham, 1982; Dedmon et al., 1979; Martin, 1978b; Staying trim, productive...and alive, 1974; Yarvote et al., 1974).

Exact results of the health promotion programs are not yet available. Long-term follow-up and data analysis are expensive and few companies have indicated a willingness to invest in controlled studies (Brennan, 1982a). However, a few companies have conducted such studies or are in the process. Also, there have been numerous reports of informal evaluations. Some of the results reported to date include a significant drop in hospitalization, decreased blood pressure in hypertensives, reduced triglycerides and cholesterol levels, significant weight reduction, decreased disability and absenteeism, decrease or cessation of smoking, increased physical strength and stamina, and significant improvement in ability to cope with psychological stress. In addition, participation in health promotion programs has been linked to increased productivity, morale, and job satisfaction, decreased employee turnover, and more appropriate use of medical services. Many employees report an increased ability to think clearly and make

decisions (Brennan, 1982a; Cunningham, 1982; Kristein, 1982; Martin, 1978a; Martin, 1978b; Wriston, 1982; Yarvote et al., 1974).

Job Satisfaction and Measurement

Improvement in morale and job satisfaction has been mentioned frequently as both a goal and a documented result of work site health promotion programs (Brennan, 1982b; Kristein, 1982; Building a Healthier Company). Several studies have been conducted to correlate level of fitness or physical activity with level of job satisfaction. One group of researchers (Blair, Pate, Howe, Blair, Rosenberg, & Parker, 1979) reported that white females who participated in physical activity scored higher on a job satisfaction scale. Cox and Shephard (1979) were unable to demonstrate an increase in job satisfaction among employees who participated in a fitness program. However, there was a significant decrease in absenteeism.

Job satisfaction has been described as a worker's "overall attitude toward his job, whether he likes or dislikes it" (Herzberg, Mausner, & Snyderman, 1959 p.5). Attitude is a general term defined as "a feeling or emotion toward a state or fact. Job satisfaction is very closely related to morale. Morale is defined as "the mental and emotional condition (as of enthusiasm, confidence, or loyalty) of an individual or group with regard to the function or tasks at hand; the level of individual psychological well-being based on such factors as a sense of purpose and confidence in the future" (Webster's Ninth New

Collegiate Dictionary, 1983, pp. 114, 771). The terms "job attitudes" and "job satisfaction" and "worker morale" are closely related and are sometimes used interchangeably.

According to Hulin, "job satisfaction is a product of the discrepancies between expectations and experience, of the actual experiences on the job, of the frame of reference of the worker, and of the alternatives open to the worker" (Hulin, 1966, p. 190). Many studies have been conducted to determine the factors which affect job satisfaction. Among female workers, factors identified as being important for high job satisfaction were good salary, challenge to ability, opportunity for self-expression, competent and considerate supervision, high responsibility, opportunity for growth and advancement, sense of achievement, recognition for work done, voice in decision making, good physical working conditions, low level of psychological stress and role strain, like coworkers, and like company policies and practices. Single marital status has also been associated with higher job satisfaction (Gerhart, 1976; Harrison & Minor, 1982; O'Reilly & Roberts, 1973; Waters & Waters, 1969; Williamson & Karras, 1970). One study reported that the three factors most highly correlated with job satisfaction among women are self-expression, role strain, and working conditions (Voydanoff, 1980).

Herzberg et al. (1959) described three basic ways by which job satisfaction and attitudes are identified and measured. In the first method the subject is asked to express his job satisfaction directly by answering questions that investigate overall attitudes (likes and

dislikes) toward his job. The second approach involves scaled inventories which measure many specific attitudinal responses and arrive at an overall score. Different parts of the scale can also be analyzed separately. In the third approach, no specific measure of attitudes is taken. A psychologist observes the worker and infers job attitudes, feelings, and motives from his behavior.

One well-tested attitude scale, which represents the second approach described above is the Index of Job Satisfaction developed by Brayfield and Rothe (1951). It was designed on the basis that a job satisfaction scale should meet the following requirements:

1. It should give an index to "overall" job satisfaction rather than to specific aspects of the job.
2. It should be applicable to a wide variety of jobs.
3. It should be sensitive to variations in attitudes.
4. The items should be of such a nature (interesting, realistic, and varied) that the scale would evoke cooperation from both management and employees.
5. It should yield a reliable index.
6. It should yield a valid index.
7. It should be brief and easily scored. (p. 307)

Eighteen items representing job attitudes are included on the Job Satisfaction Index and are scored on the basis of a Likert scale. In scoring, a value of 5 is assigned to "Strongly Agree" on positive items, while a value of 1 is assigned to "strongly Agree" on all negative items. This procedure will yield a high score of 90 for most satisfied and a low score of 18 for least satisfied with job, with the "undecided" or neutral point at 54 (Brayfield & Rothe, 1951).

The Index of Job Satisfaction was tested for reliability with a sample of 231 female office employees using a split-half procedure on

odd-even test items. An overall reliability score of .87 was obtained (Brayfield & Rothe, 1951). To insure content validity of the Job Satisfaction Index the following procedure was used during its development: (a) A list of all possible items that might be included was submitted to a panel of 77 adult judges; (b)the judges were asked to identify those items that met the criterion: "This statement expresses feelings of satisfaction or dissatisfaction with a job and should be placed at such and such a point along such a feeling continuum"; (c) only those items that were positively and consistently identified to meet this criterion were used in the final index (Brayfield & Rothe, 1951, p. 310).

To test for construct validity, the Job Satisfaction Index was administered to two groups who were expected to differ with respect to levels of satisfaction with their current job. The difference between mean scores of the two groups was 11.5 points which was significant at the .01 level and was accepted as evidence of construct validity (Brayfield & Rothe, 1951). A copy of the Index for Job Satisfaction (Form 004) is located in Appendix A.

Chronic Disease and Health Risk Factors

The term "risk factors" refers to specific characteristics that are associated with a higher-than-average incidence of a specific health problem. Many of the chronic disease and health risk factors have been identified partially on the basis of epidemiological studies which have found a higher incidence of certain diseases among groups of

people who have certain common characteristics such as a habit, lifestyle, an age, or dietary pattern. Reducing one or more risk factors decreases the probability of that disease or health problem occurring, but does not guarantee for a specific individual that he will not develop the disease or health problem. There are some chronic disease and health risk factors (sex, age, genetics) that an individual has no control over, but there are others that are controllable such as hypertension, smoking, obesity, excess alcohol consumption, stress level, rest, and many dietary factors (Senate Select Committee on Nutrition and Human Needs, 1977).

It is generally recognized by medical authorities that prevention of chronic disease is far better than cure. The various medical treatments available for damage done to the body by chronic disease can never quite restore the person to the preillness state. Furthermore, the cost of treatment is far greater than the cost of prevention. It is believed that prevention of a large percentage of chronic diseases and health problems is possible through recommended dietary practices, stress managementl smoking cessation, and physical exercise (Brennan, 1982a; Foreyt et al., 1980; Mason & Guthrie, 1979; Senate Select Committee on Nutrition and Human Needs, 1977).

Hypertension

Hypertension (high blood pressure) is defined as "excessive pressure of the blood against the arterial walls; usually restricted to the condition in which the resting systolic pressure is consistently

greater than 160 mm mercury (Hg) and the diastolic pressure is over 90 mm Hg" (Miller & Keane, 1972, p. 456). However, there is disagreement among authorities as to the upper limits of "normal" blood pressure. Generally normal blood pressure is considered to be as low as 70/50 (systolic/diastolic) in infants and as high as 140/90 in people after the age of 18 years. The risk of cardiovascular complications increases as blood pressure rises above 140/90 in all age groups (Moser, 1982).

Hypertension is technically not a disease, but rather a symptom which manifests itself in the course of many disorders. However, it is referred to as a disease in much of the literature. Adequate explanations are not yet available for the hemodynamic changes and underlying mechanisms in the development of primary and secondary hypertension. In the absence of definite knowledge, circumstantial evidence (mostly epidemiological), along with experimental data from animal models, has been used to arrive at possible causes of hypertension (Goodhart & Shils, 1980; Marsh, Klippstein, & Kaplan, 1980).

Secondary hypertension can be traced to definite diseases such as kidney disorders, tumors of the adrenal glands, and endrocrinologic, vascular, and nervous disorders. Treatment of secondary hypertension is directed toward diagnosis and treatment of the underlying condition. Less than 10 percent of the cases of hypertension are of this type (Goodhart & Shils, 1980; Miller & Keane, 1972).

Primary hypertension has no known underlying disease, but is believed to occur as a result of environmental and genetic or familial factors. "Environmental factors considered to be acting in populations

with high blood pressure are the stresses of industrial life, overcrowding, air pollution, psychosocial and psychologic perturbations and dietary disturbances." Some of the dietary disturbances that studies have associated with hypertension are "soft" drinking water, high cadmium intake, low calcium consumption, high salt (sodium) intake, and low potassium/sodium ratio (Goodhart & Shils, 1980, p. 1008).

Hypertension is considered a dangerous condition because it often leads to other conditions that kill or cripple: enlarged heart, stroke, arteriosclerosis, heart attack, and kidney damage. Hypertension has been designated as one of the most serious conditions in the U.S. and is estimated to contribute to one million deaths a year. Stroke, alone, caused 60,000 deaths in 1976 (Alderman, Green, & Flynn, 1980; Moser, 1982; U. S. Department of Health and Human Services, 1982).

According to the National Heart, Lung and Blood Institute, 60 million Americans (one of every four people) now have hypertension. It is estimated that 30-35 million members of the workforce have hypertension. Using annual aggregate national costs, it is estimated that the average hypertensive employee costs society and industry $440 to $760 per year in terms of excess medical care and lost productivity (Kristein, 1982). Approximately 70 percent of hypertensives (25 million people in the U. S.) are in the mild hypertension category with diastolic blood pressures between 90 and 104 mm Hg (Wassertheil-Smoller, Langford, Blaufox, Levine, Cameron, Babcock, Pressel, Caggiula, Cutter, Curb, & Wing, 1985). Health promotion programs that prevent or reduce hypertension among workers can result in large money savings for business and industry, as well as save lives.

Dietary Characteristics

Increasing attention has been focused on the possible involvement of diet in the development of chronic diseases in the past 15 years. Epidemiological studies have correlated the rise in certain diseases with drastic changes in the American diet, along with other lifestyle characteristics. Dietary factors receiving primary attention have been overall dietary pattern and caloric balance, fat, cholesterol, complex carbohydrates, sugar, fiber, sodium, alcohol, and caffeine (Brown, 1981; Senate Select Committee on Nutrition and Human Needs, 1977).

In the early 1970's the Select Committee on Nutrition and Human Needs of the U.S. Senate, which had been appointed in the 1960's to study the nutritional status of the nation, turned its attention from malnutrition and hunger to focus on overnutrition. After holding hearings and reviewing the findings of basic reasearch on animals, metabolic studies, clinical trials with humans, and epidemiological investigations concerning dietary components and various chronic diseases, the Committee issued some dietary goals in February, 1977. The goals were revised later in 1977 and the second edition of Dietary Goals for the United States was issued. The overall objective of the goals was "improved health through informed diet selection by every American" (Senate Select Committee on Human Needs and Nutrition, 1977, p. xxii). The U. S. Dietary Goals (2nd edition) are as follows:

1. To avoid overweight, consume only as much energy (calories) as is expended; if overweight, decrease energy intake and increase energy expenditure.
2. Increase the consumption of complex carbohydrates and naturally occurring sugars from about 28 percent of energy to about t8 percent of energy intake.
3. Reduce the consumption of refined and processed sugars by about

45 percent to account for about 10 percent of total energy intake.
4. Reduce overall fat consumption from approximately 40 percent to about 30 percent of energy intake.
5. Reduce saturated fat consumption to account for about 10 percent of total energy intake; and balance that with polyunsaturated and monounsaturated fats which should account for about 10 percent of energy intake each.
6. Reduce cholesterol consumption to about 300 mg a day.
7. Limit the intake of sodium by reducing the intake of salt to about 5 gm per day (p. 4).

After publication of the U.S. Dietary Goals, a great deal of controversy developed about diet and chronic disease regarding the specific levels of dietary components which were recommended in the goals. Hamilton and Whitney (1982) have given a good overview of the controversy. Though there has been much controversy over the exact levels of dietary components recommended, there are several points of overwhelming agreement among leading authorities. Norum (1978) reported results of a survey of over 200 scientists from 23 countries which revealed high agreement on the following dietary recommendations, especially in regard to prevention of coronary heart disease:

1. Fewer total calories
2. Less fat
3. Less saturated fat
4. Less cholesterol
5. More polyunsaturated fat
6. Less sugar
7. Less salt
8. More fiber
9. More starchy foods(p. 194)

As a result of the controversy, several other sets of dietary guidelines were issued by other national health and nutrition-related agencies from 1978 through 1980. Probably the best known and most used of these later publications, has been Nutrition and Your Health: Dietary Guidelines for Americans (USDA-DHEW, 1980). The various sets of

guidelines have been reviewed by McNutt (1980) and agreements and disagreements of the agencies on dietary recommendations have been identified. Some points of consensus among nutrition professionals concerning recommendations for general dietary patterning are as follows:

1. A wide variety of foods in the diet
2. Moderation in the consumption of foods (fats, oils, sugars, alcohol) which are low in essential nutrients, but high in calories
3. Reduction of total fat as a percentage of calories especially for sedentary, middle aged persons
4. Reduction in consumption of sugar and alcohol
5. Increased consumption of foods containing fiber
6. Reduced consumption of highly salted foods (3 to 8 grams of sodium recommended by most)

Except for sodium, recommendations for specific amounts or percentages of the various dietary components were generally avoided in the sets of guidelines that followed the original U. S. dietary goals. However, many nutrition and health professionals have continued to use as a reference or standard the specific amounts of fat, cholesterol, carbohydrate, sugar, and sodium recommended in the 1977 Dietary Goals (Foreyt et al., 1980; Mason & Guthrie, 1979; Whitney & Hamilton, 1982).

Though the exact relationships remain controversial and absolute proof of cause and effect is still not available, there is a substantial amount of convincing evidence linking certain dietary factors with a number of chronic diseases and health problems. Excess total calories are a major cause of obesity which is a high risk factor for many health problems including hyperlipidemia, atherosclerotic cardio vascular disease, diabetes mellitus, hypertension, stroke, postsurgical complications, gynecological irregularities, varicose veins, and

back and joint problems (Goodhart & Shils, 1980; Hamilton & Whitney, 1982; Hunt, Cash, & Newland, 1978; Mason & Guthrie, 1979; Senate Select Committee on Nutrition and Human Needs, 1977; USDA-DHEW, 1980).

Excess total fat is thought to be a major factor in the development of obesity and atherosclerosis and has been linked to a higher incidence of cancer of the breast and colon. Some medical authorites recommend that total fat be no more than 30 to 35 percent of total caloric intake (American Medical Association and National Academy of Sciences, 1972; Darby, 1979; Goodhart & Shils, 1980; Hamilton & Whitney, 1982; Institute of Food Technologist' Expert Panel on Food Safety and Nutrition, 1981; McGandy, Hegsted, & Stare, 1967a; Senate Select Committee on Nutrition and Human Needs, 1977).

Excessive intakes of cholesterol and saturated fat have been implicated in the development of atherosclerosis and coronary heart disease. It has been clearly documented that the risk of coronary heart disease is linearly related to plasma levels of cholesterol above 200 mg per dl. When mean levels of intake of cholesterol and saturated fat from large populations are used, there is also a positive relationship between blood cholesterol level and level of dietary cholesterol and fat. However, the level of blood cholesterol may show little correlation to level of dietary fat and cholesterol in any one individual.

There is much disagreement as to whether the general population should reduce its cholesterol intake. Some leading authorities recommend that cholesterol intake of adults be kept at or below 300 mg a day, especially among those individuals with other coronary heart disease risk factors such as family history, smoking, obesity, sedentary lifestyle, and hypertension (Blood lipids and coronary heart disease, 1978; Fat and cholesterol in the diet, 1965; Kritchevsky, 1979; McGandy, et al., 1967a, 1967b; Phillips, Lemon, Beeson, & Kuzma, 1978; Senate Select Committee on Nutrition and Human Needs, 1977; USDA-DHEW, 1980; Working Party of the Royal College of Physicians of London & British Cardiac Society, 1976).

Excess and/or frequent sugar intake is a known risk factor in the development of dental caries. Excess sugar intake is also thought to be a major factor in obesity. Some studies have also indicated a possible relationship between sucrose intake and atherosclerotic disease. The consumption of sugars and other sweeteners has drastically increased in the U.S. in the past 50 years to a level of more than 130 pounds per person (annually) in 1980. At the same time there has been a reduction in consumption of complex carbohydrates. High sugar foods are often deficient in nutrients, while foods high in complex carbohydrates contain other important nutrients and fiber. Complex carbohydrates have also been found to result in better control of blood glucose levels, whereas refined carbohydrates and sugars may cause wide fluctuations in glucose level. Many nutrition authorities recommend a decrease in consumption of sugars and other sweeteners to about 10 percent of

caloric intake, while at the same time increasing consumption of foods containing complex carbohydrates (Cohen, Lietelbaum, Balogh, & Groen, 1966; Hamilton & Whitney, 1982; Mann & Truswell, 1972; Sucrose, starch and hyperlipidemia, 1975; USDA-DHEW, 1980; Yudkin, 1964; Yudkin & Roddy, 1964).

In recent years there has been an increased interest in the role of fiber in human health and disease processes. Evidence from epidemiological studies comparing populations on diets high in refined foods with populations on high fiber diets and some experimental studies, indicates that a low fiber intake may be a risk factor in several diseases and health problems including cardiovascular disease, diabetes, diverticular disease of the colon, cancer of the colon, appendicitis, and some other diseases of the gastrointestinal tract (Cummings, Branch, Jenkins, Southgate, Houston, & James, 1978; Devroede, 1978; Kirby, Anderson, & Sieling, 1981; Kritchevsky, 1978; Mendeloff, 1978; Trowell, 1978; Walker, 1978).

Kelsay (1978) reviewed more than 50 studies dealing with fiber and, based on the published results, drew the following conclusions:

1. Inclusion of fiber in the diet increased stool bulk, but did not always affect transit time.
2. More carefully controlled studies are needed to determine the effects of fiber on diverticular disease and irritable bowel syndrome.
3. Serum cholesterol levels did appear to be lowered by pectin.
4. Serum triglycerides and other lipids were not affected by inclusion of fiber in the diet.
5. Some reports indicated fiber may reduce the absorption of calcium, iron, and some other minerals, and energy, fat, and nitrogen.
6. Widely varying amounts and types of fiber were used in the studies.

Many nutrition and medical authorities believe there is sufficient evidence of the benefits of fiber to recommend that high fiber foods be icreased in the American diet to reduce the risk of chronic constipation, diverticulosis, and irritable bowel syndrome and to aid in achieving a normal glucose level, cholesterol reduction, and weight control. No agreement has been reached on a recommended intake of dietary fiber; however, from 30 to 70 gm have been mentioned by various authors. Typical diets in the U.S. now provide only about 20 gm of dietary fiber. However, caution must be exercised due to the possible adverse effects of fiber on mineral absorption (Diabetes and dietary fiber, 1978; Hamilton & Whitney, 1982; Liebman, 1978; USDA-DHEW, 1980; Vahouny, Roy, Gallo, Story, Kritchevsky, Cassidy, Grund, & Treadwell, 1978).

Sodium is an essential mineral element in the body, involved in maintaining blood volume and cellular osmotic pressure and in transmitting nerve impulses. Though the exact level of sodium needed by the body is not known, intakes of 1,100 to 3,300 mg per day are considered safe and adequate levels for the healthy adult. Many Americans consume more sodium than they need, with the estimated daily intake ranging from 2,300 to 6,900 mg per individual. There is overwhelming evidence from epidemiological and experimental research that excess sodium intake is one causal factor in the development of hypertension in susceptible individuals. In populations with low-sodium intakes high blood pressure is rare. Other risk factors are thought to include genetics, age, obesity, stress, hyperlipidemia, and smoking. Estimates

of the percentage of people who are genetically at risk of developing hypertension range from 15 to over 25 percent of the U.S population (Alderman, Green, & Flynn, 1980; Altschul & Grommet, 1980; Goodhart & Shils, 1980; Jacobson & Liebman, 1980; Liebman, 1981; National Research Council, 1980).

Since it is very difficult to accurately identify those individuals at risk for hypertension, many nutrition and medical authorities recommend that all Americans reduce their sodium intake to the safe and adequate leels suggested by the National Research Council (1980) of 1,100 to 3,300 per day. Processed foods, cured meats, salty snack foods, table salt, and some medications are the highest contributers of sodium in the American diet. One teaspoon of salt contains about 2,000 mg of sodium (USDA-DHEW, 1981; Science and Education Administration, 1980; USDA & U.S.Department of Health and Human Services, 1982;).

Excess alcohol consumption is a nutrition and health risk factor for several reasons. Alcoholic beverages are high in calories and low in other nutrients, which may contribute to obesity and elevated serum triglycerides. Heavy drinkers may lose their appe- tites for foods containing essential nutrients and alcoholics are often found to have several vitamin and mineral deficiencies. Alcohol also affects the absorption, utilization, and excretion of several nutrients, including the water soluble vitamins and minerals. Heavy drinking may also cause a variety of serious conditions such as cirrhosis of the liver, neurological disorders, cancer of the throat and neck, and birth defects.

Pregnant women have been advised to refrain from drinking any alcoholic beverages (Dupont & Basen, 1980; Fazio, Flint, & Wahlqvist, 1981; Halsted, 1980; Hoyumpa, 1980; Shaw, Gorkin, & Lieber, 1981; Sutherland, Temple, Nye, & Herbison, 1980; USDA-DHEW, 1980).

There has been increasing concern within the health and medical professions in recent years over the high level of caffeine consumption among Americans. Caffeine is one the world's most widely used central nervous system stimulants. The U.S. estimated daily caffeine consumption is 206 mg per person and many studies report much higher consumptions (1200 mg or more) by a significant percentage of adults. Sources of caffeine include coffee, tea, cocoa, chocolate, cola drinks, pepper drinks, some other soft drinks, and many over-the-counter and prescription drugs (Institute of Food Technologists' Expert Panel on Food Safety & Nutrition, 1983; Roberts & Barone, 1983; Werley & Wier, 1982).

Caffeine belongs to a group of methylated xanthines which have several physiological effects, including stimulation of the central and the autonomic nervous system. Depending on the amount consumed, caffeine can increase heart rate, induce vasoconstriction, stimulate the release of free fatty acids from adipose tissue, increase basal metabolism, promote secretion of acid, increase urination, increase alertness, and reduce the feeling of fatigue. Some of the adverse health effects that have been associated with excess caffeine consumption are irritability, nervousness, anxiety, muscle tremor, insomnia, indigestion, irregular heart beat, decreased iron absorption, and increased

risk of benign breast lumps, birth defects, and bladder cancer. The Food and Drug Administration and many physicians recommend that pregnant women refrain from consuming high caffeine foods and medications.

The amount of caffeine that consitutes excessive intake is hard to define and varies widely among individuals. The amount of caffeine required to produce the basic physiological effects varies from 200 to 750 mg a day. Doses of 50 to 200 mg usually result in increased alertness, decreased drowsiness and fatigue, whereas 200 to 500+ mg may produce headache, tremors, nervousness and irritability (Caffeine: What it does, 1981; Morck, Lynch, & Cook, 1983; Stephenson, 1977; Dipalma, 1982; Institute of Food Technologists' Expert Panel on Food Safety & Nutrition, 1983).

Dietary Methodology

Dietary intake data on individuals are collected either to estimate average nutrient intake, food intake, or usual food habits of groups or individuals as well as the following:

1. providing a basis for making comparisons between groups
2. comparing average food or nutrient intake of groups or individuals with certain standards to identify dietary deficiencies or excesses
3. obtaining nutrient intake of individuals for correlation with clinical or biochemical measurements obtained on that individual
4. formation of a concrete basis for intervention program
5. evaluating changes in food or nutrient intake of groups or individuals over time and possibly after intervention program (Christakis, 1974; Simko, Cowell, & Gilbride, 1984; Young, 1981)

Methods of assessing individual and group dietary intake can be placed into two major categories (Christakis, 1974; Simko, Cowell, & Gilbride, 1984). The first category, "recalls", includes the 24-hour dietary recall and food frequency checklists and questionnaires. With these methods, the subject has not been alerted in advance and is asked to recall from memory foods eaten over a specified period of time.

The second category is that of food records, which involves having the subject or other person record all foods consumed over a specified period. Amounts of foods consumed are recorded either by weight or in common household measurements (cups, tablespoons, etc.). Because of convenience to the subject, the most common practice used in the field is to record amounts in common household units (Simko et al., 1984).

The dietary history includes a combination of several of the above techniques. This method is designed to determine the subject's usual intake over a period of time. The dietary history may include a 24-hour recall, questions concerning what the subject usually eats at certain times, and a food frequency checklist. In addition the subject may be asked to keep a food record of three to seven days (Bazzarre & Myers, 1979; Simko et al., 1984; Young, 1981).

Each of the dietary intake methods has advantages and limitations. The method selected for use should depend on the purposes of the dietary assessment, certain characteristics of the subjects, and the time and expertise of interviewers. Acheson et al. (1980) cautioned

that, though any technique needs to be accurate, it "should not be so intensely applied as to interfere with the subject's dietary habits and, thus, alter the parameter being measured" (Acheson, Campbell, Edholm, Miller, & Stock, 1980, p. 1147).

The success of the dietary recall method depends on the subject's memory, his ability to convey estimates of quantity to the investigator, his degree of motivation, and persistence of the interviewer in probing. In certain populations such as the elderly, the very young, and possibly among males, consciousness and/or memory of foods consumed may be very limited and result in under-reporting (Acheson et al., 1980). Subjects involved in food preparation or who are conscious of food intake because of weight control or special diets usually are able to give more complete and accurate recalls (Adelson, 1960; Bazzarre & Myers, 1979; Simko et al., 1984; Young, 1981). For this reason, women may be able to give more complete imformation than other subjects with recall methods. Accuracy and reliability of information obtained from all subjects are increased when interviewers are well-trained (Acheson et al., 1980).

A major problem in the recall method is the difficulty in estimating serving size of foods consumed (Young, 1981). The use of various types of food models, measuring cups, and other devices has been suggested to help the respondent describe more accurately the amounts of food eaten. In one study, the use of soft plastic models of foods, life-sized pictures, abstract shapes, and three-dimensional food-model

drawings resulted in similar estimates for about 60 percent of the food items tested. Sliced meats and some other foods tended to be overestimated with the use of all models (Simko et al., 1984). Many authors have cautioned that models may influence the subject's report of foods eaten and the amounts consumed (Simko et al., 1984; Young, 1981).

Several authors have reported a pattern described as the "flat slop syndrome" which is the tendency of the dietary recall method to overreport low intakes and to underreport high intakes. This results in a downward bias in the number of subjects with extremely high or extremely low intakes. The effect may be more pronounced with some nutrients than with others, including calories, protein and vitamin A (Gersovitz, Madden. & Smiciklas-Wright, 1978; Madden, Goodman, & Guthrie, 1976; Young, 1981).

Advantages of the recall methods include the fact that they are relatively easy and quick to administer as compared to other methods and do not have the disadvantage of influencing what the subject eats. Because of limited time demands on the subject, the response rate for the recall method is much higher which gives higher representativeness of the sample (Young, 1981).

One major limitation of the 24-hour recall is that food intake over this short period is not representative of the overall or usual eating habits of an individual. Studies have shown very little correlation between nutrient level in one 24-hour recall and other measures

on the individual such as biochemical or clinical values. Validity and reliability of the 24-hour recall when used to estimate an individual's usual nutrient intake have generally been very low, except in those persons with very monotonous diets (Young, 1981).

When used to estimate the average nutrient intake of groups, the 24-hour recall has shown higher validity and reliability than when used for estimating nutrient intake of individuals (Adelson, 1960; Bazzarre & Myers, 1979; Gersovitz et al., 1978). With groups there is a greater likelihood of balancing out deviations from the more typical intake. For this reason, use of the 24-hour recall has generally been limited to situations where the goal is to obtain average group intakes (Bazzarre & Myers, 1979; Simko et al., 1984).

Use of other recall methods, including food frequency checklists and food frequency questionnaires covering periods longer than 24 hours, is helpful in determining the usual intake of individuals and groups. Some investigators have concluded that one month is the maximum time period for which a recall of usual dietary intake can be considered reliable (Bazzarre & Myers, 1979).

Food frequencies are commonly administered in the form of a self-completion checklist on which subjects are asked to indicate their usual intake of the most frequently used types of food per day, per week, or per month. Checklists available in the literature usually include from 40 to 80 foods, grouped on the basis of principal nutrients.

The food frequency is generally considered a descriptive and qualitative tool, rather than quantitative, since clients are usually not asked to specify exact portion sizes. However, some investigators have had clients give usual portion sizes or have assigned average portion sizes themselves, in order to compute nutrient intake. Whether or not this practice provides valid information has not been adequately substantiated by research (Campbell, Roe, & Eickwort, 1982; Simko et al., 1984). Generally, food frequencies, like 24-hour recalls, have been found to have higher reliability and validity when used to estimate group averages than when used with individuals (Bazzarre & Myers, 1979).

Food records are most often used when the purpose of the assessment is to describe an individual's current intake and to obtain more accurate quantitative data. Records may be kept either by weighing foods before eating, or measuring with common household measurement utensils, or by menu listing of all foods consumed without giving serving size. Recording servings in household measures is much less demanding and is the usual form of record keeping used in field studies (Bazzarre & Myers, 1979; Simko et al., 1984).

The time period of record keeping in most studies has varied from one to seven days. However, in some studies, using more educated and highly motivated subjects, the period has been extended to two weeks or longer with good results (Adelson, 1960). The shorter the period, the less likely the record will reflect usual eating habits. On the other

hand, the longer the period, the lower the response rate. In a study using a two-week food record kept by highly educated men, Adelson (1960) concluded that the second week was unnecessary because the agreement between the two weeks in nutrient content was extremely close.

Some studies have shown a marked decrease in quality of record keeping beyond 4 days, particularly with less educated or less motivated subjects (Bazzarre & Myers, 1979; Simko et al., 1984; Young, 1981). With highly educated individuals, Adelson (1960) obtained good quality records for a two-week period. With individuals who have less varied diets, a shorter time period would be required to get a good estimate of overall nutrient intake. Thus, the time period for record keeping should be chosen on the basis of the education, motivation level, and anticipated dietary diversity of the subjects.

One of the major limitations of food records is the possibility that the process of record keeping will influence the subject to change his eating pattern from the usual because of the burden of recording, or in an attempt to conform to perceived approved patterns. The magnitude of this effect has not been clearly assessed. However, in comparing nutritive values obtained by the food record with those obtained with list recalls over the same period, studies have obtained somewhat lower values with the food record. In one study the food record averaged 20 percent lower in nutrient content than the food frequency checklist (Young, 1981).

The dietary history method was developed by Burke in 1947 as ameans of estimating usual or average food and nutrient intake over a period of time, for the purpose of relating nutrient intake to growth and other clinical measurements. As described by Burke, the dietary history combined a 24-hour recall with questions about usual eating patterns; a detailed checklist on use, likes, and dislikes; and a 3-day food record. In using this method, one determines the average intake of nutrients over a period of time based on usual intake. Burke proposed that a rating scale be used in which the dietary level for each nutrient is rated as "excellent, good, fair, poor, and very poor" as compared to the Recommended Dietary Allowances of the Food and Nutrition Board (Bazzarre & Mayer; Burke, 1947; Simko et al., 1984; Young, 1981).

The history method described by Burke requires one to two hours of interviewer time to complete and nutritionists who are well-trained in the method. The method is difficult to administer when subjects have a diverse eating pattern. There are a number of variations of the dietary history mentioned in the literature, but their exact procedure, validity, and reliability are not well documented (Bazzarre & Myer; Simko et al., 1984).

Christakis (1974) summarized the relative limitations of the various dietary intake methods as follows:

1. Direct measurement of food intake is feasible only for small groups
2. Food records may cause the subject to change his normal eating habits

3. Dietary histories are subject to problems of memory
4. Although 24-hour recalls may be more objective than dietary histories, they suffer because only one day is measured
5. No method short of extensive daily food sampling is likely to accurately categorize large numbers of individuals with respect to dietary intake (p.14)

With these limitations in mind, several authorities have cautioned that dietary intake studies can by no means be taken as absolute indications of actual nutritional status, but should be used to obtain presumptive evidence of dietary inadequacies or excesses in individuals or specific groups (Christakis, 1974; Young, 1981).

Once dietary data are collected, one of several methods can be used to analyze the data depending on the objectives of the study. The simpliest analysis is a comparison of the subject's food consumption with a recommended standard such as the "basic four food groups" or some other meaningful food-scoring system. Crocetti and Guthrie (1983) used the USDA basic-five food groups to evaluate the food intake of subjects, based on 3-day food records obtained in the 1977-1978 National Food Consumption Survey. They found that a low intake of the four major food groups did correspond with low values of selected nutrients. A method of obtaining a "dietary score" using the basic-four food groups (described by USDA) is used to evaluate food intake in the Expanded Food and Nutrition Education Program of the Cooperative Extension Service (Expanded Food and Nutrition Education Program, 1983.

Some of the recently developed food-scoring systems include those which are directed toward identifying individuals at risk of developing

certain chronic diseases such as coronary heart disease. These types of comparisons indicate possible dietary weakness, but may be be difficult if the diet has limited variety, unconventional foods, or special cultural components (Christakis, 1974; Simko et al., 1984).

For most studies, detailed nutrient calculations are made on the basis of food composition tables such as the U.S. Department of Agriculture's Handbook No. 8 or Church and Church's "Food Values of Portions Commmonly Used" (Christakis, 1974). Shorter tables have also been developed which include the most commonly eaten foods, grouped in broad categories. One such table is Nutritive Value of Foods (Science and Education Administration, 1981). Almost all the tables draw extensively from Handbook No. 8, but include additional foods depending on the focus of the table (Simko et al., 1984).

Nutrient calculations way be made by hand using the food tables; however, the use of computers has become increasingly common. A number of computer programs for nutrient analysis are now available, including several based on the Department of Agriculture's Handbook No. 8 and Home and Garden Bulletin No. 72. Some of these programs use the food code numbers listed in the handbooks as computer code numbers (Nutri-Calc, 1979; Simko et al., 1984). Many of these progm, designed for microcomputers, are becoming popular and offer the advantages of portability and immediate feedback (Simko et al., 1984).

Several authorities have cautioned that nutrient analysis of food intake using food composition tables provides only a rough estimate of

nutrient intake, because of the flaws in the tables themselves as well as other factors. Errors exist in the nutrient values listed in the tables due to errors inherent in the laboratory methods of chemical analysis. Also, in most food composition tables, the amounts of nutrients listed for any given food represent average values obtained for different varieties of the same food, produced or prepared under a range of conditions. Errors may also be made in transcribing information from the tables or in determining which food item in the table most closely approximates the food consumed by the subject (Bazzarre & Myers, 1979; Christakis, 1974; Simko et al., 1984).

After obtaining estimates of nutrient intake for groups or individuals, comparisons are made either with other groups of individuals or with some standard, in order to make judgements about the relative nutritional adequacy of the diet or to identify excesses. The type of comparison depends on the purpose of the study (Simko et al., 1984; Young, 1981).

The dietary standard most commonly used in the United States is the Recommended Dietary Allowances (RDA's) established by the Food and Nutrition Board of the National Research Council. Except for energy (calories), the RDA's are set at levels to meet the known nutritional needs of 97.5 percent of the population and will exceed the requirements of some individuals. The Food and Nutritional Council has stated that intakes below the recommended allowances for a nutrient cannot necessarily be interpreted as a dietary deficiency; however, when the

proportion of individuals with low intakes is extensive, the risk of deficiency in the population is increased (National Research Council, 1980). Many studies have selected two-thirds of the RDA as a marker to indicate nutritional risks to the individual or population. The existence of actual deficiencies must be confirmed or rejected by use of biochemical and/or anthropometric data (Christakis, 1974; Simko et al., 1984)

In studies where the purpose was to correlate nutrient intake with certain chronic diseases or conditions (obesity, cancer, coronary heart disease, hypertension, colon disease, diabetes, etc.), intake of nutrients or other dietary components of populations in which there is a high incidence of a disease or condition has been compared to the intake of groups where there is a low incidence of the disease. Based on these comparisons, certain indexes and standards have been developed against which an individual or group's dietary intake can be evaluated for risk of developing certain diseases or conditions. Some studies dealing with chronic disease risk factors, have used as a standard the levels of certain food components recommended in the Dietary Goals for the United States (Committee on Food Consumption Patterns of the NRC, 1981; Senate Select Committee on Nutrition and Human Needs, 1977).

Psychological Stress

The twentieth century has been labeled "the century of fear" and "the age of anxiety" because of the high levels of psychological stress suffered by a large percentage of the population in the U.S. Sehnert (1981) reported that large numbers of people fall victim each year to certain ailments that are thought to be, at least partly, caused by chronic psychological stress.

> About 25 million Americans have high blood pressure. One million persons have heart attacks each year. An estimated 8 million people have stomach ulcer. 12 million Americans are said to be alcoholics. More than 230 million prescriptions are filled each year for tranquilizers. (p. 14)

The factors or situations that cause psychological stress vary from person to person, but most individuals suffer some symptoms of psychological stress such as anxiety or depression at some time in their lives. Many work site health promotion programs include stress management (Brennan, 1982a; Sehnert, 1981).

The whole area of stress and how it affects physical health and nutritional status is a fairly new area of research and many questions are still unanswered. More research needs to be directed toward the question of how chronic psychological stress, anxiety, and depression affect one's nutrient intake and nutrient requirements.

The term "stress" has been used in a variety of ways in the literature. One of the most accepted and quoted descriptions of stress is one by Hans Selye, a distinguished scientist and researcher from Montreal, Canada, who expounded the consequences of stress on the human

body over 40 years ago (Kutash & Schlesinger, 1980). Selye (1978) defines stress as "the non-specific response of the body to any demand" (p.1). McGrath states that "stress occurs when there is a perceived, substantial imbalance between environmental demand and the response capability of the focal organism" (Vattano, 1978, p. 114).

Most authors in the literature when using the word "stress" are referring to a response which Selye (1978) calls "distress" and which he describes as unpleasant or disease-producing stress. Selye distinguishes pleasant or curative stress as "eustress" in contrast to "distress". In the present report, the unpleasant type of stress is generally being referred to when the word "stress" is used. The stress-producing factor is referred to as the "stressor" and may be pleasant or unpleasant (Kutash & Schlesinger, 1980).

Anxiety is a basic human emotion that accompanies the stress response. It is generally described as a syndrome consisting of uncomfortable feelings of apprehension, tension, and dread. These feelings are associated with an increased activity of the autonomic nervous system. Limited amounts of anxiety may be unavoidable and are helpful in certain situations of danger. However, when anxiety becomes chronic and overwhelming, it can be maladaptive and incapacitating (Vattano, 1978, p.114).

Depression is a psychological and physiological state which may accompany or follow periods of stress. It is described by Simon (1963) as including the following characteristics:

1. a general loss of interest, energy, and drive
2. anorexia and weight loss

3. insomnia and early morning waking
4. sadness and crying spells
5. inordinate guilt feelings
6. self-deprecation (p. 208)

Selye (1980) has described the total span of changes in the organism that occurs in harmful stress (distress) as the "General Adaptation Syndrome" (G.A.S.). This syndrome has been substantiated by other researchers and is generally accepted as a true picture of what takes place in the body as a result of stressful stimuli. According to Selye the General Adaptation Syndrome consist of three stages: (1) the alarm reaction, (2) the stage of resistance, and (3) the stage of exhaustion. The first stage is characterized by two phases, the "shock" phase and the "countershock" phase (Kutash & Schlesinger, 1980; Sehnert, 1981; Selye, 1980).

The "countershock" phase of the G.A.S. is often referred to as the "fight or flight" response. It prepares the organism to take action. The response is characterized by an increased production of adrenocorticotrophic hormones (ACTH) and glucocorticoids which stimulate the release of glucose and free fatty acids into the blood stream. There is an increase in alertness of the central nervous system, increased muscle contractility, heart rate, cardiac output, and breathing rate, and redistribution of blood to the muscles. At the same time the autonomic nervous system is stimulated, causing an effect on the gastrointestinal tract, as well as a release of catecholamines from the adrenal glands. The catecholamines cause an increase in blood pressure, pulse rate, muscle contractility, and increased ability of the blood to

clot (Eiseman & Heyman, 1970; Goodhart & Shils, 1980; Jacob & Francone, 1974; Sehnert, 1981; Selye, 1978).

The G.A.S. can be activated by many stressors such as cold, heat, joy, sorrow, anger, fear, drugs, muscle exertion, etc. However, in humans, emotional arousal is one of the most frequent and strongest activators of the syndrome (Selye, 1978).

Responses of the body to the glucocorticoids and the catecholamines serve to check and balance the body's functions and enable it to defend itself and to maintain homeostasis. However, unremitting stress can break down the body's protective mechanisms. When individuals are "run down" due to periods of physical or psychological stress, they are more likely to succumb to an infection or illness such as a cold that might have been resisted if in peak condition. Selye (1980) makes this observation: "potentially pathogenic microbes are in or around us all the time, yet they cause no disease until we are exposed to physical or psychological stress" (p. 137).

Several researchers have shown evidence that a poor mental state is associated with deterioration in physical health. Berkman and Syme (1979) showed evidence that patterns of social interaction were correlated with striking differences in longevity in a group of 4725 adults. In certain diseases, maladjustment to stress was believed to play a more important role than pathogens. These diseases are often called "diseases of adaptation" and are thought to be due to insufficient, excessive, or faulty reactions to stressors. The faulty reaction might be an inappropriate hormonal response such as excess ACTH production or

an excessive or inappropriate nervous response. Some diseases in which maladaptation to stress is considered to be important are kidney disorders, high blood pressure, atherosclerosis, heart disease, gastric and duodenal ulcers, irritable colon syndrome and some other colon disorders, and various types of mental disturbances (Eisenberg, 1979; Esler & Goulston, 1973; Jenkins, 1971a, 1971b, 1978; Mendeloff, Monk, Siegel, & Abraham, 1970; Taggart & Carruthers, 1971; Sehnert, 1981; Selye, 1978).

Even in the absence of specific disease, stress may cause many painful and unpleasant symptoms. The symptoms mentioned most often are tensed muscles, headache, backache, spasms of the esophagus and colon, diarrhea or constipation, tightness in the throat and chest, difficulty in swallowing, indigestion, nausea, and other gastrointestinal upsets, sleep disturbances, chronic fatigue, irritability, diminished memory, and accident proneness (Benson, Beary, & Carol, 1974; Selye, 1978; Sehnert, 1981).

Relationship Between the Stress Response and Nutrition

The relationships between stress and nutrition can be grouped into three major types of interactions:

1. the effects of stress (anxiety and depression) on consumption of food, nutrients, and certain nutrition-related compounds
2. the direct interaction of the general adaptation syndrome and the metabolic processes of nutrients and other food components
3. alterations of nutritional status as a result of stress-induced diseases and poor health conditions

There are numerous reports in the literature which indicate that emotional and psychological factors affect food choices and consumption (Baird & Schutz, 1980; Bruch, 1971; Evans & Hall, 1978; Hirsch, 1982; Janowsky, Berens, Davis, 1973; Morley & Levine, 1980; Slochower & Kaplan, 1980; Simon, 1963). Bruch (1955) summed it up this way: "The role of the emotions in relation to food can hardly be overrated . . . . Emotional aspects of eating pervade our life to such an extent that they are taken for granted as the normal and natural eating habits" (p. 68).

A study by Baird and Schutz in California (1980) compared food preferences, nutrient intake, and serum nutrient values with social, personality, and emotional characteristics of 100 nonpregnant, adult women. All the women were responsible for meal planning and food purchasing in their own households, so their food choices would be expected to influence food intake of other family members. Through the use of multivariate analysis, the authors sorted out and arranged some of the complex interrelations found among the individual food attitudes, behavior and nutritional status. The following patterns were observed:

1. Depression, anxiety, and immature attitudes and behavior had an overall negative effect on food intake and nutritional status

2. Rational attitudes and behavior were positively related to higher dietary intake of many nutrients but were not always related to elevated serum nutrient levels nor to the heart disease, and obesity-related measures

3. Picky, careless, self-indulgent attitudes and behavior, were negatively related to dietary intake of many nutrients, but were not related to lower serum nutrient levels or to heart disease and obesity-related measures

4. Positive attitudes and behavior which were suggestive of physical, social, emotional, intellectual, and economic wholeness had a positive relationship to both high dietary intake and serum nutrient levels and a negative correrelation to the heart disease- and obesity-related measures

Bruch (1955) cited several studies that support the notion that obese people often use food to alleviate depression. Simon (1963) reported conflicting results in a study of the relationship of depression and obesity. He specifically evaluated the occurrence of depression in 27 obese and 50 nonobese subjects. Surprisingly, he found that only one of the 27 obese (4 percent) subjects had suffered significant depression, whereas 13 of the 50 nonobese (26%) had suffered significant depression. However, Simon cited several other studies that had found positive correlations between obesity and personal insecurity, emotional instability, and emotional tensions. Simon concluded that in individuals with emotional stresses, hyperphagia serves as a "defensive mechanism directed toward mitigating feelings of insecurity, anxiety, and depression" (p. 209).

Slochower and Kaplan (1980) measured unobtrusively the eating patterns of obese and nonobese individuals in response to anxiety. They reported that obese participants ate more than nonobese when they felt anxious and could neither control nor explain this state. Their overeating response was sharply reduced when a sense of control was restored and a label for the cause of the arousal was present.

Undereating is often associated in the literature with depression, whereas overeating seems to be connected more with anxiety. In the

description of depression by several authors, anorexia and weight loss are listed as characteristics. Many of the typical symptoms of psychological stress are observed among those with anorexia nervosa and bulimia (Beck, 1967; Bruch, 1982; Chng, 1983; Flack & Draghi, 1975; Morley & Levine, 1980; Simon, 1963; Slochower & Kaplan, 1980).

Findings of some research has suggested that psychological stress, anxiety, and depression may lead to increased consumption of sweets, chocolate, potato chips and other high-calorie, low-nutrient snack foods. Baird and Schutz (1980) observed that subjects who were characterized as either indulgent and guilty, unhappy snackers, or as generally unhappy, were more likely than the happy subjects to see candy, pie, potato chips, and wine as appropriate to eat when unhappy. The unhappy subjects exhibited more limited food choices and voiced more food dislikes than the happy subjects.

A large number of researchers have reported that the social drinker, the heavy drinker, and the alcoholic often give "tension relief" as one reason for drinking (Hodgson, Stockwell, & Rankin, 1979). Tension is the label for a variety of unpleasant states such as anxiety, emotional arousal, fear, frustration, and unpleasant stress. Strickler, Tomaszewski, Maxwell, & Suib (1979) and Higgins and Marlatt (1975) reported that fear and anxiety induced by interpersonal relationships and evaluation were associated with increased alcohol consumption. Miller, Hersen, Eisler, and Hilsman (1974) found that alcoholics drank significantly more than nonalcoholics following exposure to stressful stimuli. When stress reducing exercises were used with the

heavy drinkers following a stress stimulus, alcohol consumption was reduced. Reduction of alcohol consumption is generally accepted as a positive step in improving the nutritional status of those who drink beyond a moderate level (USDA-DHEW, 1980).

Medication taken for stress symptoms may have detrimental effects on nutrition due to drug/nutrient interactions. Large amounts of aspirin and other analgesics may be taken for headache and other aches and pains associated with stress. According to The Nurses Drug Handbook (Lobel & Spratto, 1980) and Handbook: Interactions of Selected Drugs with Nutrients in Patients (Roe, 1979), chronic consumption of tranquilizers, antidepressants, and aspirin containing compounds (salicylates) may interact with a number of nutrients. These drugs may decrease absorption of nutrients, increase excretion, or otherwise increase the body's need of certain nutrients, thereby leading to deficiencies. Nutrients that may be affected include potassium, calcium, magnesium, iron, ascorbic acid, thiamin, folic acid, vitamin B12, pyridoxine, vitamin D, and vitamin K. Therefore, it could be expected that methods of stress control might lead to reduced use of certain medications and thus to improved nutritional status.

There is substantial evidence in scientific literature that certain nutrients are reduced in the body in the presence of severe stress. These nutrients include nitrogen (Goodhart & Shils, 1978) and vitamin A (Glick, Nakane, Levine, & Jones, 1966; Morita & Nakano, 1982). Vitamin A appears to be involved in the production of the stress-induced hormones by the adrenal glands. Several researchers have

reported that free plasma tryptophan is greatly reduced in patients with depressive illness (Coppen, Eccleston, & Peet, 1973; Coppen, Shaw, Herzberg, & Maggs, 1967). At this point, the exact cause of this low level of free tryptophan is controversial; however, some researchers have suggested dietary deficiency as one possible cause and cite findings that a high protein diet normalizes the levels of total and free tryptophan in the plasma of depressed patients (Coppèn, Gupta, Eccleston, Wood, Wakeling, and de Sousa, 1976; Coppen & Wood, 1978; Young, Hussein, Murray, & Scrimshaw, 1969).

The inducement of low levels of certain nutrients under experimental conditions in humans has resulted in the occurrence of various stress symptoms. Kinsman and Hood (1971) conducted a study to assess the effects of ascorbic acid deficiency on behavior and personality characteristics by using several tests including the Minnesota Multiphasic Personality Inventory. The results showed dramatic changes in personality factors in relation to ascorbic acid levels. Beginning ascorbic acid levels were approximately 1500 mg. As the pool reached the low level of 500 mg, symptoms of hypochondriasis, depression, and hysteria increased rapidly. Brozek (1957) reported that in accute thiamin there were large increases on measures of hypochondriasis, depression, and hysteria. Thiamin supplementation restored appetite and brought dramatic improvement in all of the personality factors measured.

Some researchers (Taggart & Carruthers, 1971; Young & Ismail, 1976) have reported a rise in serum level of free fatty acids and

triglycerides as a result of psychological stress. This effect of stress is believed to be due to increased production of the catecholamines which are involved in the body's stress response. The purpose of this increase of free fatty acids is to provide an additional energy source for the "fight or flight response". Some experts believe that this is one mechanism by which stress increases the risk of coronary artery disease.

Many researchers have reported that increased anxiety is one symtom of high caffeine intake (Caffeine: What it does, 1981; Morck, Lynch & Cook, 1983; Stephenson, 1977; Dipalma, 1982; Institute of Food Technologists' Expert Panel on Food Safety and Nutrition, 1983). Greden (1974) reported several case studies in which high intake of caffeine (caffeinism) produced symptoms similar to anxiety neurosis such as nervousness, irritability tremulousness, muscle twitching, insomnia, sensory disturbances, tachypnea, palpitations, and heart arrhythmias. The daily level of caffeine ingestion by subjects who exhibit the anxiety neurosis ranged from 1000 to 1500 mg.

The third way in which stress can affect nutritional status is through development of stress-induced diseases and conditions, including coronary artery disease, hypertension, colon conditions, and ulcers (Eiseman & Heyman, 1970; Esler & Goulston, 1973; Mendeloff et al., 1978). Numerous studies have shown evidence that a variety of psychological factors are associated with the development of coronary disease. The evidence is particularly strong among individuals with

Type A personality. This personality type is charcterized by competitiveness, strong drive, high energy output, and concern with meeting deadlines. Numerous studies indicate that the Type A individual has a much higher susceptibility to angina pectoris, myocardial infarction, and increased atherosclerosis (Goodhart & Shils, 1978; Jenkins, 1971a, 1971b, 1978; Selye, 1978; Young & Ismail, 1976).

With any of the four diseases discussed abovel there is usually a resulting alteration in dietary intake which may adversely affect nutritional status. Bowel disease and ulcer may result in a decreased appetite due to pain and fear of the consequence of eating. Certain foods may have to be restricted which may reduce nutrient intake and, thus, indirectly affect nutritional status.

Measurement of Anxiety and Depression

Methods used to assess anxiety range from subjective, global ratngs by trained professionals to the most objective instruments such as electroencephalograms. The most commonly used methods include inventories and self-rating scales. Inventories are usually more sensitive than self-rating scales, but must be administered by a well-trained professional. Self-rating scales have become very popular in clinic settings, especially as a screening tool. Zung & Cavenar (1980) listed several advantages of good self-rating scales, including the facts that they provide information that only the subject can provide, are easy to score, do not require trained personnel, and are objective.

The Self-Rating Anxiety Scale (SAS) was constructed by Zung and Cavenar (1980) on the basis of the available literature which indicated that the following 20 categorical symptoms are characteristic of anxiety: anxiousness, nervousness, fear, panic, mental disintegration, apprehension, tremors, body aches and pains, easy fatigability, weakness, restlessness, palpitation, dizziness, dyspnea, paresthesia, nausea and vomiting, urinary frequency, sweating, face flushing, insomnia, and nightmares. A study was conducted to demonstrate construct validity by comparing scores from the SAS with scores using the Hamilton Anxiety Scale. An r value of .75 was obtained ($p < .01$). Reliability of the SAS was determined on the basis of intercorrelation of items using tests for internal consistency. Using the alpha coefficient calculation, a value of .84 was obtained, indicating a high internal consistency for the profile (Zung & Cavenar, 1980).

A variety of methods have been used for measuring depression, including the use of rating scales, inventories, clinical judgments or psychometric techniques, certain behavioral tests, analysis of the patient's dreams and early memories. Other instruments include "masochism" inventories amd self-concept tests. The Minnesota Multiphasic Personality Inventory and the Depression Inventory by Beck (1967) have been widely used for the measurement of depression for clinical and research purposes (Beck, 1967).

The Beck Depression Inventory was developed by Beck et al. in 1960 as a result of the difficulty which the authors found in obtaining consistent results on measurement of depression using other available

instruments (Beck, Ward, Mendelson, Mock, and Erbaugh, 1961). The inventory was developed to provide a quantitative assessment of the intensity of depression of patients in a clinical setting. The instrument was tested for validity, internal consistency, and reliability in a study involving two separate groups of clinic and psychiatric patients. One group contained 226 participants and the second group involved 183 subjects. In addition to being rated on the Beck Depression Inventory, each subject was assessed in separate clinical trials on depth of depression by experienced psychiatrists.

In the test for internal consistency using the Pearson r procedure between odd and even categories, a reliability coefficient of 0.86 was obtained. This coefficient rose to 0.93 when corrected with a Spearman-Brown procedure, indicating a high level of internal consistency for the Beck Depression Inventory. The validity of the Beck Depression Inventory was assessed using a Pearson biserial r statistic to compare the participants' scores on the Depression Inventory with the clinical ratings of the psychiatrists. The obtained biserial coefficients were 0.65 (Study I) and 0.67 (Study II) which were highly significant. It was concluded that the inventory was able to discriminate effectively among groups of patients with varying degrees of depression (Beck et al., 1961)

The Beck Depression Inventory was tested for validity in a non-clinic population of university students by Bumberry, Oliver, and McClure (1978). Using psychiatric ratings of depth of depression as the criteria, a Pearson r coefficient of 0.77 was obtained. The authors

concluded that the Beck Depression Inventory was a valid instrument for use in a nonclinic, college population.

Measurement of Body Fat

In former years, obesity was defined in terms of excess body weight, with 20 percent or more above ideal weight being designated as obesity. However, the more accepted method today is to characterize obesity as an excess accumulation of body fat with little emphasis on actual body weight (Oscai, 1980; Roche, Siervogel, Chumlea, & Webb, 1981). Buskirk (1974) arbitrarily designated obesity as a fatness level of 25 percent or more in adult men and 30 percent or more in women. A recent trend has been to designate obesity as a fatness level in excess of 20 percent in men and 25 percent in women (Oscai, 1980). The use of percentage of body fat to designate obesity has led to a need of methods of measuring body fat which are both reliable and feasible when used in a variety of settings.

The determination of accurate methods of measuring body fat has been the focus of a great deal of research. Many of the methods that have been used to estimate body fat are based on the assumption that the body consists of two compartments of relatively constant composition: (1) the body fat, which includes the entire content of chemical lipids in the body and (2) the fat-free mass (FFM) which includes all the rest of the body, apart from the fat. Some of the procedures developed to assess body fat involve measurement of total body water, total body potassium, body density, body circumferences, and skinfold

thicknesses (Durnin & Womersley, 1973; Frisancho, 1974, 1981; Katch & McArdle, 1977; Roche et al., 1981; Zwiren, Skinner, & Buskirk, 1973). All of the methods, with the exception of measurement of circumferences and skinfold thicknesses, require the use of sophisticated equipment.

Because of the relatively low cost, the use of skinfold measurements has been widely used to estimate body fat. Numerous mathmatical equations, using various combinations of skinfolds and one or more length or girth measurements, have been developed (Zwiren et al., 1973). Durnin and Wormersley (1973) developed and tested a method with 481 adult men and women, using skinfold thickness at four sites: biceps, triceps, subscapular, and suprailiac. In the Durnin method, the four skinfold measurements are summed, then the summed value is compared to a chart developed by the two authors to estimate percentage of body fat. In testing the method, Durnin and Womersley compared the values for percentage of body fat obtained using their own method to estimates of body density calculated from hydrostatic weighing of the same 481 subjects. A significant positive linear relationship was found between percent body fat as measured by the Durnin method and body density as measured by hydrostatic weighing. However, with older subjects and especially with females, the linear relationship was not as strong. The authors concluded that the method of assessing total body fat, by use of four skinfold measurements, was relatively easy and accurate and could be used in many fields of medicine, physiology, nutrition, and anthropology.

A major concern in the use of skinfold thickness to measure body fat over time is the problem of consistency or reliability of the measurements from one time period to another or with more than one technician. Studies in this area indicate that consistency increases as the number of technicians decreases, as the amount of subcutaneous tissue decreases, as the experience of the technician increases, and as the landmarks are more clearly defined (Gavan, 1950, p. 417).

Stress and Physical Activity

A great deal of research has been conducted in the past few years on the use of systematic physical activity to counteract the effects of psychological stress such as anxiety and depression. A large number of studies have had results that strongly indicate that, as physical fitness increases, depression, anxiety, self-centeredness, and neuroticism decrease (Collingwood, 1972; Greist, Eischens, Faris, Gurman, & Morgan, 1979; Hilyer & Mitchell, 1979; Ransford, 1982; Sharp & Reilley, 1975; Young & Ismail, 1976). Many of these researchers also found an increase in measures of self-concept, including self-satisfaction, self-attiude and self-acceptance. Collingwood (1972) reported a positive correlation between improvement in physical condition and improvement in intellectual and emotional-interpersonal behaviors.

Ransford (1982) in a review of over 90 studies, concluded that exercise leads to mood elevation in normal subjects and has an antidepressant effect on clinically depressed subjects. However, the amount

of decrease in depression, anxiety, et cetera, may be directly related to amount of time the individual runs or exercises. Many of the studies that he reviewed also indicate intensity and duration may also be inportant. In support of this factor, Penny and Rust (1980) found that walking and jogging one and one-half miles only two times a week did not result in improvement in psychological factors measured by the Minnesota Multiphasic Personality Inventory (MMPI) with middle-aged women. In a position statement in the fall of 1978, The American College of Sports Medicine (1978) recommended that exercise be done 3 to 5 times a week, at 60 to 90 percent maximum heart rate, and for 15 to 90 minutes of continuous activity, for good conditioning.

Several studies indicate that the greatest physical and psychological benefits of exercise occur with those who are initially in the poorest condition and emotional health (Hilyer & Mitchell, 1979; Ransford, 1982). Hilyer & Mitchell (1979) in a study with college students, reported that those with low self-concepts initially made much greater gains in scores on the Tennessee Self-Concept Scale. The most improvement was achieved when a running program was combined with a counselling program.

Results of some studies indicate that a person's perception of his physical fitness may be at least as important as improvement in his actual fitness in causing improvement in self-concept and decrease in anxiety or depression. Heaps (1978) obtained results with 56 male college students that firmly pointed to the conclusion that the benefit of

physical improvement on psychological factors was related to the subjects' perceptions of their fitness, rather than actual fitness levels. The participants' perceptions of fitness levels were positively related to feelings of self-acceptance and negatively related to anxiety about body functioning. Leonardson (1977) and Leonardson and Garguilo (1978) also found that perceived physical fitness was positively correlated with self-concept.

Ransford (1982) has suggested several mechanisms by which exercise may relieve anxiety and depression. Griest et al. (1979) gave a similar list.

1. Exercise provides "time-out" from worrisome responsibilities. However, several studies demonstrate that the apparent antidepressant effects depends to some degree on intensity, duration, and frequency of physical activity.

2. Social interaction- A substantial portion of the psychological benefit of exercise may be due to social interaction. On the other hand, benefits have been shown in subjects who exercised alone.

3. Mastery- Exercise programs can give the subject a feeling of mastery that counteracts the feelings of helpless and hopelessness that are prominant symptoms of depression. Hilyer and Mitchell (1978) concluded that mastery was a significant factor in self-concept improvement.

4. Physiological explanations- Most studies show that the more strenuous the activity the greater the psychological benefits. Several substances are associated with emotional disorders and might be affected by exercise, including corticosteriods, glucose, cholesterol, and androgens. Elevated cholesterol has been associated with feelings of depression, fear competitiveness, and aggression.

One theory is that exercise may result in an increase in the endorphins, morphine-like substances which have effects similar to morphine in causing euphoria (Ransford, 1982). However in a study to test

the relationship of the endorphins with mood elevation during running, Markoff, Ryan, and Young (1982) found results which did not substantiate the endorphin relationship. Eleven male and four female trained runners were alternately given injections of a placebo and naloxone (a known inhibitor of the endorphines) during a one-hour running session. The Profile of Mood States was used to record and measure tension-anxiety, depression-dejection, confusion-bewilderment, vigor-activity, anger-hostility and fatigue-inertia. Results showed that, regardless of whether an injection of naloxone or the placebo was administered, the subjects showed acute reductions in anxiety and depression with exercise. Also there was significant reduction in anger-hostility. Since the naloxone injections did not prevent mood elevation, the authors concluded that mood changes were not endorphin mediated.

Ransford (1982) has suggested that the reduction of depression by exercise may be related to increased production of norepinephrine, dopamine, and serotonin. Depression may be related to hypofunctioning of central aminergic synapse. Exercise may be effective in relieving depression because it enhances aminergic synaptic transmission. Ransford reviewed several studies that reveal an increased excretion of the metabolites of norepinephine, serotonin, and dopamine after exercise and reported results of several studies that indicate a decreased level of these same amines in depressive subjects. He concluded that an increase in these amines by exercise restores the balance in some subjects, thus relieving the depression. Ransford concedes that

possibly only certain types of people may be detrimentally affected by low levels of the amines and, therefore, respond favorably to exercise.

Measurement of Physical Activity

With the increase in interest and research regarding the use of physical fitness to reduce stress and other health risk factors, there has been a concomitant increase in the need of methods to measure exercise, physical activity, and fitness level. Numerous tests and devices have been developed which measure various aspects of fitness, including muscle strength, flexibility, endurance, oxygen utilization, and efficiency of body to perform various physical tasks (Bosco & Gustafson, 1983). Most of these more reliable methods which require special and sometimes expensive epuipment are time consuming and necesssitate the use of highly trained personnel. Most of these methods also require a high degree of motivation and commitment on the part of subjects, which makes them unsuitable for epidemiological studies, as well as some other types of studies dealing with the general adult population (Montoye, Washburn, Servais, Ertl, Webster, & Magle, 1983).

In many epidemiological studies, there is a need to estimate habitual physical activity. Also in certain studies dealing with a free-living population, where usual physical activity, and not fitness level per se is the focus of the study, efforts have been made to assess the amount of daily activity. One difficulty encountered by the researchers is how to measure daily physical activity without causing a change in

the subject's activity pattern. Many studies reported in the literature have involved the use of questionnaires and interviews and have developed their own instruments without validation tests (Bosco & Gustafson, 1983; Montoyne, 1971).

Wessel, Montoye, & Mitchell (1965) conducted a study to develop a physical activity self-administered recall record based on a list of questions about physical activity involved in occupation and leisure. They attempted to validate the instrument by comparing the data obtained against information obtained by interview. Subjects were classified at two separate times into four activity groups (Very Active, Active, Moderate, or Light) by a panel of three judges on the basis of responses to the Self-Administered Activity Questionnaire (SAQ) and the Interview Activity Questionnaire (IAQ). Results indicated fairly close agreement in the classification of subjects into activity groups by the two methods. The authors concluded that a self-administered questionnaire with an adjunct interview questionnaire could be used for classifying subjects into activity subgroups with reasonable accuracy.

Buskirk, Harris, Mendez, and Skinner (1971) used two separate procedures to determine how physically active subjects were. The first method involved a self-administered questionnaire. An estimation of each subject's daily energy expenditure was made using minutes spent in various activities and multiplying by a weighted value that represented average calories per minute used in each activity. The second procedure involved a questionnaire plus an interview. Based on answers, the total

number of hours per week spent per activity both during work and leisure was determined. Activity Metabolic Indexes (AMI) were also computed to account for energy expenditure in each activity and which allowed for different intensities of performing the activity. Using the AMI values and time spent in each activity, estimates were obtained for average daily caloric expenditure of each subject. Thus, estimated caloric expenditure was obtained on each subject by the two different methods.

A seven-day food record was used to determine the average daily caloric intake of each subject. The estimated caloric intake using food records was then compared to the estimated expenditure of calories in daily activities. Results showed very little agreement between estimated caloric expenditure (by either of two methods) and estimated caloric intake. Since the subjects neither lost nor gained a significant amount of weight, this lack of agreement between expenditure and consumption of calories was unexpected. One explanation was that few of the men were very active on their jobs and it was difficult to group the men in distinctive categories of activity (Buskirk et al., 1971).

Summary

Based on the review of literature, it can be concluded that there is growing interest among employees and employers alike in work site health promotion programs. Employees stand to gain great benefits in

terms of health, longevity, and improved quality of life through learning and practicing healthier lifestyle habits. Employers would gain financially and in other ways by having healthier employees. There is a possibility of decreased health cost, decreased absenteeism, and improved morale, job satisfaction, and productivity if workers adopt healthier lifestyles.

However, at this time only a few larger companies have invested money and time into health promotion programs for the majority of their employees. Very few smaller companies (which employ the majority of workers in the U.S.) have health education programs for employees below the managerial level. It is believed that concern over expected cost of such a program may be a factor in preventing small companies from pursuing interests in this area. There is a need for more research concerning the possibility of implementing health promotion programs in small companies with the assistance of local nutritionists, extension home economists, and other qualified professionals.

Futhermore, there is clearly a need for more scientitic documentation of the results of work site health promotion programs. This type of data would help to answer the question as to what types of programs and deliveries are most successful, as well as the most cost effective. Very few companies which have implemented health promotion programs have evaluated the results in any formal way.

A nutrition-based health promotion program, with an exercise component, holds great promise for achieving success in helping employees reduce health care cost because so many of the major chronic diseases

are partially caused by dietary imbalances. Research indicates that changes in eating habits, increased exercise, and stress control each can result in reduced chronic disease risk factors. However, each of these components has been looked at in separate studies. More research on their combined effect in reducing chronic disease risk factors would be valuable in determining the real impact that a comprehensive health promotion could have on employees.

A review of the literature substantiates that stress is one of the major health risk factors today and that stress probably has far-reaching effects on nutritional status. There is a need for more re- search on the effects of stress on food and nutrient intake, on nutrient utilization, and on body composition. The interrelationship of stress with intake of caffeine, medications, and alcohol also needs further study.

An increasing percentage of women are entering the workforce today. Studies have indicated that, along with increasing employment outside the home, there has been a concurrent increase in the percentage of women suffering certain chronic diseases and stress-related problems. More research is needed on effective ways to reach working women with information on coping with stress, as well as ways to reduce other health risk factors.

CHAPTER III

METHODS AND PROCEDURES

The purposes of this study were to assess levels of anxiety, depression, and job satisfaction among female, full-time airline reservation employees; to examine the relationship of these variables to certain nutrition, chronic disease, and health risk factors, and to develop and test the effectiveness of a nutrition-based, health promotion program in producing desired changes in several variables thought to be nutrition and health risk factors. The variables which were measured and used in comparisons were scores on anxiety, depression, and job satisfaction scales; intake of certain stress-related medications, alcoholic beverages, caffeine, total calories, sugar, fiber, total fat, saturated fat, cholesterol, sodium, protein, iron, calcium, vitamin A, vitamin C; general meal patterning, percent body fat, and time spent in recreational and planned physical activity.

A quasi-experimental, nonequivalent control group, pretest-posttest design was used for the study. This design was described by Campbell and Stanley (1963) and is one of the most widespread experimental designs used in educational research. An experimental group was selected from among Piedmont Airline reservation employees working in one location in Winston Salem, North Carolina. A control group was selected from among female reservation employees working in the Piedmont Reservation Center in Nashville, Tennessee. Though a matching

procedure was used to select the control subjects, the two groups did not have complete preexperimental sampling equivalence. Analysis of covariance procedures were used in some of the computer statistical analyses to allow for preprogram nonequivalence of the two groups. This procedure has been recommended by several researchers (Ary, Jacobs, & Razavieh, 1979; Campbell & Stanley, 1963).

Contrary to the suggestion of Campbell and Stanley (1963), subjects were not assigned by random method to the experimental or control groups. Due to the distance and cost that would have been involved in conducting the educational program in Nashville, that group was used as the controls. There was no other group of reservation employees available in Winston-Salem that could have been used as a control group. Both experimental and control subjects could not be from the Winston-Salem group because the nature of the educational program was such that the total group of 600 reservation employees received some exposure to the treatment through displays and posters at the worksite.

Recruitment of Subjects and Sample Selection

The population for this study included approximately 400 female, full-time reservation employees of Piedmont Airlines' Winston-Salem Reservation Center and approximately 200 in the Nashville, Tennessee, Reservation Center who had expressed an interest in participating in a health promotion program at the worksite. These employees ranged in age from 19 to 60 years. All had at least a high school education and many had some college background. Each employee had received special

training by the company before assuming her job as a reservation agent. The pay range of the group was above the average salary of other employed females in the same geographic area.

The job of reservationist consists primarily of sitting at a desk, receiving phone calls, and using a computer terminal to arrange flight reservations for customers throughout the Southeastern section of the United States. Full-time agents work from six to nine hours per shift. Shifts begin and end at many times during the day. Part-time and male employees were not included in the sample since they represented only a small percentage of the total workforce and because of the difficulty in matching with control subjects.

In order to insure representation of certain subgroups, a stratified random sampling procedure was used to select experimental subjects. The sampling frame for experimental subjects consisted of approximately 200 employees in the Winston-Salem office who had responded to a company memorandum (Frazier, Nov. 11, 1983, Appendix B) and had indicated on the attached form that they wanted to participate in the educational program and would be willing to serve in the experimental group. The sampling procedure for selection of subjects was as follows:

1. All members of the accessible population were asked to complete Form 001 (Appendix A) giving information by which they would be statified.
2. The information was then used to stratify the population into 8 subgroups according to three variables:
   a. Two work periods (1) Day Shift - those coming in between 6:00 and 10:00 a.m. morning and getting off no later than 7:00 p.m. and (2) Evening Shift - those coming in at 1:00 p.m. or after and getting off after 7:00 p.m.
   b. Two body weight categories (1) Normal Weight - those who reported they desired to lose 5 pounds or less of weight

(2) Overweight - those who desired to lose 6 pounds or more;

c. Two age categories (1) less than age 35 and (2) age 35 or older.

3. Nine subjects were drawn by random selection from each of the eight subgroups of employees providing a total of 72 potential experimental subjects.
4. Potential subjects were notified by letter of their selection and of the dates on which measurement would take place.

The group of potential control subjects were selected from all full-time, female reservation agents in the Nashville office who had responded to a letter (Carolyn Matthews, Nov. 14, 1983, Appendix B) indicating they would be interested in participating in a health promotion program at some future date and were willing to serve in the control group. From the potential group of 200 employees, control subjects were handpicked to match the experimental subjects as closely as possible on the three variables by which the stratification was made: age, workshift, and perceived weight category. Reports in the literature indicate that age influences job satisfaction scores, caloric and nutrient requirements, and percentage of body fat (Agassi, 1982; Harrison & Minor, 1982; Katch & McArdle, 1977; National Research Council, 1980). It was believed that workshift would influence physical activity and eating patterns. It was expected that motivation to participate in seminars and exercise would be affected by whether the subject perceived herself to be overweight and how much she desired to lose.

Complete sets of pretest (baseline) data were collected on 59 experimental subjects in the Winston-Salem group and 53 control subjects from the Nashville group. Those in the initial sample (72 experimentals and 72 controls) who did not return complete sets of forms were

not included in the final sample. Complete sets of postdata were obtained on 42 experimental and 42 control subjects. The return rate of subjects for which postdata were obtained was 72 percent for the experimental group and 78 percent for the control group. The final sample of 42 experimental and 42 control subjects is shown in Table 1 according to the 8 stratifying characteristics.

Table 1
Stratification of Experimental and Control Subjects

	Less than age 35				Age 35 or older			
	Normal weight		Overweight		Normal weight		Overweight	
Shift	Exper.	Control	Exper.	Control	Exper.	Control	Exper.	Control
Day	6	(8)	6	(6)	4	(5)	6	(7)
Evening	6	(4)	4	(5)	4	(3)	6	(4)
Totals	12	(12)	10	(11)	8	(8)	12	(11

Instrumentation

Anxiety scores were obtained with the Self-Rating Anxiety Scale (SAS, Form 002, Appendix A) and was developed by Zung and Cavenar (1980). This scale yields raw scores ranging from 20 to 80 which were converted to percentages. Thus, a raw score of 40 means that the subject had 50 percent of the anxiety measured by the test. This instrument was selected because it is self-administered, easy to score, and has yielded high reliability (r=.84) and validity (r=.75) test values.

Depression scores were obtained with the Beck Depression Inventory (Form 003, Appendix A) developed by A. T. Beck (Beck, Ward,

Mendelson, Mock, & Erbaugh, 1961). The inventory yields raw scores of 0 to 63; however, raw scores were converted to percentages. The instrument was demonstrated to have a high reliability (r=.93) and validity (r=.77).

Job satisfaction scores were obtained with the Job Questionnaire (Form 004, Appendix A) developed by Brayfield and Rothe (1951). It is based on a Likert Scale which yields a high score of 90 for those most satisfied with their job and a low score of 18 for those least interested. When scores were converted to percentage points, based on 100 points, a raw score of 80 became a score of 89 percent and, thus, represented 89 percent of the job satisfaction measured by the index. This instrument was selected because it is self-administered, easy to score, was constructed on the basis of factors of interest in this study, and was demonstrated to have high reliability (r=.87) with female workers. High construct validity was demonstrated by the fact that this scale differentiated a group known to have low job satisfaction levels from a group known to have high satisfaction levels at the .01 level of significance.

General meal patterning (GMP), average weekly consumption of alcohol, daily intake of calories, caffeine, sugar, fiber, total fat, saturated fat, cholesterol, sodium, protein, vitamin A, vitamin C, calcium, and iron were assessed using a dietary history method similar to that described by Burke (1947). Forms included a standard 24-hour recall and a standard 3-day food record. A food frequency check list was included as a part of Food Questionnaire and Frequency Check List

(Form 005). This form was adapted by the author from portions of two other forms found in the literature (Christakis, 1973; Simko et al., 1984;). Copies of the Food Questionnaire and Frequency Check List (Form 005), the 24-Hour Recall (Form 006) and the 3-day Food Record (Form 007) and "Directions for 3-Day Food Record" are located in Appendix A.

General Meal Patterning was designed to consist of eight categories of usual food intake based on two factors. The first factor was a dietary score obtained by using a method developed by the Federal Cooperative Extension Service for the Expanded Food and Nutrition Education Program. The dietary score is based primarily on the number of servings consumed by the subject from the basic four food groups (Appendix A, 24-Hour Diet Scoring Method). Each subject's "usual" diet was assigned to one of eight categories, based on the dietary score. Patterns 7 and 8 were the best diets, nutritionally, as they contained all the recommended servings from the four food groups. Patterns 1 and 2 were the poorest and contained 1/2 or less of the recommended servings of the four food groups.

The second factor used in determining GMP was based on whether calories from fat and from sugar were within the levels of the U.S. Dietary Goals (Senate Select Committee on Nutrition and Human Needs, 1977) which recommend that fat be no more than 35 pecent of calories and sugar be no more than 10 percent. The letter "a" was used to desinate those patterns with sugar and fat equal to or less than 10 percent and 35 percent of total calories, respectively. The letter "b" was used

to designate patterns with sugar and fat in excess of the dietary goals. Meal patterning categories were as follows:

Pattern 8(a)- Diet Score of 90 to 100 and meets Dietary Goals with respect to sugar and fat
Pattern 7(b)- Diet Score of 90 to 100 but >10 percent of calories as sugar and/or >35 percent of calories as fat
Pattern 6(a)- Diet Score of 77 to 89 and meets Goals on sugar and fat intake
Pattern 5(b)- Diet Score of 77 to 89 but >10 percent of calories as sugar and/or >35 percent of calories from fat
Pattern 4(a)- Diet Score of 58 to 76 and meets Goals on sugar and fat intake
Pattern 3(b)- Diet Score of 58 to 76 with >10 percent of calories from sugar and/or >35 percent of calories from fat
Pattern 2(a)- Diet Score of 57 or lower but meets Dietary Goals on sugar and fat intake.
Pattern 1(b)- Diet Score of 57 or lower with >10 percent of calories from sugar and/or >35 percent of calories from fat.

Blood pressure was measured by a registered nurse, using a standard sphygmomanometer. Measurements were taken at three different times on each participant and the average of the three readings was used. Participants were seated while blood pressure was measured and the right arm was used. For the purposes of this study, values above 140/90 were designated as high blood pressure. Blood pressures were recorded on Form 008 (Appendix A).

The Nutrition and Health Habits Inventory (NAHHI, Form 009) was used in collecting data for assessing (1)use of certain stress-related medications (doses per week), (2) participation in recreational and planned physical activities (minutes per week), and (3) additional evidence of intake of alcohol, caffeine, and sugar. This instrument was developed by the researcher and another graduate student. Since the purpose of the instrument was to gather information about habits and practices, without resulting in a score, no tests were conducted to

establish validity or reliability. A pilot test was conducted with the instrument to insure that its use would result in the collection of appropriate information needed in the main study and that it could be completed with little difficulty by the subjects.

Percentage of body fat was estimated using the Durnin method ("Durnin Method of Estimating Percent Body Fat", Appendix A). Skinfold thicknesses were measured at four sites (biceps, triceps, subscapular, and suprailiac) using standard calipers. Three readings were taken at each site and the average reading was recorded (Form 010, Appencix A). The same person measured all skinfolds for pre- and posttests. The four skinfolds on each subject were summed and a table, developed by Durnin and Womersley (1973), was used to estimate body fat.

Procedures and Time Schedule

Between August 25 and December 29, 1983, several sessions were conducted by the author with personnel and management officers of Piedmont Airline Reservation Center in Winston-Salem, North Carolina, to work out details of the data collection and health promotion program (see Phyllis Hutchins, December 29, 1983, Appendix B). Data were collected at two different times, with a seven-month experimental educational program being conducted between the first and second round of measurements. On November 11, 1983 a memorandum from a Piedmont Airlines personnel representative was distributed to all reservation employees (approximately 600) at the Piedmont Airlines' Reservation

Center on Griffith Road, Winston-Salem, North Carolina. A copy of the memorandum (Frazier, Nov. 11, 1983) is located in Appendix B. The memorandum gave a brief description of the purposes and tentative plans for the health promotion program. Each employee was asked to return a form attached to the bottom of the memorandum by November 28th, to indicate her interest in participating in the health promotion program to begin in March, 1984. Approximately 200 employees responded that they would like to participate. As described earlier, experimental subjects were drawn from this group of 200 and were notified by letter of their selection. This procedure was completed in early January, 1984.

On January 31, 1984, all instruments to be used in the total study (Parts I and II) were pretested in a pilot study with six Piedmont Airline employees who were not in the main study sample. These employees came to a comference room at the Griffith Road facility as a group. The purposes of the study were explained and cooperation of the participants was solicited. Subjects completed the various data collection forms in the presence of the researchers and other anthropometric measures were taken. Forms and procedures of measurement were evaluated for clarity, ease of completion, and time to complete. Some adjustments were made in the forms and procedures before use in the main study.

Premeasurements were collected on the experimental subjects during the period between February 6 and March 9, 1984. Anthropometric measures, blood pressures, and 24-hour recalls were measured at the work site in a room normally used as a "sick room", which provided

needed privacy. Blood pressures were measured by a registered nurse. Skinfold measurements were collected by another doctoral student, trained in anthropometric measurement. Twenty-four hour recalls were collected on each subject by the researcher. All other data were collected with forms completed by the subjects, either during working hours or at home.

Before being measured, each subject signed a consent form, which listed mutual obligations of the subject and the researcher. Copies of the consent forms signed by both the experimental and controls subjects are located in Appendix A.

Premeasurement of the control subjects was conducted during the period between March 14 and March 30, 1984. A letter was sent the Piedmont Reservation Center manager in advance which gave details of the planned measurement procedures (letter to Carolyn Matthews, February 27, 1984, Appendix B). Blood pressures, skinfolds, and 24-hour recalls were taken at the work site (Piedmont Reservation Center, Nashville, Tennesee). Subjects completed forms for all other data, either at home or while on duty at their jobs. Data were collected jointly by the author and another graduate student, with the assistance of a registered nurse who normally worked for the company as a reservation agent. The registered nurse, who measured the blood pressures of controls, was not the same one who measured the experimental subjects. However, the same instrument and procedures were used for both groups.

The experimental educational program was conducted in the Winston-Salem facility during the seven-month period between March 1 and September 28, 1984. Twelve different seminar topics were presented over the first six months (two per month) with each seminar being repeated seven times over a two-day period. Company policy did not allow subjects to attend seminars during work hours; however, all efforts were made to offer seminars at the end and before shifts to make attendance more convenient.

In addition to the seminars, four different newsletters were distributed to subjects using the company interoffice mail system. The last newsletter was distributed during the seventh month of the program (September, 1984). Posters with nutrition and wellness messages were placed at strategic locations in halls and eating areas. Table tents (standing cards), containing nutrition and health messages, were placed on tables in the lunch and break rooms. Posters and table tents were changed periodically.

A problem developed very early in the treatment phase of the study (health promotion educational program) in that subjects did not attend seminars regularly. To increase this participation, several steps were taken. A questionnaire (Form 011, Appendix A) was sent to each experimental subject to obtain information of whether the seminar topics and times were acceptable to the subjects. The questionnaire also contained a question asking subjects to state the reasons, if they did not plan to attend the remaining seminars. The quesionnaire was placed in

employee mail folders, along with a cover letter from the personnel manager (Debbie Brown, April 25, 1984, Appendix B).

Approximately 75 percent of the subjects returned the questionnaires, indicating that they were very pleased with seminar topics and did not desire changes. Some slight adjustments in seminar times were requested and were made where possible. Most of the subjects' reasons for not attending seminars were in the following categories: required by company to work overtime; extreme fatigue at end of work shift due to increased work demands and longer working hours; obligations at home which prevented them from remaining after work for seminars, such as child care, illness in family, home care requirements; being away on vacation or personal sick leave.

To encourage attendance at seminars, times were adjusted as requested by the subjects on the questionnaire. Letters were sent to subjects at various times from the author, to remind them of seminar topics and times (Letters to Wellness Program Study Participants, Appendix B). In an attempt to compensate for nonattendance at seminars, various other educational methods were used including the following:

1. After each round of seminars was completed on a topic, handouts from the seminar were placed in the mail boxes of study participants who had not attended the seminar.

2. Self-learning packets were prepared on each seminar, containing a cassette recording of the seminar and visuals. These packets were made available for participants to check out and take home overnignt. Sign-out sheets indicated that subjects did check out these learning packets on a fairly regular basis.

The titles of the 12 seminars in the educational program were as follows:

1. Wellness Profile
2. Exercise Your Way to Fitness and Health
3. Let's Get Physical
4. Vitamins, Minerals, and Calories: What do they do for Me?
5. The Stress Connection
6. Coping With Stress
7. Eat For The Health of It
8. Cut The Fat
9. Carbohydrates Count
10. What Fiber Can Do For You
11. One For The Road (Alcohol, Medications, and Nutrition)
12. How much is too much? Caffeine and Cigarette Smoking

Copies of seminars, handouts, newsletter, and table tents involved in the educational program are available on request from the author.

During the period between October 11, 1984, and February 1, 1985, after the educational program had ended, all tests were repeated on the experimental and control subjects. Postmeasurements were conducted at the work sites in both Winston-Salem and Nashville in a similar fashion as the pretests. The same people collected the measurements, with the exception that the registered nurse who took blood pressures on the experimental group during posttests was not the same one who measured during the pretests. Several letters were written to the Nashville

reservation manager, Carolyn Matthews, and to both the control and experimental subjects giving details of dates and procedures for post-measurement. These letters appear in Appendix B in the order written.

Data Compilation and Analysis

Analysis of food recalls, scoring, and compiling of data from questionnaires were conducted between December 1, 1984 and February 28, 1985. Coding of foods, scoring, and the author and the graduate student who is doing Part II of overall study. Final scores and values for each individual subject were recorded on a special form designed by the author (Form 012, Appendix A). Data were entered into the computer directly from these forms by the author.

Statistical analysis was conducted at the Computer Center at the University of North Carolina at Greensboro during March, 1984. The SAS (Statistical Analysis System) package was used in analyses. A consultant with the UNC-G Computer Consulting Center assisted the researcher by writing the computer programs and helping to interpret the computer output. The following statistical procedures were used:

1. Descriptive statistics including range, means, frequencies, percentages of:
   a. scores on anxiety, depression, job satisfaction
   b. time (minutes per week) spent in physical activity
   c. daily intake of various nutrients (protein, calcium, iron, vitamin A, vitamin C)
   d. daily intake of certain dietary components (sugar, total fat, saturated fatl cholesterol, sodium, fiber, kilocalories, caffeine, alcoholic beverages)
   e. weekly intake of alcoholic beverages in ounces

f. doses per week of certain medications taken for stress-related symptoms
g. percentage of subjects on pretest who had intakes of <50%, or 50 to 75%, or >75% of RDA for selected nutrients
h. percent of subjects in each of 3 levels of physical activity
i. number and percent of subjects on pretest and on posttest in various categories of general mealpatterning

2. One-way Analysis of Variance (ANOVA) and Scheffe's Test between anxiety scores and meal patterning and between depression scores and meal patterning

3. ANOVA and Scheffé's Test between anxiety scores of subjects and between depression scores when subjects were placed into 3 groups according to 3 levels of adequacy on selected nutrients (protein, calcium, iron, vitamin A, and vitamin C); this involved 10 separate ANOVA procedures (levels of nutrient adequacy were the same as those in Number 1g above)

4. Pearson's correlation coefficient to determine relationship between anxiety scores and depression scores and intake of sugar, sodium, total fat, calories, alcoholic beverages (ounces per week), and caffeine

5. Pearson's correlation between intake of various dietary components: alcoholic beverages, caffeine, sugar, total fat, saturated fat, cholesterol, and dietary fiber

6. Pearson's correlation between anxiety scores and percentage of body fat at pretest and between depression scores and percentage of body fat at pretest

7. ANOVA and Scheffé's Test between anxiety scores and minutes per week spent in physical activity and between depression scores and minutes per week of physical activity

8. Analysis of Covariance between experimental and control subjects' pre- and postscores (using prescores as the covariate) with the following variables: anxiety, depression, and job satisfaction

9. T test to determine if experimental and controls differed on pretest with respect to intake of alcoholic beverages, caffeine, sugar, saturated fat, cholesterol, sodium, and dietary fiber
(The purpose of this analysis was to determine if all the variables should be included in a Multivariate Analysis of Variance)

10. Multivariate Analysis between posttest levels of all of the following dietary components: Alcoholic beverages, caffeine, sugar, saturated fat, cholesterol, and dietary fiber

11. Chi-Square (Goodness of Fit) test on pretest and on posttest frequency distributions of experimental and control subjects among general meal patterning categories. For this test, the 8 GMP categories were collasped into 3 categories as follows:
    - Diet 1 (worst) = original patterns 1, 2, 3
    - Diet 2 (moderate) = original patterns 4 and 5
    - Diet 3 (best) = included original patterns 6, 7, 8

12. Mann-Whitney U Test using all of the original 8 meal pattern categories to rank subjects on pretest and on posttest. This test was used to determine if the mean rank of the experimental group on diet was equal to or greater than the mean rank of the control group at pretest and again at posttest. Having a higher mean rank, would mean that a group of subjects had a better meal pattern.

The Recommended Dietary Allowances (National Research Council, 1980) and the levels of certain food components recommended in the U.S. Dietary Guidelines (1977) were used as standards to make judgements on adequacy or excesses of intake of certain nutrients and food components. The USDA basic four food groups were used in establishing meal patterning. Based on the review of literature on caffeine intake, amounts in excess of 350 mg per day were considered excessive. No standard has been set for fiber intake; however, some authors in the literature have recommended 30 to 70 gms per day of dietary fiber (Liebman, 1982).

Food intake was analyzed for nutrient content using a Nutri-Calc microcomputer program (Nutri-Calc, 1979). This program uses as a data base the entire list of 730 foods in Nutritive Value of Foods: Home and Garden Bulletin # 72 (Science and Education Administration, 1979). In addition, it includes 91 brand name products consisting of soft drinks, fast foods, infant formulas, and cereals. Additional entrees, recipes,

cereals, etc. which appeared on the three-day food records, were added to the data base of the Nutri-Calc program. The computer program was also modified to calculate intake of refined sugars and cholesterol. All coding was done by the author and four other people, who were carefully trained to insure consistency and accuracy in coding foods for nutrient analysis.

Caffeine intake was computed manually from the 24-hour recalls and 3-day food records, using a hand calculator. The amount of caffeine in each food or beverage was based on values published by the Food and Drug Administrations's National Center for Drugs and Biologics (Department of Health and Human Services, 1984). Time spent in recreational and planned physical activity was estimated from the Nutrition and Health Habits Inventory (Part II) by adding the minutes of time reported in each type of activity, then averaging the amount by two to obtain one week. Weekly intake of alcoholic beverages was estimated from the Nutrition and Health Habits Inventory, Part III. All of these calculations were made by the author.

General meal patterning of each subject on pre- and posttest was calculated by the author using a dietary score and the percentage of calories as sugar and fat. The dietary score was based on food intake as assessed using the food frequency checklist (Form 005, Appendix A). Intake of sugar and fat were obtained from the nutritional analysis output of the Nutri-Calc computer program, which was performed on the 24-hour recalls and three-day food records. Each subject was assigned to one of eight patterns discribed previously in this chapter.

On many of the variables, subjects' values were compared to certain recommended levels or standards of normal, based on a review of the literature. Standards used in this study are listed in Table 2.

Table 2

Recommended Values and Standards Used In Evaluating Nutrient Intake and Health Related Variables

Variable	Standard or recommended value	Reference
Anxiety Depression Job Satisfaction	No standard available, but 50 points considered "Average"	
Protein[1]	44 gm per day	1980 RDA of NRC[2]
Calcium	800 mg per day	" " "
Vitamin A	4000 IU's	1974 RDA of NRC
Vitamin C	60 mg per day	1980 RDA
Iron	18 mg per day	" "
(Nutrient intake at 75% and below RDA considered "deficient".)		
Sugar	10% of total calories	Dietary Goals (Senate
Total fat	35% of total calories	Select Committee, 1977)
Saturated fat	10% of total calories	" " "
Cholesterol	300 mg per day	" " "
Sodium	1100 to 3300 mg	1980 Estimate Safe and Adequate Level - NRC
Caffeine	350 mg or less per day	Based on level above which certain undesirable effects may occur (Morck et al., 1983; Institute of Food Tech. ,1983; Dipalma, 1982)
Fiber	30 to 70 gm per day	Liebman, 1978).
% Body Fat	30% and above considered "high fat group"	Buskirk, 1974
Blood Pressure	Values above 140/90 considered elevated	Miller & Keane, 1972
Physical Activity	Most sources in literature recommend that one participate in exercise at least 3 times weekly for at least 30 minutes of vigorous activity each time; Three levels were designated: Low = < 60 minutes per week Moderate 60 to 200 minutes per week High = > 200 minutes per week	

[1] NRC = National Research Council (1980)
[2] Recommemded dietary allowance for women

CHAPTER IV

RESULTS AND DISCUSSION

The purposes of this study were (a) to assess levels of anxiety, depression, and job satisfaction among female airline employees; (b) to assess levels of certain nutrition, health, and chronic disease risk factors among the population; (c) to analyze the relationship between anxiety and selected nutrition, health, and chronic disease risk factors; (d) to analyze the relationship between depression and the same selected nutrition, health, and chronic disease risk factors; (e) to evaluate the relationship between nutritional adequacy of diet and level of anxiety and level of depression; and (f) to assess the effectiveness of a nutrition-based health promotion program in producing desired changes in the risk factors. Complete sets of data were obtained on a total of 84 adult female subjects, with 42 from the experimental group and 42 from the control group. Only those subjects, for whom complete sets of pre- and postdata were obtained were used in the final analyses. The return rate of subjects, for which post-measurements were obtained, was 72 percent for the experimental group and 78 percent for the control group.

The following variables were measured on all subjects and used in testing hypotheses: anxiety, depression, and job satisfaction scores; daily intake of protein, vitamin A, vitamin C, calcium, iron, calories, refined sugar, total fat, saturated fat, cholesterol, sodium, dietary

fiber, caffeine; weekly intake of alcoholic beverages and doses of medication for stress-related symptoms; blood pressure; percentage of body fat; weekly physical activity; and general meal patterning. The variable of medications for stress-related symptoms was eliminated from further analysis. Incomplete and missing responses resulted from this question. Individual data for subjects are located in Appendix C, Tables C-1 and C-2.

An in-depth analysis was made of subjects on pretest scores to determine relationships between certain characteristics of subjects before treatment was initiated. A description of the sample as related to the variables at pretest, results of analyses for various relationships between the variables, and results of tests for treatment effect will be presented in the following sequence:

1. Description of the sample subjects on pretest anxiety, depression, and job satisfaction scores
2. Description of the sample at pretest on certain chronic disease, health, and nutrition variables including certain nutrients and dietary components, general meal patterning, percentage of body fat, physical activity, and blood pressure
3. Tests of Hypotheses 1 and 2, using only pretest values for all 84 subjects combined, to determine relationships between anxiety, depression, and job satisfaction scores and the various nutrients and dietary components, percentage of body fat, and physical activity
4. Results of analyses for testing Hypotheses 3, 4, 5, and 6,

which deal with the effect of the health promotion program in bringing about changes in the chronic disease and nutrition related risk factors measured in the study

5. Summary of result of testing all hypotheses in tables
6. Discussion of results of testing all hypotheses

Description of The Subjects On Variables Measured In Study

Subjects were measured and described on all variables measured in the study according to mean, minimum, and maximum intake; range and standard deviation on some variables; and number and percentage outside of a defined normal or recommended level based on the review of literature. Values in Table 2 of Chapter III were used for comparing individual and mean values of subgroups of subjects in order to determine the percent above or below normal or standard levels. Intake of alcoholic beverages (ounces per week) was measured, but no standard was available to determine excessive intake.

Anxiety, Depression, and Job Satisfaction

The sample was measured and described according to pretest scores on anxiety, depression, and job satisfaction both as a total group of 84 subjects and based on experimental subjects compared to control subjects. Anxiety values are shown in Table 3 according to minimum, maximum, and mean scores and standard deviation.

Table 3

Anxiety Levels of Subjects Based on Pretest

Group	Number	Minimum score	Maximum score	Mean score	Standard deviation
Total sample	84	14.0	59.0	41.9	8.36
Experimental	42	30.0	56.0	44.0	6.98
Control	42	14.0	59.0	39.9	9.74

The mean anxiety score for the total sample was 41.9 before the health promotion program was conducted. Since the anxiety scores were based on 100, the mean anxiety level of the group was considered to be a moderate level. Only 17 percent (N=14) of the subjects had an anxiety score greater than 50. This was an unexpected finding, as the company personnel officials had expected the group to exhibit high anxiety scores, based on a belief that the job of reservationist is highly stress-inducing.

The mean anxiety score of the experimental subjects was 44 compared to 39.9 for the control group. This difference was statistically significant (p=.003); therefore, an analysis of covariance procedure was used in comparing control and experimental subjects, with the pretest scores being used as the covariate. The range (R=26) and standard deviation (SD=6.98) for the experimental group were smaller than those for the control group (R=45 and SD=9.74).

Statistics describing the sample in relation to level of depression at pretest are listed in Table 4. The mean depression score of 12.6 for experimental subjects was significantly larger (p=.002) than the mean for the controls of 11.9 points. In later analyses involving

pre- and posttest scores of both control and experimental subjects, an analysis of covariance procedure was used with the pretest scores being used as the covariate.

The mean score of 12.2 for the total group means that subjects exhibited 12.2 percent of the depression measured by the test. None of the 84 subjects had a depression score above 50. It was concluded that the subjects as a group exhibited fairly low levels of depression. This was an unexpected finding as company officials had expected the group of workers to exhibit high scores on stress-related factors.

Table 4

Depression Levels of Subjects Based on Pretest

Group	Number	Minimum score	Maximum score	Mean score	Standard deviation
Total	83	0.0	44.0	12.2	8.91
Experimental	42	2.0	37.0	12.6	8.44
Control	41	0.0	44.0	11.9	9.39

The range between the highest and lowest depression scores (R=44) and the standard deviation (SD=9.39) were slightly higher for the control group than for the experimental group (R=37, SD=8.44).

Data for sample subjects, based on job satisfaction scores at pretest, are listed in Table 5. The mean score for the total sample was 70.5, which means they had 70.5 percent of the job satisfaction measured by the test. Only 6 percent of the subjects (N=5) had a score less than 50 points. Thus, it was concluded that the subjects exhibited a high level of job satisfaction.

The mean job satisfaction score of 71.2 for the experimental group was significantly higher ($p = .001$) than the mean job satisfaction score of 69.7 for the control group. An analysis of covariance procedure was used in testing hypothses involving pre- and posttest of job satisfaction to adjust for the pretest difference between the control and experimental groups. The experimental group also exhibited a higher variation among subjects' scores as based on a range of 59 between the minimum and maximum job satisfaction scores as compared to a range of 49 for the control group.

Table 5

Job Satisfaction Scores of Subjects Based on Pretest

Group	Number	Minimum score	Maximum score	Mean score	Standard deviation
Total	84	34	93	70.5	12.74
Experimental	42	34	93	71.2	13.42
Control	42	41	90	69.7	12.07

Nutrient Intake

Nutrient intake assessed in the study included protein, vitamin A, vitamin C, calcium, and iron. Nutritional analysis was performed using a microcomputer program (Nutri-Calc, 1979) on four days of food intake collected by a combination of one 24-hour recall and a three-day food record. All statistical procedures using these nutrients were based only on pretests values and included the total group of 84 subjects. Change in intake of the nutrients from pre- to postmeasurement or

differences in intake between experimental and control subjects were not assessed in this study.

Intake of protein, vitamin A, vitamin C, calcium, and iron of the total sample at pretests, expressed as means and percentages of the Recommended Dietary Allowances (RDA), are presented in Table 6. Number and percentage of subjects meeting three levels of adequacy based on the 1980 Recommended Dietary Allowances (RDA's) are also presented. The mean score for protein (61 gm) is well above the RDA for adult females of 44 gm (ages 23 to 50 years). Approximately 89 percent of the subjects consumed more than 75 percent of the RDA for protein, with no subjects consuming less than 50 percent. Based on this finding, protein intake was adequate for a majority of the subjects measured in the study.

The mean vitamin A intake of the subjects of 5588 International Units (IU's) was also well above the RDA of 4000 IU's (or 800 R.E.'s). Approximately 65.5 percent of the subjects consumed greater than 75 percent of the RDA for vitamin A. Approximately 34.5 percent of the subjects had an inadequate intake of vitamin A of less than 75 percent of the RDA.

Seventy-five percent of the subjects consumed more than 75 percent of the RDA for vitamin C. The mean vitamin C intake of 88 mg is well above the recommended level of 60 mg per day.

Table 6

Nutrient Intake and Adequacy Levels of Female Subjects on Pretest N=84

Nutrient	Mean intake	Levels of Adequacy Attained Based on RDA					
		Less than 50% Percent	(N)	50 to 75% Percent	(N)	More than 75% Percent	(N)
Protein (gm)	61	0.0	(0)	10.7	(9)	89.3	(75)
Vitamin A (IU)	5599	14.3	(12)	20.2	(17)	65.5	(55)
Vitamin C (gm)	88	16.7	(14)	8.3	(7)	75.0	(63)
Calcium (mg)	629	22.6	(19)	29.8	(24)	47.6	(40)
Iron (mg)	12	28.6	(24)	46.4	(39)	25.0	(21)

The mean calcium intake of the total sample of 84 subjects was 629 mg at pretest. This is considerably below the RDA for calcium which is 800 mg for females (23 to 50 years old). Calcium intake ranged from a low of 123 mg to a high of 1458 mg. Twenty-three percent had consumed less than 50 percent of the RDA, 30 percent had consumed from 50 to 75 percent of the RDA, and 48 percent of the subjects had consumed more than 75 percent of the RDA for calcium.

Iron was the nutrient with the lowest level of consumption as compared to the RDA of 18 mg for women of childbearing age. The mean iron intake was 12 mg. Twenty-nine percent of the subjects consumed less than 50 percent of the RDA for iron; 46 percent consumed between 50 and 75 percent; and only 25 percent of the subjects consumed more than 75 percent of the RDA for iron. Thus, more than 3/4 of the subjects were possibly deficient on iron intake.

Some studies have used 75 percent of the RDA as a cut-off point, below which subjects are judged as having an inadequate intake of a particular nutrient. Based on this standard (on pretests), 11 percent of subjects were low in protein intake, 25 percent were low in vitamin A and in vitamin C intake, 53 percent were deficient in calcium, and 75 percent were deficient in iron intake.

Intake of Certain Dietary Components

Average daily intake of certain dietary components were measured, including calories, sugar, total fat, saturated fat, cholesterol, sodium, dietary fiber, and caffeine. Mean, minimum, and maximum levels of intake of the total group of subjects at pretest are presented in Table 7. Values are not shown for the experimental and control subjects separately because a series of t tests showed no significant difference in these variables between the two groups at pretests. Levels of intake of subjects were compared with the standards listed in Table 2 of Chapter III.

The mean intake of calories was slightly below the recommended range of the suggested intake for adult women in the 1980 RDA's (1600 - 2200). Fifty-five percent of the subjects were below the recommended minimum level of 1600 calories per day. Nineteen percent (N=16) of the subjects consumed less than 1200 calories per day. Only 3.6 percent of the subjects had a caloric intake above 2400 daily.

Table 7

Levels of Intake of Certain Dietary Component of All Subjects at Pretest (N=84)

Dietary component	Mean intake	Percent of Kcal	Minimum level	Maximum level	Standard deviation
Calories	1570	---	795	3057	422.17
Sugar (gm)	67	17%	2	170	37.01
Total fat (gm)	69	40	13	164	23.99
Saturated fat (gm)	26	15	4	60	9.85
Cholesterol (gm)	429	---	76	999	216.52
Sodium (mg)	2373	---	613	6007	968.26
Dietary fiber (gm)	15	---	1	69	8.74
Caffeine (mg)	305	---	0	2298	329.74

The mean intake of refined sugar made up approximately 17 percent of average caloric intake, which is above the level recommended in the U.S. Dietary Goals (Senate Select Committee on Nutrition and Human Needs, 1977) of 10 percent. Seventy-nine percent of subjects (N=66) consumed more than 10 percent of their calories as refined sugars.

Mean total fat represented 40 percent of the mean calorie intake, with saturated fat representing 15 percent. Both of these mean values are in excess of the levels suggested in the dietary goals of 35 percent and 10 percent, respectively for total fat and saturated fat. Sixty-one percent of the subjects (N=51) had a total fat intake exceeding 35 percent of their calories. Seventy three percent consumed greater than 10 percent of their calories as saturated fat.

The mean intake of cholesterol (429 mg) is above the "dietary goal level" (i.e. no more than 300 mg per day). Sixty one percent (N=51) of subjects had a cholesterol intake above 300 mg at pretest.

The mean intake of sodium (2373 mg) is within the "safe and adequate" levels of 1100-3300 mg per day recommended for adults by the Food and Nutrition Board of the National Research Council (1980). Only 15 percent of subjects had a sodium intake above 3300 mg at pretest.

The mean dietary fiber intake was approximately 15 gm per day. This intake is well below the range of 30 to 70 gm recommended in the literature by various researchers. Only 7 percent of subjects (N=6) had a dietary intake of at least 30 gm. The majority of subjects (93 percent) were low in fiber, if the desired level is set at 30 gm or more.

The mean intake of caffeine (305 mg) for the total sample was below the maximum level of caffeine recommended (350 mgs). However, 25 percent of subjects (N=21) had a caffeine in excess of 350 mg daily. Only two subjects consumed 1000 mg or more of caffeine per day.

General Meal Patterning

The subjects' diets were arranged into eight categories of general meal patterns, based on servings from the USDA basic four food groups (milk products, meats and meat substitutes, vegetables and fruits, and breads and cereals). Percentage of calories as refined sugar and fat was also used in determining meal patterns. All categories at the "b" level were those with more than 10 percent of calories as sugar and/or more than 35 percent of calories as fat. Pattern 8(a) was the best pattern possible (i.e. the subject consumed at least two servings milk products, two servings meat or meat substitutes, four servings vegetables/fruits, and four servings of breads and cereals daily and also

consumed 10 percent or less of calories as sugar and 35 percent or less of calories as fat. Pattern 1(b) was the worst general meal pattern, (i.e. the subject had a very inadequate intake of the basic four foods, and consumed more than 10 percent of calories as sugar and/or more than 35 percent of calories as fat).

Percentages of subjects in each of the eight meal patterns on pretest are presented in Table 8. Since Pattern 8(a) and 7(b) were the only categories in which subjects consumed all the recommended servings of the basic four food groups, only 25 percent met this standard for food intake. Since all the level "b" categories represent the con-sumption of calories as sugar and fat above the standards expressed in the U.S. Dietary Goals, 90 percent of subjects consumed an excess percentage of calories as sugar and fat at the pretest. A comparison will be presented later of controls versus experimental subjects at the posttest.

Table 8

Meal Patterning Categories of All Subjects at Pretest (N=84)

Meal pattern	(Best) 8(a)	7(b)	6(a)	5(b)	4(a)	3(b)	2(a)	(Poorest) 1(b)
Subjects % in Each	1%	24%	6%	27%	1%	27%	1%	12%

Blood Pressure

The blood pressure of subjects was measured in order to identify those subjects with blood pressure elevated above 140/90. However, blood pressures above this level were present in only four of the 84 subjects. Since this number of subjects was too small for the testing of hypotheses, a decision was made to remove blood pressure as a variable from the study. It was noted that blood pressures of the majority of subjects were in the low range, below 100/70. This was an unexpected finding as it had been expected that subjects would tend to have higher blood pressures due to the "assumed" stressful nature of the job of airline reservationist.

Body Fat

Subjects were evaluated for percentage of body fat at pretest and posttest, using the Durnin Method (See Appendix A). A comparison of the control and experimental subjects according to percentage of body fat (PBF) at pretest are presented in Table 9. Subjects with levels of body fat above 30 percent were classified in the "high fat group". Using this standard, the mean percent body fat of 34 percent for the total sample was in the high-fat range for adult females. Eighty percent of the subjects (N=67) had a body fat measurement of 30 percent or more, and thus, could be considered to have excessive body fat. The mean percent body fat for the experimental group was 3.3 points lower than the mean percent body fat of the control group.

Table 9

A Comparison of Control and Experimental Subjects on Percent Boby Fat at Pretest

Group	Number	Mean	Minimum value	Maximum value	Standard deviation
Experimental	42	32.3	21	43	5.22
Control	42	35.6	19	45	5.54
Total sample	84	34.0	19	45	5.38

Tests of Hypotheses for Relationship of Anxiety and Depression to Other Variables

The results of analyses for testing Hypotheses 1 and 2 are presented in this section. Data collected on pretests from all 84 subjects (experimental and control) were combined and used in testing Hypotheses 1 and 2. The null hypotheses tested were as follows:

H1: There is no relationship between female reservation employees' scores on anxiety and depression tests and selected variables, including (a) general meal patterning, (b) nutrient adequacy of diet, and (c) level of intake of certain dietary components (caffeine, sugar, sodium, total fat, calories, and alcohol).

H2: There is no relationship between female reservation employees' scores on anxiety and depression and (a) percent body fat, (b) level of participation in planned physical and recreational activity.

Hypothesis 1

In testing the relationship between anxiety and meal patterning and depression and meal patterning (Part A), the eight categories of meal patterns were collasped into four so that cell sizes would meet

test requirements. The resulting four categories of meal patterning were thus based on numbers of servings from the basic four food groups. Pattern A was the "best" diet and was the pattern containing all the recommended servings, while Pattern D represented the "poorest" diet containing one-half or less of the recommended servings from the four food groups. A one-way analysis of variance procedure (ANOVA) was then performed on the anxiety scores and depression scores, using general meal patterning as a categorical variable with four categories (Appendix D, Table D-1). The anxiety and depression scores of subjects in each of the four meal patterns, expressed as means, are presented in Table 10.

Table 10

Mean Anxiety and Depression Scores for Four Meal Patterns Based on Intake of USDA Four Food Groups (N=84)

Meal Category	A (N) (best)	B	C	D (worst)
Mean Anxiety Score	42.0 (11)	43.3 (24)	38.3 (28)	45.0 (21)
Mean Depression Scpre	11.1 (11)	12.8 (23)	11.6 (28)	13.0 (21)

The ANOVA was statistically significant at the .05 level with an F of 2.86 (3, 80, $p = 0.04$). Therefore, Part A of null Hypothesis 1 was rejected and it was concluded that there was a difference in anxiety level based on meal patterning.

Both the Bonferroni and Tukey's Studentized Range procedures were performed to determine where the difference in anxiety scores had occured. Both tests showed a significant difference in anxiety scores between Meal Pattern C and Meal Pattern D, with the mean anxiety score being significantly higher for Meal Pattern D (poorest diet). However, the mean anxiety score for Pattern D was not significantly different from Meal Pattern A and B. It was concluded that subjects with General Meal Pattern D had a significantly higher anxiety score than subjects in Meal Pattern C.

An ANOVA procedure was performed to test the relationship between depression level and general meal pattern. As with anxiety, general meal patterning was used as a categorical variable (Appendix D, Table D-1). The ANOVA was performed on the mean depression scores in each of the 4 meal patterning categories. The mean depression scores for subjects within each of the 4 meal patterns are presented in Table 10. The F value of 0.19 (3, 79) was not significant at the .05 level ($p=.90$). Thus, the null hypothesis could not be rejected and it was concluded that there was no difference in depression level based on general meal patterning.

To test Part B of Hypothesis 1, a series of ANOVA procedures were performed using the three nutrient adequacy levels for protein, calcium, iron, vitamin A, and vitamin C as categories to group subjects for testing differences in mean depression scores (see Appendix D, Table D-2). Each nutrient was expressed at three levels of adequacy based on the Recommended Dietary Allowance (RDA): (a) less than 50 percent of

the RDA, (b) 50 to 75 percent, and (c) more than 75 percent. The mean anxiety scores for each of the three groups of subjects (grouped according to nutrient adequacy levels) for each nutrient are presented in Table 11.

Table 11

Mean Anxiety Scores* for Subjects Grouped by Nutrient Adequacy for Five Nutrients at Pretest

	Levels of nutrient adequacy based on percent of RDA					
	(a) <50% RDA		(b) 50% to 75%		(c) >75% RDA	
Nutrient	Mean	(Number)	Mean	(Number)	Mean	(Number)
Protein	--	(0)	44	(19)	42	(75)
Calcium	44	(19)	43	(25)	40	(40)
Iron	46	(24)	39	(39)	43	(21)
Vitamin A	46	(12)	39	(17)	42	(55)
Vitamin C	44	(14)	46	(7)	41	(63)

*Values rounded to nearest whole number

The ANOVA procedure on anxiety scores grouped by three levels of intake for each nutrient, resulted in a finding of no significant difference in anxiety scores based on nutrient adequacy levels, except in the case of iron intake. For iron the results of the ANOVA were significant ($p=.0141$), which indicates that there was a significant difference in anxiety level based on level of iron intake. To determine where the difference in anxiety level occurred, Scheffe's test was performed. A significant difference ($p= <.05$) was found between the

mean anxiety score of subjects at Level 1 of iron intake and the mean anxiety score of the subjects who consumed at Level 2 for iron. However, no difference was found between anxiety scores of subjects at Level 3 as compared to Level 1 or Level 2 of iron intake. It was concluded that subjects with an iron intake at Level 1 (less than 50% of RDA) had a significantly higher level of anxiety than subjects at Level 2 of iron intake (50 to 75% RDA).

Mean depression scores are presented in Table 12 for subjects grouped according to three levels of nutrient adequacy for the five nutrients (protein, calcium, iron, vitamin A, and vitamin C). An ANOVA procedure was used to test for difference in mean depression scores across the three categories for each nutrient (see Appendix D, Table D-2). The ANOVA procedures resulted in a finding of no significant differences at the .05 level in depression scores across the three groups for each nutrient. Thus, it was concluded that there was no difference in depression scores based on nutrient adequacy levels.

Thus Hypothesis 1, Part B, could not be fully rejected. While no significant difference was found in either anxiety or depression, based on adequacy levels for protein, calcium, vitamin A, and vitamin C, there was a significant difference in anxiety level based on iron adequacy. Anxiety level was significantly lower at the medium level of iron intake (50 to 75 Percent of RDA).

Table 12

Mean Depression Scores for Subjects Grouped by Levels of Adequacy for Five Nutrients at Pretest

Nutrient	Groups based on levels of nutrient adequacy					
	(a) < 50% RDA)		(b) (50 to 75% RDA)		(c) (>75% RDA)	
	Mean*	(number)	Mean*	(number)	Mean*	(number)
Protein	--	(0)	12	(9)	12	(75)
Calcium	12	(19)	12	(25)	13	(40)
Iron	14	(24)	11	(39)	13	(21)
Vitamin A	16	(12)	12	(17)	12	(55)
Vitamin C	14	(14)	14	(7)	12	(63)

*Means rounded to nearest whole number.

Part C of Hypothesis 1, regarding the relationship between anxiety scores and level of intake of certain dietary components and between depression scores and intake of the same components, was tested using the Pearson Correlation procedure. The correlation coefficients and probability values between anxiety scores and intake of dietary components and between depression scores and dietary components for subjects on pretests are presented in Table 13. All the correlation coefficients are low and are nonsignificant at the .05 level. Therefore, null Hypothesis 1-C could not be rejected. It was concluded that there was no correlation between level of anxiety and intake of the dietary components, nor between depression and intake of the same components.

Table 13

Correlation Coefficients Between Anxiety Scores and Intake of Certain Dietary Components at Pretests (N=84)

Dietary Component	Correlation Coefficient/Probability (Rho=0)			
	Anxiety		Depression	
Sugar	-0.04	p=.71	-0.02	p=.86
Sodium	-0.01	p=.92	0.04	p=.71
Total Fat	-0.09	p=.39	0.10	p.37
Saturated Fat	-0.08	p=.47	0.10	p=.35
Calories	-0.10	p=.37	0.01	p=.93
Alcoholic Beverages	0.14	p=.19	-0.04	p=.75
Caffeine	0.11	p=.32	0.01	p=.93

Hypothesis 2

Part A of Hypothesis 2, regarding the relationship between anxiety scores and percentage of body fat and between depression levels and percentage of body fat was tested using Pearsons Correlation procedure. The correlation coefficient between anxiety and percentage of body fat was only .10 ($p = .37$) and it was concluded that anxiety level was not significantly correlated with percent body fat. The correlation coefficient between depression and percentage of body fat was only 0.12 ($p=.30$) and it was concluded that there was no significant corelation between depression level and percentage of body fat. Therefore Part A of null Hypothesis 2 could not be rejected and it was concluded that anxiety and depression scores are not significantly correlated with level of body fat among subjects in this study.

To test Hypothesis 2, Part B, regarding the relationship between anxiety and physical activity and between depression level and physical activity, ANOVA procedures were again used (Appendix D, Table D-2). The levels of physical activity were used to group subjects into three groups. Mean anxiety scores and mean depression scores of the three groups are presented in Table 14.

Table 14

Mean Anxiety and Depression Score at Three Levels of Physical Activity

	Levels of planned physical and recreational activity		
	Level 1 <60 min. weekly	Level 2 60-200 min. weekly	Level 3 >200 min. weekly
	N=29	N=24	N=26
Mean anxiety	43	41	41
Mean Depression	14	11	12

The ANOVA was not significant for the anxiety based on levels of physical activity ($F = 0.39$, $DF = 3,80$, $p = 0.76$). The ANOVA was also not significant for depression at three levels of physical activity ($F=0.70$, $DF = 3,79$, $p=0.56$). Therefore, Part B of null Hypothesis 2 could not be rejected, and it was concluded that there was no significant difference in either anxiety or depression levels based on levels of planned physical and recreational activity.

The results of testing for relationships between anxiety and depression and various other variables, as measured on pretests, are summarized in Table 15.

Table 15

Summary of Relationships Between Anxiety and Depression and Selected Variables at Pretest

Selected variable	Anxiety	Depression
Hypothesis 1		
Meal Patterning	+	0
Adequacy of Nutrients:		
Protein	0	0
Calcium	0	0
Vitamin A	0	0
Vitamin C	0	0
Iron	+	0
Level of Dietary Components:		
Sugar	0	0
Sodium	0	0
Total Fat		
Saturated Fat	0	0
Calories		
Alcoholic Beverages	0	0
Caffeine	0	0
Hypothesis 2		
Percentage of Body Fat	0	0
Physical Activity	0	0

+ = Significant relationship found, null hypothesis rejected.
0 = No significant relationship found, hypothesis not rejected.

Tests of Hypotheses Regarding Effect of The Health Promotion Program

The results of analyses for testing Hypotheses 3, 4, 5, and 6 are presented in this section. This section includes results of tests regarding the effect of the treatment (the health promotion program) in bringing about changes in the experimental group as compared to the control group. In most of the analyses a "difference score" was created showing change from pretest to posttest. The difference scores of the

experimental group were then compared to determine whether the difference scores of the control group to determine if there was a significant difference between the two groups. With some measures, the pretest scores for the control and experimental groups were not equal; therefore, an analysis of covariance procedure was used to correct for the inequality of pretest scores, with the pretest scores being used as covariables

The null hypotheses tested in this section are as follows:

H3: Participation in a nutrition-based, health promotion program will result in no reduction of scores on anxiety and depression among female airline reservation employees.

H4: Participation in a nutrition-based, health promotion program will result in no increases on measures of job satisfaction.

H5: Participation in a nutrition-based, health promotion program will not result in the following improvements:
A. Reduced weekly intake of alcoholic beverages, and reduced daily intake of sugar, saturated fat, cholesterol, sodium, and caffeine;
B. Increased average daily intake of fiber;

H6: Participation in a nutrition-based, health promotion program will result in no improvement of general meal patterning.

Results of Testing Hypotheses 3 and 4

In order to test Hypothesis 3, dealing with the reduction of scores on anxiety and depression from pre- to posttest, "difference scores" were created for each subject by subtracting pretest scores from posttest. To test Hypothesis 4, concerning the effect of the treatment on job satisfaction, difference scores were also created by the same procedure. The difference scores were then used in ANOVA analyses to compare the experimental group with the control group (see

Appendix D, Table D-3). Since the control and experimental groups were significantly different from each other on pretest scores for anxiety (p=.0025), depression (p=.0018), and job satisfaction (p=.0001), an analysis of covariance procedure was used. The pretest scores on each variable was used as the covariate. Anxiety, depression, and job satisfaction scores for the experimental and control subjects are presented in Table 16 for pre- and posttest according to means and difference scores.

The analysis of variance procedure using the anxiety difference scores resulted in an F value of 0.03 (DF = 2,79), which is not significant at the .05 level (p = 0.85). The analysis of variance procedure with depression difference scores resulted in an F value of 0.01 (DF = 2, 79), which is not significant at the .05 level (p=0.94). Therefore, the null hypothesis (H3) could not be rejected, and it was concluded that no reductions occurred in anxiety and depression scores as a result of the health promotion program.

Hypothesis 4 was tested using job satisfaction difference scores, created by subtracting the pretest from the posttest job satisfaction scores (Appendix D, Tables D-5). The ANOVA procedure using job satisfaction difference scores resulted in and F value of 1.40 (DF = 2,80), which was not significant at the .05 level (p = 0.24). The null hypothesis (H4) could not be rejected and it was concluded that there was no increase in job satisfaction scores as a result of the health promotion program.

Table 16

A Comparison of Experimental and Control Subjects on Pre- and Posttest Anxiety, Depression, and Job Satisfaction Scores

		Pretest	Posttest	[1]Difference Score
		Mean	Mean	Mean
Experimental	Anxiety	44	42	-1.69
N=42	Depression	13	11	-1.47
	Job satisfaction	71	69	-2.20
Controls	Anxiety	40	40	-1.40
N=42	Depression	12	10	-1.36
	Job satisfaction	70	70	0.50

[1]"Difference Scores" were conposed of the following:
(a) Post anxiety minus pre- anxiety score for subject;
(b) Post depression scores minus pre- depression scores;
(c) Post job satisfaction scores minus pre- job satisfaction scores.

Results of Testing Hypotheses 5 and 6

Before doing the analysis to test Hypothesis 5, dealing with changes in several diet components, two preliminary statistical procedures were performed. A series of t tests were performed to determine whether the experimental and control groups were equal at pretests on intake of alcoholic beverages, caffeine, sugar, saturated fat, cholesterol, and dietary fiber. All of the t tests were nonsignificant at the .05 level. Because the two groups were equal at pretest on the variables, an analysis of covariance procedure was not necessary.

The second preliminary test was a correlation analysis using a multiple analysis of variance procedure to determine whether any of the variables were highly correlated with each other. The correlation coefficients and probability values are presented in Table 17.

Table 17

Correlation Coefficients for All Subjects on Seven Dietary Components at Pretest.

	Alcoh. bev.	Caffeine	Sugar	Saturated fat	Cholesterol	Sodium	Fiber
Alcoholic beverages	---	-0.08 p=.46	-0.05 p=.67	-0.11 p=.31	-0.08 p=.50	-0.08 p=.46	0.02 p=.86
Caffeine	---	---	-0.10 p=.39	-0.14 p=.18	0.06 p=.59	-0.02 p=.83	0.37* p=.00
Sugar	---	---	---	0.37* p=.00	0.01 p=.93	0.42* p=.00	0.17 p=.12
Saturated fat	---	---	---	---	0.47* p=.00	0.56* p=.00	0.11 p=.32
Cholesterol	---	---	---	---	---	0.45* p=.00	0.12 p=.27
Sodium	---	---	---	---	---	---	0.20 p=.08

* Significant at the .05 level

Only one variable, sodium, showed a high correlation with nearly all other variables both using pre- and posttest scores. Sodium intake was highly correlated with intake of sugar, saturated fat, and cholesterol. Other high correlations included saturated fat with cholesterol and caffeine with fiber, but this occurred only on pretest scores. Because of the correlation with three other variables, sodium was removed from subsequent analysis, as its inclusion would give redundant information.

The main analysis for testing Hypothesis 5 involved a MANOVA procedure to test for the combined change of the six variables (alcoholic beverages, caffeine, sugar, saturated fat, cholesterol, and fiber) from pre- to posttest. A comparison of the experimental and control subjects

on pre- and posttest values for the six variables are presented in Table 18 with means and difference scores. The difference scores were created for each variable by subtracting posttest from pretest scores for each subject.

Table 18

A Comparison of Experimental and Control Subjects on Pretest and Posttest Values for Intake of Selected Dietary Components

Group	Dietary component	Pretest Mean	Posttest Mean	Difference score (Mean)
Experimental N=42	Alcoh. beverages	14 oz	17 oz	3.1
	Caffeine	337 mg	218 mg	-118.9
	Sugar	61 gm	55 gm	- 6.7
	Saturated fat	25 gm	22 gm	- 3.0
	Cholesterol	462 mg	354 mg	-108.0
	Fiber	16 gm	15 gm	- 0.9
Control N=41	Alcoh. beverages	14 oz	9 oz	- 4.9
	Caffeine	272 mg	239 mg	-33.2
	Sugar	73 gm	65 gm	-10.2
	Saturated fat	27 gm	25 gm	- 2.7
	Cholesterol	396 mg	359 mg	-40.2
	Fiber	14 gm	15 gm	1.6

The difference scores were then used in the MANOVA to determine whether there was a significant difference between the experimental and control groups on all the variables combined. The MANOVA resulted in an F value of 0.82 (DF = 6,76) which was nonsignificant at the .05 level (p= 0.56). Thus it was concluded that, when all the variables were combined into a composite score there was no significant effect of the treatment in producing change on the combined variables in the experimental group versus the control group.

Univariate analysis was also performed, as a part of the MANOVA procedure, on the difference scores for each variable (Appendix D, Table D-6). All the of the univariate comparisons were nonsignificant at the .05 level, meaning that there was no significant effect of the treatment (the health promotion program) in producing a difference between the experimental and control groups on any of the six variables individually. It was concluded that the null hypothesis could not be rejected and that participation in the health promotion program resulted in no significant change in the six variables tested with the experimental subjects.

Hypothesis 6 involved testing for change in general meal patterning as a result of participation in the health promotion program. Experimental subjects and control subjects were compared on pre- and posttest as to the number of subjects consuming diets fitting each of eight meal patterns. A description of the eight meal patterns is included in Chapter III. Meal patterning categories of the experimental subjects as compared to control subjects are presented in Table 19, according to percentages of subjects in each category at pre- and posttests.

Based on the way general meal patterning was established, Patterns 8(a) and 7(b) were the only categories in which subjects consumed all the recommended servings from the basic four food groups. At pretest, 26 percent of the control subjects and 23 percent of the experimental subjects consumed the recommended number of servings, Pattern 8(a) and 7(b) from the four food groups. At posttest, the percentage of control

subjects consuming the recommended servings had decreased to 19 percent, whereas the percentage of experimental subjects consuming all the recommended servings had increased to 45 percent (8a + 7b).

Table 19

Meal Patterning Categories of Experimental and Control Subjects by Percentages at Pre- and Posttest

Meal pattern		Control group Pretest	Control group Posttest	Experimental group Pretest	Experimental group Posttest
		N=42 %	N=42 %	N=42 %	N=42 e
Best pattern	8(a)	0	0	2	7
	7(b)	26	19	21	38
	6(a)	10	5	2	7
	5(b)	24	31	31	24
	4(a)	0	2	2	0
	3(b)	26	22	29	17
	2(a)	0	0	2	5
Poorest pattern	1(b)	14	21	10	2

The "a" designation of the meal patterning categories means that the dietary goals were met in that sugar intake was 10 percent or less of total calories and fat intake was no more than 35 percent of calories. At pretest, only 10 percent of controls and 8 percent of experimentals consumed diets which met the dietary goals for sugar and fat (i.e. "a" category). At posttest, the percentage of control subjects

meeting the dietary goals for sugar and fat ("a" category) had decreased to 7 percent, whereas the percentage of experimental subjects meeting the same two dietary goals had increased from 8 to 19 percent.

Two statistical tests were performed on the frequency distributions of subjects among the various general meal patterns, to to test Hypothesis 6 concerning whether there was a significant improvement of the experimental group over the control group as a result of the health promotion program. The Chi-Square (Goodness of Fit) test was performed first on pretest data to determine whether the two groups were equal at pretest and again on the posttest data to determine differences after the treatment. For both chi-square analyses, the eight meal patterns were collapsed into three categories as follows:

1. Diet 1 (Best Diet) - included Patterns 8a, 7b, and 6a
2. Diet 2 (Moderate Diet) - included Patterns 5b and 4a
3. Diet 3 (Worst Diet) - included Patterns 3b, 2a, and 1b

The frequency distribution and the results of the chi-square analysis on the pretest data are presented in Table 20. The chi-square value of 1.2821 (DF = 2) is not significant at the .05 level ($p = 0.53$); therefore, it was concluded that there was no significant difference between the experimental and control groups at pretest. Because of this lack of difference at pretest, any difference at posttest could be attributed to the effect of the treatment.

Table 20

Frequency Distribution and Results of Chi-Square Test on Experimental and Control Subjects Using Pretest General Meal Patterning

		Worst	Moderate	Best	Row
Group					
experimental	Frequency	17	14	11	42
	Row %	40.5%	33.3%	26.2%	
	Expected	17	12	13	51
	Residual	0	2	-2	
Control	Frequency	17	10	15	42
	Row %	40.5%	23.8%	35.7%	
	Expected	17	12	13	
	Residual	0	-2	2	
Column total		34	24	26	84
		40.5%	28.6%	31.0%	

Chi-Square = 1.2821 DF = 2 p = 0.5268
Not significant at .05

The results of the chi-square analysis using posttest distribution of the experimental and control subjects among the three diet categories are presented in Table 22. The chi-square value of 7.452 (DF = 2) is significant at the .05 level (p = 0.02); therefore null Hypothesis 6 was rejected. It was concluded that the experimental group was significantly different from the the control group at posttest. A visual inspection clearly indicates that Diet 3 has a significantly higher-than-expected frequency at posttest for the experimental group. Diet 3 is the "best" diet, nutritionally. Therefore, it was concluded that there was significant improvement of the experimental group from pre- to posttest on general meal patterning, as compared to the control group.

Table 21

Frequency Distribution and Results of Chi-Square Test on Experimental and Control Subjects Using Posttest General Meal Patterning

Group		Worst	Moderate	Best	Row total
Experimental	Frequency	10	10	22	42
	Row %	23.8	23.8	52.4	50.0%
	Expected	14	12	16	
	Residual	-4	-2	6	
Control	Frequency	18	14	10	42
	Row %	42.9	33.3	23.8	50.0%
	Expected	14	12	16	
	Residual	4	2	-6	
Column total		28	24	32	84
		33.3%	28.6%	38.1%	

Chi-Square = 7.4524 DF = 2 p = 0.0241*

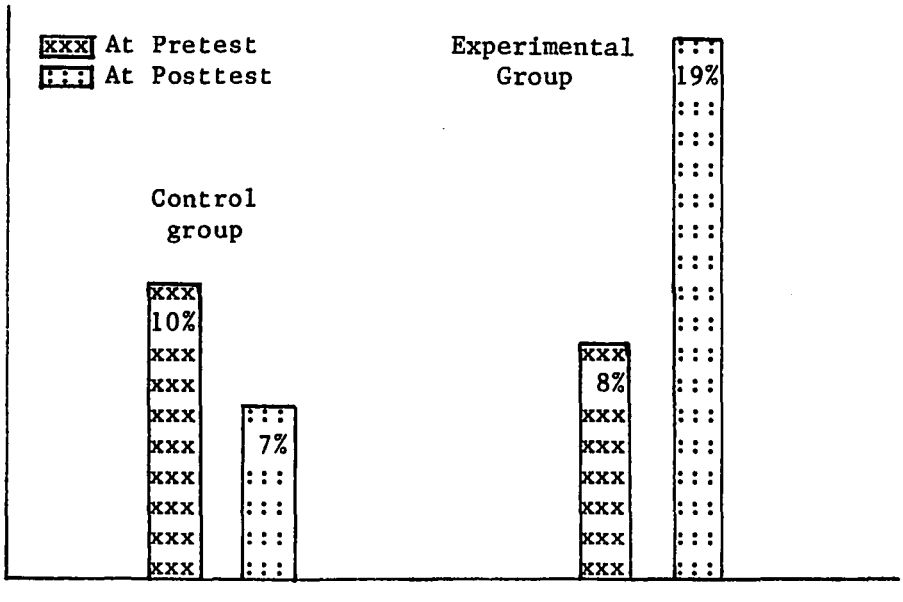
*Significant at .05 level

A second analysis performed on the general meal patterning frequency distribution was the Mann-Whitney U test. This procedure was performed on the entire set of eight original general meal patterns, using the distribution of control and experimental subjects only at posttest. The null hypothesis was tested by this procedure: "There is no significant difference between the mean ranks of control and experimental subjects at posttest on general meal patterning." The general meal patterning scores of 1 - 8 were used in ranking subjects. This procedure yielded a mean rank for the experimental group of 48.98, as compared to 36.02 for the control group. The U-value was 610, yielding a Z-score of -2.5874, which was significant in a two tail test at the .05 level (p = 0.0097). The null hypothesis was rejected and it was

concluded that there was a significant difference in mean rank of control and experimental at posttest, with the mean rank of the experimental group being higher. These results provide further evidence of significant improvement as a result of participating in the health promotion program among the experimental group as compared to the control group on general meal patterning from pre- to posttest.

A further analysis was made on the change in consumption of calories as sugar and total fat. The "a" category designated those subjects meeting the dietary goals with respect to calories as sugar and fat and the "b" category designated those who did not. Changes in the percentage of subjects in the "a" meal pattern from pre- to posttest were visually analyzed. The percentage of control and experimental subjects in the "a" category at each test period are presented in Figure 1. It appears that the experimental group made

Figure 1



Percentage of Subjects Meeting Dietary Goals for Intake of Sugar and Fat (Patterns with "a" Designation which means 10% or less of calories were consumed as sugar and 35% of calories consumed as fat).

significant improvement compared to the control group in regard to reducing consumption of sugar and fat to the dietary goal levels as a result of participating in the health promotion program.

Results of testing for improvement of experimental subjects on all variables, as a result of participating in the health promotion program as compared to the control group, are summarized in Table 22. The only variable on which a significant change occurred from pre- to posttests in the experimental subjects, as compared to the controls, was general meal patterning. The experimental group improved by a significantly greater extent than did the control group.

Table 22

Summary of Test for Effect of Health Promotion Program

Variable	Significant change in experimental group as compared with control group (?)
Hypothesis 3	
Anxiety	No
Depression	No
Hypothesis 4	
Job satisfaction	No
Hypothesis 5	
Intake of dietary components:	
Alcoholic beverages	No
Sugar	No
Saturated fat	No
Cholesterol	No
Sodium	No
Caffeine	No
Fiber	No
Hypothesis 6	
Meal patterning	Yes

Discussion

The findings and results of this study were based on self-rating anxiety, job satisfaction, and depression scales, nutrition and health habits inventories, food questionnaire and frequency checklists, 24-hour recalls, 3-day food records, and skinfold and blood pressure measurements. Subjects were measured before and following a 7-month health promotion program at the work site. Summaries of the findings in regard to pretreatment relationships between anxiety and depression and other variables and in regard to effect of the health promotion program in bringing about desired changes on selected variables are presented in Tables 15 and 22.

Using 75 percent of the RDA as the point below which subjects were judged to have an inadequate intake of a nutrient, 75 percent were deficient in iron intake, 52 percent were low in calcium, 34.5 percent were low on vitamin A, 25 percent were low in vitamin C, while only 11 percent were low in protein intake. Thus, of the nutrients studied, iron, calcium, and vitamin A were most often deficient. Protein was theleast often deficient nutrient. Nutrients found to be the most deficient in the present study were the same as those most often deficient in the Health and Nutrition Examination Survey (Abraham, Carrol, Johnson, & Villa Dressa, 1977). The finding of low intakes of iron and calcium among the subjects is consistent with the results of the Beltsville One-Year Dietary Intake Study (Kim, Kelsay, Judd,

Marshall, Mertz, & Prather, 1984). However, unlike the present study, the Beltsville study did not find low mean intakes of vitamin A and vitamin C among females, 23 to 50 years of age.

The finding of a high percentage of subjects (75%) with an inadequate iron intake is consistent with the findings of the Health and Nutrition Examination Survey (HANES) which found that the iron intake of 40 to 50 percent of females was below the standard (i.e., 18 mg per day). The mean calcium intake among the subjects was similar to the findings of HANES (48 to 63 percent of females, ages 18 to 64 years, were below the standard for calcium). HANES used 600 mg calcium as a standard, which is 75 percent of the RDA).

The finding that 34.5 percent of the subjects were deficient in vitamin A was lower than the incidence of dietary vitamin A deficiency found in HANES (57 to 68 percent of upper income females, white and black, were deficient diet). The finding that 25 percent of subjects were deficient in vitamin C intake in the present study was also somewhat lower than the incidence of dietary vitamin C deficiency in HANES (49 to 54 percent of all females ages 12 to 54 were below the standard for vitamin C of 55 mg/daily). Though HANES did not use the RDA as a standard for all nutrients, there is agreement between the findings of the present study and HANES in that the nutrients were the same for which there existed the highest rates of dietary dificiency among subjects.

Fifty-five percent of the subjects were below the minimum RDA for calories (1600 per day) and 19 percent consumed less than 1200 calories

per day. These findings are in agreement with results of the Health and Nutrition Examination Survey (HANES) in which the median intake of calories for women was 1600 at age 20 to 24, but steadily decreased to 1250 at 65 years of age (Abraham et al., 1977). These results do not agree with the Beltsville study (Mertz & Kelsy , 1984) which found the mean caloric intake of females (ages 23 to 50) to range from 1803 to 1893 calories per day. One possible explanation for this difference may stem from the fact that the subjects in the present study were very sedentary in their jobs and, at the same time, were very concerned about weight gain. Concern about weight control would encourage a low calorie intake.

Using the Dietary Goals (Senate Select Committee on Nutrition, 1977) as a standard, 79 percent of the subjects had an excessive intake of refined sugar and 73 percent exceeded the 10% standard for saturated fat. Reports of various studies (Friend, 1967; Mason & Guthrie, 1979; Senate Select Committe, 1977) have indicated that the average intake of refined sugar is about 130 pounds per year for Americans. The intake of refined sugar ranges from 15 to 25 percent of daily energy intake.

The dietary goals for fat and cholesterol (35% of calories for fat and 300 mg cholesterol) were exceeded by 61 percent of subjects, with the mean cholesterol intake being 429 mg. The fat intake is consistent with reports of others (Mason & Guthrie, 1979; Mattson, 1976; Senate Select Committee on Nutrition and Human Needs, 1977). Fat generally constitutes 40 to 45 percent of the average total calorie intake in United States. However, the same authors have reported that the mean

U.S. cholesterol intake is approximately 600 to 750 mg which is considerably higher than the mean level found in the present study of 429 mg.

The results of the present study are not consistent with the findings of the Beltsvile Study which found the mean cholesterol of females to be between 296 and 325 mg per day and the fat intake to be 38 percent of total calories. Regional difference in food preparation methods between the southern location of the present study versus the northern location of the Beltsville study may account for this difference.

Only 15 percent of the subjects were above the RDA "suggested safe level" for sodium intake (1100 to 3300 mg daily). This intake is considerably lower than expected. Reports in the literature (Senate Select Committee on Nutrition and Human Needs, 1977; Mason & Guthrie, 1979) have indicated that the average person in the United States consumes from 5 to 18 grams of salt (2000 - 7200 mg sodium) per day. This finding is similar to that of the Beltsville study which reported a sodium intake of 2450 to 2598 mg, which is within the "estimated safe and adequate" range (National Research Council, 1980). The salt intake of subjects in the present study may have been under-reported, especially in regard to salting of food at the table. Though subjects were instucted to estimate the amount of added salt on three-day food records, it appeared that they fail to do so. Thus, except for sodium, a high number of subjects exceeded the recommended levels for sugar, fat, saturated fat, and cholesterol in the Dietary Goals (Senate Select Committee, 1977).

The mean intake for dietary fiber (15 gm) was well below the intake suggested by some authors, who recommend an intake of 30 to 70 gm per day. This level of fiber consumption is in keeping with findings of several British scientists who have estimated that the average "Western" person eats about 20 gm of dietary fiber per day (Liebman, 1978).

Only about 10 percent of the control and experimental subjects in the study had blood pressures above 140/90. This incidence of elevated blood pressure is much lower than estimates by the National Heart, Lung, and Blood Institute which has estimated that 34.5 percent of the U.S. workforce has high blood pressure (Brennan, 1982). This low level of hypertension was an unexpected finding. It had been expected that a higher percentage of employees would have elevated blood pressures because of the "assumed" stressfulness of the job of reservationist. Because of the small number of subjects with elevated blood pressure, this variable was not used in any further statistical analyses.

When the eight meal patterning categories were collapsed into four (based on the number of servings from the the USDA basic four food groups), anxiety level was significantly different among subjects grouped by the meal patterns. Anxiety level was higher for subjects in in Meal Pattern D than for subjects in Meal Pattern C. Meal Pattern D represented the "poorest" food intake with 50 percent or less of the recommended servings from the basic four food groups. No difference was found between anxiety level of subjects in Meal Patterns A and B as compared to Pattern D.

Some researchers (Simon, 1963; Slochower & Kaplan, 1980; Baird & Schutz, 1980) have reported that in some individuals, high anxiety levels are associated with increased food intake, especially of high calorie snacks. Other researchers (Brozek, 1957; Coppen et al., 1976; Kinsman & Hood, 1971) have shown that increased symptoms of anxiety are associated with low levels of certain nutrients in the body. It is possible that in the present study, low food intake (and thus low nutrient intake) on one hand, resulted in higher levels of anxiety in one group of subjects, while high anxiety (due to non-nutrient causes) resulted in increased food intake in another group of subjects. However, the design of the present study prevented the testing of this hypothesis.

No significant difference was found in depression level of subjects grouped according to the type of meal patterning. This finding is in opposition to the findings of others (Beck, 1967; Bruch, 1955; Bruch, 1982; Simon, 1963; Slochower & Kaplan, 1980) who have reported that depression is strongly associated with decreased food consumption. One possible explanation for failure to demonstrate a difference in depression due to meal patterning in the present study is that the level of depression found in subjects was relatively low and and scores were fairly homogenous. In subjects with higher depression levels, it may be possible to demonstrate a difference in meal patterning.

No significant difference was found in anxiety level based on three levels of adequacy for intake of protein, calcium, vitamin A, and vitamin C. Several researchers (Brozek, 1957; Coppen et al., 1967; Coppen et al., 1973; Kinsman & Hood, 1971; Glick et al., 1966; Morita & Nalano, 1982) have reported that low body levels of certain nutrients,

including protein, vitamin A, Vitamin C, and thiamin, were found to be associated with various psychological symptoms, such as anxiety. Since biochemical analyses for body nutrient levels were not made in the present study, it is not known whether subjects with the lowest intakes of the various nutrient also had low body levels of the same nutrients.

A significant difference was found in anxiety level based on adequacy of iron intake. Subjects in the lowest level of iron intake (Level 1) had significantly higher levels of anxiety than subjects in iron Level #2. Subjects with the highest iron level (Level # 3) were not significantly different from subjects in iron Level 1 on anxiety score. Thus, subjects with the lowest and the highest iron intakes had the highest mean anxiety scores. One of the symptoms some patients have reported with iron deficiency anemia is "increased tension" (Goodhart & Shils, 1980). This response could account for the higher anxiety scores of those subjects with low iron intakes, if the subjects, in fact, had iron deficiency anemia. Hemoglobin levels assessed on the same subjects, but in conjunction with another study, revealed that a high percentage of the subjects (over 50%) had borderline or low hemoglogin values.

No significant difference was found in depression level of subjects grouped according to 3 adequacy levels of protein, calcium, iron, vitamin A, and vitamin C. This finding was not in agreement with the finding of several researchers (Beck, 1967; Bruch, 1982; Chng, 1983; Flack & Draghi, 1975; Morley, 1980; Slochower & Kaplan, 1980; and Simon, 1963) who have reported that depression is associated with decreased food intake. Decreased food intake is usually reflected in

lower nutrient intakes. One explanation for this difference in results, is that depression levels found among subjects in the present study were much lower than those in other studies. The extent of depression found in the present study was probably not severe enough to affect food intake and, thus, nutrient intake.

At the .05 level of significance, no correlation was found between the level of anxiety and level of intake of either sugar, sodium, total fat, saturated fat, calories, alcoholic beverages, or caffeine. Futhermore, no significant correlation was found between level of depression and intake of the seven dietary components. These findings are not consistent with the findings of Baird and Schutz (1980) who observed that subjects who were characterized as feeling guilty and generally unhappy were more likely than happy subjects to eat candy, pie, potato chips, and wine when unhappy.

The findings are not in agreement with other researchers (Hodges et al., 1979; Miller et al., 1974) who reported that social drinkers, heavy drinkers, and alcoholics often gave "relief of tension" as one reason for drinking alcoholic beverages. It would be expected that increased anxiety and depression would be correlated with increased alcohol intake. One possible reason as to why a correlation was not found in the present study is that the level of depression and anxiety were not high enough to affect alcohol intake. Also the subjects were also fairly homogenous in regard to scores on anxiety and on depression.

The finding of no correlation between caffeine intake and anxiety level is not consistent with reports by several authors (Greden, 1974;

Morck et al., 1983; Stephenson, 1977; Institute of Food Technologists' Expert Panel on Food Safety & Nutrition, 1983) who have indicated that doses of caffeine above 200 mg may produce tremors, nervousness, and irritability. Caffeine intake in the present study ranged as high as 1000 mg per day in some sujects, but did not correspond with high levels of anxiety. No clear explanation is available for the lack of association of high caffeine intake with increased anxiety in the present study. One possible reason may be that subjects did not answer questions on the anxiety test truthfully, because of concerns about job security making their anxiety values appear lower than actual levels. However, precautions were taken to assure the subjects that Piedmont company officials would not see individual data forms. Also code numbers, and not names, were used on all forms.

The findings of no significant correlation between either anxiety and percentage of body fat or between depression and percentage of body fat are not consistent with reports by other authors (Beck, 1967; Bruch, 1955; Simon, 1963; Flack & Draghi, 1975; Morley, 1980; Slochwer & Kaplan, 1980;) that obese people eat as a result of either depression or anxiety or that in some individuals depression results in decreased food intake and weight loss. In the present study the level of anxiety and depression may have been too low to significantly affect food intake and, thus, body fat gained or lost.

The finding of no significant difference in the anxiety and depression levels of subjects based on level of participation in planned physical and recreation activity is not consistent with the findings of

a number of studies (Collingwood, 1972; Greist et al., 1979; Hilyer & Mitchell, 1979; Ransford, 1982; Sharp & Reilley, 1975; Young & Ismail, 1976). Findings of these authors have indicated that as physical activity and/or fitness increase, depression and anxiety decrease. One possible explanation for the difference in findings, may be that other studies used direct means of measuring fitness and the amount of physical activity, whereas in the present study the amount of activity was repored by subjects on a questionnaire. The frequency and intensity of exercise may have been much lower in the present study, than in other studies where exercise was conducted under supervision of the researcher. There is also the possibility that subjects did not answer questions frankly on the depression and anxiety tests. Such responses may have under-estimated the level of the two variables.

The failure to obtain reductions in anxiety and depression scores among experimental subjects, as a result of participation in the health promotion program, does not support previous reports that health promotion programs have resulted in increased ability to cope with psychological stress. However, one possible explanation for the apparent lack of improvement on anxiety and depression is that subjects in the present study exhibited only moderate levels of anxiety ($x = 44$) and depression ($x = 12.6$) at the beginning of the program. Perhaps, there would have been some reduction on these variables if initial levels had been higher.

Another possible explanation for no improvement on anxiety and depression may be that other factors in the work environment were creating more stressful conditions, which negated any positive effect

of the health promotion program. Just as the health promotion program was getting underway, the company's flight business began to increase rapidly. This necessitated overtime work for many employees and increased everyone's workload during regular shifts. Company suprvisors also reported to the authors that they were receiving pressure from higher management to see that all phone calls from airline customers were answered within a specified time period. Subjects made frequent statements to the authors that they were too tired to attend seminars, or that they could not do so because of overtime work. It appeared to the author that the work environment became substantially more stress-inducing during the course of the program. Since there were no actual increases in anxiety and depression scores, the program may have actually had a positive effect of preventing increases in these variables under circumstances that would normally have produced increases.

There was also no significant increase in job satisfaction scores among experimental subjects as a result of participating in the program, when compared with control subjects. It was believed that the same situation (described above) of a greatly increased workload was a factor in negating any effects of the program on job satisfaction. Some other authors (Blair et al., 1979; Brennan, 1982b; Kristein, 1982; Murphy, 1983) have reported increases in job satisfaction as a result of work site wellness programs. However, the results of the present study agree with those of Cox and Shephard (1979), who were unable to demonstrate an increase in job satisfaction among employees who participated in a fitness program. Another possible factor that may have prevented improvement in the present study was disappointment on the

part of many subjects that they were not allowed company time to attend seminars. At least half of the experimental subjects stated to the author that they had initially believed that they would be given work time to participate in the program (even though this was not specifically promised by the company). It is recommended that future health promotion programs be conducted during work hours, where possible. Another possible reason for no improvement in job satisfaction may be that the initial high levels of job satisfaction ($x = 71.2$) allowed little room for improvement.

Based on the multivariate and univariate analyses of the data in this study, there was no significant change in intake of alcoholic beverages, caffeine, sugar, saturated fat, cholesterol, and fiber among experimental subjects (when compared to control subjects) as a result of participation in the health promotion program. Since sodium intake was highly correlated with several of the other dietary components, it was also assumed that there was no change in sodium intake. It is very difficult to compare the results of the present study with those of other worksite wellness progams, as most of the reports in the literature do not contain evaluations of change in the specific dietary components, foods, or nutrients. Foreyt et al. (1980) reported that 50 percent of subjects, who participated in a wellness program with Campbell in which they were instructed on the "Prudent Diet", were following the diet one year later. Murphy (1983) reported that experimental subjects in the "Live for Life" program at Johnson & Johnson showed a nine percent improvement in nutritional practices as compared to a seven percent improvement in the control group. "Nutritional

practices" were not defined in the report. There is a need for more specific data to be gathered on intake of nutrients and other food components by participants in the ongoing worksite wellness programs operating in several large companies, in order to more accurately assess change in dietary practices.

The inability to show change in the intake of the seven dietary components discussed above, may possibly be attributed to the poor attendance at seminars. Many subjects (almost 50 percent) attended fewer than three seminars. In an attempt to learn the reasons for nonattendance and to identify ways to improve attendance, a questionnaire (Piedmont Wellness Program Participant Questionnaire, Appendix A) was mailed to all subjects, to be returned anonymously. The results showed overwhelmingly that subjects were pleased with the topics offered, as well as the method of presentation at seminars. The main reasons given for nonattendance were (a) overtime work (b) inability to remain at the work site at the end of shifts because of extreme fatigue, (c) having small children to care for or other home obligations (d) being out-of-town on vacation, and (e) personal or family illness.

Several efforts were used to compensate for the low attendance at seminars, including the use of handouts, mailouts, posters and table cards in break and lunch rooms, and the use of learning packets, containing cassette recordings of seminars. These were made available for overnight check-out. The fact that no change was shown, in spite of the numerous efforts to disseminate information by means other than seminars, suggests that impersonal methods of disseminating nutrition and health information cannot be successfully substituted for the

personal contact by the educator through seminars and individual counselling. This conclusion agrees with the findings of Ware (1982) who also concluded that health promotion programs must be based on interpersonal and interactive methods, rather than impersonal disseminaton of information. Results indicate that attendance at seminars is very important and that achieving good attendance may require that companies allow employees to attend health promotion programs during working hours.

The results on meal patterning indicated that there was significant improvement among the experimental subjects as compared to the controls. There was an increase in the number of experimental subjects consuming the best meal patterns (Patterns 8a, 7b, and 6b) as compared to the the percentage of control subjects who actually decreased their consumption of the desirable meal patterns. There was also a significant increase in the percentage of experimental subjects who were meeting the dietary goals for sugar and fat at posttest, whereas a smaller percentage of the control subjects met the dietary goals on posttest as compared to pretest.

The finding of significant improvements in meal patterning of experimental subjects as compared to control subjects, as a result of participating in the health promotion, is in agreement with those of several studies (Byrne, Zelis, Byrne, & Kris-Etherton, 1983; Foreyt et al., 1980; and Murphy, 1983) who have reported changes in amounts and types of foods comsumed by experimental subjects, as a result of work site and community based nutrition education programs. Byrne et al. (1983) achieved significant changes in attitudes about food, increased

nutrition knowledge, and improvements in reported food intake as a result of a one-session educational program designed to teach the principles of the Prudent Diet to a free-living, healthy population. Foreyt et al. (1980) and Murphy (1983) have summarized results of a number of work site health program programs which have achieved significant improvements in weight control, food choices in the company cafeteria, and scores on nutrition knowledge and attitude tests.

One might question why improvement was shown from pre- to post-tests on general meal patterning, when there was no significant change shown in intake of certain dietary components (alcohol, caffeine, sugar, saturated fat, cholesterol, and sodium), as in Hypothesis 5. An explanation for this seeming contradiction lies in the fact that a food frequency checklist was used in determining general meal patterning, while a 24-hour recall plus a 3-day food record were used for obtaining intake of nutrients and the six dietary components. The food frequency checklist is indicative of one's habitual eating pattern over an extended period of time, whereas a food record or 24-hour recall reflects what the person consumed over a recent, but definite period and may not reflect usual dietary practices (Simko et al., 1984). One conclusion drawn in comparing the results of Hypotheses 5 and 6, was that the health promotion program did result in changes in the diet pattterns of subjects, but this improvement was not reflected in the short period over which diet records were collected.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purposes of this study were (a) to assess levels of anxiety, depression, job satisfaction; (b) to assess levels of certain nutrition, health and chronic disease risk factors; (c) to analyze the relationship between anxiety and selected nutrition, health, and chronic disease risk factors; (d) to analyze the relationship between anxiety and the same selected variables; (e) to evaluate the relationship between nutritional adequacy of the diet and level of anxiety and depression; and (f) to assess the effectiveness of a work site health promotion program in bringing about desired changes on anxiety, depression, job satisfaction scores, levels of various dietary components, and general meal patterning. A quasi-experimental, nonequivalent control group, pretest-posttest design was used in the study.

The sample consisted of 82 females, 19 to 60 years of age, who worked full-time as reservationists for Piedmont Airlines. Forty-two of the subjects served as controls and were located in the Nashville, Tennessee, Reservation Center, and 42 who were located in the Winston-Salem Reservation Center, served as experimental subjects. Anthropometric measurements and dietary recalls were taken at the work sites by the author, another trained graduate student, and two registered nurses. Subjects completed self-administered questionnaires including

anxiety, depression, and job satisfaction scales, a nutrition and health habits inventory, a food questionnaire and frequency checklist, and a three-day food record. These questionnaires were completed, partially at home and at the work site. All measurements were taken before and after a seven-month treatment.

The treatment consisted of a seven-month health promotion program, involving the use of seminars, posters, table tents, handouts, mail-outs, newsletters, learning packets, and cassette recordings. The goal of the health promotion program was to bring about improvement in knowledge and practices related to nutrition, chronic disease prevention, exercise and fitness, and stress control among employees of the Piedmont Reservation Center, Winston-Salem, North Carolina.

On initial tests (before the treatment), subjects exhibited low levels of depression and low to moderate levels of anxiety, generally measuring below the 50 percent mark on both variables. Job satisfaction scores were generally higher than average, with the mean being near the 75 percent point. A majority of subjects (80%) were in the high-fat category according to percentage of body fat measurements. Only about one fourth of the subjects consumed meal patterns containing all of the servings recommended in the USDA basic four food groups. The subjects tended to consume diets deficient in iron, calcium, vitamin C, vitamin A, calories, and fiber, with iron and fiber being most often deficient. Mean intakes of sugar, total fat, saturated fat, and cholesterol were above the U.S. Dietary Goals. Sodium and caffeine

intake did not appear to be excessive. Only a small percentage of subjects showed an elevated blood pressure.

Two hypotheses involved the assessment of relationships between anxiety and depression and other variables. Only one significant relationship was found. The other four hypotheses involved an assessment of the effect of the health promotion program in bringing about desired changes in various health and nutrition factors. Only one of the hypotheses (H6) resulted in the finding of a significant change in a variable as a result of the program. Below is a summary of the results of testing the six hypotheses:

1. The null hypothesis testing for the relationship between scores on anxiety and depression tests and 12 variables (general meal patterning and intake of protein, calcium, iron, vitamin A, vitamin C, sugar, sodium, total fat, calories, alcoholic beverages, and caffeine) was not rejected for any of the variables, except for iron intake and general meal patterning. In the case of iron, the anxiety level was significantly lower for the moderate level of iron intake, whereas the highest and lowest levels of iron intake corresponded with higher levels of anxiety. A significant relationship was found between anxiety and general meal patterning, with subjects in the poorest meal pattern having significantly higher levels of anxiety.
2. The hypothesis testing the relationship between scores on anxiety and depression and percentage of body fat and

participation in planned physical and recreational activities was not rejected.

3. The hypothesis testing for the effect of the health promotion program in bringing about reduction of anxiety and depression was not rejected.
4. The hypothesis testing the effect of the health promotion program in bringing about increases in job satisfaction was not rejected.
5. The hypothesis testing for the effect of the health promotion program in bringing about desired changes in consumption of alcoholic beverages, caffeine, sugar, saturated fat, cholesterol, sodium, and fiber could not be rejected.
6. The hypothesis testing for the effect of the health promotion program in bringing about improvement in general meal patterning was rejected. A significant difference was found between the control and experimental subjects at posttest.

Conclusions

The following conclusions were drawn:

1. Female, full-time reservation employees in the Winston-Salem and Knoxville locations generally exhibit low to moderate levels of depression and anxiety and generally higher-than-average levels of job satisfaction.

2. These subjects generally consume poor diets, inadequate in servings from the basic four foods, calories, iron, calcium, vitamin A, vitamin C, and fiber. Their diets tend to contain excessive amounts of sugar, total fat, saturated fat, and cholesterol, but are adequate in protein. Caffeine and sodium intakes do not appear to be excessive for most subjects.
3. There does appear to be an indirect (or possibly curvilinear) relationship between anxiety levels and food intake. The highest anxiety level was significantly correlated with the poorest meal pattern and with a moderate level of iron intake (between 50 and 75% of RDA). The highest anxiety level was associated with both a high and low level of iron intake. No relationship was found between depression and dietary variables.
4. No correlation was found between anxiety and depression levels and either percentage of body fat or level of participation in physical activity.
5. Subjects generally had body fat levels in the high-fat range. Since calorie levels did not appear to be excessive, inadequate physical activity may be a major cause of the high body fat.
6. Implementation of a health promotion, without giving employees time during the workday to attend educational activities, will generally result in poor participation among female, full-time reservation workers, especially if the work load is heavy. Poor attendance at educational activities, after regular work hours,

may be partially due to other obligations such as child or home care and other family responsibilities.

7. Results of this study indicate that improvements in specific dietary and health factors (except for general meal patterning) will not occur, as a result of a health promotion program, if a situation exist in which attendance at seminars is poor. It is not known whether the health promotion program would have resulted in more change, if seminar attendance had been high.
8. Other methods, such as newsletters, handouts, and cassette recordings, used as substitutes for seminars, may be only partially successful in bringing about change.
9. Usual diet, as represented by general meal patterning, can be improved with participation in a health promotion program, even with poor seminar attendance, if alternate educational methods are used.
10. There is a significant relationship between food intake and anxiety level, with high levels of anxiety being associated with poor eating patterns. It is not known whether the poor eating resulted in higher anxiety or the reverse.

Recommendations

Since attendance at seminars was a major problem in this study, it is recommended that future studies be conducted with groups, who can attend educational activities during work hours. It is also recommended that companies consider giving employees time for such activities, as

there are potential benefits for the company, if workers do reduce their health risk factors. Based on comments by a number of subjects in the study, the offering of a health promotion program by a company, without permitting employees to attend during work hours, may actually increase stress and decrease job satisfaction. This problem needs further investigation.

Another situation which arose was the increase in work load which required overtime work. This problem may have contributed to poor attendance at seminars, as well as preventing a reduction in anxiety and depression levels. Poor attendance at seminars made it virtually impossible to administer the educational program in the manner as originally intended. Since responses from subjects indicated that poor participation was not due to faults in the educational program, it is recommended that the present program be attempted with some other employee group, where attendance at seminars may be more easily achieved and where other changes in the work environment can be controlled.

It is recommended that future studies attempting to show a correlation between dietary intake and anxiety and depression, use subjects known to have widely varying anxiety and depression levels. Very few of the subjects had anxiety and depression levels above the 50 percent point. It is possible that these levels were too low to affect intake of specific nutrients. It is also recommended that more studies be done to investigate the relationship of body stores of various nutrients and levels of anxiety and depression.

A high percentage of subjects failed to answer the question on the Nutrition and Health Habits Inventory concerning use of medications. Many who did respond appeared to give incomplete information. It was difficult to determine whether subjects failed to answer the question because they did not take any medications, or because they did not wish to give the information. Since this was an employee group, there may have been some concern that admitting the use of certain medications would jeopardize the employment position in some way. Great effort was made to assure the subjects that all information would be kept confidential. It might be possible to obtain information about medications with face-to-face interviews, using well-trained interviewers.

The achievement of improved general meal patterning among subjects as a result of participating in the health promotion program indicates that such a program can have beneficial effects. It is presumed that positive improvements in eating patterns could, over time, lead to improved health status. It is recommended that more nutrition education be integrated into the health promotion programs which are presently being conducted by some major companies. It is also recommended that these companies employ trained nutrition professionals to assess changes in nutrition status of employees, as a result of the health promotion programs.

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APPENDIX A

DATA COLLECTION FORMS AND PROCEDURES

Form 001

Interest Questionnaire

Wellness Program - Piedmont Airlines

NAME: _____ BIRTHDATE: _____

WORK SHIFT: (Hours) Begins: _____ Ends: _____

TOTAL YEARS OF SERVICE (Including any Part-time Service):

CLASSIFICATION: Check (✓) Full-time _____ Intermediate: ____ Part-time: __

---

1. List particular areas of fitness, exercise, nutrition, or health you would like seminars on.

2. Do you consider yourself overweight? Yes _____ No _____

   If yes, by _____ pounds for _____ years.
   (Fill in blanks with numbers)

3. Would you be interested in participating in a weight control program? Check (✓) Yes ____ No _____

***Note: All Activities of the Wellness Program will be held at the Central Reservation Office, Winston-Salem, N.C.

RHC/11/83

DATE: _____ Form 002 ID NUMBER: _____

THE SELF-RATING ANXIETY SCALE

Below are 20 statements that may or may not apply to you. Please read each statement and circle one of the numbers (1-4) that corresponds to the response that fits you. There are no right or wrong answers. We would like your honest feelings.

	None or a little of the time	Some of the time	Good part of the time	Most or all the time
1. I feel more nervous and anxious than usual.	1	2	3	4
2. I feel afraid for no reason at all.	1	2	3	4
3. I get upset easily or feel panicky.	1	2	3	4
4. I feel like I'm falling apart and going to pieces.	1	2	3	4
5. I feel that everything is all right and nothing bad will happen.	1	2	3	4
6. My arms and legs shake and tremble.	1	2	3	4
7. I am bothered by headaches, neck and back pains.	1	2	3	4
8. I feel weak and get tired easily.	1	2	3	4
9. I feel calm and can sit still easily.	1	2	3	4
10. I can feel my heart beating fast.	1	2	3	4
11. I am bothered by dizzy spells.	1	2	3	4
12. I have fainting spells or feel like it.	1	2	3	4
13. I can breathe in and out easily.	1	2	3	4
14. I get feelings of numbness and tingling in my fingers and toes.	1	2	3	4
15. I am bothered by stomach aches or indigestion.	1	2	3	4
16. I have to empty my bladder often.	1	2	3	4
17. My hands are usually dry and warm.	1	2	3	4
18. My face gets hot and blushes.	1	2	3	4
19. I fall asleep easily and get a good night's rest.	1	2	3	4
20. I have nightmares.	1	2	3	4

Form 003

BECK INVENTORY

Name_____ Date_____

On this questionnaire are groups of statements. Please read each group of statements carefully. Then pick out the one statement in each group which best describes the way you have been feeling the PAST WEEK, INCLUDING TODAY! Circle the number beside the statement you picked. If several statements in the group seem to apply equally well, circle each one. Be sure to read all the statements in each group before making your choice.

1 0 I do not feel sad.
1 I feel sad.
2 I am sad all the time and I can't snap out of it.
3 I am so sad or unhappy that I can't stand it.

2 0 I am not particularly discouraged about the future.
1 I feel discouraged about the future.
2 I feel I have nothing to look forward to.
3 I feel that the future is hopeless and that things cannot improve.

3 0 I do not feel like a failure.
1 I feel I have failed more than the average person.
2 As I look back on my life, all I can see is a lot of failures.
3 I feel I am a complete failure as a person.

4 0 I get as much satisfaction out of things as I used to.
1 I don't enjoy things the way I used to.
2 I don't get real satisfaction out of anything anymore.
3 I am dissatisfied or bored with everything.

5 0 I don't feel particularly guilty.
1 I feel guilty a good part of the time.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.

6 0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

7 0 I don't feel disappointed in myself.
1 I am disappointed in myself.
2 I am disgusted with myself.
3 I hate myself.

8 0 I don't feel I am any worse than anybody else.
1 I am critical of myself for my weaknesses or mistakes.
2 I blame myself all the time for my faults.
3 I blame myself for everything bad that happens.

9 0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10 0 I don't cry any more than usual.
1 I cry more now than I used to.
2 I cry all the time now.
3 I used to be able to cry, but now I can't cry even though I want to.

11 0 I am no more irritated now than I ever am.
1 I get annoyed or irritated more easily than I used to.
2 I feel irritated all the time now.
3 I don't get irritated at all by the things that used to irritate me.

12 0 I have not lost interest in other people.
1 I am less interested in other people than I used to be.
2 I have lost most of my interest in other people.
3 I have lost all of my interest in other people.

13 0 I make decisions about as well as I ever could.
1 I put off making decisions more than I used to.
2 I have greater difficulty in making decisions than before.
3 I can't make decisions at all anymore.

14 0 I don't feel I look any worse than I used to.
1 I am worried that I am looking old or unattractive.
2 I feel that there are permanent changes in my appearance that make me look unattractive.
3 I believe that I look ugly.

15 0 I can work about as well as before.
1 It takes an extra effort to get started at doing something.
2 I have to push myself very hard to do anything.
3 I can't do any work at all.

16 0 I can sleep as well as usual.
1 I don't sleep as well as I used to.
2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
3 I wake up several hours earlier than I used to and cannot get back to sleep.

17 0 I don't get more tired than usual.
1 I get tired more easily than I used to.
2 I get tired from doing almost anything.
3 I am too tired to do anything.

18 0 My appetite is no worse than usual.
1 My appetite is not as good as it used to be.
2 My appetite is much worse now.
3 I have no appetite at all anymore.

19 0 I haven't lost much weight, if any, lately.
1 I have lost more than 5 pounds. I am purposely trying to lose weight
2 I have lost more than 10 pounds. by eating less. Yes____ No____
3 I have lost more than 15 pounds.

20 0 I am no more worried about my health than usual.
1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
2 I am very worried about physical problems and it's hard to think of much else.
3 I am so worried about my physical problems that I cannot think about anything else.

21 0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

Form 004 (RHC/11/83)

DATE: _____ ID NUMBER: _____

JOB QUESTIONNAIRE

Some jobs are more interesting and satisfying than others. We want to know how people feel about different jobs. Below are 18 statements about jobs. Please circle the number (1-5) that best describes how you feel about your present job. There are no right or wrong answers. We would like your honest opinion on each one of the statements.

5=Strongly Agree; 4=Agree; 3=Undecided; 2=Disagree; 1=Strongly Disagree

	SD	A	U	D	SD
1. My Job is like a hobby to me.	5	4	5	2	1
2. My job is usually interesting enough to keep me form getting bored.	5	4	3	2	1
3. It seems that my friends are more interested in their jobs than I am.	5	4	3	2	1
4. I consider my job rather unpleasant.	5	4	3	2	1
5. I enjoy my work more than my leisure time.	5	4	3	2	1
6. I am often bored with my job.	5	4	3	2	1
7. I feel fairly well satisfied with my present job.	5	4	3	2	1
8. Most of the time I have to force myself to go to work.	5	4	3	2	1
9. I am satisfied with my job for the time being.	5	4	3	2	1
10. I feel that my job is no more interesting than others I could get.	5	4	3	2	1
11. I definitely dislike my work.	5	4	3	2	1
12. I feel that I am happier in my work than most other people.	5	4	3	2	1
13. Most days I am enthusiastic about my work.	5	4	3	2	1
14. Each day of work seems like it will never end.	5	4	3	2	1
15. I like my job better than the average worker does.	5	4	3	2	1
16. My job is pretty uninteresting.	5	4	3	2	1
17. I find real enjoyment in my work.	5	4	3	2	1
18. I am disappointed that I ever took this job.	5	4	3	2	1

Developed by Brayfield and Rothe (1951)

Form 005

I.D. NUMBER_____

DATE_____

FOOD QUESTIONNAIRE AND FREQUENCY CHECK LIST:

Use for Coding

1. Do you eat at regular times each day? (Please check (✓))
   ___Always ___Most of the time ___Rarely

2. How many days a week do you eat:
   a morning meal? _____
   a lunch or a midday meal? _____
   an evening meal? _____
   during the evening or night? _____

3. How many days a week do you have snacks and what do you have then?
   in mid morning _____
   in mid afternoon _____
   in the evening _____
   during the night _____

4. Where do you usually eat your meal?

Morning	Mid Day	Evening
_____	_____	_____

5. With whom do you usually eat?

Morning	Mid Day	Evening
_____	_____	_____

6. How many times a week do you usually eat away from home?_____

7. Would you say your appetite is Good? _____ Fair_____ Poor_____

8. What foods do you particularly dislike_____
   _____

9. Are you on a special diet? If yes, what kind? Who prescribed?
   _____
   _____

10. Are there foods you don't eat for other reasons? YES_____ NO_____
    List and explain reason you don't eat the food:_____
    _____
    _____
    _____

11. Do you add salt to your food at the table? YES_____ NO_____

12. Do you take vitamin or mineral supplements? YES_____ NO_____
    If yes, how many per day?_____ per week?_____
    If yes, what kind (give brand name if known)?
    Multivitamin a._____
    Iron b._____
    Ascorbic Acid c._____
    Other (list) d._____
    e._____
    f._____
    g._____

RHC/arw

FOOD FREQUENCY CHECKLIST

FOOD	CIRCLE NUMBER OF SERVINGS PER WEEK	MORE THAN 7 (SPECIFY)	SELDOM EAT	NEVER EAT	YOUR USUAL SERVING SIZE	USE FOR CODING
1. Dark green vegetables	0 1 2 3 4 5 6 7					
Dark yellow vegetables	0 1 2 3 4 5 6 7					
Other green vegetables	0 1 2 3 4 5 6 7					
Potatoes	0 1 2 3 4 5 6 7					
Other vegetables	0 1 2 3 4 5 6 7					
2. Bread (type)	0 1 2 3 4 5 6 7					
Wheat germ	0 1 2 3 4 5 6 7					
Cereal (type)	0 1 2 3 4 5 6 7					
Pasta (type)	0 1 2 3 4 5 6 7					
Potato	0 1 2 3 4 5 6 7					
Other grain (type)	0 1 2 3 4 5 6 7					
Pancake	0 1 2 3 4 5 6 7					
3. Citrus fruit or juice	0 1 2 3 4 5 6 7					
Other fruits	0 1 2 3 4 5 6 7					
Tomatoes	0 1 2 3 4 5 6 7					
Dried fruits	0 1 2 3 4 5 6 7					
4. Milk (type)	0 1 2 3 4 5 6 7					
Yogurt	0 1 2 3 4 5 6 7					
Cheese (type)	0 1 2 3 4 5 6 7					
5. Oil (type)	0 1 2 3 4 5 6 7					
Margarine	0 1 2 3 4 5 6 7					
Butter	0 1 2 3 4 5 6 7					
Salad dressing	0 1 2 3 4 5 6 7					
Bacon and sausage	0 1 2 3 4 5 6 7					
Fried foods	0 1 2 3 4 5 6 7					
Salt Pork	0 1 2 3 4 5 6 7					
Cream, sweet	0 1 2 3 4 5 6 7					
Cream, sour	0 1 2 3 4 5 6 7					
6. Beef, hamburger	0 1 2 3 4 5 6 7					
Pork, ham	0 1 2 3 4 5 6 7					
Liver	0 1 2 3 4 5 6 7					
Lunch meat	0 1 2 3 4 5 6 7					
Franks	0 1 2 3 4 5 6 7					
Pizza, spaghetti	0 1 2 3 4 5 6 7					
Poultry	0 1 2 3 4 5 6 7					
Eggs	0 1 2 3 4 5 6 7					
Peanut butter	0 1 2 3 4 5 6 7					
Dried peas/beans	0 1 2 3 4 5 6 7					
Nuts	0 1 2 3 4 5 6 7					
Seeds	0 1 2 3 4 5 6 7					
Sprouts	0 1 2 3 4 5 6 7					
CONTINUED ON NEXT PAGE						

usual serving size = ¼ c., 1/3 c, ½ c, 3/4 c, 1 c, 1 tabsp., 3 oz., 1 whole, etc.

FOOD FREQUENCY CHECKLIST

FOOD	CIRCLE NUMBER OF SERVINGS PER WEEK	MORE THAN 7 (SPECIFY)	SELDOM EAT	NEVER EAT	YOUR USUAL SERVING SIZE	USE FOR CODING
7. Candy	0 1 2 3 4 5 6 7					
Pie, cake, cookies	0 1 2 3 4 5 6 7					
Potato chips, pretzels, popcorn, corn chips, etc.	0 1 2 3 4 5 6 7					
Teas	0 1 2 3 4 5 6 7					
Coffee with caffeine	0 1 2 3 4 5 6 7					
Carbonated drinks	0 1 2 3 4 5 6 7					
Kool-aid	0 1 2 3 4 5 6 7					
Wine	0 1 2 3 4 5 6 7					
Beer	0 1 2 3 4 5 6 7					
Hard liquor	0 1 2 3 4 5 6 7					
Ice cream	0 1 2 3 4 5 6 7					
Ice milk	0 1 2 3 4 5 6 7					
Sherbert	0 1 2 3 4 5 6 7					
Sugar added to beverages	0 1 2 3 4 5 6 7					
8. Other foods not listed that you eat regularly :	0 1 2 3 4 5 6 7					
_____	0 1 2 3 4 5 6 7					
_____	0 1 2 3 4 5 6 7					
_____	0 1 2 3 4 5 6 7					
_____	0 1 2 3 4 5 6 7					

RHC/arw

usual serving size = ¼ c., 1/3 c, ½ c, 3/4 c, 1 c, 1 tabsp., 3 oz., 1 whole, etc.

Form 006

A 24 HOUR RECALL FORM

NAME or I.D. NUMBER: _____ DATE _____
DAY OF WEEK OF RECALL _____

TIME*	FOOD ITEMS	TYPE AND PREPARATION**	AMOUNT	WHERE EATEN***	OFFICE USE ONLY		
					FOOD CODE	AMOUNT	CODE

* A.M. BREAKFAST
A.M. SNACK
MIDDAY LUNCH
AFTERNOON SNACK
P.M. SUPPER
EVENING SNACK

** FRIED, BAKED, BOILED
TOASTED
WHOLE WHEAT
FRESH, FROZEN, CANNED
CREAMED

*** HOME
RESTAURANT
CARRIED LUNCH
CAFETERIA AT WORK
SCHOOL
CHILD CARE CENTER, ETC.

Was intake unusual in any way? YES_____ NO_____

If yes, why (in what way)?_____

_____

RHC/arw

Form 007

FOOD RECORD

NAME OR I.D. NUMBER:______________________ DATE:______________________

DAY OF WEEK OF RECALL:________________________________

TIME*	FOOD ITEMS	TYPE AND PREPARATION**	AMOUNT	WHERE EATEN***	OFFICE USE ONLY FOOD CODE	

*GIVE APPROXIMATE TIME SUCH AS 7 a.m., 8:30 a.m.

**FRIED, BAKED, BOILED
TOASTED
WHOLE WHEAT
FRESH, FROZEN, CANNED
CREAMED

***HOME
RESTAURANT
CARRIED LUNCH
SCHOOL
WORK CAFETERIA
FRIEND'S HOUSE

RHC/ARW

DIRECTIONS FOR 3-DAY FOOD RECORD

1. Please keep a record for 3 days of everything you eat and drink from the time you get up until you go to bed. Use 2 WORK days and 1 NONWORK day. Record each day on a separate sheet.

2. Try to keep your eating pattern as usual as possible until you complete this 3-day record!

3. Record the amount you eat in household measurements, such as ¼ c., 1/3 c., ½ c., 7/8 c., 1 tsp., 1 Tbsp., 2 oz., 3 oz., etc. Meats may be recorded in ounces using a normal size hamburger pattie of 3 ozs. as a guide; or just record the size of the piece of meat (1 slice: 2"x3"x¼"). Record whole foods as follows: 1 med. apple, 1 lg. banana, 1 lg. potato, 1 (12 oz.) Diet Coke, 1 chicken leg, etc.

4. The best way to measure a plate of food is to prepare your plate first with the amounts you would normally eat; then measure each food separately with a measuring cup. For cake or cornbread, etc. give the size of slice (2"x3"x½"). For pie, record as 1/6 of 9" pie, etc.

5. Be sure to list all beverages, such as coffee, soft drinks, mixed drinks, etc. in ounces. A regular size coffee cup is usually 6 ounces; whereas, a mug may be 8 ounces. In the case of a mixed alcoholic drink, record the amount of liquor in ounces or jiggers, as well as the total size of the drink.

6. Be sure to describe all foods by listing all main ingredients and any added sugar, salt, mayonnaise, cream, margarine, butter, mustard, ketchup, etc. please indicate whether coffee, tea, and soft drinks are regular or decaf-feinated and if drinks are "diet" or regular.

7. In case of mixed dishes: soup, sandwich, casserole, or salad, list all ingredients on the back of the form, OR - better yet- clip the recipe to the records when you turn them in. If you turn in a recipe for a mixed dish, please put your name on it and we'll return it to you later with a computer printout of its nutrient content. List the number of servings it makes. List the number of servings you ate on the food record.

8. Please complete the 3-day record this week (including the first day you are not working) and bring back to _____
_____.
A box will be placed there for collecting records. Clip together records and recipes before placing in box. Put your ID number on each page.

IT IS ESSENTIAL THAT YOU RETURN A COMPLETE 3-DAY RECORD BY MARCH 13TH. IF YOU WILL NOT BE WORKING THAT DAY, PLEASE BRING IT IN ON THE 14TH. WE NEED A COMPLETE SET OF RECORDS ON EACH PERSON OR IT WILL MESS UP OUR RESULTS. WE ARE COUNTING ON YOU !!!!

Ruby H. Cox

arw
2/29/84

PIEDMONT WELLNESS PROGRAM

DATA FORM 008

DATE:_____

SHIFT:_____

USE FOR CODING	Name	BLOOD PRESSURE 1	2	3	AVG. BP	PULSE RATE	HCT. %	USE FOR CODING
	1.							
	2.							
	3.							
	4.							
	5.							
	6.							
	7.							
	8.							
	9.							
	10.							
	11.							
	12.							
	13.							
	14.							
	15.							
	16.							
	17.							
	18.							

Form 009

NUTRITION AND HEALTH HABITS INVENTORY

ID Number: _____

Date: _____

PART I: DAILY/WEEKLY HOME AND JOB ACTIVITIES

1. How many hours do you sleep (or rest in bed) in a 24 hour period?
   Check one: 6 hours or less _____
   7 to 8 hours _____
   9 hours or more _____

2. Think about all of the home or job activities you do during a week while sitting, standing, and walking. (Do not include planned recreational or exercise type activity as in Part II).

   Read through the entire list and check (✓) "yes" or "no" as to whether you have done this activity in the past week (last 7 days).

   Next, please estimate the total amount of time in hours or minutes you spent doing each activity in the past week (last 7 days).

Type of Activity	Have you done this activity in the past 7 days? Check (✓) "yes" or "no" column. Yes	No	List the total time you spent doing this activity in the past 7 days. Total Time Spent Hours	Minutes	Use for Coding
Type A= While Sitting:					
1.Eating at mealtime					
2.Bathing, Grooming, Manicuring					
3.Socializing, Resting, Watching TV, Reading, Listening to music,					
4.Sitting in church and meetings					
5.Doing Handcrafts, Needlework, Painting, Sewing, Playing cards					
6.Working at desk (home or office) Typing, Writing, Talking on Phone					
7.Driving/riding in car or plane					
Type B= While Standing:					
8.Taking a shower					
9.Meal Preparation (including kitchen cleanup)					
10.Doing laundry (washing, ironing etc.					
11.Socializing					
12.Other (specify)					
Type C= While Walking					
13.House cleaning (Dusting, mopping, Vacuuming, etc.)					
14.Shopping (Grocery or Other Type)					
15.Walking between locations					
16.Going up and down Stairs					
17.Other (specify)					

ID Number:_____

PART II: RECREATIONAL AND PLANNED EXERCISE ACTIVITY

3. Think about the types of activities you usually do for exercise, recreation, or competition. Below is a list of common physical activities.
Read through the entire list and check (✓) "yes" or "no" as to whether you have done any of these activities in the past 6 months.

Next, think only of the past 2 weeks (last 14 days). Indicate with a check (✓) in the appropriate column the number of times you did each activity in the past two weeks. If more than 6 times, please list the number of times.

Next, please estimate the total amount of time in hours and/or minutes you spent doing each activity in the past 2 weeks and list in column T.

Have you done this activity in the past 6 months? Check (✓) "yes" or "No"	Yes	No	Number of times in past 2 weeks (14 days) you did activity? 0	1	2	3	4	5	6	Other Specify	T.List Total Time Spent Hrs	Min	Use for Coding
Type D activity:													
1. Calisthenics, Lift weights													
2 Golf													
3. Putt Putt Golf, Billiards													
4 Table Tennis (Ping Pong)													
5. Volleyball, Softball													
6. Walking, slow/norm. pace (as a planned exercise)													
Type E activity:													
7. Badminton													
8. Bicycling													
9. Bowling, skating													
10. Dancing (Social)													
11. Horseback Riding													
12. Walking, fast pace (as planned exercise)													
Type F activity:													
13. Basketball													
14. Hiking													
15. Skiing (snow or water)													
16. Swimming													
17. Tennis (Doubles)													
18. Tennis (Singles)													
Type G activity:													
19. Exercise to fast music													
20. Dancercise, Jazzercise													
21. Jogging (1 mile in 12 min.)													
22. Running (1 mile in 9 min.)													
23. Raquet ball, Handball,													
24. Rope Jumping													
25. Other (Specify): _____													

4. Think of one typical 24-hour period, from the time you go to bed on one day (night) until the time you go to bed on the following day. Estimate the number of hours (to the nearest 1/4 hour) that you usually spend in the following general types of activities:

Use for Coding

a. Sleeping Hrs/day: _____

b. Sitting (includes activities in previous Question 2: Type A) Hrs/day: _____

c. Standing (includes activities Question 2: Type B) Hrs/day: _____

d. Walking (Includes activities in Question 2:Type C and Question 3:Type D) Hrs/day: _____

e. Vigorous Activity (Includes Question 3: Types E, F, & G) Hrs./day: _____

TOTAL HOURS: _____
(Should total 24 Hours)

5. When did you last have a physical examination by a physician? Month/year?

6. Do you have any type of physical problem that prevents you from participating in exercise? Please check: ___Yes ___No
If yes, Please describe:

_____

_____

_____

7. Do You Smoke? Please check: ___Yes ___No
If yes, number of cigarettes per day? _____

8. Do you ever take any type of over-the-counter or prescription medications for symptoms or health problems you believe are due to stress and tension, (such as tension headache, backache, muscle cramps, spasms in colon, stomach or esophagus, nervousness, depression, ulcer, indigestion, upset stomach, diarrhea, or constipation, etc.)?
Please check: ___Yes ___No
For what symptoms do you take each medication? (Please list)

Symptom:	Type & Name of Medication	No. Pills (dose) Daily	Weekly
a.			
b.			
c.			
d.			
e.			
f.			

ID Number: _____
Date: _____

PART III: BEVERAGES, SNACKS, VITAMIN/MINERAL SUPPLEMENTS, & MEDICATIONS.

9. Think about the types of beverages you usually drink throughout the day or on special occasions, especially during the past 6 months.

First, read through the list of beverages below and check (✓) the "yes" or "no" column as to whether you have had each beverage in the past 6 months.
Next, think only of the past week (last 7 days). Circle the appropriate number in colum B that represents the number of days on which you drank each beverage.
Next, in colum C list the number of servings you estimate you averaged per day of that beverage.
In colum D list the size serving (in ounces) that you usually drink at any one time of this beverage.

A. Have you drunk this beverage in the past 6 months. Check(✓) "yes" or "no" colum	YES	NO	B NUMBER OF DAYS IN PAST WEEK ON WHICH YOU DRANK THIS BEVERAGE	C AVG. NO. SERVS. PER DAY (Number)	D AVG. SIZE EACH SERV. (OZS.)	Use for Coding
1.Coffee, brewed (with caffeine)			0 1 2 3 4 5 6 7			
2.Coffee, instant (with caffeine)			0 1 2 3 4 5 6 7			
3.Coffee, decaffeinated, either brewed or instant			0 1 2 3 4 5 6 7			
4.Tea, hot or iced, 1-4 min.brew			0 1 2 3 4 5 6 7			
5.Tea, hot or iced, 5-8 min.brew			0 1 2 3 4 5 6 7			
6.Herbal tea			0 1 2 3 4 5 6 7			
7.Bottled or canned soft drinks, Give brand & type:(Example:Diet Coke/caffeine free)_____			0 1 2 3 4 5 6 7			
8.Chocolate milk (hot or cold)_____			0 1 2 3 4 5 6 7			
9.Beer _____			0 1 2 3 4 5 6 7			
10.Wines, Champagne_____			0 1 2 3 4 5 6 7			
11.Mixed drinks, (Bourbon/Coke, Whiskey sour, Tom Collins, Daiquiri, Bloody Mary, etc.)_____			0 1 2 3 4 5 6 7			
12.Unmixed liquor: bourbon, rum, vodka, etc._____			0 1 2 3 4 5 6 7			
13.Soft drinks from mixes (Tang, Koolade, lemonade) List type:			0 1 2 3 4 5 6 7			
14.Canned or bottled fruit punch, (Hawaiian Punch, Hi-C, etc.)_____			0 1 2 3 4 5 6 7			
15.Real Fruit Juice, (apple, grape, orange, grapefruit, etc.)_____			0 1 2 3 4 5 6 7			
16.Milk, whole?___ or ___Skimmed?_____			0 1 2 3 4 5 6 7			
17.Plain water_____			0 1 2 3 4 5 6 7			
18.Other - List:_____			0 1 2 3 4 5 6 7			

Use for Coding

10. Do you usually add sugar to any of the above beverages?
Please check: ___Yes ___No
List beverages to which you usually add sugar for yourself.

_____

_____

How much sugar do you usually add to one 8-ounce (1 c.) serving?
Number of Teaspoons: _____

11. Do you usually add artificial sweetner to any foods or beverages?
Please check: ___Yes ___No
List beverages and foods you usually add it to:

_____

_____

_____

_____

12. In the past 2 years have you been diagnosed as having, or do you currently have, any of these conditions?
Please circle the number for your answer: 1=Yes or 2=No.

	Yes	No
a. Diabetes	1	2
b. Bronchitis, emphysema, or asthma	1	2
c. Atherosclerosis (hardening of the arteries)	1	2
d. Elevated cholesterol	1	2
e. Elevated triglycerides	1	2
f. Heart Disease or defects	1	2
g. High Blood Pressure (Hypertension)	1	2
h. Anemia: Low hemoglobin or low hematocrit	1	2
i. Osteoporosis (brittle bones)	1	2
J. Spastic colon/esophagus, or nervous stomach	1	2
k. Ulcers or repeated stomach trouble	1	2
i. Migraine or other chronic headache	1	2
l. Back or joint problems	1	2
j. Food allergies (List foods)	1	2

_____

_____

_____

DATA FORM B

DATE: _____

SHIFT: _____

USE FOR CODING	ID #	HT	WT	HR	TRICEPS 1	TRICEPS 2	BICEPS 1	BICEPS 2	SUBSCAP 1	SUBSCAP 2	SUPRAIL 1	SUPRAIL 2	TRICEPS $\bar{x}$	BICEPS $\bar{x}$	SUBSC $\bar{x}$	SUPRAIL $\bar{x}$	SUM	% BF
1.																		
2.																		
3.																		
4.																		
5.																		
6.																		
7.																		
8.																		
9.																		
10.																		
11.																		
12.																		
13.																		
14.																		
15.																		
16.																		
17.																		
18.																		

HT: inches; WT: pounds; HR: 10 sec. after exercise; skinfolds: mm

PAF 2/84

Form 010

Form 011
PIEDMONT WELLNESS PROGRAM
PARTICIPANT QUESTIONNAIRE

Dear Study Participant: _____:

In order to increase participation in the Wellness Program seminars, we are attempting to determine if you desire some alterations in seminar topics or dates and times when seminars are offered. Please assist us in this effort by filling out the following questionnaire. Then return it to Debbie Brown's office by April 16, 1984. A box will be placed in the outer office, in which to place the questionnaires. You do not need to put your name on the questionnaire.

I. Below is a list of titles and dates of the remaining 10 seminars we plan to offer in the Wellness Program. We need to get a general idea of how many study participants plan to attend each seminar.

Please check the number beside the title of each seminar you plan to attend:

1. Let's Get Physical	_____	April 16 & 17
2. Vitamins, Minerals, Calories	_____	April 30 & May 1
3. The Stress Connection	_____	May 14 & 15
4. Coping With Stress	_____	May 28 & 29
5. Eat for the Health of it!	_____	June 11 & 12
6. Cut the Fat	_____	June 25 & 26
7. Carbohydrates Count	_____	July 9 & 10
8. The Carbohydrate Selection	_____	July 23 & 24
9. One For The Road?	_____	August 6 & 7
10. How Much Is Too Much?	_____	August 20 & 21

II. Following is a list of the Seminar Times. Please check the time you plan to come to most of the seminars.

Monday	1:30 PM	_____	Tuesday	8:30 AM	_____
Monday	3:30 PM	_____	Tuesday	3:00 PM	_____
Monday	7:30 PM	_____	Tuesday	4:30 PM	_____

III. I plan to attend at least 6 of the 10 seminars.
Please check ( ) Yes ___ No ___

If no, please tell us your reason(s): _____

IV. Are there other seminar topics you would prefer in place of some of the above topics? Please specify: _____

_____

_____

V. Are you interested in attending some weight control classes?
Please check ( ) Yes ___ No ____

If yes, please check ( ) one of the following:

___ a. I would like some weight control classes substituted for some of the above seminar topics.

___ b. I would like some weight control classes in addition to the above seminar topics.

Please list 3 different times (day and hour) you would be able to attend weight control classes.

1. _____
2. _____
3. _____

Thank you for completing this Questionnaire.

Sincerely,

Ruby H. Cox

Patty Fenstermaker

RHC 4/6/84

Form 012

INDIVIDUAL SUBJECT DATA SUMMARY FORM

SUBJECT'S NAME:_____ ID NUMBER:_____ AGE(initial):_____
SHIFT:_____

DATA TYPE	PRE-TREATMENT	POST-TREATMENT
ANXIETY SCORE		
DEPRESSION SCORE		
JOB SATISFACTION SCORE		
PERCENT BODY FAT		
AVERAGE BLOOD PRESSURE		
AVERAGE NO. MINUTES SPENT DAILY IN: -LEISURE/RECREAT. ACTIVITIES		
-VIGOROUS PHYSICAL ACTIVITY		
AVERAGE DAILY INTAKE OF: -CALORIES		
-PROTEIN (gm)		
-VITAMIN A (IU)		
-VITAMIN C (mg)		
-CALCIUM (mg)		
-IRON (mg)		
-FIBER (gm)		
-ALCOHOLIC BEVERAGES (OZ)		
-CAFFEINE (mg)		
-ADDED SUGAR (gms)		
SATURATED FAT (gms)		
CHOLESTEROL (mg)		
SODIUM (mg)		
CNS MEDICATIONS TAKEN FOR STRESS RELATED SYMPTOMS (doses per week)		
DESCRIPTION OF GENERAL MEAL PATTERNING; ALSO CATEGORY		

SCORING TABLE FOR TWENTY-FOUR HOUR DIET

To find the Twenty-four Hour Diet score:

1. Select the appropriate table (below) on the basis of the number of *milk* servings reported in Item 6, FAMILY RECORD-B (0, 1, ②, or more).
   NOTE: Circled numbers (②, ④) are the highest score possible in a food group. For number of servings larger than the circled number, use the circled number. Example, for 3 servings of milk, use the ②MILK SERVINGS table.
2. Select the proper column of the table on the basis of the number of *meat* servings reported in Item 7.
3. Select the proper area of the table on the basis of the number of *vegetable/fruit* servings reported in Item 8 (0, 1, 2, 3, ④, or more).
4. Find the proper line of the table on the basis of the number of *bread/cereal* servings reported in Item 9.

The number to the right of this (in **boldface** type) is the Twenty-four Hour Diet score.

Enter the diet score at the appropriate "Food Recall" number on the homemaker's FOOD AND NUTRITION PROGRESSION RECORD.

0 MILK SERVINGS

0 MEAT SERVINGS			1 MEAT SERVING			②MEAT SERVINGS		
Veg Fruit	Bread Cereal	Score	Veg Fruit	Bread Cereal	Score	Veg Fruit	Bread Cereal	Score
0	0	**0**	0	0	**3**	0	0	**6**
	1	**2**		1	**10**		1	**14**
	2	**4**		2	**12**		2	**17**
	3	**6**		3	**16**		3	**25**
	④	**8**		④	**23**		④	**29**
1	0	**2**	1	0	**10**	1	0	**14**
	1	**9**		1	**22**		1	**27**
	2	**11**		2	**25**		2	**35**
	3	**13**		3	**33**		3	**39**
	④	**21**		④	**37**		④	**43**
2	0	**4**	2	0	**12**	2	0	**17**
	1	**11**		1	**25**		1	**35**
	2	**13**		2	**33**		2	**39**
	3	**21**		3	**37**		3	**43**
	④	**25**		④	**41**		④	**47**
3	0	**6**	3	0	**18**	3	0	**25**
	1	**13**		1	**33**		1	**39**
	2	**21**		2	**37**		2	**43**
	3	**25**		3	**41**		3	**47**
	④	**29**		④	**46**		④	**60**
④	0	**8**	④	0	**23**	④	0	**29**
	1	**21**		1	**37**		1	**43**
	2	**25**		2	**41**		2	**47**
	3	**29**		3	**46**		3	**60**
	④	**33**		④	**56**		④	**65**

1 MILK SERVING

0 MEAT SERVINGS			1 MEAT SERVING			②MEAT SERVINGS		
Veg Fruit	Bread Cereal	Score	Veg Fruit	Bread Cereal	Score	Veg Fruit	Bread Cereal	Score
0	0	**3**	0	0	**11**	0	0	**16**
	1	**10**		1	**24**		1	**29**
	2	**12**		2	**27**		2	**37**
	3	**16**		3	**35**		3	**41**
	④	**33**		④	**39**		④	**45**
1	0	**10**	1	0	**24**	1	0	**28**
	1	**22**		1	**42**		1	**52**
	2	**25**		2	**50**		2	**56**
	3	**33**		3	**54**		3	**60**
	④	**37**		④	**58**		④	**64**
2	0	**12**	2	0	**27**	2	0	**37**
	1	**25**		1	**50**		1	**56**
	2	**33**		2	**56**		2	**62**
	3	**37**		3	**60**		3	**66**
	④	**41**		④	**64**		④	**70**
3	0	**18**	3	0	**35**	3	0	**41**
	1	**33**		1	**54**		1	**60**
	2	**37**		2	**60**		2	**66**
	3	**41**		3	**64**		3	**70**
	④	**45**		④	**77**		④	**85**
④	0	**23**	④	0	**39**	④	0	**45**
	1	**37**		1	**58**		1	**64**
	2	**41**		2	**64**		2	**70**
	3	**45**		3	**77**		3	**85**
	④	**56**		④	**82**		④	**91**

② MILK SERVINGS

0 MEAT SERVINGS			1 MEAT SERVING			②MEAT SERVINGS		
Veg Fruit	Bread Cereal	Score	Veg Fruit	Bread Cereal	Score	Veg Fruit	Bread Cereal	Score
0	0	**8**	0	0	**18**	0	0	**21**
	1	**14**		1	**29**		1	**35**
	2	**17**		2	**37**		2	**43**
	3	**25**		3	**41**		3	**47**
	④	**29**		④	**45**		④	**51**
1	0	**14**	1	0	**29**	1	0	**35**
	1	**27**		1	**52**		1	**58**
	2	**35**		2	**56**		2	**62**
	3	**39**		3	**60**		3	**66**
	④	**43**		④	**64**		④	**80**
2	0	**17**	2	0	**37**	2	0	**43**
	1	**35**		1	**56**		1	**62**
	2	**39**		2	**62**		2	**68**
	3	**43**		3	**66**		3	**82**
	④	**47**		④	**70**		④	**86**
3	0	**25**	3	0	**41**	3	0	**47**
	1	**39**		1	**60**		1	**66**
	2	**43**		2	**66**		2	**82**
	3	**47**		3	**70**		3	**86**
	④	**60**		④	**85**		④	**94**
④	0	**29**	④	0	**45**	④	0	**51**
	1	**43**		1	**64**		1	**80**
	2	**47**		2	**70**		2	**86**
	3	**60**		3	**85**		3	**94**
	④	**85**		④	**91**		④	**100**

Revised 10/83/JMc

COOPERATIVE EXTENSION SERVICE ⚙ CLEMSON UNIVERSITY

THE UNIVERSITY OF NORTH CAROLINA
AT GREENSBORO

School of Home Economics
Department of Food-Nutrition-Food Service Management
(919) 379-5332; 5313

Consent Form for Piedmont Airline Health Promotion
Program Experimental Subjects

I understand that I will be participating in a 6-month project entitled "Effects of a Nutrition-based Health Promotion Program on Stress, Chronic Disease Risk Factors, Dietary Adequacy, Physical Activity, Body Composition, Job Satisfaction and Performance Among Female Airline Reservation Employees" and that the study is being conducted by Ruby H. Cox and Patty Fenstermaker, two (Ph.D.) graduate students at UNC-G and supervised by Dr. Lucille Wakefield in the Department of Food and Nutrition.

I understand that the overall purpose of this study is to evaluate the effectiveness of a 6-month work site health promotion program, including seminars on nutrition, physical fitness, and stress management. Also, I understand that an additional purpose is to evaluate the relationships among such factors as food intake, physical activity, anxiety, depression, job satisfaction, job performance and absenteeism.

I understand that I volunteer myself for the following procedures:

1. I will come to a designated room at my place of work at the beginning of the project (during February, 1984) to complete certain questionnaires and to have certain measures taken on me to include:
   a. A Nutrition and Health Habits Inventory
   b. Dietary intake
   c. Blood pressure
   d. Hemoglobin test (which will involve a finger prick to obtain a small sample of blood)
   e. Heart rate after exercising for 6 minutes
   f. Measurements of my anxiety, depression, and job satisfaction levels with paper/pencil tests
   g. My skinfold thickness, height, and weight
2. I will repeat the above procedure at the end of the project (late August and again in late October, 1984).
3. I will fill out a three-day food intake record at the beginning and at the end of the project.
4. I will attend approximately 2 seminars per month, lasting about 30 to 45 minutes each, which will be held at the Piedmont Reservation Center on Griffith Road, Winston-Salem, N. C.
5. I will make an effort to increase my level of physical activity by engaging in an exercise of my choice for 3 or more times per week.

Consent Form for Piedmont Airline Health Promotion
Program Experimental Subjects

6. I will make an effort to read most of the educational materials distributed as a part of the health promotion program.

I understand that if I am age 35 or older or have any suspected health problems (i.e., hypertension, heart disease, diabetes, obesity, orthopedic problems), I must check with my doctor before engaging in strenuous activity.

I understand that there are some risks such as discomfort and/or infection involved with the finger prick for the hemoglobin test, and discomfort and sore muscles with exercise, but that all precautions will be taken to protect me. The procedures will be conducted by trained personnel.

I understand that all information collected from me will be kept confidential by the two principal researchers and will be used only for summarized group data analyses and reports. ID numbers consisting of random numbers will be used instead of names on all questionnaires and data forms. The ID numbers will be printed on index cards and enclosed in envelopes. On the days of data collection, I will be handed an envelope to obtain my number. The ID cards will be kept in the possession of the principal researcher away from the work site and only the researcher will have access to the ID number. Only the principal researcher will see individual forms completed by me.

I understand that the benefits I will gain as a result of being in this project are:

a. Access to information concerning nutrition, self-health care, stress management, and physical fitness.

b. Opportunity for feedback on the adequacy of my food habits, body composition, and physical condition.

c. Access to a copy of the final results of this study.

I understand that the principal researchers will answer any questions I have at any time about any phase of the project and my participation in it. I understand that I am free to withdraw from the project at any time without prejudice and without jeopardizing my position with Piedmont Airlines.

Dr. Lucille Wakefield
Dept. of Foods and Nutrition
UNC-G (Greensboro, N. C.)
(919) 379-5332

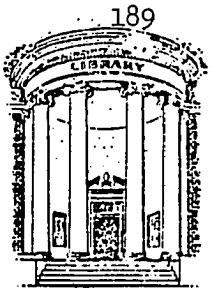
Signed:_____

Date:_____

Signed:_____
Ruby H. Cox
P. O. Box 205
Pilot Mountain, N. C. 27041
(919) 368-4123

Signed:_____
Patty Fenstermaker
3430 Kirklees Road
Winston-Salem, N. C. 27104
(919) 765-6438

RHC:PF/jec



THE UNIVERSITY OF NORTH CAROLINA
AT GREENSBORO

School of Home Economics
Department of Food-Nutrition-Food Service Management
(919) 379-5332; 5313

CONSENT FORM FOR PIEDMONT AIRLINE HEALTH PROMOTION CONTROL SUBJECTS

I understand that I will be participating as a control subject in a 6-month project entitled "Effects of a Nutrition-based Health Promotion Program on Stress, Chronic Disease Risk Factors, Dietary Adequacy, Physical Activity, Body Composition, Job Satisfaction and Performance Among Female Airline Reservation Employees" and that the study is being conducted by Ruby H. Cox and Patty Fenstermaker, two (Ph.D) graduate students at the University of N. C. at Greensboro and supervised by Dr. Lucille Wakefield in the Department of Foods and Nutrition.

I understand that the overall purpose of this study is to evaluate the effectiveness of a 6-month work site health promotion program, including seminars on nutrition, physical fitness, and stress management to be offered at the Piedmont Reservation Center in Winston-Salem, N. C. Also, I understand that an additional purpose is to evaluate the relationships among such factors as food intake, physical activity, anxiety, depression, job satisfaction, job performance, and absenteeism.

I understand that I volunteer myself for the following procedures:

1. I will come to a designated room at my place of work at the beginning of the project (during February, 1984) to complete certain questionnaires and to have certain measures taken on me to include:
   a. A Nutrition and Health Habits Inventory
   b. Dietary intake
   c. Blood pressure
   d. Hemoglobin test (which will involve a finger prick to obtain a small sample of blood)
   e. Heart rate after exercising for 6 minutes
   f. Measurements of my anxiety, depression, and job satisfaction levels with paper/pencil tests
   g. My skinfold thickness, height, and weight.
2. I will repeat the above procedures at the end of the project (late August and again in late October, 1984).
3. I will fill out a three-day food intake record at the beginning and at the end of the project.

I understand that, on completion of the study, I will receive some information regarding assessment of my own nutrition and physical condition and will have access to a report of the results of the study.

CONSENT FORM FOR PIEDMONT AIRLINE HEALTH PROMOTION CONTROL SUBJECTS

4. I will make an effort to read most of the educational materials distributed as part of the Health Promotion Program.

I understand that there are some risks such as discomfort and/or infection involved with the finger prick for the hemoglobin test, and discomfort and sore muscles with the exercise step test, but that all precautions will be taken to protect me. The procedures will be conducted by trained personnel.

I understand that all information collected from me will be kept confidential by the two principal researchers and will be used only for summarized group data analyses and reports. ID numbers consisting of random numbers will be used instead of names on all questionnaires and data forms. The ID numbers will be printed on index cards and enclosed in envelopes. On the days of data collection, I will be handed an envelope to obtain my number. The ID cards will be kept in the possession of the principal researcher away from the work site and only the researcher will have access to the ID number. Only the principal researcher will see individual forms completed by me.

I understand that the benefits I will gain as a result of being in this project are:

a. Opportunity for feedback on the adequacy of my food habits, body composition, and physical condition.

b. Access to a copy of the final results of this study.

I understand that the principal researchers will answer any questions I have at any time about any phase of the project and my participation in it. I understand that I am free to withdraw from the study at any time without prejudice and without jeopardizing my position with Piedmont Airlines.

Dr. Lucille Wakefield
Dept. of Foods and Nutrition
UNC-G (Greensboro, N. C.)
(919) 379-5332

Signed:_____

Date:_____

Signed:_____
Ruby H. Cox
P. O. Box 205
Pilot Mountain, N. C. 27041
(919) 368-4123

Signed:_____
Patty Fenstermaker
3430 Kirklees Road
Winston-Salem, N. C. 27104
(919) 765-6438

RHC:PF/jec

DURNIN METHOD OF ESTIMATING PERCENT BODY FAT

The Durnin method of estimating percent body fat involves the use of skinfold thickness at four sites, then using the sum of the skinfolds to find a percent body fat value in a special chart developed by Durnin and Womersley (1974). The Durnin method is based on the assumption that approximately half of the total body fat is subcutaneous and that a good estimate of body fat can be obtained by measuring the skin fold thickness at various sites.

In measuring skinfolds there are certain procedures that should be followed to assure obtaining accurate measurements. Skinfold calipers should be such that they exert a constant pressure of 10 grams/mm2, and are accurate to 0.1 mm. Two brands of calipers meeting this requirement are Lange Skinfold Calipers (Cambridge Scientific Industries, Cambridge, Maryland) and Harpenden Skinfold Calipers (British Indicators, St. Albans, Hertfordshire, England).

The skinfold measure to be obtained is the double thickness of the pinched, folded skin, plus the attached subcutaneous adipose tissue. The skinfold should be picked up and measured in a standard fashion as follows:

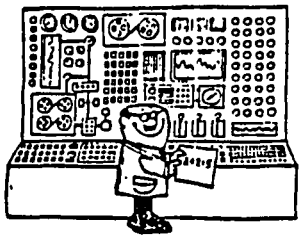
- Pinch up a full fold of skin and subcutaneous tissue between the thumb and forefinger, at a distance of about one centimeter from the site where calipers are to be placed.
- Pull the fold away from the underlying muscle. Continue to hold the skinfold during the full time the measurement is being taken.

-Apply the calipers to the fold about 1 centimeter below the fingers so that the pressure on the fold at the point measured is exerted by the faces of the calipers and not by the fingers.
-Release the handle of the caliper to permit full force of the caliper arm pressure.
-Read the dial to the nearest one-half millimeter.
-Repeat the measurement at least three times at the same site, and record the average value.

The sites measured and used in the Durnin method are the triceps, biceps, suprailiac, and subscapular. The four measurements are then summed and the tolal value is located in a conversion table, developed by Durnin and Womersley, to obtain the estimated percent body fat. The "Conversion Tables: % Fat" developed by Durnin and Womersley (1974) is located on the page following this discussion.

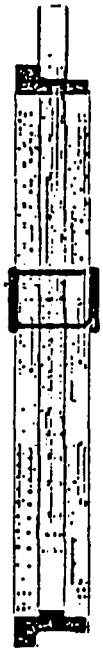
Durnin Method Continued

Conversion Tables: % Fat



SS= SUM OF 4 SKIN FOLDS (BICEPS, TRICEPS, SUBSCAPULAR, SUPRAILIAC)
DF = BODY DENSITY (ADULT FEMALES)
FF = % BODY WEIGHT AS FAT (FEMALES)
DM = BODY DENSITY (ADULT MALES)
FM = % BODY WEIGHT AS FAT (MALES)

SS	DF	FF	DM	FM
25	1.0574	18	1.0727	12
30	1.0517	20.5	1.0676	13.5
35	1.0469	23	1.0634	15.5
40	1.0428	24.5	1.0597	17
50	1.0358	28	1.0536	20
55	1.0328	29.5	1.0510	21
60	1.0301	30.5	1.0486	22
65	1.0276	32	1.0464	23
70	1.0253	33	1.0444	24
75	1.0231	34	1.0425	25
76	1.0227	34	1.0421	25
77	1.0223	34.5	1.0417	25
78	1.0219	34.5	1.0413	25.5
79	1.0215	35	1.0410	25.5
80	1.0211	35	1.0407	25.5
81	1.0207	35	1.0403	25.5
82	1.0203	35	1.0400	26
83	1.0199	35.5	1.0397	26
84	1.0195	35.5	1.0394	26
85	1.0192	36	1.0391	26.5
86	1.0188	36	1.0387	26.5
87	1.0185	36	1.0384	26.5
88	1.0182	36.5	1.0381	27
89	1.0178	36.5	1.0378	27
90	1.0174	36.5	1.0375	27
91	1.0170	36.5	1.0372	27
92	1.0166	37	1.0369	27.5
93	1.0163	37	1.0366	27.5
94	1.0160	37	1.0363	28
95	1.0157	37	1.0360	28
96	1.0153	37	1.0357	28
97	1.0150	37.5	1.0354	28
98	1.0147	37.5	1.0351	28
99	1.0144	38	1.0348	28.5



SS	DF	FF	DM	FM
100	1.0141	38	1.0346	28.
101	1.0138	38	1.0343	28.5
102	1.0135	38.5	1.0340	28.5
103	1.0132	38.5	1.0337	29
104	1.0129	39	1.0335	29
105	1.0126	39	1.0333	29
106	1.0123	39	1.0330	29
107	1.0120	39	1.0327	29.5
108	1.0117	39	1.0324	29.5
109	1.0114	39.5	1.0322	29.5
110	1.0111	39.5	1.0320	29.5
111	1.0108	39.5	1.0317	29.5
112	1.0105	39.5	1.0314	30
113	1.0102	40	1.0312	30
114	1.0099	40	1.0310	30
115	1.0097	40	1.0308	30
116	1.0094	40	1.0305	30.5
117	1.0091	40.5	1.0302	30.5
118	1.0088	40.5	1.0300	30.5
119	1.0086	41	1.0298	30.5
120	1.0084	41	1.0296	31
121	1.0081	41	1.0293	31
122	1.0078	41	1.0291	31
123	1.0075	41	1.0289	31
124	1.0073	41.5	1.0287	31
125	1.0071	41.5	1.0285	31.5
126	1.0068	41.5	1.0282	31.5
127	1.0065	41.5	1.0280	31.5
128	1.0063	42	1.0278	31.5
129	1.0061	42	1.0276	32
130	1.0059	42	1.0274	32
131	1.0056	42	1.0272	32
132	1.0053	42.5	1.0270	32
133	1.0051	42.5	1.0268	32
134	1.0049	42.5	1.0266	32
135	1.0047	42.5	1.0264	32.5
136	1.0044	43	1.0262	32.5
137	1.0042	43	1.0260	32.5
138	1.0040	43	1.0258	32.5
139	1.0038	43	1.0256	32.5
140	1.0036	43	1.0254	32.5
141	1.0033	43	1.0252	33
142	1.0031	43.5	1.0250	33
143	1.0029	43.5	1.0248	33
144	1.0029	44	1.0246	33
145	1.0025	44	1.0244	33
146	1.0022	44	1.0242	33.5
147	1.0020	44	1.0240	33.5
148	1.0018	44	1.0238	33.5
149	1.0016	44	1.0236	33.5

APPENDIX B

LETTERS TO SUBJECTS AND PIEDMONT AIRLINE OFFICIALS

M E M O R A N D U M . . .

TO: All Winston-Salem Reservations Employees

FROM: Nancy Frazier

SUBJECT: Wellness Program DATE: November 11, 1983

The interest shown in better health, disease prevention, self-care and self-help activities has greatly increased over the past several years. Your company is among those who are interested in these areas. Therefore, we would like to offer our Reservations employees an opportunity to participate in a "Wellness Program." This program will include seminars (classes) on several topics including nutrition, weight control, exercise, stress management, and prevention of aging and chronic disease (heart disease, high blood pressure, stroke, diabetes, etc.). Seminars and other activities will be conducted by two University of North Carolina at Greensboro Doctoral students in Nutrition: Ruby Cox and Patty Fenstermaker. Both are Registered Dieticians and have had wide experience in working with individuals and community groups in fitness, weight control, and nutrition.

This program will be free and totally voluntary. Since any participation in this program will be done on the employee's own time, it will be up to each individual to choose the activities and seminars they desire to attend and how often. A tentative plan is for the program to begin February 1, 1984 and run through July 1984. There will be two (2) different topics addressed monthly and several seminars conducted on each throughout the month. The seminars will last approximately 30-45 minutes each and will be held at various times throughout the day and early evening. Some of the major program emphasis will be:

1. Food Becomes You - How food affects the way we look and feel; nutrients and how they affect us; Maintaining ideal weight; the ideal eating pattern.

2. Let's Get Physical - How physical activity can help us achieve and maintain a desirable figure, increase endurance and energy level, slow the aging process, and decrease stress. This program will also include guidance on various types of exercise.

3. Understanding and coping with stress - How stress affects us internally; relationship of stress to nutrition and health; and ways to reduce stress.

4. Eat for the Health of it - Fats, cholesterol, sodium and coronary heart disease: Reducing risk factors of chronic disease.

5. Fiber, complex carbohydrates, sugar.

6. Alcohol, caffeine, smoking and excessive medications -- How much is too much?

We urge each of you to participate in this program for we know it can be beneficial in helping you to learn information and methods to guard against health problems and to achieve a higher level of fitness and stamina. We also would like to use the program here in Winston-Salem as a model for developing similar programs in other locations.

Whether or not you plan to participate in the "Wellness Program," we would like for every employee to complete the section below and return it to your supervisor no later than November 23.

Thank you,

Nancy

Nancy Frazier
Manager - Reservations Personnel Relations

I would be interested in participating in the "Wellness Program."

YES _____ NO _____

If yes, please fill in the area below:

NAME: _____

SHIFT: _____

FULL-TIME _____ INTERMEDIATE _____ PART-TIME _____

Winston-Salem, N.C.
November 14, 1983

To: Piedmont Reservation Employees, Nashville, Tennessee

From: Carolyn Matthews, Reservation Center Manager

Subject: Pilot Study of a Piedmont Health Promotion Program in Winston-Salem, N.C.

The interest shown in better health, disease prevention, self-care, and self-help has greatly increased over the past several years. Your company is among those who are interested in these areas. Plans are now being made to conduct a pilot study in Winston-Salem, N.C. to determine the effectiveness and feasibility of a health promotion program among Piedmonts' employees. An education program including nutrition, exercise, fitness, stress control, weight control, and disease prevention will be conducted over a five and one-half month period (February 27 - July 31, 1984) in the Winston-Salem reservation offices. All reservation employees who are interested will participate in seminars and activities on a voluntary basis.

Two nutrition PhD students from the University of North Carolina at Greensboro will conduct the seminars and other education activities. They are Ruby Cox and Patty Fenstermaker. Both have master's degrees in nutrition and have had varied experience in the area of nutrition and health education.

In conjunction with the health promotion education program, a study will be conducted by Ruby and Patty to determine if the program results in improved measures of nutrition, fitness, and health among the employees. If results are positive, Piedmont hopes to implement similar programs here in Nashville and in other locations. Ruby and Patty will also be using the study to write dissertations in meeting requirements for their doctorate degrees.

In order to scientifically evaluate the effects of the health promotion program in Winston-Salem, we need to obtain a control group of employees from this office for comparison purposes in evaluating the results. We are seeking your voluntary participation as control subjects. Becoming a control subject means that certain measures would be taken on you, but you will not receive an education program until the pilot study is completed.

We need a total of 72 female full-time or intermediate reservation employees who are between 24 and 60 years of age to serve as control subjects. Since some matching on age and other characteristics must be

done, we hope a larger number than 72 of you will volunteer. One advantage to you is that you would receive a complete evaluation of your nutrition and fitness status. If desired, you may also receive a written summary of the over-all results after the completion of the study.

If you volunteer and are ultimately selected as a control subject, you will be asked to fill out certain forms about yourself, which would take only a few hours, most of which would be done here at your worksite. This would be done in early February and again in August and October, 1984. In addition, Ruby Cox and Patty Fenstermaker will come to our offices in February, August, and October and make certain physical measurements such as height, weight, body fatness, blood pressure, and hematocrit. All information will be kept strictly confidential. Only Ruby and Patty will see individual records. Code numbers instead of employees' names will be used to identify imformation.

If you are willing to serve as a control subject, please fill out the attached form and return to:
by Novermber 30, 1983. Your participation is essential to the success of this endeavor. We will greatly appreciate your help.

I am willing to serve as a control subject for the Pilot Study on the Piedmont Health Promotion Program. Yes

Name:_____ Age:_____

Shift:Begins:_____ Ends:_____

Total Years of Service (including any Part-time service):
_____

Current Classification: Full-time _____ Intermediate_____

Do you consider yourself overweight? Yes_____ No_____
If yes, by __ pounds for____ years (fill in no. pounds and years).

rhc/11/83

Pilot Mountain, N.C.
February 27, 1984

Mrs. Carolyn Matthews
Piedmont Reservation Center
322 Knapp Blvd.
Nashville, Tenn. 37211

Dear Carolyn:

Here is the list of people we have chosen so far to use as control subjects in the Wellness Program study. Would you check to see if I have the names spelled correctly? Also, you will notice I have left blanks for you to fill in the names of the additional subjects in the appropriate categories. Do have the additional people to fill out the original form as we will need to know their ages, etc. Just keep the forms until we get there.

Also enclosed is a form for the nurse to record hemoglobins and blood pressure. The hemoglobometer has been sent to you in the same mail as this letter. Hope it got there okay! You will need to purchase some more lancets and hemolysis sticks at a local orthopedic and surgical supply store or from the county health department. I thought I had obtained enough here, but we have used them all. If possible, the hemoglobins need to be completed by the time we leave there March 7, as we need to bring the instrument back with us. We have rented it from a local health department and are supposed to return it by March 12.

One thing we are concerned about is whether all the subjects will be working on the 3 days we are there. If any one is on vacation, do you suppose they would come in to be measured? It would be very helpful if you could go ahead and make a schedule for times subjects will come to be measured. We have learned by experience down here that the best routine is to schedule 2 subjects for measurement every half hour. Patty and I will first take certain measurements, such as height, weight, food recall, skinfold thickness, and exercise test. Then these 2 subject can go to a conference room and fill out several other forms while we measure 2 more people. Some people take longer to fill out the forms, so this procedure doesn't result in a delay in our schedule of doing the physical measurements. We can probably start taking people at 10:30 AM on Monday if there is no delay in our flight. Also, we would be willing to work a little later on Monday and Tuesday nights in order to get the evening shifts and finish in time for our 6:00 PM return flight on Wenesday.

It is best if subjects wear a loose fiting bloose and pants and bring jogging or low-heel, crepe bottom shoes on the day they are to be measured. The exercise test cannot be done in heels or a straight skirt. Also we have to measure the skinfold on the upper arm, back, and hip, which may require removal of the bloose.

We hope to see you March 5 by 8:30 or 9:00 AM. My home phone number is 919-368-4123, if you need to reach me. I am usually home by 4:00 PM your time.

Sincerely yours,

Ruby H. Cox

Patty Fenstermaker

rhc/2/84

Wellness Program

December 29, 1983

In Attendance: Nancy Frazier, John Martin, Gene Cox, Phyllis Hutchins, Debbie Brown, Ruby Cox, Patty Fenstermaker.

A planning session for the wellness program was held this date, December 29, 1983 with the above mentioned present. Following is a brief summary of that meeting to be used as a milepost for follow up of the program.

The wellness program will commence February 27, 1984 in its entirety and presently scheduled to end the end of July, 1984. Each week there will be three seminars to begin at 0800, 1500, 1700, and can be scheduled bi-weekly depending on the number of interested participants.

A select or control group of 72 participants will be randomly chosen by Ruby Cox and Patty Fenstermaker. A letter of congruence to the program will go out to these participants. Upon receipt of their agreeing to enter into the program, Tiny Griffin, registered nurse and INTRO agent, will begin checking blood pressure for this control group to be completed by January 23, 1984.

A tentative date of January 23-27, 1984 has been set up for Ruby and Patty to complete the following on the control group:

A. Seminar
B. Measure
C. Complete questionnaire

This will take place in the old PTA room and the sick room. These sessions should last approximately 1 hour using 6 participants at one time.

Two publications are being ordered for this program: Nutrition and Your Health: Dietary Guidelines for Americans" and "Stress and Your Health".

The meeting was adjourned.

Phyllis Hutchins
Reservation Manager

PH/klh

cc: Ruby Cox
Patty Fenstermaker

Winston-Salem, N.C.
April 4, 1984

Dear Wellness Program Participant;

We missed you at the last seminar. Enclosed you will find the handouts distributed at the seminar. We have placed two cassette recordings of the seminar in Debbie Brown's office which you can check-out overnight. Since you are a study participant, we would appreciate your taking the time to read the handouts and listen to the seminar recording.

Our next seminar will be held on
and is entitled . We hope to see you then. Thank you.

Sincerely yours,

Ruby H. Cox, MS, RD

Patty Fenstermaker, MS, RD

RHC/4/84

April 25, 1984

Dear_____:

I really do appreciate the interest you have shown in the Wellness Program. If you have been attending the meetings regularly, you are to be commended on your dependability.

There has been some concern over the lack of participation by the Sample Group. I cannot emphasize enough the importance of your participation. Not only does the success and continuation of this program depend on the Sample Group, but so does the completion of Patty and Ruby's doctorate. We encourage everyone, whether they are in the Sample Group or not, to attend. Data collected on the Sample Group is vital to this study.

Those who agreed to be in the Sample Group committed themselves to attend at least two meetings per month (one on each topic). Please follow through with this commitment so that you may learn and become a healthier person. Also, your participation is important so that this study will not have to be discontinued. Many long and difficult hours have gone into the planning of this program. Please support us in this activity and take advantage of a program that so many employees have requested for many years.

If you will, please fill out the attached form as soon as you can and place it in the box in my office.

Thank you,

Debbie Brown

P.S.: A schedule is also included in the attachment.

DBB:pab

Attachment

Winston-Salem, N.C.
May 17, 1984

Dear Wellness Program Study Participants:

We have now completed five of the Wellness Seminars and have seven remaining. Many of you have attended several of these seminars and we really appreciate your participation. We are sincerely hoping that all of you who have not attended any seminars yet will be able to attend most of the remaining semirars.

We have made two cassette recordings of each of the previous five seminars and have compiled a set of appropriate visuals to go with each. These seminar packets have been placed in the outer section of Debbie Brown's office. If you have missed any seminars, please go by and check-out the seminar packets over-night and listen to them.

Since you are a study participant, it is essential to the success of the study that you get the imformation from the seminars! We also believe that you can gain imformation that will be very helpful in improving your own wellness and fitness status from these recorded seminar packets.

Please check out only one packet at a time. If necessary, you may keep each packet for two days. Be sure to sign on the sign-out sheet and put the dates "checked out" and "checked in". We hope you will attend the seminars in the future. However in case you have to miss, additional recordings of each seminar will be placed in the box within a few days after each new seminar is held.

Sincerely yours.

Ruby H. Cox, MS, RD

Patty Fenstermaker, MS, RD

rhc/5/84

Winston-Salem, N.C.
July 5, 1984

Dear Wellness Program Study Participant:

Some of you have attended many of the wellness seminars or listened to the cassette recordings when you could not attend. We sincerely appreciate your faithful participation. To those of you who have not attended any seminars to date, we are making an urgent plea that you check-out the previous seminar cassettes and listen to as many as you possibly can by the middle of August.

We will again be measuring and collecting data for the study during the last part of August and early September. Even if you have not attended any seminars, we are asking that you please remain a study participant. A few have already had to officially drop out because of pregnancy or illness. If many more of you drop out, the study as well as our entire dissertations could be seriously jeapordized. We are counting on this study to meet requirements for our doctorates. Too high a drop-out rate can result in our having to abandon the project and to have to begin anew on our dissertations. This would mean an additional year of school, as well as much added expense for us to complete our doctorate programs.

However, to really give the study a legitimate chance, it is important for you to listen to the seminar recordings, read the handout materials, and attempt to put some of the information into practice. We feel that you will personally gain from this, as well as helping us to complete our dissertations.

Attendance at seminars during June was extremely low. We realize that many of you are taking vacation, or are working overtime, or have children at home from school, which prevents your attendance at this time. Due to this we have decided not to actually present the July seminars in person, but instead to place the handouts in each person's mailbox and to provide 4 or 5 cassette recordings and visual packets for each seminar. You can then check out a cassette packet and take it home over-night. We hope this will not prevent any of you from taking advantage of the imformation. If you feel you will be unable to attend the August seminars, we could do those seminars only by cassette recording as well. Please let Debbie Brown know how you feel about our just providing the cassette recordings and handouts for July and August, instead of presenting in person. We are certainly willing to come and do the seminars, but we realize this is a busy time for everybody.

Along with this letter you have received the handouts for the July 9th and 10th seminars. Several packets of the seminar, including a cassette recording and visuals, have been placed in the box in the front section of Debbie Brown's office. We hope all of you will make an extra effort to check out one of the packets over-night and listen to it. Please be sure to sign the check out sheet, as it is very important for us to know how many are listening to the seminars.

Handouts for the July 23rd and 24th seminars will be placed in your mail box by July 20th. Also the recordings will be placed in Debbie Brown's office at that time. Remember we will not be presenting any of the July seminars in person! Please let Debbie Brown know how you feel about this arrangement so we will know what to do about the August seminars.

Sincerely yours,

Ruby H. Cox, MS, RD

Patty Fenstermaker, MS, RD

Winston-Salem, N.C.
August 2, 1984

Dear Wellness Program Participant:

Attached to this letter are the handouts for Seminar #11, which was scheculed to be presented on August 6th and 7th. This seminar will not be presented in person. However, four recorded cassettes of the seminar and visuals have been placed in Debbie Brown's office. Please check out one of the seminar packets and take it home and go through it during the next week.

The 12th (last) seminar scheduled for August 20th and 21st will also be recorded and made available by August 17th. Thank you.

Sincerely yours,

Ruby H. Cox, MS, RD

Patty Fenstermaker, MS, RD

Pilot Mountain, N. C.
September 9, 1984

Mrs. Carolyn Matthews
Piedmont Reservation Office
322 Knapp Blvd.
Nashville, Tenn. 37211

Dear Carolyn:

We have completed the wellness program at the Winston-Salem Reservation Center and need to make plans for post-measurement of the control subjects there. Patty and I would like to come there to do these measurements on Thursday and Friday, October 11 and 12. Patty is still in school this semester and she is on Fall break at that time.

We would like to follow the same procedure as before with you sending out notices for two participants to come in every 30 minutes. We will do the weight, hemoglobin, blood pressure, and exercise step test during the appointments on the 11th and 12th. Then the subjects can take the written forms with them to fill out and return to us later. We would like Janice to measure blood pressure and hemoglobin as before.

There were approximately 54 people, from whom we obtained all measures before and on whom we will want to repeat the measures. I will send you a list of people we need to measure as soon as I can get it prepared.

Please let me know as soon as possible if these dates and plans are suitable with you. You can reach me by phone during the day at 919-368-4123 on the following dates: September 14, 20, and 21.
If you prefer, just write me at P.O. Box 205, Pilot Mountain, N.C. 27041.

Hope you have had a good summer. I will look forward to hearing from you.

Sincerely yours,

Ruby H. Cox

Patty Fenstermaker

rhc/9/84

Pilot Mountain, N.C.
September 22, 1984

Mrs. Carolyn Matthews
Piedmont Airlines Reservation Center
322 Knapp Blvd.
Nashville, Tenn. 37211

Dear Carolyn:

Enclosed you will find a list of the people we need to do a post-measurement on for the wellness study. There are fifty-four on the list. Three additional people (at end of list) did not return their record folders to us when we measured before; therefore, we will be unable to use them.

Please let me know as soon as possible if October 11 and 12 will be okay. If some of the subjects are off on those days, perhaps they would agree to come in. The measurement will not take more than 20 to 30 minutes, as they can complete and return the forms later. Will Janice be able to do the hemoglobins, if we bring the equipment? Just drop me a note since I am away from the telephone much of the time. My address is P.O. Box 205, Pilot Mountain, N.C. 27041.

Sincerely yours,

Ruby H. Cox

RHC/9/84

Pilot Mountain, N.C.
November 12, 1984

Dear Wellness Study Participant:

In order to complete the study connected with the Wellness Program and to finish our dissertations, we need to remeasure each of you who are study subjects. Measurements will be exactly like those we did in February and March before beginning the Wellness Program. We hope that all of you will help us in this important step.

Enclosed you will find the forms similar to those you completed before. Your I.D. number has been placed on each form. Please fill out each one within the next week, including keeping a 3-day food intake record. Please give as much imformation as possible on the amount and type of food eaten. Use 2 workdays and 1 non-workday for the food intake record. After completing all the forms, place them bach into the plain brown envelope. Remove the yellow slip containing your name and place the packet in the provided box in Debbie Brown's office.

We will do the measurements on your weight, blood pressure, hemoglobin, and exercise test later in November and early December. You will receive an appointment slip several days in advance.

Again we want to emphasize the urgency of your filling out the forms as soon as possible (within the next 7 days). If too many of you fail to do so, it could invalidate the study results. Please continue as a subject even if you did not come to seminars! Thank you.

Sincerely yours,

Ruby H. Cox, MS, RD

Patty Fenstermakerl MS, RD

RHC/11/84

Winston-Salem, N.C.
November 30, 1984

To: Control Subjects, Piedmont Wellness Program Study

From: Ruby H. Cox, MS, RD and Patty Fenstermaker, MS, RD
Wellness Program Coordinators and Researchers
University of N. C. at Greensboro

Subject: Completion of Data Forms by Control Subjects

Enclosed You will find a new set of forms for collection of data for the Wellness Program Study. We urge each of you to complete these forms, place them back in the plain brown envelope, and return to Elaine Wells no later than December q3th. It is very vital to the successful completion of this study for each of you to fill out the forms, whether or not we got your physical measurements while we were there in Nashville. However, it would help us greatly if you would weigh yourself (without shoes) on the balance beam scales there and record your present weight on the blue form.

We are using this study to meet requirements for our dissertations in the doctorate program at UNC-G. We must have at least 50 control subjects from the Nashville group in order for the study to be valid. To date we have received only 25 completed sets of forms from your group. Please help us in this effort!!

As a part of the Wellness Program in Winston-Salem, We made cassette recordings and prepared learning packets of each seminar. Carolyn Matthews will be receiving two sets of each of the 12 Wellness Program seminars. These will be made available for you to checkout and take home overnight. We hope each of you will benefit form this. After we have had a chance to analyze each person's data, you will receive a confidential report of your own dietary and physical status.

RHC/12/84

Winston-Salem, N.C.
December 18, 1984

Dear _____:

As of today, we still have not received your completed forms as a participant in the Wellness Studyn It is possible you have turned in your forms and they were misplaced during the moving of materials for painting of Debbie`Brown's former office. We are very sorry if this has happened, but we very much need completed forms from each of you in order to reach our required quota for successful completion of the study.

If you still have your forms, please complete`and turn`them in by Saturday Morning, December 22. A box has been placed in Debbie Brown's old office for collecting the forms. If your set has`been misplaced, please sign in the designated space below and return this letter immediately to the box in Debbie Brown's office. A new set of forms will then be placed in your mail folder. We need these forms completed by each person receiving this letter regardless of how many seminars you attended and whether you were available for us to obtain your hemoglobin, blood pressure, and other measurements while we were recently at your worksite. Thank you for your cooperation!

Sincerely yours,

Ruby H. Cox, MS, RD

Patty Fenstermaker,
MS, RD

I have misplaced my forms. Please put another set in my mail folder
(signed)

rhc/12/84

Winston-Salem, N.C.
January 7, 1985

Dear _____:

Enclosed you will find another set of data forms for the Wellness Study which we again urge you to complete. As you may remember, we are using this study for our dissertations to meet requirements for doctorate degrees at UNC-G. We must have a certain number of completed sets of forms in order for the study to be valid. To reach our quota, we must receive completed forms from each person receiving this letter, regardless of how many seminars you attended.

We realize the Christmas rush may have prevented many of you from filling out the forms before. Please take the time to complete these within the next week and return them to the designated box in Debbie Brown's former office. We need your help!!. Please don't let us down! Thanks.

Sincerely yours,

Ruby H. Cox, MS, RD

Patty Fenstermaker, MS, RD

rhc/1/85

APPENDIX C

RAW DATA ON EXPERIMENTAL AND CONTROL SUBJECTS

Table C-1

Raw Data For Experimental Subjects (Group 1) On All Variables

ID	Protein gm		Vitamin A IU		Vitamin C mg		Calcium mg		Iron mg		GMP* Category	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
01	63	72	4657	4132	65	80	895	1104	13	9	7	7
02	54	47	3377	7936	37	13	1179	1164	5	16	7	5
03	65	64	11677	1905	257	80	963	538	20	13	5	5
04	53	53	4367	2849	33	43	665	240	8	10	5	5
05	52	56	2956	2350	165	138	360	567	9	10	5	7
06	39	53	1459	1917	18	49	529	521	5	8	3	6
07	48	52	2108	3817	93	77	750	457	10	9	7	7
08	42	82	4423	5424	38	187	305	357	7	11	7	7
09	87	83	6152	5633	68	59	757	1061	21	33	5	7
10	65	45	6953	3340	65	21	671	377	9	7	5	7
11	34	46	8193	2751	130	58	301	319	33	9	5	8
12	83	57	26726	6752	108	83	1130	477	14	13	3	7
13	31	89	3890	3723	20	18	758	766	7	11	3	7
14	72	57	20838	3465	65	33	523	501	16	10	1	3
15	68	96	4721	5193	62	47	571	278	9	14	5	5
16	40	59	2650	3994	00	56	296	495	7	11	3	3
17	37	50	4347	1832	47	23	415	390	6	7	7	5
18	50	59	1698	3040	7	98	342	432	7	10	5	7
19	71	87	6638	8218	122	217	638	598	15	19	5	6
20	76	55	4837	8147	4	82	670	940	11	8	3	7
21	64	64	2604	1082	106	26	857	481	15	10	3	1
22	51	39	7803	1905	101	28	756	318	12	7	3	3
23	70	30	28199	1856	62	44	471	342	13	6	6	3
24	41	80	6814	2132	133	133	323	726	9	12	3	6
25	46	63	1269	3951	25	15	198	373	8	12	1	8
26	45	85	4884	6695	69	14	540	587	7	15	5	5
27	57	38	9556	3955	85	68	504	191	12	8	3	5
28	72	50	2252	2982	28	53	773	358	15	7	2	2
29	58	77	5383	1061	54	15	347	204	11	13	1	2
30	111	32	8355	4434	50	23	636	674	19	8	4	3
31	74	58	8245	9691	66	48	502	297	14	10	3	3
32	46	61	1900	9711	99	145	346	620	7	11	1	5
33	70	54	5802	9739	83	149	463	398	24	10	5	8
34	30	59	5360	2849	7	59	609	488	4	8	6	7
35	53	48	2794	3595	253	70	760	683	9	9	5	7
36	72	60	10397	10452	128	406	756	1257	16	10	7	7
37	59	64	1850	5856	53	56	546	570	12	29	7	5
38	69	62	2759	4596	94	65	446	338	12	11	5	5
39	59	70	5874	7095	228	124	567	761	10	14	7	7
40	41	58	4616	1672	2	43	424	231	8	10	3	3
41	76	56	13160	20291	150	179	803	483	15	14	8	7
42	54	68	7212	7173	102	130	973	709	14	12	7	7

*GMP = General Meal Patterning

Table C-1 Continued

GROUP=1

OBS	PBF1	PBF2	ACT1	ACT2	KCAL1	KCAL2	ALBEV1	ALBEV2	CAF1	CAF2
1	24	25	1	2	2056	1817	0	0	270	116
2	30	21	3	2	1217	1536	0	403	75	45
3	25	.	2	2	1979	1542	24	8	79	280
4	34	30	1	2	1669	1473	8	0	138	182
5	37	30	.	1	1461	1523	20	0	8	8
6	25	28	3	3	1155	1045	12	0	70	14
7	28	29	3	2	1857	1659	24	6	36	94
8	21	20	2	3	1241	1504	32	12	79	51
9	25	26	2	2	2071	2010	62	0	48	1
10	24	28	1	2	1654	1414	0	4	201	141
11	27	29	1	2	1395	1146	32	31	21	0
12	27	26	3	1	1823	1607	4	16	85	66
13	31	31	.	.	1284	1965	32	12	391	237
14	31	33	3	3	1403	1264	44	40	259	311
15	31	29	2	2	1353	1278	8	13	458	0
16	40	.	.	2	1088	1548	0	0	414	209
17	30	30	2	1	1045	1104	4	0	329	286
18	34	34	1	1	1287	1546	0	0	65	131
19	39	36	1	2	1939	1575	47	18	346	260
20	33	29	1	2	1371	1336	0	0	127	69
21	39	.	1	1	2049	1447	12	24	248	184
22	34	33	3	1	1338	1079	8	18	172	20
23	34	32	1	1	1505	855	92	32	687	691
24	38	37	1	1	1454	2018	4	0	310	235
25	28	.	1	1	1335	1971	0	8	329	243
26	30	25	2	2	1606	1529	0	32	341	506
27	35	31	1	1	1659	1087	0	0	568	246
28	33	30	1	2	1552	1017	0	0	239	180
29	31	31	1	.	1852	1747	26	8	133	80
30	35	30	3	2	2079	714	4	0	1053	505
31	33	35	3	2	1808	1319	0	0	608	575
32	43	.	2	2	810	1553	0	0	450	486
33	31	.	1	1	1529	1083	0	0	339	3
34	34	33	.	1	795	1488	0	0	305	14
35	39	36	2	2	1699	1481	22	6	127	62
36	36	.	3	3	1741	1573	2	0	684	65
37	35	34	3	2	1124	1259	12	0	626	708
38	33	28	3	3	1971	1336	0	0	528	576
39	36	32	2	3	1294	1408	24	14	262	373
40	27	22	.	1	1132	980	35	12	229	170
41	43	42	1	1	1375	1000	0	0	2298	350
42	34	34	3	3	1247	1459	0	6	117	384

Table C-1 Continued

GROUP=1

OBS	ANX1	ANX2	DEP1	DEP2	JOB1	JOB2
1	48	33	16	5	50	34
2	46	31	22	13	60	42
3	49	46	10	10	77	76
4	41	36	3	6	73	76
5	36	29	5	0	74	83
6	41	45	19	11	58	58
7	39	32	3	2	73	73
8	48	44	14	25	83	84
9	33	46	5	6	84	73
10	43	35	24	21	34	67
11	41	34	8	2	81	79
12	50	48	8	10	83	73
13	38	51	13	16	60	39
14	54	56	37	32	51	47
15	43	35	21	8	48	73
16	55	40	25	29	78	54
17	53	44	8	11	65	87
18	50	51	33	30	79	68
19	36	40	21	11	76	80
20	46	52	11	21	82	74
21	30	29	8	3	62	70
22	39	45	11	6	89	83
23	55	70	19	29	63	52
24	48	58	19	27	57	54
25	51	49	8	0	72	78
26	43	.	5	16	91	48
27	39	48	2	2	76	70
28	36	26	8	0	71	61
29	49	51	8	11	82	72
30	30	38	6	2	78	80
31	46	43	2	3	79	73
32	45	44	10	6	87	70
33	48	35	8	8	74	79
34	36	36	6	5	77	71
35	30	35	10	6	78	71
36	56	45	14	14	67	83
37	43	34	24	6	70	59
38	43	34	22	6	79	82
39	50	33	6	0	46	60
40	50	50	2	14	93	79
41	45	41	10	10	77	77
42	44	38	16	19	51	67

Table C-1 Continued

GROUP=1

OBS	SUG1	SUG2	FIB1	FIB2	TF1	TF2	SF1	SF2	CHOL1	CHOL2	NA1	NA2
1	130	96	16	17	85	85	31	35	537	298	4145	2379
2	66	101	12	19	32	57	16	28	250	324	2392	3738
3	55	86	40	12	94	67	34	17	474	242	2406	1666
4	113	116	14	23	81	41	46	14	406	228	2027	1941
5	57	58	13	14	55	56	17	30	291	145	1764	2291
6	62	33	6	11	52	42	21	14	153	174	1086	1110
7	80	79	13	19	77	76	28	28	223	313	1888	2698
8	81	46	9	15	49	66	20	23	201	374	1418	1882
9	76	74	20	54	71	91	16	36	405	642	1969	3915
10	88	140	12	6	75	52	28	13	520	364	2295	2364
11	109	36	16	6	53	44	17	12	216	326	2323	2382
12	68	61	14	15	85	67	38	26	792	264	6007	2333
13	10	118	3	15	63	83	25	38	758	643	3687	3273
14	27	20	14	14	67	57	26	26	885	309	2096	1952
15	13	4	28	6	78	61	36	23	516	362	1685	1644
16	14	64	1	11	80	67	22	22	644	398	1645	2795
17	30	91	9	5	48	49	26	18	449	228	1986	1227
18	29	37	6	10	71	77	28	29	251	165	2319	2175
19	59	21	25	18	80	57	29	12	549	366	2101	1930
20	30	24	10	17	67	67	26	29	706	707	1983	2592
21	143	85	18	6	83	58	34	18	366	229	4430	1849
22	57	72	35	7	49	51	20	18	484	244	2380	1932
23	46	46	21	11	78	41	22	12	313	316	1393	1884
24	119	86	11	19	56	84	22	35	385	434	2091	4125
25	71	59	10	16	60	71	24	22	256	282	1049	2928
26	107	16	12	13	51	69	16	20	251	302	1718	3842
27	86	31	21	13	66	51	22	14	244	122	2316	1912
28	45	24	14	9	76	44	28	16	570	325	2166	2298
29	154	44	17	8	78	70	26	22	329	238	3178	1214
30	59	25	69	15	82	29	28	15	619	277	3626	960
31	56	18	14	10	95	75	30	23	786	495	2545	1804
32	7	34	16	27	37	71	15	34	312	347	1606	2188
33	83	35	19	12	49	34	20	11	216	578	2743	2175
34	2	40	2	14	13	83	4	23	599	373	2719	2216
35	73	87	18	8	67	65	27	24	326	239	1891	2117
36	44	13	13	27	86	72	39	34	796	392	2283	2169
37	23	23	10	48	59	44	20	17	332	405	1525	2405
38	84	75	18	14	88	55	28	12	560	458	3216	1729
39	29	66	13	14	43	40	18	16	385	497	1762	2053
40	19	13	8	8	63	44	20	11	856	408	1549	1518
41	22	40	35	18	50	34	17	10	662	501	2656	1295
42	52	58	10	22	46	59	23	27	516	517	1400	2020

Table C-2

Individual Data On Control Subjects (Group 2) On All Variables

ID	Protein gm		Vitamin A IU		Vitamin C mg		Calcium mg		Iron mg		GMP* Category	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
43	95	94	10512	7163	204	57	1458	1069	13	12	7	7
44	93	63	1784	2595	15	27	474	725	10	11	3	3
45	80	74	4051	2405	54	31	831	812	9	9	3	5
46	108	53	4927	11963	82	86	753	400	17	11	1	7
47	50	34	1121	2462	50	35	321	177	9	6	7	1
48	68	49	3391	7071	169	234	1100	541	10	8	5	3
49	67	53	18620	2746	165	27	560	570	8	11	3	5
50	35	72	6545	1421	15	25	341	663	9	10	5	5
51	62	67	9372	1367	109	65	532	568	11	17	7	3
52	51	57	6759	1917	257	70	730	508	19	13	5	5
53	64	63	3237	2017	42	39	624	521	15	12	1	1
54	76	59	3450	10305	78	70	480	660	12	8	3	5
55	72	59	2918	6500	37	62	470	395	10	10	7	7
56	83	89	7942	5036	95	65	1102	882	23	13	7	7
57	76	74	2784	7740	62	108	867	690	12	12	7	5
58	72	61	3147	4061	85	23	819	570	13	13	1	3
59	32	51	2959	6736	85	40	415	303	6	9	6	6
60	46	35	2255	3362	65	12	300	353	8	7	5	3
61	62	67	11569	3789	115	93	823	421	9	13	5	1
62	33	52	2323	2320	92	56	348	423	7	10	3	1
63	71	45	3993	3722	85	67	1213	629	12	7	6	7
64	39	33	3951	6468	134	75	895	574	7	4	3	5
65	42	48	1256	1283	4	22	393	881	8	4	3	1
66	42	80	3555	--	163	--	505	656	10	13	1	3
67	67	74	2374	5881	46	220	597	391	9	13	5	5
68	55	76	9688	6142	337	44	676	585	12	15	7	5
69	57	67	2833	3789	49	93	982	421	10	13	3	3
70	25	45	3554	3574	147	91	123	676	4	10	3	1
71	55	96	1480	3060	59	8	258	437	9	15	5	7
72	45	54	1601	5974	45	34	318	88	9	7	7	5
73	94	85	2632	6190	19	34	359	330	15	14	1	1
74	70	53	6029	5070	109	19	1270	537	10	9	7	6
75	78	65	4904	6642	92	93	1057	882	12	12	3	3
76	70	53	11451	3706	349	79	844	429	14	11	5	5
77	75	82	6744	7417	102	107	795	799	10	13	7	5
78	58	94	2155	4097	17	32	576	1395	8	11	5	3
79	46	47	10514	4870	51	95	443	349	9	16	6	5
80	33	28	789	1025	9	28	342	217	4	5	1	1
81	96	65	3675	3928	181	112	548	243	15	15	7	7
82	71	62	2311	3546	63	68	763	592	13	8	3	1
83	70	85	3356	10770	85	236	649	1262	12	26	5	7
84	70	76	6835	7085	134	78	521	549	13	12	6	4

*GMP = General Meal Patterning

Table C-2 Continued

GROUP=2

OBS	PBF1	PBF2	ACT1	ACT2	KCAL1	KCAL2	ALBEV1	ALBEV2	CAF1	CAF2
43	27	21	3	1	2612	2225	12	0	76	201
44	38	35	1	2	3057	1820	18	16	333	117
45	34	30	1	1	1753	1942	0	0	523	497
46	19	18	3	3	2341	1444	24	12	104	115
47	28	24	2	2	1227	1189	0	8	93	184
48	24	19	2	3	1657	1210	0	12	241	168
49	33	.	3	3	1493	1563	26	12	82	120
50	37	35	3	1	1559	2168	28	20	44	167
51	29	21	2	.	1590	2470	30	.	84	55
52	30	25	3	3	1278	1789	20	12	77	111
53	26	.	1	2	2193	1902	0	0	1617	1067
54	32	.	1	1	1832	1349	0	0	131	19
55	41	37	2	1	1708	1172	0	6	316	725
56	38	35	1	1	2246	2123	0	6	156	118
57	38	36	1	2	1909	1418	0	0	168	217
58	32	32	3	1	1923	1655	16	4	161	125
59	32	30	3	3	807	937	6	0	118	90
60	37	36	1	2	1087	1282	0	0	609	612
61	42	40	1	1	1579	1366	48	20	285	318
62	35	32	3	2	1023	1333	23	24	281	324
63	39	30	2	1	1875	1105	8	8	91	85
64	36	.	3	2	1088	787	0	0	153	184
65	43	.	2	1	1354	1089	0	24	228	169
66	36	35	2	1	1151	1803	0	0	714	906
67	32	29	2	2	1305	1774	40	32	375	75
68	34	29	3	2	1807	1422	4	16	0	0
69	36	34	2	3	2422	1366	0	0	352	318
70	38	37	2	2	827	1333	6	0	395	199
71	42	.	2	1	984	1328	0	0	730	80
72	36	.	3	3	1341	964	142	96	355	293
73	37	.	3	.	2130	1648	8	0	39	85
74	43	.	1	1	1367	1046	0	0	173	28
75	45	36	1	1	1812	1955	0	0	157	133
76	37	36	3	2	1845	2072	0	0	254	278
77	37	35	2	2	1461	1563	0	0	397	472
78	41	35	1	1	1817	2390	0	0	114	125
79	42	39	3	2	1040	1084	0	0	250	294
80	39	37	1	1	862	705	8	8	341	370
81	41	40	2	3	1887	1095	68	12	450	236
82	34	.	2	2	1778	1464	42	0	255	219
83	40	40	1	2	1461	2159	0	0	108	124
84	36	30	2	3	2081	1971	24	24	6	22

Table C-2 Continued

GROUP=2

OBS	ANX1	ANX2	DEP1	DEP2	JOB1	JOB2
43	46	64	11	24	90	87
44	35	44	10	8	86	90
45	29	28	.	0	81	80
46	34	34	0	8	76	72
47	41	45	5	6	76	73
48	31	35	5	3	78	79
49	51	46	14	10	58	52
50	35	39	10	22	64	67
51	38	43	5	11	66	71
52	45	31	14	6	43	74
53	59	55	17	10	71	66
54	39	35	10	8	68	71
55	39	40	22	21	78	94
56	58	55	44	43	53	52
57	35	29	6	3	78	80
58	25	34	2	2	76	73
59	40	36	11	3	59	69
60	38	35	17	14	78	80
61	38	41	8	19	70	58
62	39	34	3	5	71	77
63	30	31	5	5	82	83
64	56	50	22	10	41	46
65	55	49	27	32	61	53
66	26	28	6	8	82	81
67	31	35	2	0	81	78
68	35	30	10	2	71	59
69	53	53	17	10	47	46
70	35	31	0	6	76	71
71	39	45	5	5	77	57
72	54	36	10	10	63	73
73	36	35	2	0	64	69
74	44	48	10	10	56	61
75	40	35	17	25	62	68
76	14	.	28	.	74	.
77	29	34	8	8	88	90
78	39	38	8	5	78	92
79	31	25	0	3	60	61
80	48	49	24	8	48	42
81	53	49	10	2	79	79
82	41	35	30	16	81	74
83	44	40	13	3	67	70
84	46	45	18	16	71	70

Table C-2 Continued

GROUP=2

OBS	SUG1	SUG2	FIB1	FIB2	TF1	TF2	SF1	SF2	CHOL1	CHOL2	NA1	NA2
43	129	75	10	25	137	100	60	40	874	340	5392	2643
44	170	157	29	13	164	58	41	22	999	174	2761	1901
45	79	103	13	7	82	80	41	25	391	257	2729	2519
46	86	59	10	13	91	73	28	27	953	552	3903	1877
47	89	109	14	9	41	49	16	22	323	283	3399	1471
48	31	55	11	11	89	51	38	16	279	241	2189	1492
49	31	56	9	10	63	69	25	21	662	513	1983	3001
50	111	140	23	17	81	100	25	28	116	233	2870	2214
51	84	191	20	16	52	95	21	41	300	378	2570	3469
52	47	60	9	16	49	77	27	22	333	257	1903	2972
53	158	86	28	20	68	93	20	17	251	243	3311	2977
54	65	46	19	16	95	69	42	30	495	243	2479	1451
55	90	66	13	11	80	48	21	14	300	303	2091	2228
56	77	53	17	13	111	116	39	45	780	629	4205	3524
57	84	50	12	14	69	61	32	20	502	453	3053	2206
58	85	112	13	16	85	63	45	31	220	278	2496	2271
59	14	14	11	14	31	35	10	13	138	274	1034	1375
60	37	66	7	6	51	58	17	23	256	243	1979	1928
61	94	58	15	10	57	61	21	21	321	498	1523	2140
62	34	18	20	10	58	73	16	19	96	288	1685	2297
63	60	23	10	11	90	52	44	21	313	263	3679	2423
64	59	0	16	8	22	39	9	20	225	288	920	1101
65	125	113	7	7	53	37	18	14	302	189	1659	1510
66	37	43	13	10	61	87	18	44	108	493	1429	2761
67	52	19	10	13	48	98	22	39	188	663	1631	2694
68	72	53	18	26	66	49	20	14	362	296	3643	2202
69	135	58	9	10	126	61	50	21	691	498	3238	2140
70	61	59	6	15	26	67	7	29	88	165	613	2018
71	20	29	9	16	49	55	18	27	351	420	1321	3953
72	48	51	10	10	49	39	15	10	186	216	2351	630
73	78	39	14	24	115	89	31	24	666	508	2555	2988
74	76	22	17	14	63	43	29	17	512	287	1709	2510
75	62	45	21	35	91	118	29	43	547	462	2845	2655
76	109	140	24	13	89	83	32	24	409	367	2299	2063
77	50	59	13	15	74	68	30	23	388	541	1564	2519
78	106	128	9	12	92	112	37	58	263	549	3171	3608
79	23	36	19	34	35	59	10	12	418	262	1204	516
80	29	25	2	9	35	31	19	14	76	248	1344	1147
81	70	10	16	19	60	52	24	9	454	269	2080	1793
82	64	69	15	15	86	63	40	28	419	441	3991	2059
83	51	73	13	31	68	104	21	37	520	516	2088	2979
84	66	70	13	33	86	83	34	28	559	443	2326	3059

APPENDIX D

ANALYSIS OF VARIANCE TABLES

Table D-1

ANOVA for Pretest Anxiety and Depression Scores Over Four Meal Pattern Categories (Hypothesis 1)

Variable	df	F value	P value
Anxiety 1	3, 80	2.86	0.0422*
Depression 1	3, 79	0.19	0.8999

*Significant at .05 level.

Table D-2

Results Of ANOVA For Anxiety and Depression Pretest Scores) Over Three Levels Of Adequacy For Selected Nutrients and Three Levels of Planned Physical and Recreational Activity (Hypotheses 1, 2, and 3)

Variable	Categorizing variable	df	F value	P value
Anxiety 1	Calcium	2,81	1.97	0.1466
	Protein	1,82	0.83	0.8673
	Iron	2,81	4.49	0.0141*
	Vitamin A	2,81	2.56	0.0835
	Vitamin C	2,81	1.60	0.2091
	Phy. activity	3,80	0.39	0.7607
Depression 1	Calcium	2,80	0.39	0.9140
	Protein	1,81	0.00	0.9633
	Iron	2,80	0.92	0.4007
	Vitamin A	2,80	1.10	0.3379
	Vitamin C	2,90	0.55	0.5782
	Phy. activity	3,79	0.70	0.5559

Table D-3

Results of ANOCOVA(1) For Effect of Health Promotion Program on Anxiety (Experimental Versus Control Subjects: (Hypothesis 3)

Source of variance	Mean diff score	df	Type I SS	f	P
Wellness program	-1.55	2	1.63	0.03	0.855
Covariate: Pretest anxiety		1	508.96	9.79	0.003*

*Covariate highly signifcant

Table D-4

Results of ANOCOVA for Effect of Health Promotion Program on Depression (Exerimental Versus Control Subjects: Hypothesis 3)

Source of variance	Mean diff score	df	Type 1 SS	f	P
Wellness program	-1.41	1	0.221	0.01	0.94
Covariate: Pretest depression		1	451.741	10.48	0.002*

*Covariate highly significant

(1) ANOCOVA = Analysis of Covariance

Table D-5

Results of ANOCOVA(1) for Effect of Health Promotion Program on Job Satisfaction
(Experimental Compared With Control Subjects: Hypothesis 4)

Source of variance	Mean diff scores	df	Type I SS	f	P
Wellness program	-0.867	1	151.45	1.40	0.241
Covariate:(pretest job satisfaction		1	2043.21	18.85	0.000*

*Covariate highly significant

(1) ANOCOVA = Analysis of Covariance

Table D-6

Results of Univariate Analysis of MANOVA Procedure for Effect of Program on Intake of Six Dietary Components Experimental Compared with Control Group: Hypothesis 5)

Dependent variable	Source of variance	df	SS	MS	F	P
Alcholic beverages	Treatment(2)	1	1303.06	1303.06	0.57	0.451
	Error	81	184055.91	2272.30		
	Total	82	185358.96			
Caffeine	Treatment	1	152408.26	152404.26	2.07	0.154
	Error	81	5955931.81	73530.02		
	Total	82	6108340.07			
Sugar	Treatment	1	244.46	244.46	0.19	0.668
	Error	81	106705.92	1317.36		
	Total	82	106950.39			
Saturated fat	Treatment	1	2.42	2.42	0.02	0.897
	Error	81	11721.22	144.71		
	Total	82	11723.64			
Cholesterol	Treatment	1	95518.33	95518.33	2.13	0.148
	Error	81	3624018.34	44740.97		
	Total	82	3719536.67			
Fiber	Treatment	1	128.59	128.59	0.84	0.362
	Error	81	12364.88	152.65		
	Total	82	12493.47			

(1)Treatment = Health Promotion Program