

IDENTIFICATION OF FACTORS AFFECTING NUTRITIONAL  
RISKS OF ELDERLY UTILIZING THE NUTRITION  
SCREENING INITIATIVE

By

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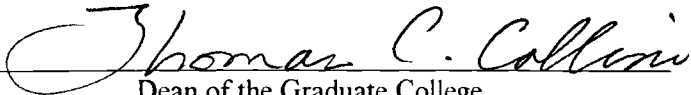
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## CHAPTER I

# IDENTIFICATION OF FACTORS AFFECTING NUTRITIONAL RISKS OF ELDERLY UTILIZING THE NUTRITION SCREENING INITIATIVE

### Introduction

Older Americans are increasing in number, and this trend is predicted to continue. In 1994, they comprised almost 12 percent of the population. Currently one in eight individuals is now 65 years of age or older. Daily, 5000 people turn 65, and by the year 2030, 21 percent of the population will be over 65. According to 1987 census data reported in the U. S. Special Committee on Aging, one in five Americans (about 52 million people) are at least 55 years old, and one in eight (about 30 million people) are at least 65 years of age. Projected increases among adults age 85 years and older are from approximately 10 percent of those over 65 years of age in 1988 to approximately 16 percent by the year 2010 (U. S. Senate Special Committee on Aging, Government Printing Office, 1990). Persons in the 85 years and older age group are one of the fastest growing age groups in the country. It is predicted that they will triple in number by the year 2030. More than 25,000 people have reached their 100th birthday (U. S. Senate Special Committee on Aging: Government Printing Office, 1990).

The aging of our population has created a major demographic shift that will have a dramatic impact on our country's future. Services involving public policy on health care to increasing efforts on behalf of various food companies to create products that are more



desirable to older consumers. are just the beginning of challenges facing our society (Nestle & Gilbride, 1990). Services such as these will have a direct impact on health care costs, nutritional status, and quality of life for many aging Americans. Therefore, the increasing number of elderly Americans has created a shift in the need for services available for the elderly.

Currently older Americans account for 36 percent of the health care costs, and 85 percent of older Americans have one or more chronic, potentially debilitating diseases and conditions that may benefit from cost-effective nutrition interventions and services. Also, nearly 50 percent of elderly persons have undetected dental disease or conditions such as colon cancer, breast cancer, cardiovascular disease, impaired physical functioning or nutritional problems(Beers, Fink & Beck, 1991). Approximately two to three percent of older persons who have an undetected condition or disease can be diagnosed by routine laboratory tests. By early detection of risk factors or conditions and implementing nutritional intervention measures, older adults can possibly maximize their independence by completing activities of daily living and reduce the number of activities restricted by illness. Thus, nutrition services and screening contribute substantial savings in health care costs (Beers, Fink, & Beck, 1991).

There are a number of reasons for the occurrence of decreased nutritional well-being, such as poverty, social isolation, lack of transportation, chronic use of prescription drugs, and limited mobility. Along with these factors, there is also the possibility of difficulty in eating or swallowing, adverse drug-nutrient interactions, alcohol abuse, depression, reduced appetite, impaired taste and smell and many other detrimental factors (White, Ham, & Lipschitz, 1991).

According to the American Dietetic Association's position on nutrition, aging, and the continuum of health care nutritional well-being is an integral component of the health, independence, and quality of life of the elderly. The aging process is often associated with a

variety of nutrition-related health problems. It is essential that there be a comprehensive understanding of the nutrition problems and requirements of the aging in order to provide optimal nutrition services within the continuum of health care (Posner, B. M., Saffel-Shrier, S., Dwyer, J., & Franz, M. M., 1993).

The Nutrition Screening Initiative (NSI) is a five year multifaceted effort that began in 1989, to promote routine nutrition screening and better nutrition care in America's health care system. It's initial focus is on the elderly, one of the largest groups of Americans at risk for poor nutrition. It is a multidisciplinary project of the American Dietetic Association, the American Academy of Family Physicians, and the National Council of Aging, Inc. A blue ribbon advisory committee of more than 35 key organizations and professionals from the fields of nutrition, medicine, and aging, also play an important role in guiding the effort (White, Ham & Lipschitz, 1991). A component of the NSI is a simplified nutritional health checklist called "DETERMINE."

The "DETERMINE Your Nutritional Health Checklist" is a public awareness tool that can be self-administered or conducted by anyone who interacts with the elderly. The simple mnemonic "DETERMINE" checklist helps to highlight any potential warning signs which may lead to poor nutritional status. The "DETERMINE Your Nutritional Health Checklist" was established in hopes that those who become aware of factors that affect their nutritional health will become motivated to improve their eating habits, modify their lifestyle, and if necessary, seek professional help in order to reduce their potential nutrition-related health problems (Dwyer, White, Ham & Lipschitz, 1991).

The purpose of this study is to identify factors affecting nutritional risks of individuals participating in Elderly Nutrition Program in Oklahoma County using the "DETERMINE

Your Nutritional Health Checklist.” The objectives of this study are as follows:

1. To determine nutritional risks of the participants.
2. To determine the association between selected demographic variables: (age, gender, ethnicity, living conditions, economic status, and length of participation in an Elderly Nutrition Program) and each of the nutritional risk mean scores
3. To determine the relationship of selected demographic variables: (age, gender, ethnicity, living conditions, economic status, and length of participation in an Elderly Nutrition Program) to nutritional risk statements.
4. To make suggestions and recommendations for nutrition education and intervention for elderly.

### Hypotheses

The following hypotheses are postulated for this study:

HO1: There will be no significant association between selected demographic variables: (age, gender, ethnicity, economic status, living conditions and length of participation in an Elderly Nutrition Program) and each of the nutritional risk statements.

HO2: There will be no significant relationship between selected demographic variables: (age, gender, ethnicity, economic status, living conditions, and length of participation in an Elderly Nutrition Program) and nutritional risk mean scores.

### Assumptions and Limitations

This study was conducted on the basis of the following underlying assumptions:

1. The individuals who participated in the study were honest when responding to the questionnaire.
2. The individuals who participated in the study were able to understand the statements.

3. The questionnaire used was a valid and reliable instrument.

The following limitations were present in this study:

1. Subjects from select congregate meal sites in Oklahoma County volunteered to participate; thus, the results limit the extent to which generalizations about nutritional risks of the elderly population at large could be made.

2. Not all factors that may affect nutritional adequacy of the diet in the elderly population were tested in this study.

3. The day of the week, week of the month, and month of the year that the survey was administered posed various limitations because of the impact they have upon attendance and participation rate.

#### Definition of Terms

Nutritional Status: the health condition of a population or an individual as influenced by the ingestion and utilization of nutrients and nonnutrients (Dwyer, 1988).

Poor Nutritional Status: includes not only deficiency, dehydration, undernutrition, nutritional imbalances, and obesity, but other excesses such as alcohol abuse (Dwyer, White, Ham, & Lipschitz, 1991).

Risk Factors: (of poor nutritional status) are characteristics that are associated with an increased likelihood of poor nutritional status. They include the presence of various acute or chronic disease diagnoses and conditions, inadequate quantity or quality of food, poverty, dependency, and medication use (Dwyer, White, Ham, & Lipschitz, 1991).

Indicators: (of poor nutritional status) are generally quantitative and include specific food components in diets: dietary, clinical, anthropometric, hematologic, and other biochemical measurements related to specific food components; and health conditions or diseases that may

be associated with them. Changes in the indicators over time is of particular importance (Dwyer, White, Ham, & Lipschitz, 1991).

Nutrition Screening: the process of discovering characteristics known to be associated with dietary or nutritional problems. It's purpose is to identify individuals who are at risk of nutritional problems or who have poor nutritional status. Intervention is facilitated when screening is used (Dwyer, White, Ham, & Lipschitz, 1991).

Malnutrition: any nutrition-related disorder; may relate to inappropriately high or low nutrient intake, and imbalanced nutrient intake, or impaired absorption or assimilation of nutrients in food (Dwyer, 1988).

DETERMINE: mnemonic device by which to convey basic nutrition information in an easily remembered format (disease, eating poorly, tooth loss or mouth pain, economic hardship, reduced social contact, multiple medicines, involuntary weight loss or gain, need for assistance with self-care, and elder of very advanced age, that is, 80 years or older) (White, Dwyer, Ham, Lipschitz, & Wellman, 1992).

Aging Americans, Older Adults, and the Elderly: those who have reached the legal retirement age (Frankle, R. T., AL. Nutrition in the Community: The Art of Delivering Services. Mosby-Year Book, Inc., 1993).

Elderly Nutrition Program: Nutrition program for those age 60 and over; established under Title VII of the Older Americans Act, and was reorganized in 1978 under Title III-C and is still often referred to as this (O'Shaughnessy, 1990).

## CHAPTER II

### REVIEW OF LITERATURE

This chapter begins with an overview of the aging population and previous nutrition status studies of the elderly. The Nutrition Screening Initiative, nutrient recommendations of the elderly, and the history of the Elderly Nutrition Program is also discussed. Finally, a review of the research concerning nutrition education for the elderly completes the chapter.

#### Overview of Aging Population

Americans are living longer, and this trend is expected to continue. Each day 5000 people turn 65, and by the year of 2030, 21 percent of the population, or approximately one in five, will be at least 65 or over (Statistical Abstract of the United States: 1991, 111th ed. Washington, DC: U. S. Bureau of the Census; 1990). Currently the older population is predominantly white. Females are living an average of seven years longer than males; however, males are making a gain in life expectancy and closing the gap. Also minority populations will increase in life expectancy in the future (U. S. Senate Special Committee on Aging, 1990). There will also be an increase in the 85 and older group, because it is now one of the fastest growing segments of our population (U. S. Bureau of the Census, 1989). Advancing age brings about an increased dependency and additional health care costs. Currently, older Americans make up almost 12 percent of the population but account for 36 percent of health care costs and 30 percent of all hospital stays and drug prescriptions (Statistical Abstract of the United States: 1991, 111th ed. Washington, DC: U. S. Bureau of the Census; 1991).

care costs and 30 percent of all hospital stays and drug prescriptions (Statistical Abstract of the United States: 1991, 111th ed. Washington, DC: U. S. Bureau of the Census: 1991).

Because the impact of chronic health problems increases with age, increased challenge and responsibility has been placed upon health professionals. Over 85 percent of all older Americans are at risk of malnutrition. Also, according to Surgeon General's report on nutrition and health, a person's choice of diet can influence their long term health. In fact, eight out of ten leading causes of death, including heart disease, stroke, some types of cancer, and diabetes are related to diet (Healthy People 2000: National Health Promotion and Disease Prevention Objectives. Washington, DC: U. S. Department Health and Human Services: 1990). Therefore, decline in nutritional status is not an inevitable part of aging; rather it is environmentally determined and often occurs due to inattention to risk factors that can be improved by nutrition screening, assessment, education, counseling, and treatment.

Inadequate nutritional intake can precipitate disease or increase the severity of it. Early detection of nutrition-related problems and appropriate treatment are useful in preventing increased morbidity from many diseases. Older adults in declining health will require special, individualized nutrition services designed to maintain the highest level of independence and functional capacity. Therefore, as the projection of increase in the elderly populations occurs, our challenges are to emphasize efforts to keep older people healthy, prevent illness, and to extend functional independence; thus leading to an increased quality of life.

### National Nutritional Status Studies

#### The Ten State Survey

The 1967 congressional hearings brought about the fact that hunger and malnutrition were likely to exist in the United States. Therefore, since no data of this nature were available,

a survey was developed to collect information from a select of the population in the United States. It was targeted toward the low income because this is where malnutrition was expected to be most prevalent.

The survey was conducted in only 10 states due to time and money constraints. The 10 states are as follows: Washington, California, Texas, Louisiana, South Carolina, Kentucky, West Virginia, Michigan, Massachusetts, and New York ( including a separate survey of New York). The Ten State Nutrition Survey was the first comprehensive survey to assess the nutritional status of the United States (Schaefer, 1969). Demographic data were obtained on 24,000 families which included over 86,000 persons, with evaluation of nutritional status being performed on approximately 40,000 persons. Of the sample, more than 50 percent were 16 years of age or less, whereas 30 percent were from 17-44 years, 10 percent were over 60 years of age. The largest percentage of those participating were white, with black being second highest percentage and Spanish-Americans being the smallest percentage.

This data, though compiled from a large number of subjects, cannot be generalized to the population at large because the sample was drawn from the lower income segments (Duval, 1972). Results of the Ten State Nutrition Survey indicated that a significant number of the population surveyed was malnourished or at high risk of developing nutritional problems, and there was increasing evidence of malnutrition as income decreased. Elderly Americans were a group with increased nutritional deficiencies. Those over 60 years of age showed evidence of undernutrition which was not restricted to the very poor or any single ethnic group. A high prevalence of low hemoglobin and hematocrit levels was found in all segments of the population. This showed a tendency for low dietary iron intakes revealing that iron-deficiency anemia was a problem in the population surveyed. Also, a somewhat large segment of pregnant



and lactating women showed low serum albumin levels, suggesting low protein intake among this group.

A high prevalence of low vitamin A was found among Spanish Americans in the low-income states and young people in all subgroups. Males showed a higher prevalence of lower vitamin C levels than females, and poor vitamin C intake increased with age. Thiamin and riboflavin were evaluated from urinary excretion studies. Thiamin deficiency did not appear to be high, however, riboflavin levels were low among blacks and young people in all ethnic groups. Also there was no evidence of iodine deficiency found in the sample population (DuVal, 1972).

#### The Health and Nutrition Examination Surveys

The first Health and Nutrition Examination Survey (HANES I) was conducted by the National Center for Health Statistics. The study began in 1971 and ended in 1974. It examined several population groups ranging from 1 to 74 years of age, so that the results obtained could be generalized to the population at large. Approximately 30,000 people were surveyed, with over 1,500 of them being 60 years of age or older. The methods used to determine nutrition and health status were dietary intake, blood and urine analysis, clinical findings, and anthropometric measures (National Center for Health Statistics, 1971-73).

The HANES I study confirmed some of the findings from the Ten State Survey. Both studies found low hemoglobin levels present with blacks demonstrating the greatest risk of deficiency. The low vitamin A levels that were present among Spanish-Americans in the Ten State Survey were not confirmed by the HANES I results. The Ten State Survey reported riboflavin deficiency to be more prevalent than thiamin, and HANES I showed the reverse.

The second Health and Nutrition Examination Survey (HANES II) was conducted from 1976 through 1980. The entire sample consisted of 27,801 persons ages six months through 74 years. Of these, 20,322 were interviewed and examined, with 2,615 of this group being 65-74 years of age (National Center for Health Statistics, 1982).

The results from HANES II seemed to confirm findings from previous studies. For instance, impaired iron status was again associated with poverty and race. The prevalence of low serum zinc values was low for all sex and age groups, however, due to lack of correlation with other physiological correlates, low serum zinc values are only suggestive of poor zinc status. Folate values were the lowest in children 6 months-9 years, males 10-19 years, and females 45-75 years of age. Low serum vitamin A levels indicated that blacks, regardless of poverty status, had more prevalence of low vitamin A levels. Also, regardless of race, those who were poor had a higher prevalence of low serum vitamin A in all groups, except adolescents. The results of vitamin C status revealed blacks males age 55-74 years had the highest incidence of low serum vitamin C status, and that low values resulted more often among adults who were poor than nonpoor (Yetley & Johnson, 1987).

The third Health and Nutrition Examination Survey (HANES III) was a longitudinal study conducted from 1988 to 1994 and involved two national probability samples over a three year period. Approximately 30,000 of the 40,000 sample size were expected to be examined, and because HANES I and II did not sample individuals over 74 years of age, a group at high risk for nutritional problems, the HANES III was designed to have no upper age limit. Therefore, upon obtaining results from HANES III, there will be a broad database for examination of nutritional issues among elderly, and the relationship of nutrition to chronic diseases common in old age (U. S. Department of Health and Human Services and U. S. Department of Agriculture, 1986).

### Nutrition Screening Initiative

In 1988 the Administration on Aging co-sponsored the Surgeon General's Workshop on Health Promotion and Aging. The focus of this meeting was to call for coordination of national efforts in promoting nutrition screening and intervention in America. Although nutritional status is a concern for most age groups, the elderly population are at a disproportionate risk of malnutrition. The Department of Health and Human Services report, Healthy People 2000, called for an increase to at least 75 percent in the proportion of primary care providers giving nutritional assessments and counseling and /or referral to qualified nutritionists or dietitians. Also this report concluded that dietary modifications can occur through primary care interventions and that dietary modifications can occur through primary care interventions and that dietary assessment, advice, counseling, and follow-up have been found to be effective (Healthy People 2000: National Health Promotion and Disease Prevention Objectives, 1990).

The Nutrition Screening Initiative (NSI), is designed to improve older American's health status and to promote regular nutrition screenings and interventions. The goal of the NSI is "to raise consciousness about the importance of nutrition to an individual's health status" (Nutrition Screening Initiative, 1991). The Nutrition Screening Initiative was formed in 1990, as a five-year project. It is a joint effort of the American Dietetic Association, the American Academy of Family Physicians, the National Council on Aging, and over 35 other support organizations. Thus, this is the largest coalition that had ever joined to focus on the goal of nutrition screening for the elderly in a multifaceted national effort. The Initiative is funded in part through a grant from Ross Laboratories, a division of Abbott Laboratories (Nutrition Screening I: Toward A Common View. Nutrition Screening Initiative, 1991).

Nutrition Screening is designed to identify individuals who are suffering from poor nutritional status. Nutrition interventions can then be implemented by the appropriate health or

social service professionals. These services vary widely, from the congregate meals programs and home health care, to dietary counseling and treatment (White, et al., 1991). The NSI centers around six different areas of intervention such as social service, oral and mental health, medication use, and nutrition education and support. There are also certain risk factors that are easily identified and associated with an increased likelihood for poor nutritional status (See Appendix A) The longer these characteristics persist, the greater the chance for poor nutrition status (Dwyer, 1991).

The mnemonic word “DETERMINE” conveys general nutrition concepts that can easily be remembered. It also provides an easy way for individuals to recall the risk factors to be addressed. Each letter stands for a different risk factor (See Appendix C). The checklist also consists of 10 nutritional risk statements (See Appendix B) which may apply to some older persons, putting them at an increased risk of malnutrition. Once these risks are recognized by a health professional, it can trigger a discussion to address possible solutions. Upon obtaining further information, the appropriate referral or social services can be provided for each individual in need (White, et al., 1992).

The “DETERMINE Your Nutritional Health Checklist” is intended to be a public awareness tool; therefore, it’s contents are consistent with many published reports which address nutritional risks and health (Institute of Medicine, 1990; The Surgeon General’s Report on Nutrition and Health, National Research Council, 1989). The checklist was not designed to be a clinical diagnostic tool or to replace other comprehensive screening of nutritional status. Rather, it predicts individuals who run greater than average risks of poor nutritional status (White, et al., 1992). It is suggested that public health agencies and professionals use the “DETERMINE Your Nutritional Health Checklist” in their daily practices. By increasing public awareness of these problems and the importance of nutrition to health in older persons, it

can create the potential for preventing malnutrition and improving the quality of life for older Americans (Lipschitz & White, 1991).

The screening tool was tested in several ways before being implemented. Focus groups of older Americans were given drafts of it to review and critique. They were also able to evaluate the length, format, educational level, and style of the checklist. Steps were then taken to alter the questionnaire according to suggestions by these groups (Harris, 1991). Preliminary research was also completed by the NSI regarding the ability of the “DETERMINE Your Nutritional Health Checklist” to detect problems occurring in elderly related to nutrition. Prospective validation and retrospective simulation techniques were both completed (Posner B. M., Jetty, A. M., Smith, Miller D. R., 1991). Results showed that those with higher total scores obtained from the “Determine Your Nutritional Health Checklist,” (See Appendix B) were more likely to have a poorer level of nutrient intake when compared to the Recommended Dietary Allowances and an increased risk of adverse health conditions (White, et al., 1992).

#### Psychologic, Physiologic, Sociologic, and Economic Aspects of Food Intake

With age, food patterns and habits may change in the lives of older adults, just as other components of their lifestyle. These changes can occur in response to changes in leisure time, income, health, and personal needs. Therefore there are many factors which must be addressed when helping older individuals select and consume appropriate foods.

Angulo (1988) discusses the idea that not only do we eat to live, but to achieve health, derive pleasure, and to express our culture or heritage; therefore, the selection, preparation, and consumption of food are shaped by psychological and social values. There are a number of

individual factors influencing food choices in the lives of the elderly, such as, health problems, taste acuity, dental problems, physical status, and income.

Level of social interaction has been found to positively influence quality of diet. Depression, loneliness, and a reduced feeling of self-worth can create a disinterest in food. Walker and Beauchene (1991) conducted a study of 61 independent living people ages 60-94 and evaluated the effect of loneliness on dietary habits. Findings from the study indicated that loneliness was related to the number of social contacts reported, with those having more contacts feeling less lonely. However, the length of contact was unrelated to feelings of loneliness. In turn, loneliness was significantly related to a lower intake of protein, iron, riboflavin, niacin, ascorbic acid, and phosphorus.

The physical changes that occur during aging can also influence food habits. Factors such as diminished taste acuity, drugs, and poor dental status can adversely affect appetite. Bartoshuk (1989) concluded that older adults have elevated taste thresholds to sweet, salty, sour, and bitter. This means that they are less able to detect a taste when it is present in low concentrations, however, in foods, taste is usually not altered. Certain prescription drugs, such as digoxin, can cause reduced taste, nausea, as well as anorexia. Wearing dentures can also mask or overpower other tastes. Serious periodontal disease or decay can cause a person to avoid certain foods. Xerostomia may also cause avoidance of certain foods because it can impair one's ability to lubricate, masticate, and swallow food. Many older people have some limitation in activity that can affect food procurement and preparation. In a study of 2,200 frail elderly in New York State, the very low income with reduced mobility had the highest nutritional risk (Roe, 1990).

Sociologic aspects of food selection are another issue influencing nutritional status of the elderly. Murphy (1990) and coworkers evaluated the influence of household size on quality

of diet in 4,402 adults age 55 and over participating in the National Food Consumption Survey. Results indicated that older men who lived alone had poorer quality diets than older women living alone, and dietary quality decreased as age increased.

Economic status can also play an important role in food selection. Several studies suggest a relationship between income and nutrient intake. A study by Posner (1987) and coworkers found 53 homebound elderly with low income to be at nutritional risk. This was not due to poor food choices, but a decrease in food availability. In another study, Murphy (1990) and coworkers found that money spent for food was a significant predictor of dietary quality. Those age 65-84 with better quality diets had higher incomes than those with lower quality. Food stamps can make a significant contribution to the diets of older recipients. Older people who are eligible but do not participate in the program tend to have diets consisting of inadequate levels of many nutrients. However, approximately 40 percent of eligible nonparticipants are 65 years of age or older (Senauer, Asp, & Kinsey, 1991).

### Nutrient Recommendations of Elderly

Recommended Dietary Allowances (RDA's) were prepared by the Food and Nutrition Board in 1941, with the first edition being published in 1943. The initial set of RDA's are revised periodically to incorporate new scientific knowledge and interpretations. RDA's are defined as being "the levels of intake of essential nutrients that, on the basis of scientific knowledge, are judged by the Food and Nutrition Board to be adequate to meet the known nutrient needs of practically all healthy persons" (Food and Nutrition Board: Recommended Dietary Allowances, 1989). Individuals with special nutritional needs are not covered by the RDA's.

With the development of the first edition of the RDA's came the standards that serve as a goal for good nutrition. They have served as a tool for evaluating diets for nutritional adequacy in healthy population groups. The amounts of various nutrients are recommended based on factors such as age and sex, and are modified based on personal variables such as physical activity, variations of the population, and environmental factors (Food and Nutrition Board: Recommended Dietary Allowances, 10th edition, National Academy of Sciences, 1989). For many of the nutrients the recommendations are the same for older adults, ages 51 and over, as they are for younger adults, ages 25-50. Some exceptions include a decreased iron recommendation for women, and a decreased thiamin, riboflavin, and niacin recommendation for both men and women (Food and Nutrition Board: Recommended Dietary Allowances, 10th edition, National Academy of Sciences, 1989).

The Recommended Dietary Allowances for older adults are not definitive at this time. This is because research involving recommendations for this age group are lacking, therefore, RDA's are extrapolated for those of younger adults (Food and Nutrition Board: Recommended Dietary Allowances, 10th edition, National Academy of Sciences, 1989). There are many limitations regarding the Recommended Dietary Allowances and older adults. Some of these limitations are as follows:

- 1) the increased heterogeneity occurring in aging adults,
- 2) the psychologic changes occurring during the natural aging process,
- 3) the degenerative changes occurring with chronic diseases, and
- 4) the increased use of prescription and over-the-counter drugs by older adults

(Harper, 1978).

Overall there are many differences of opinion regarding the need for specific RDA's for older Americans. For this reason, Munro (1980) suggested the development of two sets of



recommendations, one for healthy older adults and one for those suffering from some form of chronic disease.

### History of Elderly Nutrition Program

The amended version of the Older Americans Act of 1965 contributed to a major part of federal legislation providing nutrition programs for those ages 60 and over. In 1968, concern for the nutritional and social needs of the elderly attracted nationwide interest. Therefore Title IV of the Older Americans Act funded a program to pinpoint major areas of nutritional concern for senior citizens. In 1969, the White House Conference on Food, Nutrition and Health recommended that congregate meals with accompanying nutrition education programs be provided for the elderly (Administration on Aging, U. S. Department of Health, Education and Welfare, 1973).

The federally funded Elderly Nutrition Program (ENP) became law in 1972 as Title VII of the Older Americans Act. Its purpose is to: provide older Americans, particularly those with low incomes, with low cost, nutritionally sound meals served in strategically located centers, where they can obtain other social and rehabilitation services (Federal Register, 1972). Besides promoting better health among older people through improved nutrition, the program is aimed at reducing the isolation of old age and offering older Americans an opportunity to live the remaining time of their lives in dignity (Federal Register, 1972). Since 1972, the program has grown significantly, accounting for annual expenditures of approximately 1 billion, and representing some 244 million meals served yearly. Of these meals, 144 million were served at congregate settings and 100 million were home-delivered meals (O'Shaughnessy, 1990).

In 1978, the priority of serving frail, homebound elderly who may not eat adequate and nutritious meals was formally recognized, and the national home-delivered meals program was formed under what is now referred to as Title III (C) of the Older Americans Act

(Administration on Aging, U. S. Department of Health Education and Welfare, 1973). Those who meet eligibility requirements for the congregate meal program or home-delivered meals do so for various reasons; such as: low income which prevents them from preparing nutritious meals, feelings of rejection or isolation, lack of physical capabilities or limited ability to shop for nutritious foods and beverages, and because they are 60 years or older. The meals provided must supply one-third of the RDA and are offered free or at reduced rates and can also be paid for with food stamps. In addition to the meals, social services such as transportation, referral services, shopping assistance, health and welfare counseling, nutrition education and recreation activities are available to those who participate and meet the eligibility criteria (Administration on Aging, U. S. Department of Health Education and Welfare, 1973).

#### Nutrition Education for the Elderly

Because of the role nutrition plays in maintaining health and preventing disease, nutrition education of the elderly should be a priority. Educating and informing both the elderly and their care-givers can prove to be very beneficial in many ways. The quality of food intake is related to the amount of nutrition knowledge a person has. It also depends on their ability to obtain nutritionally adequate foods. Nutrition knowledge and habits are not something that can be learned overnight. They are instilled and developed over a lifetime. Most adults usually learn through information sources, such as newspapers, magazines, or friends. Rather, nutrition education should be acquired through professional, reliable sources, such as registered dietitians or qualified nutritionists.

The nutrition education should begin to build on the knowledge that the client has already obtained and go from there. The information should be basic and should involve some hands-on training. Results of previous knowledge tests suggested that many older adults have a

poor or limited amount of information about food. One study asked participants to name the foods necessary for a balanced diet. Less than five percent mentioned protein sources, fruits or vegetables, and 27 percent did not mention grains or dairy foods (Probart, 1989).

Most older people want to make immediate use of anything they have just learned. They will sometimes only take interest in things that will be applicable in their lives. Also when educating older Americans, it is important to remember that their formal education may be limited, therefore, the need for visual rather than technical nutrition education materials is in order. Most older people feel it is important to maintain their health and independence. This feeling may account for their vulnerability to false health claims and food faddism. Most people actually pay more for supplements than it would cost to buy nutritious foods. Also, according to the 1986 National Health Interview Survey, some elderly take inappropriate amounts of supplements which may provide more than 150 percent of the RDA (Moss, 1989).

There are many ways to offer nutrition education in learning styles that older people prefer. Verbal and visual education ideas include such things as discussions, demonstrations, filmstrips, or videos and games. Many older people, according to a study done on Title III-C participants (Hutchings & Tinsley, 1990), enjoy topics such as vitamins, weight control, special diets, cholesterol facts, and the nutritional values of foods.

According to research by Goldberg et al. (1990), there are many diet-related topics which are of interest to the elderly. In a study of 459 subjects between the ages of 55 and 89, it was discovered that approximately 85 percent of married men were involved in grocery shopping and 83 percent in cooking. Therefore, it is important that nutrition education interventions should focus on elderly men as well as elderly women. Food safety in the home and of the food supply were major concerns of these individuals. Among diet-related topics, concern about sodium intake ranked first, with weight control ranking second. Sugar intake,

serum cholesterol, supplement use and nutritional adequacy of the diet were also areas of concern among this group of subjects. Thus, findings from Goldberg et al. (1990) help demonstrate the importance of developing well-designed, entertaining and informative nutrition education programs for the elderly. Through both educational and recreational activities, elderly Americans can learn more about nutrition and their health. This knowledge can play an enormous role in dietary habits of many older people, which in turn, allows them to live fuller lives, maintain their independence longer, and ultimately improve their nutritional status.

## CHAPTER III

### METHODS AND PROCEDURES

In this study, participants from four Elderly Nutrition Programs (ENP) within Oklahoma County were surveyed to identify nutritional risks using the “DETERMINE Your Nutritional Health Checklist.” This chapter outlines the research design, population and sample, data collection, and data analyses.

#### Research Design

The research design used for this study was of descriptive nature, and is designed to describe and quantify characteristics of a defined population. The purpose of a survey is to obtain a statistical profile of the population being studied, however, a survey can also provide baseline data about the prevalence of conditions or factors in the population, which in this case are nutritional risks. (Ferber, Sheatsley, Turner, & Wakesberg, 1980).

#### Population and Sample

The sample population was taken from four ENP’s in Oklahoma County. These sites were chosen by the consulting dietitian. She identified various locations in Oklahoma County having differences in age and race based on her knowledge of the participants in each center. During the spring semester of 1993, the researcher collected the data at the four designated sites. Participants who made up the research sample were those who volunteered to participate. Of the 160 questionnaires collected, 153 were used for analysis.

sites. Participants who made up the research sample were those who volunteered to participate. Of the 160 questionnaires collected, 153 were used for analysis.

#### Instrumentation of Instrument

A survey entitled “DETERMINE Your Nutritional Health Checklist,” developed as part of the NSI, was modified for this study. A total of six demographic questions were added to the top of the questionnaire. These questions asked about the subject’s age, gender, ethnicity, household size, financial status, and length of participation in an ENP. Many of these questions were added based on the Washington State Survey (Zylstra, 1992). The researcher also modified the instrument by removing the scores listed beside each nutritional risk statement as to not bias the responses. (Zylstra, 1992). The questionnaire consisted of statements pertaining to various dietary, social, economic, and medical factors that were designed to determine whether an individual is at risk of malnutrition (See Appendix A). A total score of 0-2 indicates a low nutritional risk. A total score of 3-5 indicates moderate nutritional risk, and a score of 6 or more indicates high nutritional risk.

#### Data Collection

During February and March of 1993, the questionnaire was administered at the sites by the researcher. The participants were informed of the purpose of the research, and asked if they would like to volunteer. Confidentiality measures were taken by the researcher in several ways: 1) by informing participants that this information would be available to only the individual participants, the researcher, and the consultant dietitian; 2) by explaining that the information would be used as graduate research for completion of a master’s degree at Oklahoma State University; and 3) by explaining that no names would be used when entering the data for analysis purposes.

## Procedures

Directions for filling out the survey were given verbally by the researcher. The researcher read each statement verbally and gave further instructions and help as needed. There was no time limit for responding to the questionnaire; however, the surveys were completed just before lunch was served. The researcher informed the participants that if they receive a high score, it indicates they are at nutritional risk; therefore, some follow-up nutrition education, such as individual counseling, or further screening may need to be done.

## Data Analyses

The data from the questionnaires that were collected at the four ENP's were coded by the researcher. Of the 160 questionnaires, data from 153 of them were able to be analyzed, due to completeness of data. The coded data was later transcribed into a computer and filed using the PC-File III software program. The data were later analyzed using the Statistical Analysis System Package (SAS, 1985). Frequencies and percentages were used to describe the personal characteristics of subjects and responses to the nutritional risk statements. Statistical procedures such as Analysis of Variance, Student's t-tests, Duncan's Multiple Range tests, and Chi-squares were used to test the hypotheses in the study (Steel & Torrie, 1980).

## CHAPTER IV

### RESULTS AND DISCUSSION

The purpose of this study was to identify factors affecting nutritional risks among individuals participating in Elderly Nutrition Programs (ENP) in Oklahoma County, using the “DETERMINE Your Nutritional Health Checklist.” This chapter includes the results of data from the questionnaire described in Chapter II.

#### Age, Gender, and Ethnicity

A total of 40 percent (59) of the subjects were 65-74 years of age, and 17 percent (25) were 60-64 years of age. Eight percent (11) of subjects were 85 or over, and two percent (3) were below 60 years of age (See Table I). Of the 153 participants, 38 percent (57) were male and 63 percent (93) were female. Over half of the subjects were white (88;58 %), and 40 percent (61) of the subjects were black (See Table I). The remaining two percent of subjects were considered as “other” and were thrown out rather than grouped with blacks or whites.

#### Living Situation, Income, and Participation Time

One-half of the respondents, (72) lived alone, whereas the remaining 50 percent, (73) lived with someone. A total of 65 percent were not receiving SSI, Medicaid, or Food Stamps (95 ), compared to 35 percent, (50) who were receiving at least one of these forms of assistance.



TABLE I  
 NUMBER AND PERCENTAGE OF SUBJECTS ACCORDING  
 TO DEMOGRAPHIC VARIABLES  
 N = 153

Personal Variables	N*	Percentage**
<u>Age (Years)</u>		
Below 60	3	2
60-64	25	17
65-74	59	40
75-84	48	33
85+	11	8
Total	146	100
<u>Gender</u>		
Male	57	38
Female	93	62
Total	150	100
<u>Race</u>		
White	88	58
Black	61	40
Total	149	98
<u>Living Situation</u>		
One	72	50
More than One	73	50
Total	145	100
<u>Low Income</u>		
Yes	50	35
No	95	65
Total	145	100
<u>Participation</u>		
0-6 Months	25	17
7 Months-3 Years	48	33
3+ Years	71	49
Total	144	99

\*N = 153 Total N based on number of useable responses

\*\*May not equal 100 % due to rounding

\*\*\*N for each question varies due to item non-response

Almost one-half of subjects, (71; 49 %) had been participating in the ENP between seven months and three years, and 25 (17%) had participated six months or less in an ENP (See Table I).

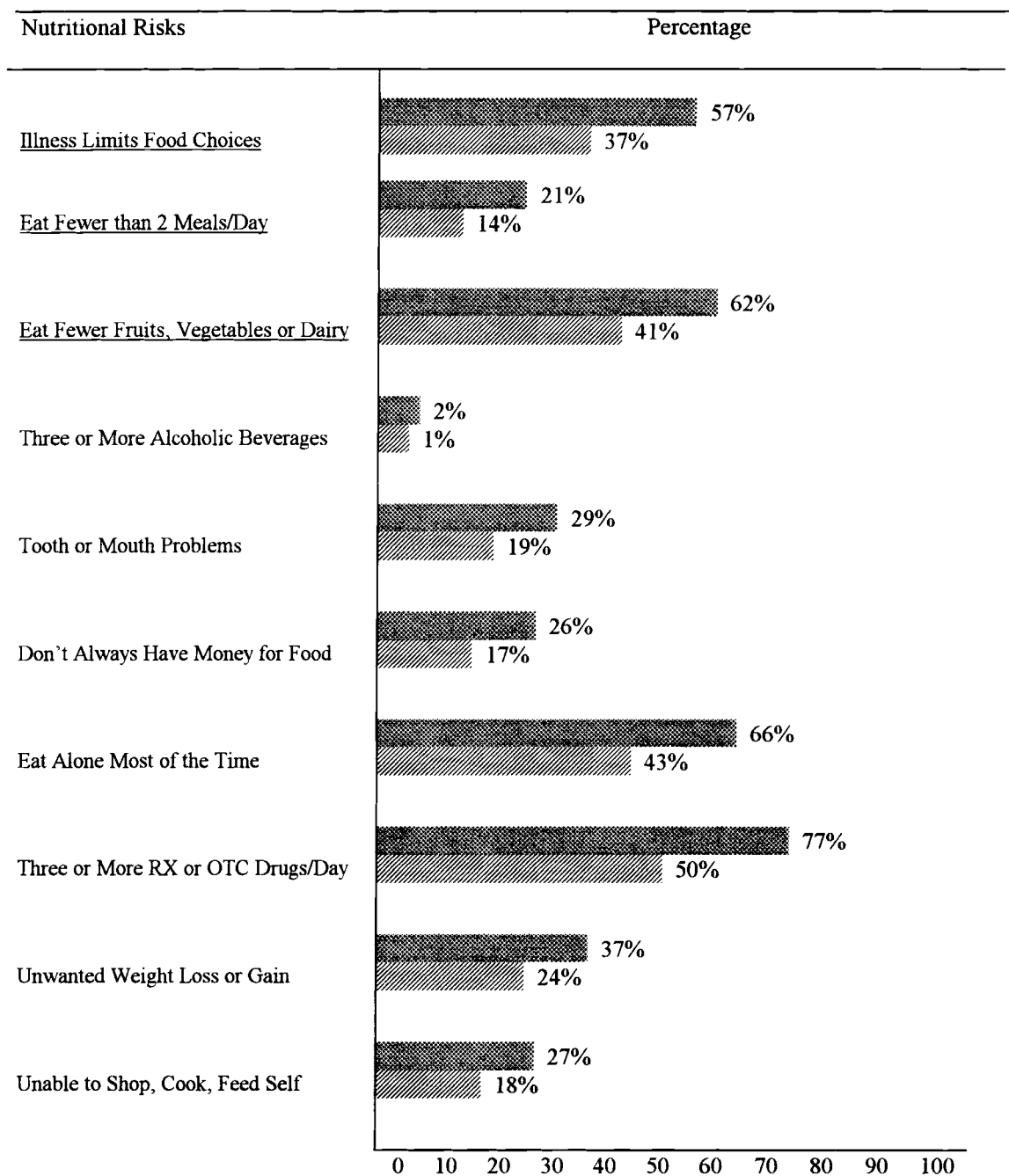
### Responses to Nutritional Risk Statements

Subjects were asked to respond to nutritional risk statements. The responses were totaled to obtain a mean score for each subject. A score of 0-2 indicated a “low risk of nutrition-related problems,” a score of 3-5 indicated “moderate risk,” while a score of over 5 indicated “high nutritional risk.”

Data in Table II identifies responses to the 10 nutritional risk statements. A total of 63 percent, (96) subjects responded that they did not have an illness causing them to limit their food choices; whereas 37 percent, (57) reported having an illness limiting food choices. Approximately 86 percent of subjects, (132), ate more than two meals daily, compared to 14 percent (21) who ate fewer than two meals daily. Results also showed that 59 percent, (91) of subjects did not eat few fruits, vegetables, or dairy products, while the remaining 41 percent (62) consumed few fruits, vegetables, or dairy products (See Table II).

A total of 99 percent (151) of subjects responded that they did not consume three or more alcoholic beverages frequently. The remaining one percent did consume three or more alcoholic beverages frequently. However, this question may have been considered somewhat personal by the respondents. Eighty-one percent of subjects were not suffering from tooth or mouth problems making it hard or them to eat. The remaining 19 percent felt they did have some problems that interfered with eating. Results also showed that the majority, 83 percent (127) of subjects reported they always have enough money for food, whereas 17 percent (26) indicated they don't always have enough money for food (See Table II).

TABLE II  
 FREQUENCY AND PERCENTAGE OF “YES” RESPONSES  
 TO NUTRITIONAL RISKS  
 N = 153



Over half of subjects, 57 percent (87), did not eat alone most of the time, yet 42 percent (66), of subjects did eat alone most of the time. One half of the subjects reported that they did not take three or more prescription or over-the-counter drugs daily, while the remaining 50 percent reported that they did take three or more of these drugs daily (See Table II).

A total of 76 percent (16) had not experienced unwanted weight loss or gain, while the remaining 24 percent, (37) had experienced unwanted weight loss or gain. The majority of subjects, 82 percent (126), were able to shop, cook, and feed themselves, while 18 percent (27), were not always able to shop, cook, and feed themselves (See Table II).

### Nutritional Risk and Age

Data in Table III indicates the number and percent of those who responded “yes” or “no” to the 10 nutritional risk statements according to age. Those who responded that illness limits food choices were primarily 65-74 years of age (26, 17.81%). The highest proportion of those who were eating fewer than two meals per day were between the ages of 65-74 (7, 4.79%), and 75-84 (7, 4.79%). Those most often eating few fruits, vegetables, or dairy products were among those 65-74 years of age (22, 15.07%). Only two participants reported that they frequently consume three or more alcoholic beverages. Tooth or mouth problems were more common among those 65-74 years of age (13, 8.90%). While those who do not always have enough for food, were ages 65-84 (9, 6.16%). Eating alone most of the time also occurred in these same age groups: 65-74 (24; 16.44 %), and 75-84 (24; 16.44%). The highest portions of those who were taking three or more prescription or over-the-counter drugs each day, experiencing unwanted weight loss or gain, or unable to shop, cook, or feed themselves were among the 65-74 age group their responses were: (32; 21.92 %), (16; 10.96 %), and (12; 8.22 %) respectively (See Table III).

**TABLE III**  
**FREQUENCY AND PERCENT OF RESPONSES TO NUTRITIONAL RISK**  
**STATEMENTS ACCORDING TO AGE**  
**N = 153**

Risk Statements	(Below 60)		(60-64)		(65-74)		(75-84)		(85+)		Total	
	n=3		n=25		n=59		n=48		n=11		F	%
	F	%	F	%	F	%	F	%	F	%		
1. Illness limits food choices												
Yes	2	1.37	9	6.16	26	17.81	14	9.59	4	2.74	55	37.67
No	1	.68	16	10.96	33	22.60	34	23.29	7	4.79	91	62.32
2. Eat fewer than two meals/day												
Yes	0	0.00	4	2.74	7	4.79	7	4.79	2	1.37	20	13.69
No	3	2.05	21	14.38	52	35.62	41	28.08	9	6.16	126	86.32
3. Eat few fruits, vegetables or dairy												
Yes	1	0.68	12	8.22	22	15.07	18	12.33	6	4.11	59	40.41
No	2	1.37	13	8.90	37	25.34	30	20.55	5	3.42	97	59.58
4. Three or more alcoholic beverages												
Yes	0	0.00	1	0.68	0	0.00	1	0.68	0	0.00	2	1.36
No	3	2.05	24	16.44	59	40.41	47	32.19	11	7.53	144	98.62
5. Tooth or mouth problems												
Yes	2	1.37	5	3.42	13	8.90	8	5.48	0	0.00	28	19.17
No	1	0.68	2	13.70	46	31.51	40	27.40	11	7.53	100	80.82
6. Don't always have money for food												
Yes	1	0.68	4	2.74	9	6.16	9	6.16	2	1.37	32	17.11
No	2	1.37	21	14.38	50	34.25	39	26.71	9	6.16	121	82.87
7. Eat alone most of the time												
Yes	3	2.05	6	4.11	24	16.44	24	16.44	7	4.79	66	43.83
No	0	0.00	19	13.01	35	23.97	24	16.44	4	2.74	82	56.16
8. Three or more RX or OTC drugs/day												
Yes	1	0.68	11	7.53	32	21.92	25	17.12	6	4.11	75	51.36
No	2	1.37	14	9.59	27	18.49	23	15.75	5	3.42	71	48.62
9. Unwanted weight loss or gain												
Yes	2	1.37	5	3.42	16	10.96	9	6.16	4	2.74	36	24.65
No	1	0.68	20	13.70	43	29.45	39	26.71	7	4.79	110	75.33
10. Unable to shop, cook, feed self												
Yes	0	0.00	4	2.74	12	8.22	8	5.48	1	0.68	25	17.12
No	3	2.05	21	14.38	47	32.19	40	27.40	10	6.85	120	82.87

### Nutritional Risk and Gender

According to data in Table IV, females were more likely than males to suffer from an illness that limits food choices (38; 25.33%), eat fewer than two meals per day (14; 9.33%), eat few fruits, vegetables, or dairy products (43, 28.67 %), and consume three or more alcoholic beverages frequently (2, 1.33 %). The female respondents were also more likely to have tooth or mouth problems (16; 10.67 %) than males (13; 8.67 %). Females were more than three times more likely to report not always having money for food (20; 13.33%) than males (6; 4.00%). Eating alone most of the time, taking three or more prescription or over-the-counter drugs per day, experiencing unwanted weight loss or gain, and being unable to shop, cook, or feed themselves was also more commonly reported by females. Results were (50; 33.33%), (54; 36.00%), (27; 18.00%), and (18; 12.00%) respectively (See Table IV).

### Nutritional Risk by Ethnicity

Data in Table V showed that white respondents were more likely to suffer from an illness limiting food choices (33; 21.71%) compared to black respondents (24; 15.79%); however, blacks were more likely to eat fewer than two meals per day (13; 8.55%) than whites (7; 4.61%). Eating few fruits, vegetables, or dairy products was more common among whites (33; 21.71%), than blacks (27; 17.76%). Consuming three or more alcoholic beverages frequently occurred more in blacks (2; 1.32%) than in whites (0; 0.00%); whereas tooth or mouth problems occurred more in whites (10; 6.58%) than in blacks (0; 0.00%). Almost twice as many black respondents reported not always having enough money for food (17; 11.18%) compared to white respondents (9; 5.92%). Eating alone most of the time also reported more

TABLE IV  
 FREQUENCY AND PERCENT OF RESPONSES TO NUTRITIONAL RISK  
 STATEMENTS ACCORDING TO GENDER  
 N = 153

Risk Statements	(Male)		(Female)	
	F	% N	F	% N
1. Illness limits food choices				
Yes	18	12.00	38	25.33
No	39	26.00	55	36.67
2. Eat fewer than two meals/day				
Yes	6	4.00	14	9.33
No	51	34.00	79	52.67
3. Eat few fruits, vegetables or dairy				
Yes	17	11.33	43	28.67
No	40	26.67	50	33.33
4. Three or more alcoholic beverages				
Yes	0	0.00	2	1.33
No	57	38.00	91	60.67
5. Tooth or mouth problems				
Yes	13	8.67	16	10.67
No	44	29.33	77	51.33
6. Don't always have money for food				
Yes	6	4.00	20	13.33
No	51	34.00	73	48.67
7. Eat alone most of the time				
Yes	14	9.33	50	33.33
No	43	28.67	43	28.67
8. Three or more RX or OTC drugs/day				
Yes	21	14.00	54	36.00
No	36	24.00	39	26.00
9. Unwanted weight loss or gain				
Yes	10	6.67	27	18.00
No	47	31.33	66	44.00
10. Unable to shop, cook, feed self				
Yes	8	5.33	18	12.00
No	49	32.67	75	50.00

TABLE V  
 FREQUENCY AND PERCENT OF RESPONSES TO NUTRITIONAL RISK  
 STATEMENTS ACCORDING TO ETHNICITY  
 N = 153

Risk Statements	White n=57		Black n=61	
	F	%	F	%
1. Illness limits food choices				
Yes	33	21.71	24	15.79
No	55	36.18	37	24.34
2. Eat fewer than two meals/day				
Yes	7	4.61	13	8.55
No	81	53.29	48	31.58
3. Eat few fruits, vegetables or dairy				
Yes	33	21.71	27	17.76
No	55	36.18	34	22.37
4. Three or more alcoholic beverages				
Yes	0	0.00	2	1.32
No	88	57.89	59	38.82
5. Tooth or mouth problems				
Yes	10	6.58	0	0.00
No	78	51.32	1	0.66
6. Don't always have money for food				
Yes	9	5.92	17	11.18
No	79	51.97	44	28.95
7. Eat alone most of the time				
Yes	31	20.39	34	22.37
No	57	37.50	27	17.76
8. Three or more RX or OTC drugs/day				
Yes	47	30.92	28	18.42
No	41	26.97	33	21.71
9. Unwanted weight loss or gain				
Yes	17	11.18	20	13.16
No	71	46.71	41	26.97
10. Unable to shop, cook, feed self				
Yes	13	8.55	1	13
No	75	49.34	48	31.58



from blacks (34; 22.37%) than from whites (31; 20.39%). Many white respondents reported taking three or more prescription or over-the-counter drugs each day (47; 30.92%) compared to black respondents (28; 18.42%). Unwanted weight loss or gain was reported more among blacks (20; 13.16%) than among whites (17; 11.18%). The portion of those who were able to shop, cook, and feed themselves was the same among both black (13; 8.55%) and white (13; 8.55%) respondents in this study, (See Table V).

### Nutritional Risk and Living Situation

Those who lived with someone had higher reports of having an illness limiting food choices (31; 21.38 %) than those who lived alone (23; 15.86%), however, those who lived alone were twice as likely to eat fewer than two meals daily (14; 9.66%) compared to those who lived with someone (6; 4.14%). Those who eat few fruits, vegetables, or dairy products were most likely to live with someone (32; 22.07%), than those who live alone (29; 20.00%). Consuming three or more alcoholic beverages frequently was equally reported by those living alone and those living with someone (1; 0.69%; n=1 ; 0.69%) respectively. Those living with someone were more than two times as likely to suffer from tooth or mouth problems (59; 40.69%) compared to those living alone (13; 8.97%). Those not always having enough money from food (16; 11.03%) and those eating alone most of the time (49; 33.7%) were more likely to live alone than with someone. Three or more prescription or over-the-counter drugs daily were reportedly taken more by those who lived with someone (41; 28.28%) than those living alone (33; 22.76%). Those experiencing unwanted weight loss or gain were more likely to live alone (21; 14.48%) than with someone (14; 9.66%). However, those unable to shop, cook, or feed themselves were more likely to live with someone (14; 9.66 %) than alone (12; 8.28%) (See Table VI).

TABLE VI

FREQUENCY AND PERCENT OF RESPONSES TO NUTRITIONAL RISK  
STATEMENTS ACCORDING TO LIVING SITUATION

N = 153

Risk Statements	(One)		More than One	
	F	%	F	%
1. Illness limits food choices				
Yes	23	15.86	31	21.38
No	49	33.79	42	28.97
2. Eat fewer than two meals/day				
Yes	14	9.66	6	4.14
No	58	40.00	67	46.21
3. Eat few fruits, vegetables or dairy				
Yes	29	20.00	32	22.07
No	43	29.66	41	28.28
4. Three or more alcoholic beverages				
Yes	1	0.69	1	0.69
No	71	48.97	72	49.66
5. Tooth or mouth problems				
Yes	13	8.97	59	40.69
No	59	40.69	14	9.66
6. Don't always have money for food				
Yes	16	11.03	8	5.52
No	56	38.62	65	44.83
7. Eat alone most of the time				
Yes	49	33.79	13	8.97
No	23	15.86	60	41.38
8. Three or more RX or OTC drugs/day				
Yes	33	22.76	41	28.28
No	39	26.90	32	22.07
9. Unwanted weight loss or gain				
Yes	21	14.48	14	9.66
No	51	35.17	59	40.69
10. Unable to shop, cook, feed self				
Yes	12	8.28	14	9.66
No	60	41.38	59	40.69

### Nutritional Risk and Income

Illness limiting food choices were reported more often by those who were not low income (36, 24.83%) than in those who were low income (19; 13.10%). Yet low income participants were more likely to eat fewer than two meals per day (11; 7.59%) than those who were not low income (10; 6.90%). Few fruits, vegetables, or dairy products were consumed by those who were not low income (38; 26.21%) compared to those who were not low income (23; 15.86%). Three or more alcoholic beverages were consumed frequently among the low income respondents (1; 0.69%) and respondents who were not low income (1; 0.69%). A larger portion of those who were not low income reported having tooth or mouth problems (18; 12.41%) than those who were low income (11; 7.59%). Results also showed that those who did not always have money for food were more likely to be low income (14; 9.66%) than those who were not low income (12; 8.28 %). Eating alone most of the time occurred more often among those who were not low income (34; 23.45%) than in the low income category (29; 20.00%). Taking three or more prescription or over-the-counter drugs per day, experiencing unwanted weight loss or gain, and being unable to shop, cook, or feed themselves occurred more often among those who were not low income (46; 31.72%; n=18; 12.41%; n=16; 11.03%; n=10; 6.90%) respectively, (See Table VII). It is important to note that in this study, low income participants were those receiving SSI, medicaid, or food stamps.

### Nutritional Risk and Participation Time in ENP

Illness limiting food choices occurred most often among those who had participated the longest time, over three years (26; 18.06%), compared to those participating six months or less (14; 9.72%) or between seven months and three years (15; 10.42%). When comparing

TABLE VII  
 FREQUENCY AND PERCENT OF RESPONSES TO NUTRITIONAL RISK  
 STATEMENTS ACCORDING TO INCOME

Risk Statements	Low Income n=57		Not Low Income n=61	
	F	%	F	%
1. Illness limits food choices				
Yes	19	13.10	36	24.83
No	31	21.38	59	40.64
2. Eat fewer than two meals/day				
Yes	11	7.59	10	6.90
No	39	26.90	85	58.62
3. Eat few fruits, vegetables or dairy				
Yes	23	15.86	38	26.21
No	27	18.62	57	39.31
4. Three or more alcoholic beverages				
Yes	1	0.69	1	0.69
No	49	33.79	94	64.83
5. Tooth or mouth problems				
Yes	11	7.59	18	12.41
No	39	26.90	77	53.10
6. Don't always have money for food				
Yes	14	9.66	12	8.28
No	36	24.83	83	57.24
7. Eat alone most of the time				
Yes	29	20.00	34	23.45
No	21	14.48	61	42.07
8. Three or more RX or OTC drugs/day				
Yes	26	17.93	46	31.72
No	24	16.55	49	33.79
9. Unwanted weight loss or gain				
Yes	16	11.03	18	12.41
No	34	23.45	77	53.10
10. Unable to shop, cook, feed self				
Yes	10	6.90	16	11.03
No	40	27.59	79	54.48

participation time to those eating fewer than two meals a day, those who had participated over three years (8; 5.56%) reported eating fewer than two meals a day more often than those participating six months or less and those participating between seven months and three years both reported the same (5; 3.47%). Those participating for three years or more, reported that they ate few fruits, vegetables, or dairy products (25; 17.36%). Consuming three or more alcoholic beverages frequently occurred similarly among those participating for six months or less (1; 0.69%) and three years or more (1; 0.69%) compared to those who had participated between seven months and three years (0; 0.00%). Tooth or mouth problems were reported more frequently by those who had participated for three or more years (12; 8.33%). This group also consisted mostly of those who did not always have money for food (13; 9.03%). Eating alone most of the time was reported more than two times as often among those who had participated the longest (37; 25.69%), and taking three or more prescription or over-the-counter drugs per day was reported more often among those who had participated three or more years (36; 25.00%). Unwanted weight loss or gain and being unable to shop, cook, or feed themselves was also reported more often among those participating for three or more years (16; 11.11 %), (14; 9.72 %) respectively (See Table VIII).

### Mean Scores by Personal Variables

#### Age

Results showed that those below 60 years of age had the highest mean score, (7.3), resulting in the highest nutritional risk. This would ordinarily be surprising; however, in this case, the researcher observed that the three participants under 60 years of age were in poor health, possibly due to a disability, thus putting them at high nutritional risk. Those over 85 years of age (11.8%) had the second highest mean score (5.18). These findings support

TABLE VIII

FREQUENCY AND PERCENT OF RESPONSES TO NUTRITIONAL RISK  
STATEMENTS ACCORDING TO PARTICIPATION TIME

Risk Statements	(0-6 Mths)		(7 Mths-3Yrs)		(3+ Yrs)	
	F	<u>n=25</u> %	F	<u>n=48</u> %	F	<u>n=71</u> %
1. Illness limits food choices						
Yes	14	9.72	15	10.42	26	18.06
No	11	7.64	33	22.92	45	31.25
2. Eat fewer than two meals/day						
Yes	5	3.47	5	3.47	8	5.56
No	20	13.49	43	29.86	63	43.75
3. Eat few fruits, vegetables or dairy						
Yes	17	11.81	16	11.11	25	17.36
No	8	5.56	32	22.22	46	31.94
4. Three or more alcoholic beverages						
Yes	1	0.69	0	0.00	1	0.69
No	24	16.67	48	33.33	70	48.61
5. Tooth or mouth problems						
Yes	9	6.25	7	4.86	12	8.33
No	16	11.11	41	28.47	59	40.97
6. Don't always have money for food						
Yes	4	2.78	8	5.56	13	9.03
No	21	14.58	40	27.78	58	40.28
7. Eat alone most of the time						
Yes	9	6.25	17	11.81	37	25.69
No	16	11.11	31	21.53	34	23.61
8. Three or more RX or OTC drugs/day						
Yes	11	7.64	26	18.06	36	25.00
No	14	9.72	22	15.28	35	24.31
9. Unwanted weight loss or gain						
Yes	9	6.25	10	6.94	16	11.11
No	16	11.11	38	26.39	55	38.19
10. Unable to shop, cook, feed self						
Yes	3	2.08	9	6.25	14	9.72
No	22	15.28	39	27.08	57	39.58

unpublished research by Zylstra (1992) in the Washington State-Wide Congregate Mealsite Survey. In Zylstra's Washington State Survey, nutritional risk decreased with age until age 85 and over, when the nutritional risk increases. One possible reason for this is that people who live to be old-old have probably practiced good nutritional habits for many years. The reason for the slight increase at age 85+ may be related to increased frailty among the oldest age groups. The data obtained from those age 65-74 (59, 40%) identified a mean score of 4.93. Those 65-74 comprised 40 percent of the sample population. The remaining two age categories were 60-64 and 75-84. Results of mean scores for these age groups were 4.68 and 4.63, respectively (See Figure 1).

### Gender

When comparing gender, results showed that females had higher mean scores (5.53) than did males (3.67), which was similar to findings from Zylstra (1992) in the Washington State Survey, showing females having higher mean scores than males. Keep in mind that a score over 5.0 indicates "high nutritional risk," therefore, the females in this study who had a mean score of 5.7, were at high nutritional risk. It should be noted that 62 percent (93) of the sample were female and 38 percent (57) were male (Figure 2). Females who had a high mean score were possibly more accurate in reporting their eating habits than males, or maybe females are more health conscious than males, thus making them more aware of their health status than males. These results were surprising because some studies have shown that single older men tend to have poorer diets than single older women (Davis et al., 1990, Exton-Smith, 1972; Kohrs, Czajka-Narins, & Nordstrom, 1989). However, in general, older men are more likely to consume sufficient levels of protein, vitamins, and minerals than women, because they consume more food overall and have higher energy intakes.

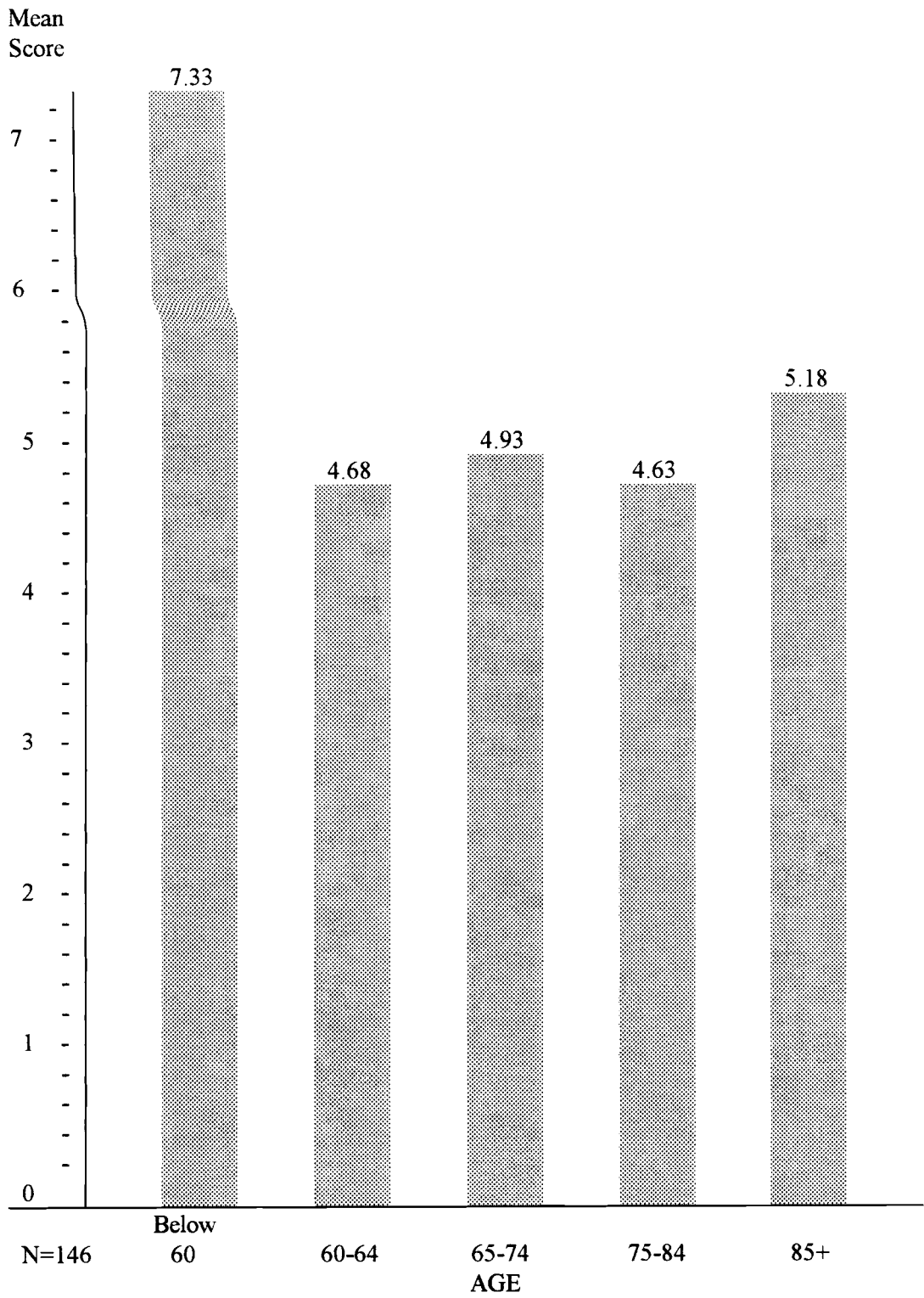


Figure 1. Mean Score by Age



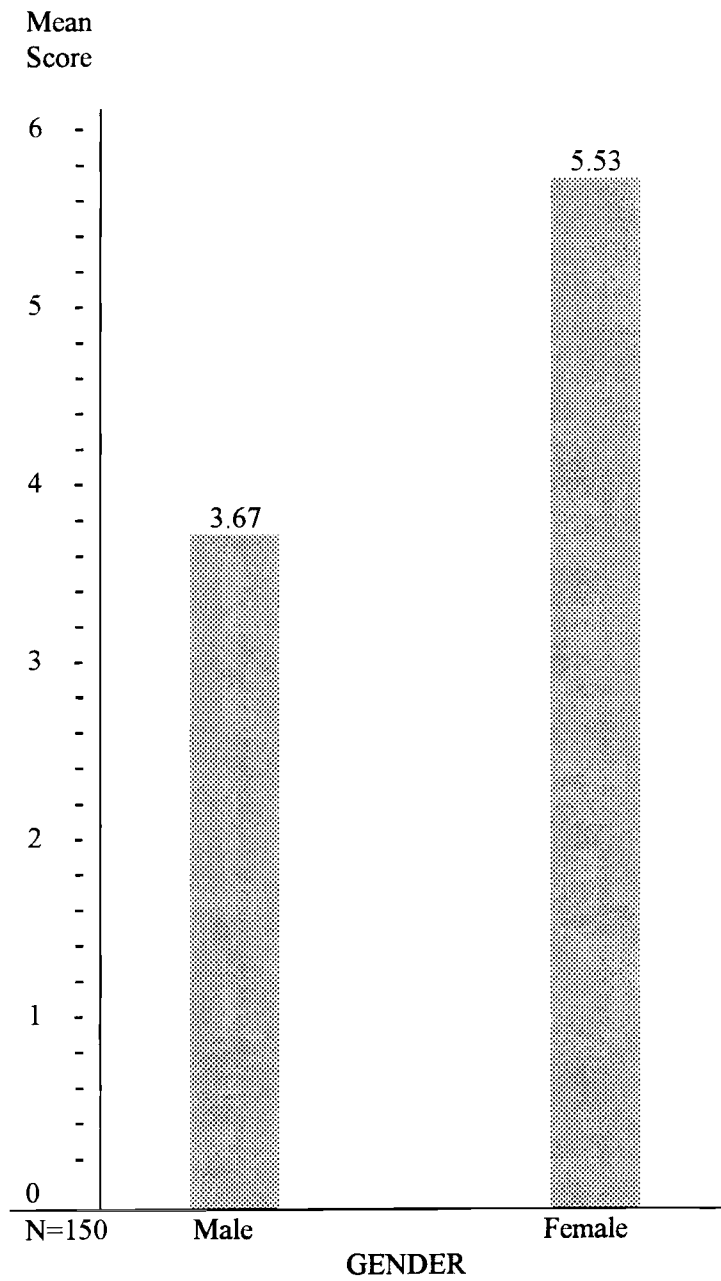


Figure 2. Mean Score by Gender

### Ethnicity

Black subjects (61, 40%) had a higher mean score (6.21) than whites (3.94) (88, 58%), thus indicating that blacks were in poorer nutritional status than whites in this study (Figure 3). These results support those of the USDA National Food Consumption Survey, 1977-78, which reported that calorie intake is lower in elderly blacks than in elderly whites (U. S. Department of Agriculture, 1984.). Also calcium and magnesium intakes were higher in white males and females than black males and females (U. S. Department of Agriculture, 1984).

### Living Situation

Those who lived alone (72, 50%) were at higher nutritional risk than those who lived with someone (73, 50%). Mean scores were 5.36 and 4.32, respectively (Figure 4). Davis, et al. (1985; 1990) also found that older people living alone are more likely to skip meals and consume a higher amount of their calories away from home (Table II). The participants were also asked whether or not they usually eat alone. Almost one-half, 43 percent, of those surveyed (See Table II, p. 28) eat alone.

### Income

Comparing the responses of those who receive SSI, Medicaid, or Food Stamps to those who do not, identified that those who received SSI, Medicaid, or Food Stamps had higher mean scores, 6.08, than those who did not receive SSI, Medicaid, or Food Stamps, 4.34. This was probably due to the direct relationship that income has on dietary adequacy (See Figure 5). Posner, et al. (1987) reported many homebound low-income older people to be at nutritional risk. Murphy, et al., also reported that money spent for food was a significant predictor of

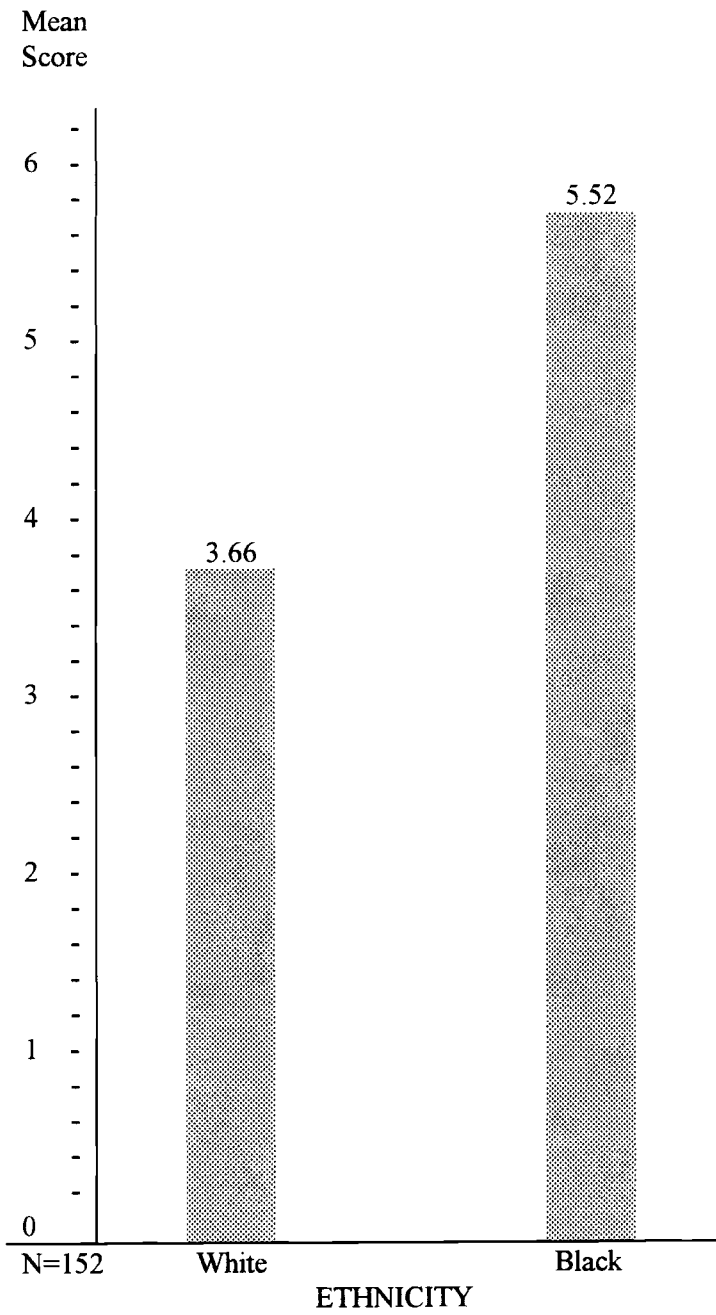


Figure 3. Mean Risk Total Score by Ethnicity

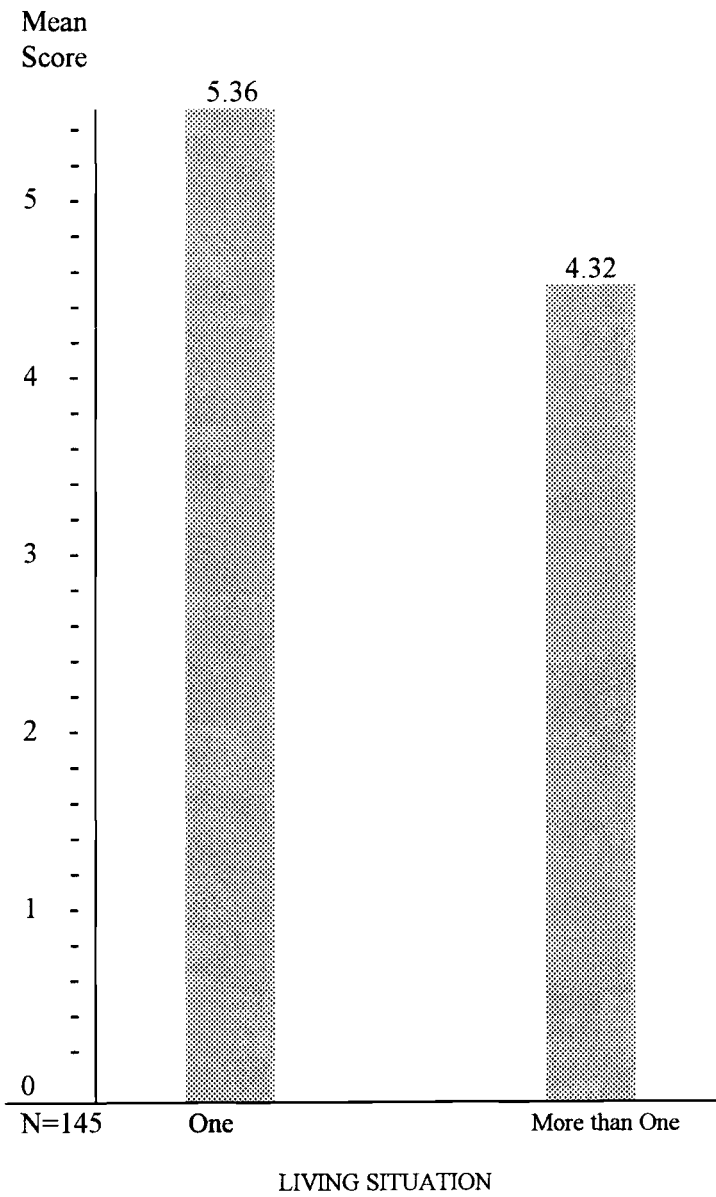


Figure 4. Mean Score by Living Situation

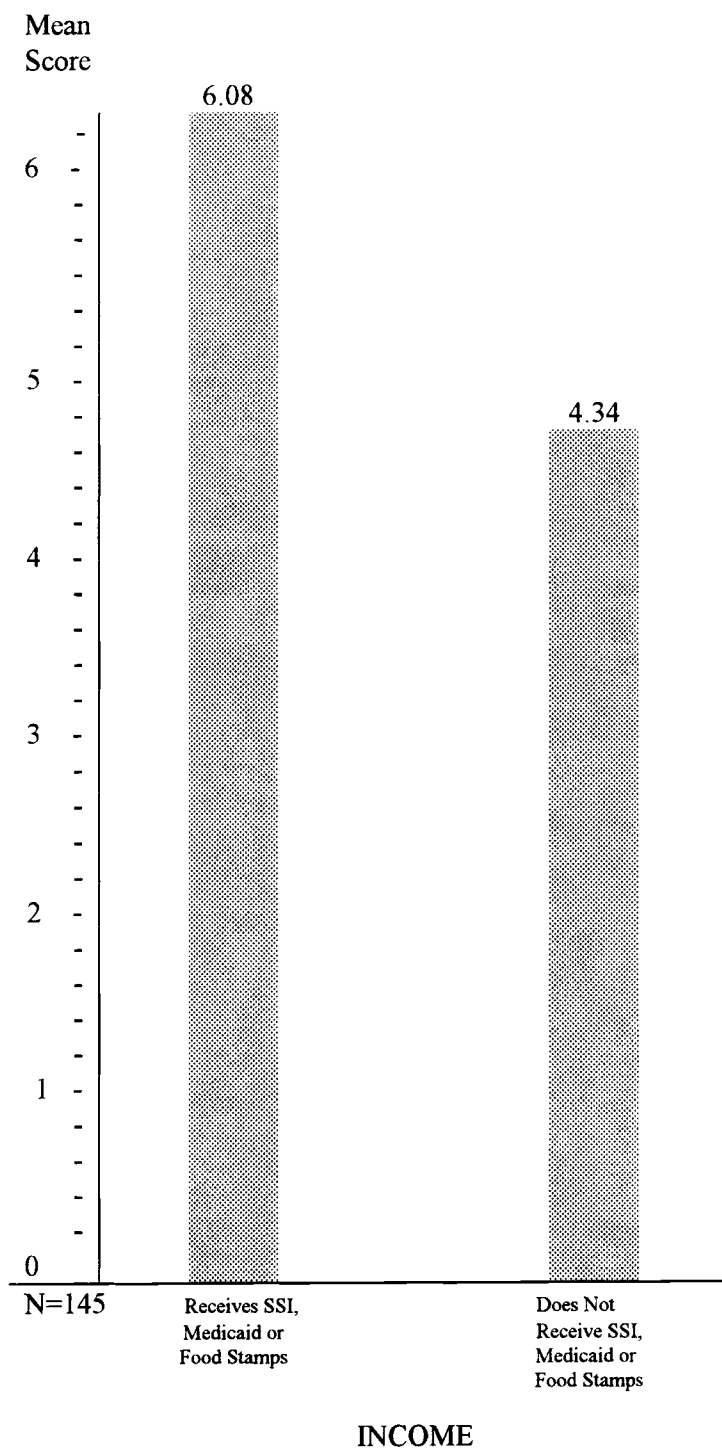


Figure 5. Mean Score by Income

dietary quality and that individuals age 65-84 who had better quality diets had higher incomes than those with poorer quality diets (Murphy, et al., 1990).

### Participation Time

Results showed that those who had participated in the ENP the shortest length of time (25, 17%) had the highest mean score, 6.28, which indicated the poorest nutritional status. Those who had participated the longest amount of time (71, 49%) had the second highest mean score, 4.75, however, results could have been due to age differences, (See Figure 6). It is interesting to note that the largest percentage of the people surveyed had been participating for three years or more. According to Zylstra (1992), this could be an indication of positive feelings on behalf of the participants the increased the likelihood that a seasoned participant which be willing to cooperate in a survey, or it could be an indication of the extent to which participants have learned to rely on the meals they receive at the sites.

### Statistical Analyses

Frequencies and percentages were obtained for the participants' age, gender, race, living situation, income, and length of participation in the ENP, and for each of the Nutritional risk statements on the questionnaire. Frequencies and percentages were used by the researcher to describe demographical information of the subjects and their responses to the nutritional risk statements. Analysis of variance, t-test's, Duncan's multiple range tests, and Chi-squares were also used by the researcher to test the hypotheses in the study (Steel & Torrie, 1980). The level of significance was established at  $p < 0.05$ .

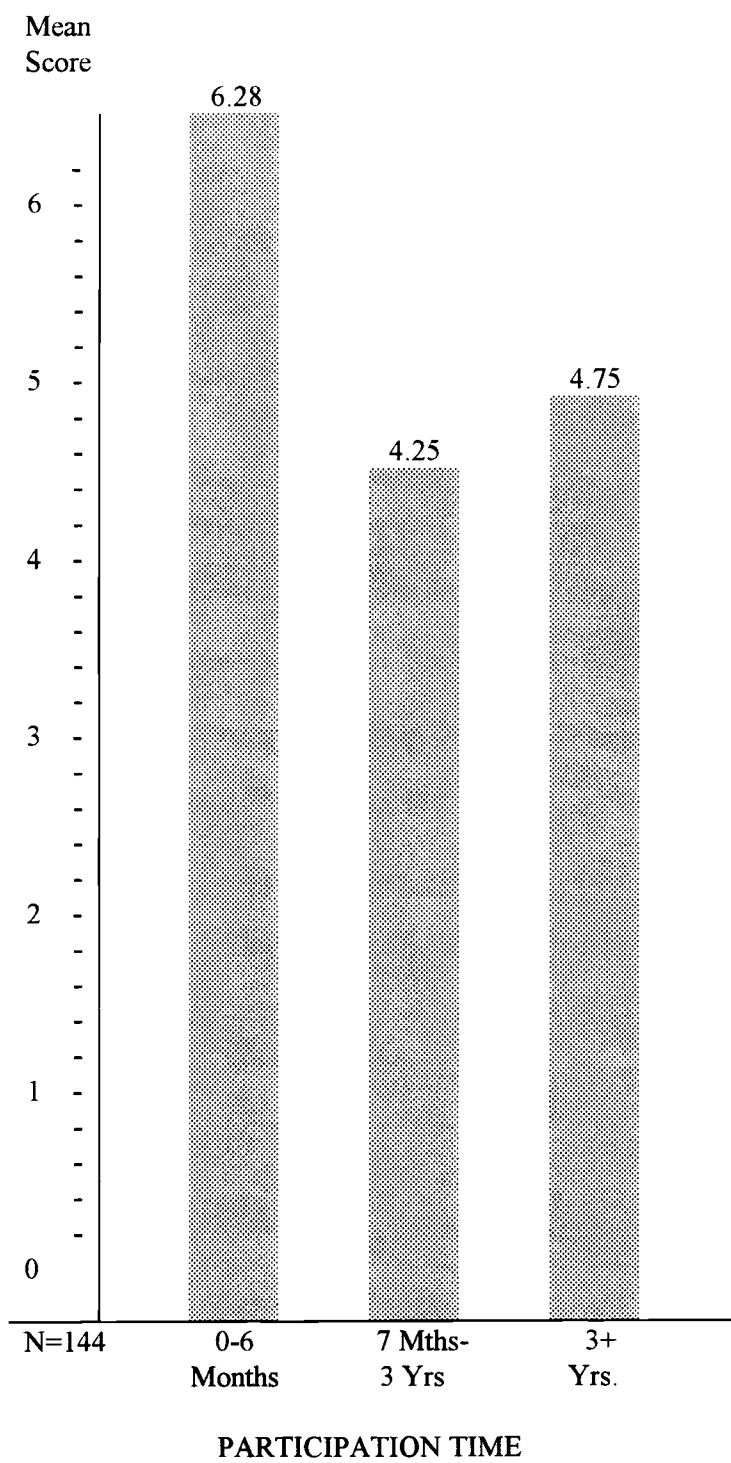


Figure 6. Mean Score by Participation Time

### Testing of Ho 1:

Ho1: There will be no significant association between the participants' personal variables: age, race, gender, income, living situation, and length of participation in an ENP and nutritional risks. A chi-square statistical technique was used to determine the association between the respondents' personal characteristics and each nutritional risk statement.

#### Nutritional Risk Statements by Personal Variables

Chi-square analyses indicated that 12 significant associations existed between nutritional risk statements and respondents' personal characteristics at the  $p < 0.05$  level (Table IX). The association between eating fewer than two meals per day and ethnicity was significant at the 0.007 level. Eating fewer than two meals per day and living situation were significant at the 0.05 level. Eating few fruits vegetables or dairy products showed significant associations with gender ( $p=0.046$ ) and participation time ( $p=0.008$ ). Having tooth or mouth problems was only associated with ethnicity ( $p=0.020$ ). Those who did not always have money for food was significantly associated with ethnicity ( $p=0.036$ ) and being low income ( $p=0.022$ ). When considering at those who eat alone most of the time four associations were found between age ( $p=0.032$ ), gender ( $p=0.000$ ), living situation ( $p=0.000$ ), and low income ( $p=0.010$ ). A significant association was also noted between those taking three or more prescription of over-the-counter drugs per day and gender ( $p=0.012$ ). No significant associations were found among illnesses limiting food choices, those consuming three or more alcoholic beverages frequently, those experiencing unwanted weight loss or gain, and those unable to shop, cook, or feed themselves any of the selected personal variables (See Table IX).



TABLE IX  
 CHI-SQUARE DETERMINATIONS INDICATING ASSOCIATIONS  
 BETWEEN NUTRITIONAL RISK STATEMENTS AND  
 SELECTED PERSONAL VARIABLES  
 N = 153

Nutritional Risk Statements	Personable Variables					
	Age	Gender	Race	Living Situation	Income	Participation Time
<u>Illness Limits Food Choices</u>						
X <sup>2</sup>	3.62	1.30	1.89	1.72	0.00	4.41
df	4	1	3	1	1	2
p	0.46	0.25	0.60	0.19	0.99	0.11
<u>Eat Fewer than 2 Meals/Day</u>						
X <sup>2</sup>	.98	0.63	11.98	3.84	3.48	1.58
df	4	1	3	1	1	2
p	0.91	0.43	0.01	0.05	0.06	0.46
<u>Eat Fewer Fruits, Vegetables or Dairy</u>						
X <sup>2</sup>	1.98	3.97	3.52	0.19	0.48	9.71
df	4	1	3	1	1	2
p	0.74	0.05	0.32	0.66	0.49	0.01
<u>Three or More Alcoholic Beverages Frequently</u>						
X <sup>2</sup>	2.48	1.24	3.02	0.00	0.22	1.92
df	4	1	3	1	1	2
p	0.65	0.27	0.39	0.99	0.64	0.38
<u>Tooth or Mouth Problems</u>						
X <sup>2</sup>	7.49	0.71	9.86	0.03	0.19	5.39
df	4	1	1	1	1	2
p	0.11	0.40	0.02	0.86	0.66	0.07
<u>Don't Always Have Money for Food</u>						
X <sup>2</sup>	0.82	2.97	8.54	3.33	5.26	0.09
df	4	1	3	1	1	2
p	0.94	0.09	0.04	0.07	0.02	0.96
<u>Eat Alone Most of the Time</u>						
X <sup>2</sup>	10.57	12.32	6.97	37.39	6.58	3.98
df	4	1	3	1	1	2
p	0.03	0.00	0.07	0.00	0.01	0.14
<u>Three or More RX or OTC Drugs/Day</u>						
X <sup>2</sup>	1.18	6.37	3.82	1.55	0.17	0.68
df	4	1	1	1	1	2
p	0.88	0.01	0.28	0.21	0.62	0.71
<u>Unwanted Weight Loss or Gain</u>						
X <sup>2</sup>	5.95	2.51	4.53	1.98	3.11	2.29
df	4	1	3	1	1	2
p	0.28	0.11	0.21	0.16	0.08	0.32
<u>Unable to Shop, Cook, Feed Self</u>						
X <sup>2</sup>	1.58	0.70	2.70	0.16	0.22	0.77
df	4	1	3	1	1	2
p	0.81	0.40	0.44	0.69	0.64	0.68

\*=Significant at  $p \leq 0.05$

Based on the results reported in Table IX, indicating associations between nutritional risk statements and selected personal variables, the researcher rejected Ho 1 in part. When considering the comparison of those having as illness limiting food choices; those consuming three or more alcoholic beverages frequently; those experiencing unwanted weight loss or gain; and those unable to shop, cook, or feed themselves to the selected personal variables, in which there were no significant associations ( $p < 0.05$ ) then the researcher failed to reject Ho 1.

### Testing of Ho 2

Ho 2: There will be no significant relationship between selected personal variables: age, race, gender, income, living conditions, and length of participation in an ENP and mean risk scores. Student's t-test's, analysis of variance (ANOVA) and Duncan's multiple range tests were used to determine the relationships between the respondent's nutritional risk mean scores and personal variables.

### Nutritional Risk Score by Race and Gender

The Black respondents' mean scores (6.21) were significantly higher than the white respondents (3.94) mean scores. The significance levels were  $p = 0.0014$  and  $p = 0.0031$  respectively (Table X). Keep in mind that a risk score of 0-2 in this study indicates "little risk of nutrition-related problems," a score of 3-5 indicates "moderate risk," while a score over five indicates "high nutritional risk."

A significant relationship was noted between male ( $p = 0.0056$ ) and female ( $p = 0.0097$ ) respondents. It was discovered that females had a higher mean risk score (5.53), putting them in poorer nutritional status than males (3.67) (See Table X). These results could have been due to females being more knowledgeable when reporting their eating habits and overall health

TABLE X  
 T-TEST DETERMINATION ON PERSONAL VARIABLES  
 BY MEAN SCORE  
 N = 153

Personal Variables	N	Mean	SD	P-Value
<u>Race</u>				
White	88	3.94	3.42	*0.003
Black	61	6.21	5.10	*0.001
<u>Ethnicity</u>				
Male	57	3.67	3.43	*0.006
Female	93	5.53	4.64	*0.010
<u>Income</u>				
Low	50	6.08	4.50	*0.03
Not Low Income	95	4.34	4.13	*0.02
<u>Living Situation</u>				
One	72	5.36	4.62	0.15
More than One	73	4.33	3.87	0.15

\*Two P-values were used to indicate both equal and unequal variance

status than men. Significance was also noted when comparing income. Yet, no significance was noted when comparing living situations. The researcher used two p-values to indicate both equal and unequal variances.

Analysis of variance (ANOVA) statistical procedures and Duncan's multiple range tests were used to determine significant relationships between both age and mean score and participation time and mean score (Tables XI, XII, XIII). No significant relationships were found in these tables, however, t-test determinations revealed three significant relationships between race and mean score, gender and mean score and low income and mean score, hence the researcher chose to reject  $H_0$ .

TABLE XI  
ANALYSIS OF VARIANCE (ANOVA) RESULTS FOR AGE  
AND MEAN SCORE  
N = 153

Source	df	Mean Square	F	P
Age	4	5.81	0.32	0.86
Error	141	18.03		
Total	145			

TABLE XII  
ANALYSIS OF VARIANCE (ANOVA) RESULTS FOR PARTICIPATION  
TIME AND MEAN SCORE  
N = 153

Source	df	Mean Square	F	P
Time	2	34.58	1.89	0.15
Error	141	18.25		
Total	143			

TABLE XIII  
 DUNCAN'S MULTIPLE RANGE TEST FOR SELECTED  
 PERSONAL VARIABLES AND MEAN SCORE  
 N = 153

Personal Variables	N	Mean	Grouping*
<u>Age</u>			
Below 60	3	7.33	A
60-64	25	4.68	A
65-74	59	4.93	A
75-84	48	4.63	A
85+	11	5.18	A
<u>Participation</u>			
0-6 Months	25	6.28	A
7 Months-3 Years	48	4.25	A
3+ Years	71	4.75	A

\*Means with the same letter are not significant at the 0.05 level

## CHAPTER V

### SUMMARY, IMPLICATIONS AND RECOMMENDATIONS

#### Summary

The purpose of this study is to identify factors affecting nutritional risks of individuals participating in Elderly Nutrition Program in Oklahoma County using the “DETERMINE” Your Nutritional Health Checklist.” Two hypotheses were postulated to determine selected variables affecting nutritional risks. A questionnaire was adapted by the researcher to obtain data from participants of selected ENP’s in Oklahoma County, Oklahoma City, Oklahoma.

The questionnaire was developed in two sections; the first section containing demographic information, and the second section included 10 nutritional risk statements. These were all assigned certain point values based upon previous research by the agencies who developed the original “DETERMINE Your Nutritional Health Checklist” (See Appendix A). The results of the data collected from the questionnaires completed by the participants are presented in Chapter IV. The sample population was made up from volunteers from four ENP in Oklahoma County. Data obtained from 153 questionnaires were analyzed using frequencies, percentages, Student’s t-tests, ANOVA, Duncan’s Multiple Range Tests, and Chi-squares.

The majority of the respondents were between the ages of 65 and 74 (Table I, p. 26). There were almost twice as many females as males in this study. Among the participants, the

majority were white, living with someone, and were not low income. Most of the subjects had been participating in the ENP for three years or over.

Females were at higher nutritional risk than males. This may have been due to the fact that there were almost twice as many females as males in this study. Black participants were also at higher risk for poor nutritional status than whites. Participants who lived alone were also at moderate to high risk, along with those who received SSI, Medicaid, or Food Stamps. These participants had higher mean scores than those who lived with someone, and those not receiving financial assistance. There was lower nutritional risk among those who participated in the ENP the longest period of time. This showed what an important role the ENP play in the lives of those who participated in this study.

Those ages 65-74 (26, 17.81%) who were white, female, living with someone, not low income, and had participated for 3+ years were most likely to respond that they had an illness limiting food choices. A person who was most likely to eat fewer than two meals a day was between the ages of 65-74 (26, 17.81%), female, black, living alone, low income, and had participated for 3+ years. Those responding to eating few fruits, vegetables, or dairy products were mainly 65-74 years of age (22, 15.07%), female, white, living with someone, not low income, and participated for 3+ years. Consuming three or more alcoholic beverages was common for 60-64 and 75-84 year-old participants who were female, black, living alone or with someone, and had participated for 6 months or less or 3+ years.

The majority of those who were most likely to suffer from tooth or mouth problems that interfered with eating were 65-74 years of age (5, 3.42%), female, white, living with someone, were not low income, and had participated for 3+ years. Not always having enough money for food was commonly reported by 65-84 year olds (9, 6.16%) who were female, black, living alone, low income, and had participated for 3+ years. Eating alone most of the time was most



common for those 65-84 years of age (24, 16.44%), female, black, living alone, not low income, and participated for 3+ years.

Those taking 3 or more prescription or over-the-counter drugs consisted mainly of those who were 65-74 years of age (32, 21.92%), female, white, living with someone, not low income, and had participated for 3+ years. Unwanted weight loss or gain had occurred mainly among those who were 65-74 years of age (16, 10.96%), female, black, living alone, not low income, and had participated for 3+ years. The majority of participants who reported being unable to shop, cook, or feed themselves were 65-74 years of age (12, 8.22%), female, white or black, living with someone, and were not low income. They had also participated for 3+ years.

In summary, all demographic variables were significantly associated with nutritional risks. The factors contributing to the greatest nutritional risk were: 1) eating alone most of the time; 2) low income; and 3) eating few fruits, vegetables or dairy products. Therefore, all participants in ENP can benefit by nutrition.

### Implications

The following implications are presented as a result of this research:

- 1) Dietetics professionals should become even more proactive in taking the lead in the nutrition screening and assessment of older Americans.
- 2) The tools provided by the NSI provide a unique opportunity for interdisciplinary teams to collaborate and incorporate nutrition screening, intervention, and referral.
- 3) Registered Dietitians should take every action possible to serve as advocates for public policy initiatives to expand research and enhance reimbursement for improved nutrition services for older Americans.

4) ENP should serve not only as a place to enjoy fellowship and friends, but most importantly to provide well-balanced, nutritionally sound, low cost meals for older Americans.

### Recommendations for Nutrition Education

Recommendations for nutrition education include:

- 1) Identify ways to increase culturally appropriate nutrition education among ENP participants.
- 2) Nutrition education should come from reliable sources such as registered dietitians or qualified nutritionists.
- 3) Nutrition education should focus on areas identified as high risk for malnutrition, i.e., specifically designed for elderly: a) ways to increase consumption of fruits, vegetables, and dairy products; b) cooking for households of one or two; and c) drug-nutrient interactions.
- 4) Nutrition education should also include referral to appropriate community and social programs when needed.

### Recommendations for Further Study

Recommendations for further research include:

- 1) Nutritional risk assessment of a) homebound elderly; b) those who are eligible to participate in the ENP, but do not ; c) rural elderly, to determine their nutritional risks in comparison to ENP participants; and d) elderly who participate in ENP in rural communities.
- 2) Identify results of Level I or Level II screening protocol designed as part of the NSI for identified at high nutritional risk.
- 3) Assessment of elderly utilizing a revised questionnaire, for example, instead of reading "I eat few fruits or vegetables or dairy products" in one statement, include three separate

statements, such as: 1) I eat few fruits, 2) I eat few vegetables, and 3) I eat few dairy products.

In addition, definition of terms should be included for words such as “frequently” and “few”.

4) Analyses of three day food records and /or food frequencies in conjunction with the questionnaire to determine the relationship between dietary intake and nutritional risks as determined by the NSI.

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## APPENDIXES



**APPENDIX A**

**QUESTIONNAIRE**

*The Warning Signs of poor nutritional health are often overlooked. Use this checklist to find out if you or someone you know is at nutritional risk.*

Read the statements below. Circle the number in the yes column for those that apply to you or someone you know. For each yes answer, score the number in the box. Total your nutritional score.

## DETERMINE YOUR NUTRITIONAL HEALTH

	YES
I have an illness or condition that made me change the kind and/or amount of food I eat.	2
I eat fewer than 2 meals per day.	3
I eat few fruits or vegetables, or milk products.	2
I have 3 or more drinks of beer, liquor or wine almost every day.	2
I have tooth or mouth problems that make it hard for me to eat.	2
I don't always have enough money to buy the food I need.	4
I eat alone most of the time.	1
I take 3 or more different prescribed or over-the-counter drugs a day.	1
Without wanting to, I have lost or gained 10 pounds in the last 6 months.	2
I am not always physically able to shop, cook and/or feed myself.	2
<b>TOTAL</b>	

### Total Your Nutritional Score. If It's —

- 0-2**      **Good!** Recheck your nutritional score in 6 months.
- 3-5**      **You are at moderate nutritional risk.** See what can be done to improve your eating habits and lifestyle. Your office on aging, senior nutrition program, senior citizens center or health department can help. Recheck your nutritional score in 3 months.
- 6 or more**      **You are at high nutritional risk.** Bring this checklist the next time you see your doctor, dietitian or other qualified health or social service professional. Talk with them about any problems you may have. Ask for help to improve your nutritional health.

*These materials developed and distributed by the Nutrition Screening Initiative, a project of:*

 AMERICAN ACADEMY OF FAMILY PHYSICIANS

 THE AMERICAN DIETETIC ASSOCIATION

 NATIONAL COUNCIL ON THE AGING, INC.

**Remember that warning signs suggest risk, but do not represent diagnosis of any condition. Turn the page to learn more about the Warning Signs of poor nutritional health.**

**APPENDIX B**

**ORIGINAL QUESTIONNAIRE**

## General Information

Name \_\_\_\_\_

1. Age: Under 60 \_\_\_\_\_ 60-64 \_\_\_\_\_ 65-74 \_\_\_\_\_ 75-84 \_\_\_\_\_ 85+ \_\_\_\_\_
2. Gender: Male \_\_\_\_\_ Female \_\_\_\_\_
3. Check ONE:
- Hispanic \_\_\_\_\_ Asian \_\_\_\_\_
- White \_\_\_\_\_ Black \_\_\_\_\_
- Native American Indian \_\_\_\_\_ Other. Specify \_\_\_\_\_
4. How many people (including you) live in your household?
- One \_\_\_\_\_ More than one \_\_\_\_\_
5. Do you receive SSI, Medicaid, or Food Stamps?
- Yes \_\_\_\_\_ No \_\_\_\_\_
6. How long have you participated in the Elderly Nutrition Program?
- 0-6 months \_\_\_\_\_ 7 months-3 years \_\_\_\_\_ 3+ years \_\_\_\_\_

Check (✓) all of the statements which apply to you.	YES
I have an illness or condition that made me change the kind and/or amount of food I eat.	
I eat fewer than 2 meals per day.	
I eat few fruits or vegetables, or milk products.	
I have 3 or more drinks of beer, liquor or wine almost every day.	
I have tooth or mouth problems that make it hard for me to eat.	
I don't always have enough money to buy the food I need.	
I eat alone most of the time.	
I take 3 or more different prescribed or over-the-counter drugs a day.	
Without wanting to, I have lost or gained 10 pounds in the last 6 months.	
I am not always physically able to shop cook and/or feed myself.	

The purpose of this is to identify any nutritional risks that you may have.  
At no time will names be used when reporting this information.

**APPENDIX C**

**WARNING SIGNS OF MALNUTRITION (BACKSIDE  
OF ORIGINAL QUESTIONNAIRE)**

**The Nutrition Checklist is based on the Warning Signs described below. Use the word DETERMINE to remind you of the Warning Signs.**

## **D**ISEASE

Any disease, illness or chronic condition which causes you to change the way you eat, or makes it hard for you to eat, puts your nutritional health at risk. Four out of five adults have chronic diseases that are affected by diet. Confusion or memory loss that keeps getting worse is estimated to affect one out of five or more of older adults. This can make it hard to remember what, when or if you've eaten. Feeling sad or depressed, which happens to about one in eight older adults, can cause big changes in appetite, digestion, energy level, weight and well-being.

## **E**EATING POORLY

Eating too little and eating too much both lead to poor health. Eating the same foods day after day or not eating fruit, vegetables, and milk products daily will also cause poor nutritional health. One in five adults skip meals daily. Only 13% of adults eat the minimum amount of fruit and vegetables needed. One in four older adults drink too much alcohol. Many health problems become worse if you drink more than one or two alcoholic beverages per day.

## **T**OOTH LOSS/ MOUTH PAIN

A healthy mouth, teeth and gums are needed to eat. Missing, loose or rotten teeth or dentures which don't fit well or cause mouth sores make it hard to eat.

## **E**CONOMIC HARDSHIP

As many as 40% of older Americans have incomes of less than \$6,000 per year. Having less--or choosing to spend less--than \$25-30 per week for food makes it very hard to get the foods you need to stay healthy.

## **R**EDUCED SOCIAL CONTACT

One-third of all older people live alone. Being with people daily has a positive effect on morale, well-being and eating.

## **M**ULTIPLE MEDICINES

Many older Americans must take medicines for health problems. Almost half of older Americans take multiple medicines daily. Growing old may change the way we respond to drugs. The more medicines you take, the greater the chance for side effects such as increased or decreased appetite, change in taste, constipation, weakness, drowsiness, diarrhea, nausea, and others. Vitamins or minerals when taken in large doses act like drugs and can cause harm. Alert your doctor to everything you take.

## **I**NVOLUNTARY WEIGHT LOSS/GAIN

Losing or gaining a lot of weight when you are not trying to do so is an important warning sign that must not be ignored. Being overweight or underweight also increases your chance of poor health.

## **N**EEDS ASSISTANCE IN SELF CARE

Although most older people are able to eat, one of every five have trouble walking, shopping, buying and cooking food, especially as they get older.

## **E**LDER YEARS ABOVE AGE 80

Most older people lead full and productive lives. But as age increases, risk of frailty and health problems increase. Checking your nutritional health regularly makes good sense.



The Nutrition Screening Initiative, 2626 Pennsylvania Avenue, NW, Suite 301, Washington, DC 20037

The Nutrition Screening Initiative is funded in part by a grant from Ross Laboratories, a division of Abbott Laboratories.

**APPENDIX D**

**RDA'S AGE 51 AND OVER**

**TABLE A-1** *Recommended Dietary Allowances for Persons Ages 51 and Over (Revised 1989)*

	Males	Females
Weight*		
(kg)	77	65
(lb)	170	143
Height*		
(cm)	173	160
(in)	68	63
Protein (g)	63	50
Vitamin A ( $\mu\text{g}$ RE) <sup>†</sup>	1000	800
Vitamin D ( $\mu\text{g}$ ) <sup>‡</sup>	5	5
Vitamin E (mg $\alpha$ -TE) <sup>§</sup>	10	8
Vitamin K ( $\mu\text{g}$ )	80	65
Vitamin C (mg)	60	60
Thiamin (mg)	1.2	1.0
Riboflavin (mg)	1.4	1.2
Niacin (mg NE) <sup>  </sup>	15	13
Vitamin B <sub>6</sub> (mg)	2.0	1.6
Folate ( $\mu\text{g}$ )	200	180
Vitamin B <sub>12</sub> ( $\mu\text{g}$ )	2.0	2.0
Calcium (mg)	800	800
Phosphorus (mg)	800	800
Magnesium (mg)	350	280
Iron (mg)	10	10
Zinc (mg)	15	12
Iodine ( $\mu\text{g}$ )	150	150
Selenium ( $\mu\text{g}$ )	70	55

\*Weights and heights given are actual median values for the U.S. population ages 51 and over as reported by NHANES II. These height-to-weight ratios may not be ideal.

<sup>†</sup>Retinol equivalents: 1 retinol equivalent = 1  $\mu\text{g}$  retinol or 6  $\mu\text{g}$   $\beta$ -carotene.

<sup>‡</sup>As cholecalciferol: 10  $\mu\text{g}$  cholecalciferol = 400 IU of vitamin D.

<sup>§</sup> $\alpha$ -Tocopherol equivalents: 1 mg d- $\alpha$  tocopherol = 1 $\alpha$ -TE.

<sup>||</sup>1 NE (niacin equivalent) = 1 mg niacin or 60 mg dietary tryptophan.



**APPENDIX E**

**CHI SQUARE FREQUENCY ANALYSIS TABLES**

## Key to Tables

In the following tables, the abbreviations used refer to questions on the questionnaire.

### Age

- 1 = 60
- 2 = 60-64
- 3 = 65-74
- 4 = 75- 84
- 5 = 85+

### Sex

- 1 = male
- 2 = female

### Race

- 2 = white
- 5 = black

### People

- 1= one
- 2= more than one

### SSI

- 1 = yes
- 2 = no

### Ens Time / Participation time

- 1 = 0-6 months
- 2 = 7 months - 3 years
- 3 = 3 + years

### Nut 1

Refers to having an illness or condition causing changes in the kind or amount of food eaten

- 0 = no
- 2 = yes

### Nut 2 Refers to eating fewer than 2 meals per day

- 0 = no
- 3 = yes

Nut 3 Refers to eating few fruits or vegetables, or milk products.

0 = no  
2 = yes

Nut 4 Refers to having 3 or more drinks of alcohol almost everyday

0 = no  
2 = yes

Nut 5 Refers to tooth or mouth problems making it hard to eat.

0 = no  
2 = yes

Nut 6 Refers to not always having enough money to buy food.

0 = no  
4 = yes

Nut 7 Refers to eating alone most of the time.

0 = no  
1 = yes

Nut 8 Refers to taking 3 or more different prescribed or over the counter drugs a day.

0 = no  
1 = yes

Nut 9 Refers to having lost or gained 10 lbs in the last 6 months without wanting to.

0 = no  
2 = yes

Nut 10 Refers to not being able to shop, cook, and /or feed self.

0 = no  
2 = yes

TABLE OF AGE BY NUT1

AGE	NUT1		Total
	01	21	
Frequency:			
Percent :			
1 :	1 :	2 :	3
	0.68 :	1.37 :	2.05
2 :	16 :	9 :	25
	10.96 :	6.16 :	17.12
3 :	33 :	26 :	59
	22.60 :	17.81 :	40.41
4 :	34 :	14 :	48
	23.29 :	9.59 :	32.88
5 :	7 :	4 :	11
	4.79 :	2.74 :	7.53
Total	91	55	146
	62.33	37.67	100.00

Frequency Missing = 7

STATISTICS FOR TABLE OF AGE BY NUT1

Statistic	DF	Value	Prob
Chi-Square	4	3.619	0.460
Likelihood Ratio Chi-Square	4	3.611	0.461
Mantel-Haenszel Chi-Square	1	1.156	0.282
Phi Coefficient		0.157	
Contingency Coefficient		0.156	
Cramer's V		0.157	

Effective Sample Size = 146

Frequency Missing = 7

WARNING: 30% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF SEX BY NUT1

SEX	NUT1		Total
	01	21	
Frequency:			
Percent :			
1 :	39 :	18 :	57
	26.00 :	12.00 :	38.00
2 :	55 :	38 :	93
	36.67 :	25.33 :	62.00
Total	94	56	150
	62.67	37.33	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF SEX BY NUT1

Statistic	DF	Value	Prob
Chi-Square	1	1.301	0.254
Likelihood Ratio Chi-Square	1	1.315	0.252
Continuity Adj. Chi-Square	1	0.905	0.334
Mantel-Haenszel Chi-Square	1	1.293	0.256
Fisher's Exact Test (Left)			0.306
(Right)			0.167
2-Tail)			0.298
Phi Coefficient		0.093	
Contingency Coefficient		0.093	
Cramer's V		0.093	

Effective Sample Size = 150

Frequency Missing = 3

TABLE OF RACE BY NUT1

RACE	NUT1		Total
	01	21	
Frequency:			
Percent			
2	55	33	88
	36.18	21.71	57.89
3	1	0	1
	0.66	0.00	0.66
5	37	24	61
	24.34	15.79	40.13
6	2	0	2
	1.32	0.00	1.32
Total	95	57	152
	62.50	37.50	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF RACE BY NUT1

Statistic	DF	Value	Prob
Chi-Square	3	1.889	0.596
Likelihood Ratio Chi-Square	3	2.908	0.406
Mantel-Haenszel Chi-Square	1	0.000	1.000
Phi Coefficient		0.111	
Contingency Coefficient		0.111	
Cramer's V		0.111	

Effective Sample Size = 152

Frequency Missing = 1

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF PEOPLE BY NUT1

PEOPLE	NUT1		Total
	01	21	
Frequency:			
Percent			
1	49	23	72
	33.79	15.86	49.66
2	42	31	73
	28.97	21.08	50.04
Total	91	54	145
	62.76	37.24	100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF PEOPLE BY NUT1

Statistic	DF	Value	Prob
Chi-Square	1	1.717	0.190
Likelihood Ratio Chi-Square	1	1.722	0.189
Continuity Adj. Chi-Square	1	1.296	0.255
Mantel-Haenszel Chi-Square	1	1.705	0.192
Fisher's Exact Test (Left)			0.931
(Right)			0.127
(2-Tail)			0.230
Phi Coefficient		0.109	
Contingency Coefficient		0.108	
Cramer's V		0.109	

Effective Sample Size = 145

Frequency Missing = 8

TABLE OF SSI BY NUT1

SSI	NUT1		Total
Frequency:	0:	2:	
Percent :			
1 :	31 :	19 :	50
:	21.38 :	13.10 :	34.48
2 :	59 :	36 :	95
:	40.69 :	24.83 :	65.52
Total	90	55	145
	62.07	37.93	100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF SSI BY NUT1

Statistic	DF	Value	Prob
Chi-Square	1	0.000	0.990
Likelihood Ratio Chi-Square	1	0.000	0.990
Continuity Adj. Chi-Square	1	0.000	1.000
Mantel-Haenszel Chi-Square	1	0.000	0.990
Fisher's Exact Test (Left)			0.565
(Right)			0.578
(2-Tail)			1.000
Phi Coefficient		-0.001	
Contingency Coefficient		0.001	
Cramer's V		-0.001	

Effective Sample Size = 145

Frequency Missing = 8

TABLE OF ENSTIME BY NUT1

ENSTIME	NUT1		Total
Frequency:	0:	2:	
Percent :			
1 :	11 :	14 :	25
:	7.64 :	9.72 :	17.36
2 :	33 :	15 :	48
:	22.92 :	10.42 :	33.33
3 :	45 :	26 :	71
:	31.25 :	18.06 :	49.31
Total	89	55	144
	61.81	38.19	100.00

Frequency Missing = 9

STATISTICS FOR TABLE OF ENSTIME BY NUT1

Statistic	DF	Value	Prob
Chi-Square	2	4.413	0.110
Likelihood Ratio Chi-Square	2	4.322	0.115
Mantel-Haenszel Chi-Square	1	1.605	0.205
Phi Coefficient		0.175	
Contingency Coefficient		0.172	
Cramer's V		0.175	

Effective Sample Size = 144

Frequency Missing = 9

TABLE OF AGE BY NUT2

AGE	NUT2		Total
Frequency:	0:	3:	
Percent :			
1 :	3 :	0 :	3
	2.05 :	0.00 :	2.05
2 :	21 :	4 :	25
	14.38 :	2.74 :	17.12
3 :	52 :	7 :	59
	35.62 :	4.79 :	40.41
4 :	41 :	7 :	48
	28.08 :	4.79 :	32.88
5 :	9 :	2 :	11
	6.16 :	1.37 :	7.53
Total	126	20	146
	86.30	13.70	100.00

Frequency Missing = 7

STATISTICS FOR TABLE OF AGE BY NUT2

Statistic	DF	Value	Prob
Chi-Square	4	0.975	0.914
Likelihood Ratio Chi-Square	4	1.369	0.850
Mantel-Haenszel Chi-Square	1	0.195	0.659
Phi Coefficient		0.082	
Contingency Coefficient		0.081	
Cramer's V		0.082	

Effective Sample Size = 146

Frequency Missing = 7

WARNING: 40% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF SEX BY NUT2

SEX	NUT2		Total
Frequency:	0:	3:	
Percent :			
1 :	51 :	6 :	57
	34.00 :	4.00 :	38.00
2 :	79 :	14 :	93
	52.67 :	9.33 :	62.00
Total	130	20	150
	86.67	13.33	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF SEX BY NUT2

Statistic	DF	Value	Prob
Chi-Square	1	0.627	0.429
Likelihood Ratio Chi-Square	1	0.645	0.422
Continuity Adj. Chi-Square	1	0.296	0.586
Mantel-Haenszel Chi-Square	1	0.620	0.430
Fisher's Exact Test (Left)			0.851
(Right)			0.297
(2-Tail)			0.470
Phi Coefficient		0.065	
Contingency Coefficient		0.065	
Cramer's V		0.065	

Effective Sample Size = 150

Frequency Missing = 3

TABLE OF RACE BY NUT2

RACE	NUT2		Total
Frequency:	0:	3:	
Percent :			
2 :	81 :	7 :	88
:	53.29 :	4.61 :	57.89
3 :	0 :	1 :	1
:	0.00 :	0.66 :	0.66
5 :	48 :	13 :	61
:	31.58 :	8.55 :	40.13
6 :	2 :	0 :	2
:	1.32 :	0.00 :	1.32
Total	131	21	152
	86.18	13.82	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF RACE BY NUT2

Statistic	DF	Value	Prob
Chi-Square	3	11.976	0.007
Likelihood Ratio Chi-Square	3	10.018	0.018
Mantel-Haenszel Chi-Square	1	4.462	0.035
Phi Coefficient		0.281	
Contingency Coefficient		0.270	
Cramer's V		0.281	

Effective Sample Size = 152

Frequency Missing = 1

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF PEOPLE BY NUT2

PEOPLE	NUT2		Total
Frequency:	0:	3:	
Percent :			
1 :	58 :	14 :	72
:	40.00 :	9.66 :	49.66
2 :	67 :	6 :	73
:	45.21 :	4.14 :	50.34
Total	125	20	145
	86.21	13.79	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF PEOPLE BY NUT2

Statistic	DF	Value	Prob
Chi-Square	1	3.841	0.050
Likelihood Ratio Chi-Square	1	3.933	0.047
Continuity Adj. Chi-Square	1	2.955	0.086
Mantel-Haenszel Chi-Square	1	3.815	0.051
Fisher's Exact Test (Left)			4.19E-02
(Right)			0.987
(2-Tail)			5.73E-02
Phi Coefficient		-0.163	
Contingency Coefficient		0.161	
Cramer's V		-0.163	

Effective Sample Size = 145

Frequency Missing = 3



TABLE OF SSI BY NUT2

SSI	NUT2		Total
	0	3	
Frequency:			
Percent :			
1 :	39 :	11 :	50
	26.90 :	7.59 :	34.48
2 :	85 :	10 :	95
	58.62 :	6.90 :	65.52
Total	124	21	145
	85.52	14.48	100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF SSI BY NUT2

Statistic	DF	Value	Prob
Chi-Square	1	3.482	0.062
Likelihood Ratio Chi-Square	1	3.328	0.068
Continuity Adj. Chi-Square	1	2.617	0.106
Mantel-Haenszel Chi-Square	1	3.458	0.063
Fisher's Exact Test (Left)			5.51E-02
(Right)			0.981
(2-Tail)			8.20E-02
Phi Coefficient		-0.155	
Contingency Coefficient		0.153	
Cramer's V		-0.155	

Effective Sample Size = 145  
 Frequency Missing = 8

TABLE OF ENSTIME BY NUT2

ENSTIME	NUT2		Total
	0	3	
Frequency:			
Percent :			
1 :	20 :	5 :	25
	13.89 :	3.47 :	17.36
2 :	43 :	5 :	48
	29.86 :	3.47 :	33.33
3 :	63 :	8 :	71
	43.75 :	5.56 :	49.31
Total	126	18	144
	87.50	12.50	100.00

Frequency Missing = 9

STATISTICS FOR TABLE OF ENSTIME BY NUT2

Statistic	DF	Value	Prob
Chi-Square	2	1.575	0.455
Likelihood Ratio Chi-Square	2	1.417	0.492
Mantel-Haenszel Chi-Square	1	0.845	0.358
Phi Coefficient		0.105	
Contingency Coefficient		0.104	
Cramer's V		0.105	

Effective Sample Size = 144  
 Frequency Missing = 9

TABLE OF AGE BY NUT3

AGE	NUT3		Total
Frequency:	0:	2:	
Percent :			
1 :	2 :	1 :	3
: 1.37 :	0.68 :		2.05
2 :	13 :	12 :	25
: 8.90 :	8.22 :		17.12
3 :	37 :	22 :	59
: 25.34 :	15.07 :		40.41
4 :	30 :	18 :	48
: 20.55 :	12.33 :		32.88
5 :	5 :	6 :	11
: 3.42 :	4.11 :		7.53
Total	67	59	146
	59.59	40.41	100.00

Frequency Missing = 7

STATISTICS FOR TABLE OF AGE BY NUT3

Statistic	DF	Value	Prob
Chi-Square	4	1.981	0.739
Likelihood Ratio Chi-Square	4	1.955	0.744
Mantel-Haenszel Chi-Square	1	0.002	0.964
Phi Coefficient		0.116	
Contingency Coefficient		0.116	
Cramer's V		0.116	

Effective Sample Size = 146

Frequency Missing = 7

WARNING: 30% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF SEX BY NUT3

SEX	NUT3		Total
Frequency:	0:	2:	
Percent :			
1 :	40 :	17 :	57
: 26.67 :	11.33 :		38.00
2 :	50 :	43 :	93
: 33.33 :	28.67 :		62.00
Total	90	60	150
	60.00	40.00	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF SEX BY NUT3

Statistic	DF	Value	Prob
Chi-Square	1	3.966	0.046
Likelihood Ratio Chi-Square	1	4.037	0.045
Continuity Adj. Chi-Square	1	3.312	0.069
Mantel-Haenszel Chi-Square	1	3.940	0.047
Fisher's Exact Test (Left)			0.985
(Right)			3.36E-02
(2-Tail)			5.30E-02
Phi Coefficient		0.163	
Contingency Coefficient		0.161	
Cramer's V		0.163	

Effective Sample Size = 150

Frequency Missing = 3

TABLE OF RACE BY NUT3

RACE	NUT3		Total
Frequency:	01	21	
Percent			
2	55	33	88
	36.18	21.71	57.89
3	0	1	1
	0.00	0.66	0.66
5	34	27	61
	22.37	17.76	40.13
6	2	0	2
	1.32	0.00	1.32
Total	91	61	152
	59.87	40.13	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF RACE BY NUT3

Statistic	DF	Value	Prob
Chi-Square	3	3.519	0.318
Likelihood Ratio Chi-Square	3	4.563	0.207
Mantel-Haenszel Chi-Square	1	0.298	0.585
Phi Coefficient		0.152	
Contingency Coefficient		0.150	
Cramer's V		0.152	

Effective Sample Size = 152

Frequency Missing = 1

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF PEOPLE BY NUT3

PEOPLE	NUT3		Total
Frequency:	01	21	
Percent			
1	43	29	72
	29.66	20.00	49.66
2	41	32	73
	28.28	22.07	50.34
Total	84	61	145
	57.93	42.07	100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF PEOPLE BY NUT3

Statistic	DF	Value	Prob
Chi-Square	1	0.188	0.664
Likelihood Ratio Chi-Square	1	0.188	0.664
Continuity Adj. Chi-Square	1	0.071	0.790
Mantel-Haenszel Chi-Square	1	0.187	0.665
Fisher's Exact Test (Left)			0.726
(Right)			0.395
(2-Tail)			0.707
Phi Coefficient		0.036	
Contingency Coefficient		0.036	
Cramer's V		0.036	

Effective Sample Size = 145

Frequency Missing = 8

TABLE OF SSI BY NUTS

SSI	NUTS		Total
	01	21	
Frequency:			
Percent :			
1 :	27 :	23 :	50
	18.62 :	15.86 :	34.48
2 :	57 :	38 :	95
	39.31 :	26.21 :	65.52
Total	84	61	145
	57.93	42.07	100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF SSI BY NUTS

Statistic	DF	Value	Prob
Chi-Square	1	0.484	0.487
Likelihood Ratio Chi-Square	1	0.482	0.487
Continuity Adj. Chi-Square	1	0.269	0.604
Mantel-Haenszel Chi-Square	1	0.481	0.488
Fisher's Exact Test (Left)			0.301
(Right)			0.809
(2-Tail)			0.596
Phi Coefficient		-0.058	
Contingency Coefficient		0.058	
Cramer's V		-0.058	

Effective Sample Size = 145  
Frequency Missing = 8

TABLE OF ENSTIME BY NUTS

ENSTIME	NUTS		Total
	01	21	
Frequency:			
Percent :			
1 :	8 :	17 :	25
	5.56 :	11.81 :	17.36
2 :	32 :	16 :	48
	22.22 :	11.11 :	33.33
3 :	46 :	25 :	71
	31.94 :	17.36 :	49.31
Total	86	58	144
	59.72	40.28	100.00

Frequency Missing = 9

STATISTICS FOR TABLE OF ENSTIME BY NUTS

Statistic	DF	Value	Prob
Chi-Square	2	9.707	0.008
Likelihood Ratio Chi-Square	2	9.577	0.008
Mantel-Haenszel Chi-Square	1	5.628	0.018
Phi Coefficient		0.260	
Contingency Coefficient		0.251	
Cramer's V		0.260	

Effective Sample Size = 144  
Frequency Missing = 9

TABLE OF AGE BY NUT4

AGE	NUT4		Total
Frequency:	01	21	
Percent			
1	3	0	3
	2.05	0.00	2.05
2	24	1	25
	16.44	0.68	17.12
3	59	0	59
	40.41	0.00	40.41
4	47	1	48
	32.19	0.68	32.88
5	11	0	11
	7.53	0.00	7.53
Total	144	2	146
	98.63	1.37	100.00

Frequency Missing = 7

STATISTICS FOR TABLE OF AGE BY NUT4

Statistic	DF	Value	Prob
Chi-Square	4	2.475	0.649
Likelihood Ratio Chi-Square	4	3.016	0.555
Mantel-Haenszel Chi-Square	1	0.177	0.674
Phi Coefficient		0.130	
Contingency Coefficient		0.123	
Cramer's V		0.130	

Effective Sample Size = 146

Frequency Missing = 7

WARNING: 60% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF SEX BY NUT4

SEX	NUT4		Total
Frequency:	01	21	
Percent			
1	57	0	57
	39.00	0.00	39.00
2	91	2	93
	60.67	1.33	62.00
Total	148	2	150
	98.67	1.33	100.00

Frequency Missing = 0

STATISTICS FOR TABLE OF SEX BY NUT4

Statistic	DF	Value	Prob
Chi-Square	1	1.342	0.265
Likelihood Ratio Chi-Square	1	1.929	0.165
Continuity Adj. Chi-Square	1	0.145	0.700
Mantel-Haenszel Chi-Square	1	1.234	0.267
Fisher's Exact Test (Left)			1.000
(Right)			0.383
(2-Tail)			0.526
Phi Coefficient		0.091	
Contingency Coefficient		0.091	
Cramer's V		0.091	

Effective Sample Size = 150

Frequency Missing = 0

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF RACE BY NUT4

RACE	NUT4		Total
	01	21	
Frequency:			
Percent			
2	88	0	88
	57.89	0.00	57.89
3	1	0	1
	0.66	0.00	0.66
5	59	2	61
	38.82	1.32	40.13
6	2	0	2
	1.32	0.00	1.32
Total	150	2	152
	98.68	1.32	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF RACE BY NUT4

Statistic	DF	Value	Prob
Chi-Square	3	3.023	0.388
Likelihood Ratio Chi-Square	3	3.692	0.297
Mantel-Haenszel Chi-Square	1	2.719	0.099
Phi Coefficient		0.141	
Contingency Coefficient		0.140	
Cramer's V		0.141	

Effective Sample Size = 152

Frequency Missing = 1

WARNING: 75% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF PEOPLE BY NUT4

PEOPLE	NUT4		Total
	01	21	
Frequency:			
Percent			
1	71	1	72
	48.97	0.69	49.66
2	72	1	73
	49.66	0.69	50.34
Total	143	2	145
	98.62	1.38	100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF PEOPLE BY NUT4

Statistic	DF	Value	Prob
Chi-Square	1	0.000	0.992
Likelihood Ratio Chi-Square	1	0.000	0.992
Continuity Adj. Chi-Square	1	0.000	1.000
Mantel-Haenszel Chi-Square	1	0.000	0.992
Fisher's Exact Test (Left)			0.748
(Right)			0.755
(2-Tail)			1.000
Phi Coefficient		-0.001	
Contingency Coefficient		0.001	
Cramer's V		-0.001	

Effective Sample Size = 145

Frequency Missing = 8

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF SSI BY NUT4

SSI	NUT4		Total
	0:	2:	
1	49	1	50
	33.79	0.69	34.48
2	94	1	95
	64.83	0.69	65.52
Total	143	2	145
	98.62	1.38	100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF SSI BY NUT4

Statistic	DF	Value	Prob
Chi-Square	1	0.216	0.642
Likelihood Ratio Chi-Square	1	0.206	0.650
Continuity Adj. Chi-Square	1	0.000	1.000
Mantel-Haenszel Chi-Square	1	0.215	0.640
Fisher's Exact Test (Left)			0.572
(Right)			0.883
(2-Tail)			1.000
Phi Coefficient		-0.039	
Contingency Coefficient		0.039	
Cramer's V		-0.039	

Effective Sample Size = 145

Frequency Missing = 8

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF ENSTIME BY NUT4

ENSTIME	NUT4		Total
	0:	2:	
1	24	1	25
	16.67	0.69	17.36
2	48	0	48
	33.33	0.00	33.33
3	70	1	71
	48.61	0.69	49.31
Total	142	2	144
	98.61	1.39	100.00

Frequency Missing = 9

STATISTICS FOR TABLE OF ENSTIME BY NUT4

Statistic	DF	Value	Prob
Chi-Square	2	1.931	0.383
Likelihood Ratio Chi-Square	2	2.170	0.338
Mantel-Haenszel Chi-Square	1	0.364	0.546
Phi Coefficient		0.115	
Contingency Coefficient		0.115	
Cramer's V		0.115	

Effective Sample Size = 144

Frequency Missing = 9

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF AGE BY NUTS

AGE	NUTS		Total
	0:	2:	
Frequency:			
Percent :			
1 :	1 :	2 :	3
	0.68 :	1.37 :	2.05
2 :	20 :	5 :	25
	13.70 :	3.42 :	17.12
3 :	46 :	13 :	59
	31.51 :	8.90 :	40.41
4 :	40 :	8 :	48
	27.40 :	5.48 :	32.88
5 :	11 :	0 :	11
	7.53 :	0.00 :	7.53
Total	118	28	146
	80.82	19.18	100.00

Frequency Missing = 7

STATISTICS FOR TABLE OF AGE BY NUTS

Statistic	DF	Value	Prob
Chi-Square	4	7.492	0.112
Likelihood Ratio Chi-Square	4	8.409	0.078
Mantel-Haenszel Chi-Square	1	3.885	0.049
Phi Coefficient		0.227	
Contingency Coefficient		0.221	
Cramer's V		0.227	

Effective Sample Size = 146

Frequency Missing = 7

WARNING: 40% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF SEX BY NUTS

SEX	NUTS		Total
	0:	2:	
Frequency:			
Percent :			
1 :	44 :	10 :	57
	29.33 :	6.67 :	38.00
2 :	77 :	16 :	93
	51.33 :	10.67 :	62.00
Total	121	29	150
	80.67	19.33	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF SEX BY NUTS

Statistic	DF	Value	Prob
Chi-Square	1	0.711	0.399
Likelihood Ratio Chi-Square	1	0.701	0.402
Continuity Adj. Chi-Square	1	0.397	0.528
Mantel-Haenszel Chi-Square	1	0.707	0.401
Fisher's Exact Test (Left)			0.262
(Right)			0.854
(2-Tail)			0.403
Phi Coefficient		-0.069	
Contingency Coefficient		0.069	
Cramer's V		-0.069	

Effective Sample Size = 150

Frequency Missing = 3



TABLE OF RACE BY NUTS

RACE	NUTS		
Frequency:	0:	2:	Total
Percent :			
2 :	78 :	10 :	88
:	51.32 :	6.58 :	57.39
3 :	1 :	0 :	1
:	0.66 :	0.00 :	0.66
5 :	42 :	19 :	61
:	27.63 :	12.50 :	40.10
6 :	2 :	0 :	2
:	1.32 :	0.00 :	1.32
Total	123	29	152
	80.92	19.08	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF RACE BY NUTS

Statistic	DF	Value	Prob
Chi-Square	3	9.955	0.020
Likelihood Ratio Chi-Square	3	10.172	0.017
Mantel-Haenszel Chi-Square	1	7.664	0.005
Phi Coefficient		0.255	
Contingency Coefficient		0.247	
Cramer's V		0.255	

Effective Sample Size = 152

Frequency Missing = 1

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF PEOPLE BY NUTS

PEOPLE	NUTS		
Frequency:	0:	2:	Total
Percent :			
1 :	59 :	13 :	72
:	40.69 :	8.97 :	49.66
2 :	59 :	14 :	73
:	40.69 :	9.66 :	50.34
Total	118	27	145
	81.38	18.62	100.00

Frequency Missing = 9

STATISTICS FOR TABLE OF PEOPLE BY NUTS

Statistic	DF	Value	Prob
Chi-Square	1	0.000	0.962
Likelihood Ratio Chi-Square	1	0.000	0.962
Continuity Adj. Chi-Square	1	0.000	1.000
Mantel-Haenszel Chi-Square	1	0.000	0.962
Fisher's Exact Test (Left)			0.650
(Right)			0.516
(2-Tail)			1.000
Phi Coefficient		0.014	
Contingency Coefficient		0.014	
Cramer's V		0.014	

Effective Sample Size = 145

Frequency Missing = 8

TABLE OF SSI BY NUTS

SSI		NUTS		
Frequency:		0:	1:	Total
Percent :				
1 :	39 :	11 :		50
:	26.90 :	7.59 :		34.48
2 :	77 :	18 :		95
:	53.10 :	12.41 :		65.52
Total	116	29		145
	80.00	20.00		100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF SSI BY NUTS

Statistic	DF	Value	Prob
Chi-Square	1	0.191	0.662
Likelihood Ratio Chi-Square	1	0.189	0.664
Continuity Adj. Chi-Square	1	0.048	0.827
Mantel-Haenszel Chi-Square	1	0.189	0.663
Fisher's Exact Test (Left)			0.409
(Right)			0.746
(2-Tail)			0.668
Phi Coefficient		-0.036	
Contingency Coefficient		0.036	
Cramer's V		-0.036	

Effective Sample Size = 145

Frequency Missing = 8

TABLE OF ENSTIME BY NUTS

ENSTIME		NUTS		
Frequency:		0:	1:	Total
Percent :				
1 :	16 :	9 :		25
:	11.11 :	6.25 :		17.36
2 :	41 :	7 :		48
:	28.47 :	4.86 :		33.33
3 :	59 :	12 :		71
:	40.97 :	8.33 :		49.31
Total	116	28		144
	80.56	19.44		100.00

Frequency Missing = 9

STATISTICS FOR TABLE OF ENSTIME BY NUTS

Statistic	DF	Value	Prob
Chi-Square	2	5.392	0.067
Likelihood Ratio Chi-Square	2	4.806	0.090
Mantel-Haenszel Chi-Square	1	2.755	0.097
Phi Coefficient		0.194	
Contingency Coefficient		0.190	
Cramer's V		0.194	

Effective Sample Size = 144

Frequency Missing = 9

TABLE OF AGE BY NUT6

AGE	NUT6		Total
Frequency:	0:	4:	
Percent :			
1 :	2 :	1 :	3
1.37 :	0.69 :	2.05	
2 :	21 :	4 :	25
14.39 :	2.74 :	17.12	
3 :	50 :	9 :	59
34.25 :	6.16 :	40.41	
4 :	39 :	9 :	48
26.71 :	6.16 :	32.88	
5 :	9 :	2 :	11
6.16 :	1.37 :	7.53	
Total	121	25	146
	32.88	17.12	100.00

Frequency Missing = 7

STATISTICS FOR TABLE OF AGE BY NUT6

Statistic	DF	Value	Prob
Chi-Square	4	0.821	0.936
Likelihood Ratio Chi-Square	4	0.730	0.948
Mantel-Haenszel Chi-Square	1	0.006	0.938
Phi Coefficient		0.075	
Contingency Coefficient		0.075	
Cramer's V		0.075	

Effective Sample Size = 146

Frequency Missing = 7

WARNING: 40% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF SEX BY NUT6

SEX	NUT6		Total
Frequency:	0:	4:	
Percent :			
1 :	51 :	6 :	57
34.00 :	4.00 :	38.00	
2 :	73 :	20 :	93
48.67 :	13.33 :	62.00	
Total	124	26	150
	82.67	17.33	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF SEX BY NUT6

Statistic	DF	Value	Prob
Chi-Square	1	2.973	0.085
Likelihood Ratio Chi-Square	1	3.152	0.076
Continuity Adj. Chi-Square	1	2.256	0.133
Mantel-Haenszel Chi-Square	1	2.953	0.086
Fisher's Exact Test (Left			0.977
(Right)			6.09E-02
(2-Tail)			0.119
Phi Coefficient		0.141	
Contingency Coefficient		0.139	
Cramer's V		0.141	

Effective Sample Size = 150

Frequency Missing = 3

TABLE OF RACE BY NUT6

RACE	NUT6		Total
Frequency:	0:	4:	
Percent :			
2 :	79 :	9 :	88
:	51.97 :	5.92 :	57.89
3 :	1 :	0 :	1
:	0.66 :	0.00 :	0.66
5 :	44 :	17 :	61
:	28.95 :	11.18 :	40.13
6 :	2 :	0 :	2
:	1.32 :	0.00 :	1.32
Total	126	26	152
	82.89	17.11	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF RACE BY NUT6

Statistic	DF	Value	Prob
Chi-Square	3	8.539	0.036
Likelihood Ratio Chi-Square	3	8.818	0.032
Mantel-Haenszel Chi-Square	1	6.805	0.009
Phi Coefficient		0.237	
Contingency Coefficient		0.231	
Cramer's V		0.237	

Effective Sample Size = 152

Frequency Missing = 1

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF PEOPLE BY NUT6

PEOPLE	NUT6		Total
Frequency:	0:	4:	
Percent :			
1 :	56 :	16 :	72
:	38.62 :	11.03 :	49.66
2 :	65 :	8 :	73
:	44.83 :	5.52 :	50.34
Total	121	24	145
	83.45	16.55	100.00

Frequency Missing = 5

STATISTICS FOR TABLE OF PEOPLE BY NUT6

Statistic	DF	Value	Prob
Chi-Square	1	3.322	0.068
Likelihood Ratio Chi-Square	1	3.332	0.066
Continuity Adj. Chi-Square	1	2.564	0.109
Mantel-Haenszel Chi-Square	1	3.300	0.069
Fisher's Exact Test			5.41E-02
			0.980
			7.74E-02
Phi Coefficient		-0.152	
Contingency Coefficient		0.150	
Cramer's V		-0.152	

Effective Sample Size = 145

Frequency Missing = 8

TABLE OF SSI BY NUT6

SSI	NUT6		Total
Frequency:	01	41	
Percent			
1	36	14	50
	24.83	9.66	34.48
2	93	12	95
	57.24	8.28	65.52
Total	119	26	145
	82.07	17.93	100.00

Frequency Missing = 0

STATISTICS FOR TABLE OF SSI BY NUT6

Statistic	DF	Value	Prob
Chi-Square	1	5.258	0.022
Likelihood Ratio Chi-Square	1	5.034	0.025
Continuity Adj. Chi-Square	1	4.265	0.039
Mantel-Haenszel Chi-Square	1	5.221	0.022
Fisher's Exact Test (Left)			2.10E-02
(Right)			0.993
(2-Tail)			0.36E-02
Phi Coefficient		-0.190	
Contingency Coefficient		0.187	
Cramer's V		-0.190	

Effective Sample Size = 145

Frequency Missing = 0

TABLE OF ENSTIME BY NUT6

ENSTIME	NUT6		Total
Frequency:	01	41	
Percent			
1	21	4	25
	14.58	2.78	17.36
2	40	8	48
	27.78	5.56	33.33
3	58	15	71
	40.28	9.03	49.31
Total	119	25	144
	82.64	17.36	100.00

Frequency Missing = 0

STATISTICS FOR TABLE OF ENSTIME BY NUT6

Statistic	DF	Value	Prob
Chi-Square	2	0.093	0.955
Likelihood Ratio Chi-Square	2	0.093	0.954
Mantel-Haenszel Chi-Square	1	0.088	0.767
Phi Coefficient		0.025	
Contingency Coefficient		0.025	
Cramer's V		0.025	

Effective Sample Size = 144

Frequency Missing = 0

TABLE OF AGE BY NUT7

AGE	NUT7		Total
Frequency:	0:	1:	
Percent			
1	0	3	3
	0.00	2.05	2.05
2	19	6	25
	13.01	4.11	17.12
3	35	24	59
	23.97	16.44	40.41
4	24	24	48
	16.44	16.44	32.88
5	4	7	11
	2.74	4.79	7.53
Total	82	64	146
	56.16	43.84	100.00

Frequency Missing = 7

STATISTICS FOR TABLE OF AGE BY NUT7

Statistic	DF	Value	Prob
Chi-Square	4	10.571	0.032
Likelihood Ratio Chi-Square	4	11.929	0.018
Mantel-Haenszel Chi-Square	1	2.697	0.101
Phi Coefficient		0.269	
Contingency Coefficient		0.260	
Cramer's V		0.269	

Effective Sample Size = 146

Frequency Missing = 7

WARNING: 30% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF SEX BY NUT7

SEX	NUT7		Total
Frequency:	0:	1:	
Percent			
1	43	14	57
	28.67	9.33	38.00
2	43	50	93
	28.67	33.33	62.00
Total	86	64	150
	57.33	42.67	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF SEX BY NUT7

Statistic	DF	Value	Prob
Chi-Square	1	12.020	0.000
Likelihood Ratio Chi-Square	1	12.757	0.000
Continuity Adj. Chi-Square	1	11.155	0.001
Mantel-Haenszel Chi-Square	1	12.207	0.000
Fisher's Exact Test (Left)			1.000
(Right)			3.51E-04
(2-Tail)			6.10E-04
Phi Coefficient		0.287	
Contingency Coefficient		0.275	
Cramer's V		0.287	

Effective Sample Size = 150

Frequency Missing = 3

TABLE OF RACE BY NUT7

RACE	NUT7		Total
Frequency:	0:	1:	
Percent :			
2 :	57 :	31 :	88
:	37.50 :	20.39 :	57.89
3 :	1 :	0 :	1
:	0.66 :	0.00 :	0.66
5 :	27 :	34 :	61
:	17.76 :	22.37 :	40.13
6 :	1 :	1 :	2
:	0.66 :	0.66 :	1.32
Total	86	66	152
	56.58	43.42	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF RACE BY NUT7

Statistic	DF	Value	Prob
Chi-Square	3	6.974	0.073
Likelihood Ratio Chi-Square	3	7.350	0.062
Mantel-Haenszel Chi-Square	1	6.101	0.014
Phi Coefficient		0.214	
Contingency Coefficient		0.209	
Cramer's V		0.214	

Effective Sample Size = 152

Frequency Missing = 1

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF PEOPLE BY NUT7

PEOPLE	NUT7		Total
Frequency:	0:	1:	
Percent :			
1 :	23 :	49 :	72
:	15.86 :	33.79 :	49.66
2 :	60 :	13 :	73
:	41.38 :	8.97 :	50.34
Total	83	62	145
	57.24	42.76	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF PEOPLE BY NUT7

Statistic	DF	Value	Prob
Chi-Square	1	37.092	0.000
Likelihood Ratio Chi-Square	1	39.355	0.000
Continuity Adj. Chi-Square	1	35.367	0.000
Mantel-Haenszel Chi-Square	1	37.134	0.000
Fisher's Exact Test (Left)			5.74E-10
(Right)			1.000
(2-Tail)			7.21E-10
Phi Coefficient		-0.508	
Contingency Coefficient		0.453	
Cramer's V		-0.508	

Effective Sample Size = 145

Frequency Missing = 3

TABLE OF SSI BY NUT7

SSI		NUT7		Total
Frequency:	0:	1:		
Percent	:	:	:	
1	:	21	:	29
	:	14.48	:	20.00
2	:	61	:	34
	:	42.07	:	23.45
Total		82		63
		56.55		43.45
				145

Frequency Missing = 8

STATISTICS FOR TABLE OF SSI BY NUT7

Statistic	DF	Value	Prob
Chi-Square	1	6.577	0.010
Likelihood Ratio Chi-Square	1	6.563	0.010
Continuity Adj. Chi-Square	1	5.704	0.017
Mantel-Haenszel Chi-Square	1	6.532	0.011
Fisher's Exact Test (Left)			0.51E-02
(Right)			0.997
(2-Tail)			1.05E-02
Phi Coefficient		-0.213	
Contingency Coefficient		0.208	
Cramer's V		-0.213	

Effective Sample Size = 145

Frequency Missing = 8

TABLE OF ENSTIME BY NUT7

ENSTIME		NUT7		Total
Frequency:	0:	1:		
Percent	:	:	:	
1	:	16	:	9
	:	11.11	:	6.25
2	:	31	:	17
	:	21.53	:	11.81
3	:	34	:	37
	:	23.61	:	25.69
Total		81		60
		56.25		43.75
				144

Frequency Missing = 9

STATISTICS FOR TABLE OF ENSTIME BY NUT7

Statistic	DF	Value	Prob
Chi-Square	2	3.982	0.137
Likelihood Ratio Chi-Square	2	4.001	0.135
Mantel-Haenszel Chi-Square	1	3.078	0.079
Phi Coefficient		0.166	
Contingency Coefficient		0.164	
Cramer's V		0.166	

Effective Sample Size = 144

Frequency Missing = 9



TABLE OF AGE BY NUTS

AGE	NUTS		
Frequency:	0:	1:	Total
Percent :			
1 :	2 :	1 :	3
:	1.37 :	0.68 :	2.05
2 :	14 :	11 :	25
:	9.59 :	7.53 :	17.12
3 :	27 :	32 :	59
:	18.49 :	21.92 :	40.41
4 :	23 :	25 :	48
:	15.75 :	17.12 :	32.88
5 :	5 :	6 :	11
:	3.42 :	4.11 :	7.53
Total	71	75	146
	48.63	51.37	100.00

Frequency Missing = 7

STATISTICS FOR TABLE OF AGE BY NUTS

Statistic	DF	Value	Prob
Chi-Square	4	1.183	0.881
Likelihood Ratio Chi-Square	4	1.190	0.880
Mantel-Haenszel Chi-Square	1	0.527	0.468
Phi Coefficient		0.090	
Contingency Coefficient		0.090	
Cramer's V		0.090	

Effective Sample Size = 146  
Frequency Missing = 7

TABLE OF SEX BY NUTS

SEX	NUTS		
Frequency:	0:	1:	Total
Percent :			
1 :	36 :	21 :	57
:	24.00 :	14.00 :	38.00
2 :	39 :	54 :	93
:	26.00 :	36.00 :	62.00
Total	75	75	150
	50.00	50.00	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF SEX BY NUTS

Statistic	DF	Value	Prob
Chi-Square	1	6.367	0.012
Likelihood Ratio Chi-Square	1	6.424	0.011
Continuity Adj. Chi-Square	1	5.546	0.019
Mantel-Haenszel Chi-Square	1	6.324	0.012
Fisher's Exact Test (Left)			0.997
(Right)			9.08E-03
(2-Tail)			1.32E-02
Phi Coefficient		0.206	
Contingency Coefficient		0.202	
Cramer's V		0.206	

Effective Sample Size = 150  
Frequency Missing = 3

TABLE OF RACE BY NUT8

RACE	NUT8		Total
Frequency:	01	11	
Percent :			
2	41	47	88
	26.97	30.92	57.89
3	0	1	1
	0.00	0.66	0.66
5	33	28	61
	21.71	18.42	40.13
6	2	0	2
	1.32	0.00	1.32
Total	76	76	152
	50.00	50.00	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF RACE BY NUT8

Statistic	DF	Value	Prob
Chi-Square	3	0.819	0.282
Likelihood Ratio Chi-Square	3	4.979	0.173
Mantel-Haenszel Chi-Square	1	1.416	0.234
Phi Coefficient		0.159	
Contingency Coefficient		0.157	
Cramer's V		0.159	

Effective Sample Size = 152

Frequency Missing = 1

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF PEOPLE BY NUT8

PEOPLE	NUT8		Total
Frequency:	01	11	
Percent :			
1	39	33	72
	26.90	22.76	49.66
2	32	41	73
	22.07	28.28	50.34
Total	71	74	145
	48.97	51.03	100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF PEOPLE BY NUT8

Statistic	DF	Value	Prob
Chi-Square	1	1.540	0.213
Likelihood Ratio Chi-Square	1	1.551	0.213
Continuity Adj. Chi-Square	1	1.162	0.281
Mantel-Haenszel Chi-Square	1	1.538	0.215
Fisher's Exact Test: Left			0.321
(Right)			0.140
(2-Tail)			0.246
Phi Coefficient		0.100	
Contingency Coefficient		0.100	
Cramer's V		0.100	

Effective Sample Size = 145

Frequency Missing = 8

TABLE OF SSI BY NUT8

SSI	NUT8		Total
Frequency:	0:	1:	
Percent :			
1 :	24 :	26 :	50
:	16.55 :	17.93 :	34.48
2 :	49 :	46 :	95
:	33.79 :	31.72 :	65.52
Total	73	72	145
	50.34	49.66	100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF SSI BY NUT8

Statistic	DF	Value	Prob
Chi-Square	1	0.168	0.682
Likelihood Ratio Chi-Square	1	0.168	0.682
Continuity Adj. Chi-Square	1	0.055	0.814
Mantel-Haenszel Chi-Square	1	0.167	0.683
Fisher's Exact Test (Left)			0.407
(Right)			0.720
(2-Tail)			0.729
Phi Coefficient		-0.034	
Contingency Coefficient		0.034	
Cramer's V		-0.034	

Effective Sample Size = 145

Frequency Missing = 8

TABLE OF ENSTIME BY NUT8

ENSTIME	NUT8		Total
Frequency:	0:	1:	
Percent :			
1 :	14 :	11 :	25
:	9.72 :	7.64 :	17.36
2 :	22 :	26 :	48
:	15.28 :	18.06 :	33.33
3 :	35 :	36 :	71
:	24.31 :	25.00 :	49.31
Total	71	73	144
	49.31	50.69	100.00

Frequency Missing = 9

STATISTICS FOR TABLE OF ENSTIME BY NUT8

Statistic	DF	Value	Prob
Chi-Square	2	0.686	0.712
Likelihood Ratio Chi-Square	2	0.681	0.711
Mantel-Haenszel Chi-Square	1	0.138	0.710
Phi Coefficient		0.069	
Contingency Coefficient		0.069	
Cramer's V		0.069	

Effective Sample Size = 144

Frequency Missing = 9

TABLE OF AGE BY NUT9

AGE	NUT9		Total
Frequency:	0:	1:	
Percent :			
1	1	2	3
	0.68	1.37	2.05
2	20	5	25
	13.70	3.42	17.12
3	43	16	59
	29.45	10.96	40.41
4	39	9	48
	26.71	6.16	32.88
5	7	4	11
	4.79	2.74	7.53
Total	110	36	146
	75.34	24.66	100.00

Frequency Missing = 7

STATISTICS FOR TABLE OF AGE BY NUT9

Statistic	DF	Value	Prob
Chi-Square	4	5.047	0.282
Likelihood Ratio Chi-Square	4	4.543	0.337
Mantel-Haenszel Chi-Square	1	0.113	0.731
Phi Coefficient		0.186	
Contingency Coefficient		0.183	
Cramer's V		0.186	

Effective Sample Size = 146

Frequency Missing = 7

WARNING: 30% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF SEX BY NUT9

SEX	NUT9		Total
Frequency:	0:	1:	
Percent :			
1	47	10	57
	31.33	6.67	38.00
2	66	27	93
	44.00	18.00	62.00
Total	113	37	150
	75.33	24.67	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF SEX BY NUT9

Statistic	DF	Value	Prob
Chi-Square	1	2.510	0.113
Likelihood Ratio Chi-Square	1	2.537	0.107
Continuity Adj. Chi-Square	1	1.930	0.165
Mantel-Haenszel Chi-Square	1	2.493	0.114
Fisher's Exact Test (Left)			0.964
(Right)			3.09E-02
(2-Tail)			0.123
Phi Coefficient		0.129	
Contingency Coefficient		0.128	
Cramer's V		0.129	

Effective Sample Size = 150

Frequency Missing = 3

TABLE OF RACE BY NUT9

RACE	NUT9		Total
Frequency:	01	21	
Percent :			
2	71	17	88
	46.71	11.18	57.89
3	1	0	1
	0.66	0.00	0.66
5	41	20	61
	26.97	13.16	40.13
6	2	0	2
	1.32	0.00	1.32
Total	115	37	152
	75.66	24.34	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF RACE BY NUT9

Statistic	DF	Value	Prob
Chi-Square	3	4.533	0.209
Likelihood Ratio Chi-Square	3	5.151	0.161
Mantel-Haenszel Chi-Square	1	2.795	0.095
Phi Coefficient		0.173	
Contingency Coefficient		0.170	
Cramer's V		0.173	

Effective Sample Size = 152

Frequency Missing = 1

WARNING: 50% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF PEOPLE BY NUT9

PEOPLE	NUT9		Total
Frequency:	01	21	
Percent :			
1	51	21	72
	35.17	14.48	49.66
2	59	14	73
	40.69	9.66	50.34
Total	110	25	145
	75.86	24.14	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF PEOPLE BY NUT9

Statistic	DF	Value	Prob
Chi-Square	1	1.975	0.160
Likelihood Ratio Chi-Square	1	1.985	0.159
Continuity Adj. Chi-Square	1	1.467	0.226
Mantel-Haenszel Chi-Square	1	1.961	0.161
Fisher's Exact Test (Left)			0.113
(Right)			0.945
(2-Tail)			0.178
Phi Coefficient		-0.117	
Contingency Coefficient		0.116	
Cramer's V		-0.117	

Effective Sample Size = 145

Frequency Missing = 3

TABLE OF SSI BY NUT9

SSI		NUT9		
Frequency:		0:	2:	Total
Percent :				
1 :	34 :	16 :		50
	23.45 :	11.03 :		34.48
2 :	77 :	18 :		95
	53.10 :	12.41 :		65.52
Total	111	34		145
	76.55	23.45		100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF SSI BY NUT9

Statistic	DF	Value	Prob
Chi-Square	1	3.109	0.078
Likelihood Ratio Chi-Square	1	3.020	0.082
Continuity Adj. Chi-Square	1	2.425	0.119
Mantel-Haenszel Chi-Square	1	3.088	0.079
Fisher's Exact Test (Left)			6.11E-02
(Right)			0.974
(2-Tail)			9.92E-02
Phi Coefficient		-0.146	
Contingency Coefficient		0.145	
Cramer's V		-0.146	

Effective Sample Size = 145

Frequency Missing = 8

TABLE OF ENSTIME BY NUT9

ENSTIME		NUT9		
Frequency:		0:	2:	Total
Percent :				
1 :	16 :	9 :		25
	11.11 :	6.25 :		17.36
2 :	38 :	10 :		48
	26.09 :	6.94 :		33.03
3 :	55 :	16 :		71
	38.19 :	11.11 :		49.31
Total	109	35		144
	75.69	24.31		100.00

Frequency Missing = 9

STATISTICS FOR TABLE OF ENSTIME BY NUT9

Statistic	DF	Value	Prob
Chi Square	2	2.294	0.318
Likelihood Ratio Chi-Square	2	2.149	0.341
Mantel-Haenszel Chi-Square	1	1.160	0.281
Phi Coefficient		0.126	
Contingency Coefficient		0.125	
Cramer's V		0.126	

Effective Sample Size = 144

Frequency Missing = 9

TABLE OF AGE BY NUT10

AGE	NUT10		
Frequency:	0:	2:	Total
Percent :			
1 :	0 :	0 :	3
:	2.05 :	0.00 :	2.05
2 :	21 :	4 :	25
:	14.38 :	2.74 :	17.12
3 :	47 :	12 :	59
:	32.19 :	8.22 :	40.41
4 :	40 :	8 :	48
:	27.40 :	5.48 :	32.88
5 :	10 :	1 :	11
:	6.85 :	0.68 :	7.53
Total	121	25	146
	82.88	17.12	100.00

Frequency Missing = 7

STATISTICS FOR TABLE OF AGE BY NUT10

Statistic	DF	Value	Prob
Chi-Square	4	1.579	0.913
Likelihood Ratio Chi-Square	4	2.151	0.708
Mantel-Haenszel Chi-Square	1	0.027	0.869
Phi Coefficient		0.104	
Contingency Coefficient		0.103	
Cramer's V		0.104	

Effective Sample Size = 146

Frequency Missing = 7

WARNING: 40% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF SEX BY NUT10

SEX	NUT10		
Frequency:	0:	2:	Total
Percent :			
1 :	49 :	8 :	57
:	32.67 :	5.33 :	38.00
2 :	75 :	18 :	93
:	50.00 :	12.00 :	62.00
Total	124	26	150
	82.67	17.33	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF SEX BY NUT10

Statistic	DF	Value	Prob
Chi-Square	1	0.698	0.400
Likelihood Ratio Chi-Square	1	0.714	0.398
Continuity Adj. Chi-Square	1	0.376	0.540
Mantel-Haenszel Chi-Square	1	0.693	0.405
Fisher's Exact Test (Left)			0.255
(Right)			0.270
(2-Tail)			0.507
Phi Coefficient		0.068	
Contingency Coefficient		0.068	
Cramer's V		0.068	

Effective Sample Size = 150

Frequency Missing = 0

TABLE OF RACE BY NUT10

RACE		NUT10		
Frequency:		0:	2:	Total
Percent :				
2 :	75 :	13 :		88
:	49.34 :	8.55 :		57.89
3 :	1 :	0 :		1
:	0.66 :	0.00 :		0.66
5 :	48 :	13 :		61
:	31.58 :	8.55 :		40.13
6 :	1 :	1 :		2
:	0.66 :	0.66 :		1.02
Total	125	27		152
	82.24	17.76		100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF RACE BY NUT10

Statistic	DF	Value	Prob
Chi-Square	3	2.703	0.440
Likelihood Ratio Chi-Square	3	2.531	0.470
Mantel-Haenszel Chi-Square	1	1.585	0.208
Phi Coefficient		0.133	
Contingency Coefficient		0.132	
Cramer's V		0.133	

Effective Sample Size = 152

Frequency Missing = 1

WARNING: 30% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

TABLE OF PEOPLE BY NUT10

PEOPLE		NUT10		
Frequency:		0:	2:	Total
Percent :				
1 :	60 :	12 :		72
:	41.38 :	8.28 :		49.66
2 :	59 :	14 :		73
:	40.69 :	9.66 :		50.34
Total	119	26		145
	82.07	17.93		100.00

Frequency Missing = 8

STATISTICS FOR TABLE OF PEOPLE BY NUT10

Statistic	DF	Value	Prob
Chi-Square	1	0.155	0.693
Likelihood Ratio Chi-Square	1	0.150	0.693
Continuity Adj. Chi-Square	1	0.022	0.631
Mantel-Haenszel Chi-Square	1	0.154	0.694
Fisher's Exact Test (Left)			0.722
(Right)			0.409
(2-Tail)			0.521
Phi Coefficient		0.033	
Contingency Coefficient		0.033	
Cramer's V		0.033	

Effective Sample Size = 145

Frequency Missing = 8



TABLE OF SSI BY NUT10

SSI		NUT10		Total
Frequency:	0:	2:		
Percent :				
1 :	40 :	10 :	50	
	27.59 :	6.90 :	34.48	
2 :	79 :	16 :	95	
	54.40 :	11.00 :	65.51	
Total	119	26	145	
	82.07	17.93	100.00	

Frequency Missing = 9

STATISTICS FOR TABLE OF SSI BY NUT10

Statistic	DF	Value	Prob
Chi-Square	1	0.222	0.638
Likelihood Ratio Chi-Square	1	0.219	0.640
Continuity Adj. Chi-Square	1	0.059	0.808
Mantel-Haenszel Chi-Square	1	0.220	0.639
Fisher's Exact Test (Left)			0.328
(Right)			0.760
(2-Tail)			0.654
Phi Coefficient		-0.039	
Contingency Coefficient		0.039	
Cramer's V		-0.039	

Effective Sample Size = 145

Frequency Missing = 0

TABLE OF ENSTIME BY NUT10

ENSTIME		NUT10		Total
Frequency:	0:	2:		
Percent :				
1 :	22 :	3 :	25	
	15.28 :	2.08 :	17.36	
2 :	39 :	9 :	48	
	27.08 :	6.25 :	33.33	
3 :	57 :	14 :	71	
	39.58 :	9.72 :	49.31	
Total	118	26	144	
	81.94	18.06	100.00	

Frequency Missing = 9

STATISTICS FOR TABLE OF ENSTIME BY NUT10

Statistic	DF	Value	Prob
Chi-Square	2	0.768	0.681
Likelihood Ratio Chi-Square	2	0.831	0.660
Mantel-Haenszel Chi-Square	1	0.599	0.439
Phi Coefficient		0.070	
Contingency Coefficient		0.070	
Cramer's V		0.070	

Effective Sample Size = 144

Frequency Missing = 9

**APPENDIX F**

**INSTITUTIONAL REVIEW BOARD**

**APPROVAL FORM**

**OKLAHOMA STATE UNIVERSITY  
INSTITUTIONAL REVIEW BOARD  
HUMAN SUBJECTS REVIEW**

**Date:** 10-14-94

**IRB#:** HE-95-006

**Proposal Title:** IDENTIFICATION OF NUTRITIONAL RISKS AMONG ELDERLY UTILIZING THE NUTRITION SCREENING INITIATIVE

**Principal Investigator(s):** Bernice Kopel, Lea Ebro, Shannon Kennedy

**Reviewed and Processed as:** Exempt

**Approval Status Recommended by Reviewer(s):** Approved with Provision

APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.

APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.

ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

**PROVISION REQUESTED:**

It is assumed by the reviewer, based on responses given on the application and the accompanying material, that subjects who place their names on the questionnaire and who have high scores will be approached by the consulting dietitian for further screening or nutrition education. If this is true, will the subjects be informed of this procedure at the time that the questionnaires are distributed? Please provide clarification regarding this matter.

**DO NOT PROCEED WITH THIS STUDY PRIOR TO RECEIVING FINAL APPROVAL.**

Please submit your response to Jennifer Moore, IRB Executive Secretary, 005 LSE, x45700.

If you have any strong disagreements with the reviewer's recommendations, you may respond in writing to the executive secretary or request a meeting with the full IRB to discuss the recommendations.

Signature:



Chair of Institutional Review Board

Date: October 17, 1994

## VITA

Shannon G. McNeil Kennedy

Candidate for the Degree of

Master of Science

**Thesis: IDENTIFICATION OF FACTORS AFFECTING NUTRITIONAL RISKS OF ELDERLY UTILIZING THE NUTRITION SCREENING INITIATIVE**

### Biographical:

**Personal Data:** Born in Durant, Oklahoma, September 1, 1970, the daughter of Dennis and Brenda McNeil.

**Education:** Graduated from Atoka High School, Atoka, Oklahoma, in May, 1988; received Associate of Science Degree in Pre-Med Tech. from Eastern Oklahoma State College, Wilburton, Oklahoma in May 1990. Attended Oklahoma State University in August 1990 and received Bachelor of Science Degree in Nutritional Sciences Stillwater, Oklahoma in May 1992; completed Approved Pre-Professional Practice Program at Oklahoma State University, May 1993; passed registration exam to meet requirements for American Dietetic Association membership in October 1993; completed requirements for the Master of Science Degree at Oklahoma State University in July, 1995.

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