NUTRITIONAL HEALTH RISKS

IN RURAL ELDERLY

By

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CHAPTER I

NUTRITIONAL HEALTH RISKS IN RURAL ELDERLY

Introduction

One in eight individuals is now age 65 or older, and by the year 2030, it will be one in five (Schlenker, 1993). Of these individuals age 65 and older, it has been estimated that about one quarter of them live in areas that can be defined as rural (Krout, 1986 & Coward and Lee, 1985). This particular population is often not utilized in studies due to the large area that must be covered in order to obtain an adequate amount of data and also because of the difficulty in reaching these individuals. Rural elderly are often hard to reach, sometimes frail and may have incomes below the poverty level (Smiciklas-Wright, Lago, Bernardo & Beard, 1990).

Rural elderly populations need to be assessed for nutrition risks should and equally be considered for distribution of funding for elderly health programs. The nutrition health risks are often higher for rural elderly due to lower frequency of social opportunities, demographic characteristics and accessibility to health care professionals.

According to the Nutrition Screening Initiative, over 85% of older Americans suffer from health risks that could be improved through nutrition intervention (NSI, 1991). These risks could be caused by a number of reasons: difficulties in eating or swallowing, low income, adverse drug-nutrient interactions, alcohol abuse, depression, reduced appetite, functional disabilities, impaired taste and smell and many others (NSI, 1991).

Elderly individuals living in rural areas often have a lower education level and the majority have a lower income than their urban counterparts (Briley, Owens, Gillhav & Sharplin, 1990). These two factors have led to rural elderly spending less money on food and having less access to nutrition/food assistance programs. Since this population is often under-reported in studies, we may see a lack of funding to adequately meet their needs, and a misrepresentation of this segment of the population in research.

The Nutrition Screening Initiative (NSI) was developed in 1989 by The American Academy of Family Physicians, The American Dietetic Association and the National Council on the Aging. It was designed to help nutrition professionals identify individuals who may require nutrition counseling, social or health services, or medical and nutrition intervention which can be easily utilized in rural areas. NSI was also designed to help the elderly realize that they may be at increased risk for nutrition related problems. Current NSI studies have not reported any data on the nutrition risks of rural elderly. This easy to use screening tool will enable us to determine the health risks of an under-represented population of at risk individuals.

Purpose and Objectives

The purpose of this study was to determine the nutritional health risks of elderly ages 60 and over living in rural areas of Oklahoma, utilizing the DETERMINE Your Nutrition Health Checklist developed for NSI.

The objectives of this study were as follows:

1. To assess the nutrition health risks of rural elderly utilizing the "DETERMINE your Nutritional Health" instrument.
2. To determine the association between age and nutrition risk.
3. To determine the association between gender and nutrition risk.
4. To determine the association between ethnic background and nutrition risk.
5. To determine the association between the number of people living in the household and nutrition risk.
6. To determine the association between income and nutritional health risk.
7. To determine the association of the length of time participating in the Elderly Nutrition Program and nutrition risk.
8. To determine the primary sources of nutrition information utilized by rural elderly.
9. To make suggestions and recommendations regarding nutrition education for rural elderly.

Hypotheses

The following hypotheses were postulated for the research study:

H1: There will be no significant association between age and nutrition risk.

H2: There will be no significant association between gender and nutrition risk.

H3: There will be no significant association between ethnic background and nutrition risk.

H4: There will be no significant association between the number of people living in a household and nutrition risk.

H5: There will be no significant association between income and nutrition risk.

H6: There will be no significant association between the length of time participating in the Elderly Nutrition Program and nutrition risk.

Assumptions and Limitations

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

1. Inadequate diets are often found in the rural elderly segment of the population.
2. Rural elderly individuals will be willing to participate and complete the NSI questionnaire.
3. The surveys will be completed accurately and honestly.
4. The instrument is reliable and valid.
5. The instrument does not identify cause of nutritional risk.

The following limitations were present in this study:

1. This study was limited to a select population of elderly adults age 60 and over that participate in Oklahoma's Area Agency on Aging, District 7.
2. The questionnaire was used in communities of $\leq$ 5,000 people.
3. The statements may not be applicable to rural elderly.

Methods And Procedures

In this study, rural elderly who participate in the Elderly Nutrition Program were surveyed in the summer of 1995 to determine the nutritional health risks of elderly ages 60 and over living in rural areas of Oklahoma utilizing the "DETERMINE Your Nutrition Health Checklist".

Research Design

The research method used in this study was descriptive research. Descriptive research describes the state of nature at a point in time. It involves the description, recording, analyses and interpretation of current conditions. It allows the establishment of associations among factors to be determined (Monsen, 1991).

The type of descriptive research used in this study was survey research. Survey research is designed to describe and quantify characteristics of a defined population. Surveys are useful for establishing associations among variables or factors being studied. Surveys are usually used on a representative sample of the population in which a questionnaire or interview is used in order to determine the opinions, attitudes, preferences and perceptions of interest to the researcher (Monsen, 1991).

Sample and Population

The population used in this study was comprised of elderly, age 60 or over, who participated in the congregate meal programs in Oklahoma's Area Agency on Aging, District 7 (Figure 1). District 7 was chosen due to the large number of rural communities and the close proximity to the researcher's residence. All 11 sites chosen for this survey had a population less than 5,000. All those who were willing to participate were included in the study. The study population (332) is based on a monthly average of the meals served at each site (Table 1).

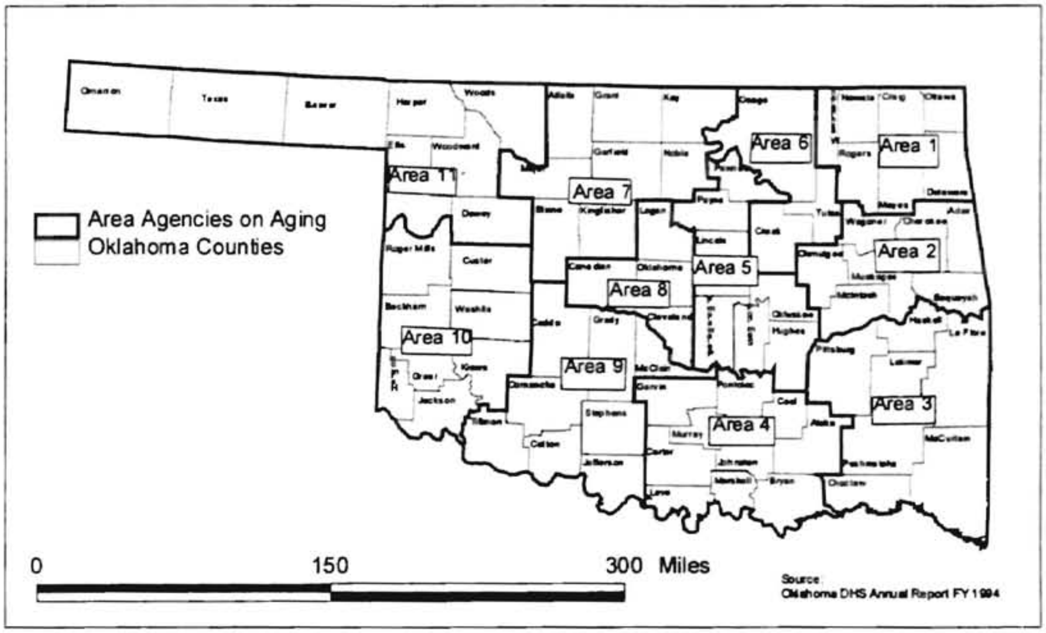

Figure 1. Map Showing Oklahoma Area Agencies on Aging

Table 1.

District 7 Rural Towns with Elderly Nutrition Programs

District 7			
# of Meals per day	City	County	Total City 1990 census
16	Billings	Noble	555
26	Garber	Garfield	959
15	Helena	Alfalfa	1043
35	Medford	Grant	1172
43	Newkirk	Kay	2168
47	Perry	Noble	4978
20	Pondcreek	Grant	982
45	Ringwood	Major	394
38	Tonkawa	Kay	3127
26	Watonga	Blaine	3408
21	Waukomis	Garfield	1322
332	Total		

Data Collection

Planning and Development

The survey instrument was adapted from the "DETERMINE Your Nutrition Health Checklist" developed for NSI. The demographic questions were added to determine associations between health risks and selected variables. The survey consisted of seven demographic questions and 10 nutrition risk statements, taken directly from the Determine Your Nutrition Health Checklist. The demographic questions were derived from State of Washington survey (1995). The questionnaire was examined by the researcher's committee members for content validity, clarity and format. The approved questionnaire and proposal were then sent to the Institutional Review Board, Oklahoma State University, for further approval.

Procedures

The questionnaires were administered at the 11 different sites by the researcher and another trained registered dietitian. The questionnaires were passed out to all interested individuals at the nutrition sites. The participants were asked if they would assist in a research project that was being done by a graduate student at Oklahoma State University. The participants were informed that the data obtained would allow the researcher to determine their nutrition health risks so that education programs could be planned to keep them healthy. They were also told that their participation would help them realize whether or not they were at risk for nutritional problems. Subject results were kept confidential by use of a coding sheet that was passed around for all those to sign next to their code number only if they were interested in follow up or if they wished to know their nutrition risk score. The administrators of the instrument were available to interpret questions throughout the administration process. The surveys were then collected for analyses. The surveys were scored according to the scoring values set up by the researchers who designed the NSI. Dummy variables were assigned to the demographic data to allow the data to be used in statistical analyses. All statistical analyses was performed using Statistical Analysis System (SAS).

Definition of Terms

The following terms were defined for this study following a review of literature:

Rural - "Senate Select Committee on Aging identified 5 different demographic definitions for rural within the federal government "(Special Committee on Aging United States Senate, 1984). For the purposes of this study rural was defined as a community with a population of 5,000 or less.

Risk Factors - "Characteristics that are associated with an increased likelihood of poor nutritional status." (Nutrition Screening Initiative, 1991)

Nutrition Screening - The process of discovering characteristics known to be associated with dietary or nutritional problems (Dwyer, White, Ham. & Lipschitz, 1991)

Nutrition Screening Initiative (NSI) - "A five-year program focusing on nutrition screening and intervention in the nation's elderly." (Nutrition Screening Initiative, 1991)

DETERMINE - A pneumonic 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).

Medicaid - Cooperative federal and state funding of health care for economically disadvantaged individuals and the disabled. Each state legislature sets its own state's eligibility standards and policies for health services within broad federal guidelines (Frankle & Owen, 1993)

CHAPTER II

REVIEW OF LITERATURE

This chapter begins with trends in the elderly population followed by an overview of rural communities and their population characteristics. History of the Elderly Nutrition Program, nutrition status studies and the Nutrition Screening Initiative are also discussed. Finally, some methods to reach elderly individuals for nutrition education completes the chapter.

Trends In The Elderly Population

It is projected that the elderly population (age 65 and over) will increase from 12.2 percent of the population in 1987 to 24.5 percent of the population by 2030 (U.S. Bureau of the Census: Projections of the population of the United States, by age, sex, and race, 1989). The population age 85 years and over is projected to grow even more rapidly than the 65-and-over age group. Currently the majority of the population is White, approximately 84 percent Blacks; make up 12.4 percent and other races 3.5 percent. The proportion of Whites is projected to decrease while Blacks and other races are projected to increase (U.S. Bureau of the Census: Projections of the population of the United States, by age, sex, and race, 1989). Some of the factors responsible for the large number of aged persons are improved nutrition, sanitation, public health and medical care (Sanstead, 1985). The elderly, age 65 and over in Oklahoma make up 13.5 percent of the total population (Oklahoma Alliance on Aging, 1995), whereas 32.3 percent of all of Oklahoma residents live in rural areas (Oklahoma Department of Commerce, 1990). Currently, the elderly account for 36 percent of health care costs and 30 percent of all hospital stays (Statistical abstract of the U.S.: 1991, 111th ed. Washington DC: U.S. Bureau of the Census; 1991) while only accounting for 12.2 percent of the population. This means that by 2030, the elderly population is expected to nearly double its current size (U.S. Bureau of the Census: Projections of the population of the United States, by age, sex, and race, 1989). The aging population itself presents a challenge to many aspects of our society, from nutrition and health care, to living arrangements, income levels and health care costs.

According the Surgeon Generals Report on Nutrition and Health, a person's choice of diet can influence their long term health (Healthy People 2000: National Health Promotion and Disease Prevention Objectives. Washington, DC : U.S. Department of Health and Human Services, 1990). The Surgeon General, the National Research Council, the Center for Disease Control, and the Institute of Medicine have agreed that preventive nutrition intervention can reduce the risk of diet related chronic diseases. Health care workers are currently challenged and will continue to be challenged to promote independent living and good health for as long as possible in the aging population. This must be done in order to help curb rising health care costs.

Nutrition needs also change as one ages as can be seen in the changes in Recommended Dietary Allowances (RDA's) throughout the life span from birth through adulthood (Food and Nutrition Board: Recommended Dietary Allowances, 10th edition, National Academy of Sciences, 1989). The RDA's have been used as a tool for evaluating whether or not a diet is adequate in vitamins and minerals. The Recommendations for elderly individuals, as yet, have not been defined. This is due to a lack of research done specifically on these age groups; therefore the RDA's have been extrapolated from those of younger adults (Food and Nutrition Board: Recommended Dietary Allowances, 10th edition, National Academy of Sciences, 1989). Further research is needed in order to properly treat, evaluate and counsel these individuals toward better and more prolonged health.

The elderly population currently accounts for just over one third of current health care costs while making up only 12 percent of the population. It can be expected that the cost of health care will continue to increase as new technologies become available and methods of sustaining life for longer periods of time become more widely available. Early detection of nutrition related problems and appropriate treatment, nutrition programs and availability of nutritionally adequate diets will be useful in preventing increased morbidity for many diseases and perhaps help to control the rampant rise in medical costs.

Rural Communities

There are many differences between rural living and urban living. "All too often, rural areas have been forced to 'take care of their own' while urban areas have the benefit of Government-sponsored and private programs to help the elderly."(Special Committee on Aging United States Senate, 1984). To start, one must understand what it is that constitutes rural, then the demographics of a rural population can be seen.

Definition of Rural

According to the United States Senate Committee statements, rural could be defined as a population ranging from 1 to 50,000. Different facets of the federal government have completely different opinions of what a rural community is:

> **The Administration on Aging, and the Urban Mass Transportation Administration (ACTION)** defines rural as "any community with 2,500 persons or less".
>
> **The Rural Highway Public Transportation Administration** defines rural as a population of 5,000 or less.
>
> **The Farmers Home Administration and the Legal Services Corporation** define rural as communities with 20,000 or fewer residents.
>
> **The Department of Housing and Urban Development** classifies rural as any area outside the SMSA (standard metropolitan statistical area).
>
> **The Social and Rehabilitation Service and several agencies under the U.S. Department of Agriculture** define rural as areas with 50,000 residents or less (Special Committee on Aging United States Senate, 1984).

It is clear that according to the Federal standards, rural has not been agreeably defined. Therefore, it is difficult to determine how Government programs apply to the 'rural' elderly. Several studies have shown demographic trends in rural areas, and how the researchers defined a rural area was at their discretion. For purposes of this study, rural was defined as a community with a population of $\leq$ 5,000 people. It was defined as this size in order to include a large enough sample size yet the communities still had rural characteristics, i.e. limited shopping, limited social opportunities, and a large farming population.

Health Care for Rural Elderly

There are several demographic variables to consider when studying the rural elderly. First, is the lack of accessibility to quality health care. Second, determining who indeed are the rural elderly, third, determining what type of living arrangements they have, and last but not least, determining what the poverty rate is among the rural elderly?

People living in rural areas have less access to quality health care services. Over 56 percent of the 49 million citizens who live in medically under served areas live in rural America (Special Committee on Aging United States Senate, 1984). Rural areas not only have a lack of medical facilities. They have a lack of medical professionals, especially physicians. Not only is there a lack of availability but studies show that elders in rural communities have a higher rate of Medicare hospital discharges per 1,000 enrollees than their urban counterparts (U.S. Senate, Special Committee on Aging, 1992).

Demographics of Rural Elderly

We often think of rural elderly as people "whiling away their remaining years in the rocker on the expansive two-sided porch of their immaculately painted white farmhouse, surrounded by their land and their grandchildren, and their futures protected by the prosperity that they accumulated from their years of hard labor" (Coware & Lee, 1985; p. 15). However, on average, the income in rural communities is lower than that of their urban counterpart (Kaiser, 1991). Rural elders typically have lower education levels (U.S. Senate, Special Committee on Aging, 1992). A large percentage of rural elders occupy a disproportionate share of the nation's substandard and dilapidated housing (Clark, 1992). There is a lack of public transportation which requires the rural elderly to rely on private vehicles for transportation (Rosenbloom, 1988). Studies indicate a significantly higher percentage of "heavy drinkers among the rural elderly compared to their urban counterparts (Bainton, 1981; p. 55-76).

Research has demonstrated that compared to never-married people, married persons are happier, more satisfied with their lives, and in better mental and physical health (Reiss & Lee, 1988). Household composition has been shown to exert an important and pervasive influence on the quality of life of older persons (Coward, Bull, Kukulka & Galliher, 1994). In all elderly categories, 65-74, 75-84 and 85+ years, rural individuals were more likely to still be living with a spouse.

It is expected that as one ages and therefore retires from the work force, their income level would drop. However, it is not known by how much or who is hit the hardest. A higher percentage of non-metropolitan elders, aged 65-74 and 75 to 84 are poorer (using the census definition), than are elders of similar ages from non-central-city areas (Coward, Bull, Kukulka & Galliher, 1994). There are many characteristics that separate the rural elderly from their urban counterparts. This is why there is such a need come to a consensus on the definition of rural so that more research can be done that focuses directly on these individuals.

History Of The Elderly Nutrition Program

Concern of the elderly's nutrition needs first began to be noticed in detail in the late 1960's. Senator George McGovern declared "They form the most uniformly malnourished segment of our population" (U.S. Senate, Part 14, Nutrition and the Aged, 1971; p. 1). 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). On June 6, 1972, the appropriation for the Elderly Nutrition Program was published in the Federal Register (Federal Register, 1972). The program was authorized by Title VII of the Older Americans Act in order to meet the food and nutrition needs of the growing number of older Americans (Balsam, Bottum and Rogers, 1992). The Elderly Nutrition Program is known today as the Congregate Meals Program or Title III-C. Title III-B, Social Services Fund, is used to provide transportation to congregate meal sites.

Initial funding for the Elderly Nutrition Program (ENP) was $100 million. These funds were distributed throughout the 50 states, the District of Columbia, and various Trust Territories to be used to fund Elderly Nutrition Programs within their states that concentrated on serving the 25 percent of elderly with incomes below the poverty level (Federal Register, 1972). In Fiscal Year 1978, the Federal appropriation for the Program amounted to $250 million (U.S. Department of Health and Human Services, 1979).

Purpose of the Elderly Nutrition Program

The purpose of the program 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 rehabilitative services (Federal Register, 1972). Eligibility requirements are for persons: (1) who are age 60 or over ; (2) cannot afford to eat adequately; (3) lack the skills and/or knowledge to select and prepare nourishing and well-balanced meals; (4) have limited mobility which may impair their capacity to shop and cook for themselves; or (5) have feelings of rejection and loneliness which obliterate the incentive necessary to prepare and eat a meal alone. The spouses of such individuals, regardless of age, are also considered eligible (Federal Register, 1972).

Nutrition projects are also encouraged to provide supportive services that may not otherwise be available to participants. Federal regulations define these programs as shopping assistance, recreation, transportation, escort services, nutrition education, counseling and information and referral to outside agencies (U.S. Department of Health and Human Services, 1979).

Studies on the Efficacy of the ENP

Results of a study performed by Pluckebaum and Chavez (1994) determined that the ENP was indeed providing a large portion of the participant's nourishment. The mean nutrient intakes, aside from energy and magnesium by men, exceeded the recommended one-third of the RDAs, and contributed 42-73 percent of most nutrients to the daily intake despite the fact that the majority of the recipients refused one or more of the meal components. A study done by the U.S.

Department of Health and Human Services (DHHS) (1979) agreed with the findings of Pluckenbaum and Chavez. DHHS findings showed that participants ate better than did non-participants. This difference was seen primarily on the days when the participants ate at the site.

The Elderly Nutrition Program has been and continues to be a positive nutritional influence in the lives of participating elderly. Study results of Peterson and Maiden (1991) showed that there was a direct correlation between a person's awareness and use of nutrition programs. Yet, those with the greatest needs and fewest resources were the least cognizant of the programs. An effort needs to be made to reach those at greatest nutrition risk.

National Nutrition Status Studies

As of yet, none of the National Nutrition Status Studies have looked at a comparison of urban nutrition status verses rural nutrition status for any of the age groups.

Ten State Nutrition Survey

In 1967, a Congressional mandate was set forth that information concerning the nation's problems of serious hunger and malnutrition be obtained within six months of the mandate. The Secretary of the Department of Health, Education, and Welfare designated the Nutrition Program, National Center for Chronic Diseases, Bureau of Disease Prevention and Environmental Control, Public Health Service, to carry out a National Nutrition Survey (Ten State Nutrition Survey, 1968-70). The sampling procedure was designed to select low-income families on the basis of their geographic location.

The committee felt that it was unrealistic to survey thousands of areas spread randomly throughout the country. Ten states were judgmentally selected to provide a population representative of the target groups. These states were assumed to have a large number of poverty families and a high prevalence of malnutrition and associated problems (Ten State Nutrition Survey, 1968-70). The states included were Texas, Louisiana, Kentucky, Michigan, New York (including a separate survey of New York City), Massachusetts, Washington, California, West Virginia and South Carolina.

The Ten State Survey included clinical assessment, anthropometric measurements (i.e. Body Mass Index and tricep skinfold), biochemical measurements and dietary assessment. A total of 23,846 families were interviewed which included a total of 86,352 persons, and 10.4 percent of those surveyed were over the age of 59 (Ten State Nutrition Survey, 1968-70). The age groups were classified in ranges from younger than six to older than 59 years of age.

The Survey results showed that a significant number of the impoverished subjects interviewed were malnourished and at risk of developing nutrition related problems. It also showed that income was positively correlated with an increase in malnutrition and those in the 60 and over age group had diets low in protein, thiamin, iron and vitamin C (Hollingsworth and Hart, 1991).

National Health and Nutrition Examination Surveys

The National Health and Nutrition Examination Survey (NHANES) program was undertaken by the National Center for Health Statistics and the Centers for Disease Control in response to a directive from the Secretary of the Department of Health, Education, and Welfare to establish a continuing National Nutrition Surveillance System. NHANES I was designed to permit analytic studies on the health and nutrition information that was collected from each participant with a special emphasis on dental health, skin problems, eye conditions and nutritional status of the population 1-74 years of age. This study was conducted from 1971-1974. A little over 27,000 individuals were interviewed, of which nine percent were age 60 and over. The measures taken were: (1) dietary interviews; (2) body measurements; (3) biochemical tests.

The findings from all respondents in NHANES I showed that fat made up 37 percent of the calories consumed and that the majority of that fat was coming from meat, dairy products and sweets. These foods, due to their high saturated fat content have also been shown to contribute to the incidence of heart disease. The results of NHANES I confirmed results found in the Ten State Study that there was a low iron intake among the elderly. Low income, White elderly, age 60 and over had more prevalence of low intakes of vitamin C (U.S. Department of Health, Education and Welfare, 1974). Most age groups regardless of race and income level, had mean calcium, vitamin A, and vitamin C intakes that either approached 90 to 100 percent of the RDA or exceeded it (National Center for Health Statistics, 1971-73).

NHANES II was conducted from 1976-1980. Data were obtained through interviews, 24 hour recall, food frequency questionnaires, questions relating to eating habits, nutrition related practices, anthropomentric measures, biochemical assessment and physical and dental exams. It included individuals who ranged in age from six months to 74 years. Approximately 25,000 people were interviewed, 33 percent were age 50-74.

NHANES II showed that mean caloric intake of both White and Black men ages 50-59 was significantly higher than that of men ages 60-69 and 70-74. The decline was typically due to a decline in the nutrient intakes. Intake of 12 of the 16 nutrients studied for the age group 70-74 as compared to 60-69 year old White males tended to decline significantly. Similar findings occurred in females. Those 50-59 years of age had higher caloric intakes than either the 60-69 or 70-74 age group, although a reverse trend was seen in the consumption of vitamin A and vitamin C. The women between ages 70-74 had lower intakes of calories than did the 50-59 or the 60-69 year olds. Mean caloric intakes in the Black subjects were lower than those of the White subjects for each age group (National Center for Health Statistics, 1982-84). The mean intakes of iron for men and women of similar ages who were at or above the poverty level were 13.6 mg and 9.6 mg respectively. The median intake of calcium for all subjects over the age of 55 was below the Recommended Dietary Allowance (RDA) of 800 mg. (National Center for Health Statistics, 1982-84).

NHANES III was launched in 1988 and finished in 1994. The target population for NHANES III study were between the ages of two months and older. It was expanded to cover more of the young and all ages of the elderly. NHANES III was designed to have no upper age limit. It offered an opportunity to assess the nutritional status and the impact of nutrition status on the outcome of major chronic diseases common in old age (Harris, Woteki, Bliefel and Kleinman, 1989). NHANES III had two major aims, one of which was to provide data for nutrition monitoring purposes, including tracking nutrition-related risk factors and estimating the prevalence of compromised nutritional status. The second aim was to provide information useful for studying the relationship between diet, nutritional status and health. In phase I, data on food intake were collected from 14,801 individuals (Nutrition Today, 1995).

It was reported that the mean energy intake for all individuals ages 2 months of age and older was 2095 calories with males consistently having higher intakes. Fifty percent of energy came from carbohydrates, 15 percent from protein, 34 percent from fat and two percent from alcohol. Mean protein intakes for males were between 88 to 92 grams and for females between 63 to 66 grams. These findings were similar among the different races. Non-Hispanic Blacks males tended to eat a higher portion of their calories from fat than their other male counterparts. Mean intakes of iron met or exceeded the RDA for all adolescent and adult males but not for most female groups (Vital and Health Statistics of the Center for Disease Control and Prevention, 1994). All data from the NHANES III study have not yet been tabulated, including data of the nutrition intake of elderly. NHANES III results should give us a better perspective of the general health and nutrition of all ages of our elderly population.

Nutrition Health Studies In Rural Elderly

Very few nutritional health studies have been conducted with elderly living in rural areas. Yet, this group of elderly is more likely to have incomes below the poverty level, have a larger number of health problems and have less accessibility to health services (Smicklas-Wright, Lago, Bernardo and Beard, 1990).

Northern California

A study conducted by Stevens, Grivetti and McDonald (1992) in northern California compared nutrient intakes and non-dietary factors that may influence nutrient intake in urban and rural elderly clients in the Title III-C home-delivered meal program. A total of 95 subjects, ages 60-94 years old participated. Forty seven of the subjects were residing in rural areas. The results of their study showed that urban individuals consumed significantly more energy (calories) than did rural elderly. Mean intakes of vitamin B-6, calcium, copper, magnesium, and zinc were below the RDA. However, there were few differences observed between urban and rural individuals for vitamin and mineral intake. No general pattern was seen. Eighty seven percent of the subjects would not shop for food alone and 50 percent needed assistance with cooking. Rural elders tended to rely on family members, who were not spouses, to help with daily living activities more so than urban elderly (Stevens, Grivetti and McDonald, 1992).

Louisiana

Another comparison study, between urban and rural, was conducted in Louisiana. The subjects were 60 years or older and ate two thirds of their meals at home. The individuals were recruited from health clinics, social groups, elderly day care centers, congregate feeding sites as well as recommendations from family members and participants. A total of 361 subjects participated. The researchers found that rural elderly tended to vary their nutrient intake with the seasons of the year (the researchers felt this may reflect the use of vegetable gardens by rural subjects). They also found that in general, female subjects consumed significantly less calories, protein and iron than did the male subjects (Hollingsworth and Hart, 1991).

Pennsylvania

Rawson, Weinberg, Herold and Holtz (1978) conducted a study on rural elderly in three counties of southwestern Pennsylvania. Twenty eight subjects, age 60 and over participated. Results showed that rural elderly in southwestern Pennsylvania were frequently deficient in calories, vitamin A, iron, vitamin C, and calcium.

Guthrie, Black and Madden, (1972) conducted another study in Pennsylvania on rural elderly, ages 60 and over. A total of 109 people participated. Their results reported low intakes of iron, protein, calories, riboflavin, and thiamin the study population. Prevalence of under-nutrition is evident in the rural elderly, as shown in the three previous studies. It is necessary to further assess these individuals to provide the most appropriate services and referrals.

Nutrition Screening Initiative

The Nutrition Screening Initiative (NSI), launched in 1989, is a five year program focused on promoting routine nutrition screening in health and medical care settings (Finn and Wellman, 1993). It is a multidisciplinary project of the American Dietetic Association, the American Academy of Family Physicians, and the National Council on the Aging (White, Ham, Lipschitz, Dwyer and Wellman, 1991). Elderly Americans are the initial targeted population due to their rapid growth in numbers and disproportionate risk of poor nutritional status (Dwyer, 1991). The purpose of the of the NSI is: (1) to provide basic nutrition information to people regarding characteristics that may increase the likelihood of poor nutritional status and (2) guide consumers to begin a dialogue with their health and social services providers about personal nutritional concerns (White, Dwyer, Posner, Ham, Lipschitz and Wellman, 1992). NSI's national effort is creating wide spread awareness and action. NSI has influenced public policy regarding the availability of nutrition services (Finn and Wellman, 1993).

The screening tool was tested in several ways before being implemented. Focus groups consisting of older Americans were asked to review and critique drafts of the screening tool. These focus groups were also able to evaluate the length, format, readability and style of the checklist. Steps were then taken to alter the questionnaire according to the focus groups suggestions (Harris, 1991). Preliminary research was completed by the developers of the NSI to determine the ability of the questionnaire to detect problems in elderly related to nutrition. Results showed that those with higher nutritional risk scores (Appendix B) were more likely to have lower nutrient intakes when compared to the Recommended Dietary Allowances and an increased risk of adverse health conditions (White, 1992)

There is an initial checklist and two more levels of screening involved with the NSI. The initial checklist involves the use of the word DETERMINE as a mnemonic device designed to highlight the warning signs of poor nutritional status (Nutrition Screening Initiative, 1991) (Appendixes B & C). DETERMINE stands for: Disease; Eating poorly; Tooth loss/mouth pain;

Economic hardship; Reduced social contact; Multiple medicines; Involuntary weight loss/gain; Needs assistance in self care; Elder years above age 80. Each nutritional risk statement was weighted according the degree at which it affects nutrition status. A score of: 1) 0-2 indicates no current nutritional risk, 2) 3-5 moderate nutritional risk and 3) 6 or above high nutritional risk and the need for more in-depth assessment. The Level 1 or Level 2 screen can be used to perform the more in-depth assessment. The Level 1 screen is a method of separating those individuals who should be referred for evaluation and possible intervention from those who would benefit from other medical or community services. The Level 2 screen has more specific assessment tools. It includes a detailed history of weight change, laboratory test, clinical indicators of protein-calorie malnutrition, obesity, and other nutrition-related disorders (Nutrition Screening Initiative, 1991).

Research Using the Nutrition Screening Initiative

Washington

The NSI was used with 7,690 free-living elderly in Washington state by Zylstra, Beerman, Hillers and Mitchell (1995) to determine the nutritional risk behaviors in elderly participants of Title III and Title IV Nutrition Programs. They found that their population had more women, were older, lived alone more often and was more likely to be of Color or American Indian than the general study population. The low-income elderly had significantly higher nutrition risk scores than did those who were not low income. Elderly persons of Color or American Indian exhibited higher nutrition risk scores than Whites. More than 35 percent of those surveyed said they eat alone most of the time. Nearly one fourth of the survey participants had an illness that affected their food choices. Those persons were likely to be younger than 65 years of age, of low income and of Color. Twelve percent ate fewer than two meals per day, 11 percent lacked money to purchase food and 15 percent needed assistance to complete food-related activities of daily living.

Wisconsin

An unpublished study by Vailas, Russo, Rankin and Nitzke (1995) utilized NSI in Wisconsin to examine nutrition health risks in 20,781 participants of congregate-meal and home-delivered meal programs. They found that 28.8 percent of congregate and 38.6 percent of home-delivered participants had an illness that changed their eating habits. Twenty two percent of congregate, and 28 percent of home-delivered meal participants ate few fruits or vegetables, or milk products. Forty nine percent and 68 percent, respectively, ate alone most of the time. These are similar findings to those found by Zylstra, Beerman, Hillers and Mitchell (1995) in Washington were 35 percent of those surveyed ate alone most of the time. Forty three and 62 percent took three or more over-the-counter or prescribed drugs per day. Sixty six percent of the home-delivered meal participants were not always physically able to shop, cook and/or feed themselves. Overall, 41 percent of those surveyed were determined to be at low risk, 32 percent were at moderate risk and 27 percent scored in the high risk category.

Indiana

A third study was done by Spangler and Eigenbrod (1995) and administered to 374 volunteer older persons attending the Indiana Black Exposition or Indiana State Fair in Indianapolis. The most frequently identified problems on the DETERMINE checklist were having illnesses or conditions that caused changes in foods eaten; consuming few fruits ,vegetables, or milk; eating alone; and taking at least three medications daily. Slightly more than half of those surveyed were at moderate or high risk for nutrition related problems.

These three studies have found some similarities among the elderly that they surveyed. Each identified that having an illness changed the kind or amount of food eaten, eating few fruits or vegetables or milk, taking three or more prescribed or over-the-counter drugs as being the most prevalent nutrition risk questions that subjects answered yes to. These may be some areas health professionals need to target for education in this segment of the population.

Oklahoma

Kennedy (1995) conducted a study with 153 urban elderly using the NSI. Results showed that 37 percent of subjects had an illness that limited their food choices. Forty one percent of subjects consumed fewer than two meals per day, 41 percent consumed few fruits and vegetables, 42 percent ate alone most of the time. Those most likely to be at higher nutritional risk were, below age of 60, female, Black, lived alone, low income and had participated in the ENP less than six months.

Nutrition Education For Elderly

The elderly population is an increasing population group with rising health care costs and needs. They are a group that needs to be targeted for education on improving health and quality of life through better nutrition and disease prevention measures. The question is, what is the best and most effective ways to reach this group?

Nutrition Information Sources

Nutrition Sources in North Dakota

In a study conducted by Crockett, Heller, Merkel and Peterson (1990), 68 rural elderly in North Dakota, age 60 and over were interviewed as a preliminary research step in developing nutrition education intervention for rural seniors. It was found that concerning health advice, opinions of the family doctor and public health nurses as well as family members and the senior's own judgment were highly valued. They also found that newsletters sent directly to a senior at home would be a very good idea, according to participants, however, they were not responsive to having a lesson included in the brochure to be completed.

Nutrition Sources in Central Texas

Another study done by Briley, Owens, Gillham and Sharplin (1990) was conducted with urban and rural adults, age 60 and over. One hundred ninety nine volunteers, 96 of whom lived in rural areas, participated. The objective was to determine the sources of nutrition information available to non-institutionalized urban and rural adults. The results showed that seniors used a number of different sources to acquire nutrition related information. Their primary sources from most to least used were as follows: Magazines; Newspapers; Physicians; Cookbooks; Dietitians; Public school teachers; TV/Radio; Labels; Grocery store flyers; Health food stores and Pharmacists.

Nutrition Sources in South Carolina

Ryan and Gates (1989) conducted a study of 339 subjects who were over the age of 51. The nutrition survey was a supplement to an ongoing survey of the health status and practices of South Carolina adults, 18 years and older. The purpose of the study was partly to determine sources of nutrition information. The researchers found that 70 percent (238) of the participants had never sought nutrition information, two percent had sought information and never found it. Of the 30 percent who sought nutrition information, 34 percent used printed word (newspaper, cookbooks, exhibits, labels, magazines), 32 percent used a physician, 29 percent used a dietitian and five percent sought other sources.

Nutrition Sources in New Zealand

Another nutrition information source study was conducted by Silvester and Horwath (1990). A questionnaire was sent to 230 elderly New Zealanders selected at random. The subjects were age 65 and older. The purpose of the study was to determine the usage of nutrition information sources by elderly New Zealanders. The researchers found that the most frequently reported source by men was a doctor (48 percent) and by women was a dietitian (41 percent). Newspapers and magazines were considered to be the least reliable source of nutrition information.

Computerized Information

Dennison, Dennison, Ward and Wu (1992) conducted a study to assess the receptiveness of senior citizens to the use of microcomputers in a nutrition education program at participating senior citizen subsidized housing sites. A total of 83 elderly participated. The subjects were divided into group A and group B. Both groups received the same nutrition education but group A had computer assisted instruction (CAI). The researchers found that group A was as satisfied as group B. The majority in group A indicated that learning to use the computer was not difficult and was "somewhat enjoyable" to "very enjoyable". These results showed that the elderly were receptive to CAI.

Peer Educators

The peer education model, which enables trained learners to instruct their peers, was tested in a case study involving senior citizens in a nutrition education program. Lynde (1992) conducted this study using 34 subjects ranging in age from 59 to 84 years. Six of the subjects were trained to become peer educators. The peer educators took full responsibility for disseminating the nutrition information to their peers. The peer education model was found to be particularly useful in providing nutrition information to a much broader sector of the senior population than could be reached via public health programs.

The studies conducted in Washington, Indiana, Wisconsin and Oklahoma using the NSI have determined that the elderly are a population at risk for nutrition related problems. The rural elderly currently are an undefined population by federal standards. They are a community at a disadvantage as compared to their urban counterparts because of the lack of: available health care; social activities; public transportation and a lower expected retirement income. Nutrition adequacy studies conducted in rural populations have shown the rural elderly to be a population at risk, as seen in northern California, Louisiana and Pennsylvania. The American population in general is increasing in age. By the year 2030, 24.5 percent of the population will be over the age of 65. The 65 and over population has greater needs, they currently account for just over one third of current health care costs, have the lowest income levels and frequently inadequate housing. National nutrition risk (Ten State, NHANES I, & NHANES II) studies have shown that these risks can be compounded if the individual is female, low income and of Black or Hispanic background. Efficacy studies conducted in regard to the ENP have shown that there has been a positive effect in the lives of those elderly individuals who participate. By learning what sources of nutrition information the rural elderly use, more effective nutrition education programs can be planned. Through better nutrition risk screening, awareness, and education, older Americans can be more proactive in their efforts to combat nutrition related diseases..

CHAPTER III

METHODS AND PROCEDURES

In this study, rural elderly who participate in the Elderly Nutrition Program were surveyed in the summer of 1995 to determine the nutritional health risks of elderly ages 60 and over living in rural areas of Oklahoma. The "DETERMINE Your Nutrition Health Checklist" was used to collect the data (Appendix B). This chapter outlines the research design, population and sample, data collection and data analyses.

Research Design

The research method used in this study was descriptive research. Descriptive research describes the state of nature at a point in time. It involves the description, recording, analysis and interpretation of current conditions. It allows the establishment of associations among factors to be determined (Monsen, 1991).

The type of descriptive research used in this study was survey research. Survey research is designed to describe and quantify characteristics of a defined population. Surveys are useful for establishing associations among variables or factors being studied. Surveys are usually used on a representative sample of the population in which a questionnaire or interview is used in order to determine the opinions, attitudes, preferences and perceptions of interest to the researcher (Monsen, 1991).

Sample and Population

The 200 respondents in this study were elderly, age 60 or over, who participated in the Congregate Meal Programs in Oklahoma's Area Agency on Aging, District 7. District 7 was chosen due to the large number of rural towns and the close proximity to the researchers' residence. All 11 sites chosen for this survey were located in a town with a population of less than

5,000 (See definition of terms, page 7). All those who were willing to participate were included in the study. Of the 209 surveys collected 200 were used for analyses. Five surveys were not used due to incomplete information.

Instrumentation

The instrument used in this study was the "DETERMINE Your Nutrition Health Checklist". It was developed and validated by the American Academy of Family Physicians, The American Dietetic Association and the National Council on Aging. It is the first screen in the Nutrition Screening Initiative (NSI) used to help identify nutrition risks in elderly individuals (NSI, 1991). The "DETERMINE Your Nutrition Health" Checklist has undergone considerable review and testing. Groups of older adults with varied backgrounds were asked to evaluate the usefulness, format and credibility of the document. In addition, data collected by the National Center for Health Statistics, the New England Research institute, and the Boston University School of Public Health were used as guides for the Checklist's wording, content, design, and scoring (NSI, 1991). The numbered statements pertained to various dietary, physiological, social, medical and economic factors that were designed to identify whether or not the individual was at nutrition risk (Appendix B). The nutrition risk questions were given weighted scores based on previous research by the research agencies who developed the original 'DETERMINE Your Nutrition Health Checklist' (Appendix B and C). There was a weight range from one to four for the nutrition risk questions. A higher score indicated higher risk. A score of 0-2 indicated no risk, 3-5 was moderate nutrition risk and 6 or more was high nutrition risk. A total of seven demographic questions were asked to establish associations between nutrition risk and certain demographic characteristics. These questions included age, gender, race, living situation, income assistance, length of participation in the Elderly Nutrition Program and nutrition information sources. A person was considered low income if they received either Food Stamps or Medicaid. The researcher also modified the instrument by removing the scores next to each risk statement to reduce the risk of biasing the responses (Zylstra, 1992).

Data Collection

The questionnaires were administered at the 11 different sites (Figure 1 and Table 1, page 5) by the researcher and a trained registered dietitian. The data were collected during the fall semester of 1995. The questionnaires were passed out to all interested individuals at the nutrition sites. The participants were asked if they would assist in a research project that was being done by a graduate student at Oklahoma State University. The participants were informed that the data obtained would allow the researcher to determine their nutrition health risks so that education programs could be planned to keep them healthy. They were also told that their participation would help them realize whether or not they were at risk for nutritional problems. The questionnaires were coded and a sheet was passed around for all those to sign next to their code number if they were interested in follow up or if they wished to know their nutrition risk score. At no time were the subjects' names linked to the scores during analyses of the data. The researcher trained a dietitian to assist in data collection. The researcher or trained dietitian were available to interpret questions throughout the administration process. The surveys were then collected for analyses. No time limit was assigned for filling out the surveys.

Data Analyses

The data from 200 useable the surveys, collected at the 11 sites, were coded by the researcher. The surveys were scored according to the scoring values set up by the NSI. Dummy variables were assigned to the demographic data to allow the data to be used in statistical analyses. The data were entered into the computer using Excel for windows program and the files were then converted to a .dbf file to be analyzed by the Statistical Analysis System (SAS) package. Frequencies and percentages were used to describe the demographic characteristics and responses to the nutritional risk statements. Chi-squares were used to test the hypotheses in the study.

CHAPTER IV

RESULTS AND DISCUSSION

The purpose of this study was to assess the nutritional health risks of elderly ages 60 and over living in rural areas of Oklahoma, using the "DETERMINE Your Nutrition Health Risks Checklist." This chapter includes the results of data from the questionnaire described in Chapter III (Appendix A).

Demographics

Age, Gender and Ethnicity

The majority of the respondents were between 61 and 80 years of age (134, 68%). A large percentage of the population were over 81 years of age (64, 32%). Kennedy (1995) utilized the Nutrition Screening Initiative (NSI) with urban elderly in Oklahoma. Urban respondents had a large number over the age of 75 years (59,41%). More females completed out the survey (120, 60%). Over three fourths of the subjects were White (170, 85%). The next largest group were Blacks (14, 7%) and Native Americans (12, 6%). Four subjects were identified by the researcher as Other (White and Native American). Table II.

Living Situation, Income and Participation Time

There was a fairly even distribution between those living alone (107, 54%) and those living with one or more people (91,46%). The majority of rural respondents reported not being of low income (150, 76%). This was similar to the findings of Kennedy (1995) study of urban individuals, where 65 percent (95) responded not low income. Sixty one percent (118) of rural respondents had participated in the Elderly Nutrition Program (ENP) more than three years. The least number of respondents had participated less than one year (28, 14%). Table II.

TABLE II

NUMBER AND PERCENTAGE OF SUBJECTS ACCORDING TO DEMOGRAPHIC VARIABLES
N=200

Personal Variables	N*	Percentage**
Age (Years)		
61-70	55	28
71-80	79	40
81-90	50	25
90+	14	7
Total	198	100
Gender		
Male	79	40
Female	120	60
Total***	199	100
Ethnicity		
White	170	85
Black	14	7
Native American	12	6
Other	4	2
Total	200	100
Living Situation		
One	107	54
More than one	91	46
Total	198	100
Low Income		
Yes	48	24
No	150	76
Total	198	100
Participation		
Less than one year	28	14
1-3 years	47	24
more than 3 years	118	61
Total***	193	99

*N = 200 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

Responses to Nutrition Risk Statements

The subjects were to check the 'yes' column if the nutrition risk statement applied to them. The 'yes' column was then totaled using the weighted scored as determined by the developers of the Nutrition Screening Initiative. A score of 0-2 indicated a 'low risk of nutrition-related problems", a score of 3-5 indicated "moderate risk", and a score of 6 or over indicated "high nutritional risk".

The nutritional risk statement most frequently reported was taking three or more prescribed or over-the-counter (OTC) drugs per day (44%). This was also found in the urban population (Kennedy, 1995). Thirty five percent of rural respondents reported eating alone most of the time. Two other nutrition risk statements were responded to by more than 25 percent of the subjects, they were: (1) Eating few fruits, vegetables or dairy products daily (29%) and (2) Having an illness or condition that limited food choices (27%).

There were two nutritional risk statements that were responded to by less than 10 percent of the subjects: (1) Eating fewer than two meals per day (6%) and (2) Drinking three or more alcoholic beverages per day (2%). These were also the two least responded to statements found in urban elderly by Kennedy (1995). Figure 2.

Mean Nutritional Risk Scores by Personal Variables

Age

Results showed that those age 71 to 80 had the highest mean nutritional risk score (3.48). This indicates that this group is moderately at risk for nutrition related problems. The 81-90 age group had the lowest mean nutritional risk score (2.72). Respondents age 61-80 in general were at higher risk than those 81 and over. Those who were living to 80 and older may have practiced good health habits throughout their life and this may be why they have been alive so long. Kennedy (1995) also found those below the age of 60 to have the highest mean nutritional risk score (7.33), although there were only three subjects in this group. Figure 3.

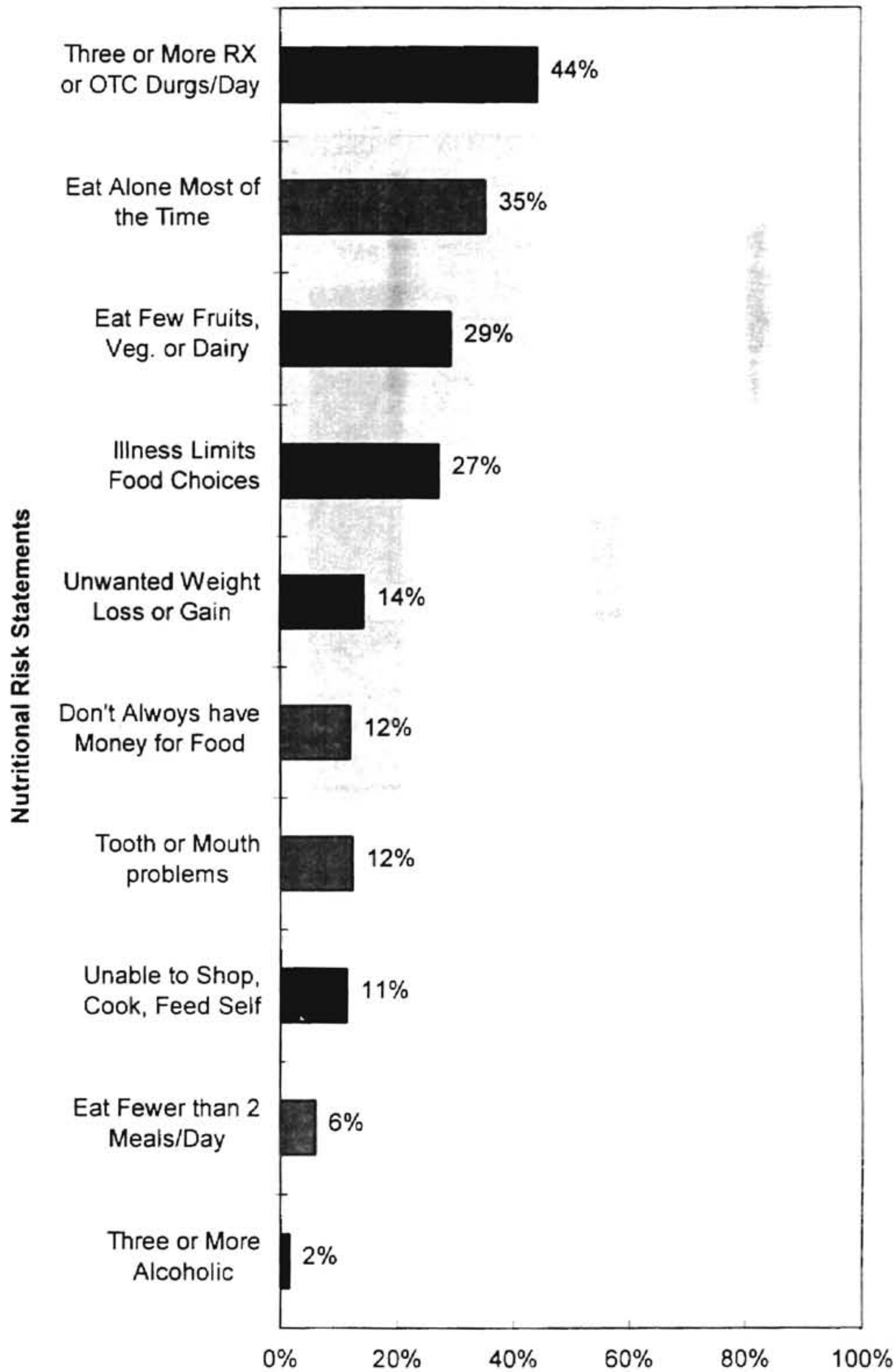

Figure 2. Frequency and Percentage of 'Yes' and 'No' Responses to Nutritional Risks, N=200

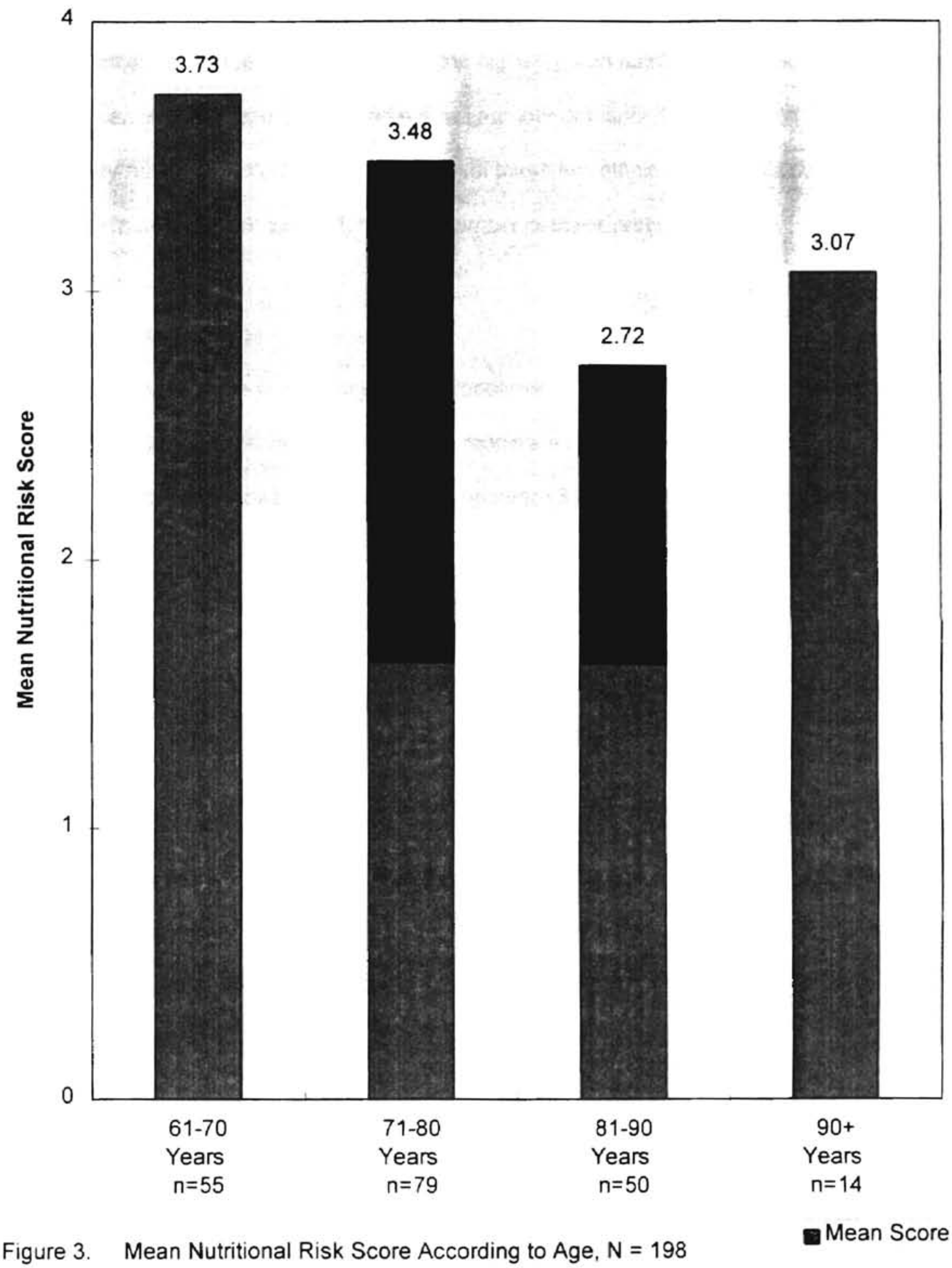

Figure 3. Mean Nutritional Risk Score According to Age, N = 198

Gender and Ethnicity

Females were at higher nutritional risk than males (3.43), although both males and females were at moderate nutritional risk. Figure 4. Females in general tend to eat less calories than males and females often do not eat enough food to meet their RDA's for many nutrients. Native Americans (4.58) and Other (4.5) had the highest mean nutritional risk scores among the ethnic groups. Both of these groups had a small number of respondents (12) and (4) respectively, thus this may not be an accurate representation of these two ethnic groups. Blacks had the lowest mean nutritional risk score (1.71. The number of Black respondents was low (14). Figure 5.

Living Situation and Income

Those living alone were at higher nutritional risk (3.52) than those living with one or more people (3.21). Both groups were considered at moderate nutritional risk. Figure 6. The mean nutritional risk score for those who were not low income (3.96) was higher than those considered low income (3.19). See Figure 7. Those who were not low income may not spend as much of their income on nutrition and health. This finding was opposite of that found by Kennedy (1995). Urban respondents, considered low income, had a mean score of (6.08) compared to those considered not low income (4.34).

Participation Time in ENP

The mean nutritional risk scores for participation time in the ENP decreased the longer the respondents participated. There was a difference of 1.53 in the mean range between the of the group at highest nutritional risk (those participating less than one year) and the respondents with the lowest mean nutritional risk score (those participating more than three years). Figure 8. Kennedy (1995) also found that those who had participated for the least amount of time in the ENP had the highest mean nutritional risk score (6.28). This finding suggests that participation in the ENP for an extended period of time, has a positive effect on nutritional adequacy.

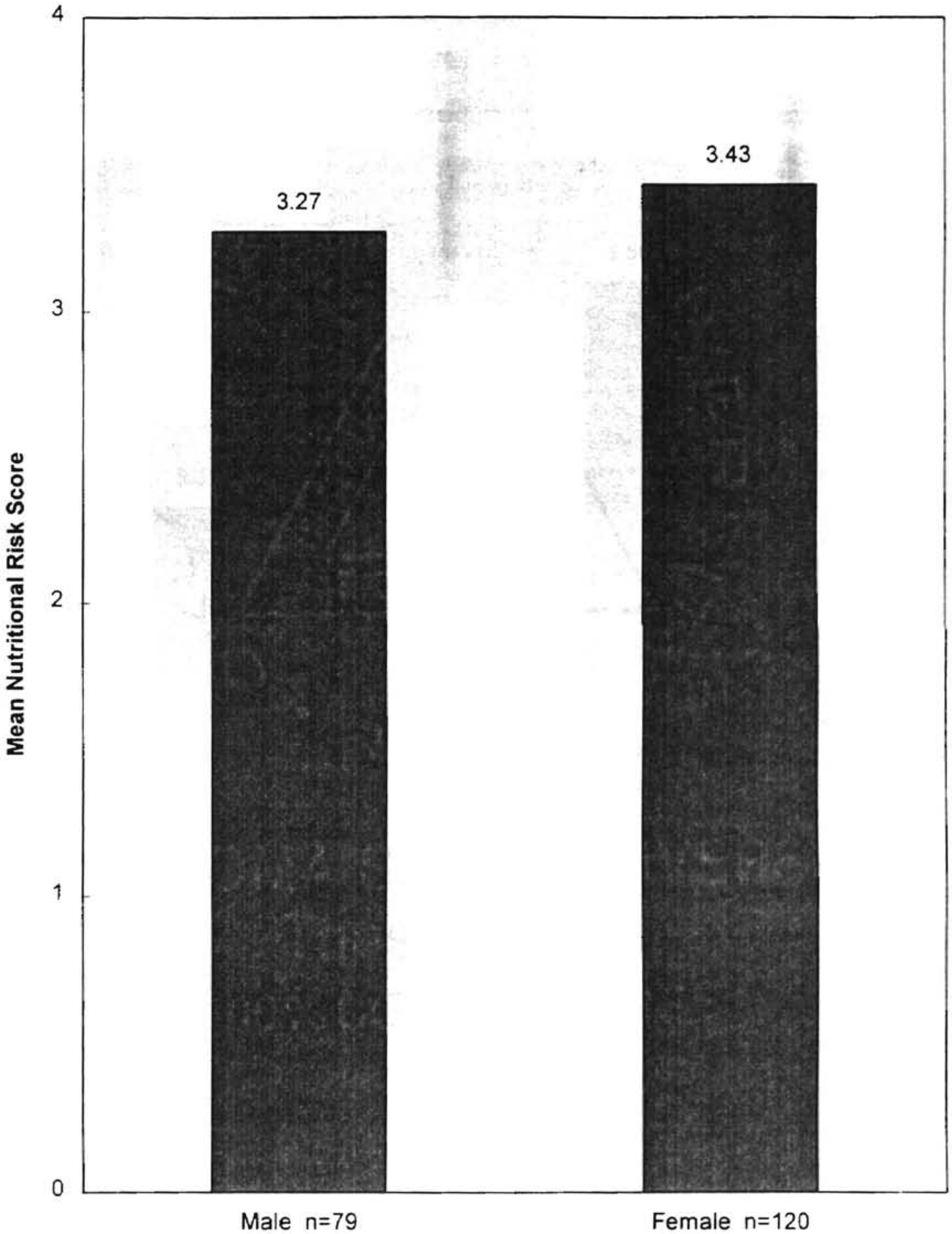

Figure 4. Mean Nutritional Risk Score According to Gender, N = 199

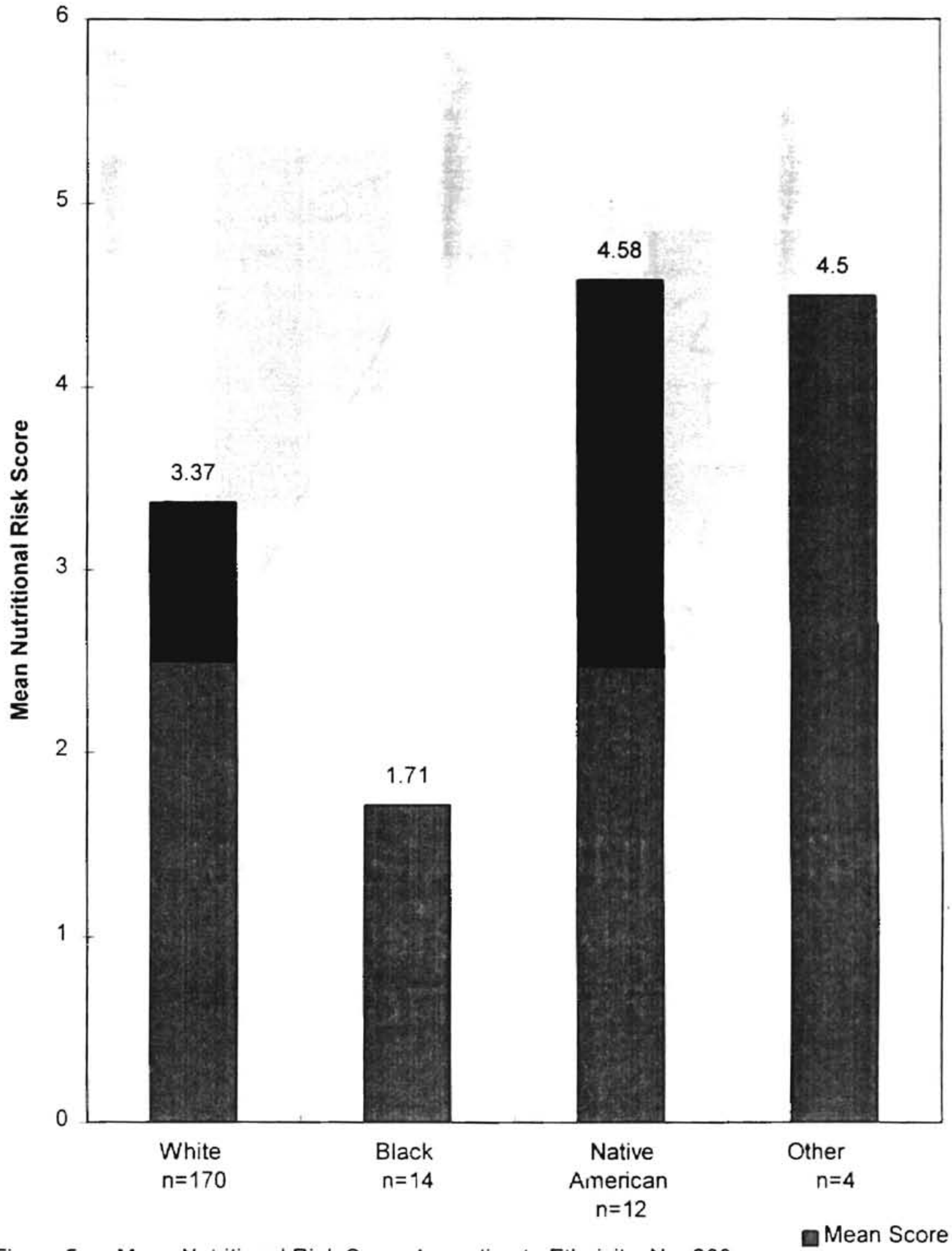

Figure 5. Mean Nutritional Risk Score According to Ethnicity, N = 200

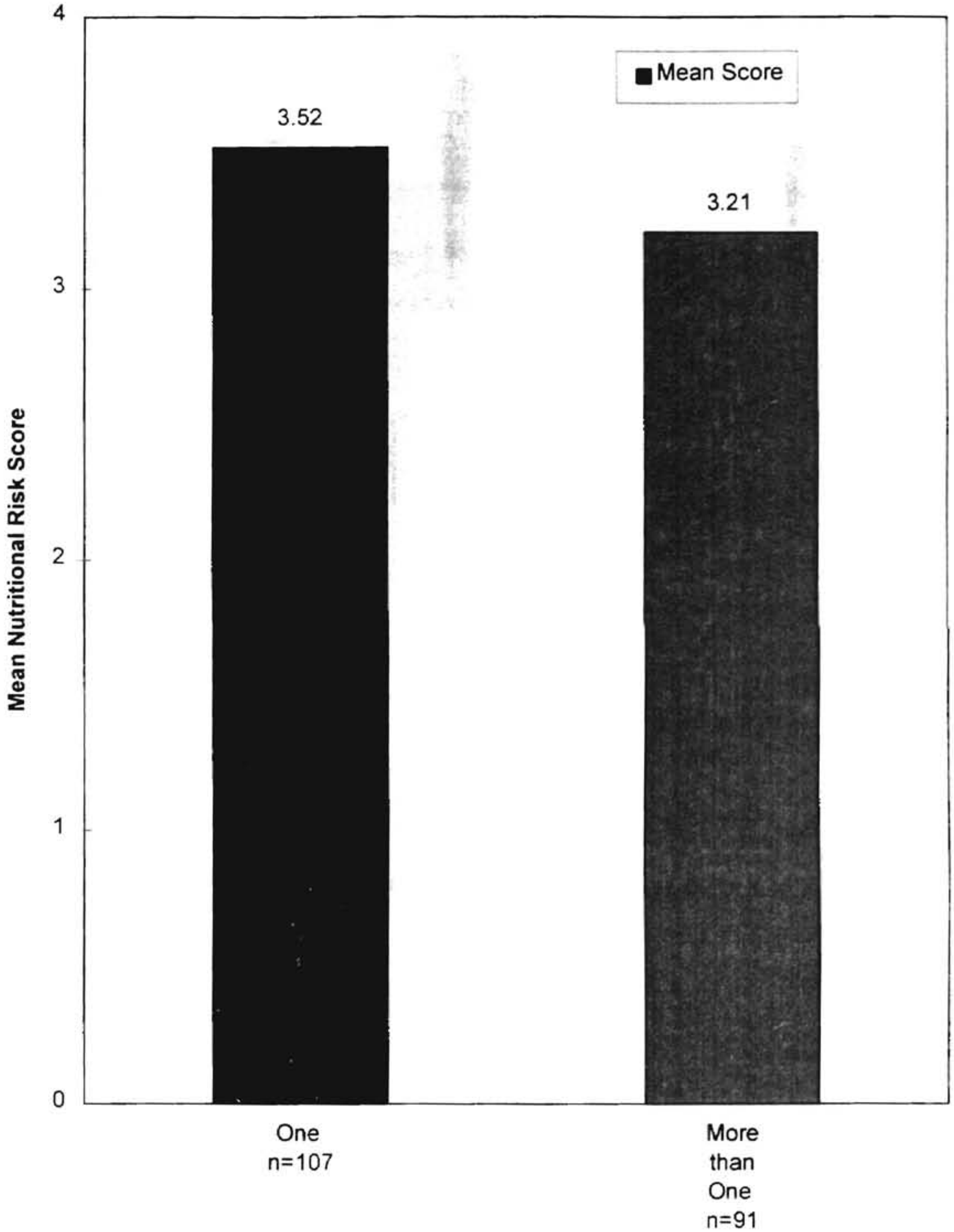

Figure 6. Mean Nutritional Risk Score According to Living Situation, N = 198

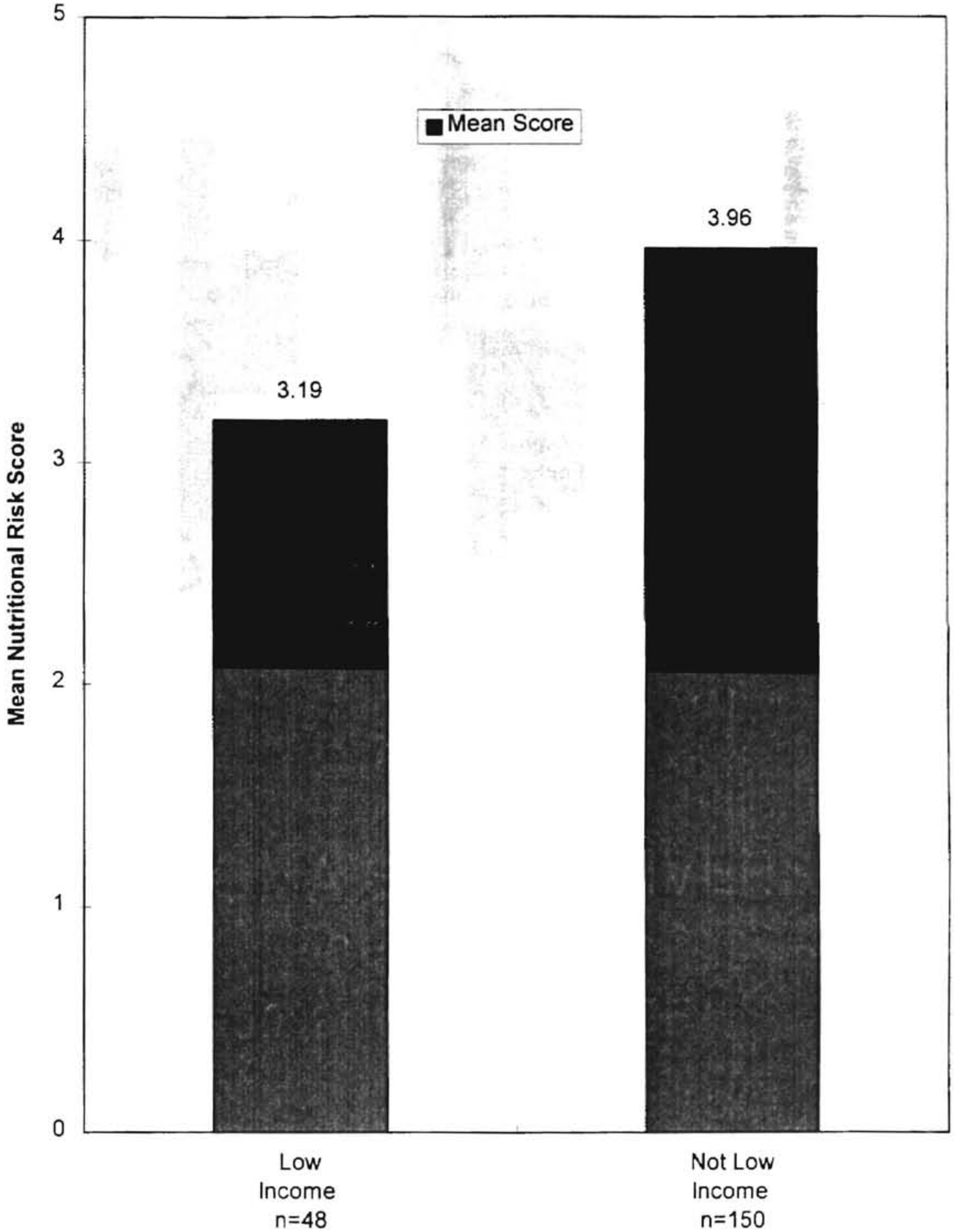

Figure 7. Mean Nutritional Risk Score According to Income, N = 198

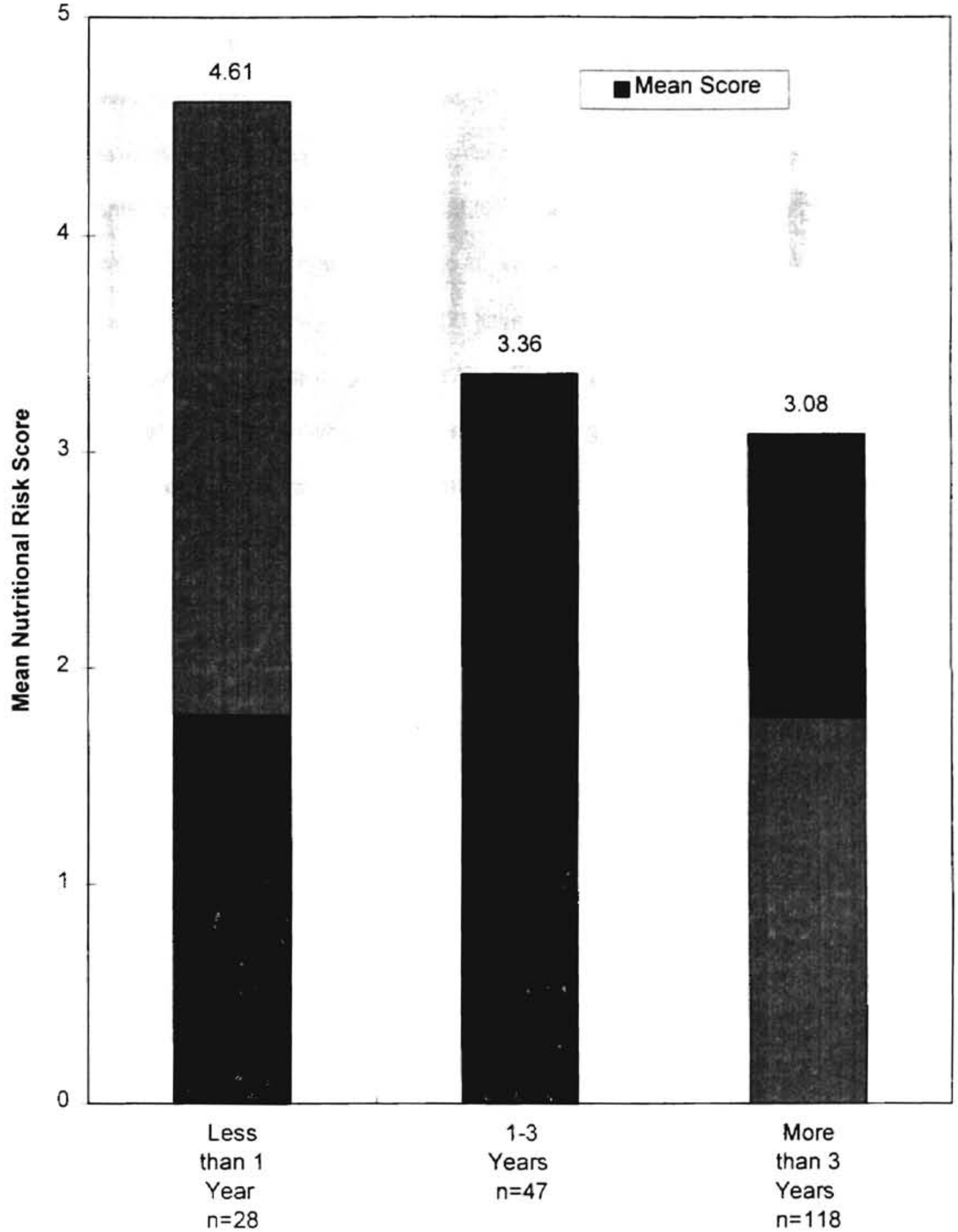

Figure 8. Mean Nutritional Risk Score According to Participation Time, N = 193

Nutrition Risk and Age

The data in Table III indicate the number and percentage of subjects who responded 'yes' or 'no' to the 10 nutritional risk statements according to age groups. Eating alone most of the time was responded to most frequently of all nutritional risk statements by those age 81 and over (31, 48%), whereas 29 percent (39) of those age 61-80 ate alone most of the time. Taking three or more prescription or OTC drugs per day was responded to the most frequently of all nutritional risk statements by those age 61 to 80 years old (61,46%) and 39 percent (25) of those age 81 and over. Respondents in the age group 61 to 80 were more likely to: (1) eat few fruits, vegetables or dairy products daily (41,31%), (2) have an illness that limits food choice (40,30%) and Have unwanted weight loss or gain (21, 17%). The only nutritional risk statement besides eating alone most of the time in which the 81 and over age group had a higher response rate was: Having tooth or mouth problems that made it hard to eat (8, 13%). Table III.

Nutritional Risk and Gender

Data in Table IV shows the frequency and percentage responses to nutrition risk statements in relation to gender. Nearly one half of all female respondents (59, 49%) and 38 percent (30) of the males were taking three or more prescription or OTC drugs per day. Kennedy (1995) found similar results in female and male urban respondents (54, 58%) and (21, 37%) respectively. Thirty nine percent (47) of female respondents ate alone most of the time. Having an illness limiting food choices was responded to by 35 percent (42) of females. Males were most likely to eat few fruits, vegetables or dairy products (27, 34%), although over one quarter of the females responded the same way (31, 26%). Males were almost twice as likely as females to not always have enough money to buy food (13, 16%) and (11, 9%) respectively and eat fewer than two meals per day (7, 9%) and (5, 4%) respectively. Females were more likely to: (1) have tooth or mouth problems and (2) have unwanted wt loss or gain. Table IV.

TABLE III
FREQUENCY AND PERCENT OF RESPONSES TO NUTRITION RISK STATEMENTS ACCORDING TO AGE
N=200

	61-70 n=55		71-80 n=79		81-90 n=50		90+ n=14	
Risk Statements	F	% N	F	% N	F	% N	F	% N
1. Illness limits food choices								
Yes	20	10	20	10	11	6	2	1
No	35	18	59	30	39	20	12	6
2. Eat fewer than two meals/day								
Yes	4	2	6	3	1	1	1	1
No	51	26	73	37	49	25	13	7
3. Eat few fruits, vegetables or dairy								
Yes	14	7	27	14	13	7	4	2
No	41	21	52	26	37	19	10	5
4. Three or more alcoholic beverages								
Yes	1	1	2	1	0	0	0	0
No	54	27	77	39	50	25	14	7
5. Tooth or mouth problems								
Yes	8	4	7	4	5	3	3	2
No	47	24	72	36	45	23	11	6
6. Don't always have money for food								
Yes	10	5	10	5	3	2	1	1
No	45	23	69	35	47	24	13	7
7. Eat alone most of the time								
Yes	12	6	27	14	26	13	5	3
No	43	22	52	26	24	12	9	5
8. Three or more RX or OTC drugs/day								
Yes	27	14	34	17	18	9	7	4
No	28	14	45	23	32	16	7	4
9. Unwanted weight loss or gain								
Yes	10	5	11	6	6	3	1	1
No	45	23	68	34	44	22	13	7
10. Unable to shop, cook feed self								
Yes	4	2	11	6	5	3	2	1
No	51	26	68	34	45	23	12	6

TABLE IV

FREQUENCY AND PERCENT OF RESPONSES TO NUTRITION RISK STATEMENTS ACCORDING TO GENDER
N=200

	Male n=79		Female n=120	
Risk Statements	F	% N	F	% N
1. Illness limits food choices				
Yes	12	6	42	21
No	67	34	78	39
2. Eat fewer than two meals/day				
Yes	7	4	5	3
No	72	36	115	58
3. Eat few fruits, vegetables or dairy				
Yes	27	14	31	16
No	52	26	89	45
4. Three or more alcoholic beverages				
Yes	1	1	2	1
No	78	39	118	59
5. Tooth or mouth problems				
Yes	9	5	16	8
No	70	35	104	52
6. Don't always have money for food				
Yes	13	7	11	6
No	66	33	109	55
7. Eat alone most of the time				
Yes	22	11	47	24
No	57	29	73	37
8. Three or more RX or OTC drugs/day				
Yes	30	15	59	30
No	49	25	61	31
9. Unwanted weight loss or gain				
Yes	10	5	18	9
No	69	35	102	51
10. Unable to shop, cook feed self				
Yes	9	5	14	7
No	70	35	106	53

Nutrition Risk and Ethnicity

Almost one half of all White respondents took three or more prescription or OTC drugs per day (78, 46%). Three out of four of the Other group (3, 75%) and over a quarter of Native Americans and Blacks took three or more prescription or OTC drugs per day (4, 33%) and (4, 29%) respectively. Over one third of Other, Native Americans and Whites ate alone most of the time (2, 50%), (5, 42%) and (60, 35%) respectively. Over one quarter of all Native American respondents: (1) ate few fruits, vegetables or dairy products daily (4, 33%), (2) had an illness that limited food choices (3, 25%), (3) did not always have enough money to buy food (3, 25%) and (4) were unable to shop, cook or feed themselves (3, 25%). Three quarters of the Other group ate few fruits, vegetables or dairy products daily (3, 75%). groups (4). Over one quarter of all White respondents: (1) Had an illness that affected food choices (49, 29%) and (2) Ate few fruits, vegetables or dairy products (50, 29%). See Table V.

Nutrition Risk and Living Situation

Those who lived alone were most likely to eat alone most of the time (68, 64%). This is similar to what Kennedy (1995) found in urban elderly (49, 86%). Forty four percent of both those living alone and those living with more than one person took three or more prescription or OTC drugs per day (47, 44%) and (40, 44%) respectively. Over one quarter of both those living alone and those living with more than one person responded to: (1) eating few fruits, vegetables or dairy products daily (30, 28%) and (29, 32%) respectively and (2) having an illness that limited food choices (30, 28%) and (24, 26%) respectively. Table VI.

Nutrition Risk and Income

Data in table VII presents the frequency and percent of responses to nutritional risk statements according to income. Findings for income were similar to that of living situation (both those that lived alone and those that lived with others took three or more drugs per day. except that the most likely nutritional risk statement for both low income and not low income

TABLE V

FREQUENCY AND PERCENT OF RESPONSES TO NUTRITION RISK STATEMENTS ACCORDING TO ETHNICITY
N=200

	White		Black		Native American		Other	
	n=170		n=14		n=12		n=4	
Risk Statements	F	% N	F	% N	F	% N	F	% N
1. Illness limits food choices								
Yes	49	25	2	1	3	2	1	1
No	121	61	12	6	9	5	3	2
2. Eat fewer than two meals/day								
Yes	8	4	0	0	2	1	1	1
No	162	81	14	7	10	5	3	2
3. Eat few fruits, vegetables or dairy								
Yes	50	25	1	1	4	2	3	2
No	120	60	13	7	8	4	1	1
4. Three or more alcoholic beverages								
Yes	3	2	0	0	0	0	0	0
No	167	84	14	7	12	6	4	2
5. Tooth or mouth problems								
Yes	23	12	0	0	2	1	0	0
No	147	74	14	7	10	5	4	2
6. Don't always have money for food								
Yes	19	10	2	1	3	2	0	0
No	151	76	12	6	9	5	4	2
7. Eat alone most of the time								
Yes	60	30	4	2	5	3	2	1
No	110	55	10	5	7	4	2	1
8. Three or more RX or OTC drugs/day								
Yes	78	39	4	2	4	2	3	2
No	92	46	10	5	8	4	1	1
9. Unwanted weight loss or gain								
Yes	26	13	1	1	2	1	0	0
No	144	72	13	7	10	5	4	2
10. Unable to shop, cook feed self								
Yes	18	9	0	0	3	2	1	1
No	152	76	14	7	9	5	3	2

TABLE VI

FREQUENCY AND PERCENT OF RESPONSES TO NUTRITION RISK STATEMENTS ACCORDING TO LIVING SITUATION
N=198

	One n=107		More than one n=91	
Risk Statements	F	% N	F	% N
1. Illness limits food choices				
Yes	30	15	24	12
No	77	39	67	34
2. Eat fewer than two meals/day				
Yes	9	45	3	2
No	98	49	88	44
3. Eat few fruits, vegetables or dairy				
Yes	30	15	29	15
No	77	39	62	31
4. Three or more alcoholic beverages				
Yes	1	1	2	1
No	106	53	89	45
5. Tooth or mouth problems				
Yes	14	7	10	5
No	93	47	81	41
6. Don't always have money for food				
Yes	10	5	14	7
No	97	49	77	39
7. Eat alone most of the time				
Yes	68	34	3	2
No	39	20	88	44
8. Three or more RX or OTC drugs/day				
Yes	47	24	40	20
No	60	30	51	26
9. Unwanted weight loss or gain				
Yes	15	8	13	7
No	92	46	78	39
10. Unable to shop, cook feed self				
Yes	9	5	14	7
No	98	49	77	39

TABLE VII
FREQUENCY AND PERCENT OF RESPONSES TO NUTRITION RISK STATEMENTS ACCORDING TO INCOME
N=198

	Low Income n=48		Not Low Income n=150	
Risk Statements	F	% N	F	% N
1. Illness limits food choices				
Yes	17	9	37	19
No	31	16	113	57
2. Eat fewer than two meals/day				
Yes	5	3	7	4
No	43	22	143	72
3. Eat few fruits, vegetables or dairy				
Yes	16	8	43	22
No	32	16	107	54
4. Three or more alcoholic beverages				
Yes	1	1	2	1
No	47	24	148	75
5. Tooth or mouth problems				
Yes	7	4	17	9
No	41	21	133	67
6. Don't always have money for food				
Yes	8	4	16	8
No	40	20	134	68
7. Eat alone most of the time				
Yes	16	8	54	27
No	32	16	96	48
8. Three or more RX or OTC drugs/day				
Yes	21	11	66	33
No	27	14	84	42
9. Unwanted weight loss or gain				
Yes	7	4	21	11
No	41	21	129	65
10. Unable to shop, cook feed self				
Yes	5	3	18	9
No	43	22	132	67

was taking three or more prescription or OTC drugs per day (21, 44%) and (66, 44%) respectively. The three next most frequently responded to nutrition risk statements were the same for both low income and not low income. Over on third of all low income respondents (1) had an illness that limited food choices (17, 35%), (2) ate few fruits, vegetables or dairy products daily (16, 33%) and (3) ate alone most of the time (16, 33%). Those not of low income responded frequently to: (1) eating alone most of the time (54, 36%), (2) eating few fruits, vegetables or dairy products daily (43, 29%) and (3) having an illness limiting food choices (37, 25%). Table VII. Similarly, Kennedy (1995) found that taking three or more prescription or OTC drugs per day, eating alone most of the time, eating few fruits, vegetables or dairy products daily and having an illness limiting food choices were most frequently responded to.

Nutrition Risk and Participation Time in ENP

Respondents who participated in the ENP less than one year had the highest mean nutritional risk score (Figure 8), they also had six nutritional risk statements that over one quarter of the group were at risk for. Most frequently was: (1) taking three or more prescribed or OTC drugs per day (12, 43%), (2) eating few fruits, vegetables or dairy products daily (11, 39%), (3) eating alone most of the time (10, 36%), (4) having an illness limiting food choices (8, 29%), (5) not always having enough money to buy food (7, 25%), and (6) unable to shop, cook or feed self (7, 25%). Almost one half of those participating in the ENP one to three years took three or more prescribed or OTC drugs per day (22, 47%). Those with the lowest mean nutrition risk score had participated more than three years in the ENP (Figure 8). Their major areas of nutritional risk were: (1) taking three or more prescribed drugs (52, 44%), (2) eating alone most of the time (40, 34%), (3) having an illness that limited food choices (32, 27%) and (4) eating few fruits, vegetables or dairy products daily (29, 25%). Table VIII. Kennedy (1995) found the same nutritional risk statements n the urban elderly who participated more than three years.

TABLE VIII

FREQUENCY AND PERCENT OF RESPONSES TO NUTRITION RISK STATEMENTS ACCORDING TO PARTICIPATION TIME
N=193

	Less than one year n=28		1-3 years n=47		More than 3 years n=118	
Risk Statements	F	% N	F	% N	F	% N
1. Illness limits food choices						
Yes	8	4	13	7	32	16
No	20	10	34	17	86	44
2. Eat fewer than two meals/day						
Yes	5	3	2	1	5	3
No	23	12	45	23	113	58
3. Eat few fruits, vegetables or dairy						
Yes	11	6	17	9	29	15
No	17	9	30	15	89	46
4. Three or more alcoholic beverages						
Yes	0	0	2	1	1	1
No	28	14	45	23	117	60
5. Tooth or mouth problems						
Yes	2	1	7	4	15	8
No	26	13	40	21	103	53
6. Don't always have money for food						
Yes	7	4	3	2	13	7
No	21	11	44	23	105	54
7. Eat alone most of the time						
Yes	10	5	16	8	40	21
No	18	9	31	16	78	40
8. Three or more RX or OTC drugs/day						
Yes	12	6	22	11	52	27
No	16	8	25	13	66	34
9. Unwanted weight loss or gain						
Yes	4	2	8	4	16	8
No	24	12	39	20	102	52
10. Unable to shop, cook feed self						
Yes	7	4	4	2	11	6
No	21	11	43	22	107	55

Sources of Nutrition Information

Respondents were allowed to check as many sources as they wished. The most frequently identified source of information was a dietitian (36.3%). This could be the result of the fact that all of the ENP sites employ a consultant dietitian who provides ENP sites nutrition education. The next most frequently identified sources were physicians (27.9%) and food labels (27.9%). Friends and family was the fourth most frequently identified source of nutrition information (21.9%). Health food stores and pharmacists were used least frequently as sources of nutrition information (7%) and (1.5%) respectively. Figure 9. This indicates that our best sources to reach elderly individuals who participate in rural ENP programs in Oklahoma's District 7 is through the dietitian, physician, food labels and friends and family.

Statistical Analyses

Frequencies and percentages were used to identify the subjects according to age, gender, ethnicity, living situation, income and length of participation time and for each nutritional risk statement. Nutritional risks were identified by weighted number values where: 0-2= no current nutritional risk; 3-5= moderate nutritional risk and 6 or over= high nutritional risk. Chi square was used to determine the association between the nutritional risk statements and the demographic variables at the $p \leq 0.05$ level of significance.

Chi Square

Testing of Ho 1 through Ho 6.

Ho 1: There will be no significant association between age and nutrition risk.

Ho 2: There will be no significant association between gender and nutrition risk.

Ho 3: There will be no significant association between ethnic background and nutrition risk.

Ho 4: There will be no significant association between the number of people living in a household and nutrition risk.

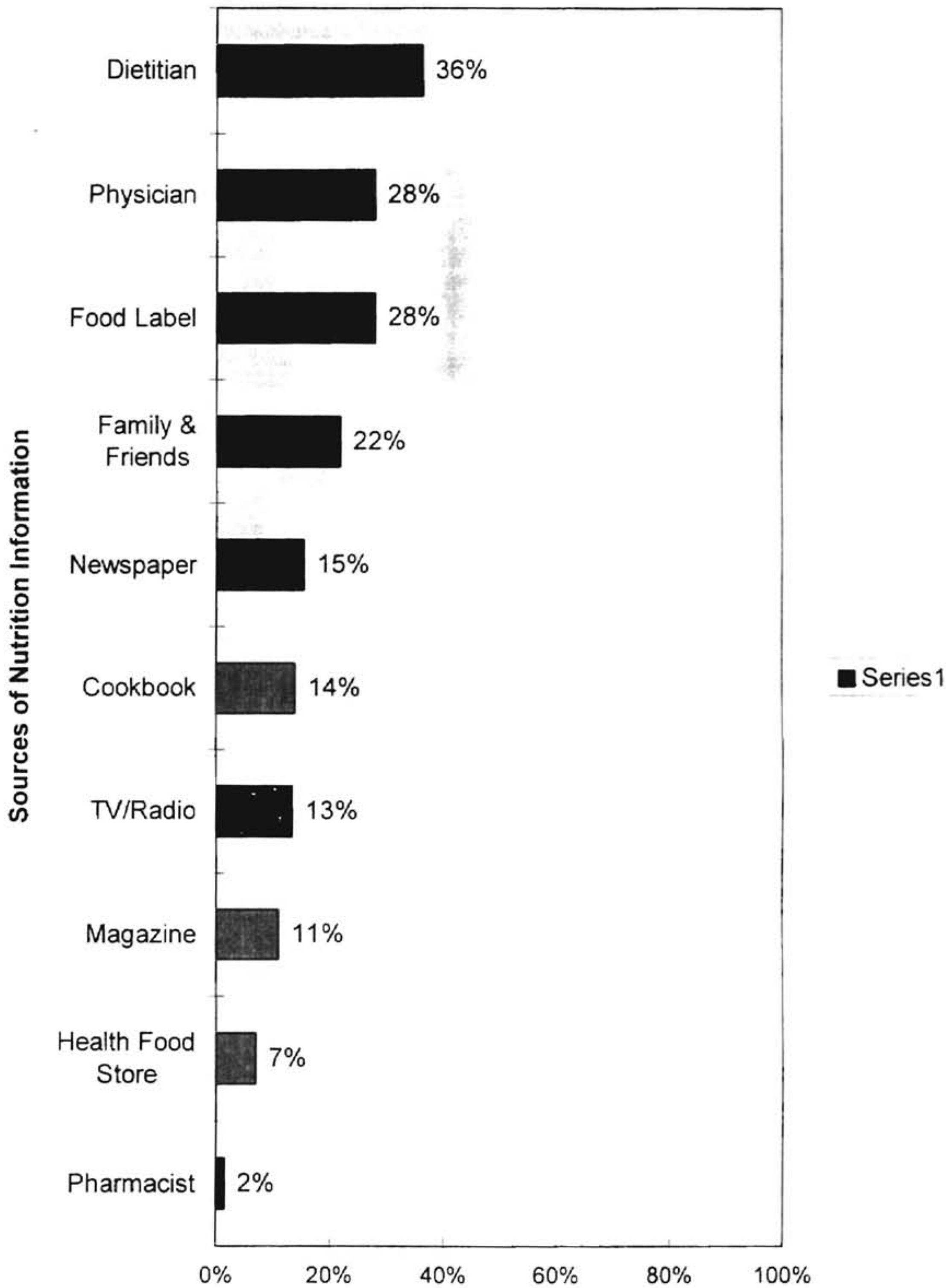

Figure 9. Sources of Nutrition Information by Percentage of Use

Ho 5: There will be no significant association between income and nutrition risk.

Ho 6: There will be no significant association between the length of time participating in the Elderly Nutrition Program and nutrition risk.

Nutritional Risk Statements by Personal Variables

Chi-square analyses indicated that there were four significant associations between nutritional risk statements and demographic variables at the $p \leq 0.05$ significance level, therefore four of the hypotheses were rejected. Table IX. The association between having an illness or condition that made them change their kind and/or amount of food was significantly associated with gender at the p=0.002 level, and as was previously discussed, more women were at risk for this statement (Table IV). Thus, the researcher rejected Ho 2. The researcher also chose to reject Ho 1 because, eating alone most of the time was significantly associated (p=0.015) with the 81 years and over age group. Ho 4 was rejected because there was a significant association (p=0.000) found between those who lived alone and eating alone most of the time. Eating fewer than two meals per day and length of participation time in the ENP (those who participated less than one year) were significantly associated with each other (p=0.050), thus, the researcher chose to reject Ho 6. Eating few fruits, vegetables or dairy products daily approached significance ethnicity. Whites, Native Americans and Others frequently had this as a nutritional risk (p=0.06). Eating fewer than 2 meals per day approached significance with ethnicity (p=0.08). No significant association was found among having three or more alcoholic beverages each day, having tooth or mouth problems that make it hard to eat, not always having enough money to buy the food they need, taking three or more prescribed or over-the-counter drugs each day, unwanted weight loss or gain and those unable to shop, cook or feed themselves and any of the selected personal variables. Table IX. The researcher chose not to reject Ho 3 and Ho 5 since no significant association was found between ethnic background, income and the nutritional risk statements. Kennedy (1995) reported a significant association between eating alone most of the time and those age 65 to 84 (p=0.03), and those living alone (p=0.000).

TABLE IX

CHI-SQUARE DETERMINATIONS INDICATING ASSOCIATIONS BETWEEN NUTRITIONAL RISK STATEMENTS AND SELECTED PERSONAL VARIABLES
N=198

Nutrition Risk Statements	Age	Gender	Ethnicity	Living Situation	Income	Participation Time
Illness limits food choices						
X^2	4.36	9.46	1.43	0.44	2.12	0.78
df	3	1	3	2	1	3
p	0.26	**0.00 ***	0.70	0.80	0.15	0.85
Eat Fewer than 2 meals/Day						
X^2	1.95	1.85	6.83	2.34	2.11	0.78
df	3	1	3	2	1	3
p	0.58	0.17	0.08	0.31	0.15	**0.05***
Eat Few Fruits, Veg. or Dairy						
X^2	1.57	1.61	7.48	0.77	0.38	0.45
df	3	1	3	2	1	3
p	0.67	0.21	0.06	0.68	0.54	0.21
3 or More Alcoholic Bev./Day						
X^2	1.57	0.05	0.54	0.54	0.14	3.13
df	3	1	3	2	1	3
p	0.67	0.82	0.91	0.76	0.71	0.37
Tooth or Mouth Problems						
X^2	2.48	0.16	2.93	0.34	0.36	1.28
df	3	1	3	2	1	3
p	0.48	0.69	0.40	0.84	0.55	0.73
Don't Always Have Money for Food						
X^2	4.00	2.39	2.64	1.83	1.23	6.35
df	3	1	3	2	1	3
p	0.26	0.12	0.45	0.40	0.27	0.10
Eat Alone Most of Time						
X^2	10.52	2.69	0.86	78.34	0.11	1.07
df	3	1	3	2	1	3
p	**0.02***	0.10	0.83	**0.00***	0.74	0.79
3 or More Rx or OTC						
X^2	2.09	2.41	3.68	1.27	0.00	0.16
df	2	1	3	2	1	3
p	0.55	0.12	0.30	0.53	0.98	0.98
Unwanted Weight Loss or Gain						
X^2	1.50	0.22	1.42	0.17	0.01	0.67
df	3	1	3	2	1	3
p	0.68	0.64	0.70	0.92	0.92	0.88
Unable to Shop, Cook, Feed Self						
X^2	1.66	0.00	4.96	2.47	0.09	6.33
df	3	1	3	2	1	3
p	0.65	0.95	0.18	0.29	0.77	0.10

*=Significance at $p \leq 0.05$

CHAPTER V

SUMMARY, MAJOR FINDINGS, IMPLICATIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to determine the nutritional health risks of elderly, ages 60 and over, living in rural areas of Oklahoma who participated in the Elderly Nutrition Program. The 'DETERMINE Your Nutrition Health Checklist' was adapted and used in the survey. Six hypotheses were postulated to determine if there was a significant association between selected personal variables and nutritional risk. Data was obtained from participants of the ENP in Oklahoma's Area Agency on Aging, District 7 (Figure 1, page 5).

The survey instrument was developed in two sections; the first section contained selected demographic variables, and the second section contained 10 nutritional risk statements. The nutritional risk statements were previously assigned weighted point values based upon research for the development of the original 'DETERMINE Your Nutritional Health Checklist' (Appendix A). The results and statistical analyses of the survey data presented in Chapter IV. The sampled population were individuals who participated in the ENP in rural communities (less than 5,000 people, See definition of terms Chapter I, page 7). Only those individuals who were willing to participate were surveyed. Data were obtained from 200 respondents and analyzed using frequencies, percentages, mean scores and chi-squares.

The largest age group were between 71 and 80 years (40%) (Table I). Sixty percent of the subjects were females. The majority of subjects were White (85%). Most of the subjects lived alone, were not considered low income and had participated in the ENP for more than three years.

Females were at slightly higher nutrition risk than the males. This may be due to the fact that the females made up a larger portion of the study group or because they had more nutrition risks. The Native American subjects were at the greatest nutritional risk although their sample size was only six percent of the population or 12 individuals. Participants who lived alone had mean scores that classified them at moderate nutrition risk as well as those who were not considered low income. The subjects who participated for the least amount of time in the ENP, less than one year, were at the highest nutritional risk. The mean nutritional risk score decreased with the longer the subjects had participated in the ENP.

Females between the ages of 61-70 (10%; 20) who were White were the most likely to have and illness or condition that made them change the kind and/or amount of food they ate. Those who ate fewer than two meals per day were most likely between the ages of 71-80 (3 %; 6) , male, White and lived alone. Those responding to eating few fruits or vegetables or milk products were mainly 71-80 year olds (14 %; 27), female, White, had participated in the ENP more than three years and were not considered low income. Only three subjects reported that they consumed three or more alcoholic beverages per day. Having tooth or mouth problems that made it difficult to eat was most common in those living alone, having participated more than three years in the ENP, White, female and between the ages of 61-70 (4 %; 8) and 71-80 (4 %; 7).

The majority of those who did not always have enough money to buy the food they needed were 61-80 (10 %; 20), male, White, lived with more than one person, were not considered low income. Those who eat alone most of the time were 71-80 years old (14 %; 27), female, White, had participated more than three years in the ENP, lived alone and were not low income.

Seventy one to eighty year olds (17 %; 34), female, White, lived alone and were not low income most commonly took three or more prescription or over-the-counter drugs daily. Unwanted weight loss or gain was most frequent in 71-80 year olds (6 %; 11), females, Whites, those living alone, and those who were not low income. The majority of participants who reported being unable to shop, cook, or feed themselves were 71-80 years old (6 %; 11), female, White, had participated more than three years in the ENP, lived with more than one person and were not low income.

The majority of the respondents reported using dietitians, physicians, friends and family as their main source of nutrition information. The least utilized sources of nutrition information were health food stores and pharmacists.

In summary, the only demographic variables that were significantly associated with nutritional risk were: 1) age, 2) gender, 3) living situation and 4) participation time. Taking three or more drugs per day, eating alone most of the time, eating few fruits or vegetables or milk products and illness limiting food choices contributed the greatest to nutritional risk. Therefore, participants can benefit from the nutritious meal and from the nutrition education provided in the ENP

Major Findings.

The following were major findings of this research:

1.Participation in the ENP for an extended period of time has a positive effect on nutritional adequacy.

2.Living alone is positively correlated with eating alone most of the time

3.Low income does not necessarily mean a person is at higher nutritional risk..

Implications

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

1.Nutrition professionals need to help raise consciousness about the importance of nutrition to an individuals health status.

2.Dietitians, physicians and food label industries need to promote and increase nutrition education for the public.

3.Registered Dietitians need to take action in public policies that promote funding for ENP's.

4.The ENP needs to continue to provide well balanced, nutritious meals while at the same time providing fellowship and comfort for the lonely.

Nutrition Education Recommendations for the Elderly

The following are recommendations for nutrition education:

1.Use respected and reliable sources for nutrition education i.e. Registered Dietitians and Physicians.

2.Nutrition education should focus on areas identified as contributing to greater nutrition risk; i.e. Drug intake/interaction, ways to cook nutritious meals for one, ways to increase fruit, vegetable and milk consumption and nutritional adequacy during illness.

3.Nutrition education should also be an interdisciplinary approach when appropriate.

Recommendations for Further Study

Recommendations for further research include:

1.To conduct nutrition risk assessment for rural elderly who are not participants in ENP.

2.To conduct nutritional risk assessment for urban elderly who are not participants in ENP.

3.To conduct further and more in-depth assessment of individuals who are identified as moderate or high nutritional risk using Level I and Level II screens developed by NSI.

4.To conduct nutritional risk assessment that includes a three to four day food record to provide more detailed information about nutrition.

5.To examine factors affecting participation of minority in ENP.

6.To examine whether the same demographic characteristics are present in those who participate in the ENP.

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APPENDIXES

APPENDIX A

QUESTIONNAIRE

GENERAL INFORMATION Code # 46

1. Age: Under 60 ____ 61-70____ 71-80____ 81-90____ 90+____

2. Gender: Male____ Female____

3. Check ONE:
Hispanic____ Asian____ White____
Black____ Native American____ Other, Specify____

4. How many people including your self live in your household?

Live alone______ Live with others______(How many?)

5. Which of the following do you receive, check all that apply:
Social Security____ Medicaid_____ Food Stamps____
Other, specify____ None______

6. How long have you participated in the Elderly Nutrition Program?
Less than one year_____ 1-3 years_____ More than 3 years____

7. From which source do you obtain nutrition information most often:
Cookbook___ Dietitian___ Family & Friends___
Food Label___ Health Food Store___ Magazine___
Newspaper___ Pharmacist___ Physician___
TV/Radio___ Other,specify____________

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.	

APPENDIX B

'DETERMINE' YOUR NUTRITIONAL HEALTH RISKS QUESTIONNAIRE *'he Warning Signs of poor nutritional health are often overlooked. Use this klist to find out if you or someone you know is at nutritional risk.*

ͻ statements below. Circle the number in the :umn for those that apply to you or someone w. For each yes answer, score the number in the box. Total your nutritional score.

DETERMINE YOUR NUTRITIONAL HEALTH

	YES
an illness or condition that made me change the kind and/or amount of food I eat.	2
ewer than 2 meals per day.	3
ew fruits or vegetables, or milk products.	2
3 or more drinks of beer, liquor or wine almost every day.	2
tooth or mouth problems that make it hard for me to eat.	2
t always have enough money to buy the food I need.	4
ılone most of the time.	1
3 or more different prescribed or over-the-counter drugs a day.	1
ut wanting to, I have lost or gained 10 pounds in the last 6 months.	2
ıot always physically able to shop, cook and/or feed myself.	2
TOTAL	

'our Nutritional Score. If it's —

Good! Recheck your nutritional score in 6 months.

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.

'e **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

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

APPENDIX C

WARNING SIGNS OF MALNUTRITION
(BACK SIDE OF 'DETERMINE"
QUESTIONNAIRE)

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

DISEASE

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.

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.

TOOTH 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.

ECONOMIC 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.

REDUCED SOCIAL CONTACT

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

MULTIPLE 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.

INVOLUNTARY 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.

NEEDS 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.

ELDER YEARS ABOVE AGE 80

Most older people lead full and productive lives. But as age increases, risk of frailty and health

APPENDIX D

CHI SQUARE FREQUENCY ANALYSES TABLES

TABLE OF Q1 BY AGE

Q1 / AGE Frequency / Percent / Row Pct / Col Pct	1	2	3	4	Total
0	35 17.68 24.14 63.64	59 29.80 40.69 74.68	39 19.70 26.90 78.00	12 6.06 8.28 85.71	145 73.23
2	20 10.10 37.74 36.36	20 10.10 37.74 25.32	11 5.56 20.75 22.00	2 1.01 3.77 14.29	53 26.77
Total	55 27.78	79 39.90	50 25.25	14 7.07	198 100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q1 BY AGE

Statistic	DF	Value	Prob
Chi-Square	3	4.361	0.225
Likelihood Ratio Chi-Square	3	4.379	0.223
Mantel-Haenszel Chi-Square	1	3.990	0.046
Phi Coefficient		0.148	
Contingency Coefficient		0.147	
Cramer's V		0.148	

TABLE OF Q2 BY AGE

Q2 / AGE Frequency / Percent / Row Pct / Col Pct	1	2	3	4	Total
0	51 25.76 27.42 92.73	73 36.87 39.25 92.41	49 24.75 26.34 98.00	13 6.57 6.99 92.86	186 93.94
3	4 2.02 33.33 7.27	6 3.03 50.00 7.59	1 0.51 8.33 2.00	1 0.51 8.33 7.14	12 6.06
Total	55 27.78	79 39.90	50 25.25	14 7.07	198 100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q2 BY AGE

Statistic	DF	Value	Prob
Chi-Square	3	1.945	0.584
Likelihood Ratio Chi-Square	3	2.395	0.495
Mantel-Haenszel Chi-Square	1	0.633	0.426
Phi Coefficient		0.099	
Contingency Coefficient		0.099	
Cramer's V		0.099	

Effective Sample Size = 198
Frequency Missing = 3

TABLE OF Q3 BY AGE

Q3	Statistic	AGE 1	AGE 2	AGE 3	AGE 4	Total
0	Frequency	41	52	37	10	140
	Percent	20.71	26.26	18.69	5.05	70.71
	Row Pct	29.29	37.14	26.43	7.14	
	Col Pct	74.55	65.82	74.00	71.43	
2	Frequency	14	27	13	4	58
	Percent	7.07	13.64	6.57	2.02	29.29
	Row Pct	24.14	46.55	22.41	6.90	
	Col Pct	25.45	34.18	26.00	28.57	
Total		55	79	50	14	198
		27.78	39.90	25.25	7.07	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q3 BY AGE

Statistic	DF	Value	Prob
Chi-Square	3	1.566	0.667
Likelihood Ratio Chi-Square	3	1.557	0.669
Mantel-Haenszel Chi-Square	1	0.002	0.964
Phi Coefficient		0.089	
Contingency Coefficient		0.089	
Cramer's V		0.089	

TABLE OF Q4 BY AGE

Q4	Statistic	AGE 1	AGE 2	AGE 3	AGE 4	Total
0	Frequency	54	77	50	14	195
	Percent	27.27	38.89	25.25	7.07	98.48
	Row Pct	27.69	39.49	25.64	7.18	
	Col Pct	98.18	97.47	100.00	100.00	
2	Frequency	1	2	0	0	3
	Percent	0.51	1.01	0.00	0.00	1.52
	Row Pct	33.33	66.67	0.00	0.00	
	Col Pct	1.82	2.53	0.00	0.00	
Total		55	79	50	14	198
		27.78	39.90	25.25	7.07	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q4 BY AGE

Statistic	DF	Value	Prob
Chi-Square	3	1.565	0.667
Likelihood Ratio Chi-Square	3	2.442	0.486
Mantel-Haenszel Chi-Square	1	0.766	0.382
Phi Coefficient		0.089	
Contingency Coefficient		0.089	
Cramer's V		0.089	

Effective Sample Size = 198
Frequency Missing = 3

TABLE OF Q5 BY AGE

Q5 / AGE — Frequency / Percent / Row Pct / Col Pct	1	2	3	4	Total
0	47	72	45	11	175
	23.74	36.36	22.73	5.56	88.38
	26.86	41.14	25.71	6.29	
	85.45	91.14	90.00	78.57	
2	8	7	5	3	23
	4.04	3.54	2.53	1.52	11.62
	34.78	30.43	21.74	13.04	
	14.55	8.86	10.00	21.43	
Total	55	79	50	14	198
	27.78	39.90	25.25	7.07	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q5 BY AGE

Statistic	DF	Value	Prob
Chi-Square	3	2.484	0.478
Likelihood Ratio Chi-Square	3	2.278	0.517
Mantel-Haenszel Chi-Square	1	0.007	0.935
Phi Coefficient		0.112	
Contingency Coefficient		0.111	
Cramer's V		0.112	

TABLE OF Q6 BY AGE

Q6 / AGE — Frequency / Percent / Row Pct / Col Pct	1	2	3	4	Total
0	45	69	47	13	174
	22.73	34.85	23.74	6.57	87.88
	25.86	39.66	27.01	7.47	
	81.82	87.34	94.00	92.86	
4	10	10	3	1	24
	5.05	5.05	1.52	0.51	12.12
	41.67	41.67	12.50	4.17	
	18.18	12.66	6.00	7.14	
Total	55	79	50	14	198
	27.78	39.90	25.25	7.07	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q6 BY AGE

Statistic	DF	Value	Prob
Chi-Square	3	4.002	0.261
Likelihood Ratio Chi-Square	3	4.185	0.242
Mantel-Haenszel Chi-Square	1	3.578	0.059
Phi Coefficient		0.142	
Contingency Coefficient		0.141	
Cramer's V		0.142	

Effective Sample Size = 198
Frequency Missing = 3

TABLE OF Q7 BY AGE

Q7 / AGE (Frequency, Percent, Row Pct, Col Pct)	1	2	3	4	Total
0	43 21.72 33.59 78.18	52 26.26 40.63 65.82	24 12.12 18.75 48.00	9 4.55 7.03 64.29	128 64.65
1	12 6.06 17.14 21.82	27 13.64 38.57 34.18	26 13.13 37.14 52.00	5 2.53 7.14 35.71	70 35.35
Total	55 27.78	79 39.90	50 25.25	14 7.07	198 100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q7 BY AGE

Statistic	DF	Value	Prob
Chi-Square	3	10.520	0.015
Likelihood Ratio Chi-Square	3	10.587	0.014
Mantel-Haenszel Chi-Square	1	6.924	0.009
Phi Coefficient		0.230	
Contingency Coefficient		0.225	
Cramer's V		0.230	

TABLE OF Q8 BY AGE

Q8 / AGE (Frequency, Percent, Row Pct, Col Pct)	1	2	3	4	Total
0	28 14.14 25.00 50.91	45 22.73 40.18 56.96	32 16.16 28.57 64.00	7 3.54 6.25 50.00	112 56.57
1	27 13.64 31.40 49.09	34 17.17 39.53 43.04	18 9.09 20.93 36.00	7 3.54 8.14 50.00	86 43.43
Total	55 27.78	79 39.90	50 25.25	14 7.07	198 100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q8 BY AGE

Statistic	DF	Value	Prob
Chi-Square	3	2.092	0.554
Likelihood Ratio Chi-Square	3	2.104	0.551
Mantel-Haenszel Chi-Square	1	0.637	0.425
Phi Coefficient		0.103	
Contingency Coefficient		0.102	
Cramer's V		0.103	

Effective Sample Size = 198
Frequency Missing = 3

TABLE OF Q9 BY AGE

Q9 / AGE (Frequency, Percent, Row Pct, Col Pct)	1	2	3	4	Total
0	45	68	44	13	170
	22.73	34.34	22.22	6.57	85.86
	26.47	40.00	25.88	7.65	
	81.82	86.08	88.00	92.86	
2	10	11	6	1	28
	5.05	5.56	3.03	0.51	14.14
	35.71	39.29	21.43	3.57	
	18.18	13.92	12.00	7.14	
Total	55	79	50	14	198
	27.78	39.90	25.25	7.07	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q9 BY AGE

Statistic	DF	Value	Prob
Chi-Square	3	1.496	0.683
Likelihood Ratio Chi-Square	3	1.560	0.668
Mantel-Haenszel Chi-Square	1	1.428	0.232
Phi Coefficient		0.087	
Contingency Coefficient		0.087	
Cramer's V		0.087	

TABLE OF Q10 BY AGE

Q10 / AGE (Frequency, Percent, Row Pct, Col Pct)	1	2	3	4	Total
0	51	68	45	12	176
	25.76	34.34	22.73	6.06	88.89
	28.98	38.64	25.57	6.82	
	92.73	86.08	90.00	85.71	
2	4	11	5	2	22
	2.02	5.56	2.53	1.01	11.11
	18.18	50.00	22.73	9.09	
	7.27	13.92	10.00	14.29	
Total	55	79	50	14	198
	27.78	39.90	25.25	7.07	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q10 BY AGE

Statistic	DF	Value	Prob
Chi-Square	3	1.659	0.646
Likelihood Ratio Chi-Square	3	1.710	0.635
Mantel-Haenszel Chi-Square	1	0.380	0.538
Phi Coefficient		0.092	
Contingency Coefficient		0.091	
Cramer's V		0.092	

Effective Sample Size = 198
Frequency Missing = 3

```
                 TABLE OF Q1 BY GENDR

Q1         GENDR

Frequency|
Percent  |
Row Pct  |
Col Pct  |       1|       2|  Total
---------+--------+--------+
       0 |     67 |     78 |    145
         |  33.67 |  39.20 |  72.86
         |  46.21 |  53.79 |
         |  84.81 |  65.00 |
---------+--------+--------+
       2 |     12 |     42 |     54
         |   6.03 |  21.11 |  27.14
         |  22.22 |  77.78 |
         |  15.19 |  35.00 |
---------+--------+--------+
Total          79      120      199
            39.70    60.30   100.00

Frequency Missing = 2

           STATISTICS FOR TABLE OF Q1 BY GENDR

Statistic                     DF       Value      Prob
------------------------------------------------------
Chi-Square                     1       9.455     0.002
Likelihood Ratio Chi-Square    1       9.979     0.002
Continuity Adj. Chi-Square     1       8.480     0.004
Mantel-Haenszel Chi-Square     1       9.408     0.002
Fisher's Exact Test (Left)                       1.000
                    (Right)                   1.46E-03
                    (2-Tail)                  2.02E-03
Phi Coefficient                        0.218
Contingency Coefficient                0.213        --
Cramer's V                             0.218
```

```
                 TABLE OF Q2 BY GENDR

Q2         GENDR

Frequency|
Percent  |
Row Pct  |
Col Pct  |       1|       2|  Total
---------+--------+--------+
       0 |     72 |    115 |    187
         |  36.18 |  57.79 |  93.97
         |  38.50 |  61.50 |
         |  91.14 |  95.83 |
---------+--------+--------+
       3 |      7 |      5 |     12
         |   3.52 |   2.51 |   6.03
         |  58.33 |  41.67 |
         |   8.86 |   4.17 |
---------+--------+--------+
Total          79      120      199
            39.70    60.30   100.00

Frequency Missing = 2

           STATISTICS FOR TABLE OF Q2 BY GENDR

Statistic                     DF       Value      Prob
------------------------------------------------------
Chi-Square                     1       1.852     0.174
Likelihood Ratio Chi-Square    1       1.804     0.179
Continuity Adj. Chi-Square     1       1.117     0.291
Mantel-Haenszel Chi-Square     1       1.843     0.175
Fisher's Exact Test (Left)                       0.146
                    (Right)                      0.951
                    (2-Tail)                     0.226
Phi Coefficient                       -0.096
Contingency Coefficient                0.096        --
[illegible]                           -0.096
```

TABLE OF Q3 BY GENDR

Q3 / GENDR Frequency Percent Row Pct Col Pct	1	2	Total
0	52 26.13 36.88 65.82	89 44.72 63.12 74.17	141 70.85
2	27 13.57 46.55 34.18	31 15.58 53.45 25.83	58 29.15
Total	79 39.70	120 60.30	199 100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q3 BY GENDR

Statistic	DF	Value	Prob
Chi-Square	1	1.606	0.205
Likelihood Ratio Chi-Square	1	1.592	0.207
Continuity Adj. Chi-Square	1	1.227	0.268
Mantel-Haenszel Chi-Square	1	1.598	0.206
Fisher's Exact Test (Left)			0.134
(Right)			0.923
(2-Tail)			0.264
Phi Coefficient		-0.090	--
Contingency Coefficient		0.089	
Cramer's V		-0.090	

TABLE OF Q4 BY GENDR

Q4 / GENDR Frequency Percent Row Pct Col Pct	1	2	Total
0	78 39.20 39.80 98.73	118 59.30 60.20 98.33	196 98.49
2	1 0.50 33.33 1.27	2 1.01 66.67 1.67	3 1.51
Total	79 39.70	120 60.30	199 100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q4 BY GENDR

Statistic	DF	Value	Prob
Chi-Square	1	0.052	0.820
Likelihood Ratio Chi-Square	1	0.053	0.819
Continuity Adj. Chi-Square	1	0.000	1.000
Mantel-Haenszel Chi-Square	1	0.051	0.821
Fisher's Exact Test (Left)			0.783
(Right)			0.653
(2-Tail)			1.000
Phi Coefficient		0.016	--
Contingency Coefficient		0.016	
Cramer's V		0.016	

TABLE OF Q5 BY GENDR

```
Q5        GENDR

Frequency|
Percent  |
Row Pct  |
Col Pct  |       1|       2|  Total
---------+--------+--------+
       0 |     70 |    104 |    174
         |  35.18 |  52.26 |  87.44
         |  40.23 |  59.77 |
         |  88.61 |  86.67 |
---------+--------+--------+
       2 |      9 |     16 |     25
         |   4.52 |   8.04 |  12.56
         |  36.00 |  64.00 |
         |  11.39 |  13.33 |
---------+--------+--------+
Total          79      120      199
            39.70    60.30   100.00
```

Frequency Missing = 2

STATISTICS FOR TABLE OF Q5 BY GENDR

Statistic	DF	Value	Prob
Chi-Square	1	0.163	0.686
Likelihood Ratio Chi-Square	1	0.165	0.685
Continuity Adj. Chi-Square	1	0.034	0.853
Mantel-Haenszel Chi-Square	1	0.163	0.687
Fisher's Exact Test (Left)			0.731
(Right)			0.431
(2-Tail)			0.828
Phi Coefficient		0.029	--
Contingency Coefficient		0.029	
Cramer's V		0.029	

TABLE OF Q6 BY GENDR

```
Q6        GENDR

Frequency|
Percent  |
Row Pct  |
Col Pct  |       1|       2|  Total
---------+--------+--------+
       0 |     66 |    109 |    175
         |  33.17 |  54.77 |  87.94
         |  37.71 |  62.29 |
         |  83.54 |  90.83 |
---------+--------+--------+
       4 |     13 |     11 |     24
         |   6.53 |   5.53 |  12.06
         |  54.17 |  45.83 |
         |  16.46 |   9.17 |
---------+--------+--------+
Total          79      120      199
            39.70    60.30   100.00
```

Frequency Missing = 2

STATISTICS FOR TABLE OF Q6 BY GENDR

Statistic	DF	Value	Prob
Chi-Square	1	2.386	0.122
Likelihood Ratio Chi-Square	1	2.334	0.127
Continuity Adj. Chi-Square	1	1.749	0.186
Mantel-Haenszel Chi-Square	1	2.374	0.123
Fisher's Exact Test (Left)			0.094
(Right)			0.960
(2-Tail)			0.181
Phi Coefficient		-0.110	--

TABLE OF Q7 BY GENDR

Q7 / GENDR Frequency Percent Row Pct Col Pct	1	2	Total
0	57 28.64 43.85 72.15	73 36.68 56.15 60.83	130 65.33
1	22 11.06 31.88 27.85	47 23.62 68.12 39.17	69 34.67
Total	79 39.70	120 60.30	199 100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q7 BY GENDR

Statistic	DF	Value	Prob
Chi-Square	1	2.694	0.101
Likelihood Ratio Chi-Square	1	2.734	0.098
Continuity Adj. Chi-Square	1	2.218	0.136
Mantel-Haenszel Chi-Square	1	2.681	0.102
Fisher's Exact Test (Left)			0.964
(Right)			0.068
(2-Tail)			0.128
Phi Coefficient		0.116	--
Contingency Coefficient		0.116	
Cramer's V		0.116	

TABLE OF Q8 BY GENDR

Q8 / GENDR Frequency Percent Row Pct Col Pct	1	2	Total
0	49 24.62 44.55 62.03	61 30.65 55.45 50.83	110 55.28
1	30 15.08 33.71 37.97	59 29.65 66.29 49.17	89 44.72
Total	79 39.70	120 60.30	199 100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q8 BY GENDR

Statistic	DF	Value	Prob
Chi-Square	1	2.414	0.120
Likelihood Ratio Chi-Square	1	2.428	0.119
Continuity Adj. Chi-Square	1	1.982	0.159
Mantel-Haenszel Chi-Square	1	2.402	0.121
Fisher's Exact Test (Left)			0.956
(Right)			0.079
(2-Tail)			0.145
Phi Coefficient		0.110	--
Contingency Coefficient		0.109	
Cramer's V		0.110	

TABLE OF Q9 BY GENDR

Q9 (Frequency / Percent / Row Pct / Col Pct)	GENDR 1	GENDR 2	Total
0	69	102	171
	34.67	51.26	85.93
	40.35	59.65	
	87.34	85.00	
2	10	18	28
	5.03	9.05	14.07
	35.71	64.29	
	12.66	15.00	
Total	79	120	199
	39.70	60.30	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q9 BY GENDR

Statistic	DF	Value	Prob
Chi-Square	1	0.216	0.642
Likelihood Ratio Chi-Square	1	0.218	0.640
Continuity Adj. Chi-Square	1	0.066	0.798
Mantel-Haenszel Chi-Square	1	0.215	0.643
Fisher's Exact Test (Left)			0.747
(Right)			0.403
(2-Tail)			0.683
Phi Coefficient		0.033	
Contingency Coefficient		0.033	
Cramer's V		0.033	

TABLE OF Q10 BY GENDR

Q10 (Frequency / Percent / Row Pct / Col Pct)	GENDR 1	GENDR 2	Total
0	70	106	176
	35.18	53.27	88.44
	39.77	60.23	
	88.61	88.33	
2	9	14	23
	4.52	7.04	11.56
	39.13	60.87	
	11.39	11.67	
Total	79	120	199
	39.70	60.30	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q10 BY GENDR

Statistic	DF	Value	Prob
Chi-Square	1	0.004	0.953
Likelihood Ratio Chi-Square	1	0.004	0.953
Continuity Adj. Chi-Square	1	0.000	1.000
Mantel-Haenszel Chi-Square	1	0.003	0.953
Fisher's Exact Test (Left)			0.608
(Right)			0.571
(2-Tail)			1.000
Phi Coefficient		0.004	
Contingency Coefficient		0.004	
Cramer's V		0.004	

TABLE OF Q1 BY ETHN

Q1 / ETHN: Frequency, Percent, Row Pct, Col Pct	1	2	3	5	Total
0	121 60.50 83.45 71.18	12 6.00 8.28 85.71	9 4.50 6.21 75.00	3 1.50 2.07 75.00	145 72.50
2	49 24.50 89.09 28.82	2 1.00 3.64 14.29	3 1.50 5.45 25.00	1 0.50 1.82 25.00	55 27.50
Total	170 85.00	14 7.00	12 6.00	4 2.00	200 100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF Q1 BY ETHN

Statistic	DF	Value	Prob
Chi-Square	3	1.426	0.700
Likelihood Ratio Chi-Square	3	1.598	0.660
Mantel-Haenszel Chi-Square	1	0.364	0.546
Phi Coefficient		0.084	
Contingency Coefficient		0.084	
Cramer's V		0.084	

Effective Sample Size = 200
Frequency Missing = 1

TABLE OF Q2 BY ETHN

Q2 / ETHN: Frequency, Percent, Row Pct, Col Pct	1	2	3	5	Total
0	162 81.00 85.71 95.29	14 7.00 7.41 100.00	10 5.00 5.29 83.33	3 1.50 1.59 75.00	189 94.50
3	8 4.00 72.73 4.71	0 0.00 0.00 0.00	2 1.00 18.18 16.67	1 0.50 9.09 25.00	11 5.50
Total	170 85.00	14 7.00	12 6.00	4 2.00	200 100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF Q2 BY ETHN

Statistic	DF	Value	Prob
Chi-Square	3	6.826	0.078
Likelihood Ratio Chi-Square	3	5.362	0.147
Mantel-Haenszel Chi-Square	1	4.347	0.037
Phi Coefficient		0.185	
Contingency Coefficient		0.182	
Cramer's V		0.185	

Effective Sample Size = 200
Frequency Missing = 1

TABLE OF Q3 BY ETHN

Q3 ETHN

Frequency / Percent / Row Pct / Col Pct	1	2	3	5	Total
0	120 60.00 84.51 70.59	13 6.50 9.15 92.86	8 4.00 5.63 66.67	1 0.50 0.70 25.00	142 71.00
2	50 25.00 86.21 29.41	1 0.50 1.72 7.14	4 2.00 6.90 33.33	3 1.50 5.17 75.00	58 29.00
Total	170 85.00	14 7.00	12 6.00	4 2.00	200 100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF Q3 BY ETHN

Statistic	DF	Value	Prob
Chi-Square	3	7.482	0.058
Likelihood Ratio Chi-Square	3	7.910	0.048
Mantel-Haenszel Chi-Square	1	1.237	0.266
Phi Coefficient		0.193	
Contingency Coefficient		0.190	
Cramer's V		0.193	

Effective Sample Size = 200
Frequency Missing = 1

TABLE OF Q4 BY ETHN

Q4 ETHN

Frequency / Percent / Row Pct / Col Pct	1	2	3	5	Total
0	167 83.50 84.77 98.24	14 7.00 7.11 100.00	12 6.00 6.09 100.00	4 2.00 2.03 100.00	197 98.50
2	3 1.50 100.00 1.76	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	3 1.50
Total	170 85.00	14 7.00	12 6.00	4 2.00	200 100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF Q4 BY ETHN

Statistic	DF	Value	Prob
Chi-Square	3	0.537	0.911
Likelihood Ratio Chi-Square	3	0.983	0.805
Mantel-Haenszel Chi-Square	1	0.397	0.529
Phi Coefficient		0.052	
Contingency Coefficient		0.052	
Cramer's V		0.052	

Effective Sample Size = 200
Frequency Missing = 1

TABLE OF Q5 BY ETHN

Q5 / Frequency, Percent, Row Pct, Col Pct	ETHN 1	2	3	5	Total
0	147	14	10	4	175
	73.50	7.00	5.00	2.00	87.50
	84.00	8.00	5.71	2.29	
	86.47	100.00	83.33	100.00	
2	23	0	2	0	25
	11.50	0.00	1.00	0.00	12.50
	92.00	0.00	8.00	0.00	
	13.53	0.00	16.67	0.00	
Total	170	14	12	4	200
	85.00	7.00	6.00	2.00	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF Q5 BY ETHN

Statistic	DF	Value	Prob
Chi-Square	3	2.927	0.403
Likelihood Ratio Chi-Square	3	5.143	0.162
Mantel-Haenszel Chi-Square	1	0.617	0.432
Phi Coefficient		0.121	
Contingency Coefficient		0.120	
Cramer's V		0.121	

Effective Sample Size = 200
Frequency Missing = 1

TABLE OF Q6 BY ETHN

Q6 / Frequency, Percent, Row Pct, Col Pct	ETHN 1	2	3	5	Total
0	151	12	9	4	176
	75.50	6.00	4.50	2.00	88.00
	85.80	6.82	5.11	2.27	
	88.82	85.71	75.00	100.00	
4	19	2	3	0	24
	9.50	1.00	1.50	0.00	12.00
	79.17	8.33	12.50	0.00	
	11.18	14.29	25.00	0.00	
Total	170	14	12	4	200
	85.00	7.00	6.00	2.00	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF Q6 BY ETHN

Statistic	DF	Value	Prob
Chi-Square	3	2.644	0.450
Likelihood Ratio Chi-Square	3	2.726	0.436
Mantel-Haenszel Chi-Square	1	0.195	0.658
Phi Coefficient		0.115	
Contingency Coefficient		0.114	
Cramer's V		0.115	

Effective Sample Size = 200
Frequency Missing = 1

TABLE OF Q7 BY ETHN

Q7 ETHN

Frequency / Percent / Row Pct / Col Pct	1	2	3	5	Total
0	110 55.00 85.27 64.71	10 5.00 7.75 71.43	7 3.50 5.43 58.33	2 1.00 1.55 50.00	129 64.50
1	60 30.00 84.51 35.29	4 2.00 5.63 28.57	5 2.50 7.04 41.67	2 1.00 2.82 50.00	71 35.50
Total	170 85.00	14 7.00	12 6.00	4 2.00	200 100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF Q7 BY ETHN

Statistic	DF	Value	Prob
Chi-Square	3	0.863	0.834
Likelihood Ratio Chi-Square	3	0.853	0.837
Mantel-Haenszel Chi-Square	1	0.312	0.576
Phi Coefficient		0.066	
Contingency Coefficient		0.066	
Cramer's V		0.066	

Effective Sample Size = 200
Frequency Missing = 1

TABLE OF Q8 BY ETHN

Q8 ETHN

Frequency / Percent / Row Pct / Col Pct	1	2	3	5	Total
0	92 46.00 82.88 54.12	10 5.00 9.01 71.43	8 4.00 7.21 66.67	1 0.50 0.90 25.00	111 55.50
1	78 39.00 87.64 45.88	4 2.00 4.49 28.57	4 2.00 4.49 33.33	3 1.50 3.37 75.00	89 44.50
Total	170 85.00	14 7.00	12 6.00	4 2.00	200 100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF Q8 BY ETHN

Statistic	DF	Value	Prob
Chi-Square	3	3.682	0.298
Likelihood Ratio Chi-Square	3	3.792	0.285
Mantel-Haenszel Chi-Square	1	0.000	0.995
Phi Coefficient		0.136	
Contingency Coefficient		0.134	
Cramer's V		0.136	

Effective Sample Size = 200
Frequency Missing = 1

TABLE OF Q9 BY ETHN

Q9 (rows) by ETHN (columns). Each cell: Frequency / Percent / Row Pct / Col Pct

Q9		1	2	3	5	Total
0	Frequency	144	13	10	4	171
	Percent	72.00	6.50	5.00	2.00	85.50
	Row Pct	84.21	7.60	5.85	2.34	
	Col Pct	84.71	92.86	83.33	100.00	
2	Frequency	26	1	2	0	29
	Percent	13.00	0.50	1.00	0.00	14.50
	Row Pct	89.66	3.45	6.90	0.00	
	Col Pct	15.29	7.14	16.67	0.00	
Total		170	14	12	4	200
		85.00	7.00	6.00	2.00	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF Q9 BY ETHN

Statistic	DF	Value	Prob
Chi-Square	3	1.422	0.700
Likelihood Ratio Chi-Square	3	2.112	0.549
Mantel-Haenszel Chi-Square	1	0.577	0.448
Phi Coefficient		0.084	
Contingency Coefficient		0.084	
Cramer's V		0.084	

Effective Sample Size = 200
Frequency Missing = 1

TABLE OF Q10 BY ETHN

Q10 (rows) by ETHN (columns). Each cell: Frequency / Percent / Row Pct / Col Pct

Q10		1	2	3	5	Total
0	Frequency	152	14	9	3	178
	Percent	76.00	7.00	4.50	1.50	89.00
	Row Pct	85.39	7.87	5.06	1.69	
	Col Pct	89.41	100.00	75.00	75.00	
2	Frequency	18	0	3	1	22
	Percent	9.00	0.00	1.50	0.50	11.00
	Row Pct	81.82	0.00	13.64	4.55	
	Col Pct	10.59	0.00	25.00	25.00	
Total		170	14	12	4	200
		85.00	7.00	6.00	2.00	100.00

Frequency Missing = 1

STATISTICS FOR TABLE OF Q10 BY ETHN

Statistic	DF	Value	Prob
Chi-Square	3	4.963	0.175
Likelihood Ratio Chi-Square	3	5.753	0.124
Mantel-Haenszel Chi-Square	1	1.504	0.220
Phi Coefficient		0.158	
Contingency Coefficient		0.156	
Cramer's V		0.158	

Effective Sample Size = 200
Frequency Missing = 1

TABLE OF Q1 BY HSE

Q1 (Frequency / Percent / Row Pct / Col Pct)	HSE 0	HSE 1	HSE 2	Total
0	1	77	67	145
	0.50	38.69	33.67	72.86
	0.69	53.10	46.21	
	100.00	71.96	73.63	
2	0	30	24	54
	0.00	15.08	12.06	27.14
	0.00	55.56	44.44	
	0.00	28.04	26.37	
Total	1	107	91	199
	0.50	53.77	45.73	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q1 BY HSE

Statistic	DF	Value	Prob
Chi-Square	2	0.443	0.801
Likelihood Ratio Chi-Square	2	0.704	0.703
Mantel-Haenszel Chi-Square	1	0.017	0.895
Phi Coefficient		0.047	
Contingency Coefficient		0.047	
Cramer's V		0.047	

Effective Sample Size = 199
Frequency Missing = 2

TABLE OF Q2 BY HSE

Q2 (Frequency / Percent / Row Pct / Col Pct)	HSE 0	HSE 1	HSE 2	Total
0	1	98	88	187
	0.50	49.25	44.22	93.97
	0.53	52.41	47.06	
	100.00	91.59	96.70	
3	0	9	3	12
	0.00	4.52	1.51	6.03
	0.00	75.00	25.00	
	0.00	8.41	3.30	
Total	1	107	91	199
	0.50	53.77	45.73	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q2 BY HSE

Statistic	DF	Value	Prob
Chi-Square	2	2.335	0.311
Likelihood Ratio Chi-Square	2	2.508	0.285
Mantel-Haenszel Chi-Square	1	2.016	0.156
Phi Coefficient		0.108	
Contingency Coefficient		0.108	
Cramer's V		0.108	

Effective Sample Size = 199
Frequency Missing = 2

TABLE OF Q3 BY HSE

Q3 / HSE (Frequency, Percent, Row Pct, Col Pct)	0	1	2	Total
0	1	77	62	140
	0.50	38.69	31.16	70.35
	0.71	55.00	44.29	
	100.00	71.96	68.13	
2	0	30	29	59
	0.00	15.08	14.57	29.65
	0.00	50.85	49.15	
	0.00	28.04	31.87	
Total	1	107	91	199
	0.50	53.77	45.73	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q3 BY HSE

Statistic	DF	Value	Prob
Chi-Square	2	0.770	0.681
Likelihood Ratio Chi-Square	2	1.050	0.592
Mantel-Haenszel Chi-Square	1	0.499	0.480
Phi Coefficient		0.062	
Contingency Coefficient		0.062	
Cramer's V		0.062	

Effective Sample Size = 199
Frequency Missing = 2

TABLE OF Q4 BY HSE

Q4 / HSE (Frequency, Percent, Row Pct, Col Pct)	0	1	2	Total
0	1	106	89	196
	0.50	53.27	44.72	98.49
	0.51	54.08	45.41	
	100.00	99.07	97.80	
2	0	1	2	3
	0.00	0.50	1.01	1.51
	0.00	33.33	66.67	
	0.00	0.93	2.20	
Total	1	107	91	199
	0.50	53.77	45.73	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q4 BY HSE

Statistic	DF	Value	Prob
Chi-Square	2	0.544	0.762
Likelihood Ratio Chi-Square	2	0.560	0.756
Mantel-Haenszel Chi-Square	1	0.540	0.462
Phi Coefficient		0.052	
Contingency Coefficient		0.052	
Cramer's V		0.052	

Effective Sample Size = 199
Frequency Missing = 2

TABLE OF Q5 BY HSE

Q5 / HSE — Frequency / Percent / Row Pct / Col Pct	0	1	2	Total
0	1	93	81	175
	0.50	46.73	40.70	87.94
	0.57	53.14	46.29	
	100.00	86.92	89.01	
2	0	14	10	24
	0.00	7.04	5.03	12.06
	0.00	58.33	41.67	
	0.00	13.08	10.99	
Total	1	107	91	199
	0.50	53.77	45.73	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q5 BY HSE

Statistic	DF	Value	Prob
Chi-Square	2	0.341	0.843
Likelihood Ratio Chi-Square	2	0.461	0.794
Mantel-Haenszel Chi-Square	1	0.133	0.715
Phi Coefficient		0.041	
Contingency Coefficient		0.041	
Cramer's V		0.041	

Effective Sample Size = 199
Frequency Missing = 2

TABLE OF Q6 BY HSE

Q6 / HSE — Frequency / Percent / Row Pct / Col Pct	0	1	2	Total
0	1	97	77	175
	0.50	48.74	38.69	87.94
	0.57	55.43	44.00	
	100.00	90.65	84.62	
4	0	10	14	24
	0.00	5.03	7.04	12.06
	0.00	41.67	58.33	
	0.00	9.35	15.38	
Total	1	107	91	199
	0.50	53.77	45.73	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q6 BY HSE

Statistic	DF	Value	Prob
Chi-Square	2	1.829	0.401
Likelihood Ratio Chi-Square	2	1.937	0.380
Mantel-Haenszel Chi-Square	1	1.810	0.179
Phi Coefficient		0.096	
Contingency Coefficient		0.095	
Cramer's V		0.096	

Effective Sample Size = 199
Frequency Missing = 2

TABLE OF Q7 BY HSE

Q7 HSE

Frequency / Percent / Row Pct / Col Pct	0	1	2	Total
0	1	39	88	128
	0.50	19.60	44.22	64.32
	0.78	30.47	68.75	
	100.00	36.45	96.70	
1	0	68	3	71
	0.00	34.17	1.51	35.68
	0.00	95.77	4.23	
	0.00	63.55	3.30	
Total	1	107	91	199
	0.50	53.77	45.73	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q7 BY HSE

Statistic	DF	Value	Prob
Chi-Square	2	78.357	0.000
Likelihood Ratio Chi-Square	2	92.567	0.000
Mantel-Haenszel Chi-Square	1	71.625	0.000
Phi Coefficient		0.628	
Contingency Coefficient		0.532	
Cramer's V		0.628	

Effective Sample Size = 199
Frequency Missing = 2

TABLE OF Q8 BY HSE

Q8 HSE

Frequency / Percent / Row Pct / Col Pct	0	1	2	Total
0	0	60	51	111
	0.00	30.15	25.63	55.78
	0.00	54.05	45.95	
	0.00	56.07	56.04	
1	1	47	40	88
	0.50	23.62	20.10	44.22
	1.14	53.41	45.45	
	100.00	43.93	43.96	
Total	1	107	91	199
	0.50	53.77	45.73	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q8 BY HSE

Statistic	DF	Value	Prob
Chi-Square	2	1.268	0.531
Likelihood Ratio Chi-Square	2	1.638	0.441
Mantel-Haenszel Chi-Square	1	0.050	0.823
Phi Coefficient		0.080	
Contingency Coefficient		0.080	
Cramer's V		0.080	

Effective Sample Size = 199
Frequency Missing = 2

TABLE OF Q9 BY HSE

Q9 \ HSE (Frequency / Percent / Row Pct / Col Pct)	0	1	2	Total
0	1	92	78	171
	0.50	46.23	39.20	85.93
	0.58	53.80	45.61	
	100.00	85.98	85.71	
2	0	15	13	28
	0.00	7.54	6.53	14.07
	0.00	53.57	46.43	
	0.00	14.02	14.29	
Total	1	107	91	199
	0.50	53.77	45.73	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q9 BY HSE

Statistic	DF	Value	Prob
Chi-Square	2	0.167	0.920
Likelihood Ratio Chi-Square	2	0.307	0.858
Mantel-Haenszel Chi-Square	1	0.018	0.893
Phi Coefficient		0.029	
Contingency Coefficient		0.029	
Cramer's V		0.029	

Effective Sample Size = 199
Frequency Missing = 2

TABLE OF Q10 BY HSE

Q10 \ HSE (Frequency / Percent / Row Pct / Col Pct)	0	1	2	Total
0	1	98	77	176
	0.50	49.25	38.69	88.44
	0.57	55.68	43.75	
	100.00	91.59	84.62	
2	0	9	14	23
	0.00	4.52	7.04	11.56
	0.00	39.13	60.87	
	0.00	8.41	15.38	
Total	1	107	91	199
	0.50	53.77	45.73	100.00

Frequency Missing = 2

STATISTICS FOR TABLE OF Q10 BY HSE

Statistic	DF	Value	Prob
Chi-Square	2	2.471	0.291
Likelihood Ratio Chi-Square	2	2.574	0.276
Mantel-Haenszel Chi-Square	1	2.456	0.117
Phi Coefficient		0.111	
Contingency Coefficient		0.111	
Cramer's V		0.111	

Effective Sample Size = 199
Frequency Missing = 2

```
                 TABLE OF Q1 BY INCOM

Q1          INCOM

Frequency|
Percent  |
Row Pct  |
Col Pct  |       0|       1|  Total
---------+--------+--------+
       0 |    113 |     31 |    144
         |  57.07 |  15.66 |  72.73
         |  78.47 |  21.53 |
         |  75.33 |  64.58 |
---------+--------+--------+
       2 |     37 |     17 |     54
         |  18.69 |   8.59 |  27.27
         |  68.52 |  31.48 |
         |  24.67 |  35.42 |
---------+--------+--------+
Total         150       48      198
            75.76    24.24   100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q1 BY INCOM

Statistic                     DF       Value      Prob
------------------------------------------------------
Chi-Square                     1       2.119     0.146
Likelihood Ratio Chi-Square    1       2.045     0.153
Continuity Adj. Chi-Square     1       1.611     0.204
Mantel-Haenszel Chi-Square     1       2.108     0.147
Fisher's Exact Test (Left)                       0.948
                    (Right)                      0.103
                    (2-Tail)                     0.192
Phi Coefficient                        0.103
Contingency Coefficient                0.103
Cramer's V                             0.103

Effective Sample Size = 198
Frequency Missing = 3
                 TABLE OF Q2 BY INCOM

Q2          INCOM

Frequency|
Percent  |
Row Pct  |
Col Pct  |       0|       1|  Total
---------+--------+--------+
       0 |    143 |     43 |    186
         |  72.22 |  21.72 |  93.94
         |  76.88 |  23.12 |
         |  95.33 |  89.58 |
---------+--------+--------+
       3 |      7 |      5 |     12
         |   3.54 |   2.53 |   6.06
         |  58.33 |  41.67 |
         |   4.67 |  10.42 |
---------+--------+--------+
Total         150       48      198
            75.76    24.24   100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q2 BY INCOM

Statistic                     DF       Value      Prob
------------------------------------------------------
Chi-Square                     1       2.112     0.146
Likelihood Ratio Chi-Square    1       1.886     0.170
Continuity Adj. Chi-Square     1       1.223     0.269
Mantel-Haenszel Chi-Square     1       2.101     0.147
Fisher's Exact Test (Left)                       0.958
                    (Right)                      0.136
                    (2-Tail)                     0.168
Phi Coefficient                        0.103
Contingency Coefficient                0.103
```

TABLE OF Q3 BY INCOM

Q3 / INCOM (Frequency / Percent / Row Pct / Col Pct)	0	1	Total
0	107	32	139
	54.04	16.16	70.20
	76.98	23.02	
	71.33	66.67	
2	43	16	59
	21.72	8.08	29.80
	72.88	27.12	
	28.67	33.33	
Total	150	48	198
	75.76	24.24	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q3 BY INCOM

Statistic	DF	Value	Prob
Chi-Square	1	0.379	0.538
Likelihood Ratio Chi-Square	1	0.373	0.541
Continuity Adj. Chi-Square	1	0.188	0.664
Mantel-Haenszel Chi-Square	1	0.377	0.539
Fisher's Exact Test (Left)			0.788
(Right)			0.329
(2-Tail)			0.588
Phi Coefficient		0.044	
Contingency Coefficient		0.044	
Cramer's V		0.044	

Effective Sample Size = 198
Frequency Missing = 3

TABLE OF Q4 BY INCOM

Q4 / INCOM (Frequency / Percent / Row Pct / Col Pct)	0	1	Total
0	148	47	195
	74.75	23.74	98.48
	75.90	24.10	
	98.67	97.92	
2	2	1	3
	1.01	0.51	1.52
	66.67	33.33	
	1.33	2.08	
Total	150	48	198
	75.76	24.24	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q4 BY INCOM

Statistic	DF	Value	Prob
Chi-Square	1	0.137	0.711
Likelihood Ratio Chi-Square	1	0.128	0.721
Continuity Adj. Chi-Square	1	0.000	1.000
Mantel-Haenszel Chi-Square	1	0.136	0.712
Fisher's Exact Test (Left)			0.854
(Right)			0.567
(2-Tail)			0.567

TABLE OF Q5 BY INCOM

Q5 (Frequency / Percent / Row Pct / Col Pct)	INCOM 0	INCOM 1	Total
0	133	41	174
	67.17	20.71	87.88
	76.44	23.56	
	88.67	85.42	
2	17	7	24
	8.59	3.54	12.12
	70.83	29.17	
	11.33	14.58	
Total	150	48	198
	75.76	24.24	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q5 BY INCOM

Statistic	DF	Value	Prob
Chi-Square	1	0.361	0.548
Likelihood Ratio Chi-Square	1	0.348	0.555
Continuity Adj. Chi-Square	1	0.120	0.729
Mantel-Haenszel Chi-Square	1	0.359	0.549
Fisher's Exact Test (Left)			0.806
(Right)			0.354
(2-Tail)			0.612
Phi Coefficient		0.043	
Contingency Coefficient		0.043	
Cramer's V		0.043	

Effective Sample Size = 198
Frequency Missing = 3

TABLE OF Q6 BY INCOM

Q6 (Frequency / Percent / Row Pct / Col Pct)	INCOM 0	INCOM 1	Total
0	134	40	174
	67.68	20.20	87.88
	77.01	22.99	
	89.33	83.33	
4	16	8	24
	8.08	4.04	12.12
	66.67	33.33	
	10.67	16.67	
Total	150	48	198
	75.76	24.24	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q6 BY INCOM

Statistic	DF	Value	Prob
Chi-Square	1	1.229	0.268
Likelihood Ratio Chi-Square	1	1.155	0.282
Continuity Adj. Chi-Square	1	0.730	0.393
Mantel-Haenszel Chi-Square	1	1.223	0.269
Fisher's Exact Test (Left)			0.910
(Right)			0.194
(2-Tail)			0.310
[illegible]		0.079	

TABLE OF Q7 BY INCOM

Q7 (Frequency / Percent / Row Pct / Col Pct)	INCOM 0	INCOM 1	Total
0	96	32	128
	48.48	16.16	64.65
	75.00	25.00	
	64.00	66.67	
1	54	16	70
	27.27	8.08	35.35
	77.14	22.86	
	36.00	33.33	
Total	150	48	198
	75.76	24.24	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q7 BY INCOM

Statistic	DF	Value	Prob
Chi-Square	1	0.113	0.737
Likelihood Ratio Chi-Square	1	0.114	0.736
Continuity Adj. Chi-Square	1	0.027	0.871
Mantel-Haenszel Chi-Square	1	0.113	0.737
Fisher's Exact Test (Left)			0.439
(Right)			0.692
(2-Tail)			0.863
Phi Coefficient		-0.024	
Contingency Coefficient		0.024	
Cramer's V		-0.024	

Effective Sample Size = 198
Frequency Missing = 3

TABLE OF Q8 BY INCOM

Q8 (Frequency / Percent / Row Pct / Col Pct)	INCOM 0	INCOM 1	Total
0	84	27	111
	42.42	13.64	56.06
	75.68	24.32	
	56.00	56.25	
1	66	21	87
	33.33	10.61	43.94
	75.86	24.14	
	44.00	43.75	
Total	150	48	198
	75.76	24.24	100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q8 BY INCOM

Statistic	DF	Value	Prob
Chi-Square	1	0.001	0.976
Likelihood Ratio Chi-Square	1	0.001	0.976
Continuity Adj. Chi-Square	1	0.000	1.000
Mantel-Haenszel Chi-Square	1	0.001	0.976
Fisher's Exact Test (Left)			0.556
(Right)			0.577
(2-Tail)			1.000
Phi Coefficient		-0.002	
Contingency Coefficient		0.002	

TABLE OF Q9 BY INCOM

Q9 INCOM

Frequency / Percent / Row Pct / Col Pct	0	1	Total
0	129 65.15 75.88 86.00	41 20.71 24.12 85.42	170 85.86
2	21 10.61 75.00 14.00	7 3.54 25.00 14.58	28 14.14
Total	150 75.76	48 24.24	198 100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q9 BY INCOM

Statistic	DF	Value	Prob
Chi-Square	1	0.010	0.920
Likelihood Ratio Chi-Square	1	0.010	0.920
Continuity Adj. Chi-Square	1	0.000	1.000
Mantel-Haenszel Chi-Square	1	0.010	0.920
Fisher's Exact Test (Left)			0.642
(Right)			0.543
(2-Tail)			1.000
Phi Coefficient		0.007	
Contingency Coefficient		0.007	
Cramer's V		0.007	

Effective Sample Size = 198
Frequency Missing = 3

TABLE OF Q10 BY INCOM

Q10 INCOM

Frequency / Percent / Row Pct / Col Pct	0	1	Total
0	132 66.67 75.43 88.00	43 21.72 24.57 89.58	175 88.38
2	18 9.09 78.26 12.00	5 2.53 21.74 10.42	23 11.62
Total	150 75.76	48 24.24	198 100.00

Frequency Missing = 3

STATISTICS FOR TABLE OF Q10 BY INCOM

Statistic	DF	Value	Prob
Chi-Square	1	0.089	0.766
Likelihood Ratio Chi-Square	1	0.091	0.763
Continuity Adj. Chi-Square	1	0.002	0.969
Mantel-Haenszel Chi-Square	1	0.088	0.766
Fisher's Exact Test (Left)			0.498
(Right)			0.702
(2-Tail)			1.000
[illegible]		[illegible]	

TABLE OF Q1 BY ELDR

Q1 ELDR

Q1	Frequency / Percent / Row Pct / Col Pct	0	1	2	3	Total
0	Frequency	2	20	34	86	142
	Percent	1.03	10.26	17.44	44.10	72.82
	Row Pct	1.41	14.08	23.94	60.56	
	Col Pct	100.00	71.43	72.34	72.88	
2	Frequency	0	8	13	32	53
	Percent	0.00	4.10	6.67	16.41	27.18
	Row Pct	0.00	15.09	24.53	60.38	
	Col Pct	0.00	28.57	27.66	27.12	
Total		2	28	47	118	195
		1.03	14.36	24.10	60.51	100.00

Frequency Missing = 6

STATISTICS FOR TABLE OF Q1 BY ELDR

Statistic	DF	Value	Prob
Chi-Square	3	0.780	0.854
Likelihood Ratio Chi-Square	3	1.301	0.729
Mantel-Haenszel Chi-Square	1	0.017	0.896
Phi Coefficient		0.063	
Contingency Coefficient		0.063	
Cramer's V		0.063	

Effective Sample Size = 195
Frequency Missing = 6

TABLE OF Q2 BY ELDR

Q2 ELDR

Q2	Frequency / Percent / Row Pct / Col Pct	0	1	2	3	Total
0	Frequency	2	23	45	113	183
	Percent	1.03	11.79	23.08	57.95	93.85
	Row Pct	1.09	12.57	24.59	61.75	
	Col Pct	100.00	82.14	95.74	95.76	
3	Frequency	0	5	2	5	12
	Percent	0.00	2.56	1.03	2.56	6.15
	Row Pct	0.00	41.67	16.67	41.67	
	Col Pct	0.00	17.86	4.26	4.24	
Total		2	28	47	118	195
		1.03	14.36	24.10	60.51	100.00

Frequency Missing = 6

STATISTICS FOR TABLE OF Q2 BY ELDR

Statistic	DF	Value	Prob
Chi-Square	3	7.816	0.050
Likelihood Ratio Chi-Square	3	5.945	0.114
Mantel-Haenszel Chi-Square	1	4.157	0.041
Phi Coefficient		0.200	
Contingency Coefficient		0.196	
Cramer's V		0.200	

Effective Sample Size = 195
Frequency Missing = 6

TABLE OF Q3 BY ELDR

Q3 ELDR

Frequency / Percent / Row Pct / Col Pct	0	1	2	3	Total
0	2 1.03 1.45 100.00	17 8.72 12.32 60.71	30 15.38 21.74 63.83	89 45.64 64.49 75.42	138 70.77
2	0 0.00 0.00 0.00	11 5.64 19.30 39.29	17 8.72 29.82 36.17	29 14.87 50.88 24.58	57 29.23
Total	2 1.03	28 14.36	47 24.10	118 60.51	195 100.00

Frequency Missing = 6

STATISTICS FOR TABLE OF Q3 BY ELDR

Statistic	DF	Value	Prob
Chi-Square	3	4.524	0.210
Likelihood Ratio Chi-Square	3	5.006	0.171
Mantel-Haenszel Chi-Square	1	2.111	0.146
Phi Coefficient		0.152	
Contingency Coefficient		0.151	
Cramer's V		0.152	

Effective Sample Size = 195
Frequency Missing = 6

TABLE OF Q4 BY ELDR

Q4 ELDR

Frequency / Percent / Row Pct / Col Pct	0	1	2	3	Total
0	2 1.03 1.04 100.00	28 14.36 14.58 100.00	45 23.08 23.44 95.74	117 60.00 60.94 99.15	192 98.46
2	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 1.03 66.67 4.26	1 0.51 33.33 0.85	3 1.54
Total	2 1.03	28 14.36	47 24.10	118 60.51	195 100.00

Frequency Missing = 6

STATISTICS FOR TABLE OF Q4 BY ELDR

Statistic	DF	Value	Prob
Chi-Square	3	3.131	0.372
Likelihood Ratio Chi-Square	3	2.925	0.403
Mantel-Haenszel Chi-Square	1	0.059	0.808
Phi Coefficient		0.127	
Contingency Coefficient		0.126	
Cramer's V		0.127	

Effective Sample Size = 195

TABLE OF Q5 BY ELDR

Q5 / ELDR (Frequency, Percent, Row Pct, Col Pct)	0	1	2	3	Total
0	2	26	40	103	171
	1.03	13.33	20.51	52.82	87.69
	1.17	15.20	23.39	60.23	
	100.00	92.86	85.11	87.29	
2	0	2	7	15	24
	0.00	1.03	3.59	7.69	12.31
	0.00	8.33	29.17	62.50	
	0.00	7.14	14.89	12.71	
Total	2	28	47	118	195
	1.03	14.36	24.10	60.51	100.00

Frequency Missing = 6

STATISTICS FOR TABLE OF Q5 BY ELDR

Statistic	DF	Value	Prob
Chi-Square	3	1.282	0.733
Likelihood Ratio Chi-Square	3	1.618	0.655
Mantel-Haenszel Chi-Square	1	0.463	0.496
Phi Coefficient		0.081	
Contingency Coefficient		0.081	
Cramer's V		0.081	

Effective Sample Size = 195
Frequency Missing = 6

TABLE OF Q6 BY ELDR

Q6 / ELDR (Frequency, Percent, Row Pct, Col Pct)	0	1	2	3	Total
0	2	21	44	105	172
	1.03	10.77	22.56	53.85	88.21
	1.16	12.21	25.58	61.05	
	100.00	75.00	93.62	88.98	
4	0	7	3	13	23
	0.00	3.59	1.54	6.67	11.79
	0.00	30.43	13.04	56.52	
	0.00	25.00	6.38	11.02	
Total	2	28	47	118	195
	1.03	14.36	24.10	60.51	100.00

Frequency Missing = 6

STATISTICS FOR TABLE OF Q6 BY ELDR

Statistic	DF	Value	Prob
Chi-Square	3	6.352	0.096
Likelihood Ratio Chi-Square	3	5.833	0.120
Mantel-Haenszel Chi-Square	1	1.415	0.234
Phi Coefficient		0.180	
Contingency Coefficient		0.178	
Cramer's V		0.180	

Effective Sample Size = 195
Frequency Missing = 6

TABLE OF Q7 BY ELDR

Q7 / ELDR (Frequency, Percent, Row Pct, Col Pct)	0	1	2	3	Total
0	2	18	31	78	129
	1.03	9.23	15.90	40.00	66.15
	1.55	13.95	24.03	60.47	
	100.00	64.29	65.96	66.10	
1	0	10	16	40	66
	0.00	5.13	8.21	20.51	33.85
	0.00	15.15	24.24	60.61	
	0.00	35.71	34.04	33.90	
Total	2	28	47	118	195
	1.03	14.36	24.10	60.51	100.00

Frequency Missing = 6

STATISTICS FOR TABLE OF Q7 BY ELDR

Statistic	DF	Value	Prob
Chi-Square	3	1.068	0.785
Likelihood Ratio Chi-Square	3	1.697	0.638
Mantel-Haenszel Chi-Square	1	0.030	0.861
Phi Coefficient		0.074	
Contingency Coefficient		0.074	
Cramer's V		0.074	

Effective Sample Size = 195
Frequency Missing = 6

TABLE OF Q8 BY ELDR

Q8 / ELDR (Frequency, Percent, Row Pct, Col Pct)	0	1	2	3	Total
0	1	16	25	66	108
	0.51	8.21	12.82	33.85	55.38
	0.93	14.81	23.15	61.11	
	50.00	57.14	53.19	55.93	
1	1	12	22	52	87
	0.51	6.15	11.28	26.67	44.62
	1.15	13.79	25.29	59.77	
	50.00	42.86	46.81	44.07	
Total	2	28	47	118	195
	1.03	14.36	24.10	60.51	100.00

Frequency Missing = 6

STATISTICS FOR TABLE OF Q8 BY ELDR

Statistic	DF	Value	Prob
Chi-Square	3	0.164	0.983
Likelihood Ratio Chi-Square	3	0.164	0.983
Mantel-Haenszel Chi-Square	1	0.005	0.945
Phi Coefficient		0.029	
Contingency Coefficient		0.029	
Cramer's V		0.029	

Effective Sample Size = 195
Frequency Missing = 6

TABLE OF Q9 BY ELDR

Q9 (Frequency / Percent / Row Pct / Col Pct)	ELDR 0	1	2	3	Total
0	2	24	39	102	167
	1.03	12.31	20.00	52.31	85.64
	1.20	14.37	23.35	61.08	
	100.00	85.71	82.98	86.44	
2	0	4	8	16	28
	0.00	2.05	4.10	8.21	14.36
	0.00	14.29	28.57	57.14	
	0.00	14.29	17.02	13.56	
Total	2	28	47	118	195
	1.03	14.36	24.10	60.51	100.00

Frequency Missing = 6

STATISTICS FOR TABLE OF Q9 BY ELDR

Statistic	DF	Value	Prob
Chi-Square	3	0.668	0.881
Likelihood Ratio Chi-Square	3	0.941	0.816
Mantel-Haenszel Chi-Square	1	0.008	0.927
Phi Coefficient		0.059	
Contingency Coefficient		0.058	
Cramer's V		0.059	

Effective Sample Size = 195
Frequency Missing = 6

TABLE OF Q10 BY ELDR

Q10 (Frequency / Percent / Row Pct / Col Pct)	ELDR 0	1	2	3	Total
0	2	21	43	107	173
	1.03	10.77	22.05	54.87	88.72
	1.16	12.14	24.86	61.85	
	100.00	75.00	91.49	90.68	
2	0	7	4	11	22
	0.00	3.59	2.05	5.64	11.28
	0.00	31.82	18.18	50.00	
	0.00	25.00	8.51	9.32	
Total	2	28	47	118	195
	1.03	14.36	24.10	60.51	100.00

Frequency Missing = 6

STATISTICS FOR TABLE OF Q10 BY ELDR

Statistic	DF	Value	Prob
Chi-Square	3	6.332	0.097
Likelihood Ratio Chi-Square	3	5.431	0.143
Mantel-Haenszel Chi-Square	1	2.785	0.095
Phi Coefficient		0.180	
Contingency Coefficient		0.177	
Cramer's V		0.180	

Effective Sample Size = 195
Frequency Missing = 6

APPENDIX F

INSTITUTIONAL REVIEW BOARD
APPROVAL FORM

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 02-09-96 **IRB#:** HE-96-034

Proposal Title: NUTRITION HEALTH RISKS IN RURAL ELDERLY

Principal Investigator(s): Bernice Kopel, Gwen Umbach

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE 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:

Provisions received and approved.

Signature: John H. Wheeler Date: March 8, 1996

Chair of Institutional Review Board

VITA

Gwendolyn A Umbach

Candidate for the Degree of

Master of Science

Thesis: NUTRITIONAL HEALTH RISKS IN RURAL ELDERLY

Major Field: Nutritional Sciences

Biographical:

Personal Data: Born in Ann Arbor, Michigan on July 8, 1970, the daughter of Terry and King Foster. Wife of Daniel Umbach and mother of Colette Umbach.

Education: Graduated from Milford High School, Milford, Michigan in May 1988; received Bachelor of Science degree in Family and Consumer Sciences from Miami University, Oxford, Ohio 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 May, 1996.

Experience: Dietary Department Director, Perry Memorial Hospital, Perry, Oklahoma, June 1993 to April 1995; Part-time dietitian Perry Memorial Hospital, Perry, Oklahoma, April 1995 to present; Consultant Dietitian Perry Green Valley Nursing Home, Perry, Oklahoma, May 1994 to present; Consultant Dietitian Perry Nursing Home, Perry, Oklahoma, May 1994 to present.

Professional Organizations: American Dietetic Association, Oklahoma Dietetic Association, Oklahoma Consultants Network, Phi Upsilon Omicron.