

A STUDY OF THE NUTRITIONAL KNOWLEDGE  
OF ELDERLY NURSING HOME RESIDENTS

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## CHAPTER I

### INTRODUCTION

Due to the increasing number of persons 60 years of age and older in our population, a great deal of attention is now being placed on our elderly American citizens. It is realized that the elderly have needs and wants similar to other age groups. Elderly people are a diverse group, each with their own special needs and problems.

The nutritional status of the elderly has become of particular concern. A number of research studies dealing with dietary intakes of elderly persons have indicated that inadequate nutrient intake is a common occurrence. Literature is available concerning the diet and nutritional needs of the elderly, the physical, emotional and social factors affecting their nutritional intake and factors related to improper nutrition; however, very little research has been done on their nutritional knowledge.

One reason elderly persons do not eat properly is that they know little about the nutritional aspects of food. Swanson (1964) found that only five percent of a group of 695 elderly persons were choosing nutritionally adequate diets. A study by Steele (1971) of the nutritional knowledge of a group of elderly persons was based on the assumption that persons who know how to choose a nutritionally adequate diet are more likely to eat properly than those who do not have such knowledge. Steele concluded that although some elderly persons were



knowledgeable in the area of nutrition, many do not possess enough nutritional knowledge to choose an adequate diet. Zollars (1976) found that elderly subjects chose an unbalanced diet from the Basic Four Food Groups. The subjects were unaware that a well-planned diet provided needed nutrients. Rao (1973) stated that one factor which may cause improper nutrition in the elderly is food fads and fallacies. The results of a study by Thornton (1968) showed that there were a large number of nutritional misconceptions among 40 elderly subjects. The data indicated that there was a trend for the subject's nutritional misconceptions to increase with age. There was a strong trend toward a decreasing food acceptance as the number of nutritional misconceptions increased.

The purpose of this study was to determine the nutritional knowledge of a group of elderly nursing home residents. The objectives for this study were as follows:

1. To determine the nutritional knowledge of a group of elderly nursing home residents in Oklahoma County in the state of Oklahoma.
2. To determine where elderly nursing home residents learned about nutrition.
3. To determine if there are differences in nutritional knowledge of elderly nursing home residents based on sex, age and educational level.
4. To make recommendations for further research in this area.

#### Hypotheses

The following hypotheses were postulated for the study:

1. Hypothesis One--There will be no significant difference in the nutritional knowledge of elderly nursing home residents based on their sex.
2. Hypothesis Two--There will be no significant difference in the nutritional knowledge of elderly nursing home residents based on their age.
3. Hypothesis Three--There will be no significant difference in the nutritional knowledge of elderly nursing home residents based on their educational level.

#### Assumptions

Assumption made for the study were as follows:

1. The residents in nursing homes will complete the interview schedule as instructed.
2. All data will be verified by the researcher in person.

#### Limitations

The following limitations of the study were acknowledged:

1. Only nursing home residents in Oklahoma County in the state of Oklahoma were interviewed.
2. Only nursing home residents, 60 years and over, who were physically and mentally able to participate in the study were interviewed.

#### Definition of Terms

The following terms were important to this research:

Nutrition--"The sum of the processes by which an animal or plant takes in and utilizes food substances" (Webster's New Collegiate Dictionary, 1977, p. 789).

Knowledge--"The range of one's information or understanding . . . ." (Webster's New College Dictionary, 1977, p. 639).

Elderly--Nursing home residents who are over 60 years of age (Wells, 1973).

Interview Schedule--"The instrument used to gather survey information through personal interview" (Kerlinger, 1973, p. 412).

Nursing Home--"An institution in the State of Oklahoma that is licensed by the State of Oklahoma as a nursing home to provide care for individuals" (McCormick, 1979, p. 5).

Skilled Care Facility--"Any home, establishment or institution in which there is offered or provided, by any person, medical services, skilled nursing care, necessary special dietary service, and personal care and supervision to three (3) or more persons domiciled therein who by reason of physical or mental infirmity may require such services" (Minimum Standards, 1980, p. 4).

Room and Board Home--Any house, establishment or institution . . . which provides residential accommodations and food service and which houses three (3) or more people who require supportive assistance, who are ambulatory and essentially capable of managing their own affairs, but who do not routinely require skilled nursing care or intermediate care . . . ." (House Bill 1686, 1978).

## CHAPTER II

### REVIEW OF LITERATURE

The literature reviewed for this study has been concerned with the diets of the elderly. Much attention is being given to the elderly and there is great concern for the nutritional status of this population group. The literature focused on factors related to improper nutrition and physical, social and emotional factors causing poor diets. It included the nutritional intake of the elderly, the nutritional needs of the elderly and planning diets for the elderly. It also included literature on the nutritional knowledge of elderly persons and other groups.

#### Factors Related to Improper Nutrition

According to Todhunter (1980), 11 percent of the United States population, 25 million people, are 65 years of age or older. A century ago, only 2.5 percent of the population was 65 or older (Stare and McWilliams, 1977). In 1900 only four percent of the population was 65 or older (Harman, 1979). The increase in the elderly population is the result of the greater availability of health services, improved living conditions and discoveries and advances in the fields of nutrition and medicine (Stare and McWilliams, 1977). Sixty-three percent live with families, 31 percent live alone and not more than six percent are institutionalized (Todhunter, 1980). Two out of three

elderly are in metropolitan areas and cities (National Council on Aging, 1978). In 1979 Harman stated that of the 20 million elderly persons in the United States population, there were about 12 million aged 65 to 74, some 6.5 million aged 75 to 84 and about one million aged 85 and over. The number of elderly is increasing, especially in the age group over 75 years (National Council on Aging, 1978). Women outnumber men. In the age group over 65 years, the ratio is seven men to ten women (Todhunter, 1980). Harman (1979) stated that the ratio of women to men increases with age from 120 to 100 at ages 65 to 69 to around 160 to 100 at ages 85 and over. Most elderly women are widows; most elderly men are married.

The nutritional status of the elderly is a product of the influence of heredity, environment and nutrition over their lifetime. Food habits are firmly established and, if poor, are difficult to replace with better ones. As a rule, the elderly individual is set in his ways. Changes in food and other radical changes are not welcome. According to Krause and Hunscher (1972, p. 297), "The known is familiar, the results of the unknown are mysterious!" Black, Eddy and Pishkin (1962) ascertain that patients found it very difficult to change their eating patterns.

The individual who has enjoyed the benefits of a good diet is more likely to be in better health than the individual who has a lifetime of poor eating habits. Good diet in later years cannot completely make up for years of inadequacy or correct irreversible tissue change. The application of principles of good nutrition can greatly benefit even the individual with poor food habits who is in a poor state of nutrition.

The unique role of nutrition in the maintenance of an optimal state of physical, mental and emotional health is most apparent at the extremes of life when the consequences of aging are most obviously evident. The elderly are dependent on nutritional care for life itself and for the quality of life they have. Their physical, mental and emotional environments are susceptible to the influences of nutrition. Three important concerns of the elderly are diets so low in essential nutrients, obesity and the increase in the number of modified diets (Templeton, 1972). A modified or special diet had been prescribed for 18.4 percent of 3200 persons in a study reported by Timmreck (1977). The study was made by the Independent Living Project of the Bridgerland Senior Citizens Council on Aging of Cache County, Utah. Common factors related to age and nutrition include undernutrition, malnutrition, vitamin and mineral deficiencies, obesity and monotonous diets (Timmreck, 1977). A study of 59 elderly persons revealed three major nutritionally related problems: anemia, obesity and poor dental health (Kohrs, O'Neal, Preston, Eklund and Abrahams, 1978). According to Timmreck (1977), factors contributing to poor nutritional status and health among the elderly include poor dietary habits, lack of nutrition education, dental problems, poor mental health, self-defeating values, living alone, limited income and alcoholism. According to Harman (1979), the major cause of substandard nutrition in the elderly is lack of knowledge about nutrition and other social and medical problems. Harman stated that overt nutritional deficiencies are rare and affect no more than two to three percent of elderly people. Subclinical deficiencies evidenced by vague feelings of weakness, drowsiness and ill health are probably higher

than overt, but are more difficult to document. Decreased food intake by elderly persons can produce clinically evident deficiencies through a combination of age-associated changes. These changes included depression, poor vision, a decline in the sense of taste and smell, dentures and poorly fitted dentures, slower fat clearance from the blood, and decreased activity (Harman, 1979).

Smith (1962) noted problems of nursing home residents that may affect their appetite. These problems included disinterest in living, need for attention, lack of teeth or dentures, inability to swallow well, difficulty in feeding themselves, belief that certain foods do not agree with them and poor food habits.

Rao (1973) discussed several factors which may cause improper nutrition in the elderly. The purchases of sufficient amounts of the proper types of food, proper refrigeration and cooking facilities may be restricted by limited income. The appetite may be lessened by unhappiness, loneliness and bereavement. The incentive for eating may be affected by living alone, reduced activity and increased fatigue and weakness. Mental and physical deterioration may result from social isolation. Deprivation resulting from lack of support from family, friends and community may lead to depression, apathy and impairment of appetite. Poor nutrition may be a product of chronic alcoholism and food fads and fallacies. Lack of appetite and a poor nutritional status may be caused by chronic invalidism. A serious factor in the poor eating habits of the elderly may be poor dental health. Eating habits and the nutritional state are significantly affected by mental disturbances, such as depression and confusion.

In general, several of these factors combine to make the elderly particularly vulnerable to malnutrition.

Kupers (1973) paints a realistic picture of the elderly and their nutrition problems as follows:

Picture a loss of taste and smell and consequently of food appeal, a poorly functioning dentition, an insufficient amount of income to purchase meat and other needed food, a live-alone situation with no one to shop, cook or assist and with no person who can tone down the aching loneliness, a physical disability or two or three, an anemia, an electrolyte deficit, and a depressive anxiety state to boot. How much and how well could anyone eat under these circumstances? Add to this neglect by family, loss of friends and relatives, total absence of recreation, lack of entertainment and adequate exercise, and fear of worse to come such as more pain, more disability and early death, and you have the rest of the story behind the malnutrition of the elderly (p. 101).

Malnutrition in the elderly results from a complex mixture of physical, social, psychological and economic factors. Development of malnutrition may be due to a number of factors, such as chronic illness or coexisting disease, low income, isolation and poor diet (Krehl, 1974). According to Ozerol (1980), some major factors involved in the malnutrition state of the elderly include food habits, economic factors, housing, transportation, lack of information, education, misinformation and faddism. According to Krause and Hunscher (1972), rigidity in eating habits is one reason for universal malnutrition in the elderly. Causes of geriatric malnutrition include oral problems, gastrointestinal problems and personal factors. Geriatric malnutrition is characterized by a reduction in total body cell mass of functioning energy-exchanging, mitotically active cells (Kupers, 1973).

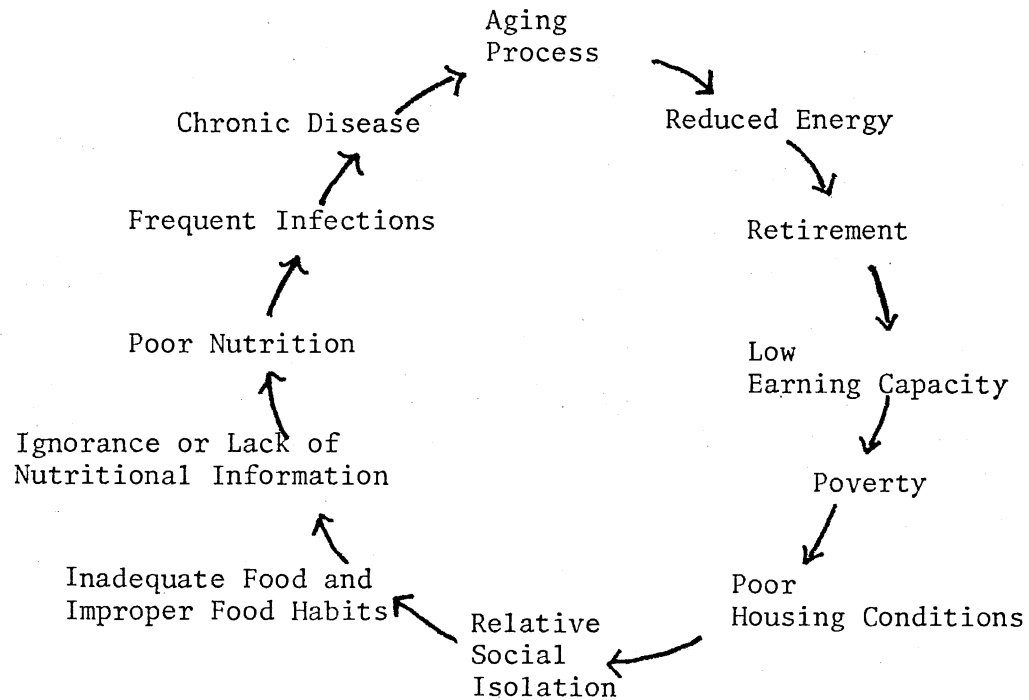
Exton-Smith (1977) discussed several characteristics common in his study of nutritional deficiency and malnutrition. A high



proportion of elderly persons in the United Kingdom had low nutrient intakes and many of these were well below the recommended nutrient intakes. Many elderly people had blood and tissue levels of nutrients which were below the arbitrarily defined limits adopted for younger people. Low intakes and abnormal biochemical findings were rarely associated with a disturbance of function or form that is required for the diagnosis of clinical malnutrition. The importance of sub-clinical malnutrition and the degree to which the health of the elderly would benefit from increased intakes are unknown. However, it would seem prudent to attempt to increase the levels of nutrients in order to make these individuals more resistant to the effects of stress due to nonnutritional diseases which become increasingly common with advancing years. The vicious cycle of disease and malnutrition for the elderly is illustrated in Figure 1.

#### Physical Factors Causing Poor Diets

Two important contributors to undernutrition in the elderly are inadequate dentition and ill-fitting, uncomfortable dentures (Sharman, 1972). Guthrie (1975) stated that the American Dental Association estimates that of every 100 70-year-olds, 28 men and 38 women have lost all their teeth. Eighty percent of these either fail to replace them or replace them with ill-fitting dentures. A study of 59 elderly persons revealed that one-half were edentulous (Kohrs et al., 1978). Difficulty in chewing foods properly and eating with comfort is caused by loss of natural teeth and inability on the part of the individual to become accustomed to dentures. A tendency to eat softer, more bland



Source: Dodda D. Rao, Problems of nutrition and the aged.  
J. Am. Geriatrics Society (1973, p. 364).

Figure 1. Malnutrition and Disease in the Aged

foods results from a loss of teeth and dulling of taste sensitivity. These foods often have more calories in relation to their nutritional value than the foods they replace and may cause a serious deficiency in the intake of protein, vitamins and minerals (Robinson and Lawier, 1977). In a study reported on by Timmreck (1977), 7.4 percent (N=235) of the subjects reported that they did not see a dentist when necessary. Health education, accessible dental care and screening are of utmost importance in promoting good dental health, sound teeth and proper mastication of food. Proper dental care and health practices throughout the life span may eliminate the need for dentures.

Physical changes which occur as a part of the aging process may affect the nutrition of the elderly. The appetite for many foods may be affected by less acute senses of taste and smell. A person of age 70 has 36 percent of the taste buds of a person of age 30 (Guthrie, 1975). The degeneration of the salivary glands results in a decrease in the flow of saliva. This change causes difficulty in swallowing without the lubricating effect of adequate saliva, thus making food less palatable. Digestion, absorption and metabolism of food is also affected by the degenerative changes of aging. Elderly persons are more subject to hypo- and hyper-glycemia due to a reduced capacity to maintain stable blood sugar levels (Krause and Hunscher, 1972).

Physiological and environmental factors can strongly influence a particular elderly person's ability to obtain or use nutrients (Yen, 1980). Decreased protein synthesis and cell loss affects many organ systems. Digestion and absorption of nutrients are hampered by gastrointestinal changes. Peristalsis may tend to become slower

and enzyme secretions may be reduced. Many of the elderly avoid the high fiber foods that could relieve constipation due to limited food choices, poor chewing ability and concerns about gas-forming foods (Yen, 1980). Taking mineral oil to promote regularity blocks the absorption of fat-soluble vitamins A, D and K. Antacids, frequently used for indigestion, contribute significant amounts of sodium and can deplete phosphate.

#### Social and Emotional Factors Causing Poor Diets

According to Guggenheim and Margulec (1965), nutrition plays an important role in the social and mental well-being of the elderly. Krause and Hunscher (1972) stated that the mental health status of the individual is closely related to geriatric nutrition. Gradual but progressive development of apathy toward other individuals, toward the environment in general and particularly toward food is one of the most common problems of the elderly (Krehl, 1974). Food is associated with social or family activities and the sharing of meals and companionship plays a vital role in maintaining essential levels of nutrition. A study of 3164 elderly subjects found that 20.9 percent ate alone and 11.7 percent did not know how to cook for themselves (Timmerck, 1977). Pelcovits (1972) stated that there is a link between isolation and nutrition. Each contributes to the other, creating a chain of cause and effect. Reasons people become isolated from society are a loss of role in the family and the social structure, poor health, poverty and lack of transportation (Pelcovits, 1972). There

may be an association between loneliness and poor appetite, apathy toward food and selecting food that provides inadequate nutrition (Krehl, 1974). Loneliness can result in failure to prepare proper meals, poor eating habits, intensified listlessness and apathy and withdrawal from social contact (Pelcovits, 1972). Elderly persons who live alone often have no incentive to cook and may eat carbohydrate foods to an excess because they often require less preparation, are easy to chew and are inexpensive. These may cause the diet to lack many essential nutrients necessary to prevent malnutrition.

An important factor leading to improper nutrition in the elderly is limited income. Seventy-five percent of persons over age 65 have an income insufficient to maintain a minimum acceptable level of living (Stare, 1977). Approximately five million elderly persons have to live on fixed incomes that are not enough to enable them to live in the manner they did while still employed (Stare, 1977). In 1974, 50 percent of elderly people had an income of less than \$1480 per year and 25 percent had an income of less than \$1000 per year (Guthrie, 1975). According to a survey reported by Timmreck in 1977, 16.7 percent of 2889 elderly subjects had an annual income of \$1499 or less and 52.6 percent had an annual income between \$1500 and \$4999. The income of persons 55 to 64 years of age is about twice that of persons 65 years of age and older (Harman, 1979). Limited income may restrict the purchase of sufficient amounts of the proper kinds of food, refrigeration and proper cooking facilities (Rao, 1973). Food shopping may also be difficult due to inability to carry groceries, the distance from the store, transportation or confusion because of the variety of food items. Transportation was not convenient for 9.6 percent

of 3207 subjects and 10.7 percent of these subjects said they walked to their destination when possible. Lack of motility prevents some elderly persons from obtaining the types and amounts of food desired or needed and also prevents them from going out to eat, even if they have the money to do so.

#### Nutritional Intake of the Elderly

Numerous dietary surveys have been made in an effort to determine the adequacy of the diet of the elderly. Fifty percent of the subjects in a study by Brown (1978) said they chose their food for taste and enjoyment, 26 percent for good nutrition and energy, eight percent out of habit, eight percent to keep from starving, and four percent because of some dietary restriction.

The eating patterns of the elderly may be erratic. Pelcovits (1972) reported on a study made by the Administration on Aging which revealed that one-fourth of the 3500 subjects ate less than three meals a day. Half ate breakfast and dinner, nearly one-fourth ate breakfast and lunch, more than one-eighth ate lunch and dinner, the rest ate one meal a day.

Studies have provided information on the likes and dislikes of the elderly. A study by McCormick (1972) indicated that there were differences in food likes and dislikes among 400 nursing home residents relative to the region of Oklahoma in which they lived. The study also revealed that elderly male residents tended to like more foods than did elderly female residents. The study indicated that people tend to like fewer foods and consequently eat less as they grow older. Thornton (1968) also found that food acceptance decreased

with age. Black et al. (1962) found that likes and dislikes were definitely influenced by racial background and environment.

About three percent of the 3190 elderly persons in a study reported on by Timmreck (1977) did not eat the Basic Four Food Groups regularly and eight percent of 3102 subjects said they believed they did not have a good diet. Milk is poorly consumed by many elderly persons because of its cost, its supposed constipating or gas-producing effects and failure to realize its value for adults (Robinson and Lawier, 1977). Pelcovits (1972) reported that 20 percent of the subjects in a study made by the Administration on Aging consumed no milk products. Some clients in a study by Templeton (1978) stated that they were avoiding all milk, bread-stuff and milk products because they had heard that these foods caused arthritis. Harman (1979) stated that the food groups most neglected by the elderly are milk and milk products and green leafy vegetables and fruits. Black et al. (1962), however, found that milk was a popular food. Guggenheim and Margulec (1965) found that milk and milk products supplied 44 percent of the calcium and 34 percent of the riboflavin intake of the subjects in their study. Men were found to consume more meat, eggs and cheese than women. Black et al. (1962) found meat as a group was well liked. Guggenheim and Margulec (1965) found cereal contributed over 40 percent of the calories, protein, thiamin and riboflavin and approximately one-third the mineral intake of the subjects in their study. Robinson and Lawier (1977) stated that the elderly may consider fruits too acidic and vegetables too expensive or hard to chew. Black et al. (1962) found plate waste was highest,

approximately 40 percent for fruits and vegetables, especially for vegetables. Pelcovits (1972) reported on a study made by the Administration on Aging that revealed that 34 percent of the subjects ate no fruits and 18 percent ate no vegetables. Guggenheim and Margulec (1965) found fruits and vegetables supplied one-third of the iron, 72 percent of vitamin A and 97 percent of vitamin C intake of the subjects in their study. Black et al. (1962) found that as a group, desserts were the most popular food. Desserts had the lowest percentage of plate waste, approximately 15 percent.

Dietary intake studies reveal that elderly persons tend to give their diets a higher nutritional rating than the individual making the study. Brown (1978) found that 48 percent of the subjects in her study had a dietary intake of good (67 to 100 percent of the Recommended Dietary Allowances). Eighty-seven percent believed their intake was good or excellent, but less than 60 percent actually ate that way. Each successive age group had a higher percentage of good or excellent diets. The percentage of persons with good or excellent intakes was higher for the group 80 years of age and over than any other age group. The percentage of men who ate excellent diets was higher than that of women.

The Ten-State Nutrition Survey (1972) found that the nutrient density of food consumed by elderly persons was fairly good. The adequacy of protein, iron, thiamin and vitamin A depended on the amount of food eaten. Vitamin C and riboflavin inadequacies were frequent. A study of the dietary intakes of nursing home residents found that protein, calcium, iron and vitamin A were consumed at more than 100 percent of the 1968 Recommended Daily Allowance (Watson, 1970). Female



subjects appeared to eat a better diet than male subjects. Black et al. (1962) found that the Recommended Dietary Allowances for eight nutrients and calories were met or were exceeded for all 36 hospital patients in their study. The diets were low in thiamin, niacin and vitamin C. A study of 303 independent-living elderly persons found that the intake of eight essential nutrients was high overall (Brown, 1978).

Several researchers have studied the dietary intakes of independent-living elderly persons. Riggs (1973) found that the intake of calories and eight nutrients was not equal to that recommended for the 115 subjects in her study. The intake of calories was less than two-thirds of the allowance and the consumption of vitamin A was quite low. Iron and protein intakes were high. Templeton's (1978) study of 608 subjects found that nutrient intakes of protein, calcium, vitamin A and vitamin C were less than desirable, particularly for vitamin A and calcium. Guggenheim and Margulec (1965) found food consumption to be low for their 115 subjects and the mean intake of all nutrients was below the Recommended Dietary Allowances. A study of 59 elderly persons revealed that one-half of the women compared to one-fifth of the men had consumed diets with one or more nutrients below 67 percent of the 1974 Recommended Dietary Allowances (Kohrs et al. 1972). Harman (1979) found the nutrients most frequently lacking in the diet of the elderly were calcium, iron, vitamin C, vitamin A and riboflavin, and among the very elderly, calories and thiamin.

Henricksen and Cate (1971) studied the nutrient content of food served versus food eaten in six nursing homes. The results showed that four homes met or exceeded 100 percent for all nutrients served

to at least one subject. Two homes failed to provide sufficient vitamin C and one of these also failed to provide the recommended level of thiamin. Highest levels of actual consumption were attained for iron and vitamin A, while lowest intake level occurred with calories, calcium, vitamin C and riboflavin. Another study made a nutritional analysis of the food served in three nursing homes (Allington, Matthews, Johnson and Johnson, 1980). Nutrient levels below 100 percent of the Recommended Dietary Allowances were found for zinc and vitamin B<sub>6</sub> in all three homes. Nutrient levels were below 100 percent of the Recommended Dietary Allowances for magnesium and folacin in two homes. The nutrient level for niacin was below 100 percent of the Recommended Dietary Allowance in one home.

Two studies compared the dietary intake of independent-living elderly persons and nursing home residents. One study found that 23 independent-living elderly of low middle-class, with a low level of education, were consuming slightly better diet than were the 20 nursing home residents with similar backgrounds and from the same geographic area (Brown, Bergan, Parsons and Krol, 1977). A study by Clarke and Wakefield (1975) of 102 independent-living elderly persons and 102 institutionalized elderly persons found that neither type of residence insured an adequate diet. Some respondents in each group ate good diets, while others ate poor diets.

Templeton (1978) found that factors such as income, formal education and whether an individual lived alone or with others had a relationship with the intake of some nutrients. Yearly income and formal education were related to dietary adequacy of vitamins A and C.

Subjects living with others had diets adequate in calcium more frequently than those living alone. Brown (1978), however, found that educational level did not correlate significantly with dietary inadequacy.

Hunter and Linn (1979) interviewed 182 elderly subjects concerning background data, health variables and dietary habits. Correlational analysis revealed an association between education, social class, health status, the smoking of cigarettes and the quality of diet. The study also showed that meal patterns and the quantity and content of the diet varied according to sex and race differences.

#### Nutritional Needs of the Elderly

The needs of the elderly do not differ significantly from those of young adults. Krause and Hunscher (1972, p. 29) stated that "The role of nutrition in geriatric nutrition is to conserve the health and prolong the life of the individual and delay the onset of chronic degenerative diseases. . . ." According to Munro (1980), nutrition has three potential aspects for aging man:

1. The adult progressively loses tissue function.
2. Aging results in accretion of some diseases which probably have nutritional elements.
3. Little knowledge exists of optimal nutrient intakes for those who are already old (p. 137).

The main principle of nutrition for the elderly is providing the amount of energy-producing food to meet bodily needs (Swanson, 1964). Good dietary practice means including foods each day that provide the nutrients necessary for the health and functioning of cells and the

daily rejection of excess amounts of energy-producing foods that lead to fat deposits in the body. According to Howell and Loeb (1969), there are two major categories composing the basic nutritional needs. These are repair and growth of normal structural requirements and functional needs provided by the production of energy requirements. Factors that influence the necessary amounts of nutrients are age, sex, size, activity and state of health (Rao, 1973). Other factors that influence the amounts of nutrients are individual variability and environmental factors (Todhunter, 1980).

There are major gaps in the nutrient allowances of the elderly (Munro, 1980). The allowances for each nutrient should be assessed as age advances. The inclusion in the recommended allowances of a component for the degenerative diseases of old age should be considered. A better understanding of dietary interactions is needed to achieve the optimal combination of nutrients. A thorough investigation of the interaction of diet and drugs should be made.

Factors that may vary the individual caloric needs are sex, age, basal metabolism, size, occupation, environment, hormonal balance and physical activity and habits (Howell and Loeb, 1969). Adequacy of caloric intake is essential for body functioning and to maintain normal weight. The daily intake of food should be adjusted, increased or decreased according to the reduced energy expenditure, reduced level of metabolism, decreased or increased work habits and maintenance of desirable weight (Kupers, 1973). The decline in basal metabolism may be explained by the increasing proportion of body fat to body tissue, the reduced muscle tension and sometimes by diminished thyroid

activity (Robinson and Lawier, 1977). Energy needs decline with age at about two percent per decade, due to a decrease in the basal metabolic rate (Yen, 1980). Further decline occurs because of decreases in physical activity. The Recommended Dietary Allowances estimate a decline in activity equal to 200 calories per day for males and females between 51 and 75 years of age, 500 calories for males over 75 years of age and 400 calories for females over 75 years of age (Yen, 1980). The 1980 Recommended Dietary Allowances gives recommended energy intakes for two older age groups. The Recommended Dietary Allowance for males 51 to 75 years of age is 2400 calories per day and for females the same age is 1800 calories per day while the Recommended Dietary Allowance for males age 76 and older is 2050 calories per day and for females the same age is 1600 calories per day (Food and Nutrition Board, 1980). The fatigue, lassitude and lack of interest experienced by many elderly persons may be caused by failure to consume adequate calories and with it adequate amounts of nutrients (Guthrie, 1975).

Protein functions in an adult in the maintenance and repair of cells and synthesis of enzymes needed for digestion and cellular enzymes (Krause and Hunscher, 1972). There is little reason to believe that protein requirements decrease with age. Increased intake of protein is not normally advantageous and may be harmful in liver or kidney disease. Adequate intake should be maintained, otherwise tissue proteins would be broken down to maintain normal levels of blood glucose for the central nervous system and to make up caloric deficit. Needs for protein are influenced by the biological value of the protein and adequate caloric value of the diet. The percentage

of total energy provided by protein should increase with age because the energy requirement decreases while protein recommendations remain the same. Howell and Loeb (1969) stated that if 10 to 15 percent of the energy value of the diet is derived from protein, the protein need of the elderly will be met. Rao (1973) recommends that 20 to 25 percent of the total calories should be derived from protein. According to Yen (1980), healthy older adults need about 0.8 grams of protein per kilogram of body weight. The Recommended Dietary Allowances indicate that males over age 51 should consume 56 grams of protein per day and females the same age should consume 44 grams of protein per day (Food and Nutrition Board, 1980). According to Guthrie (1975), studies show that the average intake of protein by the elderly is 45 grams of protein per day. Harman (1979) stated that 10 to 12 percent of the average daily diet should be derived from high quality animal protein. Robinson and Lawier (1977), however, estimated that one-fourth to one-half of the protein intake should come from animal sources with the remainder from plant protein sources. A low intake of protein may result in a deficiency in vitamins and minerals because protein foods supply these nutrients. There are numerous reasons for low protein intake. Some of these reasons are economic conditions, high cost of protein foods, lack of teeth, inability to chew, low caloric intake, lack of cooking facilities or rejection of milk (Krause and Hunscher, 1972).

No specific recommendation for fat in the diet of the elderly has been made. Fats provide a source of energy, important fat-soluble vitamins and essential fatty acids. The proportion of fat in

the diet of the elderly should be reduced to help reduce calories. Kupers (1973) and Rao (1973) stated that fats should provide 20 percent of the total calories. Guthrie (1975) indicated that fats should provide 30 to 35 percent of the total calories.

Carbohydrates function in providing energy and protecting protein for tissue metabolism activities. Williams (1977) stated that it is usually recommended that about 50 percent of the total calories come from carbohydrate foods. Todhunter (1980) stated that 55 to 60 percent of the total calories should come from carbohydrates. Deprivation of carbohydrates may result in a loss of tissue protein to compensate for the caloric deficit, a rise in blood cholesterol caused by mobilization of fat or a sodium and water excretion with lack of energy (Howell and Loeb, 1969).

The Recommended Dietary Allowances for minerals are the same for older and younger adults except for iron (Food and Nutrition Board, 1980). Menopause lowers the iron requirement and consequently the recommended allowance for older women is decreased. Krause and Hunscher (1972) stated that the most important minerals in the nutrition of the elderly are calcium and iron. Bone is actively metabolizing throughout life and needs to replace its calcium content. Low intake of calcium-rich foods may result in fragility of bones and capillaries. A diet providing 400 milligrams of calcium or less can cause a loss of 100 milligrams of calcium per day resulting in a loss of 30 percent of the skeleton in 10 years (Guthrie, 1975). High intake of some protein sources, immobility, stress and emotions have an adverse effect on calcium retention (Todhunter, 1980). Calcium utilization is favored by accompanying adequate intakes of phosphorous,

magnesium and vitamin D (Todhunter, 1980). Because of a loss of iron from the body secondary to mild bleeding from hemorrhoids or other gastrointestinal lesions, the need for iron at times may be increased for elderly persons.

The Recommended Dietary Allowances for vitamins are the same for older and younger adults, except for thiamin, riboflavin and niacin (Food and Nutrition Board, 1980). Thiamin and niacin requirements are related to caloric intake and therefore are decreased. The need for riboflavin, also related to caloric intake, decreases for older men, but remains the same for women. Vague, non-specific symptoms, such as weakness and fatigue, may result from prolonged inadequate vitamin intake (Howell and Loeb, 1969).

Fiber is the indigestible complex carbohydrate material in fruits and vegetables. Dietary fiber serves an important function in the intestinal tract by promoting the elimination of waste products. The needs of the elderly should be met by liberal use of raw and cooked fruits and vegetables and whole grain products.

Fluids are an essential element in the diet of the elderly. Six to seven glasses of water a day is adequate. Water is important as a carrier, due to decreased kidney function. Sufficient water with which to eliminate the solid waste will help the kidneys function more adequately. Water aids digestion and helps in the control of constipation which frequently afflicts elderly persons. Enough fluids should be consumed each day to provide for a 24-hour urine volume of about one and a half quarts (Harman, 1979). Inadequate fluid intake can produce lethargy and a semicomatose state.



## Planning Diets for the Elderly

Lane (1967, p. 28) stated that ". . . an ideal geriatric diet is merely a normal well-balanced diet modified when necessary to fit the individual need of the aging person." Kupers (1973) stressed that the elderly person is an individual and all elderly persons are not alike, thus it is essential to individualize when planning diets for elderly persons. Eating for the elderly should be a genuine pleasure, rather than a chore or experiment.

According to Rao (1973), the general qualifications of an ideal food for the elderly are that it stores well; can be used in liquid form; mixes easily with other foods; is acceptable and readily available; inexpensive; easily and quickly prepared; appetizing and easily masticated and digested; and rich in essential elements, protein, minerals and calories. Todhunter (1980) provided guidelines for the selection of food for the elderly. Menus should be checked for nutritional adequacy. Nutrient-dense foods should be chosen. Foods from each group should be selected for variety and color.

According to Watkins (1975), three principles can result in optimum nutrition for persons 60 and over when intelligently and diligently applied. Nutrition must be determined for the individual alone. Efforts to improve the elderly person's health by changes in the diet must be accompanied by diagnosis and treatment of any disease. The elderly must be educated in the areas of health, nutrition, gerontology and consumer protection.

Rao (1973) and Yen (1980) discussed factors in planning successful and nutritious diets and promoting good nutrition among the

elderly. Individual preferences, life style and psychological social, racial and religious factors should be considered. Regular exercise should be promoted. The elderly should be advised that the stress of illness alters nutrient needs. Include the basic five sources of nutrients: meat and allied foods, dairy products, fruits and vegetables, breads and cereals and fluids. A variety of food choices should be encouraged to insure nutrients in adequate amounts. Recommend foods that are good sources of vitamins A and C, iron and calcium. The elderly should be persuaded to consume good sources of fiber. The manner and ease of preparation and presentation should be considered. The number of meals should be flexible. Total dietary requirement should be met.

A Guide to Good Eating (1977), the recommended daily pattern which provides the foundation for a nutritious, healthful diet includes:

#### Milk Group

Two (one cup) servings per day for adults. Cheese, ice cream and other milk-made foods can supply part of these servings.

#### Meat Group

Two servings per day. One serving equals two ounces of meat, fish or poultry. Eggs, cheese, dried beans, peas and nuts are substitutes.

#### Fruit-Vegetable Group

Four servings per day. One serving equals one-half cup cooked or one cup raw fruit or vegetable, one-half cup juice or a medium-sized fruit.

#### Grain Group

Four servings. One serving equals one slice of bread, one cup ready-to-eat cereal or one-half cup cooked cereal, pasta or grits. Whole-grain, fortified or enriched grain products are recommended.

### Others

Include carbohydrate and fat. Individual caloric needs determine amount.

When used as recommended, an individual obtains about 1300 calories and from 80 to 120 percent of the Recommended Dietary Allowances from A Guide to Good Eating (Todhunter, 1980).

Justice, Howe and Clark (1975) suggested three menu-planning guidelines for inactive persons 75 years or older, such as nursing home residents. Cycle menus should be planned to reach 1400 calories per day for aged women which include the vitamins, minerals and protein as set by the Recommended Dietary Allowances. Larger servings of the same foods could be provided for men to reach 1600 calories. Significant sources of calcium, in addition to fluid milk serves as a beverage, needs to be included in the menu each day. Only those residents who have excessively high serum cholesterol concentrations should follow dietary practices to reduce blood cholesterol.

Ford and Neville (1972) compared the nutritive intake of nursing home patients served three meals a day with the nutritive intake of nursing home patients served five meals a day. The menus and food intakes were evaluated for calories, protein, fat, carbohydrates, thiamin, vitamin C, vitamin A and iron. They concluded that the Recommended Dietary Allowance for nursing home patients could be met by either three- or five-meal-a-day service.

As the result of their study of the nutritional status of elderly nursing home residents, Steidmann, Jansen and Harrill (1978) made suggestions relative to food preparation and attention to patient's individual needs. To increase calcium intake, add dried milk

solids to foods. To increase the intake of the foods served, all foods should be well prepared. Patients who are very old, particularly those with dental problems, should be offered pureed meats and vegetables of a consistency that can be eaten with a spoon. When patients have a temporary physical disorder, communication should occur between nursing and dietary personnel to provide desired and appropriate foods.

Todhunter (1980) provided guidelines for preparing food for the elderly. Preparation methods should be adapted to available time and cooking facilities. A variety of cooking methods should be used. Flavor and taste should be enhanced by herbs and seasonings. Vegetables should be cooked until tender and some raw vegetables should be used. To provide ease in chewing, avoid sticky and hard foods and outer crustiness on foods. Provide a variety of food texture.

Todhunter (1980) offered guidelines concerning foodservice for the elderly. Food should be served at the proper temperature and should provide eye appeal in color, texture and arrangement on the plate. The dining table should be lit so food can be seen clearly and identified easily. Tableware should be suitable for feeble and arthritic hands. Cups or mugs should have a firm base and not tip easily. Plates should be flat and have a vertical or higher outer rim against which food can be pushed and secured with a fork. Hard-to-open individual packages of food, beverages or utensils should be avoided. If the use of one hand is limited, place utensils and food near the good hand. Serving sizes should be adequate and appropriate to the individual. A minimum of three meals a day should be served.

Robinson and Lawier (1977) made suggestions for enhancing the enjoyment of meals for the elderly. If eating alone, colorful foods should be served attractively on a tray. Eat leisurely in pleasant surroundings. Instead of eating three heavier meals, eat four or five light meals. Include the essential foods first. Eat a good breakfast. Avoid fats or other foods which cause discomfort or distress. If sleeping is difficult, the heaviest meal should be eaten at noon. If insomnia is a problem, tea and coffee should be avoided late in the day.

#### Nutritional Knowledge of the Elderly

Zollars (1976) administered 11 true or false questions concerning nutrition to 55 elderly subjects. Subjects scored highest on questions concerning protein, fiber and calcium. Subjects scored lowest on questions concerning milk, vitamins and sources of vitamin C.

Brown (1978) questioned 303 noninstitutionalized persons over 65 on their knowledge about food and nutrition. A significant correlation between educational level and correct answers was found. Older subjects were more likely to give incorrect answers. Men exhibited good knowledge of nutrition. Subjects who grew up in larger towns were more likely to give correct answers.

Steele (1971) studied 52 noninstitutionalized persons ages 57 to 84 to determine if the subjects had an adequate nutritional knowledge to choose a nutritionally sound diet. Steele concluded that although some elderly persons were knowledgeable in the area of nutrition, many do not possess enough nutritional knowledge to choose an adequate

diet. Female subjects had a greater knowledge of nutrition than male subjects. White subjects had a greater knowledge of nutrition than black subjects.

A study by Grotkowski and Sims (1978) indicated a fairly low level of nutritional knowledge among 64 noninstitutionalized elderly subjects. Nutritional knowledge was positively correlated with socioeconomic status and with the attitude that nutrition was important. Subjects rated themselves on their personal level of nutritional knowledge. The mean score was 4.8 on a scale of 1 to 10. There was a positive correlation between self-evaluation of nutritional knowledge and actual test scores. Although approximately 16 percent of the subjects rated themselves as having almost as much knowledge as a dietitian, none actually had a perfect score on the nutritional knowledge test.

#### Nutritional Knowledge of Nurses

Schwartz (1976) studied the nutritional knowledge of 352 nurses. The mean test score was 74.9 percent. The areas in which the lowest scores occurred were nutrition and pregnancy, nutritional requirements, nutritional value of foods and functions of nutrients.

The findings of a study by Harrison, Sanchez and Young (1969) showed great variation in all areas of the nutritional knowledge of nurses. The greatest variation was in the categories which related physiological and psychological factors to food intake and nutrient needs than in categories dealing directly with nutrients or with evaluating diets. Responses indicated a general lack of understanding of

the tools used in planning diets, such as the Recommended Dietary Allowances. Nurses with bachelor's degrees scored significantly higher than those with diplomas or associate degrees.

The nurses in a study by Vickstrom and Fox (1976) answered 75 percent of the nutritional knowledge questions correctly, but received low scores because they indicated a low degree of certainty on their answers. In general, the nurses were well informed regarding basic aspects of normal nutrition and applied aspects of therapeutic nutrition. Older nurses were less knowledgeable than younger nurses. Degree nurses had a higher level of nutritional knowledge than those from diploma schools. This finding agreed with the findings of a study by Harrison et al. (1969). A significant relationship existed between nutritional knowledge and nurses' attitudes toward their roles in nutrition education and their perception of the value of the work of the health care team.

#### Nutritional Knowledge of Medical Students and Physicians

The results of Phillip's (1971) study of the nutritional knowledge of 254 second year medical students indicated that the majority of the students were not familiar with many of the basic concepts and knowledge of nutrition that were considered to be important for them to know by a panel of experts. Linn-Conover (1975) found that the nutritional knowledge of third and fourth year medical students was equal to that of dietetic interns. The nutritional knowledge of student nurses was considerably less.

Eighty-three percent of the physicians participating in a study by Krause (1973) had received some type of nutrition education in medical school. This resulted in higher nutritional knowledge scores. Overall nutrition knowledge scores were low. Physicians exhibited a great deal of confidence in their responses to knowledge questions, thus lowering their scores. The type of practice and type of medical specialty influenced nutrition knowledge scores. A significant and negative relationship existed between age and the number of years in practice and nutritional knowledge. This relationship indicated that older physicians, who had not been exposed to the newer concepts of nutrition in medical school, had not been able to increase their limited nutritional knowledge during ensuing years in practice.

A study by Mayer (1978) of the nutritional knowledge of physicians showed that although physicians understood the biochemistry of eating, they had difficulty translating this knowledge into practical information. Mayer felt that overall, their level of knowledge only reflected their own appreciation of nutrition. Young physicians were eager for nutritional knowledge. Seventy-one percent of the interns and residents questioned felt their medical curriculum had not given nutrition enough emphasis. Only 26 percent thought their nutritional training had been adequate. Fifty-seven percent stated that an understanding of nutrition and diet therapy was very important in their practice and 14 percent stated it was extremely important. Sixty-two percent thought that other physicians were inadequately informed about diet and only 28 percent believed that older physicians knew enough about diets.



### Nutritional Knowledge of Other Groups

The purpose of a study by Johnson (1971) was to determine what homemakers understood by some of the terms commonly found in the mass media that those homemakers should know to interpret nutrition information. The study showed that a higher knowledge of nutrition was associated with a higher educational level.

A study of 200 mothers of newborns revealed that educational attainment had a direct relationship on nutritional knowledge (Kidd, 1972). A significant difference in nutritional knowledge was indicated for the areas of identification of vitamins and minerals, dietary sources of nutrients and the number of servings needed daily. Sims (1978) found nursing mothers fairly knowledgeable about nutrition. The number of years of education was the variable most strongly related to performance on the nutritional knowledge test. A significant correlation existed between the score on the nutritional knowledge test and self-evaluation of nutritional knowledge.

Sims (1976) assessed the nutritional knowledge of mothers of preschoolers by means of their knowledge of the Basic Four Food Groups and their score on a nutrition test. Mothers with the highest level of nutritional knowledge had higher socio-economic status, were younger, had fewer people in the home, spent less money for food each week, had less authoritarian attitudes about child-rearing and felt that nutrition was very important for children. Higher socio-economic status and the attitude that nutrition was very important for children were the most important predictors of nutritional knowledge. The nutritional knowledge of parents of preschool children was rated fair

by Johansen (1976). Two hundred seventy-two families participated in the study. Knowledge of dietary sources of vitamin A, iron and calcium was limited. Professional women scored higher than non-professional women. Phillips, Bass and Yetley (1978) found similar food and nutrition scores for mothers with children older than preschoolers and mothers where the preschool children were the oldest in the family. In the first group, the mothers' food and nutrition knowledge was positively associated with behavior regarding the use of presweetened cereals. In the second group, the mothers' food and nutrition knowledge was not related to their cereal purchasing behavior.

Eppright, Fox, Fryer, Lamkin and Vivian (1970) found that mothers tended to score higher on items of a general nature, but tended to miss items related to food composition and those that might have been influenced strongly by advertising. The education of the mother was relatively highly correlated with nutrition knowledge. The results of the study showed some tendency for the overall diet quality to improve when mothers had more nutritional knowledge.

Emmons and Hayes (1973) studied the nutritional knowledge of 844 children and their mothers. The foods mothers listed as most important in their children's diet were meat, vegetables and potatoes. The children listed meat, vegetables and dairy foods as most important in their diets. Mothers and children considered certain foods important more often because of general reasons, custom or habit than for valid nutritional reasons.

Wodarski's (1976) study revealed that 185 10th through 12th grade high school students had a limited knowledge of nutrition. The mean

score on a nutritional knowledge test taken by 1338 high school students was 55.9 out of a possible 100 (Dwyer, Eieldman and Mayer, 1970). Girls scored higher than boys. College bound students scored higher than vocational students.

The findings of a study of high school graduates indicated a relatively high knowledge of nutritional concepts (Schwartz, 1975). A study of the nutritional knowledge of deaf students showed that knowledge was low for both deaf and hearing students (Garton and Bass, 1974); however, the knowledge of the deaf students was significantly lower.

Cho (1972) studied the nutritional knowledge of physical education majors and basic nutrition college students. The mean score of the basic nutrition students was significantly higher than that of the physical education majors on a nutritional knowledge test.

Morris (1974) tested the nutritional knowledge of 333 5th, 8th and 12th grade students, some of their parents, college students who had completed a college level nutrition course and college students who had not had a college level nutrition course. The college students who had completed a nutrition course scored highest on the nutritional knowledge test. Mothers of school children scored second highest. Fathers of school children scored toward the middle. College students who had not had a college level nutrition course scored next to the lowest. The school students scored the lowest. The test categories on which the subjects scored highest were the Basic Four Food Groups, quantitative nutritional needs and food science and preparation. The test categories on which the subjects scored lowest were classes of nutrients, qualitative nutritional needs and protein

quality. Educational level correlated with 11 of 13 categories on the nutritional knowledge test.

Matlock (1977) found that the position, years of teaching experience, education and type of child care center at which they worked had an effect on the nutritional knowledge of child care center teachers. Williams (1974) studied the nutritional knowledge of child care center managers, teachers, cooks and parents. The managers and teachers scored higher on the nutritional knowledge test than the parents and cooks. Peterson and Kies (1972) found the overall nutritional knowledge scores of 910 early elementary teachers were low. Teachers tended to score higher on items of a general nature, but tended to miss those items related to food composition. A study of 1279 elementary teachers in Kentucky found that nutritional knowledge scores increased as credit hours of nutrition increased, up to six hours (Wesley, 1975). Giglotti (1976) found that teachers had a relatively low level of nutritional knowledge.

Yetley and Roderuck (1980) found that the mean score on a nutritional knowledge test were not statistically different for husbands and wives. An interesting finding of a study of the nutritional knowledge of migratory workers by Quinn (1971) was the absence of a significant correlation between years of formal education and the level of nutritional knowledge and between the ways nutrition information was received with the level of nutritional knowledge. Stansfield and Fox (1977) studied the nutritional knowledge of grocers. The grocers' knowledge was quite good, although they were still misinformed regarding several general nutrition topics. A significant correlation existed between nutritional knowledge and education.

Nutritional knowledge of other groups such as mothers (Kidd, 1972; Sims, 1976, 1978; Johansen, 1976, Phillips et al. 1978; Eppright et al. 1970), homemakers (Johnson, 1971), students (Wodarski, 1976; Dwyer et al. 1970; Garton and Bass, 1974; Cho, 1972) and teachers (Matlock, 1977; Peterson and Kies, 1972; Wesley, 1975; Giglotti, 1976) have been studied in the last two decades, but there is limited information on the nutritional knowledge of the elderly. It appears from implications and recommendations from the literature reviewed that research concerning the nutritional knowledge of elderly individuals needs further exploration. Information about the elderly may facilitate the preparation of materials to enhance the nutritional knowledge of institutionalized and independent-living elderly persons, thus providing better living and a healthier elderly population.

## CHAPTER III

### METHOD

The purpose of this investigation was to determine the nutritional knowledge of a group of elderly nursing home residents. The research design; sample population; data collection which consisted of the instrument, scoring and survey procedure; and data analysis are presented in this chapter.

#### Research Design

The research design used in this study was the descriptive status survey (Kerlinger, 1973; Van Dalen, 1973). The method employed to obtain information was by questionnaire. A personal interview was conducted by the researcher to complete the collection of data.

#### Sample

The sample was an invited sample (Fox, 1969) of elderly nursing home residents in Oklahoma County in the state of Oklahoma. Permission was obtained from the administrators of 20 nursing homes to include their institution in the survey. Nineteen of these institutions provided no skilled care, while one had one wing which provided skilled care.

### Instrumentation

An interview schedule (Kerlinger, 1973) with questions requiring a choice of possible answers (closed type) and questions requiring respondents to answer freely (open type) was developed during the spring 1980 semester. Graduate faculty of the Food, Nutrition and Institution Administration and Statistics Departments examined the schedule for content validity and clarity. The instrument was then pretested on 30 elderly individuals at a room and board home in Oklahoma City. The approved instrument consisted of 25 questions requiring true, false or don't know answers and five open-ended questions (Appendix A). The instrument was printed in large print to enable subjects to read it.

### Scoring

For the purpose of scoring the true-false questions each correct answer was given four points, each don't know answer was given two points and each incorrect answer was given zero points. One hundred points were possible on the true-false questions. Scores were used in analyzing data.

### Procedure

The administrators of 35 nursing homes in Oklahoma County in the state of Oklahoma listed in the 1980 Directory of Nursing Homes of the State Department of Health were contacted by letter and informed of the study (Appendix B). Permission was requested to conduct the study in the 35 nursing homes and was granted by the administrators

of 20 of these homes. Reasons given by administrators for not participating in the study were that it was against the policy of the home or it was not possible at the present time. Only residents who were 60 years of age and over and who were considered by the personnel of each home to be physically and mentally able to participate in the research activities were contacted and requested to participate in the study. With a majority of the residents, it was necessary for the researcher to read the interview schedule aloud to the subjects. This was necessary because many of the subjects were unable to see well enough to read the schedule themselves or were unable to hold a pen steady enough to complete the questionnaire. The time involved in presenting the schedule to each subject varied from 20 minutes to one hour. Many subjects wanted to socialize and the researcher provided correct answers to questions which the subjects had answered incorrectly, if the subjects were interested.

#### Analysis of Data

An analysis of variance (ANOVA) determined if a significant difference existed between the knowledge scores of the elderly based on sex, age and educational level. Duncan's multiple range test determined the location of significant differences. The Statistical Analysis System (Barr and Goodnight, 1976) was employed to generate frequencies, percentages, ANOVA and Duncan's multiple range determinations.



## CHAPTER IV

### RESULTS AND DISCUSSION

This study was conducted to determine the nutritional knowledge of a group of elderly nursing home residents. Chapter IV presents the demographic characteristics, evaluation of nutritional knowledge and an analysis of data in accordance with the hypotheses of the study.

#### Demographic Characteristics

The participants in this study were 215 elderly nursing home residents in 20 nursing homes in Oklahoma County in the state of Oklahoma. The total census of these homes was 1797 residents. The sample consisted of 60 (27.9 percent) males and 155 (72.1 percent) females. Their ages ranged from 60 to 99. The predominant number of residents (37.2 percent) were in the 80 to 89 age group. Table I presents the number and percentage of residents included in each age group.

The number and percentage of residents included in each educational level is presented in Table II. Seventy-seven percent (N=166) of the sample had a high school education or less.

One hundred and sixty (65.6 percent) of the residents had not taken any formal nutrition classes, while 55 (34.4 percent) had taken a nutrition class in school. Twenty-eight of these residents (45.9 percent) had taken a class during their 11th or 12th years of school (Table III).

TABLE I  
NUMBER AND PERCENTAGE OF RESIDENTS PER AGE GROUP

Age Group	Number	Percentage*
60 to 69	45	20.9
70 to 79	68	31.6
80 to 89	80	37.2
90 to 99	<u>22</u>	<u>10.2</u>
Total	215	99.9

\*Note that percentages have been rounded off to the nearest tenth, thus total may not equal 100 percent.

TABLE II  
NUMBER AND PERCENTAGE OF RESIDENTS PER  
EDUCATIONAL LEVEL

Educational Level	Number	Percentage*
8 years or less	75	34.9
9 to 10 years	41	19.1
11 to 12 years	50	23.3
13 to 16 years	33	15.3
Graduate school	<u>16</u>	<u>7.4</u>
Total	215	100.0

\*Note that percentages have been rounded off to the nearest tenth, thus total may not equal 100 percent.

TABLE III  
EDUCATIONAL LEVEL DURING WHICH RESIDENTS  
ATTENDED NUTRITION CLASS

Educational Level	Number	Percentage*
8 years or less	3	4.9
9 to 10 years	16	26.2
11 to 12 years	28	45.9
13 to 16 years	8	13.1
Graduate school	6	9.8
Other: nurse's training	6	9.8
Total	67	99.9

\*Note that percentages have been rounded off to the nearest tenth, thus total may not equal 100 percent. The total residents is greater than 55 since some residents had taken a nutrition class at more than one educational level or during nurse's training.

One hundred seventy-four residents (80.7 percent) had never attended any other activities where they learned about nutrition. Forty-one residents (19.3 percent) had attended other activities where they learned about nutrition. Women's clubs were the activity attended by the largest number of residents. Twenty-six percent (N=12) of the residents had attended women's clubs. Other activities where residents learned about nutrition are listed in Table IV.

#### Evaluation of Nutritional Knowledge

The interview schedule included 25 true, false or don't know questions (Appendix A). Table V presents the residents' responses to these questions. The questions which the residents answered

correctly most frequently were questions 4, 5, 18, 24 and 25, which related to nutrition and health, the Basic Four Food Groups, fluids, calcium and sources of iron. Questions often missed were 8, 10, 13, 16 and 21 which were on weight reduction, sources of B vitamins, functions of protein, the calories in butter and margarine and vitamin C. The topics where residents did not know the answer included calories in bread, sources of protein, sources of B vitamins, nutrients in carbohydrate-rich foods and fiber which were covered in questions 6, 9, 10, 14 and 17.

TABLE IV  
OTHER ACTIVITIES WHERE RESIDENTS  
LEARNED ABOUT NUTRITION

Activity	Number	Percentage*
Women's club	12	26.1
Adult education class	10	21.7
Extension program	8	17.2
Cooking course	8	17.2
Job experience in school cafeteria	3	
Taught food and nutrition	1	
Weight reduction course at Mayo clinic	1	
Infant and child nutrition lectures	1	17.2
Health class	1	
American Red Cross course	1	
Total	<u>46</u>	<u>99.4</u>

\*Note that percentages have been rounded off to the nearest tenth, thus total may not equal 100 percent. The total residents is greater than 41 since some residents had attended more than one activity.

TABLE V  
RESIDENTS' RESPONSES TO THE TRUE, FALSE OR DON'T  
KNOW QUESTIONS ON THE INTERVIEW SCHEDULE

Number of Question	Subject of Question	Correct Answer		Incorrect Answer		Don't Know	
		N	%	N	%	N	%
1.	Variety in the diet	179	83.3	15	7.0	21	10.0
2.	Balanced diet	172	80.0	14	6.5	29	13.5
3.	Nutrients	150	70.0	47	21.9	18	8.4
✓4.	Nutrition and health	203	94.4	6	2.8	6	2.8
✓5.	Basic Four Food Groups	188	87.4	9	4.2	18	8.4
6.	Calories in bread	62	28.8	110	51.2	43	20.0
7.	Milk group	182	84.7	8	3.7	25	11.6
8.	Weight reduction	63	29.3	129	60.0	23	10.7
9.	Sources of protein	117	54.4	58	27.0	40	18.6
10.	Sources of B vitamins	20	9.3	133	61.9	62	28.8
11.	Caloric intake	152	70.7	38	17.7	25	11.6
12.	Caloric intake	177	82.3	12	5.6	26	12.1
13.	Function of protein	17	7.9	171	79.5	27	12.6

TABLE V (Continued)

Number of Question	Subject of Question	Correct Answer		Incorrect Answer		Don't Know	
		N	%*	N	%	N	%
14.	Carbohydrate-rich foods	74	34.4	101	47.0	40	18.6
15.	Fat	113	52.6	76	35.3	26	12.1
16.	Calories in margarine	51	23.7	144	67.0	20	9.3
17.	Fiber	142	66.0	21	9.8	52	24.2
✓18.	Fluids	✓200	93.0	3	1.4	12	5.6
19.	Excess of vitamins	159	74.0	20	9.3	36	16.7
20.	Vitamin pills	96	44.6	95	44.2	24	11.2
21.	Vitamin C	21	9.8	160	74.4	34	15.8
22.	Vitamin A	174	80.9	8	3.7	18	8.4
23.	Vitamin C	175	81.4	22	10.2	18	8.4
✓24.	Calcium	✓194	90.2	13	6.0	8	3.7
✓25.	Sources of iron	✓198	92.0	1	0.5	16	7.4

\*Note that percentages have been rounded off to the nearest tenth, thus totals may not equal 100 percent.

The interview schedule also included five open-ended questions. Question 1 was "Do you think that consuming a nutritionally balanced diet is important to maintaining good health?" Ninety-three percent (N=200) of the residents responded affirmatively (Table VI). Question 2 was "Will vitamin C cure colds or prevent a person from getting a cold?" Fifty-nine residents (27.4 percent) responded negatively, while 57 residents (26.5 percent) responded affirmatively. Forty residents (18.6 percent) responded that they did not know (Table VII). Question 3 was "Should a person reduce their calories as they grow older?" One hundred forty-three residents (66.5 percent) responded affirmatively (Table VIII). Question 4 was "Why is fiber important to the diet?" Two-fifths of the residents (N=86) gave a don't know response, while about a fourth of the residents (N=57) responded that fiber was important for elimination (Table IX). Question 5 was "What is the function of fat?" About two-thirds of the residents (N=140) gave a don't know response. Twenty-six residents (12.0 percent) responded that the function of fat was for energy or calories (Table X).

For the purpose of scoring the true-false questions, each correct answer was given four points, each don't know answer was given two points, each incorrect answer was given zero points. One hundred points were possible on the true-false questions. Scores on the interview schedule ranged from 44 to 96, with about 50 percent (N=114) of the residents scoring between 64 and 76 (Figure 2).

### Testing of Hypotheses

The following hypotheses were postulated for this study. An analysis of variance (ANOVA) determined if a significant difference

existed between the knowledge scores of the elderly based on sex, age and educational level. Duncan's multiple range test determined the location of significant differences.

TABLE VI  
RESIDENTS' RESPONSES TO QUESTION 1: "DO YOU  
THINK THAT CONSUMING A NUTRITIONALLY  
BALANCED DIET IS IMPORTANT TO  
MAINTAINING GOOD HEALTH?"

Response	Number	Percentage*
Yes	200	93.0
Do not know	8	3.7
No	3	1.4
Important, to a certain degree	2	0.9
Helpful	1	0.5
Doubtful	<u>1</u>	<u>0.5</u>
Total	215	100.0

\*Note that percentages have been rounded off to the nearest tenth.

### Hypothesis 1

H<sub>1</sub>: There will be no significant difference in the nutritional knowledge of elderly nursing home residents based on their sex.



The first hypothesis examined the relationship between the nutritional knowledge of elderly nursing home residents and their sex. Mean scores for nutritional knowledge of nursing home residents are shown in Table XI. An analysis of variance is presented in Table XII. There was an indication that sex had some effect on nutritional knowledge; however, the sample was not large enough to indicate statistical significance. There was no significant relationship between nutritional knowledge and sex at the  $p < .05$  level; therefore, the researcher failed to reject  $H_1$ .

### Hypothesis 2

$H_2$ : There will be no significant difference in the nutritional knowledge of elderly nursing home residents based on their age.

The second hypothesis examined the relationship between the nutritional knowledge of elderly nursing home residents and their age. Mean scores for nutritional knowledge of nursing home residents based on age are shown in Table XIII. (An analysis of variance is presented in Table XII.) There was no significant relationship between nutritional knowledge and sex at the  $p < 0.05$  level; therefore, the researcher failed to reject  $H_2$ .

### Hypothesis 3

$H_3$ : There will be no significant difference in the nutritional knowledge of elderly nursing home residents based on their educational level.

The third hypothesis examines the relationship between the nutritional knowledge of elderly nursing home residents and their

educational level. (An analysis of variance is presented in Table XII.) A Duncan multiple range test was also determined (Table XIV). There was a significant relationship between nutritional knowledge and educational level at the  $p < 0.05$  level; therefore, the researcher failed to accept  $H_3$ . This result is in agreement with the result reported by Brown (1978).

TABLE VII

RESIDENTS' RESPONSES TO QUESTION 2: "Will  
VITAMIN C CURE COLDS OR PREVENT A  
PERSON FROM GETTING A COLD?"

Response	Number	Percentage*
No	59	27.4
Yes	57	26.5
Do not know	40	18.6
Helpful	28	13.0
Yes, prevent	20	9.3
It's supposed to, they say or claim it will	5	2.3
To a certain degree	2	0.9
Questionable	2	0.9
Keep cold from being as serious	1	0.5
Yes, cure	<u>1</u>	<u>0.5</u>
Total	215	99.0

\*Note that percentages have been rounded off to the nearest tenth, thus total may not equal 100 percent.

TABLE VIII  
 RESIDENTS' RESPONSES TO QUESTION 3: "SHOULD  
 A PERSON REDUCE THEIR CALORIES  
 AS THEY GROW OLDER?"

Response	Number	Percentage*
Yes	143	66.5
No	35	16.3
Do not know	27	12.6
No, should increase calories	6	2.8
Depends on the indi- vidual	<u>4</u>	<u>1.9</u>
Total	215	100.1

\*Note that percentages have been rounded off to the nearest tenth, thus total may not equal 100 percent.

TABLE IX

RESIDENTS' RESPONSES TO QUESTION 4: "WHY  
IS FIBER IMPORTANT IN THE DIET?"

Response	Number	Percentage*
Do not know	86	39.5
Elimination	57	26.5
Bulk, roughage, coarseness, porousness, food grinder or filler	27	12.6
Digestion and regulation	19	8.8
Digestion and elimination	6	2.7
Strengthening or building the body or system	4	1.9
Keeping the system going	2	0.9
Hold the body together	2	0.9
Functions as a non-fattening ingredient or to keep a per- son from getting fat	2	0.9
Not important or not needed	2	0.9
Bulk and blood clotting	1	0.5
Health	1	0.5
Health and strength	1	0.5
Protection	1	0.5
For a balanced diet	1	0.5
Vitamins	1	0.5
Energy	1	0.5
Balance out things that are not good for the stomach	<u>1</u>	<u>0.5</u>
Total	215	99.6

\*Note that percentages have been rounded off to the nearest tenth, thus total may not equal 100 percent.

TABLE X  
RESIDENTS' RESPONSES TO QUESTION 5: "WHAT  
IS THE FUNCTION OF FAT?"

Response	Number	Percentage*
Do not know	140	65.1
Energy or calories	26	12.0
Lubrication	10	4.7
Digestion and elimination	7	3.3
Not needed or not needed as a person grows older	6	2.8
Energy and heat	3	1.4
Warmth and heat	3	1.4
Padding and insulation	2	0.9
Health	2	0.9
Body building	2	0.9
Regulation	2	0.9
Digestion and health	1	0.5
Lubrication and energy	1	0.5
Lubrication and warmth	1	0.5
Vitamins	1	0.5
Strength	1	0.5
Keep body well adjusted	1	0.5
Weight gain	1	0.5
Weight gain and carbohydrate digestion	1	0.5
Material valuable to most organs of the body	1	0.5
Flavor	<u>1</u>	<u>0.5</u>
Total	215	99.3

\*Note that percentages have been rounded off to the nearest tenth, thus total may not equal 100 percent.

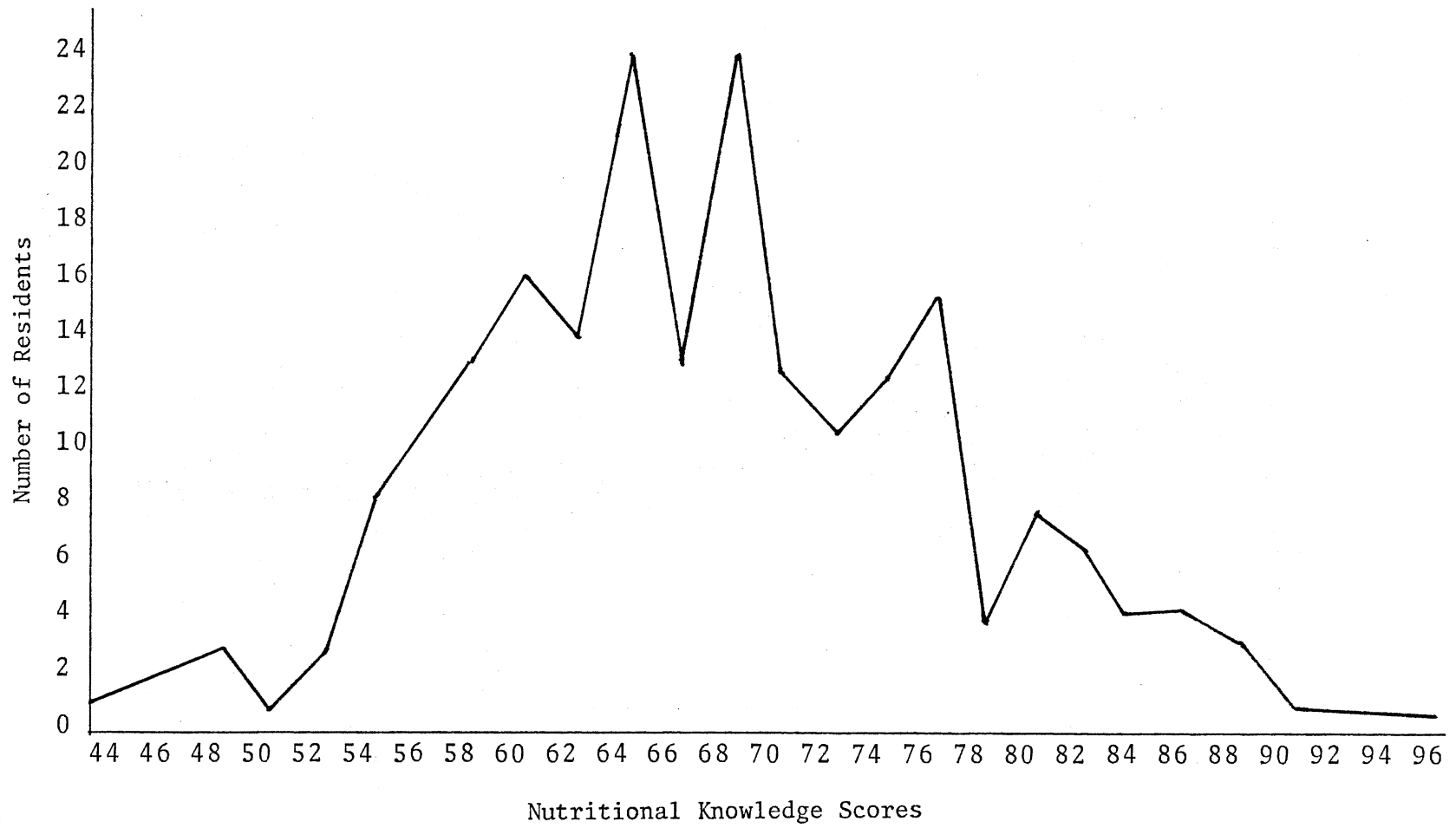


Figure 2. Interview Schedule Scores

TABLE XI  
 MEAN SCORES FOR NUTRITIONAL KNOWLEDGE OF  
 NURSING HOME RESIDENTS BASED ON SEX

Sex	Number	Mean Scores
Male	60	65.36
Female	<u>155</u>	67.97
	N=215	

TABLE XII  
 ANALYSIS OF VARIANCE FOR NUTRITIONAL KNOWL-  
 EDGE SCORES OF NURSING HOME RESIDENTS

Source	DF	Mean Squares	F Value	Observed Significance Level
Sex	1	294.10	3.34	0.0688
Educational Level	4	237.82	2.76	0.0286
Age	3	105.01	1.18	0.3166

TABLE XIII

MEAN SCORES FOR NUTRITIONAL KNOWLEDGE OF  
NURSING HOME RESIDENTS BASED ON AGE

Age Levels	Number	Mean Scores
60 to 69	45	64.98
70 to 79	68	68.21
80 to 89	80	67.75
90 to 99	<u>22</u>	67.09
	N=215	

TABLE XIV

MEAN SCORES FOR NUTRITIONAL KNOWLEDGE OF  
NURSING HOME RESIDENTS BASED ON  
EDUCATIONAL LEVEL

Educational Level	Number	Mean Scores*
8 years or less	75	64.80 <sup>b</sup>
9 to 10 years	41	66.59 <sup>b</sup>
11 to 12 years	50	69.16 <sup>a</sup>
13 to 16 years	33	69.03 <sup>a</sup>
Graduate school	<u>16</u>	70.73 <sup>a</sup>
	N=215	

\*Scores within the column having no letter in common are significantly different ( $p < .05$ ).



## CHAPTER V

### SUMMARY AND RECOMMENDATIONS

#### Summary

The purpose of this study was to determine the nutritional knowledge of a group of elderly nursing home residents. Information about the elderly may facilitate the preparation of materials to enhance the nutritional knowledge of individuals, thus promoting better living and a healthier population.

Three hypotheses were postulated as follows:

- H<sub>1</sub>: There will be no significant difference in the nutritional knowledge of elderly nursing home residents based on their sex.
- H<sub>2</sub>: There will be no significant difference in the nutritional knowledge of elderly nursing home residents based on their age.
- H<sub>3</sub>: There will be no significant difference in the nutritional knowledge of elderly nursing home residents based on their educational level.

The review of literature focused on factors related to improper nutrition and physical, social and emotional factors causing poor diets. It included the nutritional intake of the elderly, the nutritional needs of the elderly and planning diets for the elderly. It also included literature on the nutritional knowledge of elderly persons and other groups. It appeared from implication and recommendations from the literature reviewed that research concerning the nutritional knowledge of elderly individuals needed further exploration.

The research design used was the descriptive status survey. The method employed to obtain information was by questionnaire. A personal interview was conducted by the researcher to complete the collection of data. An interview schedule with questions requiring a choice of possible answers (closed type) and questions requiring respondents to answer freely (open type) was developed.

The sample was an invited sample of 215 elderly nursing home residents in 20 nursing homes in Oklahoma County in the state of Oklahoma. The sample consisted of 60 males and 155 females. The predominant number of residents (37.2 percent) were in the 80 to 89 age group. Seventy-seven percent of the residents (N=166) had a high school education or less. Fifty-five of the residents (34.4 percent) had taken a nutrition class in school. Forty-one residents (19.3 percent) had attended other activities where they learned about nutrition.

The nutrition knowledge scores on the interview schedule ranged from 44 to 96 percent with about 50 percent (N=114) of the residents scoring between 54 and 76 percent. The interview schedule included 25 true, false or don't know questions. Residents scored highest on questions concerning nutrition and health, fluids, iron, calcium and the Basic Four Food Groups. Residents scored lowest on questions concerning protein, vitamin C, calories in margarine and butter, B vitamins and weight reduction.

The interview schedule also included five open-ended questions. Two hundred residents (93.0 percent) thought a nutritionally balanced diet was important to maintain good health. Fifty-seven residents (26.5 percent) thought that vitamin C would cure colds or prevent a

person from getting a cold; however, 59 residents (27.4 percent) disagreed with this notion. One hundred forty-three of the residents (66.5 percent) thought that a person should reduce their calories as they grew older. While 86 of the residents (39.5 percent) did not know why fiber was important in the diet, 57 of the residents (26.5 percent) stated that fiber was important in the diet for elimination. Twenty-six of the residents (12.0 percent) stated that the function of fat was to provide energy or calories; however, 140 of the residents (65.1 percent) did not know the function of fat.

An analysis of variance (ANOVA) determined if a significant difference existed between the knowledge scores of the elderly based on sex, age and educational level. Duncan's multiple range test determined the location of significant differences. The Statistical Analysis System (Barr and Goodnight, 1976) was employed to generate frequencies, percentages, ANOVA and Duncan's multiple range determinations.

No significant relationship was found between nutritional knowledge and the sex or age of the subjects. A significant relationship ( $p < 0.05$ ), however, was found between nutritional knowledge and the educational level of subjects.

#### Recommendations

The results of this study indicate a need for nutrition education for elderly nursing home residents. Based on these results, the following are recommended:

1. Incorporation of nutrition education into the social activities of nursing homes.

2. Development of a nutrition education unit for elderly nursing home residents. The unit should include the sources and functions of protein, the importance of fiber in the diet and the sources and functions of vitamins and minerals.

Further studies might be conducted to determine:

1. The effect of other variables such as race, occupation and rural versus urban living have on the nutritional knowledge of elderly persons.

2. If there are differences in the nutritional knowledge of institutionalized versus independent-living elderly persons.

3. If nutritional knowledge has an effect on the dietary intake of elderly persons.

4. The effect of a nutrition education unit on the nutritional knowledge of elderly persons.

5. How is nutritional knowledge gained and what factors have influenced it, such as the effect of the Depression and World War II. These factors may have an effect on the variance in nutritional knowledge between age groups.

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## APPENDIXES

APPENDIX A

INSTRUMENT

OKLAHOMA STATE UNIVERSITY  
Department of Food, Nutrition and  
Institution Administration

Nutrition Knowledge Test

Directions: Some statements concerning nutrition are given below. Please mark the choice to the right which you think is correct with an X.

Statement:	True	False	Don't Know
1. A sound nutritional practice is to eat a wide variety of food each day.			
2. The term balanced, when applied to a day's diet, means that all of the food groups in a daily plan are included in the amounts recommended.			
3. Every age group needs the same nutrients and the same amounts of these nutrients.			
4. Nutrition is important in maintaining good health.			
5. The Basic Four Food Groups include the milk group, the meat group, the grain group and the fruit and vegetable group.			
6. Whole wheat bread contains fewer calories per slice than white bread.			
7. Cheese, yogurt and ice cream can supply part of the recommended servings of milk daily.			
8. A person on a weight reduction diet should avoid foods from the grain group, such as bread, cereal, rice and macaroni.			
9. Eggs, cheese, peanut butter and dried beans are poor sources of protein.			
10. Fruits and vegetables are major sources of B vitamins.			
11. A person's intake of calories should remain the same throughout life.			
12. The number of calories people need vary with their age, sex and activity.			
13. The primary function of protein is to furnish energy.			

Statement:	True	False	Don't Know
14. Carbohydrate-rich foods, such as bread, rice and potatoes provide few nutrients other than calories.			
15. Fat is the most concentrated source of energy.			
16. Margarine has fewer calories than butter.			
17. Fiber aids in digestion.			
18. Fluids are important in the diet of the elderly to prevent dehydration and to avoid constipation.			
19. An excess of vitamins can be harmful to the body.			
20. Vitamin pills are needed by most people to insure good health, even if a well-balanced diet is consumed.			
21. Vitamin C is referred to as the "sunshine" vitamin.			
22. A dark green leafy or deep yellow vegetable or fruit should be included at least 3 to 4 times a week for vitamin A.			
23. Adults need a source of vitamin C, such as citrus fruits, tomatoes, cantaloupe, strawberries, broccoli or raw cabbage daily.			
24. People of all ages need calcium in their diets.			
25. Eggs and meat, especially liver, are good sources of iron.			

Directions: Please provide a brief discussion of the following questions:

1. Do you think that consuming a nutritionally balanced diet is important to maintain good health?

2. Will vitamin C cure colds or prevent a person from getting a cold?
  
3. Should a person reduce their calories as they grow older?
  
4. Why is fiber important in the diet?
  
5. What is the function of fat in the diet?

Directions: Please provide the information as indicated. Check the appropriate category.

- A. What is your sex?
  1.  Male
  2.  Female
  
- B. What is your present age?
  1.  60 to 69
  2.  70 to 79
  3.  80 to 89
  4.  90 or over
  
- C. What is your highest educational level?
  1.  8 years or less
  2.  9-10 years
  3.  11-12 years
  4.  13-16 years
  5.  Graduate school
  
- D. Have you had any classes in school concerned with food and nutrition?
  1.  Yes
  2.  No
  
- E. Have you attended any other activities in which you learned about food and nutrition?
  1.  Yes
  2.  No

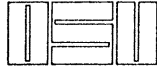
If yes, please check what activities.

1.  Extension program
2.  Adult education
3.  Women's club
4.  Cooking course
5.  Other: specify



APPENDIX B

LETTER TO ADMINISTRATORS



# Oklahoma State University

Department of Food, Nutrition and Institution Administration

STILLWATER, OKLAHOMA 74078  
(405) 624-5039

Dear

I am a graduate student at Oklahoma State University preparing for a master's degree in Food, Nutrition and Institution Administration. A research project is required to fulfill the requirements for this degree. I am proposing a study to determine the nutritional knowledge of elderly nursing home residents in Oklahoma County. Hopefully this information will help nutritionists plan better nutrition education for the elderly.

I would like to request permission to present my data gathering device to a randomly selected sample of your residents. If you are willing to participate in this study, kindly indicate your response, sign and return the enclosed postcard. All responses of subjects will be anonymous and will be treated confidentially. Neither names nor the name of your facility will be identified in this study.

Thank you for your cooperation.

Sincerely,

Sharron Kay Oakes  
Graduate Student  
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Lea L. Ebro, Ph.D.  
Associate Professor  
(Adviser)

VITA

Sharron K. Oakes

Candidate for the Degree of

Master of Science

Thesis: A STUDY OF THE NUTRITIONAL KNOWLEDGE OF ELDERLY NURSING HOME RESIDENTS

Major Field: Food, Nutrition and Institution Administration

Biographical:

Personal Data: Born in Neosho, Missouri, April 15, 1946, the daughter of Mr. and Mrs. Homer B. Williams; married March 9, 1979, to David L. Oakes, Oklahoma City, Oklahoma.

Education: Graduated from Edison High School, Tulsa, Oklahoma, in May, 1964; received Bachelor of Science degree in Home Economics Education from Oklahoma State University in 1968; completed the requirements for the Master of Science degree in Food, Nutrition and Institution Administration at Oklahoma State University in December, 1980.

Professional Experience: Teacher, Olive High School, Olive, Oklahoma, 1968 to 1969; Public Health Nutritionist, Oklahoma State Department of Health, 1969 to 1980.

Professional Organizations: Associate member of the American Dietetic Association.