A STUDY OF THE NUTRITION KNOWLEDGE/INTERESTS OF PARTICIPANTS OF THE WHEATHEART NUTRITION PROGRAM FOR THE ELDERLY

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CHAPTER I

INTRODUCTION

"Longevity without happiness is mere existence, not living" (Gilperin, 1978, p. 318). Row (1978) called aging a jewell in the mosiac of life. Gilperin (1978) goes on to discuss:

> Why are today's elderly remarkable?. . . of their peers they are the ones who did not die; they are the living small minority of that group, . . . The elderly of today have brought with them the scars of a lifetime of struggle, to adapt, to tolerate and to be tolerated, and to live, or exist" (p. 318).

The elderly of today are not to be placed in one category. They are as diverse a group as any other segment of the population, where each person is the product of his lifetime of experiences (Todhunter, 1980; Knowles, 1980; Schaefer, 1980; Lindeman, 1926). Gilperin points out that older Americans have an ingrained basic need for economic security after having lived through two world wars, the great depression, and many of the life-threatening diseases that have now been largely eliminated by modern medicine and technology. In the youth oriented society of today, there is a tendency to treat people over 65 as useless and as having little self-worth (Williams, 1982). Laube (1980) states that:

> "ageism, prejudice against the elderly, like other prejudices, it has three ugly heads: discrimination, or the denial of the right to <u>have</u>; segration, or denial of the right to <u>belong</u>; caricaturization, or the denial of the right to <u>be</u>" (p. 17).

Laube says mandatory retirement is discrimination because it halves the income of most pensioned citizens at a time when health and energy costs are escalating. He says that the tendency to put the older

citizens on the "shelf" assigning them a hollow role is segregation. There is caricaturization when the elderly are cast into faceless stereotypes as senile, sexless, and silly.

However some may view the elderly, Row (1978) paints an entirely different picture of today's older adults. She sees them as actively enjoying life. Morgan (1982, p. 5) states, "Contrary to popular belief, senility does not automatically accompany old age." If the elderly citizens are to have a quality life, they do have need of nutrition knowledge, so they will know how to maintain a good nutritional status as a means to better health. The science of nutrition was barely developing when they were in school. Formal courses were non-existent or of variable quality, while the nutrition information they do have, was gained from family, friends, and mass media, and is often conflicting and misleading, or erroneous (Shannon and Smicklas-Wright, 1979).

Nutrition is vitally important to the well being of older adults. The current threats to health among the elderly are largely nutrition-related disease (i.e. cardio-vascular, nutritional anemias, diabetes, obesity and malnutrition) as has been discussed by Watkins (1975), Albanese (1976), Stiedman, Janson and Harrell (1978), Weg (1978), and Todhunter (1980) among others.

Watkins (1977) reported that half of all health expenditures in the United States of America are for those persons 60 years of age or more--about 14 percent of the population. The importance of nutrition education became more apparent during the hearings before the Senate Select Committee on Nutrition and Human Needs in 1969. The elderly were identified as a nutritionally vulnerable segment of the population of the United States (hearings before Senate Select Committee on Human Needs,

1969). Also, according to the Census of the Population (1980), this segment of the population is growing more rapidly than any other segment. In 1977, one person in 10 was age 65 with over with 4000 people becoming 65 daily (Hoare, 1982).

The Proceedings of the 1971 White House Conference on Aging reported concern for the needs of the aging population and made recommendations to improve the quality of the food supply with special emphasis on the low-income elderly. In 1972 the Congress enacted an admendment to the Older Americans Act of 1965, funding the nutrition projects for the elderly (Federal Register, 1979).

This Federal Register states,

> "The projects were designed to provide older persons aged 60 and older with at least one hot nutritious meal five or more days a week. Emphasis in the project to be placed on serving older persons with the greatest economic need, and on reducing the isolation of old age (p. 45032)."

The program also mandated nutrition for participants as a requirement, since those persons over 60 years often do not eat adequately because: (1) they cannot afford to do so; (2) they lack skills and or the facilities to cook properly; (3) they lack mobility to shop and to prepare food for themselves; and, (4) they may have feelings of rejection and lack the incentive to eat (Administration on Aging Annual Report, 1975).

Studies revealing the lack of nutrition knowledge among the elderly include Roundtree and Tinklin (1975), Shannon and Smicklas-Wright (1979), Kohrs (1979), Caliendo and Smith (1981), and numerous others. The Wheatheart Nutrition Project, Inc. (WNP) had short nutrition education presentations at each site on a monthly basis. These were led by the nutritionist (the investigator). Other speakers were scheduled when

available. While there was positive feed back from participants there had not been an analysis of nutrition education needs or a means to determine the effectiveness of past nutrition education. Planning for future nutrition education improvements pointed up the need to know the nutrition knowledge level of the participants, as well as their perceived needs, and what learning methods would be most effective.

Statement of the Problem

The problem was a lack of information for the assessment of the participant's learning needs and/or their interests and concerns. A recent consolidation with another nutrition program and the opening of a site in another area pointed out the need for improving the quality of nutrition education to meet the needs of so many participants. The nutritionists of the two programs had somewhat different approaches toward nutrition education. One nutritionist utilized more nutrition games (i.e. nutrition Bingo) while the other nutritionist had relied more on informal discussion, question/answer sessions, and slides with discussions. Therefore, information was needed on the participants' actual learning needs as well as their perceived needs and interests in order to plan for future effective nutrition learning experiences.

Purposes of Study

The purposes of this study were to (1) determine the nutrition learning needs of the participants of the WNP and (2) gain insight for developing learning experiences appropriate to their "actual" needs while meeting their perceived needs, interests and concerns. To accomplish these purposes, answers to the following research questesions were

needed:

1. What was the level of nutrition knowledge of the participants of WNP?

2. How did the participants perceive prior nutrition learning experiences?

3. What were the perceived needs and interests of all participant groups?

Assumptions

For the purposes of this study the following assumptions were made:

1. The subjects of this study are representative of the participants at most nutrition programs for the elderly.

2. A lack of nutrition knowledge is common among the participants of all program areas.

Limitations

Limitations of this study were that the only persons included were, (1) 60 years or older; (2) mentally and physically able to participate; (3) living in site areas served by WNP; (4) present and willing to participate on the day of the study. The sample used were intact groups, not a random sampling. Therefore, the findings may not be generalized to comparable nutrition programs. In addition to the above limitations, a diet recall was not a part of this study.

Definitions of Terms

The following terms are defined as they are used in this study.

Adult Education -- the process by which adults seek to improve

themselves or society, by increasing skill, knowledge, and/or sensitiveness; any process to help men and women improve (Houle, 1972, p. 229).

Andragogy -- the art and science of helping adults, as mature humans to learn, as opposed to pedagogy, the art and science of teaching children.

Lifelong learning -- the concept of education as a lifelong process, beginning at birth, and ending at death; a process related at all points to life experiences, full of meaning and reality to the learner, where the student is an active participant rather than passive.

Nutrition -- the act or process of nourishing or being nourished; the sum of the processes by which the human body takes in and utilizes food substances in the maintenance or repair of body tissues.

Nutrition education -- purposeful self-improvement involving some foods and nutrition learning for self or family through the use of carefully designed instructional aids and programs related to nutrition (Suter 1971).

Nutritionally adequate diet -- based upon 75 percent of the Recommended Dietary Allowances (RDA) of nutritients developed by Food and Nutrition Board of the National Research Council, and "furnishing the body with all of the nutrients necessary for growth and repair of tissues and the normal functioning of the organs" as related to age and sex (Krause and Mahan 1979, p. 30).

24-hour recall -- method of obtaining information concerning food and beverage intakes within the last 24 hours.

Principles -- comprehensive and fundamental laws, doctrines, or assumptions.

Organization of the Study

This report of the study is organized in five chapters. Chapter I introduces the study, presents the problem, purpose of study, research questions, assumptions, limitations, and definitions pertinent to the study. Chapter II includes a review of literature covering characteristics of the elderly, some of the theories on aging, elderly nutrient requirements, nutrition programs for the elderly, nutrition education needs of the elderly, and implications for nutrition educators from adult learning principles and methods. Chapter III reports on the methodology used in the study and includes the population and sample, the instrumentation, and procedures used for data collection and analyses. Chapter IV presents the findings of the study. Chapter V is a summary of the study, presenting conclusions and recommendations for further research.

CHAPTER II

LITERATURE REVIEW

"It has been said that of all of the people who have lived to be 65 years old since the dawn of human history, 25 percent are still alive" (London and Ewing, 1982, p. 230). Persons over 60 years represent the fastest growing minority in the United States today, this is supported by the fact that between 1900 and 1977 the normal life expectancy increased from 48.2 years to 72.8 years, while the over age 65 percentage of the population increased from four percent to 15.2 percent (Schaefer, 1980). With 4000 persons reaching 65 each day, it is predicted that by year 2030, one person out of five will be 65 or over, with the median age reaching 39 years (Hoare, 1982).

This is not a homogenous group and the people cannot be treated as such (Watkins, 1975; Todhunter, 1980). People over 60 are from every walk of life: all shapes, sizes and colors; incomes ranging from poverty level to the affluent; varied cultural and ethnic backgrounds, as well as education, intelligence, and mental alertness; women outnumber men 10 to seven; most older women are widows, while most older men are married (National Council on Aging, 1978). The common denominator is that all are dependent on nutritional care for life itself and for the quality of life (Todhunter, 1980).

Todhunter discusses aging as a physiological process continuing from birth to death, and points out that aging is not a disease. Rowe (1978)

and Weg (1978) also agree that illness is not synomomous with aging--people rarely die of old age. Watkins (1977) writes that most people over 60 years old die from disease or accident; very few live out documented life spans to die of old age (i.e. the longest documented life span for man is 113 years). Thus, death from disease or accident is actually a premature death.

Theories on Aging

There are many and diverse theories as to the causes of aging. In general it is believed to be a combination of processes (Weg, 1978). Weg discusses several theories. One theory is the genetic theory that says, due to a dysfunction of the genes, there can be an error in the DNA/RNA codes so that the production of faulty protein molecules and defective enzymes result in impaired metabolic efficiency.

Weg also noted the immunologic theory. As the immunologic functions of the body declines, the auto-immune reactions increase causing the body to attack itself, resulting in cell destruction.

After discussing other theories, Weg (1978, p. 115) reports "that most singular factor in aging is the progressive, intermolecular cross-linkage of collagen". This theory states that in aging organisms, the co-valent linkage of molecules form protein aggregates within the cell, disallowing normal functioning and thus cell destruction.

Whatever theory seems appropriate and acceptable, the breakdown and/or slowing of functions of the various body systems (i.e. renal, gastrointestinal, neuro-muscular, etc.) are often attributed to the aging of cells. With varying degrees, the elderly show physiological changes such as decreased lean body mass, increase in body fat, decreased

metabolic rate, lowered glucose tolerance, and the decline of renal function. However, Todhunter (1980) posits that all aspects of aging--physical, mental, and emotional--can be helped by improved nutrition.

Mayer (1975) believes that nutrition and aging interact in at least three ways: (1) aging, with decreased incomes, increased disabilities, and loneliness interferes with good nutrition; (2) malnutrition is involved in the development of diseases associated with old age; and, (3) the exact relationship of nutrition to the aging process is not fully understood. Watkins (1977) believes the physical problems are not due so much to aging as to disease. Watkins further describes the elderly as under-utilizers of health services and suggest that many have undiagnosed diseases and are totally untreated. He believes that these are the people who would benefit most from nutrition education. According to Weg (1978),

> . . .though not considered a theory, one of the most promising investigations has been the contribution of diet to the rate of aging. Nutrition has become a tool in the attempt to test some of the hypotheses. There remains the hidden hope that some nutritional intervention could "stay" the rate of aging. For many, the management of food may be the magic for everlasting youth and vigor (p. 9).

For the already aging, Albanese (1976) believes that even through some of the scars from past malnutrition cannot be eradicated, many others can be improved. Further advancement of the aging processes are slowed, while existing degrees of health and vigor are sustained and often improved.

Watkins (1975) set forth three principles as a means to optimum nutrition among those 60 years and over. Since each person compiles a unique history of disease and disability the principles are these:

> 1. optimum nutrition for each person 60 and more must be determined for that individual alone . . 2. diagnose and

> treat the underlying pathology while simultaneously improving the nutrient intake . . . 3. educate the elderly in the realms of health, nutrition, gerontology, and consumer protection (p. 8).

Elderly Nutrition Requirements

The Recommended Dietary Allowances (RDA) for the elderly are not well defined. After the age of 52 years, except for sexes, there are no further specifications made (Todhunter, 1980). Todhunter points out that the RDAs are intended as nutritional allowances for groups of healthy people and should not be used to evaluate individual diets; never the less, the RDAs are a useful goal for planning meals of the elderly individuals.

Schaefer (1980) notes that nutrient requirements for the elderly are assumed to be much the same as for the mature adult with the exception of calories, which must be decreased due to reduced energy expenditures. Schaefer (1980, p. 10) suggests the reduced calories may restrict nutrients so that optimal nutrition may not be provided and states, "There are wider variances for all biological needs in the aged as compared to the young because of the bodily insults sustained over a life time." Nutrient-dense foods must be consumed when calories are decreased. This is to prevent further deficiencies than may already be present due to faulty absorption in the aging individual. Shaefer indicates that obesity is believed to induce maturity-onset diabetes as well as other chronic diseases. However, he notes that obesity-induced diabetes can usually be controlled by a reduction in weight. A knowledge of nutrition is essential if the elderly person is to have an adequate nutrient intake while achieving proper weight control. Pao and Hill (1974) report:

> The elderly fall into two groups: (a) those who are eating enough food judging by calorie content and thus not approaching the recommendations for nutrients, particularly vitamin A, vitamin C, and calcium; and, (b) those who are eating more calories than recommended and who are doing better in terms of nutrients. Both groups need help to obtain a desirable balance of nutrients with energy (p. 99).

Schaefer (1980, p. 9) states, "without a doubt, the major diet problems among the elderly involve obesity and starvation." Shannon and Smicklas-Wright (1979) suggest that while the elderly have been designated as nutritionally vulnerable, their strength, health, and longevity depend on their choice of foods since diets low in quality and/or quantity may be responsible for chronic health problems. Often, there are a variety of interrelated contributing factors. In addition to the cultural, physiologic and economic problems, there is an inadequate knowledge of nutrition (Shannon and Smicklas-Wright, 1979; Caliendo and Smith, 1981).

Albanese (1976, p. 5) reports that obesity is " . . . a burden to the cardio-vascular system which accelerates degenerative disease and shortens the life span, . . . and is the most prevalent form of malnutrition." (Krehl, 1974) stated:

> . . . the problem of obesity substantially increases the difficulties of osteoporosis and rheumatic increases, which are commonly found in the elderly. Here again, excessive use of carbohydrate with a concomitant low intake of protein, may be a contributing factor in the problem" (p. 71).

Numerous studies have cited deficiencies in the diets of the elderly. The Preliminary Findings of the First Health and Nutrition Examination Survey (HANES) (1971-71) found that at least one-third of the elderly had inadequate intakes of calcium, iron, vitamin A, and ascorbic acid. The Ten State Survey (DHEW, 1972) had much the same findings, but also found protein deficient intakes in one-third of the elderly.

A desirable level of protein has not been agreed upon by researchers (Dairy Council Digest, 1977). While it is believed that the protein requirements of the elderly are not different than for younger adults, it is possible that a greater margin of safety is required to offset the higher frequency of ill health and the subsequent protein losses (Young and Scrimshaw, 1975). However, according to Todhunter (1980), the use of high quality protein foods--lean meats, milk and dairy products, and legumes--should be stressed in adequate amounts to meet the RDA rather than a diet extremely high in protein. One of the major functions of the kidneys is the elimination of the excess end products of nitrogen metabolism. An extremely high intake of protein places an increased stress on kidneys to rid the body of the excess waste products.

Calcium is essential to the ossification of bones. The skeletal structure is used as a reservoir from which the mineral may be withdrawn when dietary calcium is inadequate to meet physiological processes (Weg, 1978). Some of the specific calcium involvements include blood clotting, activation of the digestive enzyme pancreatic lipase, and as a regulator of muscle contractions, especially of irregular heart beats. Weg (1978, p. 42) cites Lutwak and Nordin in saying that, "Long-term dietary calcium inadequacy has been suggested as a principle cause for osteoporosis" and adds, "calcium (with flouride, phosphate, and vitamin D) is a critical metabolite in the pathology of osteoporosis." Albanese (1976, p. 8) reports that "calcium retention is adverserly affected by emotions, inactivity, or immobility which increases with age."

Iron deficiency anemia is a frequent problem in the elderly, resulting from dietary insuffiency, impaired absorption, or excess blood loss (Schaefer, 1980). Iron is essential in the oxygen carrying capacity

in cell respiration and in the development of red blood cells (Guthrie, 1975). According to Albanese (1976):

> . . . a combination of nutritional anemias may coexist in elderly persons, most often iron deficiency anemia and deficiencies of either folic acid or vitamin B_{12} or both. Folic acid deficiency may also be found in conjunction with ascorbic acid, since both of these vitamins are found in fresh fruit and vegetables (p. 8).

Schaefer (1980, p. 9) also reports that mental dysfunction occurs in folic acid deficiency in the elderly, "a significant correlation between mental assessment scores and low red blood cell folacin values."

Vitamin A has a vital role in the visual system of the body (Goodhart and Shils, 1978). Insufficient stores of vitamin A lead to a decrease in the formation of rhodopsin in the eye. Continued failure to ingest adequate vitamin A leads to decreased adaptation to darkness and, subsequently, to night blindness. It may also lead to a decrease in taste and smell (Guthrie, 1975). Vitamin A is important to healthy skin and mucous membranes. Weg (1978, p. 48) noted: "Low intakes of vitamin A was correlated with heightened incidence of nervous, circulatory, and respiratory diseases."

Vitamin C (ascorbic acid) was reported low in both studies. (HANES, 1971-72; Ten State, 1972). Ascorbic acid is important for its role in iron absorption, for collagen formation, for wound healing, and for its contribution to normal functioning of all cells (Goodhart and Shils, 1978; Guthrie, 1975; Todhunter, 1980; and Weg, 1978).

The foregoing brief discussion of nutrients has only considered some of the more common deficiencies prevalent among the elderly as indicated by studies. An increased intake of foods with these nutrients would also increase other nurients usually found to be in the same foods and thus result in overall improvement of the nutritional status of the invididual.

Sorenson and Ford (1981) point out another area in which the elderly are vulnerable. They are often susceptible to food misinformation, fad diets, and quackery in a search to find a miracle cure, or longevity, or freedom from pain, when these are not available from the medical profession. Sorenson and Ford suggest the use of such alternatives "may prevent the subscriber from seeking a 'bona fide' medical cure until a disease has advanced or is irreversible . . ." (p. 257). Watkins (1977) stated:

> . . . the great challenge is to reach those who are already old and those who are aging with already tested knowledge. . . .to find means for effectively immunizing . . . against misinformation emanating from faddists, quacks, psuedo-scientists and slick promoters of worthless commercial products" (p. 38).

Caliendo and Smith (1981) found that 46 percent of the participants in their study took vitamin and/or mineral supplements. Fifty-one percent believed that "healthy adults should take vitamin and mineral pills to be sure they are getting all of the nutrients for good health" (p. 31).

Knowles (1980, p. 84) stated, " . . . human beings have a driving need to be healthy, with the result that they are strongly motivated to invest millions of dollars in vitamin pills, patent medicines . . . ." Hoare (1982) believes that while more people are realizing that they have some control and must become responsible for their own health, "many Americans continue to engage in health destructive behaviors, perhaps believing that medical science can cure anything" (p. 59). This attitude allows the individual to avoid having to deal with the consequences of his own actions. Hoare cites Reiff (1974), Glover (1979), and Williams (1976) for their indictment of . . .

> . . . professionals for fostering such behaviors by perpetrating delivery systems in which consumers remain captives of a therapeutic network which does little to augment an appropriate knowledge base or an effective utilization of professional

services (p. 59).

Hoare continues:

> . . . adult education could have a viable future in the reduction of public anxieties about health services. . . . learning endeavors should emphasize preventive health maintenance and care. As the number of elderly increase in future years, the special health problems of aging will demand additional attention (p. 59).

Nutritionists are in a position to coordinate nutrition education with other health education efforts, since nutrition education plays such a vital role in health status. One of the places that such education should take place is the centers of the nutrition programs for the elderly (Lofton, Stratton and Crisp, 1975).

Nutrition Programs for the Elderly

The Nutrition Programs for the Elderly were implemented as an attempt by Congress to help correct the nutritional vulnerability of the elderly. The purpose of the National Nutrition Program is to secure for older persons who do not eat adequately, the delivery of low-cost, nutritionally sound meals, served in congregate settings (Administration on Aging, 1975). Nutrition education was mandated in program regulations as a necessary compliment to the program because "providing one nutritious meal a day is not enough" (Lofton, Stratton, and Crisp, 1975, p. 6). It is important for older people not only to know what makes a meal nutritious but also how to provide adequate nutrition in home prepared meals. The nutrition programs serve hot meals five days a week. Menus are planned by a nutritionist using the Nutrient Standard Method (1975) of the RDAs. Menus are monitored for protein, vitamin A, vitamin C, thiamine, riboflavin, niacin, calcium, iron, and phosphorus. Energy and fat are limited to provide a higher nutrient per calorie ratio.

The success of the meals program for improving the nutritional status of the participants has been documented by recent studies. Kohrs, O'Hanlon, Krause and Nordstrom (1979, p. 537) state: "A major factor enabling older Americans to maintain their nutritional health and thus to remain independent is their ability to obtain nutritionally adequate meals." Kohrs (1975) reported a nutrition study of 466 elderly subjects revealed participants had higher intakes of energy, protein, and calcium than non-participants. Kohrs found low blood levels of vitamin A in 50 percent of the non-participants as compared to four percent of the participants. Low values for ascorbic acid were found in non-participants four times as often as in participants. Participants reflected better blood values for all nutrients than did non-participants. Those participants above 75 years of age consumed a larger proportion of the total day's protein, calories and vitamins A and C from the program meal.

The role of nutrition is important in that it is not only a way to improve both the health and quality of life for the older adult, but is also a factor in delaying the aging process. Nutrition is an environmental factor subject to intervention (Caliendo, 1980). Caliendo and Batcher (1980) found the mean intake for all nutrients, except protein to be greater for participants than for non-participants in a study of 73 subjects. Kohrs (1979) found significant correlation between participation and vitamin A and C nutriture as well as improved intakes of riboflavin and thiamine. Caliendo and Smith (1981, p. 71), in a study of 169 senior citizens, found that ". . . analysis of food records revealed that for many participants, the meal eaten at the site was not only the main meal of the day, but was often the only meal." They felt this added emphasis to the importance of the nutrition program to the

needs of the people, especially those with limited incomes. Caliendo (1980, p. 36) found "the mean percent of the total day's intake provided by the meal program for all nutrients was 44 percent or greater while for many it was 50 percent or more." This leaves those who eat only one meal extremely deficient in nutrients, however for those having one or two light meals at home, the program has made a significant contribution.

Singleton, Overstreet and Shilling (1980, p. 88) found "participation in the congregate meals program did not assure an adequate daily nutrient intake." In their study of 97 non-institutionalized elderly females, the mean intake of nutrients was 65 percent of the RDAs except for vitamin B_6. While participants had higher nutrient intakes at the noon meal, the non-participants had a similar nutrient intake daily overall, except for vitamin A. They believed this was due to the fact that the site meal on the day of the study included liver. Goodman (1974) had previously observed similar results. However, as Caliendo pointed out, while the program meals are planned to include a minimum of one-third of the RDAs for the given nutrients, the meals often supplied 40 to 50 percent, and "thus the Title III Meal Program offerred an important way to improve the nutrient intake of the elderly population" (p. 36).

The meals programs are seen to have a leveling effect on the other factors that adversely affect the dietary intake of the elderly such as less education, restricted income, loneliness, and shopping difficulties (Caliendo, 1980; Kohrs, 1979). The evidence from all studies point to the need for effective nutrition education. The programs that are so successful in improving nutrient intakes have so far failed to achieve effective nutrition education. Efforts are being made as specified

by Cogress. The problem is that studies indicate that learning is not taking place, even though nutrition education programs are being presented.

Nutrition Education for the Elderly

The American Dietetic Association Position Paper (1980, p. 597) on a national nutrition policy states in goal seven, "Nutritional services and education should be integrated into health, education, and social service delivery systems." In response to a request for comments on "National Guidelines for Health Planning" the American Dietetic Association (1980, p. 597) suggested the following goal: "to emphasize the need for nutritional care and nutrition education as one of the top priority concerns in every health systems agency and state planning and development agency." In 1970 the American Dietetic Association issued a position paper on nutrition and aging, which stated:

> . . . helping the aging resist being influenced by food faddism and food misinformation by: Counseling and teaching both individuals and groups of senior citizens, in their homes, and in institutions the importance and need for eating good food and an adequate diet (p. 448).

Basically the objectives of the nutrition education component of the program are:

> --to learn more about appropriate nutrition
> --to understand how to buy and prepare food economically
> --to come to regard regular cooking and eating habits as worthwhile (Carlin, undated, p. 31).

Leong (1970, p. 4) stated, "there is no better substitute for prevention of illness than promoting good nutrition in the home." Kohrs (1979, p. 546) wrote, "nutrition education should be provided on a consistent basis."

Those studies that documented the effectiveness of the nutrition

programs as being a positive intervention for improving the nutritional status of the elderly, also documented a low level of accurate nutrition knowledge of the participants. Caliendo and Smith (1981) found nutrition knowledge scores were negatively correlated with program participation, when it was expected that knowledge should have improved. Caliendo and Smith (1981), utilizing a 10 statement knowledge test, found the mean among the participant subjects to be 5.8. Dillaway (1981) reported a lack of knowledge of sources of vitamin A, thiamine, and the Basic Four Foods groups, though they were able to name sources of iron and vitamin C. However current knowledge did not influence the subject's consumption patterns. This fact is also reflected in the May 24, 1979, CNI Weekly Report, (p. 4), that a "gap exists between knowledge and action, between what Americans know about diet and exercise and what they actually practice." This is also confirmed by Caliendo and Smith (1981) who found that participants with higher scores and a higher rating of health importance often had less adequate diets.

Almost without exception, the literature reviews of other groups of elderly citizens reveal similar low nutrition knowledge scores. Roundtree and Tinklin (1975) surveyed 104 senior citizens, 60 years of age or older with 20 general questions about normal nutrition. Knowledge was generally low with 75 percent or more answering only 35 percent correctly. They also found present knowledge was not always applied to food practices, thus identifying the need for motivation and assistance in the application of knowledge and for additional information.

Grotkowski and Sims (1978) reported only six percent of their subjects had scores of 75 to 80 percent. In a self-evaluation of nutritional knowledge, the mean was 4.8 on a scale of one to 10. Sixteen

rated themselves with having almost as much knowledge as a professional dietitian, though none had a perfect score. In this study, nutritional knowledge was positive to the "nutrition is important" attitude and negative to "misconceptions about weight reducing diets" and the belief that "food supplements can be used as medicine."

While most studies are emphatic as to the need for nutrition education, few studies present effective methods for delivery of nutrition knowledge that will lead to a behavioral change in food patterns. Mitic (1980) conducted a study of the effectiveness of a Nutrition Instruction Model (NIM) based on principles of Activated Health Education (Darwin, 1977). This study consisted of eight, one-hour workshops over a four-week period, with two sessions per week. The study included 75 subjects classified as inadequate eaters as evidenced by a 24-hour recall at the start. Results at the end of the instruction period showed improved 24-hour recalls as did subsequent recalls six week later.

Wong, Krondl and Williams (1982) reported on a three-year food behavior study, including a nutrition intervention program over a period of six weeks to maintain or improve dietary practices of the urban elderly living alone. The changes for improvement were minimal in the participant group, however, there were fewer negative changes in the participant group than in the control group. Also the study demonstrated that seniors' dietary behavior is not fixed, but rather, there is a continuous process of change, requiring the attention of nutritionists.

Sorenson and Ford (1981) report on a one-day, seven-hour workshop series presented at various locations in rural areas by a team of health care specialists. Participants evaluated the one-day workshop quality as above average. Two weeks later, returned mail questionnaires indicated

positive dietary changes as a result of attending the workshop.

Fee and Tseng (1982) have developed a "Mini" nutrition slide presentation for use in the elderly nutrition programs. The five to 10 minute mini-demonstrations have met with a positive reaction from the elderly participants. This type of nutrition education was reported as adaptable to the programs due to the short time frame required and the short attention span often observed in the older adult.

Williams (1982) conducted a study to develop a practical needs assessment technique utilizing the case study approach with evaluation by the participants. The case studies, planned for a short time frame, depicted one case per slide of typical problems of the older consumer: the confusion of choices to be made at the super market; a problem at the cash register with too many purchases and too little money; and, results of eating patterns, such as the overweight woman and a slender woman with their plates at a church picnic. The viewers were shown the slides without prompting, and given as much time as desired for commenting on the slides. Williams found: "Overall participation for the three slides was extensive and rich in detail, perceptive, and most revealing" (p. 81). The discussions lasted from 10 to 14 minutes with no comments from the researcher. While in this incident, the case study was used for a needs assessment of participants' interests, concerns, and attitudes, this approach was recommended as a basis for nutrition education discussions to help participants to solve the same problems for themselves.

The large number of studies reflecting low scores and poor eating habits, suggest a need for improving teaching methods. Attitudes and

values that have developed over a life time are hard to change, but older adults "are hardly set in their ways" (Media and Methods, 1980, p. 18). They have lived through more social and technological change than any other group in history. Havighurst (1953) believes that "readiness to learn" is associated with life situations or social roles and that a person will learn those things he believes will help him meet his needs.

Principles of Adult Learning Methods

If nutrition educators are to be effective communicators of nutrition information, they need to consider some of the principles of how adults learn--"basic adult education practices that encourage and support the learning process in mature adults" (Lofton, 1975, p. 6). One of the first principles of adult education is that adults maintain the ability to learn. Knowles (1980, p. 55) states: "The central proposition on which the entire adult-education movement is based is that adults can learn."

Thorndike's (1928) research revealed that the learning ability of older adults was only slightly diminished from that of the younger adults. According to Birren (1964), changes with age in the primary ability to learn are small. Most differences are more readily attributed to other processes such as perception, motivation, and physiological state.

Horn and Cattell's (1966) study revealed the ability to learn increased to age 50, and then only slightly decreased to age 80, when there was a rapid decline. This does not mean at age 80, the adult forgets or becomes senile. However, since the population over 75 years of age is increasing rapidly, the nutrition knowledge implanted before

this age is reached helps the quality of life to remain as fruitful as possible.

Senility is not automatic with old age. Less than six percent of the 25 million elderly Americans experience any type of intellectual problems (Morgan, 1982) or about three to four million persons. Of this group "only a small portion are so debilitated that they can no longer care for themselves or remain in their own homes. In spite of these facts, many people still believe senility is inevitable" (Morgan, 1982, p. 6). Morgan continues:

> Many encouraging facts . . . have come to light in recent years . . . oxygen and blood flow through the brains of older people is no different from the rate found in healthy young adults . . . It is a myth that hardening of the arteries . . . comes with advancing age. . . tests of brain activity which suggest that the healthy aged brain works just as hard and as efficiently as the healthy young brain. . . maintain--and sometimes even raise--the level of their intellects as they grow older (p. 6).

While adults do maintain the ability to learn, reaction time is slower, so that the speed of learning is reduced. Observers often mistake the slowed reaction time as an inability to learn (Shore, 1976). If the educator will allow time, the older adult will absorb more of what is being said. It is important to treat the learners as adults rather than using methods that are suggestive of their grade school days (Knowles, 1980).

Pedagogy or Andragogy

Since adults have a different orientation to learning from that of children the adult educator should have a different orientation to learning than that of a child educators (Knowles, 1981). Pedagogy is the art and science of teaching children, whereas andragogy is the art and science of helping adults learn (Knowles, 1981). Andragogy is a

relatively new term, coming from the stem of the Greek word "aner" meaning man, as distinguished from boy. Pedagogy says that children are to be taught what they should know, that they are empty vessels waiting to be filled. Andragogy recognizes that the adult is full of a lifetime of experiences and that he has other responsibilities and interests. He also must perceive the learning to be of benefit to his needs if he is to invest time in its pursuit. Knowles (1980) states:

> In andragogy the starting point in programming is always the adults interests even though the end objective may be to meet their "real" needs. . . .the highest expression of the art . . . is skill in helping adults discover and become interested in meeting their real needs. . . . for adult educators to have a chance to practice this art, they have first to reach their learners through their "felt need" or "interests" (p. 82).

The educator errs in determining what should be taught, without first making an assessment of the interests and concerns of the participants and what they think they need to learn. Knowles sees this as a determinant of whether the program is vibrant and flourishing or is one of apathy and unconcern.

Andragogical Assumptions

Andragogy employs five main assumptions about adults, that differ from pedagogy. These assumptions are basic to the principles of adult learning. They are as follows: changes in self-concept; role of experience; readiness to learn; orientation to learning; and, motivation to learn (Knowles, 1978).

Changes in Self-concept

This assumption is that "as a person grows and matures his self-concept moves from one of total dependency (as is the reality of the

infant) to one of increasing self-directness" (Knowles, 1978, p. 55). As the person takes responsibility for his own learning and as he experiences success in achieving new goals, he gains confidence and self-directedness. "People who have been self-sustaining for six decades or more do not want to be reeducated, but they may respond to practical help in adjusting to their changing life styles and concerns" (Pelcovits, 1973, p. 6). Knowles (1980) states:

> "The adults' self-concept of self-directivity, is in direct conflict with the traditional practice of the teacher telling the students what they need to learn. Indeed it is in conflict with the social philosophy that society has a right to impose its ideas about what they need to learn . . . They are more deeply motivated to learn those things they see the need to learn (p. 47).

Therefore, the fact that the nutrition component is mandated by congress may cause participants to feel ambivalent about nutrition education even though they are truly interested in better health. Lofton (1975) points out that involvement in nutrition education sessions is not a prerequisite for participation in the nutrition programs. Health is a focal concern to older persons as they attempt to remain independent and self-sufficient. Once the relationship between health and nutrition is established in the minds of the older adults, they will become more eager to learn (Lofton, 1975). Grotkowski and Sims (1978) suggested that the high incidence of health food purchases reflects a concern for health and diet.

Role of Experience

This assumption says that the experience of the learner is a major resource in the learning situation (Knowles, 1978). Knowles also states:

> ". . . As an individual matures he accumulates a reservoir of knowledge . . . to become a rich resource for learning . . . a base to which he can relate new learning . . . to an adult, his experience is who he is . . . any situation in which the

> adult's experience is being devalued or ignored the adult perceives this not as rejecting his experience, but as rejecting him as a person" (p. 56).

New learing is most effective when related to past experiences. An educator conveys his respect for people by making use of their experience as a resource for learning (Knowles, 1980). Knowles also stated:

> People attach more meaning to the learning they gain from experience than to that acquired passively . . . primary techniques in education are experiental techniques--laboratory techniques, discussion, problem solving cases, simulation exercises, field experiences, and the like (p. 44).

William (1982) used the case study with problem-solving techniques to motivate interest and interaction among participants.

Readiness to Learn

Havighurst (1953) saw readiness to learn as the result of the developmental tasks associated with the social role of a particular phase of adulthood. Among tasks associated with the later maturity is that of adjusting to decreasing physical strength and health. One might add the task of maintaining health, adjusting to fixed incomes, and living alone, as well as the problems of shopping and cooking so that one eats adequately. Havighurst also discusses the "teachable moment". This he describes as a time when one's motive to learn is intense and education is extremely important. For the older adult this might be when his physician tells him some alarming news about his health. He would suddenly need to learn more about the condition, how it may be improved and how to live if it requires change in life styles, as well as what foods will help or harm him. Often these incidents provide a teachable moment, not only for himself but for his peer group as well. However, as stated elsewhere, if his self-esteem is low, and if the message is too

strong, he may avoid doing anything (Leventhal, 1973).

Orientation to Learning

This assumption says that adults tend to be problem-centered in their orientation to learning. To the older adult, learning is problem-centered and requires an "immediacy of application" (Knowles, 1978, p. 58). The child's orientation to learning is subject-centered with post-poned application, whereas the adult has a limited time available or remaining for learning. The value of new learning is found in its practical and immediate use. The adult wants to apply the knowledge gained today to living tomorrow (Knowles, 1978).

Houle (1961) described the adults who attend education activities as three types of individuals:

--the goal oriented, or those with a particular goal in mind that the learning activity would help solve;

--the acitivy oriented who need social interaction and to meet people;

--learning oriented, those who need to satisfy a desire for knowledge and a desire to learn about more things.

Those who attend the nutrition center fall into these same categories. For some, the goal is for a balanced meal that will help them to eat better and learn something about food and nutrition. For many, the program provides a social activity and the chance to be with others - the social aspect of the program is almost as important as the meal. These people are often the ones who volunteer and are activity or socially oriented. The learning oriented are those who may come up and ask questions afterward, wanting to learn more.

Motivation to Learn

This assumption says that adults are motivated to learn by a variety of factors. Pedagogy makes use of external rewards and punishments, where as andragogy assumes internal incentives, curiosity and self-concept. Tough (1971) investigated what and why people learn. He found the large majority anticipated several desired outcomes and benefits to result. Tough discovered some of the benefits to be immediate: satisfying a curiosity, enjoying the content itself, enjoying practicing a skill, enjoying the activity of learning. Other benefits are long-run: producing something, imparting knowledge or skills to others, understanding what will happen in some future situation. Tough found pleasure and self-esteem to be critical elements of motivation. Also, in each case, the adult had a personal value as a motive for learning.

Tough (1979, p. 9) described a "learning project as a deliberate effort to gain or retain certain definite knowledge and skill, or to change in some other way." The most common motivator was some anticipated use or application. Tough also discovered that 90 percent of all adults enegage in at least one major learning project each year, and that age was not a factor. Thus the nutritionist must compete with many interests in an attempt to motivate interest in learning about nutrition. Tough says there is a pattern that most self-learners seem to follow in organizing their learning projects: (1) clarifying a general problem or issue; (2) becoming aware of the need to learn or deciding to begin a learning project; and (3) generating long-term objectives and identifying resources.

Shannon and Smicklas-Wright (1979) discussed behavioral changes of

adult dietary patterns as only being accomplished through a multiplicity of steps. They credit Leventhal (1973) with the method for bringing about change in adult behavior related to health:

> Creating a motive to change . . . involves providing clear informatioin on the threat or harm that may befall one if change does not occur. Creation of an action structure requires specification of a desired response with a clear statement of its value and detailed spelling out of the steps that must be taken in changing behavior. Weak, rather than strong messages were recommended, because the latter may inhibit change, when they emphasize the vulnerability, if the individual subject has a low self-esteem (p. 86).

According to Shannon and Smicklas-Wright (1979), the nutritionist or health educator should heed the last point above. Research has shown that, for the elderly, the high-anxiety information may be an excuse to avoid taking action or changing behavior. When dealing with the elderly it is necessary to create a motive for change through focusing on the positive influence of a good diet, rather than the negative aspects of a bad diet. Shannon and Smicklas-Wright also point out that "health is a good source of motivation since it is a recurrent theme in elderly concerns" (p. 88). Thus perhaps Leventhal's methods may be appropriate to stimulate the self-learner (in this case the participant) as described by Houle and Tough.

Some of the other principles of adult learning are discussed in addition to the assumptions of andragogy. These include: adults are a highly diversified group, physical/sensory capacities do change, active learner participation, and a comfortable supportive environment.

Adults are a Highly Diversified Group

This principle is that adults are a highly diversified group of individuals with widely differing preferences, needs, backgrounds and

skills. If individual differences are important in dealing with children, they are even more important when working with adults because the differences widen with experiences and years. Knowles (1978) believes there is as much diversity among adults as there are differences in children. Their needs are as diverse as their differences. They come from all walks of life, all backgrounds, cultures, and professions with a wide assortment of attitudes, values and interests. Todhunter (1980, p.1) discussed the diversity of adults as has been previously mentioned, but went on to say ". . . that meeting the needs of every individual does make a difference and should have a high priority in every program for older Americans".

Physical/Sensory Capacity Changes

Adults experience a gradual decline in physical/sensory capabilities. These decreased capacities contribute to the slower reaction time required for learning to take place. All sensory capacities gradually deteriorate with age (Carter, 1981). The slowed reaction time is due to the physiological changes in the central nervous system, especially in the auditory and vision capacities.

A gradual hearing loss begins about 20. By age 65, more than half of all men and a third of all women have a significant hearing loss (Carter, 1982, p. 20). "Severe hearing impairment for older adults affects them psychologically". As communication problems increase, feelings of isolation develop, so that people are separated from each other.

Visual capability declines from the forties on; by age 65, about half of all people have a visual acuity of 20/70 or less, which is five times higher than at age 45 (Shore, 1976). With aging, the lens of the

eye thickens and starts to yellow, becoming opaque and thus preventing light from filtering into the eye.

Other senses are likewise affected as one ages. Gustatory and olfactory senses are affected by age, with most persons over 60 having lost 50 percent of their taste buds. The sense of smell is closely related to taste, but is also related to the ability to see (Shore, 1976). Ordinarily most persons are not aware of kinesthesia, or the spatial sensations and perceptions. Shore noted that neurological and neuromuscular dysfunction appears and muscle strength changes. As the physiological changes take place, the sense of balance is affected, with dizziness and "buzzing" in the ear and less spatial orientation. All of the above situations require special attention in order to compensate for the disabilities if the participant is to learn. Carter (1982) states:

> Speed of learning involves reaction time to perceive the stimulus, time to transmit and register the message, and response time to carry out the action. This process of input, through-put and output may take older adults longer to perform. . . . all the past experiences and learning they have stored in their brains . . . should take longer to process. This is normal. The power, ability, and efficiency to learn remain stable. Only the rate slows as a natural process of the slowing down of the central nervous system (p. 21).

Carter believes the physiological changes bringing about the lessened speed of reaction and the declining sight and hearing "need to be understood in order to properly facilitate learning so that sterotypes about older adults, which may interfer with their ability (psychologically) to learn, may be overcome" (p. 21). Carter claims that hearing aids do not denote senility any more than wearing glasses does.

Active Learning Participation

Active learner partipation in the instructional/learning process

contributes to learning. Knowles (1978) believes that when a learner has active participation in the instructional/learning process the learner takes more interest in learning. An authority figure--the teacher, the programmer, the trainer--is in conflict with the adult's need to be self-directing. Knowles states:

> . . . a mechanism must be provided for involving all parties concerned in the educational enterprise in its planning." "One of the basic findings of applied behavioral science research has shown that people tend to feel committed to a decision . . . in direct proportion to their participation. . . in planning and decision making (p. 118).

According to Lofton (1975), keeping open to suggestions from the group is essential. Lofton states:

> Adults learn best when they are involved actively in the process of learning. Older people are not children; they have maturity gained through 60 plus years of rich and varied experience. . . the experiences of each other (p. 6).

A Comfortable Supportive Environment

This principle states that a comfortable supportive environment is a key to successful learning. An environment must first meet the creature comforts. The nutritionist can do little to change the physical setting at some of the sites which are sometimes crowded and have poor accoustics. However, a warm supportive climate includes more than the physical setting. Knowles (1980, p. 47) believes the "psychological climate should be one which causes the adult to feel accepted, respected, and supported; in which there is a feeling of mutuality between teacher and students." Knowles (p. 47) also believes "the behavior of the teacher probably influences the character of the learning climate more than any other single factor. . . "

It is important for teachers to take the time and trouble to get to

know the students, calling them by name, and respecting their contributions by really listening to what they have to say. Knowles points out "People tend to feel more 'adult' in an atmosphere that is friendly and informal, in which they are known by name and valued as unique individuals" (p. 47).

Summary

The rapidly increasing population of older Americans is a highly diversified group of individuals with widely differing preferences, needs, backgrounds and skills. The diversity exceeds the likenesses. The commonalities of the group are basically found in the area of needs and concerns about health, security, and longevity. Adequate nutrition is basic to health, therefore accurate nutrition information is basic to obtaining a balanced diet and to the avoidance of malnutrition, whether it is due to over-eating or to failure to eat enough food. Nutrition, then is vital to life itself as well as to the quality of life (Todhunter, 1980). Theories on aging lose some of their relevance, in light of the fact that most persons die of disease rather than old age, almost never living out their normal life span. There is a dearth of nutrition knowledge extant in the elderly who look to medicine, to health foods and diet fads, and often to the miracle cures from quackery and those who prey on their fears and concerns. Many of the olderly remain ignorant of the advantages of a well-balanced diet as a means to better health and well being. The nutritionist can apply adult learning theory to nutrition education of the elderly. Andragogical methods may succeed where other methods have been less effective. Lindeman (1926, p. 9) wrote "the resource of highest value in adult education is the learner's

experience. If education is life, then life is also education". Knowles (1978) credits Lindeman's key assumptions about adult learners as foundations of modern adult learning theory, because they have been supported by later research. As such, they summarize the principles of adult learning that are applicable to the elderly nutrition program participant:

1. Adults are motivated to learn as they experience needs interests that learning will satisfy; therefore, these are the appropriate starting points for organizing adult learning activities.

2. Adult orientation to learning is self centered; therefore, the appropriate units for organizing adult learning are life stiuations, not subjects.

3. Experience is the richest resource for adult learning; therefore, the core methodology of adult education is the analysis of experience.

4. Adults have a deep need to be self-directing; therefore, the role of the teacher is to engage in a process of mutual inquiry with them rather than to transmit his or her knowledge to them and then evaluate their conformity to it.

5. Individual differences increase with age; therefore, adult education must make optional provisions for differences in style, time, place, and pace of learning (p. 31).

CHAPTER III

METHODS AND PROCEDURES

The purposes of this study were to (1) determine the nutrition learning needs of the participants of the WNP; and (2) gain insight for developing learning experiences appropriate to their "actual" needs while meeting their perceived needs, interests and concerns. To accomplish these purposes, answers to the following research questions were needed:

1. What was the nutrition knowledge level of the participants of WNP?
2. How did participants perceive prior nutrition learning experiences?
3. What were the perceived needs and interests of all participant groups?

This chapter describes the research design. Sections included are:

1. Population and sample,
2. Instrumentation,
3. Collection of data,
4. Analysis.

Population and Sample

The population studied was the participants of the Wheatheart Nutrition Program, Inc., located in four counties in northern central Oklahoma. Permission for conducting the study at the WNP sites was

requested from the Project Director. (See Appendix A for a copy of the letter). This request was granted in Riddle's letter (See Appendix B). The studies were conducted during the nutritionist's regular site visits during the month of January 1984. The original programs, prior to consolidation were the Kay-Noble Nutrition Program and the Garfield Nutrition Program, named for the respective counties. The congregate meal sites are located at Garber, Enid (two sites), and Waukomis, all in Garfield county. Sites in Kay county are at Blackwell, Newkirk, Ponca City, Tonkawa, and White Eagle. Noble county has a site at Perry. After the consolidation of the two programs, the name was changed to Wheatheart Nutrition Project, Inc. A newly opened site included in this study is situated in Blaine county at Geary. The division of groups for this study was thus the area of the original programs before consolidation: Blaine, Garfield, and Kay-Noble.

The sample for the study were those persons who were (1) over 60 years old; (2) live in a site area served by WNP; (3) mentally and physically able to participate; and, (4) present and willing to participate on the day of the study. The sample used in-tact groups, it was not a random sample. The findings, therefore, may not be generalized to other individuals attending comparable nutrition programs.

The study was announced on previous days so that participants would plan to participate if they so desired. They were told the reasons for the study and the importance of the study to the program. The Blaine county group was the newest site and also the only site where nutrition education had not been started prior to this study.

Instrumentation

An extensive liteature search and the reviewing of numerous other instruments preceded the development of the questionnaire used for this study. The instrument was designed to meet the purposes of the study, by providing information leading to the answers to the research questions. Field testing led to further refinements in the final questionnaire. The instrument (Appendix C) used was a six-page questionnaire including the following sections.

1. Nutrition interests and attitudes toward the WNP.
2. Demographic information.
3. Nutrition knowledge test.

Permission was granted for the use of a portion of a nutrition test developed at Oklahoma State University by the Food, Nutrition, and Institutional Administration. See Appendix D for a copy of the request letter and Appendix E for a copy of the letter granting permission to use part of the test. This tests consists of 25 statements to be answered true/false and five discussion questions. Added to the test were 11 questions on food sources for seven essential nutrients and the basic four foods groups. The nutrients used were chosen because they were the ones most often found to be lacking in the diet of the elderly according to the Ten State Survey (1972) and HANES (1974) as well as other smaller studies.

4. Principles of older adult learning relative to nutrition education, including 12 positive statements to be checked strongly agree, agree, disagree, or strongly disagree.

The instrument was field tested on five persons including three older adults unable to be present for the study, a consultant dietitian for another nutrition program for the elderly, and another person not

involved in the programs.

Collection of Data

The data collection took place at the various WNP sites. The questionnaires were distributed to the participants in group setting providing a face-to-face situation. Directions were given orally for completing the questionnaires. Participants were allowed to work at their own speed. The investigator was available to answer questions and clarify points. Assistance was also given by site managers who were given prior instructions so that participants would not be led or biased. The site managers also assisted those persons with visual impairments. This method helped to avoid bias that could not have been controlled with a mailed questionnaire, since site participants often ask help with almost any kind of form to filled out. The participants were asked to make their answers their own and not to discuss the answers with their neighbors.

Analysis of Data

Analysis of data consisted of frequency counts and percentages. T-tests were calculated on the group means of the three country groups, Blaine, Garfield, and Kay-Noble to determine whether differences were significant or more likely due to chance.

CHAPTER IV

RESULTS AND DISCUSSION

The results of the nutrition education study conducted in the WNP are presented in this chapter. The purposes of the study were to (1) determine the nutrition learning needs of the participants of the WNP; and (2) gain insight for developing learning experiences appropriate to their "actual" needs while meeting their perceived needs, interests and concerns. Discussed in this chapter are:

1. Response Rate
2. Population and Demographics
3. Results of Questionnaire
4. t-Test Analysis
5. Observation

Response Rate

The number and percentage of respondents from total attendance per site for the day of study are presented in Table I. A total of 298 subjects attempted to participate in the study. Of this number, 21 questionnaires failed to include usable information. Two of the remaining 277 completed only the first two pages. Many of the participants omitted some of the questions, thus most of the tables report only the actual number of responses per question.

TABLE I

RESPONDENTS BY SITES PER COUNTY GROUP AND BY PERCENTAGES'OF TOTAL ATTENDANCE DAY OF STUDY

Blaine County			Garfield County			Kay-Noble		
Site	N	Percent*	Site	N	Percent*	Site	N	Percent*
Geary	21	45.7	Enid Hoover	36	42.4	Blackwell	37	49.3
			Southern Heights	13	54.2	Newkirk	39	61.7
			Garber	19	82.6	Ponca City	38	62.7
			Waukomis	9	37.5	Tonkawa	25	34.4
						White Eagle	17	47.2
						Perry	21	61.3
Total	21	45.7		77	49.4		177	55.3

* Percentages indicate the percentage of response from the total attendance on the day of the study.

TABLE II

DEMOGRAPHIC RESPONSES OF PARTICIPANTS BY COUNTY GROUPS

Category	County						Total/Percent				Combined	
	Blaine		Garfield		Kay-Noble		Sex					
	Sex		Sex		Sex		M		F		M/F	
	M	F	M	F	M	F						
	N	N	N	N	N	N	N	%	N	%	N	%
Age												
60-69	0	4	9	16	18	37	27	10.0	57	21.0	84	30.0
70-79	4	8	13	24	27	58	44	16.0	90	33.0	134	48.0
80-89	3	2	7	9	16	20	26	9.0	31	11.0	57	21.0
90+	0	0	0	0	1	1	1	.4	1	.4	2	.7
Total Response	7	14	29	49	62	116	98	35.0	179	65.0	277	99.7
Live Alone												
Yes	1	9	8	28	24	77	33	11.9	114	41.2	147	53.1
No	6	5	21	18	35	36	62	22.0	59	21.3	121	43.7
No Response	0	0	0	3	3	3	3	1.1	6	2.2	9	3.2
Total	7	14	29	49	62	116	98	35.4	179	64.6	277	100.0

Population and Demographics

Demographic responses are reported in Table II. Females outnumbered males 179 to 98 or 65 percent females and 35 percent males. This compares to the 10 to seven female-male ratio or 59 percent females to 41 percent males reported by the National Council on Aging (1978). The largest sector according to age was the 70 to 79 years group with 48 percent including 44 males and 90 females. The next largest group--30 percent were the 60 to 69 years group with 27 males and 57 females. Twenty-one percent of those responding represent the 80 to 89 years group, with 26 males and 31 females. One male and one female reported from the 90 years plus group.

Responses to "do you live alone?" (Table II) revealed that 53 percent or 147 persons live alone as opposed to 44 percent or 121 who did not live alone. Females living alone outnumbered men 114 to 33. This compared with the National Council on Aging (1978) report which stated that more women are widows and more men are married. The number of men and women who did not live alone in this study were 62 men and 59 women or 22 and 21 percent respectively.

Responses to "sources of income," as reported in Table III, indicated that over one-half (56%) of respondents depended entirely on Social Security income. Ten percent had retirement and/or pensions in addition to Social Security. Eight percent reported Social Security and savings. Seven percent reported only retirement or a pension. Five relied on savings alone.

Attendance

Attendance at WNP is reported in Table IV. The most frequently

TABLE III

SOURCES OF INCOME BY COUNTY GROUP

Income Sources	County Group			Total	Percent
	Blaine N	Garfield N	Kay - Noble N	N	
Social Security	8	39	109	156	56.3
Retirement/Pension	2	4	14	20	7.2
Welfare	0	1	0	1	0.4
Private	1	3	3	7	2.5
Savings	0	6	8	14	5.1
Soc. Sec. + Retire/Pension	3	10	15	28	10.1
Soc. Sec. + Welfare	0	2	6	8	2.9
Soc. Sec. + Private	0	1	3	4	1.4
Soc. Sec. + Savings	0	9	13	22	7.9
Soc. Sec. +SSI	0	0	3	3	1.1
SS + Ret/Pens or Savings	1	0	3	4	1.4
SS + Welfare + SSI or VA	0	0	1	2	0.7
No Response	6	2	0	8	2.9
Total	21	77	179	277	99.9

* More than one response

TABLE IV

RESPONSES TO ATTENDANCE AT WNP PROJECT BY COUNTY GROUP

Attendance	County Group			Total	Percent
	Blaine N	Garfield N	Kay - Noble N	N	
Reasons for:					
Friends	7	19	26	52	13
Good Food	5	13	36	34	9
Affordable	7	10	28	45	11
Something To Do	2	12	23	37	9
Balanced Diet	9	43	116	181	46
Easier Than Cooking	5	13	28	46	12
Total Responses *	35	110	257	395*	100
Weekly Rate					
Daily	10	49	152	211	76
3-4 Da. Wk.	2	25	19	46	17
1-2 Da. Wk.	8	2	4	14	5
< 1 Da. Wk.	1	2	2	5	2
No Response			1		
Total *	21	78	178	277	100
Length of Time					
Just Started	21	4	16	41	15
6 Mo.	0	2	13	13	5
1 - 2 Yr.	0	29	77	106	38
3 Yr. or More	0	45	72	117	42
Total *	21	80	178	277	100

* More than one response per person

listed reason for attendance was to help balance the diet, 46 percent (181). Thirteen percent (52) reported that they came to the program because of friends. Eleven percent (45) found the meals to be affordable, while 12 percent said it was easier than cooking at home. "Good food" and "something to do" were each reported by nine percent.

Ninety-three percent (257) reported attendance on three or more days per week. Forty-two percent (117) of respondents had attended WNP for three or more years. Thirty-eight percent (106) had attended one to two years. Thirteen (5%) had attended six months, while new participants included 41 (15%) individuals who had "just started."

Eating Habits

Response to questions related to eating habits are presented in Table V. "Changes in eating habits" were reported on by 237 participants, however changes in eating habits since attending WNP were reported by 45 percent (126) persons. Forty percent (111) stated they had no changes. Negative and positive comments are given. Four persons had developed diabetes or kidney problems. One person formerly had both raw vegetables and whole wheat bread each meal. Positive comments were made by 78 persons reporting better balance in diet, more variety in diet, less junk foods, now balancing home meals, feel better et cetera.

One hundred ninety-seven persons responded to "Do you eat breakfast?" Eighty-four percent (173) reported yes. Nine percent (24) did not eat breakfast. Of these, eight reported they slept late and were not hungry.

Perceived Nutrition Attitudes

"Perceived Nutrition Attitudes" results are presented in Table VI.

TABLE V

EATING HABITS BY COUNTY GROUPS

Category	County Group			Total	Percent
	Blaine N	Garfield N	Kay - Noble N	N	
Eat Breakfast					
Yes	20	70	143	233	84.1
No	1	3	20	24	8.7
No Response	0	5	15	20	7.2
Total	21	78	178	277	100.0
Eating Habit Changes					
Yes	5	39	82	126	45.5
No	10	22	79	111	40.1
No Response	6	17	17	40	14.4
Total	21	78	178	277	100.0
Reasons For Not Eating Breakfast:					
Sleep late and/or not hungry				8	2.9
Said no reason or never did				8	2.9
Sometimes if have money				3	1.1
To lose weight				1	0.4
Don't want to eat alone				1	0.4

TABLE V (Continued)

Category	County Group			Total	Percent
	Blaine N	Garfield N	Kay - Noble N	N	
Comments on eating changes: (68)					
Positive:					
More balanced meals and/or now balancing home meals				22	7.9
More variety, eating disliked vegetables and foods				14	5.1
More regular meals, from snacks to good meals				11	4.0
Feel better, eat more, better appetite				12	4.3
Lighter evening meals and/or less cooking due to noon meal				9	3.3
Negative: (4)					
Now diabetic or high blood sugar				3	1.1
Kidney failure				1	0.4
Less whole wheat bread and raw vegetables				1	0.4

TABLE VI

PERCEIVED NUTRITION ATTITUDES AND INTERESTS BY COUNTY GROUP

Category	County Group			Total	Percent*
	Blaine N[a]	Garfield N[a]	Kay - Noble N[a]	N	
Learn Best					
Informal Talks	5	21	76	102	35.0
Question Answers	7	15	47	68	23.0
Films/Slides with Discussion	3	9	33	45	16.0
Films/Slides	1	10	23	34	12.0
Games	0	24	4	28	10.0
Posters	0	1	5	7	2.0
Totals	16	80	188	291	100.0
Nutrition Information					
Dietitian/ Nutritionist	9	25	84	118	39.6
Magazines/ Newspapers	4	20	32	56	18.8
Doctor	5	21	22	48	16.1
Friends	0	8	25	33	11.1
TV-Radio	1	5	26	32	10.7
Nurse	1	4	3	8	2.7
Books	0	0	2	2	.7
Wife	2	1	0	1	.3
Totals	20	84	194	298	100.0

TABLE VI (Continued)

Category	County Group			Total	Percent*
	Blaine N[a]	Garfield N[a]	Kay - Noble N[a]	N	
Interest					
Weight Control	2	26	42	70	17.0
Shopping/cooking	4	20	45	69	16.0
Basic Four	5	20	33	58	14.0
Vitamins	6	15	27	48	11.0
Sodium/potassium	2	17	19	38	9.0
Food Drug Interactions	3	9	17	29	7.0
Carbohydrates & Fats	2	5	17	24	6.0
Misinformation & Disceptions	2	7	14	23	5.0
Nutritional Labeling	1	9	13	23	5.0
Fiber & Diet	0	6	17	23	5.0
Minerals	2	7	10	19	5.0
Diabetes	0	0	1	1	0.2
Totals	29	141	255	425	100.0

* Responses may not total 100 due to rounding.
[a] More than one response per respondent.

There were 291 responses to "how I learn best" with over half, or 68 percent who marked informal talks and question/answer sessions. Of the 27 percent (79) choosing films/slides, over half, 45 persons, preferred discussions along with video. Games and posters were reported by 12 percent. However in the area where games had been used extensively, twenty-eight percent, or 24 of the 80 responses were for nutrition games.

Under "best source of nutrition information" (Table VI) there were 298 responses. Forty percent (118) checked dietitian/nutritionist. Nineteen percent (56) believed magazines and newspapers were a good source. Sixteen percent (48) relied on doctors. Eleven percent each chose friends and TV-radio while the remaining four percent marked nurses and books.

When asked to check desired subjects for future nutrition education, 425 responses were marked. Greatest response was for weight control checked by 70 (17%). Shopping and cooking was checked by 69 (16%). Basic four foods were in third place for 58 persons.

Educational Experiences

Nutrition education and educational level are reported in Table VII. Of 286 reporting, 82 (30%) had an eighth grade or less education. Of 115 attending high school, 71 or 26 percent graduated from high school. College attendance was checked by 70 persons with 22 (8%) of those graduating from college.

When asked about nutrition classes in school, 251 responded. Eighty-five (31%) reported some kind of nutrition classes. Two hundred forty individuals responded to the questions relating to food/nutrition activities attended. Fifty-one percent (140) had attended some activity

TABLE VII

EDUCATIONAL EXPERIENCES BY COUNTY GROUP

Category	County Group			Total	Percent*
	Blaine N	Garfield N	Kay - Noble N	N	
Education Level					
< 8th Grade	1	5	19	25	9.0
8th Grade	3	22	32	57	20.6
9 - 12 Grade	4	13	27	44	15.9
High School Grad	5	17	49	71	25.6
Attend College	4	17	27	48	17.3
College Grad	4	4	14	22	7.9
Total Responses	21	78	178	277	99.9
Nutrition in School					
No	12	42	112	166	59.9
Yes	9	31	45	85	30.7
No Response	0	5	21	26	9.4
Total	21	78	178	277	100.0
Food Nutrition Activities					
No	1	30	55	100	36.1
Yes	14	39	91	140	50.5
No Response	6	9	32	37	13.4
Total	21	78	178	277	100.0

TABLE VII (Continued)

Category	County Group			Total	Percent*
	Blaine N	Garfield N	Kay - Noble N	N	
Activities Listed					
Extension	5	12	16	33	11.9
Womens Clubs	4	2	14	20	7.2
Adult Education	1	3	9	13	4.7
Cooking Course	1	7	13	21	7.6
Other	2	10	8	20	7.2
Cooking Jobs - 10					
Nursing 1					
Diet Club 2					
NTMC 1					
Army 1					
Diabetic Group 1					
Over 55 Club 1					
Lipid Study 1					
Books 1					
Vitamin Store 1					
Total	13	34	60	107	38.6

with 127 reporting a specific activity. The most commonly mentioned activities were extension, women's clubs, cooking courses, and adult education. Blaine reported that 14 individuals, or 67 percent, had outside food or nutrition activities. Garfield reported 39, or 57 percent; while Kay-Noble reported 91, or 62 percent, as having food and nutrition activities.

Discussion Questions

Responses to the discussion questions by County group are presented in Table VIII. The question "do you think that consuming a nutritionally balanced diet is important to maintain good health?" received 173 responses. Among these responses there were 140 positive and 33 negative. Thirteen of the positive comments are detailed in Table VIII.

Responses to "Will vitamin C cure or prevent a cold?" were made by 192 persons (Table VIII). Forty-five percent (87) responded yes. Forty-three percent (82) responded no. Five percent (9) reported it helps. Two percent (4) wrote that it prevented but did not cure. Two persons believed it was debatable or not determined while eight wrote "don't know."

Of 197 responses to "Should a person reduce calories as they grow older?" (Table VIII) 56 percent (111) responded yes with 34 percent (66) answering no. Five wrote according to weight and activity. Fifteen stated "don't know".

Responses to "why is fiber important?" are also reported in Table VIII. Almost 69 percent, or 97 persons out of 141 reported that fiber was important for regularity, digestion or elimination. Twenty-one percent (30) wrote to provide bulk. Nine wrote "don't know". In

TABLE VIII

RESPONSES TO DISCUSSION QUESTIONS BY COUNTY GROUP

Questions	County Group			Total	Percent
	Blaine N	Garfield N	Kay - Noble N	N	
Importance of Nutrition To Health					
No	0	9	24	33	19.1
Yes	17	34	89	140	80.9
Total Responses	17	43	113	173	100.0
Positive Comments From All Groups:					
Resist Disease				3	
Live Longer				2	
Mental/Physical Health				2	
Body Needs Variety				1	
Very Important to Diabetics				1	
For Good Elimination				1	
Very Important				1	
Vitamin C as Cold Preventative					
Yes	7	19	61	87	45
No	7	17	58	82	43
Help	2	6	1	9	5
Prevent	0	0	4	4	2
Debatable	0	0	2	2	1
Don't Know	0	1	7	8	4
Total Responses	16	43	133	192	100

TABLE VIII (Continued)

Questions	County Group			Total	Percent
	Blaine N	Garfield N	Kay - Noble N	N	
Reduce Calories with Aging					
Yes	13	46	52	111	56.4
No	5	6	55	66	33.5
Don't Know	0	1	14	15	7.6
According to weight/activity	0	0	5	5	2.5
Total Response	18	53	126	197	100.0
Why is Fiber Important?					
Regularity-Digestion-Elimination	12	21	64	97	68.8
Provide Bulk	2	9	19	30	21.3
Maintain Health	0	0	3	3	2.1
Prevent Cancer	0	1	-	1	7.0
Help Tissue/Muscle	0	1	-	1	7.0
Don't Know	1	3	5	9	6.4
Total Response	15	35	91	141	100.0

TABLE VIII (Continued)

Questions	County Group			Total	Percent
	Blaine N	Garfield N	Kay - Noble N	N	
Functions of Fat					
Heat-Energy and Weight Gain	4	14	29	47	35.8
Lubrication-Elimination	1	6	9	16	12.2
Burn Carbohydrates	0	8	7	15	11.5
Satisfy/Flavor	0	0	4	4	3.1
For Good Health	1	1	1	3	2.3
Healthy Skin	1	1	1	3	2.3
Need Some	0	1	3	4	3.1
Calcium/Protein	0	2	1	3	2.3
Unhealthy-Blood Pressure/Cholesterol	0	1	6	7	5.3
Don't Know	2	8	19	29	22.1
Total Responses	9	42	80	131	100.0

responses to the question "what is the function of fat?" Forty-seven out of 131 responses, or 36 percent, listed heat, energy or weight gain. Twelve percent (16) believed it was needed for lubrication or elimination. Fifteen persons reported it was needed to burn up carbohydrates. Four said that the function of fat was for satiety and flavor. Seven believed it was unhealthy, causing blood pressure or cholesterol problems. Twenty-nine persons reported that they did not know.

Nutrition Knowledge Test

Correct answers to the Nutrition Knowledge Test are reported by statement in Table IX. There were 25 statements to be answered "true/false" or "don't know", omissions, or errors are not considered. Two Hundred and Seventy-five individuals participated in the nutrition knowledge test. The statements missed most often were as follows:

6. "Whole wheat bread has fewer calories than white bread." Forty-two percent (116) of the respondents answered with false.

8. "Persons on a weight reduction diet should avoid foods from the grain group." Forty percent (111) correctly answered false.

10. "Fruits and vegetables are major source of B vitamins." Twenty-four percent (66 persons) checked false.

13. "The primary function of protein is to furnish energy." Less than 15 percent (41) correctly checked false.

14. "Carbohydrate rich foods provide few nutrients other than calories." Forty-five percent were correct in marking false.

15. "Fat is the most concentrated source of calories." Less than 20 percent (54) agreed.

TABLE IX

NUMBER OF CORRECT ANSWERS TO NUTRITION KNOWLEDGE STATEMENTS BY COUNTY GROUP

Statements	County Group			Total	Percent
	Blaine N	Garfield N	Kay - Noble N	N	
1. A sound nutritional practice is to eat a wide variety of food each day.	18	64	111	193	70.2
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.	17	50	133	200	72.7
3. Every age group needs the same nutrients and the same amount of these nutrients.	15	44	128	187	68.0
4. Nutrition is important in maintaining good health.	17	54	160	231	84.0
5. The Basic Four Food Groups include the milk group, the meat group, the grain group and the fruit and vegetable group.	18	70	163	251	91.3
6. Whole wheat bread contains fewer calories per slice than white bread.	12	36	68	116	42.2

TABLE IX (Continued)

Statements	County Group			Total	Percent
	Blaine N	Garfield N	Kay - Noble N	N	
7. Cheese, yogurt and ice cream can supply part of the recommended servings of milk daily.	19	56	151	226	87.2
8. A person on a weight reduction diet should avoid foods from the grain group.	8	29	74	111	40.4
9. Eggs, cheese, peanut butter and dried beans are poor sources of protein.	16	50	129	195	70.9
10. Fruits and vegetables are major sources of B vitamins.	1	26	39	66	24.0
11. A person's intake of calories should remain the same throughout life.	17	54	131	202	73.5
12. The number of calories people need vary with their age, sex and activity.	21	60	148	229	83.3
13. The primary function of protein is to furnish energy.	3	9	29	41	14.9

TABLE IX (Continued)

Statements	County Group Blaine N	Garfield N	Kay - Noble N	Total N	Percent
14. Carbohydrate-rich foods, such as bread, rice and potatoes provide few nutrients other than calories.	8	29	86	123	44.7
15. Fat is the most concentrated source of energy.	5	13	37	54	19.6
16. Margarine has fewer calories than butter.	8	23	39	70	25.5
17. Fiber aids in digestion.	18	62	131	211	76.7
18. Fluids are important to prevent dehydration and to avoid constipation.	19	67	158	244	88.7
19. An excess of vitamins can be harmful to the body.	11	48	108	167	60.7
20. Vitamin pills are needed by most people.	11	36	86	133	48.4
21. Vitamin C is referred to as the "sunshine" vitamin	2	17	24	43	15.6

TABLE IX (Continued)

Statements	County Group			Total	Percent
	Blaine N	Garfield N	Kay - Noble N	N	
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.	19	63	153	235	85.5
23. Adults need a source of vitamin C.	21	64	150	235	85.5
24. People of all ages need calcium in their diets.	21	70	151	242	88.0
25. Eggs and meat, especially liver, are good sources of iron.	19	70	127	216	78.5
Total Correct Answers	344	1164	2714	4221	61.4
$\overline{X}$ Correct answers	16.4	15.1	15.3	15.2	

16. "Margarine has fewer calories than butter." Most agreed, only 26 percent marked false.

20. "Vitamins are needed by most people even with a well balanced diet." Forty-eight percent (133) correctly marked false.

21. "Vitamin C is referred to as the 'sunshine vitamin'." Less than 16 percent (43) wrote false, knowing Vitamin D is obtained from sunshine.

Length of Attendance and Mean Score

Nutrition Knowledge mean scores of men and women and mean scores by length of attendance are reported in Table X. Women outnumber men by two to one, or 184 to 91 and outranked the men by 1.2 points on the mean scores. The overall mean score for men was 15.2 and 16.4 for women based on 25 possible points. In Blaine county, there was a 2.8 difference beteen males (14.4) and females (17.2) mean scores. In Garfield county there was a difference of 1.0 with males scoring 14.9 and females 15.9. The difference observed in the Kay-Noble area for mean scores was males 15.7 and females 16.3, or 0.6. The combined male/female mean scores by areas were Blaine 15.9, Garfield 15.4, and Kay-Noble 16.0. Scores in the Blaine area (new site) were almost as high as in Kay-Noble. A possible reason for this may be found in Table VI, Nutrition Activities, with the questions, "Have you attended any other activities in which you learned about food and nutrition?" In the Blaine group 14, out of 21 or 67 percent reported other food and nutrition activities. Fifty-seven percent of those responding (39 out of 69) in the Garfield group and 62 percent (91 out of 146) for the Kay-Noble group had other food and nutrition activities.

TABLE X

NUTRITION KNOWLEDGE MEAN SCORES BY COUNTY GROUPS

Category	County Group						Total	
	Blaine		Garfield		Kay - Noble			
	N	$\bar{X}$	N	$\bar{X}$	N	$\bar{X}$	N	
Sex								
Males	7	14.4	28	14.9	61	15.7	96	15.2
Females	14	17.2	49	15.9	116	16.3	179	16.4
Combined	21	15.9	77	15.4	177	16.0	275	15.8
Length of Attendance								
Just Started	21	15.9	4	14.0	18	14.2	43	14.7
6 Mo	0	0	2	11.5	14	14.8	16	13.2
1-2 Yr	0	0	28	13.8	70	16.8	98	15.3
3 Yr +	0	0	43	15.5	75	16.5	118	16.4

The educational level may also have impacted on mean scores. Sixty-seven percent of the Blaine group were high school graduates or above. Garfield reported 49 percent (38) and Kay-Noble reported 53 percent (99) as high school graduates or above.

Change in mean scores over length of attendance is presented in Table X. Results are pictorially presented for each group in Figure 1. The six month Garfield group only consisted of two individuals; it is possible that these two persons had not attended any nutrition education classes during the six months since the nutritionist's visits were irregular during that period of time.

Nutrient Sources Response

Respondents were asked to name two sources for each listed nutrient. Responses are reported in Table XI. The lower number of correct responses agreed with the assumption that all program participants were lacking in nutrition knowledge. Only nine persons (3%) were able to respond with two correct sources for each of the nutrients listed. Thirty-eight percent, or 105 individuals either failed to answer or gave wrong answers for all nutrients listed. The lowest correct number of responses, 24 percent, was for thiamine. Iron responses were highest, 67 percent with 117 individuals listing two sources and 68 listing one source. Protein sources were 63 percent. One or more vitamin C sources were listed by 56 percent of the respondents, while 52 percent listed sources of potassium.

Basic Four Foods

Responses to questions concerning required servings of the four

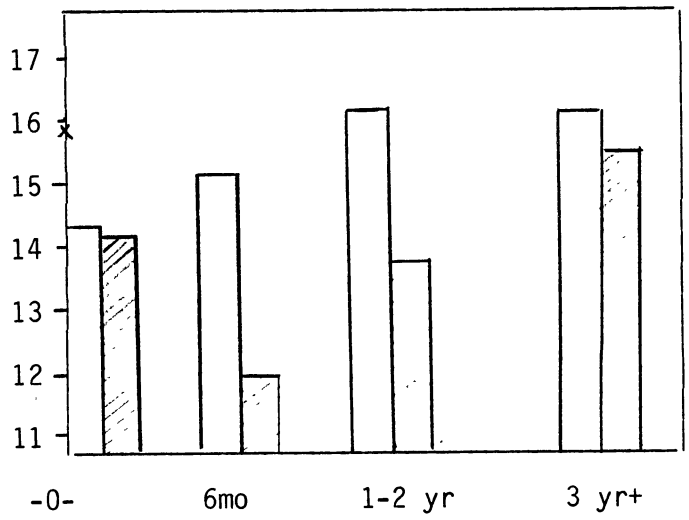

Figure 1. Mean Scores versus Length of Attendance

TABLE XI

RESPONSES TO NUTRIENT SOURCES BY COUNTY GROUP

Category	County Group						Total			
	Blaine		Garfield		Kay - Noble		2SC	%	1SC	%
	2SC N	1SC N	2SC N	1SC N	2SC N	1SC N	N		N	
Nutrient Sources										
Vitamin A	5	3	16	15	33	48	52	19	68	25
Vitamin C	10	3	27	22	40	55	70	25	87	31
Calcium	8	7	32	15	64	29	103	37	52	19
Protein	11	5	38	14	86	20	129	47	45	16
Iron	6	7	50	26	60	37	117	42	68	25
Thiamine	0	5	9	8	28	16	42	15	24	9
Potassium	4	8	15	31	41	46	64	23	81	29
Named 2 Sources for all nutrients	0		1		8		N 9		Percent 3	
Unable to name 1 source of any nutrient on list	6		26		73		105		38	

Note: * Percentages based on 277 study participants.
[a] Percentages do not total 100 because of more or less than one answer per person.

basic foods groups are reported in Table XII. Twenty-five responded that two servings of dairy foods daily were needed; 18 persons (7%) correctly answered that four servings of grains or breads were needed. Of the 275 studies, only one person checked the correct number of servings for all of the four foods groups. Four persons (1%) were able to state the required number of servings in three of the food groups. Fifty-one respondents (18%) stated the correct number for two of the groups while 66 (24%) knew the number of servings in one of the four foods groups. Over one-half, 157 persons, failed to check the correct number of servings for any one food group.

Principles of Adult Education Relative to Nutrition Education

Twelve positive statements based on adult learning principles in the application of nutrition education were presented on the last page of the questionnaire. Results are presented in Table XIII. Respondents were asked to indicate their agreement/disagreement for each statement. Scale responses were 4--strongly agree, 3--agree, 2--disagree, 1--strongly disagree. The highest rate of agreement was 3.7 on statement one, "nutrition education is as important for the older adult as for younger persons." The least agreement, 2.9 was with statement eight, "the nutritionist should spend more time on a one-to-one basis with participants." The next least agreements were obtained on statements four, 3.1 and three, 3.4. Some of the participants who disagreed with the statement three that "the older adult will change his eating patterns if he believes the change will improve his health" stated that they disagreed because "you can't teach an old dog new tricks. If you could

TABLE XII

RESPONSES TO BASIC FOUR FOODS BY COUNTY GROUP

Category	County Group						Total	
	Blaine		Garfield		Kay - Noble			
	2SC	1SC	2SC	1SC	2SC	1SC		
	N		N		N		N	%
Basic Four Foods State Sv. Each	N		N		N		N	Percent
Dairy	3		50		16		69	25.0
Protein	4		43		13		60	22.0
Fruits and Vegetables	2		28		6		36	13.0
Grains	2		13		3		18	7.0
Name Servings for All Groups								
4 groups	0		0		1		1	.4
3 groups	0		1		3		4	1.0
2 groups	2		10		39		51	18.0
1 group	7		16		43		66	24.0
None	13		48		96		157	57.0

Note: * Percentages based on 277 study participants.
[a] Percentages do not total 100 because of more or less than one answer per person.

TABLE XIII

RESPONSES TO PRINCIPLES OF ADULT EDUCATION RELATIVE TO NUTRITION EDUCATION BY COUNTY GROUP

Statements	County Group			Total
	Blaine	Garfield	Kay - Noble	
	$\bar{X}$	$\bar{X}$	$\bar{X}$	$\bar{X}$
1. Nutrition education is important for older adults.	3.9	3.4	3.7	3.7
2. Nutrition education is important to help adults learn about how food patterns relate to health patterns.	3.6	3.7	3.6	3.6
3. The older adult will change his eating patterns when he believes the changes will improve his health and life.	3.3	3.4	3.3	3.3
4. The older adult wants to have, and he should have a part in deciding what nutrition area he wants to learn about.	3.5	2.3	3.6	3.1
5. Special small group sessions should be planned for specific nutrition information as wanted by site participants.	3.4	3.5	3.4	3.4
6. More nutrition education should be scheduled for older adults.	3.6	3.4	3.4	3.5

TABLE XIII (Continued)

Statements	County Group			Total
	Blaine	Garfield	Kay - Noble	
	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$
7. Nutrition education is important to help adults discern between misinformation and accurate information.	3.7	3.5	3.5	3.6
8. Nutritionist should spend more time on a one-to-one basis with participants.	2.2	3.4	3.0	2.9
9. Adults learn better in open discussions.	2.6	3.6	3.5	3.6
10. Adults have a greater motivation to learn when learning is important to their needs.	3.4	3.4	3.5	3.4
11. Case studies help participants relate to their own problems.	3.6	3.4	3.4	3.5
12. Adults should have a basic knowledge of nutrition.	3.9	3.4	3.4	3.6

Note: Scale = Strongly Agree (4); Agree (3); Disagree (2) and Strongly Disagree (1)

no one would be over weight." Statement four states that "the older adult wants to have and should have a part in deciding what nutrition area he wants to learn about." Persons disagreeing stated that "most people should be taught what they need to hear because they did not know what they need."

t-Test Analysis

The mean group scores for nutrition knowledge for the county groups were analyzed statistically by use of the t-tests as reported in Table XIV. Comparisons were made between the Garfield and Blaine county groups, the Garfield and Kay-Noble county groups and the Blaine and Kay-Noble county groups. The hypothesis were as follows:

Hypothesis 1. There are no significant differences between the Garfield and Blaine county groups in mean scores for nutrition knowledge.

Hypothesis 2. There are no significant differences between the Garfield and Kay-Noble county groups with the mean scores for nutrition knowledge.

Hypothesis 3. There are no significant differences between Blaine and Kay-Noble County Groups in the mean score for nutrition knowledge.

The significant difference was established at $p > .05$ level. The null bypothesis was accepted in each hypothesis.

Observations

Two factors of interest were observed: (1) The subjects most often checked as desirable for future nutrition education discussions were often related to the actual learning needs as determined by analysis of

TABLE XIV

RESULTS OF t-TEST ON THE MEAN SCORES OF COMPARED COUNTY GROUPS

County Group	N	$\bar{X}$	df	t
Garfield	77	15.3	48	.815
Blaine	21	15.9		
Garfield	77	15.3	77	1.429
Kay-Noble	177	16.1		
Blaine	21	15.9	96	.185
Kay-Noble	177	16.1		

* $P < .05$

the nutrition knowledge test. (2) There appeared to be a possible effect of commercial advertising on nutrition beliefs.

The greatest perceived need was for discussion of weight control, checked 70 times out of 425 choices. Questions relative to weight control were often missed. Most often missed were : "Whole wheat bread contains fewer calories than white bread" was missed 57 percent of the time; "carbohydrate-rich foods . . .provide few nutrients other than calories" was missed by 55 percent of respondents; "fat is the most concentrated source of calories" was incorrect 80 percent of the time; and, "margarine has fewer calories than butter" received 75 percent incorrect answers. The second most desired subject, shopping and cooking for one or two, had little in common with the nutrition knowledge test except that knowing nutrient sources and the required number of serving to balance the diet would affect what to buy and how much. The third choice for discussion was Basic Four Foods, requested by 58 persons. One person knew the required number of servings per foods group, while 96 were unable to state the number of servings for any of the groups. Discussion of vitamins was desired by 48 persons. The vitamin questions were very often missed.

The other factor of interest was what appeared to suggest the power of commercial advertising. The statement "vitamin C is referred to as the 'sunshine' vitamin" received 84 percent incorrect answers. Both past and present advertising has referred to sunshine as relative to oranges or orange juice. Since the majority of persons correctly related oranges and vitamin C, it appeared there was some possibility that the commercials had "planted" the idea that vitamin C came from sunshine. Less than 16 percent said false.

The mean scores of the groups were analyzed statistically by use of the t-test to determine if was a significant difference. The comparisons were shown in Table XII. Garfield is compared with Blaine and then with Kay-Noble. Blaine was then compared with Kay-Noble.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary and conclusions for this study. Included also are the recommendations for practice and for further research.

Summary

The purposes of this study were to (1) determine the nutrition learning needs of the participants of the WNP; and (2) gain insight for developing learning experiences appropriate to their "actual" needs while meeting their perceived needs, interests and concerns.

A 25-point nutrition knowledge test, five discussion questions, and 11 nutrient source and/or basic four foods were used to identify learning needs. Perceived needs and preferred learning methods were obtained from multiple choice questions. Attitudes toward learning were further defined through use of 12 positive statements on principles of adult learning relative to nutrition education, using the agree/disagree format. The six-page questionnaires were submitted to intact groups at the various sites by the investigator.

Conclusions

The conclusions from this study are:

1. The level of nutrition knowledge among the participants was generally low.

2. The perceived needs were often the subjects of the questions most often missed and thus were identified as learning needs.

3. Perceived needs, interests and concerns were identified. Often identified was weight control, shopping and cooking, basic foods and vitamins. A wide variety of subjects were checked for future nutrition education

4. All of the listed learning methods were checked by most of the respondents, indicating the desirability for a variety of learning methods to meet the various learning styles.

Recommendations

These recommendations are made for further practice and future research.

Practice

The author suggests the following recommendations for practice.

1. The WNP nutritionist should plan learning experiences to correct the specific nutrition learning needs identified in this study.

2. A definite need exists for the development of appropriate presentations that appeal to the older adult.

3. New methods of learning should actively involve the participants (i.e. Panels, Game Show Formats, etc.)

4. The new methods should include a wide variety of learning experiences involving the five senses.

Further Research

The investigator believes future research should include the following:

1. This study should be carried out across the state to determine if a similarity exists in other nutrition programs for the elderly.

2. This study should be repeated after one year to determine the effectiveness of learning experiences developed as the result of this study. Diet recalls should be added at that time if not taken earlier.

3. Future research should be directed toward the development and testing of appropriate materials to be used in the planning of learning experiences for older adults.

4. Research is needed on the differences in learning styles of the older adults and how to best meet the needs for each.

5. Future research in the above, or other studies aimed at the development of materials, should consider the limits imposed by lack of space at many sites. This includes the necessity of the nutrition education sessions being held usually just prior to the meal when participants are seated at the table.

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APPENDIXES

APPENDIX A

Letters Requesting Permission to Conduct Study

Halsene C. Alexander
205 Ash
Perry, Oklahoma 73077
December 1, 1983

Mrs. Glenda Riddle, Director
Wheatheart Nutrition Project, Inc.
P. O. Box 4
Tonkawa, Oklahoma 74653

Dear Mrs. Riddle,

I am currently involved in research study of the nutrition knowledge and interests of the participants versus non-participants in the Nutrition Programs for the Elderly. I am requesting permission to submit a nutrition knowledge/interest questionnaire to those participants whose names are chosen in a random sampling and who are willing to participate.

I would like to include all sites operated under the Wheatheart Nutrition Project. I believe the results will point out areas that need to be addressed in future nutrition education planning.

The study is for the completion of a thesis for a Master's Degree in Occupational and Adult Education now being pursued at Oklahoma State University at Stillwater, Oklahoma.

Thank you for your consideration in this request. Your help will be greatly appreciated.

Sincerely,

Mrs Halsene Alexander

Mrs. Halsene Alexander

HA:rl
Enclosures: 4 page questionnaire

205 Ash Street
Perry, Oklahoma 73077
December 2, 1983

Dr. Esther Winterfeldt
Department of Food, Nutrition and
Institutional Administration
Oklahoma State University
Stillwater, Oklahoma 74740

Dear Dr. Winterfeldt,

I am currently pursuing a Master's Degree in Occupational and Adult Education at Oklahoma State University. My thesis study involves the nutrition knowledge of the participants of the Wheatheart Nutrition Program for the elderly. The nutrition centers are are located in Blaine, Garfield, Kay, and Noble counties in Oklahoma.

I am requesting your permission to use a portion of a nutrition knowledge test developed by the FNIA department. I am enclosing a copy of the portion of the test I propose to include in the questionnaire for the study.

Your cooperation is gratefully appreciated.

Sincerely,

Halsene Alexander

Halsene Alexander

APPENDIX B

Letters Granting Permission to Conduct Study

Wheatheart Nutrition Project, Inc.
P O Box
TONKAWA, OKLAHOMA 74653

TO: Halsene Alexander

FROM: Glenda Riddle, WNP Director

SUBJECT: Research Project

DATE: December 16, 1983

I have received your request for using participants to carry out a research study with our nutrition project. The questionnaire seems a reliable tool to measure nutrition knowledge.

If I can be of assistance with the research, please feel free to ask for assistance.

I believe the study, when completed, will allow the nutrition projects to evaluate and improve the education component of our project.

GR:vl

CC: Polly White, DHS
Holly Beaty, NODA

Oklahoma State University

Department of Food, Nutrition and Institution Administration

STILLWATER, OKLAHOMA 74078
(405) 624-5039

December 9, 1983

Halsene Alexander
205 Ash St.
Perry, OK 73077

Dear Mrs. Alexander:

In reply to your letter asking for permission to use a portion of a Nutrition Knowledge Test developed in FNIA, this is permissable as long as credit is given in your thesis.

Best of wishes.

Sincerely,

Esther Winterfeldt

Esther Winterfeldt, Head
Food, Nutrition and
Institution Administration

EW:sdb

APPENDIX C

Nutrition Interest and Attitudes Toward the Nutrition Program Survey Form

CITY: _____

NUTRITION INTEREST AND ATTITUDES

TOWARD THE NUTRITION PROGRAM

1. Why do you attend the Wheatheart Nutrition Program? (check one)
   a. ____ because your friends attend?
   b. ____ because the food tastes so good?
   c. ____ because the meals are affordable?
   d. ____ for something to do?
   e. ____ because it helps toward a balanced diet?
   f. ____ because it is easier than cooking at home?

1.1 How often do you attend?
   a. ____ almost daily.
   b. ____ 3 to 4 days a week.
   c. ____ 1 to 2 days a week.
   d. ____ less than once a week.

2. I have been a participant in the nutrition program for: (check one)
   a. ____ just started
   b. ____ 6 months or less
   c. ____ 1 to 2 years
   d. ____ 3 or more years

3. My eating habits have changed since attending the nutrition program.
   a. ____ yes b. ____ no. If yes, what has changed?_____
   _____

4. I learn best from: (check your favorite)
   a. ____ films and/ or slides
   b. ____ posters
   c. ____ informal talks
   d. ____ films/slides with discussion
   e. ____ question & answer sessions
   f. ____ nutrition games

5. My best source of nutrition information is: (check one)
   a. ____ Magazines and newspapers
   b. ____ television or radio
   c. ____ dietition or nutritionist
   d. ____ friends
   e. ____ nurse
   f. ____ doctor

6. Check the subjects you would like discussed in future nutrition education.
   a. ____ Basic Four and balanced diet
   b. ____ Misinformation & deceptive claims
   c. ____ Shopping & cooking for one or two
   d. ____ Food & drug interactions
   e. ____ Nutrition labeling
   f. ____ Carbonydrate & fats
   g. ____ Vitamins
   h. ____ Minerals
   i. ____ Sodium & potassium
   j. ____ Weight control
   k. ____ Fiber and diet
   l. ____ other, specify_____

7. Do you eat breakfast? 1. ____ yes, 2. ____ no. If no, why not?_____
   _____

ADDITIONAL INFORMATION

Directions: Please provide the information as indicated. Check the appropiate 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 major sources of income? (check one or more)

1. ____ social security
2. ____ retirement
3. ____ Welfare
4. ____ private
5. ____ savings
6. ____ other (specify)_____

D. What is your highest educational level? (check one)

1. ____less than eighth grade
2. ____ eighth grade
3. ____ ninth / twelfth grade
4. ____ high school graduate
5. ____ attended college
6. ____college graduate

E. Have you had any classes in school concerned with foods and nutrition?

1. ____ yes
2. ____ no

F. Have you attended any other activities in which you learned about food and nutrition? If yes, please check what activities.

1. ____ yes
2. ____ no

a. ____ Extension programs
b. ____ Adult Education
c. ____ Women's clubs
d. ____ Cooking course
e. ____ Other: specify _____

G. Do you live alone? 1._____yes, 2._____ no.

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?

From the following list of foods, write in 2 sources for each nutrient.

bread	apricots	beef	broccoli	green beans	milk
cereals	bananas	liver	spinach	green peas	cheese
rice	peaches	eggs	tomatoes	cauliflower	fish
apples	spaghetti	squash	ice cream	sweet potatoes	chicken
yogurt	macaroni	pork	oranges	dry beans	carrots

6. Vitamin A _____, _____.

7. Vitamin C _____, _____.

8. Calcium _____, _____.

9. Protein _____, _____.

10. Iron _____, _____.

11. Thiamine _____, _____.

[illegible] _____, _____.

12. Potassium _____, _____.

Circle the number of servings needed daily from each of the four food groups.

	Food group	Number of servings
13	Dairy group	1, 2, 3, 4.
14	Protein group	1, 2, 3, 4.
15	Fruit/Vegetable	1, 2, 3, 4.
16	Bread/Grains	1, 2, 3, 4.

Principles of Older Adult Learning

Relative to Nutrition

Some statements concerning adult education and nutrition education. Please Check the how you feel about the statement, in the appropiate box.

Statement:	Strongly agree	agree	disagree	Strongly disagree
1. Nutrition education is as imoortant for older adults as for younger persons.				
2. Nutrition education is important as a means to help adults learn about how food patterns relate to health patterns.				
3. The older adult will change his eating patterns when he believes the changes will improve his health and life.				
4. The older adult wants to have, and he should have a part in deciding what nutrition area he wants to learn about.				
5. Special small group sessions should be planned for specific nutrition information as wanted by site participants.				
6. More nutrition education should be scheduled for older adults.				
7. Nutrition education is important to help an adult to become informed so that he may discern between misinformation and accurate information.				
8. The nutritionist should spendmore time on a one-to-one basis with participants.				
9. Adults learn better in open discussions where there is freedom to ask questions and express opinions.				
10. Adults have a greater motivation to learn when learning is important to their needs.				
11. Nutrition case studies help participants relate eating behavior to their own nutrition problems.				
12. Adults should have a basic knowledge of nutrition, the basic four foods groups, and food sources for vitamin A and C, iron, calcium, protein, and potassium.				

APPENDIX D

Letters Requesting Permission to Use A Portion of a Nutrition Knowledge Test

205 Ash Street
Perry, Oklahoma 73077
December 2, 1983

Dr. Esther Winterfeldt
Department of Food, Nutrition and
Institutional Administration
Oklahoma State University
Stillwater, Oklahoma 74740

Dear Dr. Winterfeldt,

I am currently pursuing a Master's Degree in Occupational and Adult Education at Oklahoma State University. My thesis study involves the nutrition knowledge of the participants of the Wheatheart Nutrition Program for the elderly. The nutrition centers are are located in Blaine, Garfield, Kay, and Noble counties in Oklahoma.

I am requesting your permission to use a portion of a nutrition knowledge test developed by the FNIA department. I am enclosing a copy of the portion of the test I propose to include in the questionnaire for the study.

Your cooperation is gratefully appreciated.

Sincerely,

Halsene Alexander

Halsene Alexander

Oklahoma State University

Department of Food, Nutrition and Institution Administration

STILLWATER, OKLAHOMA 74078
(405) 624-5039

December 9, 1983

Halsene Alexander
205 Ash St.
Perry, OK 73077

Dear Mrs. Alexander:

In reply to your letter asking for permission to use a portion of a Nutrition Knowledge Test developed in FNIA, this is permissable as long as credit is given in your thesis.

Best of wishes.

Sincerely,

Esther Winterfeldt

Esther Winterfeldt, Head
Food, Nutrition and
Institution Administration

EW:sdb

VITA 2

Halsene Clara Alexander

Candidate for the Degree of

Master of Science

Thesis: A STUDY OF THE NUTRITION KNOWLEDGE/INTEREST OF PARTICIPANTS OF THE WHEATHEART NUTRITION PROGRAM FOR THE ELDERLY

Major Field: Occupational and Adult Education

Biographical:

Personal Data: Born in Perry, Oklahoma, February 18, 1923, the daughter of Leonard M. Neuerburg and Lucille C. Nunn, deceasesd. Married Harrison W. Alexander on November 25, 1939. Three married children.

Education: Received Bachelor of University Studies degree with a major in Food, Nutrition, and Institutional Administration from Oklahoma State University, Stillwater, Oklahoma, May 1978; completed requirements for a Master of Science Degree with major in Occupational and Adult Education, May 1984.

Professional Experience: Food Service Manager Green Valley Rest Home, Perry, Oklahoma, October 1965 to December 1968; Food Service Supervisor at Four Seasons Nursing Center, Stillwater, Oklahoma, January 1969 to February 1970; Food Service Supervisor/Dietetic Technician, Stillwater Medical Center, Stillwater, Oklahoma, March 1970 to March 1978; Nutrition Consultant to Title VII Nutrition Programs for the Elderly in Osage and/or Creek counties, May 1978 to October 1981; Nutrition Education Coordinator for Tonkawa Tribal WIC Program, Tonkawa, Oklahoma, November 1980 to July 1983: Nutrition Consultant to Wheatheart Nutrition Project, Inc., Offices in Tonkawa, Oklahoma, January 1979 to present.

Professional Organizations: American Dietetic Association; Oklahoma Dietetic Association; American Diabetes Association, Oklahoma Chapter; American Association of Adult and Continuing Education; Society for Nutrition Today.