NUTRITION KNOWLEDGE AND ATTITUDES OF PUBLIC HEALTH NURSES IN OKLAHOMA

By

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CHAPTER I

INTRODUCTION

Educating the public is a vital component of preventive medicine. Preventive medicine has assumed the role of high levels of individual health maintenance and efficiency (Sevrell and VanItallie, 1962). According to McGinnis (1980), preventive efforts work, stronger efforts are needed, and a nutritious, adequate diet is one of the most effective tools for prevention of disease we have. In the state of Oklahoma, the county health departments serve the population in various ways by providing health screening and monitoring, education, counseling services, and environmental monitoring. The health screening and education services are components of the preventive health care provided through the county health departments under medical direction with referral into the private medical community when indicated. Nutrition education is a part of the preventive health care provided by the county health department's medical direction.

Human nutrition can be defined as the study of foods and its interaction in the total life situation of man ("Commentary: Nutrition in Medical Education," 1974). During most of the United States' history, very little emphasis has been given to nutrition (Lee, 1978). In the last 20 years, consideration of the nutritional status of humans has gained in importance when policies are made (Lee, 1978).

Public health nutrition came into being as early as 1918 and when the Social Security Act of 1935 provided funding, more public health nutrition was provided by dietitians. As more public health programs were established in the late 1950's and 1960's, the numbers of nutritionists increased to meet the needs (Egan, 1980). Even so, the demand for nutrition information and counseling to satisfy the public's need for information far surpasses the number of available and qualified nutritionists.

The health care team is comprised of many disciplines involved in providing patient care and, depending upon the facility or agency, the nurse often assumes the major responsibility for providing patient care. The nurses in county health departments are working daily with the public and are responsible for educating them in the ways of good nutrition for preventing health problems. The nurse engaged in community health practice (public health) has the responsibility for assuming the lead role in nursing by providing guidance and technical information in nursing and health-related programs. The public health nurse, more than any other public health person, assumes the reponsibility for nutrition education. The public health nurse is in direct contact with people and needs nutrition knowledge so that sound decisions can be made by the individual with whom he/she is working (Harrison, Sanchez, and Young, 1969).

It is known that nutrition facts can be taught and those who are taught can demonstrate the knowledge learned upon examination, but it is not as clearly understood how much of this nutrition education is used in making food choices and improving nutritional status (Hegsted, 1973). It has been said that we are a healthy nation and we should work

from that premise in health education for prevention of disease, while others say we have gross nutritional and other health problems (Thomas, 1978). Cortez (1978) states, in a satire, that if we listen to all the politicians and nutrition activists we would never get to eat anything except "special foods". He feels that we are living in a great country where most of us are healthy.

In the past, nutrition education has been taught in a way to appeal to the intellect so that changes in food attitudes were looked down upon by those who believed in the traditional method. The two approaches must be combined for people to learn effectively ("Editorial--the Depth and Breadth of Nutrition," 1972).

The amount of nutrition education that is done by the nurse could be considerable. The nurse can educate in both the conscious or unconscious manner (Vickstrom and Fox, 1976). Realizing that the public health nurses have had various types of training and that nutrition was not always included as a major segment in nursing education, the researcher felt the need to assess the nutrition knowledge and attitudes of the public health nurses in Oklahoma. The nurse's nutrition knowledge and attitudes toward nutrition can support, negate, or nullify the efforts of the other professional involved in the patient care. The researcher felt that such an assessment can be useful in preparing an in-service nutrition education program for the public health nurses that could be used to improve nutritional status of the professional and the patient.

Purpose and Objectives

The purpose of this study was to identify nutrition knowledge and

attitudes of public health nurses in Oklahoma for the purpose of developing in-service nutrition education. To accomplish this purpose, the following objectives have been identified:

1. To assess nutrition knowledge and attitudes toward nutrition education of public health nurses.

2. To determine the relationship of nutrition knowledge of public health nurses to selected variables such as age, years of experience, attitude toward nutrition education, and educational background using the Analysis of Variance.

3. To make suggestions and recommendations for nutrition education in-service programs for public health nurses.

Hypotheses

The hypotheses for the study were:

1. There will be no significant difference between nutrition knowledge and attitude toward nutrition education.

2. There will be no significant difference between nutrition knowledge and age.

3. There will be no significant difference between nutrition knowledge and years of nursing experience.

4. There will be no significant difference between nutrition knowledge and educational background.

Limitations

The following limitations were identified by the researcher:

1. The subjects in this study were limited to public health nurses who were employed in county health departments in the state of Oklahoma during the months of October and November, 1978.

2. Trained public health nutritionists in Oklahoma administered the instrument to public health nurses.

3. The completed questionnaires were mailed to the researcher for analysis.

Assumptions

The assumptions for this study were:

1. Public health nurses in Oklahoma may have insufficient nutrition knowledge to incorporate good nutrition practices in the care plans for their patients.
2. Many public health nurses may not be open to changes in methods of teaching nutrition to their patients.
3. The attitudes toward nutrition influence total patient care by the public health nurses.
4. Public health nurses could answer the knowledge portion of the questionnaire objectively.
5. The public health nurses answered the questionnaire early in the morning before they became involved in their day's assignments and did not share information while they completed the questionnaire.
6. In-service nutrition education programs could be beneficial to public health nurses.

Definitions

The following terms were important to the study:

Nutrition - Science of human nutrition--study of food and its interaction in the total life situation of man ("Commentary: Nutrition in Medical Education," 1974).

Nutrition Education - The process by which beliefs, attitudes, environmental influences, and understanding about food lead to practices that are scientifically sound, practical, and consistent with individual needs and available food sources. (Position paper on nutrition education for the public, 1973).

Behavior of Professional Health Team - Those actions carried out in meeting the nutritional needs of patients by the nurse, physician, and dietitian ("Commentary: Nutrition in Medical Education," 1974).

Public Health Nutritionist - Professional practitioner prepared to provide all aspects of nutrition service in community health programs (U.S. Department of Health, Education, and Welfare, 1978).

Public Health Nurse - A nurse who practices nursing skills for which there exists a body of knowledge and related skills, which are applied in meeting the health needs of communities and of individuals and their families in their normal environments, such as the home, school, and work place (Freeman, 1970).

In-Service Education - On the job training, either seminar or demonstration, that covers a specific subject matter such as nutrition.

Associate Degree Nursing Program - A two-year college affiliated and accredited nursing program which, after completion, enables a graduate to take the state board examination to become a registered nurse.

Diploma Nursing Program - A three-year hospital affiliated nursing program which enables graduates to take the state board examination to become a registered nurse.

B.S. Nursing Program - An accredited four-year college or university nursing program which results in a Bachelor of Science degree in nursing. Graduates of this type of nursing program are eligible to take the state board examination to become a registered nurse.

Health Professionals - Trained health professionals such as physicians, dentists, dietitions, nurses, etc. who assume an active role in patient education and care.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The eating patterns of our nation have changed considerably in this century alone. The food supply has increased not only in volume, but availability. Advances in food technology have given the population new food products for consumption that our ancestors never dreamed of having available. Medical science, too, has made many discoveries in the last 100 years which have influenced our food supply and food choices. Research has increased our knowledge about such medical problems as diabetes, obesity, and cardiovascular conditions, to mention only three, which are greatly influenced by food habits and treated by changes in the diet. Nutrition research has presented information to the health professionals and the public resulting in an awareness of the importance of diet in relation to health status.

The composition of the United States' diet has changed drastically since the early 1900's. The intake of complex carbohydrates has decreased while the intake of fats and simple sugars has increased. Saturated fat, cholesterol, sugar, salt, and alcohol are related to six of the ten leading causes of death--heart disease, cancer, cerebrovascular, diabetes, arteriosclerosis, and cirrhosis of the liver.

Sound nutrition is not a panacea; nutritious food provides needed nutrients and should not be regarded as poison, medicine, or a good

charm (Food and Nutrition Board, 1980). Sharing food is one of society's main social contacts (Senate Select Committee on Nutrition and Human needs, 1977) and this thought needs to remain uppermost in our thinking that we are not dealing with a part of life that is only limited to the "physical." Food choices are influenced by many factors and the consumer is bombarded by confusing and conflicting information (U.S. Department of Health, Education, and Welfare, 1979). It is a known fact that good nutrition contributes to the development and health of infants and children and that good eating patterns should be established in teens and young adults.

One major public health concern that still exists in children and women of childbearing age is iron deficiency. In some older age population groups in the United States there is a trend toward a lower calorie intake. If these trends continue to exist, some of the deficiencies that seemed to be disappearing may surface again, even though most of our nutrition problems seem to be associated with overeating and imbalances in the kinds of foods eaten.

Nutritional Status Studies

The U.S. Public Health Service identified nutrition as one of the six major health care concerns, stating that it affects people at all stages in the life cycle and that nutrition education and care has to be coordinated (U.S. Department of Health, Education, and Welfare, 1975). In previous decades, the nutrition status of large population groups in the United States have been assessed by using various clinical and dietary consumption records, taking into consideration social and economic status. Results from the United States Department of Health,

Education and Welfare's Ten State Nutrition Survey (1972) indicated that a significant portion of the population was malnourished or the potential for malnutrition was evident. Malnutrition was most evident in Blacks, then Spanish-Americans, and finally, Whites. The incidence of malnutrition increased as income decreased. Evidence indicated that the adolescents between 10 and 16 years of age had a higher incidence of unsatisfactory nutrition status than did members of the other age groups studied. Male teens had a higher rate of malnutrition than female teens. Elderly people (over 60) showed an increase in nutrient deficiencies that was not restricted to race or economic status. Poor food choices and money management were responsible for inadequate diets. The educational levels of the person purchasing and preparing food were related to the nutrient status of persons under 17 living in the household, yet the school lunch program did help improve the diets of the low income youngsters. Obesity and dental cavities were related to the dietary intakes of the survey participants. Black females had a higher incidence of obesity than White females, but White males were more likely to be obese than Black men. Overall, women were more obese than men. Black children had more skeletal and dental development than the other racial groups. This survey showed that vitamin A foods and iron rich foods were often not selected. Iron deficiency was widespread. Dietary protein intake was well above adequate levels.

USDA Food Consumption Survey of 1977-78

The nationwide USDA Food Consumption Survey of 1977-78 (Pao, 1980) indicated a decrease from 1965 to 1977 in caloric intake by 10 percent. Diets decreased in dietary fats by 9 percent, carbohydrates by

13 percent, and protein by 4 percent. The consumption of foods high in vitamin C and thiamin increased more than any other nutrients. Vitamin C fortification and citrus juice consumption contributed to the increase. The participants in this survey had intakes lower in pork, lunch meat, eggs, and beans, while fish, beef, poultry, and nut consumption was up specifically from the 1965 survey in 1977. Except for men and women over 65 years of age, protein intake decreased for all sex-age groups. Riboflavin intake decreased from 1965 to 1977, yet intakes met or exceeded the 1974 RDA's. Caloric intake from fat was lower for all sex-age groups by 20 percent. Boys aged 15-18 had the largest average intake of calcium in 1977. Average calcium intakes were 25 percent or more lower for females 12 years and over. Calcium intakes were lower for infants in 1977, yet it was above the 1974 RDA. In 1977, children had intakes of calcium 10 to 20 percent lower than in 1965 and 13 to 15 percent lower for teens than in 1965. Infants' iron intake was two times what it was in 1965, but the one and two year olds had mean iron intakes that were half as high as infants in 1977. Mean protein intake decreased by 36 percent from 1965 to 1977, which may reflect the change in baby formulas.

In 1977, boys 15-18 years of age had the highest caloric intake of slightly over 2,700 calories; in 1965, 18 and 19 year olds had just over 3,000. Girls 12-14 years of age consumed 1,920 calories in 1977, which decreased from 2,150 calories in 1965 for the same group. In 1977, 51-64 year old women had intakes of one percent greater than 35-50 year old women. The population of the country changed from 1965 to 1977 with an increase of four percent of people age 18-44 and an increase of one percent of people age 65 and older.

Hegsted (1979, p. 1) stated, "The food supply is now exceedling complex and becomes more so all the time. Knowledge of food composition always lags behind our need and always will. . . ." Hegsted indicated that inadequacies in the data base exist because there is no sure way to compare what people eat to what they say they eat. The foods used in the Spring, 1977, survey had a higher nutrient density than food used in 1965. Average nutrient levels in the lowest income households generally improved more than in the other income levels. In 1977, quantities of food used and nutrient levels were more uniform at various income levels than in 1965.

HANES Survey

The first Health and Nutrition Examination Survey (HANES) was conducted from 1971 to 1974 by the National Center for Health Statistics (NCHS) to measure the nutritional status of the United States' population aged 1-74 years (U.S. Department of Health, Education, and Welfare, 1979). The study was comprised of a food frequency questionnaire and a 24-hour diet recall, blood and urine tests to measure various levels of nutrients, anthropometric measurements, and clinical signs of nutrient deficiencies. Age, sex, and income level were used for comparison but young children, pregnant women, older adults, and low income groups were the target groups. After the interviews, examinations, and assessments, iron was the nutrient which was below standard most often in the population, especially in low income adults aged 49-59 and Black children aged 6-11. White children aged 1-5 and White females aged 18-44 in the lower income group had a higher percentage of vitamin A and C intakes below standard, as compared to the Black

population in the same age, sex, and income bracket. Upper income Blacks had intakes in the higher percentages than Whites. Low income Black adults 60 years or older had the highest prevalence of low hemoglobin and hematocrit values. Children in the groups 1-5, 6-11, and 12-17 had the highest prevalence of low transferrin saturation values. Black children 1-5 showed the highest prevalence of low serum vitamin A values. All age groups of Whites, regardless of income or clinical findings, had a higher prevalence of low serum protein values. Clinical signs of malnutrition are secondary to other health conditions. Blacks seem to show a higher prevalence of secondary malnutrition than Whites in the same sex, age, and income groups. Dietary intake of protein was not markedly deficient. In some older age groups B-complex deficiency was indicated. White young children and women of childbearing age had greater vitamin A deficiency than Blacks. Poverty level Black adolescents and young women had more goiter. Black women were shown to be at highest risk for such diseases as hypertension, diabetes, and heart disease.

The results from the dietary intake portion of the survey showed that there was an increase in percentage of 12-17 year olds and 18 years and older who seldom or never drank milk. One to five year olds consumed eggs in greatest quantity, while 12-17 year olds ate them least often. Blacks reported eating more meat than Whites. Sample participants at less than two percent below poverty and one percent above poverty seldom or never ate meat or poultry. Of all income levels, children 6-17 years old had the highest salty snack consumption. The consumption of sweetened beverages increased for 1-17 year olds and decreased after age 17. After age 18, the intake of tea, coffee,

sweetened and carbonated beverages, fruits, and vegetables increased. Vitamin A rich vegetables and fruits, shellfish, tea, fish, skim milk, and artificially sweetened beverages were eaten less often in the 1-17 year age group than in other age groups.

The three national studies cited indicated that the population's eating habits are changing and that some of these changes may influence the health status of the population negatively. These national nutrition studies also indicate a need for nutrition education. Nutrition education is needed by man regardless of economic, educational, cultural, social, or geographic location because there is no instinct in man which can guarantee an adequate diet (Todhunter, 1969). For the public to benefit, health professionals need to be trained to provide care, not only to the patient in the hospital, but to prevent as well as to diagnose the disease (Winterfeldt, 1980). Recommendations were made that nutrition programs be required in medical, nursing, dental, and other allied health training programs (Mayer, 1973; White House Conference on Food, Nutrition, and Health, 1970, and Winterfeldt, 1980). The students should be provided with theoretical and practical experiences for doing nutrition education with patients (White House Conference on food, Nutrition, and Health, 1970). Those experiences should be relative to each other, not fragmented as they are in some existing programs (Mayer, 1973).

Nutrition Knowledge and Attitude Studies

Nutrition Education and Women Athletes

Determining the concerns of those who are to receive nutrition education can indicate a more effective way to teach nutrition.

University women who were involved in college athletics were surveyed to determine their nutrition knowledge, attitudes, and food patterns (Werblow, Fox, and Henneman, 1978). Of the 974 participants in the study, 41 per cent had never been exposed to any type of high school or college nutrition courses. Their knowledge level was higher regarding nutrition and athletics and their attitudes were generally favorable toward nutrition. From their food patterns, they were concerned about weight control and seemed to eat accordingly. Those who had had nutrition courses showed consistent eating patterns regarding weight control and pre-competition meals (Rosander and Sims, 1981; Shannon, Marbach, Groves, and Sims, 1981; Woolcott, Kawash, and Sabry, 1981).

Hospital R.N.s and Nutrition Knowledge and Attitudes

The registered nurse (RN) functions as an informal nutrition educator, yet with increasing demands of other subject matter in nursing curriculum, nutrition was left out. Vickstrom and Fox (1976) assessed the knowledge of normal and therapeutic nutrition and attitudes toward different areas of nutrition in hospital nurses in Nebraska. They found the level of nutrition knowledge to be low, yet the scores of both parts of the test were equal. The scores indicated they were better informed about basic nutrition principles than the application of these principles, but the opposite was true on the therapeutic part of the questionnaire. These nurses felt the dietitian could function for general nutrition teaching but it was more important for the dietitian to teach diet therapy to the patients on therapeutic diets. They found that nutrition knowledge declined with age and work

experience, but the older nurses had a more positive attitude toward nutrition. Nutrition knowledge was positively related to the nurse's attitude toward their role as nutrition educator and their perception of the health care team. They felt that nutrition knowledge increased the confidence of the nurse when working with patients. The same can be said when trying to learn about other cultures (LaMarqueta, 1975). As a learning experience, student nurses in New York City were sent to the ethnic markets to watch people shop and learn what they eat. These students learned to appreciate the food heritage of other cultures.

Public Health Nurses and Nutrition Education

Harrison et al. (1969) developed a true-false nutrition knowledge questionnaire for public health nurses. The bachelor degree level nurses had a better grasp of the social and cultural aspects of food. Specific nutrient knowledge was more correlated with the public health experience than with education level. Overall, the group knew direct nutrition facts but there was a greater variation of nutrition knowledge relating nutrition and food intake to physiological and psychosocial factors. The most often used printed materials were pamphlets.

Affective-Based Nutrition Education to Improve Knowledge, Attitude, and Diet

Rosander and Sims (1981) developed an affective-based series nutrition education plan in which the participants' attitudes about food, nutrition knowledge, and dietary behaviors were explored. The population studied were 69 women enrolled in a central Pennsylvania weight

control program. Only 23 of the women attended all three nutrition education sessions and completed a posttest (instructed group), while 22 women completed the pretest and postest but did not attend any of the three educational sessions. Data from the other participants who were unable to attend all three sessions was not included in this study. Participants were encouraged to bring their children to the education sessions and these researchers felt that they may have significantly affected attendance. (The instructed group of women were older 25 years vs. 22 and better educated 12 years vs. 11.) The uninstructed group of women had larger households which contained more adults and children over 12, while the households of the instructed group were smaller and had more preschoolers. The instructed group had significantly higher knowledge scores after attending the education sessions on the posttest. There were no significant differences in pretest attitude scores of either group, but after posttesting the instructed group had significantly greater mean scores in comparison with the pretest scores and the posttest scores of the instructed group. The pretest dietary scores of the uninstructed group were slightly higher in all areas, except in plant protein. After the nutrition education, the instructed group's posttest dietary scores showed improvement in all areas. Attendance at the education session was not a requirement for participating in the program; therefore, even though the results were encouraging, those in the uninstructed group might not have benefitted had attendance been required. However, there were no significant changes in knowledge, attitudes, or dietary behavior of those who took only the pretest and posttest. The researchers felt the affective-based approach for nutrition was effective and helped achieve the ultimate goal of changing dietary behavior.

Knowledge, Attitudes, and Teaching Effectiveness of K-6 Teachers

Shannon et al. (1981) also concluded that an affective component to help teachers gain positive feelings about nutrition combined with a cognitive component resulted in higher nutrition test scores of students who were taught nutrition in grades K-6. In their research, 125 kindergarten through sixth grade teachers were assessed to determine nutrition knowledge, attitudes, and commitment to teaching nutrition to their classes. The teachers were given one of three different types of preparation (curriculum material only, in-service education material, and in-service and post-grad course material) before teaching the 10 week nutrition course.

The teachers were divided into control and experimental groups, then further divided depending on which type of nutrition preparation they received. After analysis, all the data were combined because there were no significant differences between the groups. The teachers had a positive attitude toward nutrition in school but were not as supportive of nutrition when other optional class subjects were competing with it. Teachers who had prior science classes had higher knowledge scores but not attitude or commitment scores. Only 8 of the 125 teachers had completed a prior nutrition course and there was no correlation with the prescores. However, all groups had stronger correlations among attitude and commitment postscores than among prescores and nutrition knowledge postscores correlated significantly with the attitude and commitment postscores.

Teachers who had participated in the voluntary postgraduate course plus the in-service had significantly higher poststudy nutrition

knowledge than the ones who prepared with the 10-week curriculum materials only, or the materials and the in-service. The posttest was given four months after the course concluded, indicating that the type of nutrition preparation for the teachers influenced their knowledge. Teaching material is in itself a learning experience and provided positive nutrition knowledge for the teachers; however, there is no way to determine whether the preparation for teaching, the actual teaching, or a combination resulted in knowledge gained. These researchers found a trend that positive teaching experiences positively influence the teachers' attitudes toward nutrition education, but not all teaching experiences improved the attitudes toward the subject matter.

Nutrition Knowledge of Businessmen

Men are an important target for nutrition education because they not only influence family food habits but are susceptible to such nutrition-related problems as obesity and heart disease (Woolcott et al., 1981). In a study of Canadian businessmen, Woolcott et al. assessed the nutrition knowledge of 195 men who worked in a large insurance company. Information was collected on demographic data, personality factors, and participation in nutrition-related activities. These men had various educational backgrounds and were in different econmic status groups. Both married and single men participated. The mean age was 38 years and 76 per cent were educated beyond high school. The mean score on the 20 nutrition questions was 59 per cent. The researchers found that higher nutrition scores correlated with higher education and with greater participation in nutrition-related activities.

According to the personality profile of the respondents, those men who were more imaginative and open to new ideas had higher nutrition knowledge scores. In this study, the men were older, better educated, and on the management level. The men who reported whemselves to be more extroverted tended to have lower knowledge scores. These findings could influence the planning of nutrition education programs.

Nutrition Education

American Dietetic Association Position on Nutrition Education

The American Dietetic Association takes the position that nutrition education should be available to everyone ("Position Paper on the Scope and Thrust of Nutrition Education," 1978). Those who assume the responsibility of nutrition educator need to be aware of the meanings and ways foods are used by people as well as the acceptability and availability. Eating habits are so deeply ingrained in a person that it is most difficult to provide new knowledge that will be incorporated into an eating behavior that promotes good health. Unfortunately, not all health professionals understand the relevance of nutrition to their own health goals. Meaningful nutrition education information has not been abundant in the past; therefore, consumers have not had the incentive to actually incorporate nutrition knowledge into their eating behaviors (Sevrell and VanItallie, 1962). The broadcasting media had been used extensively to advertise nutrition information and reach the public, but health educators have not had the opportunity to do so.

Community Nutrition Education

Health professionals are often called upon to give programs or serve on panels for nutrition education. These obvious short term opportunities need to give the public the freedom to evaluate their own knowledge, then help them find reasons to incorporate a new eating behavior (Chethik, 1977). Food models, various games, food preparation machines, and pictures are just a few of the different tools that can be used to stimulate an exchange of ideas from an audience. The flow of conversation between audience members is also a very good way to provide nutrition education. Another successful way to provide nutrition education is through the use of the panel discussion involving various health care team members. One such panel was comprised of two physicians and one registered dietitian in a series of three sessions about diet and heart disease. The data indicated that participants who had no history of heart disease showed the greatest change in their knowledge, attitudes, and behavior (Podell, Gary, Keller, and Mulvihill, 1975). The highly motivated person with a good knowledge base seems to respond more favorably to this type of education technique than does the non-motivated, uninterested participant. Appealing to the "emotional" side of the issue may have merit when planning a nutrition education program. It is unfortunate that the word nutrition has very little meaning to the vast population (Briggs, 1969).

Another successful method of teaching nutrition was reported by MacKenzie and Arbor (1979). By forcing two groups of teens to review learned material and teach nutrition to other younger children and older adults, those who were "teachers" improved their knowledge levels.

Nutrition Education of Day Care Center Teachers

The types and quality of foods provided to children in day care is greatly influenced by the day care teachers. In a Canadian study, 120 day care teachers responded to a questionnaire assessing levels of nutrition knowledge, opinions of the importance of nutrition and food practices of young children, and the teachers' use of foods as learning experiences (Gillis and Sabry, 1980). The teachers surveyed were in various sized day care centers located mostly in urban or suburban areas. The majority had some training in early childhood education with some specific nutrition training. Their main source of nutrition information was from government agencies and their nurses or nutritionists. Overall, their knowledge scores were not relative to the size, locale, sponsorship, work experience, or in-service nutrition education. Teachers with early childhood degrees did score slightly higher than teachers without early childhood training. The teachers who were between 24 and 34 years of age did have more positive opinions on the importance of nutrition. The teachers who had had contact with a nutritionist during the previous year were more likely to use food learning activities. The results of this study suggested that in-service education might be helpful to the teachers.

In-Service Education for Early Elementary Teachers

Petersen and Kies (1972) also found that innovative in-service education could be helpful for early elementary teachers (K-3). These teachers were tested on their nutrition knowledge and attitudes. They scored higher on general information, yet, overall, their scores were

low. Little relationship was indicated between nutrition knowledge and attitude toward nutrition education.

Development of a Testing Instrument to Determine Nutrition Competencies

So that nutrition pre-service and in-service could be more meaningful, Carver and Lewis (1979) developed a testing instrument to determine nutrition competencies and interpretation of lay literature in nutrition. The control group for this study were nutritionists. This control group was important because it helped the researchers determine whether or not the test discriminated against those with previous nutrition knowledge. The findings indicated that the two parts of the test probably measured different levels of knowledge and that nutrition knowledge was valuable in interpreting nutrition reading material.

Nutrition Education in Public Schools

Another education area that shapes eating patterns of the population is the foodservice department. Foodservice employees can promote nutrition education if the school system recognizes nutrition as an independent function of total health and is incorporated into the school curriculum involving both parents and the community. From a survey of school administrators in Kansas, Greig (1978) learned that they did not consider nutrition important subject matter or foodservice employees as qualified instructors. Few school districts had developed a way to provide valid information through teachers or employees, much less the parents and community. The Kansas State

Department of Education developed vocational foodservice courses throughout the state, continued offering classes for teachers and foodservice employees, and concluded by presenting classes or holding meetings in the local areas, depending on need. From these efforts, the Manhattan (Kansas) School District developed a curriculum for their elementary schools, grades K-6, and established food advisory councils for junior and senior high schools consisting of students, teachers, PTA members, and local health professionals to promote nutrition education.

Foodservice Employees Promote Nutrition Education

Another effort to promote nutrition education in elementary schools was undertaken by the Little Rock (Arkansas) School District for grades, 1, 2, and 3 which was administered by the foodservice employees (Blake and Knickrehm, 1978). The objective of the program was to reduce plate waste. To accomplish this objective, a nutrition coordinator developed 10 nutrition lessons and distributed these to the teachers. In Group A, no extra direction or teaching aides were presented to the teachers. Group B was given extra time from the nutrition coordinator to teach the classes as well as special teaching aids and tasting samples. There were no differences between the two groups initially. Group A's food consumption remained the same except that the first graders increased their consumption of sweet potatoes after nutrition education. But Group B increased their consumption of sweet potatoes, whole wheat rolls, and cottage cheese significantly in first and second graders. The overall plate waste was reduced in Group

B after nutrition education. Many of the teachers in Group B developed their own teaching aids. Conclusions from this study showed that eating patterns were more rigid in third grade children, a cooperative effort from all school personnel in nutrition education improved eating behavior, and finally, increases in food consumption were demonstrated, yet these increases are not always translated into sufficient increases in consumption.

Medical and Dental Schools Incorporate Nutrition Education for Students

Because of the "lip-service" given to nutrition in many medical and dental schools, the State University of Iowa offered a nutrition course to dental students requiring as the prerequisites only science classes (Ohlson and Osborn, 1961). The demands for the class grew until it was made a requirement for second year dental students. The class was structured to have large lecture sections plus discussion and demonstration sessions. The class was a basic human nutrition class with emphasis on good nutrition for the student and his family. The medical student is exposed to different conferences dealing with patients offering the opportunity to discuss nutritional problems with the health care team. Thus, medical and dental students have the opportunity to learn nutrition and apply that knowledge whether they are taught in the formal classroom or during ward conferences.

A system for nutrition education was developed for dental students during their four year program using didactic, clinical, and community health experiences (DePaola, Modrow, and Wittemann, 1978). The didactic component provided the knowledge base for the patient whose

nutritional status influences dental health. The student received the didactic portion during his first, second, and fourth years of training. The clinical counseling and nutrition assessment with subsequent counseling was emphasized during the second and third years. During each of the four years, community experiences were provided the student to improve their skills. The intensity of the program and the extensiveness of the experiences provided the students with the knowledge they needed to apply to their private practices. The preliminary follow-up of the graduates indicated they were utilizing nutrition counseling after completing the program.

Assessment of Dental Students' Nutrition Education

At the University of Kentucky, a study was undertaken to find the source and quality of nutrition education received and to determine nutrition knowledge gained by dental students (Bozdech, Packett, Marlatt, and Bridges, 1978). To determine knowledge levels, a general nutrition test from the Department of Nutrition and Food Sciences was given on a take-home basis to all dental students during orientation week. These questionnaires were to be returned within 48 hours. Of the 235 tests, only 175 were returned completed for analysis. The results from the scores were low, with the first year students having the lowest scores. This may have occurred because of the various backgrounds of incoming students. The second and third year students scored higher on the test but the overall scores for the second through fourth year students were low. The same test was given to undergraduate students who had completed the freshman food class "Food, Nutrition,

and Man." Their percentage scores were higher. The low scores of the dental students may also have indicated they retained small amounts of knowledge but had no uniform nutrition instruction or evaluation. After the final analysis, the results indicated a need to clearly establish essential nutrition knowledge areas of the dental students and present the material clearly to the students, then establish a compe-competency-based evaluation system in the specific areas of nutrition.

The didactic, clinical, and public health approach should be coordinated to teach nutrition in medical schools. Sevrell and VanItallie (1962) listed the areas of nutrition which they considered to be the most important topics to be covered in preventive medicine. They are the following:

1. Historical development of nutrition in medicine and public health.
2. Recommended Daily Allowances and their proper use.
3. Important areas of nutrition directly related to public health and the proper treatment.
4. Evaluation methods for determining nutritional status of various populations.
5. Nutritional biochemistry.
6. Methods of controlling and preventing malnutrition.
7. Role of nutrition in the care of the patient (p.630).

The authors felt that most physicians were not qualified to give accurate answers to nutrition questions or to evaluate sources of printed nutrition information. Also, they felt that an expert should teach the broad areas of nutrition so that accurate, up-to-date information would be presented.

Nutrition Education in Medical Schools

A commentary for the Journal of the American Dietetic Association ("Commentary: Nutrition in Medical Education," 1974) echoed the previous remarks stating that improvement in the physician's knowledge and application of nutrition in preventive health care should reduce the contribution of inadequate nutrition to ill health. This commentary defined the science of human nutrition as the study of food and its interaction in the total life situation of man. Medical school nutrition training was needed to acquaint the physician with the influence food has on the patient, to present sound nutrition principles, and to learn to refer to the dietitian.

Another series of commentaries published in Nutrition Today in 1972 further illustrated the need for nutrition education of physicians ("Nutrition Education of Physicians--Five Commentaries," 1972). Two of the commentors felt that nutrition had been neglected; therefore, the knowledge gap was being filled by untrained, inaccurate people willing to share their "expertise," yet, when nutrition is offered, it is very fragemented. Another felt that unless the medical profession was willing to include more nutrition education, physicians should be reluctant to discuss the subject. Still another panel member stated that quality nutrition education was crucial but it could not come from a sterile or static nutrition science. He felt that of three crucial items in the environment (air, water, food), food was the most complicated, most important, and most subject to declines or improvement in quality. The fifth member of the panel stated his medical school did have a computer-assisted nutrition course.

He felt that no matter how much knowledge a physician had, if appetizing food was not presented to the individual, it would not be accepted; therefore, no improvements in nutritional status would be accomplished.

Nutrition Education in Nursing Schools

The nurse should know how to use nutrition in all patient relationships because it is an essential component of health which can be integrated with other sciences so good nutrition principles can be taught (Greene, 1960). Nutrition and Diet Therapy instructors at four diploma nursing schools in Knoxville, Tennessee, and the Knoxville Dietetic Association formed a committee to improve nutrition education within the nursing schools and to promote understanding and cooperation between the two disciplines ("Interorganization Committee of the East Tennessee League for Nursing and the Knoxville District Dietetic Association," 1971). A survey to determine the needs of the nurses was done and was followed with workshops incorporating small group sessions. The groups rotated through all sessions which explained revisions in the diet manual being used. The committee received positive feedback. The nutrition education must be interesting and correlated with diet therapy classes for student nurses (Miriam, 1957). Food composition and diet therapy should be taught very carefully and in a practical fashion (less theory) for nurses if it is to be incorporated in their work.

A program using the conceptual approach to teach nutrition to nursing students in their junior year required prerequisites of humanities, behavioral science, physical and biological science, mathematics, and nursing (Grant and McCarthy, 1971). The overall course

objective was to acquire knowledge and understanding of nutrition principles, and to apply these principles to meet the nutritional needs of both individuals and families in the community that were either healthy or sick. The team teaching approach was used. The faculty and students discussed nutrition and its place. Results from these discussions established that the daily diet may be among the most important facts in maintaining health, preventing disease, and recovering from illness; that nurses obtain knowledge of food and dietetics in both preventive and therapeutic areas from a professional; that nutrition is integrated into physiology and biochemistry. The students had experiences in nutrition and patient care, developed an interest in nutrition, and learned how to apply that knowledge in public health practice.

At the University of Nebraska Medical Center, the nutrition instructor at the nursing school used the "potluck party" idea to consolidate the information students had been given during the semester ("Perspectives in Practice--Teaching Nutrition to Nursing Students: Let's Have a Party!" 1978). The class had discussed food as a source of nutrients, low-cost meals, low-fat, low-calorie cooking, non-meat entrees, and food from other cultures. To keep interest up, the students could either work individually or in groups of two or three and bring a food to the tasting party that illustrated what they had discussed in class. This was an optional experience, yet 50 of 61 students participated. As the tasting party was proceeding, the students were asked to complete an optional questionnaire asking if they tried the food and if they had, if they would eat it again. Comments from the class members, their participation, and feedback from other faculty

members considered this approach to learning to be interesting and appealing.

Summary

From the results of the Ten-State, USDA Food Consumption, and HANES surveys, the population of the United States does have dietary deficiencies which are either caused by primary health problems or are secondary to the health problems.

For nutrition education to be effective, the nutrition knowledge and attitudes of the population need to be assessed and various types of demographic data which influence the responses must be considered. The results of the studies can be used to provide valuable information in planning nutrition education. The main concern of the women athletes was weight control and they ate according to their knowledge of nutrition. The demographic data of elementary teachers indicated how their knowledge and attitudes were influenced by their training and commitment to the subject matter. Dietary practices of pregnant women who participated in a WIC nutrition education program improved while they learned more about nutrition. Personality characteristics, educational background, income status, and participation in nutrition-related activities influenced the nutrition knowledge of businessmen. Those who had higher scores were more open minded and were in the management area of the business.

The American Dietetic Association advocates nutrition education for everyone and those who educate need to be aware of the various meanings of food to the people they are educating. Informal education in the form of panel discussions or seminars lends itself to a

flow of conversation which can be stimulating to the audience as well as the educators. Public school systems found that foodservice employees, as well as teachers and parents, could provide meaningful nutrition education experiences for students resulting in better health, new taste experiences, and reduced plate waste.

The dental, medical, and nursing schools across the nation have not always provided their students with the background knowledge that is needed to effectively educate their patients to make wise nutrition decisions. At the University of Iowa, a required nutrition course for second year dental students resulted from the growth of an elective nutrition course. Other dental schools found that their students had such diverse nutrition backgrounds that nutrition courses and patient education were included during each year of training. Follow-up indicated that practitioners who graduated from such programs provided more nutrition education to their patients. Many medical students have the opportunity to expand their formal knowledge through informal staffing conferences by learning from the other members of the health care team. Experts teaching the nutrition to medical students provided accurate, current information which could be applied in both therapeutic and preventive medicine.

Nurses assume the role of nutrition educator because they have more contact with patients. They, too, have accurate dietary information to provide the best possible care to patients. Cooperation between local dietetic associations and area nursing schools is one way to provide the necessary nutrition education. Field trips to ethnic markets and social functions which focus on using principles of nutri-

tion, economics, meal planning, and diet therapy are two ways to reinforce the nutrition education classes in which students are enrolled.

CHAPTER III

PROCEDURE

Introduction

The purpose of this study was to assess the nutrition knowledge and attitudes of public health nurses in Oklahoma and to determine any significant differences between selected variables of age, years of public health experience, educational background, and attitudes toward nutrition education and nutrition knowledge. From these findings, recommendations for nutrition education in-service training will be made.

Subjects

The subjects in the study were public health nurses who were employed by county health departments in Oklahoma. Within the 77 counties in Oklahoma, there are 60 established county health departments which are working under the policies, procedures, and guidelines of the State Health Department located in Oklahoma City. One of the services of the health department is preventive health care screening. Nutrition assessment and counseling are included in this service. In October and November, 1978, Oklahoma was divided into six regions with a public health nutritionist assigned to each region (see Appendix A). There were six regional nutritionists serving a five to ten

county area within the state at the time of the study. Nutritionists were not available to every county health department.

The nutritionists in Oklahoma worked with the public health nurses in providing direct and indirect patient services. Each day that a nutritionist was in the particular county health department, a portion of her time was spent consulting with the nurses to help ensure that the patients who were being seen only by the nurses when they came to the health department for preventive health screening services were receiving nutrition counseling. The other part of the nutritionist's time was spent counseling on a one-to-one or a group basis with the people in the community.

Approximately 250 nurses were employed by the Oklahoma State Department of Health at the time of the study. Only the nurses who were on duty in the county health department within a three week time period during October and November, 1978, were included in the sample. A total of 70 subjects responded to the questionnaire.

Development of Instrument

The researcher developed a questionnaire for the purpose of assessing the nutrition knowledge and attitude toward nutrition (see Appendix B). Comprehensive nutritional studies and the researcher's professional experience were utilized in the development of the instrument. The instrument was developed to include three areas:

I. Background information of the subjects and attitudes toward nutrition education.

II. Nutrition knowledge.

III. In-service education.

Part I of the questionnaire was designed to obtain various demographic data including age, years of experience, and educational background of the public health nurses. Also included in this part were questions to obtain the nurse's sources of nutrition information and the nurse's attitude toward nutrition education.

Part II of the questionnaire was based on the review of literature and aspects of nutrition counseling done by public health nutritionists and nurses in Oklahoma. The final examination from the course FNIA 1113, Basic Human Nutrition, at Oklahoma State University was used as a guide to develop the nutrition knowledge questionnaire. A total of 27 questions were developed in the areas of general nutrition, weight control, iron enrichment, maternal nutrition, and pediatric nutrition to assess nutrition knowledge. Approximately the same number of questions were in each category.

Part III of the questionnaire included questions to guide the development and presentation of in-service nutrition education for public health nurses. Also included was a question to determine interest in a university nutrition course for credit.

Pretesting the Instrument

The questionnaire was reviewed by the Chief of Nursing Services and by the maternal-child health nutrition specialist at the Oklahoma State Department of Health for clarity and appropriateness of the questions. Following their review, the questionnaire was revised and pretested for readability and clarity by ten public health nurses in the Payne and Kay County Health Departments in Oklahoma. After pretesting, their suggestions and recommendations were incorporated into the

questionnaire.

Administration of the Instrument

The researcher instructed five other public health nutritionists in the procedure of administration of the instrument to the subjects by letter and telephone (see Appendix C). The instruments were returned to the researcher by mail within the three week time period. This time period was chosen because of the nutritionist's schedule at the particular county health department. No follow-up was necessary.

Analyses of Data

The responses from the questionnaires were compiled by frequency and percentages of responses to each question. Each knowledge question was given a score of one point for the correct answer. Twenty eight points were possible for nutrition knowledge. Each attitude statement was given a value of five points for strongly agree decreasing to one point for strongly disagree. Thirty five points were possible for the attitude statements.

5 = Strongly agree
4 = Agree
3 = Undecided
2 = Disagree
1 = Strongly disagree

Total points for both nutritional knowledge and attitude were analyzed.

To test the null hypothesis, analysis of variance standard statistical procedures (SAS computer program) was employed. A level of significance was established at P 0.05. From the results of the study,

the researcher made suggestions and recommendations for in-service education in nutrition for public health nurses in Oklahoma.

CHAPTER IV

DISCUSSION AND RESULTS

Introduction

The purpose of this study was to identify the nutrition knowledge and attitude of public health nurses in Oklahoma. The difference between nutrition knowledge and selected variables, including age, years of public health experience, educational background and attitude toward nutrition education. Seventy public health nurses participated in the study.

Background of Subjects

The majority of the nurses, 25 (35.7%) were 26-35 years of age. Those nurses less than 25 years old represented only 13 (18.16%) of the total and the remaining eight (11.4%) were over 51 years of age. At the time this questionnaire was completed, the largest percentage, 34 (48.6%) of the nurses had less than two years of public health work experience. Those nurses with two to five years of experience represented 19 (27.1%) of the sample. There were 13 (18.6%) of the nurses with six to ten years of experience, and only one (1.4%) nurse had 11 to 15 years of experience in public health. However, three (4.3%) of the nurses had worked over 16 years in the field.

The nurses were asked to indicate the type of training program from which they graduated. Thirty-one (45.6%) responded that they

had a Bachelor of Science degree. The diploma nurses totaled 24 (34.2%), while 15 (22%) of the nurses were trained in the Associate Degree program. None of the nurses in the sample had a Master of Science degree. Sixty-six (94.3%) of the nurses had at least one nutrition course during their nursing training (Table I).

TABLE I

AGE, PUBLIC HEALTH EXPERIENCE, EDUCATIONAL BACKGROUND, AND NUTRITION COURSE DURING TRAINING BY NUMBER AND PERCENTAGE (N=70)

	Number	Percentage
Age		
Less than 25	13	18.6
26-35	25	35.7
36-50	24	34.3
51 and over	8	11.4
Years of Public Health Experience		
Less than 2	34	48.6
2-5	19	27.1
6-10	13	18.6
11-15	1	1.4
16 and over	3	4.3
Training		
B.S.	31	45.6
Diploma	24	34.2
Associate degree	15	22.0
Had Nutrition Course		
Yes	66	94.3
No	4	5.7

The nurses were asked to indicate which sources of nutrition information they used most often. They were asked to indicate all sources of nutrition information which resulted in the numbers and percentages to be larger than the total number of the sample. The majority of the nurses, 52 (74.3%), responded that dietitians were their primary source of nutrition information. Twenty-nine (44.4%) of the respondents identified other nurses as nutrition information sources. Professional journals were indicated by 27 (38.6%) for nutrition information; doctors and others were identified by 15 (21.4%); magazines and newspapers were identified by 10 (14.3%); and only 1 (1.4%) identified television and radio.

Dietitians were identified as a nutrition information source three times as often as doctors. This may be caused by a closer working relationship between nurses and dietitians. Other nurses provided considerable nutrition information to their peers, although no attempt was made in this study to determine the accuracy of the nutrition information. In this study, television and radio were not as important a source of nutrition information as has been cited in other studies. (Nutrition education--a needs assessment for Oklahoma, 1979 p. 19). Ranked responses in descending order of reported frequencies are shown in Table II.

Knowledge Scores

The nutrition knowledge questions were assigned a value of one point for each correct answer. There was only one correct answer for each knowledge question. A total knowledge score of 28 points was possible. The range of scores were from 16 to 28. The mean knowl-

edge score was 22.2. Forty (57.1%) of the respondents' scores ranged between 21 and 23 points. Only one of the subjects had a perfect score of 28. The number and percentage of correctly answered questions is shown in Table III.

TABLE II

SOURCES OF NUTRITION INFORMATION ACCORDING TO NUMBER AND PERCENTAGE OF RESPONSE (N=70)

Source	Number of Respondents	Percentage of Respondents
Dietitions	52	74.3
Nurses	29	41.4
Professional Journals	27	38.6
Doctors	15	21.4
Other	15	21.4
Magazine/Newspapers	10	14.3
Television/Radio	1	1.4

*Does not equal 100% because all sources used were to be indicated.

Knowledge Areas

In the nutrition knowledge portion of the questionnaire, the respondents selected the best answers for each question in five areas of nutrition. The five nutrition areas were general nutrition, weight control, iron enrichment, maternal nutrition, and pediatric nutrition (see Table III). The largest number of correct responses were in the

TABLE III

QUESTIONS ANSWERED CORRECTLY BY NUMBER AND PERCENTAGE (N=70)

	Number	Percentage
General Nutrition		
identify a protective food	70	100.0
meaning of incomplete protein	69	98.5
meaning of term enrichment	68	97.1
identify function of cellulose	65	92.8
how carbohydrate is utilized by the body	59	84.2
identify mid-morning snack use	58	82.8
dangers of excess fat-soluble vitamins	41	58.5
Weight Control		
choose best method of weight control	70	100.0
select meal to reduce calories	66	94.2
maintain weight with nutrition and exercise	61	87.1
lose two pounds weekly be decreasing calories	27	38.5
choose high calorie food item	24	34.2
Iron		
choose nutrient that is twice RDA of males for females	68	97.1
choose nutrient that is used to carry oxygen	67	95.7
select iron-rich infant food	48	68.5
identify length of time which babies' iron stores last	44	62.8
choose nutrient which improves iron absorption	31	44.2
Maternal		
choose maternal diet influences	70	100.0
choose condition influencing prematurity and anemia	69	98.5
choose important value of breast feeding	60	85.7
choose vitamins influencing red blood cell synthesis	34	48.5
identify change occurring when lactation diet low in nutrients	9	12.8
Pediatric		
identify age where improper diet causes most harm	70	100.0
choose how to use milk other than drinking	70	100.0
identify first solid added to diet of infant	70	100.0
choose nutrients supplement in breast fed infants	58	82.8
identify increased birth weight in first year	53	75.7
identify change in child's appetite in second year	53	75.7

pediatric nutrition portion of the questionnaire.

Thirty-eight (54.2%) nurses answered these pediatric nutrition questions correctly. Seventy (100%) of the nurses were knowledgable about the damage which can occur from lack of proper feed during the first six months of life; that iron fortified cereal was the first solid added to the diet; and that cooking with milk was the best way to use dairy products if the child would not drink it. Fifty-eight (83%) knew that vitamin C needed to be added to the breast fed infant's diet. Fifty-three (76%) knew that birth weight tripled during the first year of life and the appetite decreased in the second year.

General nutrition knowledge ranked second, with 35 nurses (50.0%) correctly answering all questions. Seventy (100%) correctly identified which foods were not protective foods. Sixty-nine (98%) knew the meaning of an incomplete protein and 68 (97%) knew the meaning of the term "enrichment" in bread products. Sixty-five (92%) knew the function of celluose in the body, but only 59 (84.2%) understood how carbohydrates were utilized. Fifty-eight (83%) knew how a mid-morning snack fit into a meal plan properly. Forty-one (58%) correctly identified the fat-soluble vitamins.

Fifteen (21.4%) nurses answered all questions on iron enrichment correctly. None of these questions were answered correctly by the total sample, although 68 (97.1%) indicated that iron was recommended for the 19-22 year old female in amounts twice that of what was needed by males. Sixty-seven (95%) knew that iron was needed to carry oxygen to the cells. Forty-eight (68%) correctly identified iron-rich infant cereal as the first source of iron for the infant. Forty-four (63%) knew that babies had iron stores which lasted about three months. Thirty-one (44%) knew that vitamin C enhanced iron absorption.

Both weight control and maternal nutrition had only five (7.1%) correct responses. Seventy (100%) knew that smaller food portions from the Basic Four food groups and daily exercise was the best method of weight control. Sixty-six (94%) correctly identified the meal which best reduced caloric intake and 61 (87%) identified daily exercise as one component of weight maintenance. However, only 27 (38.5%) were able to choose the number of calories per day which would be needed to lose two pounds weekly. Only 24 (34%) were able to select which one entree item had the highest calorie count.

Seventy (100%) knew that the maternal diet influenced the newborn iron levels. Sixty-nine (98%) knew that anemia in the mother could result in premature delivery and anemia in the infant. Sixty (85%) identified the transmission of antibodies as one of the values of breast feeding. Thirty-four (48%) knew the requirements for folic acid and vitamin B_{12} were increased during pregnancy for the synthesis of red blood cells. Only nine (13.8%) knew that a diet low in nutrients influenced the quantity not quality of the breast feeding mother's milk. Table IV illustrates these groups of responses by number and percentages in descending order.

The greater knowledge of pediatric nutrition could have resulted from information nurses received from work with pediatric nutrition programs, information from dietitians, or available printed literature on the subject. Maternity nutrition programs were increasing at the time of this study and similar maternity nutrition information sources as pediatric nutrition information sources were available to the nurses, yet correct nutrition knowledge responses were low. Correct reponses to weight control questions were

low. Information in this area of nutrition is abundant but the sources of such information are not always valid. While 35 (50%) of the respondents answered general nutrition knowledge questions correctly, information and education in this area needs to be available to provide background for the above mentioned specific areas of nutrition.

TABLE IV

NUMBER AND PERCENTAGE OF QUESTIONS ANSWERED CORRECTLY IN EACH KNOWLEDGE AREA BY THE RESPONDENTS (N=70)

Questions	No. of Respondents	Percentage of Respondents
Pediatric Nutrition	38	54.2
General Nutrition	35	50.0
Iron Enrichment	15	21.4
Maternal Nutrition	5	7.1
Weight Control	5	7.1

Knowledge Scores Variables--Age, Public Health Experience, and Educational Background

Analysis of variance (ANOVA) was used to determine any significant difference between nutrition knowledge and age, years of public health experience, educational background, and attitudes. Mean scores for knowledge and attitudes were determined from this data according to

Statistical Analysis Systems 79 (Barr and Goodnight, 1972).

The mean knowledge score for the nurses was 22.2. The largest number of nurses, 25 (35.7%), were in the age group 26-35 and they had the highest mean knowledge score of 23.1. The 24 nurses (34.2%) age 36-50 had a mean score of 21.5, but the 13 nurses (18.5%) who were less than 25 years old had a mean score of 22.3. There were eight nurses (11.4%) in the 51 years and over age group with the lowest mean score of 19.7, but one of this group had a perfect knowledge score of 28 (Table V). Although the largest numbers of nurses with the highest mean scores were found in nurses 26-50 years old, the results indicated that age is not an indicator of knowledge acquisition and retention.

The largest number of nurses, 34 (48.5%) had less than two years in public health experience. Their mean knowledge score was 22.5. Nineteen nurses (27%) had two through five years of public health work experience and their mean score was 21.8. Thirteen nurses (18.5%) had six through ten years of experience and a mean score of 22. One nurse (1.4%), working 11-15 years, had a mean score of 19, while the three nurses (4.2%) who had worked 16 or more years in public health had the highest mean score of 23.6 (see Table V). No conclusions about the number of years of work experience and knowledge could be determined.

These results regarding age and years of public health experience, contrast those of Vickstrom and Fox (1976) who found that nutrition knowledge declined with age and work experience. However, Harrison et al (1969) found a stronger correlation between specific nutrient knowledge and public health experience.

TABLE V

MEAN KNOWLEDGE SCORES BY NUMBER AND PERCENTAGE ACCORDING TO AGE, PUBLIC HEALTH EXPERIENCE, AND TRAINING (N=70)

	Mean Score	Number	Percentage
Age			
Less than 25	22.3	13	(18.5)
26-35	23.1	25	(35.7)
36-50	21.5	24	(34.2)
Over 51	19.7	8	(11.4)
Years Public Health Work Experience			
Less than 2	22.5	34	(48.5)
2-5	21.8	19	(27.0)
6-10	22.0	13	(18.5)
11-15	19.0	1	(1.4)
16 and over	23.6	3	(4.2)
Training			
B.S.	22.8	31	(44.2)
Diploma	21.4	22	(31.4)
Associate Degree	22.4	15	(21.4)

There were 31 (44.2%) B.S. degree nurses in the sample. Their mean knowledge score was 22.8. The 22 diploma nurses (31.4%) had a mean knowledge score of 21.4. The 15 Associate Degree nurses (21.4% had a mean knowledge score of 22.4 (see Table V). The mean scores of this group of variables were not significantly different.

Sixty-six of the nurses (94.3%) had had at least one nutrition course during their nursing training. Four nurses (5.7%) indicated they had not been taught nutrition during their nursing training. The mean nutrition knowledge score of those nurses who had received nutrition course work was 22.2, however, those who had not taken a nutrition

course also had a mean score of 22.0.

Attitude Profile Scores

The attitude statements in the questionnaire were answered by indicating the degree with which the nurse agreed with that statement. There were five responses from which to indicate agreement. Each of these responses was assigned a numerical value ranging from five points for strongly agree to one point for strongly disagree. There were seven statements comprising the attitude profile. The responses to the attitude statements by number and percentage are found in Table VII.

Forty-eight (68.5%) of the respondents agreed and strongly agreed that the term "nutrition education" had a negative connotation. Thirty-four of the nurses (48.5%) agreed and strongly agreed they had enough knowledge to teach nutrition to their patients, but 18 (25.7%) were undecided and 18 (25.7%) disagreed and strongly disagreed with the statement.

Thirty-one (44.2%) nurses agreed and strongly agreed they were responsible for the nutrition education of their patients. Twenty-six (37.1%) disagreed and strongly disagreed with the statement and 13 (18.5%) were undecided.

Fifty-nine nurses (84.2%) disagreed and strongly disagreed with the statement that the nutritionist was responsible for the patient's nutrition education. Only six (8.5%) agreed that this was the nutritionist's responsibility.

Thirteen (18.4%) agreed and strongly agreed that they knew where to obtain printed material, but 42 (59.9%) agreed and strongly agreed that they had enough printed nutrition teaching materials. Only nine

TABLE VI

RESPONDENTS' ATTITUDE TOWARD NUTRITION EDUCATION BY NUMBER AND PERCENTAGE
(N=70)

Attitude	[a] SA		A		U		D		SD		Total	
	N	%	N	%	N	%	N	%	N	%	N	%[b]
"Nutrition Education" negative connotation	12	17.1	36	51.4	8	11.4	14	20.0	0	0.0	70	99.9
Has enough printed nutrition teaching aids	8	11.4	34	48.5	7	10.0	17	24.2	4	5.7	70	99.8
Enough knowledge to teach nutrition to patients	8	11.4	26	37.1	18	25.7	17	24.2	1	1.4	70	99.8
Nurse responsible for nutrition education of patients	6	8.5	25	35.7	13	18.5	25	35.7	1	1.4	70	99.8
Obtain printed nutrition information	3	4.2	10	14.2	4	5.7	46	65.7	7	10.0	70	99.8
Would teach more nutrition if had more knowledge	1	1.4	8	11.4	8	11.4	39	55.7	14	20.0	70	99.9
Nutritionist responsible for nutrition education of patients	0	0.0	6	8.5	5	7.1	32	45.7	27	38.5	70	99.8

[a]Strongly Agree; Agree; Undecided; Disagree; Strongly Disagree.

[b]Does not equal 100% because of rounding.

nurses (12.8%) agreed and strongly agreed that they would teach more nutrition if they had more knowledge; eight (11.4%) were undecided about the statement; 53 (75.7%) disagreed or strongly disagreed.

From this data, a majority of the respondents felt that nutrition education was a negative term; they had enough knowledge to teach nutrition and it was their responsibility to do so, not the nutritionist's; they did not know where to obtain printed nutrition information but what they had was enough; however, they felt that more nutrition knowledge would not result in more nutrition education for their patients. Vickstrom and Fox (1976) determined from their study of hospital nurses that the subjects felt it was more important for the dietitian to teach theraputic diets instead of general nutrition. They also determined that nutrition knowledge increased and attitudes were more positively related to nutrition knowledge as the nurse became more confident in working with patients.

Profile of Attitude And Knowledge Scores

The nutrition questions were assigned a value of one point for each correct answer. There was only one correct answer for each knowledge question. A total knowledge score of 28 points was possible. A mean knowledge score of 22.2 was obtained from the respondents. Knowledge scores ranged from 16-28 (Figure 1).

The attitude statements in the questionnaire were scored and a total point value was assigned to give an attitude profile. The statements were answered by indicating the degree with which the nurse agreed or disagreed with each statement. The five responses were

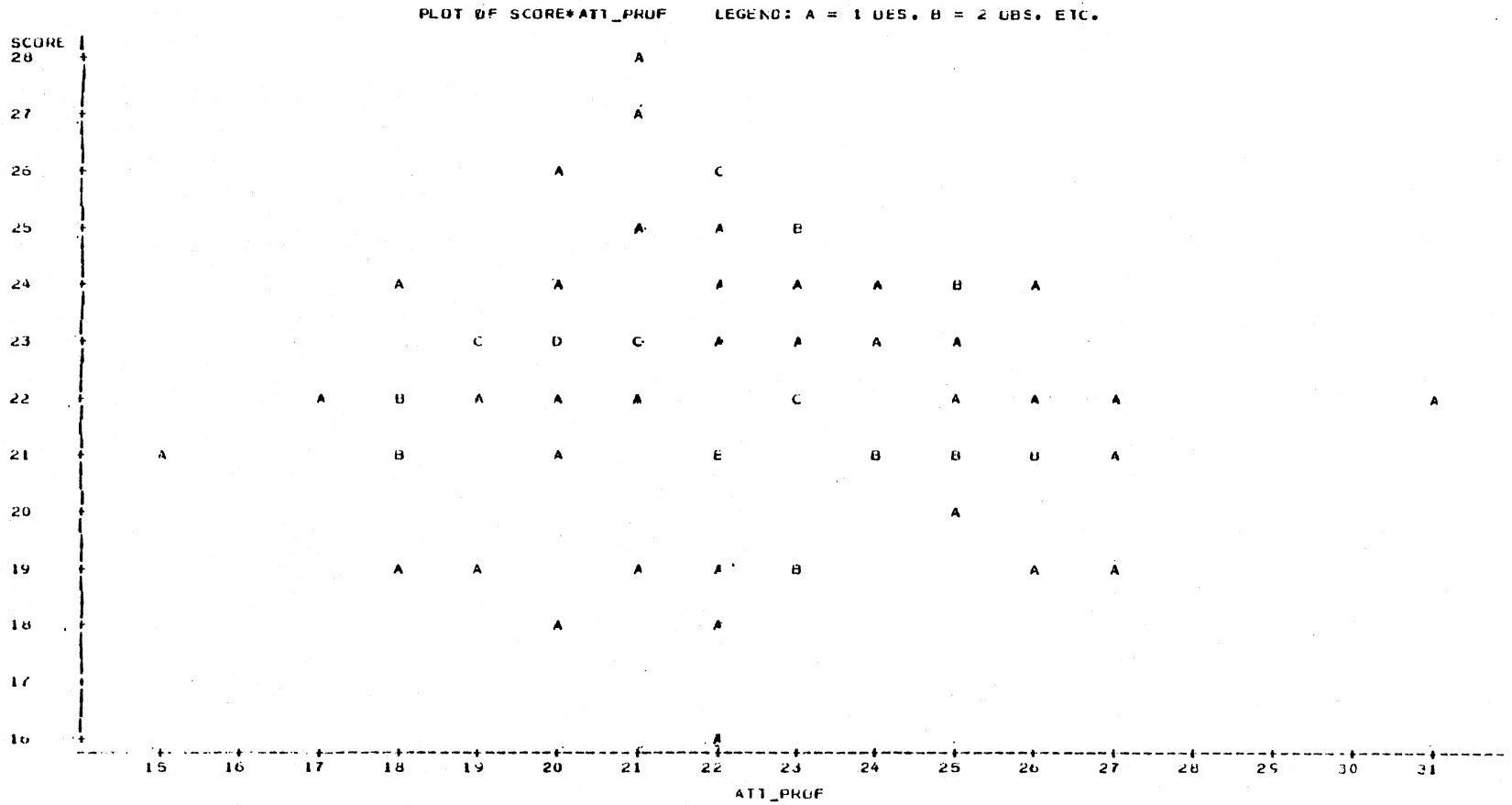

Figure 1. Scattergram of Knowledge and Attitude Profile Scores by Frequency (N=70)

assigned a numerical value ranging from five points for strongly agree, decreasing to one point for strongly disagree. A total attitude profile value of 35 was possible for the seven questions. The mean attitude profile score was 22.2. Attitude profile scores ranged from 15-31 (Figure 1).

There was no significant difference between nutrition knowledge and attitude profile in this study. As cited in the review of literature, Vickstrom and Fox (1976), found the older nurses in their study had a more positive attitude toward nutrition but nutrition knowledge declined as age increased.

In-Service Training and Continuing Education

Sixty-eight nurses (97.1%) indicated they would attend nutrition education in-service training. All day in-service training on a district level was the preference of 55 nurses (78.5%). The second choice was a statewide all-day in-service training session. Twelve (17.1%) nurses preferred this type of in-service training. Only three nurses (4.2%) preferred to have nutrition information mailed to them. Of the 70 nurses in this study, 47 (67.1%) indicated that they would be interested in a university course for continuing education credit (Table VIII).

Testing the Hypotheses

Nutrition knowledge and the variables age, years of public health experience, educational background, and attitude were analyzed by analysis of variance (ANOVA) to determine any significant F-score. The level of significance was $P=<0.05$. The results of these findings are

TABLE VII

RESPONDENTS' PREFERENCES FOR IN-SERVICE TRAINING AND CONTINUING EDUCATION BY NUMBER AND PERCENTAGE (N=70)
N=70

	Number	Percentage
Would attend nutrition education in-service	68	97.1
District in-service	55	78.5
State in-service	12	17.1
Mailed nutrition information	3	4.2
University course for continuing education	47	67.1

summarized in Table VIII. There was no significant difference between nutrition knowledge and age, public health experience, educational background, and attitude at the established level of significance, $P=< 0.05$.

1. There will be no significant difference between nutrition knowledge and age.

The null hypothesis was accepted because there was no significant difference between nutrition knowledge and age when the statistical technique, analysis of variance, was used (Table VIII).

2. There will be no significant difference between nutrition knowledge and years of public health nursing experience.

The null hypothesis was accepted because there was no significant difference between nutrition knowledge and years of public health work experience (Table VIII).

3. There will be no significant difference between nutrition knowledge and educational background.

The null hypothesis was accepted because there was no significant difference between nutrition knowledge and educational background (Table VIII).

4. There will be no significant difference between nutrition knowledge and attitude toward nutrition education.

The null hypothesis was accepted because there was no significant difference between nutrition knowledge and attitudes toward nutrition education (Table VIII).

TABLE VIII

ANALYSIS OF VARIANCE FOR NUTRITION KNOWLEDGE BY VARIABLES (N=70)

Variable	d.f.	Mean Square	F-Score
Age	1	10.20	3.83
Years of experience	1	.42	.08
Educational background	2	13.43	2.72
Attitude profile	1	1.55	.30

P=<0.05

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Summary

The purpose of this study was to identify nutrition knowledge and attitudes of public health nurses in Oklahoma. The difference between knowledge and variables such as attitude, age, public health, work experience, and educational background were analyzed.

The sample was composed of public health nurses who were on duty during a three week time period in October and November, 1978. The instruments were delivered to the nurses by public health nutritionists who were working with the nurses in the local health departments at that time. The questionnaires were delivered to and answered by the nurses, then returned to the nutritionist on the same day. They were then mailed to the researcher. Seventy questionnaires were completed. No follow-up was required.

The data were tabulated by frequency and percentage and used to identify background information, an attitude profile, and knowledge score. A numerical score was obtained for each variable and statistically analyzed. Analysis of variance was used to analyze the difference between nutrition knowledge and attitude, age of the respondent, public health work experience, and their educational background. The F test was used to determine the significant differences between

nutrition knowledge and age, years of public health experience, educational background and attitude. The level of significance was set at P=<0.05 level of confidence.

Of the 70 nurses in the sample, twenty-five (35.7%) were 26-35 years old; thirty-four (48.6%) had less than two years of work experience; thirty-one (45.6%) had a B.S. degree; sixty-six (94.3%) had completed at least one course in nutrition during their training. Dietitians were used by fifty-two (74.3%) nurses as their primary information source, as compared to television and radio, which was used by one (1.4%) nurse.

The knowledge scores ranged between 16-28. One had a perfect score of 28. The majority of the respondents (57.1%) had scores which ranged between 21-23 points. The mean knowledge scores was 22.2.

The questionnaire was divided into five knowledge areas--general knowledge, weight control, iron enrichment, maternal nutrition, and pediatric nutrition. Thirty-eight (54%) of the respondents answered all pediatric questions correctly and thirty-five (50%) answered all general nutrition questions correctly. Only fifteen (21.4%) answered the iron enrichment questions correctly. The questions about both maternal nutrition and weight control were answered correctly by only five (7.1%) of the respondents.

Only five of the 28 knowledge questions were answered correctly by all respondents. These were:

1. Crackers and cakes were not a good sense of vitamins, minerals or protein.
2. Best method of weight control was to eat small portions of food from the Basic 4 and get regular exercise.
3. Maternal diet during pregnancy will influence infant's iron levels.

4. Iron fortified cereal is the first solid added to the infant's diet.

5. Using milk in cooking is an acceptable way to add milk to the diet without drinking it.

Those questions about specific nutrient functions seemed to be answered correctly less often and questions about caloric counts of entrees, number of calories needed to lose two pounds weekly, and the influence of a low nutrient diet on the quality and quantity of breast milk were answered correctly least often.

The 25 nurses in the 26-35 year age group had the highest knowledge mean score of 23.1. The eight nurses who were 51 years and over had the lowest mean score of 19.7. The one nurse with a perfect knowledge score of 28 was in the oldest age group, though the largest numbers and highest mean scores were in the 26-35 year age group.

There were no significant differences in the mean knowledge scores of the nurses according to years of work experience. The majority of the nurses (48.5%) had less than two years of experience, with a mean knowledge of 22.5. There was no significant difference between the knowledge score and the nurses' educational background.

Eighty percent of the nurses felt that nutrition education was a negative term. Approximately one-half of the nurses felt they had enough knowledge to teach their patients nutrition, but 18 (25%) were undecided on the matter and 18 (25%) felt they did not have enough knowledge to teach nutrition to patients. Thirty-one (44%) of the nurses felt they were responsible for the nutrition education of the patient; 13 (18.5%) were undecided; 26 (37.1%) disagreed with the statement. Yet, 59 (84.2%) felt that the nutritionist was not responsible for the nutrition education of the patient. Six (8%) agreed that

it was the nutritionist's responsibility. Only 13 (18.4%) felt that they knew where to obtain printed nutrition material, but 42 (59.9%) felt they had enough printed material. Only nine (12.8%) agreed they would teach more nutrition to patients if they had more nutrition knowledge. Forty percent of the nurses had attitude profile scores ranging from 21-26. The mean score was 22.2. The scores ranged from 15-31, with a possible score of 35. There was no significant difference between nutrition knowledge and attitude.

Based on the findings of this study, it appeared that:

1. Age, public health work experience, and educational background of public health nurses did not significantly influence nutrition knowledge.
2. Attitude about nutrition education did not significantly influence nutrition knowledge of public health nurses.
3. Dietitians were important sources of nutrition information for public health nurses.
4. Creative and innovative nutrition education inservice that will result in improved attitudes about the need for nutrition education of patients could be planned.

Recommendations

The following recommendations were made by the researcher for in-service education for public health nurses:

1. Establish in-service nutrition education sessions as an on-going part of the orientation and professional continuing education for nursing staff taught by registered dietitians.
2. Develop in-service education sessions for public health nurses in each area of nutrition with emphasis on maternal nutrition, weight control, and iron nutrition.
3. Public health nutritionist and food nutrition university faculty make available a nutrition course for continuing education credit at the university level for public health nurses.
4. Public health nutritionist make available valid nutrition

information resource material for use by the public health nurse when she is teaching nutrition to the patient.

Suggestions

The researcher made the following suggestions for further research:

1. Determine the effectiveness of nutrition education in-service training sessions for public health nurses using a pre- and post-test for evaluation at the beginning and conclusion of the series.

2. Further develop and validate an instrument to assess the nutrition knowledge base that could be used when the nurse starts his/her public health employment so that appropriate nutrition training could be planned.

3. Determine nutrition knowledge and attitudes of registered nurses who work in private physicians' offices and/or hospitals, nursing homes, and convalescent centers.

4. Repeat this study with public health nurses in other states or regions of the country.

BIBLIOGRAPHY

Baird, J. Nutrition education--a needs assessment for Oklahoma. Okla. State Univ., Dept. of Food, Nutrition, and Institution Administration, College of Home Ec. Funded by Okla. State Dept. of Educ., School Lunch Section (USDA) June, 1979.

Barr, A. J. and Goodnight, J. H. Statistical analysis system. Raleigh, N.C.: North Carolina State University, Dept. of Statistics.1972.

Blake, S. and Knickrehm, M. Nutrition education in the Little Rock school lunch program. J. Am. Dietet. A., 72:389, 1978.

Bozdech, P., Packett, L., Marlatt, A., and Bridges, R. Assessment of nutrition education of dental students. J. Am. Dietet. A., 73:36, 1978.

Briggs, G. The need for nutrition education. J. of Nutr. Educ., 1:7, 1969.

Carver, L. and Lewis, K. A nutrition knowledge test for elementary school teachers. J. of Nutr. Educ., 11:68, 1979.

Chethik, B. The brief encounter with nutrition education. J. of Nutr. Educ., 9:64, 1977.

Cohen, S. The selling of nutrition knowledge. J. of Nutr. Educ., 8:104, 1976.

Commentary: Nutrition in medical education. J. Am. Dietet. A., 65:259, 1974.

Cortez, F. A lot to smile about. Nutr. Today, 13:16, 1978.

DePaola, D., Modrow, C., and Wittemann, J. An integrated nutrition education program for dental students. J. of Nutr. Educ., 10:160, 1978.

Editorial--The depth and breadth of nutrition. J. of Nutr. Educ., 4:53, 1972.

Egan, M. Public health nutrition services: Issues today and tomorrow. J. Am. Dietet. A., 77:423, 1980.

Food and Nutrition Board, National Research Council, National Academy of Sciences. Toward Healthful Diets. Washington, D.C.: U.S. Govt. Printing Office, 1980.

Freeman, R. Community Health Nursing Practice. Philadelphia: W. B. Saunders Co., 1970.

Gillis, D. and Sabry, J. Daycare teachers: Nutrition knowledge, opinions, and use of food. J. of Nutr. Educ., 12:200, 1980.

Grant, F. and McCarthy, G. Nutrition subject matter in the nursing curriculum. J. Am. Dietet. A., 58:26, 1971.

Greene, J. Nutrition in nursing--A bookshelf review. J. Am. Dietet. A., 37:38, 1960.

Greig, S. Nutrition education in school foodservice in Kansas. J. Am. Dietet. A., 73:422, 1978.

Harrison, G., Sanchez, A., and Young, C. Public health nurses' knowledge of nutrition. J. Am. Dietet. A., 55:133, 1969.

Hegsted, D. M. The development of a national nutrition policy. J. Am. Dietet. A., 62:395, 1973.

Hegsted, D. M. Nationwide food consumption survey--implications. Paper presented at the National Agricultural Outlook Conference, Session #11, Washington, D.C., November 6, 1979.

Interorganization Committee of the East Tennessee League for Nursing and the Knoxville Dist. Dietetic Assoc. Nurses and dietitians work together for better nutritional care of patients. J. Am. Dietet. A., 59:374, 1971.

La Marqueta: A food learning experience. J. of Nutr. Educa., 7:2, 1975.

Lee, P. Nutrition policy--From neglect and uncertainty to debate and action. J. Am. Dietet. A., 72:581, 1978.

MacKenzie, L. and Arbor, E. Cross-age teaching--An important concept for nutrition education. J. of Nutr. Educ., 11:138, 1979.

Mayer, J. U.S. Nutrition Policies in the Seventies. San Francisco: W. H. Freemand and Co., 1973.

McGinnis, J. Prevention--Today's dietary challenges. J. Am. Dietet. A., 77:129, 1980.

Miriam, S. X. Simultaneous correlation of nutrition and diet therapy for student nurses. J. Am. Dietet. A., 33:381, 1957.

Nutrition education of physicians--Five commentaries. Nutr. Today, 7:24, 1972.

Ohlson, M. and Osborn, M. Teaching nutrition to future professional colleagues. J. of H. E., 53:86, 1961.

Pao, E. Talk--Nutrition consumption patterns of individuals in 1977 and 1965. Consumer and Food Economic Institute, Human Nutrition Center, Science and Education Administration. Agriculture Outlook Conference, Washington, D.C., 1980.

Perspectives in practice--Teaching nutrition to nursing students: Lets have a part! J. Am. Dietet. A., 73:546, 1978.

Petersen, M. and Kies, C. Nutrition knowledge and attitudes of early elementary teachers. J. of Nutr. Educ., 4:11, 1972.

Podell, R., Gary, L., Keller, K., and Mulvihill, M. The public seminar as a nutrition education approach. J. Am. Dietet. A., 67:460, 1975.

Position paper on nutrition education for the public. J. Am. Dietet. A., 62:429, 1973.

Position paper on the scope and thrust of nutrition education. J. Am. Dietet. A., 72:302, 1978.

Rosander, K. and Sims, L. Measuring effects of affective-based nutrition education intervention. J. of Nutr. Educ., 13:3, 1981.

Senate Select Committee on Nutrition and Human Needs. Dietary Goals for United States. Washington, D.C.: U.S. Govt. Printing Office, 1977.

Sevrell, W. and VanItallie, T. Nutrition teaching in preventive medicine. Arch. Environ. Health, 4:630, 1962.

Shannon, B., Marbach, E., Groves, K., and Sims, L. Nutrition knowledge, attitudes, and teaching effectiveness of K-6 teachers. J. of Nutr. Educ., 13:4, 1981.

Thomas, L. Your very good health. Nurt. Today, 13:30, 1978.

Todhunter, N. Approaches to nutrition education. J. of Nutr. Educ., 1:8, 1969.

U.S. Dept. of HEW. Ten-State Nutrition Survey, 1968-70. Publication No. (HSM) 72-8130-8134. Washington, D.C.: U.S. Govt. Printing Office, 1972.

U.S. Dept. of HEW. Guide for Developing Nutrition Services in Community Health Programs. Rockville, MD.: Bureau of Community Health Serv., 1978.

U.S. Dept. of HEW. Caloric and Selected Nutrient Values for Persons 1-74 Years of Age. First Health and Nutrition Examination Survey United States, 1971-74. Publication No. (PHS) 79-1657. Hyattsville, MD., 1979.

U.S. Dept. of HEW. Healthy People: Surgeon General's Report on Health Promotion and Disease Prevention. Washington, D.C.: Public Health Serv., 1979.

U.S. Dept. of HEW. Forward Plan for Health--FY 1977-82. Pub. No. (05) 76-50025. Washington, D.C.: DHEW, 1975.

Vickstrom J. and Fox, H. Nutritional knowledge and attitudes of registered nurses. J. Am. Dietet. A., 68:153, 1976.

Werblow, J., Fox, H., and Henneman, A. Nutritional knowledge, attitudes, and food patterns of women athletes. J. Am. Dietet. A., 73:242, 1978.

White House Conference on Food, Nutrition, and Health--Final Report. Washington, D.C.: U.S. Govt. Printing Office, 1970.

Winterfeldt, E. ADA reports. J. Am. Dietet. A., 76:598, 1980.

Woolcott, D., Kawash, G., and Sabry, J. Correlates of nutrition knowledge in Canadian businessmen. J. of Nutr. Educ., 13:4, 1981.

APPENDIXES

APPENDIX A

OKLAHOMA MAP SHOWING COUNTY ASSIGNMENTS OF PUBLIC HEALTH NUTRITIONISTS

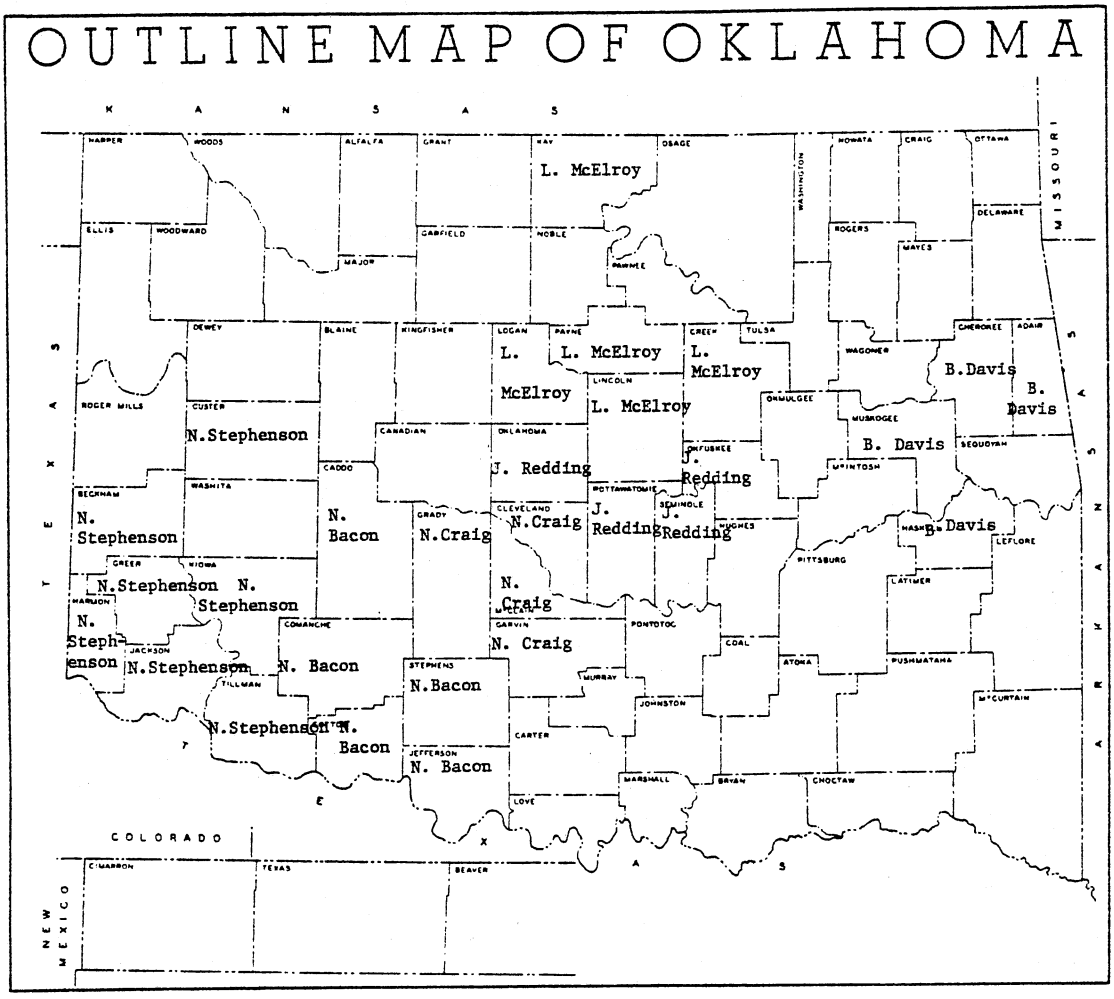

Figure 2. Oklahoma Map of County Assignments of Public Health Nutritionists

APPENDIX B

LETTER OF INSTRUCTION TO PUBLIC HEALTH NUTRITIONISTS

Oklahoma State University

Department of Food, Nutrition and Institution Administration

STILLWATER, OKLAHOMA 74074
(405) 624-5039

November 22, 1978

Ms. Betty Davis, R.D.
Rt. 1 Box 444
Ft. Gibson, Oklahoma 74434

Dear Betty:

I am a M.S. degree student at OSU enrolled in the Food, Nutrition, and Institution Administration Department. To complete requirements for the degree, I am conducting a study to determine the nutrition knowledge and attitudes of public health nurses toward nutrition education. Your expertise and contacts with public health nurses will be most helpful in obtaining this data.

You will recall that I talked with you concerning assistance in administering the questionnaire when you are in the county health departments. I appreciate your willingness to cooperate. The questionnaires are enclosed and are to be completed by the registered nurses who are attending clinic on the day you are in the county health department.

It is important that you instruct the nurses carefully so that the data will be useable. Please instruct therm to:

a.)Write the name of the county in the upper right hand corner.

b.)Do not write their name on the questionnaire. Results will be anonymous.

c.)Complete the questionnaire without assistance from anyone.

d.)Return the questionnaire to you on the same day.

e.)Check the returned questionnaire for the following--county name
a response to each question
Pt. 3 ranking in numerical order.

Please return the questionnaires to me in the self-addressed stamped folder by December 18, 1978. Thank you for your cooperation.

Sincerely,

Lynne McElroy, R.D.

Bernice Kopel

Bernice Kopel, Ed.D.
Asst. Prof., FNIA
Oklahoma State University

APPENDIX C

QUESTIONNAIRE

PART I

Place an X in the space that indicates your response. Fill in the answers where needed.

1. What is your age? Less than 25____ 26-35____ 36-50____ Over 51____

2. How many years experience do you have in public health?
   Less than 2____ 2-5_____ 6-10_____ 11-15_____ 16 or more____

3. From which program did you get your training?
   Associate Degree____ Diploma_____ B.S.____

   Do you have a M.S. in nursing? Yes____ No____

4. Were nutrition courses included in your training? Yes____
   No____

   How many semester hours_____ or quarter hours____?

5. What sources of nutrition information do you use most often?
   Doctors_____ TV,Radio____ Professional Journals____
   Dietitians____ Magazines,
   Nurses____ Newspapers____ Other_____

Circle your response to each question---- SA-Strongly Agree A-Agree U-Undecided D-Disagree SD-Strongly Disagree

SA A U D SD 6. I feel that the term "nutrition education" has a negative connotation.

SA A U D SD 7. I feel that I have enough nutrition knowledge to teach nutrition to my patients.

SA A U D SD 8. I think the public health nurse should be responsible for the patient's nutrition education.

SA A U D SD 9. I think the public health nutritionist should be the responsible person to teach nutrition to patients.

SA A U D SD 10. I feel that I know where to obtain printed nutrition information to use for patient instruction.

SA A U D SD 11. I feel that I have sufficient printed hand-out material available as nutrition teaching aides.

SA A U D SD 12. If I had more nutrition knowledge and background, I would teach more nutrition to my patients.

PART II

Circle only one letter that is your answer to the question or statement.

13. The term "enriched" as applied by the government to bread, means bread made of white four to which has been added:
   a. Milk, butter, eggs
   b. Thiamin, niacin, riboflavin
   c. Protein, roughage, fat
   d. Phosphorus, Vit. C, sugar

14. In which way are carbohydrates utilized by the body?
   a. To supply heat and energy
   b. To build and renew tissue
   c. To regulate the body processes
   d. Both to supply energy & build & renew tissue

15. Excess fat soluble vitamins are
   a. Not absorbed
   b. Excreted in the feces
   c. Excreted in the urine
   d. Stored in liver, bone, & adipose tissue

16. An incomplete protein is
   a. Lacking or low in 1 or more essential amino acids
   b. Lacking in vitamins
   c. Low in fiber
   d. Found only in animal products

17. Which food is NOT a protective food, that is not ordinarily a good source of vitamins, minerals, or protein?
   a. Fruits & vegetables
   b. Cheese & milk
   c. Crackers & cakes
   d. Beans & Meats

18. A mid-morning snack is
   a. Unwise due to extra calories
   b. Appropriate if it is part of the food which would be eaten at one of the day's other meals
   c. A poor idea to promote work output
   d. Essential to meet the day's nutritional needs

19. Lack of cellulose in the diet results in
    a. Lack of blood glucose
    b. Diarrhea
    c. No effect in the human body
    d. Slow movement of digestive tract content with possible compaction

20. To maintain ideal body weight, apply principles of good nutrition in diet selection and
    a. Increase amount of sleep
    b. Eliminate all snacks
    c. Increase amount of exercise daily
    d. Exercise actively one day each weekend

21. To lose two pounds of body fat per week, a person must reduce the daily caloric intake by
    a. 250
    b. 500
    c. 1000
    d. 1500

22. Which food item would be higher in calories?
    a. Delux ½ lb. hamburger
    b. Chef salad with ham, egg, cheese, & dressing
    c. 1 c. cottage cheese & large tomato
    d. 2 T. peanut butter on a slice of bread

23. Choose the best method of weight control.
    a. Small portions of fruits, unlimited protein, & water
    b. Cut out all desserts & go to health spa
    c. Smaller food portions of the Basic 4 & daily exercise
    d. Cut out all carbohydrates and pork

24. Which would you choose to cut down on calories?
    a. Fried steak, mashed potato, salad with dressing, fresh peach
    b. Broiled steak, baked potato, salad w/o dressing, fresh peach
    c. Fried steak & potato in gravy, salad with low calorie dressing, fresh peach
    d. Broiled steak, mashed potato, salad with low calorie dressing, peach in syrup

25. The nutrient for 19-22 year old girls which is almost twice the RDA of boys is
    a. Calcium
    b. Iron
    c. Protein
    d. Vit. A

26. The red corpuscles in the blood need which mineral to help in carrying oxygen?
    a. Calcium
    b. Iron
    c. Flourine
    d. Phosphorus

27. Which vitamin works with protein to improve the absorption of iron?
    a. Vit. D
    b. Vit. C
    c. Vit. E
    d. Vit. A

28. Babies are born with iron stores which last about
    a. 1 week
    b. 1 month
    c. 3 months
    d. 9 months

29. The first rich source of iron for most infants will be
    a. Human milk
    b. Evaporated milk
    c. Cereals prepared for babies
    d. Orange juice

30. Premature birth and anemia in infants can be associated with which condition of the mother?
    a. Lack of exercise
    b. Anemia
    c. Less than 10 hours of sleep nightly
    d. Constipation

31. The diet of a woman during pregnancy will
    a. Cause hyperthyroidiam
    b. Influence infant's sodium needs
    c. Influence newborn's iron levels
    d. Trigger excess vitamin production in the baby

32. Increased requirement for nutrients during pregnancy which relate to synthesis of red blood cells are
    a. Calcium & Vit. K
    b. Vit. E & Vit. C
    c. Folic acid & B12
    d. Protein & calcium

33. When the lactating woman's diet is low in nutrients, this will cause
    a. Less milk production of fairly normal composition
    b. Normal milk volume but poor nutritional quality
    c. Milk will be thin and watery
    d. Toxic products in milk

34. One of the important values of breast feeding is
    a. Adherence to cultural tradition
    b. Transfer of high iron levels
    c. Transmission of antibodies
    d. Transmission of genes controlling obesity

35. During which age period will lack of proper food result in most harm?
    a. From birth to 6
    b. Childhood, 6-12
    c. Adolescence, 12-18
    d. Early maturity, 18-24

36. By the age of 1 year, a baby will increase his birth weight by
    a. 1½ times
    b. 3 times
    c. 4 times
    d. 5 times

37. Usually the first solid food added to a baby's diet is
    a. Banana
    b. Pureed meats
    c. Pureed vegetables
    d. Iron fortified cereal

38. The diet of a breast fed baby needs added nutrients in the form of
    a. Calcium, Phosphorus
    b. Thiamin, Riboflavin
    c. Vit. C, Iron
    d. Vit. C, Protein

39. During the second year of life, the appetite of most children will
    a. Be consistantly very large
    b. Be obviously less than the 1st yr.
    c. Be extremely small
    d. Reflect the parent's appetite

40. If your child does not like to drink milk, the best thing to do is
    a. Omit it from the diet
    b. Use milk in cooked foods
    c. Substitute other drinks such as tea & fruit punch
    d. Make sure they drink a lot of water

Part III

Would you attend a nutrition education in-service? Yes____ No____

If nutrition in-service were availabe, I would like to learn more about_____

If nutrition education in-service were available to you, how should it be planned? (Put a number in each blank with 1 as your 1st choice, 2 as 2nd, etc.)

_____All day in-service workshops on a district level

_____All day in-service workshops on a state level

_____Nutrition education resource materials mailed to you

Would you be interested in university nutrition courses for continuing education hours? Yes____ No____

VITA

Lynne Branch McElroy

Candidate for the Degree of

Master of Science

Thesis: NUTRITION KNOWLEDGE AND ATTITUDES OF PUBLIC HEALTH NURSES IN OKLAHOMA.

Major Field: Food, Nutrition and Institution Administration

Biographical:

Personal Data: Born in Walters, Oklahoma, March 13, 1949, the daughter of C. N. and Billie Branch.

Education: Graduated from Comanche High School, Comanche, Oklahoma, in May, 1967; received Bachelor of Science degree from Oklahoma State University in 1971; completed dietetic internship from Oklahoma State University in 1972; completed requirements for the Master of Science degree at Oklahoma State University in May, 1982.

Professional Experience: Assistant Food Production Manager, Student Union Food Service, Oklahoma State University, 1972; Maternal-Child Health Nutritionist, Oklahoma State Department of Health, 1973 to present; Nutrition Training Consultant for Headstart, 1981; Adjunct Faculty, Oklahoma State University Dietetic Internship, 1975 to present.

Professional Organizations and Honors: American Dietetic Association, Oklahoma Dietetic Association, Oklahoma Public Health Association, Society for Nutrition Education, Nutrition Today Society, Omicron Nu.