NUTRITION-RELATED TRAINING, KNOWLEDGE, ATTITUDES, AND PRACTICES OF SELECTED KANSAS SCHOOL FOODSERVICE PERSONNEL

by

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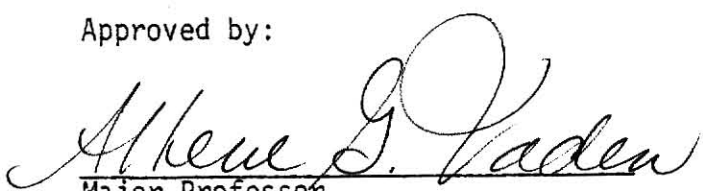

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INTRODUCTION

Effective nutrition education programs can be developed in schools by applying the principles of learning, using effective educational techniques, creating an appreciation for the world of food, and utilizing the school foodservice as a laboratory for classroom experiences (1). School nutrition programs are an effective means of achieving the nutritional needs of children and providing adequate food and educational opportunities for them to learn and practice good food habits (2). The role of school foodservice in child nutrition programs is to provide adequate nutrition to students and provide nutrition education programs that will assist them in food attitudes and choices for not only the present but for a lifetime (3).

School lunch is recognized as a part of the educational program in many schools and should be used as a positive force for good nutrition (4, 5). A primary goal of the National School Lunch Program is producing and serving acceptable, nutritious meals. To achieve this goal effectively, quality of ingredients, preparation and service methods, individual student preference and familiarity with foods served, environmental setting in which meals are served and consumed, and the competency and motivation of foodservice personnel must be considered (6).

The school foodservice staff is the key to increased acceptance of school nutrition programs. Many of the problems faced by foodservice operations are due to a lack of well-trained staffs. Training foodservice personnel in the basic skills of production, management, merchandising,

and service, as well as the acquisition of basic nutrition knowledge, is essential to an integrated school nutrition education program (7).

As part of legislation (P.L. 95-166) enacted by the United States Congress, funds were provided to the Kansas State Department of Education for a Nutrition Education and Training Program (NETP). Under a joint agreement, the Kansas State Department of Education contracted with Kansas State University to conduct a needs assessment during the 1979-80 school year, which included a survey of nutrition knowledge, attitudes and dietary practices of school foodservice personnel, teachers, and fifth grade students.

The objectives of one component of the Kansas Nutrition Education and Training Program Needs Assessment Project and the objectives of this research were:

1. to assess nutrition education experiences available to school foodservice personnel,
2. to assess school foodservice personnel's attitudes toward previous nutrition education experiences,
3. to measure school foodservice personnel's level of basic knowledge achieved in foods and nutrition,
4. to assess school foodservice personnel's dietary behavior,
5. to study relationships among nutrition-related attitudes, knowledge of food and nutrition and dietary behavior of school foodservice personnel, and
6. to identify factors related to nutrition knowledge and attitudes of school foodservice personnel.

REVIEW OF LITERATURE

Nutrition Education and School Foodservice

White House Conference

The general need for nutrition education was emphasized at the 1969 White House Conference on Food, Nutrition, and Health (8). A recommendation of the Conference (9) in the relation to the need for nutrition education in the schools was as follows:

> A dynamic nutrition education program that begins in early childhood and continues through the elementary and secondary schools can help young children to acquire positive attitudes toward food. Also it can help older children to assume responsibility for their own food selection and prepare them for adult and parental responsibility.

In support of school foodservices, the following conclusion was reached at the Conference (9):

> Children are helped to develop good habits by receiving needed nutrients in the school setting from a variety of foods acceptable to all cultural groups represented in the schools, and planned, prepared, and served in accordance with scientific and aesthetic principles.

The school foodservice as a laboratory for application of nutrition principles taught in the classroom was emphasized (9). To achieve nutrition education objectives, these specific recommendations were developed:

(a) that lunch and breakfast be provided when needed to all school children including preschool;

(b) that school authorities establish standards for foodservice and provide a comfortable, pleasant place for eating and allow time for social interactions;

(c) that programs be supervised at all levels by personnel trained in nutrition management;

(d) that maximum use be made of foodservice facilities for nutrition;

(e) that student, parent, and community involvement in school foodservices be encouraged; and

(f) that school authorities be encouraged to develop innovative approaches to feed school children.

School Nutrition Programs

School foodservices have an important part to play both in contributing to the nutrition of children and in helping them to form good food habits (10). Since food habits are formed early in life, the greatest impact on promoting favorable nutrition practices can be made through a child's primitive years (11).

Oyer et al. (4) asserted that the school lunch is recognized as a part of the educational program in many schools. According to Hinton (5), the lunchroom is a laboratory for nutrition education where the children have a chance to eat and enjoy nutritious, well prepared, attractively served food under good conditions. If the school lunch is not providing such an experience with food, she asserted that it is not being used to its fullest potential.

Hinton (5) reported that if eaten regularly the lunch furnishes one-third of the meals of a school day, one-fourth of the meals for the week, and at least one-sixth of the total meals for a calendar year. The lunch served at school, therefore, makes a substantial contribution to the total food intake of the child and provides experience with foods which can help him to learn to like a variety of wholesome foods.

Martin (12) emphasized that school foodservice is vital to the education, health, and welfare of America's youth. Johns (10) expressed that the school lunchroom can provide an ideal laboratory through which all pupils pass each day, learning to eat wisely and accept new foods, flavors, and textures.

Price et al. (13) stated, however, that school lunch as a medium for exposing children to new foods does not work. She found that the most effective method of achieving greater food acceptability is increasing exposure to that particular food at home. If the children have eaten the food at home, they are more likely to accept it at school.

Role of School Foodservice Personnel in Nutrition Education

Hoglund (14) cited that the dedicated attitude of school foodservice personnel and the informal atmosphere of the school lunchroom can provide an excellent learning environment. Curry and Toma (15) commented that school foodservice personnel are in daily contact with children and this contact provides an opportunity to transfer and interpret nutrition information. Johnson and Butler (11) reported that school foodservice directors or consultants had major responsibility for nutrition education within thirty-one states.

According to Lachance (16), school foodservice personnel can play an important role in nutrition education of school children. By serving an adequate lunch, answering questions relative to foods and nutrition, or by participating in a formalized nutrition education program, the workers can influence the child's knowledge about foods and encourage good food habits and attitudes. He contended that the only way to have successful nutrition education in the classroom is to have successful nutrition education in the cafeteria.

Mellinger (17) stressed that foodservice professionals are a strong link in the nutrition education chain. Neill (3) asserted that the foodservice professional may be the key member of the nutrition education team in the school. Often they are the persons most likely to provide

the momentum for the maintenance of an integrated school nutrition and nutrition education program.

Team Approach in Nutrition Education

Hinton (5) contended there cannot be a program of nutrition education without the cooperation of teachers and administrators. The classroom teachers can support the lunch program by creating interest in foods being served and by using the lunch at school to put into practice nutrition principles learned in the classroom. The teachers can help create interest in new foods by introducing them in the classroom before they are served in the lunchroom.

Lavigne and Siegel (18) stated that the success of a nutrition education program involves not only the health classes or school lunch program but the whole school, including the science, health, art, physical education, and home economics departments. Leverton (19) stated that in order for nutrition education to reach its full potential, school feeding must be understood, appreciated, and supported by the administration, the teaching staff, and the community. According to Dobbins (20), teamwork is required for a nutrition education program to be effective.

At a national conference on nutrition education (21), participants concluded that foodservice personnel needed team workshops or in-service meetings with teachers to be part of the total educational network. Lee et al. (22) reported that members of the nutrition education team can be trained to support and reinforce each other's efforts in the classroom and cafeteria. With specific training, the teacher and school foodservice manager can learn to combine their talents to strengthen nutrition education in both classroom and cafeteria.

Lee et al. (22) asserted school foodservice personnel can fill a definite role in nutrition education but that they are not prepared to teach, do not have sufficient time, and do not have the classroom contact needed to change children's eating habits. Therefore, the classroom teacher must assume a major role in teaching nutrition to children with the support of the foodservice personnel.

Relevant Legislation

The National School Lunch Act of 1946 had as its purpose "to safeguard the health and well-being of the Nation's children" (23). Subsequent legislation amended and strengthened various aspects of the program (24).

Public Law 91-248 (25) enacted in 1970 was the first major legislation providing funds for nutrition education. The use of one percent of child nutrition program funds for nutritional training and education for workers, cooperators, and participants of the program and for surveys and studies of requirements for foodservice programs was authorized in Section 6 of PL 91-248.

In 1977, the National School Lunch Act and the Child Nutrition Act of 1966 were amended and authorization for a nutrition education and training program was included. The amendments included provisions to "encourage effective dissemination of scientifically valid information to children participating or eligible to participate in the school lunch program. . . ." The Act, PL 95-166, specifically stated in the purpose that "such nutrition education programs shall fully use as a learning laboratory the school lunch and child nutrition program" (26).

In Section 19 of the Act (26), the United States Secretary of Agriculture was authorized to provide grants to state education agencies to formulate a nutrition information and education program. For each child enrolled in school and institutions in the state, a grant was allocated at the rate of 50 cents for each child. The money was to provide nutrition education for teachers and foodservice personnel, foodservice management training for school foodservice personnel, instruction of food and health relationships to the students, and development of classroom materials and curricula. Upon receipt of funds authorized by this amendment, states were required to conduct a needs assessment, defined as a systematic process for evaluating the scope and success of nutrition education activity. The goal of the program is to support children with better learning experiences in the classroom and school cafeteria so that they may develop good food and nutrition practices fundamental to their health and well-being (27).

Training Needs of School Foodservice Personnel

Need in job context has been described as a lack of knowledge, skill, or attitude that prevents an employee from performing satisfactorily or that interferes with his or her job potential for assuming greater responsibilities (28). Needs assessment has been defined as a systematic process for delineating the scope, extent, quantity, reach, and success of any current nutrition education of activities, including those related to . . . training of school foodservice personnel in the principles and practices of foodservice management . . . and the competency levels achieved by the foodservice personnel (27).

Gammill (29) defined training as developing a multitude of habits in a group of individuals so that they will function as satisfactory employees. For training to be successful, Mitchell (30) contended that top management must understand the principles of food training and support a program which is initiated at the top and reaches down to every level of the organization. She further stated that a training program has the following advantages: better quality foodservice, lower labor cost, improved relations among foodservice workers, and better cooperation within the department.

Oyer et al. (4) stressed that the first purpose of the National School Lunch Program is to provide a nutritionally adequate lunch for school children. She commented that a positive step toward the fulfillment of this objective may lie in improved training of school foodservice personnel who are in positions to contribute to the nutrition education of the children. In a study to determine the nutrition knowledge and attitudes of school lunch managers, Uhrmacher (31) found that foodservice managers who had completed training (e.g., University of Nebraska short course, ADA correspondence course, or a state workshop) scored higher in all categories studied than managers without any specialized training.

The American Dietetic Association takes the position that child nutrition programs should be coordinated at all levels by qualified staff with training in food, nutrition, and institutional foodservice management (32). According to Jenkins and Watts (33), a cafeteria manager should be involved in training to learn about food preparation and foodservice equipment, food specifications, serving systems, nutrition, convenience foods, and merchandising.

When setting up a training program for a foodservice operation, Avery (34) indicated that determination of need and a critical study of the procedures that are being considered for transmittal to the employee are needed. He stated that instructing the worker by step-by-step procedures makes the supervisors more secure in their knowledge that tasks are being done properly, aware that they will not have to supervise as closely, and know they can expand their span of supervision.

Maretzki (35) cited that developing a good nutrition education program for the lunchroom can begin by instructing foodservice personnel on the principles of nutrition. She concluded that an in-depth curriculum is needed to prepare them for their task as nutrition educators.

Foodservice personnel training programs, according to Neill (7), have been successful. Past participants have increased their self esteem; provided nutrition education information to students, teachers, and the community; improved food preparation and merchandising skills; and learned more effective management procedures. Also, as a result of training programs, Neill stated that labor and food costs can be reduced and participation increased.

Neill (7) stressed that a good school nutrition education team requires a well-trained foodservice staff. Due to increased training, she contended that foodservice professionals will be extremely competent not only in production and service of nutritious and attractive meals, but also in the areas of management and labor practices. She further stated they will also become skilled nutrition paraprofessionals, working closely with teachers, administrators, students, and parents to assist in the school nutrition programs. Applebaum's (36) position on the need for

training concurred with Neill's in that they both support a systematic approach to school foodservice training.

For a school lunch worker to perform adequately, Oyer et al. (4) stated they need to have some general information about food sources of nutrients in order to plan menus and buy quantities of food that will meet the requirements of the lunch pattern. She believes the worker needs to know how nutrients are affected by storage and methods of preparation.

Attitudes have been defined as organized and consistent measures of thinking, feeling, and reacting (37). According to Foley et al. (38), attitudes are a vital link between nutrition knowledge and application.

Sheehan (39) reported that a good training program has two purposes, developing skills and influencing attitudes. She believes that a worker with an understanding of the potential effect the school lunch program has on the health of the child is more likely to have a positive attitude toward nutrition, food preparation, and sanitation procedures. Before a nutrition education program can be organized, Sipple (25) stated that a person's attitudes toward food and the reasons behind their development must be understood.

Attitudes of school foodservice personnel can play an important role in students' acceptance of the school lunch program. For this reason, Head et al. (40) conducted research dealing with workers' attitudes toward school and school lunch. They found that managers had more positive attitudes toward the school lunch program than foodservice workers.

Kende et al. (41) conducted a study on nutrition education and training needs of Michigan school foodservice directors and supervisors. Their survey was designed to collect data to characterize Michigan school foodservice directors and supervisors, to survey current nutrition education

programs offered by directors and supervisors for their staffs, and to determine the needs and interests of these directors and supervisors for additional education and training in nutrition and foodservice management. Survey results were to be used to design programs for these managerial personnel to enable them to relate nutrition education to the school foodservice personnel and children in their local districts. They found that about two-thirds of the surveyed population indicated either a moderate or great need for additional training in seventeen topical areas surveyed, including both management and nutrition education-related topics. Seventy-eight percent or more were interested or very interested in additional training in a broad range of topics: nutrition, nutrition education, food science, food production and service, and merchandising the program.

Assessment of Nutritional Knowledge, Attitudes and Practices

Limited studies were found in the literature on nutrition knowledge, attitudes, and practices of school foodservice personnel. Therefore, data from a few studies are included in this section which were conducted among populations similar to those employed in school foodservices; i.e., adult women, predominantly high school graduates.

Nutrition Knowledge

Oyer et al. (4) designed a test to assess lunchroom workers' knowledge and understanding of nutrition and of some of the problems of menu planning and quantity food production as related to the nutrient content of food. A positive relationship was found between test performance and educational level.

Another study to investigate the knowledge of school lunch managers was conducted in Mississippi by Clarke (42). The results indicated that managers as a whole were well prepared in areas such as commodities, control of sanitation, preparation of food, supervision of employees, scheduling the work for employees, and standards of serving. The rating for the managers in the area of maintaining the nutrition in meals was lower than expected. The managers were most deficient in technical managerial knowledge.

Ninemeier et al. (43) evaluated a school lunch training program consisting of three, five-day short courses. Based on subject matter taught in the short courses, items on evaluation instruments were in 11 subject-matter areas, including nutrition.

A study was conducted by Uhrmacher (31) to measure school foodservice managers nutritional knowledge. Foodservice managers scored higher on the subject of nutrient functions than they did on food composition items. Over half (60 percent) of the managers believed that children required concentrated sweets, such as candy, for energy needs.

The nutrition knowledge of past Ohio high school graduates was assessed by Schwartz et al. (44). They tested the relationship of the graduate's nutritional knowledge to college or university attendance, membership in 4-H, FHA, or other groups teaching nutrition, cumulative grade-point average attained in high school, marital status, and role in meal planning and in meal preparation. The results revealed that significantly higher nutrition knowledge scores were achieved by those who had cumulative grade-point averages above the median of 2.53 on a four-point scale, had attended college or university, and had remained single. No relationship existed between high nutrition knowledge scores and membership

in any of the clubs or groups teaching nutrition. The respondents scored highest on questions related to general nutrition concepts and lowest on those relating to food composition.

Curry and Toma (15) conducted a series of in-service workshops to determine the influence of certification classes on nutrition knowledge of school foodservice personnel. The results from the nutrition knowledge test revealed that personnel who had attended one or more certification classes performed better than those without class participation.

In 1979, a nutrition education needs assessment project (45) was conducted in Florida to measure nutrition knowledge, attitudes, and habits of foodservice managers, preschool, elementary, and secondary teachers, and pre-kindergarten through senior high students. In general, foodservice managers scored higher on food preparation items than on any other areas assessed; performance was lower on test items regarding essential nutrient definition and functions.

Nutrition Attitudes

Gunn (46) investigated the attitudes of Mississippi school lunch managers. To determine the areas in which the managers had the most desirable and least desirable attitudes, the possible score was compared with an average of the managers' scores. The managers scored the highest in the areas of work interest and social qualities and lowest in the areas of manpower development and public relations.

Uhrmacher (31) conducted a study to measure nutritional attitudes of Nebraska school lunch managers toward the role of the school feeding program in nutrition education and the service of breakfast at school. The managers indicated an overall positive attitude toward the role of the school foodservice program in nutrition education. They believed strongly

(91 percent) that nutrition teaching should be correlated with all agencies of the school. Eighty-nine percent believed that the foodservice supervisor has a responsibility to teach good nutrition practices and most (72 percent) thought that the wise choice of food outside the school is a desirable goal of school lunch.

Schwartz et al. (44) found that more favorable attitudes toward food and nutrition were expressed by women who were married and by those who had regular responsibility for meal planning and meal preparation than by those who were single and did not have a regular role in planning and preparing meals. No positive relationships were found between nutrition attitudes and high school home economics experience, cumulative GPA in high school, college or university attendance, or club or nutrition class membership.

A study to evaluate Kansas women's attitudes and food choices was conducted by Cosper and Wakefield (47). An attitudinal questionnaire was used to determine the degree of influence various factors would have on 591 Kansas women trying a new food. Another questionnaire was developed to determine factors influencing women's consumption of six categories of food. The results indicated that 80 percent of the women would readily accept suggestions from husbands, physicians, nutritionists, parents, children, and close friends. About half would follow suggestions of members of their churches and neighbors or try a food if it was easy to prepare or low in calories. An advertisement would influence a fourth of the respondents to try a new product. Family and personal preferences accounted for food choices of 64 percent of the respondents. The only other factor that influenced more than 10 percent was a food being "good for you." The appearance of the food, preparation time, cost, and calorie

content were minor influences with the majority of the subjects in selecting a particular food.

Head et al. (40) measured school foodservice employees' attitudes in relation to students' attitudes. The sample consisted of 310 workers and 64 managers. They responded to questions that covered all phases of work for both managers and employees in public school cafeterias. Overall, the workers and managers had favorable attitudes toward their work. More workers than managers believed that they should not be expected to keep serving sizes the same, they were overworked for the pay they got, and that students always want something different regardless of how good the food is. Although the foodservice employees had these attitudes, they were cheerful as students came through the line, enjoyed seeing students enjoy food, and liked working in the cafeteria. They also believed that they should keep trying to improve the food they served and that they had a responsibility toward each student.

In the Florida Needs Assessment Project (45), the general attitudes of the foodservice manager were favorable related to nutrition education and health. Most of the foodservice managers, however, reported that they did not coordinate lunchroom activities with classroom instruction and they did not feel competent enough to do so.

Nutrition Practices

In the study of 1969 Ohio high school graduates, Schwartz et al. (44) found that married graduates and those with regular responsibility for meals achieved higher nutrition practice scores than those who were single or those without regular meal responsibility. No significant differences were found between respondents with and without high school home economics experience, between those who did and did not attend college or university,

or between those who were or were not members of clubs or nutrition classes.

In Kansas (47), Cosper and Wakefield found that women averaged 2.7 meals a day. Breakfast was eaten daily by 65 percent of the women, lunch by 70 percent, and dinner by 93 percent of the respondents. Twenty-four percent ate no snacks; 36 percent, one snack daily; and 18 percent, three or more.

Few studies have been conducted to examine dietary practices of school foodservice personnel. Dietary practice information was obtained from school foodservice managers in the Florida Needs Assessment Project (45). Scores were substantially low in the areas of nutrition practices; however, a large proportion of foodservice managers strongly valued good eating habits. The majority indicated that their diets were well balanced, and reported combining good eating habits and exercise. Snacks usually consisted of fruits, rather than "sweets," vegetables, or high fat/high salt foods. Most of the foodservice managers disagreed or strongly disagreed that crash dieting was a good way to lose weight.

Needs Assessment in Program Planning

Frankle and Owen (48) defined program planning as a process that includes the identification of a problem and its related aspects; the setting forth of a goal and objective toward which the program should be directed; and the development of alternative action plans, one of which is to be selected, implemented, evaluated, and updated. They purported that the first step in the planning process is a description of the problem. Questions they believe that should be asked are what are the specific health problems with a nutrition component, what are the

nutrition problems, how severe are they, who is affected, what age group is affected, and what are the patterns of health and illness.

The term "need" was described by Frankle and Owen (48) as a lack of something required or desired. The final achievement of all program planning is to meet a need, satisfy a want, or alleviate an existing condition. To determine a need, several criteria can be employed. Determination of a need may arise from general observation, failure to achieve a predetermined standard, or results of surveys, studies, or surveillance information for baseline data.

According to Mullins (49), in planning a needs assessment, the following questions should be asked:

(a) what do we want or need to know;

(b) why do we want to know it;

(c) how will the information be used once it is obtained;

(d) how can we obtain the data;

(e) what useful data sources already exist at the local, state and federal level;

(f) how can we most advantageously compile, analyze, and present the data;

(g) what will the program cost; and

(h) which needs assessment techniques will be most efficient.

Frankle and Owen (48) emphasized that a needs assessment determines the extent and type of problems that certain individuals or groups experience in a community. Health practitioners make the assumption that these people could function at a higher or more efficient level if they receive proper services.

Bass et al. (50) stated that planning food and nutrition education programs means finding the most appropriate and effective ways to proceed

which involves many different but interrelated steps and implies more than simply developing a program on specific topics in relation to community problems and needs. They contended that close consideration must be given to the processes that will follow the planning stage--implementation, evaluation, and revision. Unless all the phases are integrated, the program's effectiveness will be diminished.

According to Knutson (51) evaluation is concerned with determining values or worth. He described program evaluation as concerned specifically with determining the worth or values of efforts expended to achieve a given purpose or objective. The American Public Health Association's description of the evaluation process (52) also requires determining the value or amount of success in achieving a predetermined objective. It should include steps such as formulating the objective, identifying the proper criteria to be used in measuring success, determining and explaining the degree of success, and recommendations for continued program activity.

Meredith (53) defined program evaluation as the determination of the degree of progress in achieving program objectives. He stated that evaluation can and should be used in planning and control and thus serve as feedback link between these crucial functions. Program evaluation was defined by McCool (54) as a systematic assessment of the effectiveness of a program in achieving its objectives. Such an evaluation can serve as the basis for making decisions regarding future program development and resource allocation.

A strong demand for evaluation to determine the extent to which currently funded programs are meeting the needs of society exists because of the realization that social problems affect the entire community and not only the victims who have the problems (55). This represents a

recognition that social institutions, rather than individuals alone, bear the major responsibility for the presence of social problems and that institutions, too, must change if individual behavior is to be affected (48). If society is going to meet these challenges, new programs of preventive health care will be required. New objectives and new criteria for effectiveness will be needed in program evaluation.

Frankle and Owen (48) stated that emphasis on early detection may replace emphasis on rehabilitation as the objectives become prevention of the problem rather than finding cures for the problem. They provided the following reasons for program evaluation:

(a) information is required to help make decisions--decisions to modify, expand, curtail, continue, or terminate programs;

(b) any organization using resources should see the most and best service possible is being rendered;

(c) the need for a given program may change with the passage of time; consequently there should be a continuing analysis of each program from the standpoint of need, objective, and alternative ways of accomplishing its objectives;

(d) occasional programs are launched which are not really needed and there is a strong tendency for programs once started to be carried along without being seriously questioned;

(e) without program evaluation, there is no way of knowing or documenting that public activities are in fact achieving program objectives; and

(f) evaluation assists the program manager and the administrator to demonstrate that the program is achieving its objectives.

On the basis of an assessment of a goal-oriented operation, Frankle and Owen (48) commented that a judgment is made as to whether the activity was worthwhile. At the end of the evaluation process, one may get a new value, or one may reassess, or redefine an old value. Values are consequential factors in deciding on the objectives of public service programs. An evaluation study must consider not only the specific values arising

from a nutrition program but also social values, particularly those which might be conflicting.

Needs assessment is defined as a systematic process for delineating the scope, extent (quantity), reach, and success of any current nutrition education activities (27). Needs assessment is defined as a process used to evaluate how effective activities are in reaching their goals and objectives. The results of the evaluations serve as the basis for the development of the state plan and are required as part of the state plan submission for the NET program.

Egan et al. (56) concluded that evaluation of nutrition education programs should be used to refine and upgrade programs as well as to assess their effectiveness. Both formative and summative evaluation and validation are necessary. Assistance in applying evaluation techniques throughout the programs is also a pressing need.

According to Brown and Cooke (57), nutrition education has suffered because top policy planners have not been shown that it is effective in changing behavior and thereby influencing health status. They stated that quantifying behavior interventions has always been difficult and that comparisons with other interventions may be inappropriate since results of nutrition education programs can rarely be expressed in biomedical terms. Brown and Cooke emphasized, however, that summative evaluation is possible and necessary. Program planners must set realistic objectives for program evaluation and be satisfied with near-term results expressed only in changes of knowledge and attitude.

METHODOLOGY

Selection of Schools

To obtain a sample representative of elementary schools throughout the state of Kansas, Unified School Districts (USD) were selected at random from each Board of Education District (BED) and then individual schools, or the sampling units, were selected randomly from the USD's. The number of schools (N = 104) selected from each BED was proportional to the number of schools in each district, which was an approximate 10 percent sample of elementary schools in the state. In selecting schools, simple random sampling within a BED was used with the following exceptions:

(1) One or more schools from the largest USD were selected so the largest USD in each BED would be represented.

(2) Minor adjustments were made to include some schools with breakfast programs.

(3) The one school district in the state not participating in the National School Lunch Program was added.

The initial sample was reviewed by School Food Service Specialists on the staff of the Kansas State Department of Education. Based on their suggestions the list was modified slightly. General information regarding the original sampling plan is given in Appendix A.

Fifteen schools in the original sample were replaced; eight were replaced because they did not include fifth graders. One school had been closed at the end of the 1978-79 school year and six schools refused to participate. One large urban school district which had four schools in the original sample refused and was not replaced because a comparable replacement district was not available. In one USD, the superintendent

requested the deletion of a school that was forced into the sample, initially, because a special health project was being conducted there. The school was not replaced because a suitable replacement was not available. Another school not replaced refused after data collection had begun. The proportionality of the resultant sample (N = 97 schools) is indicated on the Kansas map of the USD's and the BED's (Figure 1).

USD superintendents were contacted by mail and asked to grant approval for the participation of school(s) in their district (Appendix B). If permission was not granted for a particular school to participate in the Needs Assessment Project, the school was replaced at random with a different school from the same USD if possible or from a randomly selected USD.

The three target groups for the Needs Assessment Project were:

(1) All foodservice personnel involved in food preparation for the selected schools including managers and other employees, but excluding district level foodservice personnel.

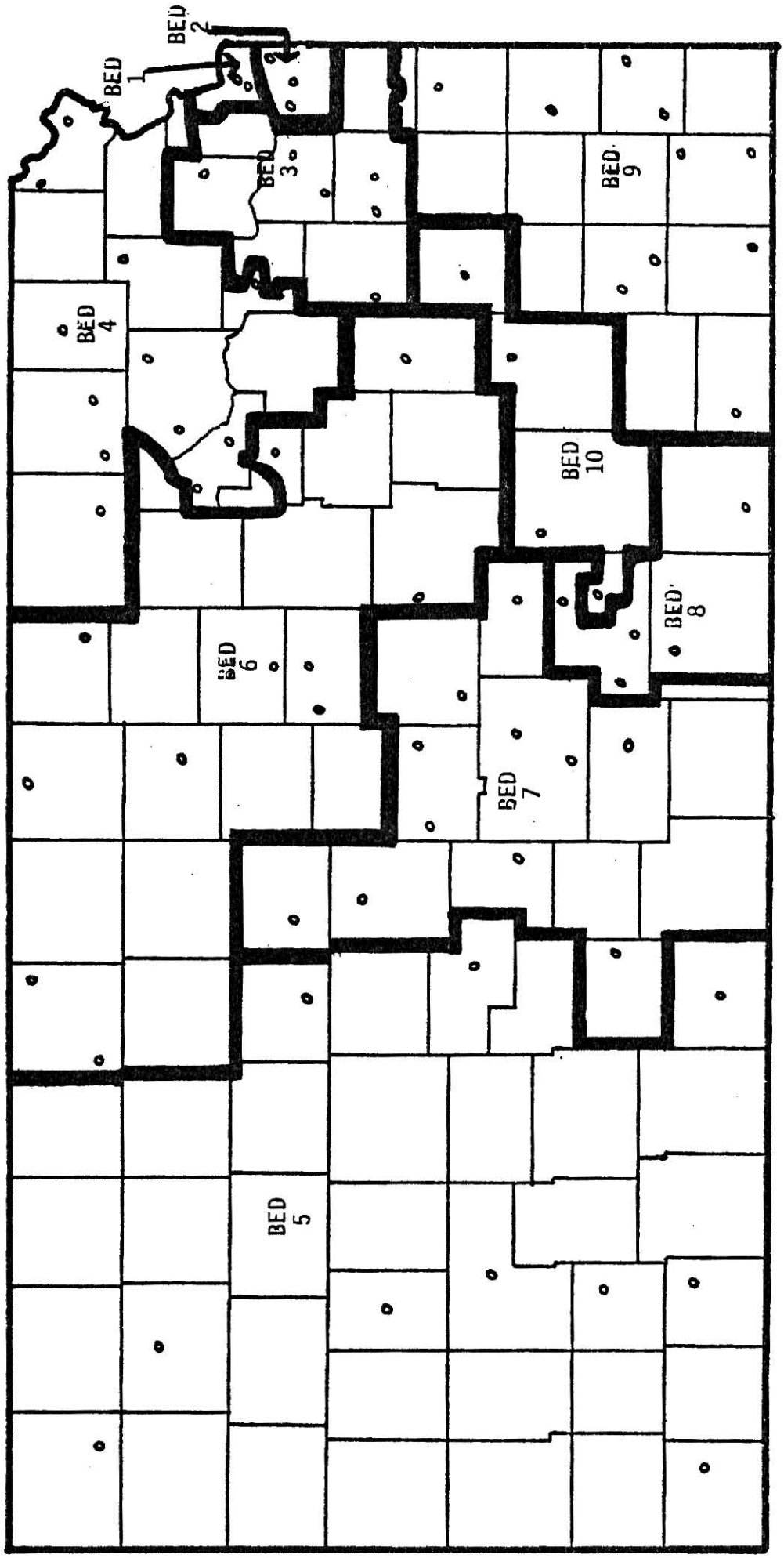
(2) All elementary school teachers, grades K-6, in the selected schools.

(3) All fifth graders attending selected schools.

This research report includes a description of the data collection and analysis for the foodservice personnel. The survey was limited to managers and other foodservice personnel in the selected schools. District level foodservice personnel were excluded. If food was not prepared on-site at the selected school, foodservice personnel at the base or central kitchen from where the food was transported were asked to complete the questionnaire.

USD superintendents granting approval for the participation of the school(s) in their district supplied the name(s) of principals at the selected school(s). Principal(s) at each school in the sample were

FIG. 1. Geographic location of Unified School Districts (USD) in the study sample by Board of Education Districts (BED).


BED 1
BED 2
BED 3
BED 4
BED 5
BED 6
BED 7
BED 8
BED 9
BED 10

contacted by mail and asked to supply the names and addresses of all the foodservice employees in base, central, and on-site kitchens (Appendix B).

The Instrument

The instrument selected for the Needs Assessment Project was the Food Service Personnel Edition of the Nutrition Education Assessment Series published by Planning, Development, and Evaluation (PDE) Associates, Inc., Tampa, Florida (Appendix C). The PDE instrument was selected for several reasons: (a) the instrument was designed specially for the NET program (58);(b) several of the PDE series had been selected for the National Evaluation of NETP;[1] and (c) data from the Florida study indicated that the test was reliable for use with group data (45).

The NEAS was developed by PDE Associates specifically to meet the needs of state departments of education and other groups involved in nutrition education needs assessments and evaluation of on-going programs. The NEAS was developed by a group of specialists in the areas of nutrition education, nutrition science, curriculum, early childhood education, health education, and test development. All editions of the series include items in the domains of nutrition knowledge and nutrition attitudes and habits. Within each domain, items are clustered into areas of knowledge and areas of attitudes and habits, respectively (58).

The first step in the development process entailed the preparation of an instrument series blueprint which identified the domains (knowledge, attitudes, and habits) and areas for which items would be developed. These domains and areas were identified based on these considerations:

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[1]Conversation with Dr. Thomas Ferb, NETP, Evaluation Study, ABT Associates Inc., Cambridge, Mass.

(a) the data needs of nutrition education planners as described by several prominent nutrition education specialists; (b) the USDA guidelines for nutrition education (26, 27); and (c) the Florida guidelines for nutrition education (59).

The initial items were written by PDE staff members in consultation with several nutrition education specialists. Extant nutrition education materials, nutrition education textbooks, and nutrition books were used as resource materials. The initial items underwent several review and revision stages. Reviews were conducted by nutrition education and educational measurement specialists. A pilot test of each edition of the NEAS was conducted in November, 1979, using respondents from Florida school systems. Content validity was assessed by several reviewers who were experts in the area of nutrition and nutrition education. According to their evaluation, the series addressed critical areas of knowledge, attitudes, and habits needed for assessing nutrition education status and planning nutrition education programs (59).

The instrument contained 110 items designed to measure nutrition knowledge, attitudes, and dietary practices. Fifty-five multiple choice items were used to assess knowledge in the following domains: basic nutrition vocabulary and concepts, nutrition practices, food selection, food preparation, storage procedures, and advertising claims (Table 1).

To measure nutrition-related attitudes and practices, foodservice personnel were asked to respond to 35 items on Likert type scales in the following areas: the value of proper nutrition, food selection, eating patterns, beverage consumption, advertising claims, and school food. In addition, the Food Service Personnel Edition contains 20 items which assess occupational attitudes and habits in the following areas:

THIS BOOK CONTAINS NUMEROUS PAGES WITH DIAGRAMS THAT ARE CROOKED COMPARED TO THE REST OF THE INFORMATION ON THE PAGE.

THIS IS AS RECEIVED FROM CUSTOMER.

Table 1: Areas of measurement and corresponding items in knowledge, attitudes, and habits domains of the Nutrition Education Assessment Series, Food Service Personnel Edition[1]

area of measurement	number of items	item numbers
Knowledge Domain:		
basic vocabulary/basic concepts	14	1-14
nutrition practices	12	15-26
food selection	14	27-40
food preparation	7	41-47
storage procedures	3	48-50
advertising claims	5	51-55
Total Knowledge	55	1-55
General Attitudes/Habits Domain:		
value of proper nutrition	5	56-59, 72
food selection	9	60-62, 73-78
eating patterns	5	63, 79-82
beverage consumption	5	64, 83-86
advertising claims	7	65-69, 87, 88
school food	4	70, 71, 89, 90
Total General Attitudes/Habits	35	56-90
Occupational Attitudes/Habits:		
coordination between teachers and foodservice personnel	7	91, 97, 103-106, 110
classroom practices	2	94, 102
cafeteria practices	5	92, 93, 95, 100, 101
in-service needs	4	96, 107-109
coordination with parents	2	98, 99
Total Occupational Attitudes/Habits	20	91-110

[1] PDE Associates, Inc., 1979.

coordination of nutrition education learning activities with teachers and parents, classroom practices, cafeteria practices, and perceived in-service needs (Table 1).

A form (Appendix D) was developed for foodservice personnel to record responses and to collect general information (demographic data and educational background). Also, a number of items were developed on nutrition education practices, which were designed to secure information on aspects not included in the PDE instrument.

Information on the reliability and content validity of the instrument was supplied by PDE Associates, based on the Florida statewide sample (60). Two reliability estimates were provided by the test developers. The Kuder Richardson reliability coefficient (KR-20) is based on the proportion of persons passing each item and the standard deviation of the total scores. The odd/even estimate, a measure of internal consistency, indicates the degree to which the two halves of the test are equivalent (61). The KR-20 was .83 and the odd/even estimate .84 indicating the test was sufficiently reliable for research purposes and for evaluating differences among groups (66).

Construct validity is the ability of a test to measure an individual's achievement based on their previous nutrition training (62) and it is assessed by testing groups with and without training. A higher nutrition knowledge score for persons with nutrition training indicates content and construct validity of the test.

The test was given in one junior level nutrition class (N = 45) and in one class on organizational behavior in the College of Business Administration (N = 69). The students in the business classes were primarily junior level business administration majors without prior

training in nutrition. Because of difficulties in processing the mark-sense computer response cards, the last five of the 55 items were not analyzed. The mean scores, standard deviations, ranges, and the t-value from the testing are summarized in Table 2. The mean score of the nutrition-trained college students was significantly higher than that of the students without training; therefore, construct validity of the nutrition knowledge test was indicated.

Table 2: Data from pilot study to evaluate reliability and validity of test instrument for foodservice personnel and elementary teachers

student group	highest possible score	mean score and standard deviation	range	reliability estimate KR-20
nutrition (N = 45)	50	40.58 ± 4.23	29-48	0.70
business (N = 69)	50	30.26 ± 5.86	19-44	0.74

t-value = 10.90 ($P \leq 0.001$)

Distribution of Survey Instruments

Packets including letters to the foodservice personnel describing the study and providing instruction for completing the questionnaire, PDE instruments, response sheets, and return envelopes were assembled and mailed to principals in each school with directions for distribution to the foodservice personnel in the sample (Appendix E). In schools in which food was not prepared on-site, packets were distributed to food-service personnel at the school from where food was transported. Packets also were distributed to personnel at the central kitchens which provided food to sample schools in two districts. The district foodservice

director or another appropriate person was identified in these school districts and contacted by phone to solicit assistance in distributing packets. The packets were sent to the contact person for distribution, along with a cover letter describing the project and giving instructions for distribution. The letter for foodservice employees in these base or central kitchens explained the project and the rationale for including them in the survey sample. Questionnaires were mailed to 618 foodservice personnel, 300 were employed at the sample schools and 318 were employees in base or central kitchens which provided food to sample schools.

The names of the foodservice personnel did not appear on the forms used to collect data. Identification code numbers were employed for maintaining confidentiality of information, identifying the location of the foodservice personnel, and facilitating follow-up mailings. Following completion of the questionnaires by the foodservice personnel, they were returned to the investigator. In the event that a section(s) of the response sheet was incomplete, a follow-up letter (Appendix E) and the unanswered section of the response sheet were mailed to the respondent for completion.

Approximately three weeks after the date of the initial mailing a follow-up mailing was sent to non-respondents (Appendix E). An additional response sheet and a stamped, addressed envelope were enclosed to facilitate response. A checklist (Appendix F) was developed to record the name and identification number of each foodservice employee by school or kitchen. The dates survey forms were sent and returned were recorded on the checklist during the distribution phase. The return rate (N = 464) from foodservice personnel was 75 percent.

Data Analysis

Data from the NEAS instrument were reviewed and keypunched directly from the response sheets. The general information section of the food-service personnel response sheet required hand-coding (Appendix G). Frequency distributions and percentages were compiled for each response category for all items on the NEAS instrument and general information section.

Analysis of Nutrition Knowledge Scores

The split half technique was used to examine reliability of the total score on the nutrition knowledge test for the foodservice personnel (63, 64). The general linear model (65) analysis of variance was used to analyze nutrition knowledge test scores. Independent variables included in the initial analysis were the following: Board of Education District (BED), Unified School District (USD), and sampled schools. Means, standard deviations, and coefficients of variation were computed for the total, percent, and nutrition knowledge domain scores devised by PDE (Table 3). The knowledge section of the test was scored according to the answer key provided by the test developers (Appendix H).

Analysis of variance also was used to study relationships between selected demographic variables and nutrition knowledge scores. Variables considered initially in analyzing foodservice personnel knowledge scores were: years in school foodservice, job title, whether the employee had completed formal training (vocational course(s), workshops), and type of system in which person was employed (on-premise, central, or base kitchen). Examination of data indicated that length of employment was not significant in analysis of any of the scores; also, differences were not

Table 3: Nutrition knowledge scores computed

score	number of items[1] Food Service Personnel Edition
total score[2]	55
basic vocabulary/basic concepts	14
nutrition practices	12
food selection	14
food preparation	7
storage procedures	3
advertising claims	5

[1]NEAS instruments developed by PDE Associates, Inc., 1979.

[2]A percent score was computed to study total percentage of correct responses (i.e., $\frac{\text{no. of items answered correctly}}{\text{total number of items}}$)

significant between several job categories. The eleven categories were collapsed into four classifications. Subsequent analysis was conducted using the following variables:

Training--those with and without formal job training

Type of group--(1) on-premise, (2) central kitchen, or (3) base kitchen personnel

Job title--(1) managers/supervisors, (2) cooks, assistant cooks, and bakers, (3) foodservice workers and cafeteria servers, and (4) other (maintenance, sanitation, clerical)

Analysis of Attitudes, Practices, and Nutrition Education Practice Scores

A group of 13 faculty members and graduate students trained in nutrition were asked to evaluate attitudes/practices (items 56-105) on

the Food Service Personnel Edition of the NEAS (Appendix I) to assist in developing scales from the items. Three scales were developed from the items: nutrition-related attitudes scale, nutrition-related practices scale, and nutrition education practices scale. Responses of the panel were used to determine items to include on each scale and to devise relative weighting of item responses in constructing scales. This approach for developing attitudes/practices scales was suggested by the test developer, since the clusters of items in Table 1 were for purposes of categorization and discussion and were not intended for computation of scores.[1]

Each nutrition trained panelist read the attitude statements (items 56-71) and indicated on a response sheet whether they believed agreement or disagreement represented a positive attitude related to nutrition. Uncertainty was indicated with a question mark. They also indicated the degree of importance they attached to each of the items in terms of the value to positive nutrition attitudes using the following scale:

1 = extremely important
2 = important
3 = somewhat important
4 = not very important
5 = definitely not important
6 = uncertain

Nutrition-related practices items (72-90) were evaluated as desirable, undesirable, or neither desirable nor undesirable. Each nutrition-related practice also was reviewed for its importance using the scale listed above and rated accordingly. Nutrition education classroom

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[1]Telephone conversation with Dr. Tom Freijo, President, PDE Associates, Inc., May 1980.

practices (items 91-105) were evaluated for their importance for school foodservice personnel using the same importance scale.

Frequency distributions from the nutrition trained panel were compiled on each item (Tables 27-29, Appendix J). A review panel analyzed each statement and decided whether agreement or disagreement represented a positive attitude based on responses from the nutrition trained group. Ten items (nos. 70, 77, 80, 81, 84, 94, 95, 98, 100, 101) were excluded because of lack of agreement by the nutrition trained panel (Appendix J).

When fewer than eight of the thirteen nutrition trained panel members (61.5 percent) agreed that an item represented a positive or negative attitude or practice the question was excluded (Tables 27, 28; Appendix J) with one exception (item 81). Although 61.5 percent of the nutrition trained panel was uncertain whether this item represented a positive attitude, the decision of the review panel was to include the item because it was postulated to receive a lower weighted score. Items in the nutrition education practices section were excluded because of lack of agreement among the nutrition trained panel members as to the importance of the practice (Table 29).

The means and standard deviations of the importance responses of the nutrition trained panel were computed and arranged in ascending order. Responses were scored according to the rating scale presented above. Then a priority score grid was developed for categorizing panel responses that provided a method for considering both means (general level of importance) and standard deviations (amount of consensus among respondents) simultaneously (Table 4). The review panel assigned weighted values of 1 to 5, with 5 representing a high degree of importance of the attitude or practice with high consensus (i.e., low variance) among the

nutrition trained panel members. Conversely, low importance ratings of an attitude or a practice were assigned a value of 1, regardless of the amount of consensus. Intermediate priority values (4, 3, and 2) were assigned to items with importance ratings in the mid-range between the two extremes and with various degrees of consensus. Tables 30 and 31 (Appendix J) present listings of the means and standard deviations computed from importance ratings of the nutrition trained panel and resultant priority scores assigned to each item.

Table 4: Priority score grid for evaluation of nutrition trained panel responses on importance of nutrition-related attitudes and practices and nutrition education practices items

mean scores[1] (relevance)	standard deviations (consensus)		
	0 - 0.77	0.77 - 1.34	1.34 - 1.99
1.00 - 1.85	5	4	3
1.85 - 2.34	3	2	2
2.34 - 3.92	1	1	1

[1]Scale: 1 = extremely important, 2 = important, 3 = somewhat important, 4 = not very important, 5 = definitely not important, and 6 = uncertain.

The four response categories in the nutrition-related attitudes and practices and nutrition education practices of the test were assigned numerical values from 1 to 4. A score of 4 represented the most positive attitude or practice and 1 the least positive. The direction of scoring was reversed on items for which disagreement on the attitude items or infrequent on the practices item represented the most positive response. In Table 5, items comprising each of the three scales are tabulated.

Table 5: Items comprising scales constructed from attitudes/habits domains (Food Service Personnel Edition)

scale[1]	response categories[2]	positive items[3]	negative items
nutrition-related attitudes	strongly agree agree disagree strongly disagree	56, 57 59, 63 64, 66, 68 69, 71	58, 60, 61, 62 65, 67
nutrition-related practices	always usually seldom never	72, 74, 75 76, 79, 84 87, 88, 89	73, 78, 82, 83 86, 90
nutrition education practices	frequently sometimes rarely never	91-93 96-97 99 102-105	

[1]Items 70, 77, 80, 81, 85, 94, 95, 98, 100, and 101 were excluded because of lack of agreement among the nutrition trained panel.

[2]Responses were scored 4 to 1 for positive items as listed, and 1 to 4 for negative items.

[3]Item number refers to test question number in Nutrition Education Assessment Series, Food Service Personnel Edition, PDE Associates, Inc., 1979.

Priority scores for the items on the scales developed for analysis of attitudes/practices are summarized in Table 6.

Scores for attitudes and practices and nutrition education practices were computed by multiplying the priority scores by the assigned numerical value for each item. Weighted item scores in each section (nutrition-related attitudes and practices and nutrition education practices) were added to compute scale scores. The minimum score for each of the three scales was computed by multiplying the lowest possible score, or 1, by the priority score for each item on the scale and adding these values.

Table 6: Priority scores assigned to nutrition-related attitudes and practices and nutrition education practices items based on evaluations of nutrition trained panel (Food Service Personnel Edition)

scale	priority score[1]	item no.
nutrition-related attitudes	1	60, 61, 63, 65, 66, 68
	2	57, 71
	3	58, 69
	4	62, 67
	5	56, 59, 64
nutrition-related practices	1	78, 89
	2	83, 84, 86
	3	73, 87, 88
	4	90
	5	72, 74, 75, 76, 79, 82
nutrition education practices[2]	1	99, 104
	2	91, 97, 102, 103, 105
	5	92, 93, 96

[1] 5 = highest priority according to evaluations of nutrition trained panel; 1 = lowest.

[2] None of the items were assigned a priority score of 2 or 3.

The maximum score was computed by multiplying the highest possible score, or 4, by the priority score for each item on each of the respective scales and summing these item scores. Scale scores were then standardized on a base of 100.

Coefficient alpha was computed to determine internal consistency of attitudes/practices scores (64). Coefficient alpha provides a standard method for estimating the reliability of attitude scales which contain no right or wrong answers but assess degree of agreement (66). It is based on internal consistency among the items composing the scale. According to Nunnally (66), a coefficient of .40 or above is a minimum acceptable level for attitude scales.

The general linear models (65) analysis of variance also was used to analyze attitudes/practices scores of foodservice personnel using the same variables from the analysis of knowledge test scores (BED, USD, school). Demographic variables used for analyzing attitudes and practices scores also were the same as those used in analysis of nutrition knowledge scores.

Correlation coefficients were computed to analyze relationships between knowledge, attitudes, and practices scores. Responses on nutrition education practices items were analyzed using chi-square to examine relationships based on type of foodservice facilities (on-premise, base, or central) in which personnel were employed.

RESULTS AND DISCUSSION

Description of Sample

General Information

A demographic profile of the school foodservice personnel in the study is shown in Table 7. Personnel surveyed were those employed in foodservice operations in the schools selected for the Needs Assessment Project or those employed at base or central kitchens which provided food for sample schools.

The majority of the respondents were females and over 80 percent were between the ages of 31 and 60 years of age. A few (5.1 percent) were under 30 and 14.5 percent were over 60 years of age.

About one-fourth of the foodservice personnel had not completed high school. Only a few held associate, bachelor's, or master's degrees (2.2 percent); although an additional 9.7 percent had attended college but had not completed a degree.

Almost 60 percent of the foodservice personnel were in job positions of head cook/cook, assistant cook, or baker and an additional 10.6 percent were classified as foodservice workers. The remainder were divided into two general categories; almost 20 percent were in three supervisory or managerial job positions and 14.2 percent were in non-food production jobs (i.e., maintenance/delivery, cashier/secretary).

Most (77.5 percent) had been employed in school foodservice for three or more years. Over 40 percent (43.5 percent) had been employed eight or more years. Only 11.2 percent were relative newcomers to school foodservice (i.e., they had been employed less than one year).

Table 7: Characteristics of Kansas school foodservice personnel

characteristic	response categories	N[1]	percent
age	under 21	0	0.0
	21-30	23	5.1
	31-40	96	21.2
	41-50	130	28.6
	51-60	139	30.6
	over 60	66	14.5
sex	female	450	99.3
	male	3	0.7
educational background	completed grade school	37	8.2
	attended high school but did not finish	82	18.1
	completed high school	280	61.8
	attended college but did not complete degree	44	9.7
	completed associate degree	4	0.9
	completed bachelor's degree	5	1.1
	completed master's degree	1	0.2
job title	manager/cook manager	55	13.9
	supervisor/other manager	14	3.6
	head cook/cook	117	29.6
	assistant cook	72	18.2
	baker	39	9.9
	foodservice worker	42	10.6
	maintenance/delivery	35	8.9
	cashier/secretary	12	3.0
	other	9	2.3
years of experience	less than 1 year	51	11.2
	1-2 years	51	11.3
	3-5 years	95	21.0
	6-7 years	59	13.0
	8 or more years	197	43.5

[1]N varies because of nonresponses.

In a national survey of school foodservice personnel conducted by Information Planning Associates, Inc., under contract with the United States Department of Agriculture, Food and Nutrition Service (USDA/FNS), a profile of a typical worker was described (67). The typical worker was 45 to 50 years of age and a high school graduate with approximately eight years of experience in school foodservice. Data from the Needs Assessment Project in Kansas reflected a similar profile for Kansas school foodservice employees.

Type and Recency of Training

The data indicated that 38.3 percent of the school foodservice personnel had training in nutrition, whereas 61.7 percent reported they had not completed any type of nutrition training (Table 8). Of those with training, the type varied from completion of a high school course to completion of various types of post-secondary training. About 12 percent of the school foodservice personnel reported they had completed a high school course, and only 3.3 percent completed a college or continuing education nutrition course. Almost one-fourth (23.7 percent) of the school foodservice personnel had attended a workshop on nutrition, most of them within the last three years. Less than 2 percent had completed a correspondence course on nutrition. Probably these persons had completed foodservice supervisor's or dietetic assistant's course approved by The American Dietetic Association.

A large majority (81.9 percent) of the school foodservice personnel reported they had on-the-job training in preparation for their job position. Relatively small percentages reported formal types of training for their jobs. Although, 27.5 percent had completed a workshop sponsored by the Kansas State Department of Education. In the national study (67),

Table 8: Reports of Kansas school foodservice personnel on type and recency of training

educational activity	N[1]	percent
completed nutrition training (type not specified)		
yes	165	38.3
no	266	61.7
completed high school nutrition course		
yes	57	12.4
no	402	87.6
completed college nutrition course or continuing education course		
yes	15	3.3
no	443	96.7
attended workshop on nutrition		
yes	109	23.7
no	350	76.3
time of completing workshop		
1977-1979	50	10.8
1975-1976	15	3.2
1970-1974	20	4.3
1963-1969	3	0.6
completed correspondence course on nutrition		
yes	7	1.5
no	452	98.5
training completed in preparation for position		
on-the-job training	375	81.9
short course (area vocational school)	53	11.6
workshops conducted by State Department of Education	126	27.5
workshops conducted by other than State Department	49	10.7

[1] N varies because of nonresponses.

only three out of 10 foodservice employees had completed training in the past 10 years and the most recent training was prior to 1975. In this study, almost two-thirds (64.2 percent) of those surveyed had only on-the-job training; the remainder (35.8 percent) had completed one or more of the three types of formal training.

Nutrition Knowledge

Individual responses on knowledge items (items 1-55) were examined and knowledge scores were computed as specified by PDE. A total score, a percentage score, as well as scores in six areas of measurement were computed. The Spearman-Brown or split half reliability estimate of the overall test was .74. Scores were analyzed to study differences based on geographic distribution (BED, USD, school) and on selected demographic variables. Also, interrelationships with attitude and practices scores were examined.

Analysis of Variance of Nutrition Knowledge Test Scores

Effect of BED, USD, and School. Results of the initial analysis of variance of the nutrition knowledge test scores for studying effects of BED, USD, and school are presented in Tables 9 to 11. The variance component estimates of scores on the nutrition knowledge test are listed in Table 10. The mean nutrition knowledge test scores of the school food-service personnel in the BED's, USD's, and schools did not differ significantly. Individual differences among the personnel surveyed accounted for 82.22 to 90.46 percent of the variance (Table 10).

The means, standard deviations, and coefficients of variation for the nutrition knowledge test for the overall group of foodservice

Table 9: Analysis of variance of nutrition knowledge test variables for Kansas school foodservice personnel

	source of variation			
	BED	USD/BED	school/USD/BED	error[1]
d.f.	9	68	21	362
expected mean squares	$\sigma^2+7.56\sigma^2_s+11.94\sigma^2_{USD}+44.72\sigma^2_{BED}$	$\sigma^2+4.10\sigma^2_s+4.98\sigma^2_{USD}$	$\sigma^2+5.04\sigma^2_s$	σ^2
mean squares				
total score	122.75	59.83	44.10	31.43
percent score	405.80	197.77	145.78	103.91
basic vocabulary/ basic concepts	8.76	6.10	6.49	4.06
nutrition practices	7.99	5.67	2.87	2.90
food selection	5.86	5.53	6.37	3.20
food preparation	3.67	1.58	1.51	1.20
storage procedures	1.04	0.83	0.66	0.44
advertising claims	4.32	2.64	1.80	1.46

[1]Between individual school foodservice personnel.

Table 10: Variance component estimates of scores of Kansas school foodservice personnel on the nutrition knowledge test

	variance component			
	σ^2_{BED}	$\sigma^2_{USD/BED}$	$\sigma^2_{school/USD/BED}$	σ^2_{error}[1]
total score				
variance component	0.65	3.64	2.51	31.43
percent	1.69	9.51	6.57	82.22
percent score				
variance component	2.14	12.02	8.31	103.91
percent	1.69	9.51	6.57	82.22
basic vocabulary/ basic concepts				
variance component	0.02	0.01	0.48	4.06
percent	0.44	0.30	10.57	88.70
nutrition practices				
variance component	-0.04	0.56	-0.01	2.90
percent	0.0	16.24	0.0	83.76
food selection				
variance component	-0.03	-0.05	0.63	3.20
percent	0.0	0.0	16.43	83.57
food preparation				
variance component	0.04	0.03	0.06	1.20
percent	2.87	2.01	4.66	90.46
storage procedures				
variance component	-0.01	0.04	0.04	0.44
percent	0.0	8.06	7.99	83.95
advertising claims				
variance component	0.00	0.18	0.07	1.46
percent	0.25	10.57	3.89	85.29

[1]Between individual school foodservice personnel.

Table 11: Means, standard deviations, and coefficients of variation of the scores of Kansas foodservice personnel on the nutrition knowledge test (N = 461)

scores	highest possible score	mean	standard deviation	coefficient of variation
				%
total score	55	36.48	5.61	15
percent score	100	66.33	10.19	15
basic vocabulary/ basic concepts	14	9.84	2.01	20
nutrition practices	12	6.54	1.70	26
food selection	14	9.90	1.79	18
food preparation	7	5.69	1.09	19
storage procedures	3	1.68	0.67	40
advertising claims	5	2.83	1.20	43

employees are listed in Table 11. The total score was based on 55 test items and the scores ranged from 18 to 51, with a mean of 36.48. The score on the nutrition knowledge test expressed as a percentage ranged from 29.1 to 92.7 percent with a mean of 66.33. In a report (45) on the needs assessment in the state of Florida, the mean score of foodservice personnel taking the same test was 38.08, or 69.24 percent (Table 12). The Florida school foodservice personnel surveyed were limited to those employed as managers; whereas the Kansas group included all levels of foodservice personnel, except directors.

Kansas foodservice personnel scored relatively (i.e., compared to maximum scores) higher on the basic vocabulary, food selection, and food

Table 12: Comparison of mean scores of Kansas and Florida school foodservice personnel on nutrition knowledge test[1]

scores	Kansas (N=461)	Florida[2] (N=201)
	mean	mean
total score	36.48	38.08
percent score	66.33	69.24
basic vocabulary/basic concepts	9.84	10.44
nutrition practices	6.54	6.86
food selection	9.90	10.25
food preparation	5.69	5.69
storage procedures	1.68	1.62
advertising claims	2.83	3.14

[1]Kansas sample included all foodservice personnel except directors. Florida sample included school lunch managers only.

[2]From: Freijo, T.D., Perez, J.V., Freijo, K.K., and MacDonald, D.: Florida Nutrition Education Needs Assessment Final Report. Tampa, Florida: PDE Associates, Inc., 1979.

preparation than on nutrition practices, storage procedures, and advertising claims. Florida school foodservice managers scored slightly higher than the Kansas sample of foodservice personnel on four areas of measurement within the nutrition knowledge test (45). The score of the Kansas group was the same as that of the Florida managers on food preparation and was slightly higher on the storage procedures score.

Nutrition Knowledge and Selected Characteristics of School Foodservice Personnel. Scores were examined to study effects of three demographic variables:

Training--those with and without formal training (e.g. vocational classes, workshops),

Types of group--on premise, central kitchen, or base kitchen personnel, and

Job position--job titles include (a) managers/supervisor, (b) cooks, assistant cooks and bakers, (c) foodservice workers and cafeteria servers, and (d) other (maintenance, sanitation, clerical).

The initial 11 job categories were redefined into four groupings as listed above. Analysis of variance indicated that there were differences in nutrition knowledge scores of Kansas school foodservice personnel attributable to these variables (Tables 13 and 14). F ratios are given in Table 13 and least squares means are listed in Table 14. Six scores differed based on type of training: total score, percent score, basic vocabulary, food selection, food preparation, and advertising claims (Table 13). In all instances, those with formal training scored significantly higher than those with only on-the-job training.

Total and percent scores and scores on basic vocabulary, nutrition practices, food selection, and advertising claims of school foodservice personnel in the on-premise school kitchens were higher than those employed in central or base kitchens with one exception. The base kitchen personnel scored slightly higher on the advertising claims score. Scores of the central kitchen workers were lowest in all comparisons.

Differences in four scores were found among employees based on job type (Table 13). The school foodservice personnel who were managers/supervisors achieved a significantly higher total score and percent score than did those in other position categories (cooks, assistant cooks, and bakers; foodservice workers and cafeteria servers; and the maintenance, sanitation, and clerical personnel). The managerial personnel also scored highest on food selection but somewhat lower than two other groups

Table 13: F ratios for analysis of effects of selected variables on nutrition knowledge scores of Kansas school foodservice personnel[1]

scores	mean square error[2]	F ratios for effects of: training[3]	type of group[4]	title of group[5]
total score	31.76	14.81***	12.45***	4.59**
percent score	104.99	14.81***	12.45***	4.59**
basic vocabulary	4.21	8.53**	10.64***	2.31
nutrition practices	3.17	3.32	8.01***	4.25**
food selection	3.34	8.03**	11.59***	2.78*
food preparation	1.16	4.16*	1.09	2.05
food storage	0.50	3.07	2.08	1.78
advertising claims	1.58	9.36**	3.92*	1.69

[1] N = 393.

[2] Degrees of freedom = 386.

[3] Training indicates groups with and without formal job training (vocational classes, workshops).

[4] Types of group consist of (1) on-premise, (2) central kitchen, and (3) base kitchen personnel.

[5] Job titles include (1) managers/supervisor, (2) cooks, assistant cooks and bakers, (3) foodservice workers and cafeteria servers, and (4) other (maintenance, sanitation, clerical).

* $P \leq 0.05$ ** $P \leq 0.01$ *** $P \leq 0.001$

Table 14: Least squares means and standard errors for nutrition knowledge scores of Kansas school foodservice personnel from analysis of effects of selected variables[1]

score	variable	least squares means and standard errors
total score	training	
	yes	36.87 ± 0.70
	no	34.35 ± 0.61
	type of group	
	on-premise	38.26 ± 0.55
	central kitchen	31.01 ± 1.40
	base kitchen	37.56 ± 0.48
	title of group	
	managers/supervisor	36.93 ± 0.83
	cooks, assistant cooks, and bakers	34.26 ± 0.57
	foodservice workers and cafeteria servers	36.03 ± 0.78
	maintenance, sanitation, and clerical	35.22 ± 1.31
percent score	training	
	yes	67.04 ± 1.27
	no	62.45 ± 1.12
	type of group	
	on-premise	69.57 ± 0.99
	central kitchen	56.37 ± 2.54
	base kitchen	68.29 ± 0.88
	title of group	
	managers/supervisor	67.15 ± 1.50
	cooks, assistant cooks, and bakers	62.30 ± 1.04
	foodservice workers and cafeteria servers	65.50 ± 1.43
	maintenance, sanitation, and clerical	64.03 ± 2.39
basic vocabulary	training	
	yes	9.87 ± 0.26
	no	9.18 ± 0.22

[1]Data presented only for significant findings.

Table 14: (cont.)

score	variable	least squares means and standard errors
	type of group	
	on-premise	10.41 ± 0.20
	central kitchen	7.97 ± 0.51
	base kitchen	10.19 ± 0.18
nutrition practices	type of group	
	on-premise	7.13 ± 0.17
	central kitchen	5.30 ± 0.44
	base kitchen	6.89 ± 0.15
	title of group	
	managers/supervisor	6.54 ± 0.26
	cooks, assistant cooks, and bakers	5.94 ± 0.18
	foodservice workers and cafeteria servers	6.64 ± 0.25
	maintenance, sanitation, and clerical	6.64 ± 0.42
food selection	training	
	yes	9.75 ± 0.23
	no	9.15 ± 0.20
	type of group	
	on-premise	10.33 ± 0.18
	central kitchen	8.13 ± 0.45
	base kitchen	9.88 ± 0.16
	title of group	
	managers/supervisor	10.05 ± 0.27
	cooks, assistant cooks, and bakers	9.35 ± 0.19
	foodservice workers and cafeteria servers	9.43 ± 0.25
	maintenance, sanitation, and clerical	8.97 ± 0.43
food preparation	training	
	yes	5.80 ± 0.13
	no	5.55 ± 0.12
advertising claims	training	
	yes	2.97 ± 0.16
	no	2.53 ± 0.14

Table 14: (cont.)

score	variable	least squares means and standard errors
	type of group	
	on-premise	2.96 ± 0.12
	central kitchen	2.21 ± 0.31
	base kitchen	3.08 ± 0.11

on the nutrition practices score. The cooks, assistant cooks, and bakers had the lowest mean squares mean on the four scores differing by position type, except on the food selection score.

Responses on Nutrition Knowledge Items

The responses of Kansas school foodservice personnel on each of the four alternatives to the 55 nutrition knowledge questions are listed in Table 32 (Appendix K). Percentages of the survey group responding correctly and incorrectly to the individual items in the knowledge domain by area of measurement are in Table 15. Selected test items from the table on which the school foodservice personnel scored high ($\geq$ 85 percent correct) or low (< 40 percent correct) are discussed below.

Basic Vocabulary/Basic Concepts. Over 88 percent of the Kansas school foodservice personnel selected the correct definition of calorie (item 1), 98.5 percent knew that table salt was sodium chloride (item 2), and 86.2 percent identified dextrose as a carbohydrate (item 4). Most (92.9 percent) identified the two major types of carbohydrate (item 6) and knew that fibers were not absorbed by the body but aid in regularity (item 11). Incorrect responses were most frequent on the items concerning absorption rate of iron (item 10) and identification of the small intestine as the absorption site (item 12).

On the Basic Vocabulary/Basic Concepts items, almost all the Florida foodservice managers (45), responded correctly to five of the 14 items. These items dealt with basic vocabulary such as calorie, sodium chloride, dextrose, and carbohydrate, and the function of fiber. Less than one-half responded correctly to the items that related to absorption and the definition of an essential nutrient.

Table 15: Responses of Kansas school foodservice personnel[1] on items in knowledge domain by area of measurement

item number by area of measurement[2]	summary of question content	correct responses	incorrect responses[3]
		%	%
basic vocabulary/basic concepts			
1	definition of calorie	88.8	11.2
2	definition of sodium chloride	98.5	1.5
3	description of an essential nutrient	49.4	50.6
4	identification of dextrose as a carbohydrate	86.2	13.8
5	identification of fat as a high energy source	54.5	45.5
6	identification of sugars and starches as carbohydrates	92.9	7.1
7	identification of iron as an essential nutrient	75.6	24.4
8	composition of protein	55.6	44.4
9	identification of carbohydrate as a source of energy	80.4	19.6
10	absorption rate of iron	39.7	60.3
11	function of dietary fiber	92.9	7.1
12	identification of the small intestine as the absorption site	37.1	62.9

[1] N = 464.

[2] Item number refers to test question number in Nutrition Education Assessment Series, Foodservice edition, PDE Associates, Inc., 1979.

[3] Includes incorrect and nonresponses.

Table 15: (cont.)

item number by area of measurement	summary of question content	correct responses	incorrect responses
		%	%
13	knowledge that vitamins are non-digestible	58.4	41.6
14	knowledge that vitamin C cannot be stored for extra energy	75.0	25.0
nutrition practices			
15	knowledge that one pound of weight loss is equivalent to a 3500 calorie deficit	31.2	68.8
16	knowledge that eight hours of vigorous exercise are necessary to lose one pound of fat	20.5	79.5
17	selecting the correct diet from a list of foods containing too much or too little protein	54.1	45.9
18	best nutritional advice for pregnant women	39.7	60.3
19	identification of breast milk as best to meet nutritional needs of an infant at three to five months	78.0	22.0
20	lowest risk age group for iron deficiency	46.6	53.4
21	amount of sugar consumed annually by average American	30.2	69.8
22	a major dietary source of carbohydrate	82.3	17.7
23	relationship of cholesterol with blood vessel disease	90.5	9.5
24	identifying excessive amounts of vitamin A to be toxic	43.8	56.2

Table 15: (cont.)

item number by area of measurement	summary of question content	correct responses	incorrect responses
		%	%
25	identifying iron as being the most serious deficiency in Americans	81.5	18.5
26	identifying that loss of appetite can result from excessive alcohol consumption	56.5	43.5
food selection			
27	a dietary source of high quality protein	83.4	16.6
28	a food source of riboflavin	74.1	25.9
29	major food sources of iron	48.3	51.7
30	selection of the food having highest fat content	45.0	55.0
31	identification of a meat substitute	95.3	4.7
32	identification of beans and rice as foods containing the best protein balance	80.4	19.6
33	major food sources of vitamins A and C	71.8	28.2
34	major food source of calcium	95.0	5.0
35	identification of a milk substitute	49.8	50.2
36	identification of eggs as containing high cholesterol content	75.4	24.6
37	selection of skim milk as containing less fat than other forms of milk	89.2	10.8
38	application of information given on a nutritional label	24.4	75.6

Table 15: (cont.)

item number by area of measurement	summary of question content	correct responses	incorrect responses
		%	%
39	identification of the best nutrient balance in a meal	87.7	12.3
40	selection of most nutritious breakfast	70.7	29.3
food preparation			
41	identification of sugar as the most prevalent food additive	40.3	59.7
42	purpose of adding salt to canned foods	80.4	19.6
43	identification of broccoli as a food which is safely eaten raw	80.2	19.8
44	nutrient conservation in cooking vegetables	81.5	18.5
45	recognizing that raw chicken sometimes carries salmonella poisoning	93.1	6.9
46	knowledge that warm dressing will allow microorganisms to grow and could cause food poisoning	96.8	3.2
47	recognizing that fresh pork should be heated to an internal temperature of 170°F to kill the parasite trichinae if present	96.8	3.2
storage procedures			
48	recognizing that turkey should be refrigerated immediately after use	93.3	6.7
49	identification of a food not requiring refrigeration	51.3	48.7

Table 15: (cont.)

item number by area of measurement	summary of question content	correct responses	incorrect responses
		%	%
50	recognizing that meat can be refrozen if ice crystals are still present	23.7	76.3
advertising claims			
51	definition of bread enrichment	66.8	33.2
52	definition of fortification	69.2	30.8
53	selection of an advertising claim based on fact	41.4	58.6
54	selection of an advertising claim based on fact	35.8	64.2
55	definition of "USDA choice"	70.3	29.7

Nutrition Practices. Slightly over 30 percent of the school foodservice personnel knew that a deficit of 3,500 calories (item 15) and only 20.5 percent that exercising vigorously for eight hours is required to lose one pound of body fat (item 16). Over a third of the school foodservice personnel did not know that nutrients needs increase during pregnancy (item 18). Approximately 70 percent of the Kansas school foodservice personnel underestimated the amount of sugar the average American consumes per year (item 21). Almost 91 percent of the school foodservice personnel, however, were aware of the harmful effects of cholesterol on the blood vessels (item 23).

Relatively high proportions of the Florida managers (45) identified a major source of carbohydrate and iron deficiency as a serious deficiency. Less than one-third identified the calorie expenditure required to lose one pound of body weight and the amount of exercise necessary to lose one pound of body fat.

Food Selection. Over 95 percent of the Kansas school foodservice personnel could identify an appropriate meat alternate (item 31) and also, 95 percent knew that milk was a good source for calcium (item 34). Almost 90 percent were aware that skim milk had less fat than other forms of milk (item 37). Identification of a meal with the best balance of nutrients was correct for 87.7 percent of the employees surveyed (item 39). Only 24 percent, however, could select a food group from a label describing nutrient content (item 38).

Similar results were found in Florida (45). Almost all of the foodservice managers answered correctly the items on protein substitute and calcium sources. Less than half could identify a milk substitute and less than one-fourth were able to classify a food from its nutritional label.

Food Preparation. Overall, the group of Kansas school foodservice personnel were knowledgeable on items related to food preparation. Nearly all (96.8 percent) knew the reason why turkey should not be stuffed until immediately before baking (item 46) and why fresh pork should be heated to an internal temperature of 170°F (item 47). Most (93.1 percent) responded correctly to the item on raw chicken as a salmonella carrier (item 45). Also, almost all of the Florida respondents (45) knew the correct response on the cooking procedures of turkey, chicken, and pork.

Storage Procedures and Advertising Claims. Over 90 percent recognized that turkey should be refrigerated immediately after use (item 48), while only 23.7 percent knew that meat with ice crystals could be refrozen (item 50). Less than one-fourth of the Florida (45) respondents answered the item on refreezing meat correctly and nearly two-thirds responded correctly to the item on advertising claim based on fact (item 54). Only 35.8 percent of the Kansas employees responded correctly.

Nutrition-Related Attitudes and Practices and Nutrition Education Practices

As described in the initial discussion of the section on the Data Analysis and Interpretation Phase, nutrition-related attitudes and practices and nutrition education practices scores were computed to study effects of geographic location (BED, USD, school), selected demographic characteristics, and interrelationships with scores on nutrition knowledge. Higher scores on the attitudes/practices indexes are indicators of more positive attitudes and greater frequency of positive nutrition-related or nutrition education. Reliability of the nutrition-related attitudes and practices scores and the nutrition education practices score

were analyzed using coefficient alpha (64). The coefficients for the attitude and practices scores were .50, .45, and .87, respectively. According to Nunnally (66), a coefficient of .40 or above is a minimum acceptable level for attitude scales. Also, responses on individual attitude and practices items were examined.

Analysis of Variance of Nutrition-Related Attitudes and Practices and Nutrition Education Practices Scores

Effects of BED, USD, and School. Results of the analysis of variance of the nutrition-related attitudes and practices and nutrition education practices scores of Kansas school foodservice personnel are presented in Tables 16 to 18. The variance component estimates are listed in Table 17. Individual differences among the foodservice personnel accounted for 79.27 to 89.27 percent of the variance. Compared to the variance for nutrition knowledge (Table 10), nutrition-related attitudes, and nutrition education practices scores, more of the variance for nutrition practices was attributable to differences among schools (Table 17). Over 20 percent of the variance in the nutrition education practices score was among USD's.

The means, standard deviations, and coefficients of variation for the nutrition-related attitudes and practices and nutrition education practices scores are listed in Table 18 for the overall group of Kansas school foodservice employees. As described in the section on computation of attitudes/practices scores, all three scores were standardized on a base of 100.

Attitudes/Practices Scores and Selected Characteristics of School Foodservice Personnel. Analysis of variance indicated that there were differences in nutrition-related attitudes and practices and nutrition

Table 16: Analysis of variance of nutrition-related attitudes and practices and nutrition education practices test variables for Kansas school foodservice personnel

	source of variation			
	BED	USD/BED	school/USD/BED	error[1]
d.f.	9	68	21	360
expected mean squares	$\sigma^2+7.484\sigma^2_s+11.83\sigma^2_{USD}+44.5\sigma^2_{BED}$	$\sigma^2+4.09\sigma^2_s+4.96\sigma^2_{USD}$	$\sigma^2+5.01\sigma^2_s$	σ^2
mean squares				
nutrition-related attitudes	153.84	81.19	45.76	61.65
nutrition-related practices	259.94	140.54	177.49	101.28
nutrition education practice	1277.64	877.74	374.84	0.38

[1]Between individual foodservice personnel.

Table 17: Variance component estimates of scores of Kansas school foodservice personnel on the nutrition-related attitudes and practices and nutrition education practices

	variance component			
	σ^2_{BED}	$\sigma^2_{USD/BED}$	$\sigma^2_{school/USD/BED}$	σ^2_{error}[1]
nutrition-related attitudes				
variance component	0.86	6.55	0.00	61.65
percent	1.25	9.48	0.00	89.27
nutrition-related practices				
variance component	2.23	0.00	15.21	101.28
percent	1.88	0.00	12.81	85.31
nutrition education practices				
variance component	0.00	100.88	0.00	0.38
percent	0.00	20.73	0.00	79.27

[1]Between individual foodservice personnel.

Table 18: Means, standard deviations, and coefficients of variation of the scores of Kansas school foodservice personnel on the nutrition-related attitudes and practices and nutrition education practices

scores	highest possible score	mean	standard deviation	coefficient of variation
				%
nutrition-related attitudes	100	71.39	7.85	11
nutrition-related practices	100	61.78	10.06	16
nutrition education practices	100	33.40	19.64	59

education practice scores of Kansas school foodservice personnel attributable to demographic factors examined (training, type of group, and the job title) (Tables 19 and 20). These demographic variables were the same as those used in analyzing knowledge scores.

Nutrition-related attitudes of school foodservice personnel in managerial or supervisory positions were significantly higher ($P \leq 0.001$) than those in the three other job categories studied. Attitude scores were not different among groups in relation to training or type of facility in which employed (on-premise, central, or base kitchen). Those who had completed formal training scored significantly higher ($P \leq 0.001$), however, than those with only on-the-job training.

The nutrition education practices least squares means differed significantly ($P \leq 0.001$) in relation to all three demographic variables examined. Those with formal training scored significantly higher than those without such training, as did the managerial/supervisory personnel

Table 19: F ratios for analysis of effects of selected variables on nutrition-related attitudes and practices and nutrition education practices scores of Kansas school foodservice personnel[1]

scores	mean square error[2]	F ratios for effects of: training[3]	type of group[4]	title of group[5]
nutrition-related attitudes	61.31	1.70	0.72	6.91***
nutrition-related practices	98.17	13.88***	0.51	1.42
nutrition education practices	340.05	24.07***	17.34***	6.80***

[1]N varies from 391 to 392 because of nonresponses.

[2]Degrees of freedom vary from 384 to 385.

[3]Training indicates groups with and without formal job training (vocational classes, workshops).

[4]Types of group consist of (1) on-premise, (2) central kitchen, and (3) base kitchen personnel.

[5]Job titles include (1) managers/supervisor, (2) cooks, assistant cooks and bakers, (3) foodservice workers and cafeteria servers, and (4) other (maintenance, sanitation, clerical).

*** $P \leq 0.001$

Table 20: Least squares means and standard errors for nutrition-related attitudes and practices and nutrition education practices scores of Kansas school foodservice personnel[1]

score	variable	least squares means and standard errors
nutrition-related attitudes	title of group	
	manager/supervisor	75.01 ± 1.15
	cooks, assistant cooks, and bakers	70.72 ± 0.80
	foodservice workers and cafeteria servers	72.50 ± 1.09
	maintenance, sanitation, and clerical	67.57 ± 1.83
nutrition-related practices	training	
	yes	65.04 ± 1.23
	no	60.73 ± 1.08
nutrition education practices	training	
	yes	34.61 ± 2.29
	no	24.03 ± 2.01
	type of group	
	on-premise	40.15 ± 1.78
	central kitchen	15.79 ± 4.58
	base kitchen	32.02 ± 1.58
	title of group	
	manager/supervisor	39.22 ± 2.70
	cooks, assistant cooks, and bakers	27.97 ± 1.88
	foodservice workers and cafeteria servers	26.05 ± 2.57
	maintenance, sanitation, and clerical	24.04 ± 4.30

[1]Data presented only for significant findings.

compared to those in other school foodservice jobs. Also, when scores were adjusted for effects of training and job type there was a main effect in relation to type of group. Those employees who worked in on-premise school foodservice systems had significantly higher nutrition education practices scores than did those employed in central or base kitchens. These data indicate that those employees with training, those working in on-premise facilities, and those in managerial positions were the most actively involved in nutrition education activities in their schools.

Intercorrelations of Nutrition Knowledge, Attitudes and Practices Scores

Correlations among scores for nutrition knowledge, nutrition-related attitudes and practices, and nutrition education practices are listed in Table 21. All nutrition knowledge scores for the six areas of measurements correlated strongly and positively with the total nutrition knowledge score (i.e., $r > .60$), except the storage procedure score. The coefficient between that score and the total score was only .288. With one exception noted, those with high total scores on the nutrition knowledge test also scored high on all the areas of measurements. As shown in Table 21 the storage procedures score had the weakest correlations with all the other nutrition knowledge scores.

Nutrition knowledge scores were correlated positively with the scores for nutrition-related attitudes; coefficients were significant ($P \leq .01$) for three of the comparisons (total score, nutrition practices, and food selection). Nutrition-related practices also were correlated positively with knowledge scores; four of the seven coefficients were significant ($P \leq .05$).

Table 21: Correlation coefficients of foodservice personnel's scores for nutrition knowledge, nutrition-related attitudes and practices, and nutrition education practices[1]

score	T score	basic voc	nutr pract	food sel	food prep	stor proc	adv claims	nutr attit	nutr pract
total score									
basic vocabulary	.777								
nutrition practices	.729	.444							
food selection	.728	.431	.394						
food preparation	.612	.333	.337	.373					
storage procedures	.288	.147	.111	.082n.s.	.124				
advertising claims	.647	.394	.358	.324	.369	.182			
nutrition-related attitudes	.148	.066n.s.	.128	.144	.084n.s.	.081n.s.	.076n.s.		
nutrition-related practices	.201	.145	.135n.s.	.227	.058n.s.	.092	.085n.s.	.161	
nutrition education practices	.103	.113	.010n.s.	.125	-.122	.065n.s.	.032n.s.	.190	.180

[1]All correlation coefficients are significant ($P \leq 0.05$) except for those labeled n.s.

$P \leq 0.05$, $r = .09$; $P \leq 0.01$, $r = .12$.

The nutrition education practices scores correlated positively and significantly with three of the nutrition knowledge scores (total score, basic vocabulary, food selection) and the nutrition-related attitudes score, as well as the nutrition-related practices score. These data indicate that those who are more knowledgeable about nutrition and who have more positive nutrition attitudes and practices will most likely be most involved in nutrition education in the school setting.

Responses on General Attitudes/Habits Items

The responses to the nutrition attitude questions of Kansas school foodservice personnel are listed in Table 22. Selected items are discussed below according to the categories devised by PDE (Table 1).

Value of Proper Nutrition. In general, Kansas school foodservice personnel have a favorable attitude toward the value of proper nutrition. Almost all (99.6 percent) of the foodservice personnel strongly agreed or agreed that good eating habits are important to good health (item 56) and 96.3 percent indicated that they were interested in the nutritional value of the food they ate (item 59). Over 85 percent thought their diet was well-balanced nutritionally (item 57); however, a smaller percentage (65.9 percent) reported they combined exercise and diet to maintain weight. The majority of the foodservice managers in the Florida Needs Assessment Project (45) also believed that their current diets were well-balanced.

Food Selection. Nearly 90 percent of the school foodservice personnel in the present study reported that they frequently selected food to obtain a balanced diet (item 76). Over 50 percent indicated they ate fruit for snacks (item 74); whereas only 26.6 percent ate vegetables between meals (item 75). Sweets, however, were always or usually selected as snack

Table 22: General attitudes/habits of Kansas school foodservice personnel toward nutrition[1]

item number by area of measurement[2]	item	strongly agree	agree	disagree	strongly disagree
		%	%	%	%
value of proper nutrition					
56	Good eating habits are important to good health.	71.9	27.7	0.4	0.0
57	My current diet is a well balanced nutritious one.	13.6	71.6	14.1	0.7
58	Crash dieting is a good way to lose weight.	1.7	3.7	41.1	53.5
59	I am interested in the nutritional value of what I eat.	24.5	71.8	3.5	0.2
		always	usually	seldom	never
72	I combine good eating habits and exercise to maintain proper body weight.	5.8	60.1	32.4	1.7

[1] N varies from 458 to 462.

[2] Item number refers to test question number in Nutrition Education Assessment Series, Food Service Personnel Edition, PDE Associates, Inc., 1979.

Table 22: (cont.)

item number by area of measurement	item	strongly agree	agree	disagree	strongly disagree
		%	%	%	%
food selection					
60	Foods higher in nutrient content are less tasty than other foods.	2.8	11.1	69.4	16.7
61	If people simply eat what they like, they will have a nutritious diet.	0.9	0.6	56.5	42.0
62	The best way to lose weight is to eliminate foods containing fat from the diet.	7.1	35.3	51.1	6.5
		always	usually	seldom	never
73	I eat sweets for snacks.	2.2	36.2	55.1	6.5
74	I eat fruit for snacks.	3.2	62.5	33.2	1.1
75	I eat vegetables for snacks.	1.3	25.3	61.3	12.1
76	I select foods to make up a balanced diet.	11.5	77.8	8.7	2.0
77	I use a vitamin supplement	16.9	17.7	31.6	33.8
78	I eat foods like potato chips, corn chips, or cheese curls for snacks.	0.4	10.8	65.8	23.0

Table 22: (cont.)

item number by area of measurement	item	strongly agree	agree	disagree	strongly disagree
		%	%	%	%
eating patterns					
63	Part of the pleasure of eating is sitting and talking with people I like.	14.1	65.9	18.5	1.5
		always	usually	seldom	never
79	I eat breakfast.	43.2	20.4	26.0	10.4
80	I eat a snack before going to bed.	2.2	18.9	56.7	22.2
81	I eat a snack between lunch ahd supper.	2.7	29.8	54.0	13.5
82	After I finish a meal I feel "stuffed."	2.2	25.6	65.9	6.3
		strongly agree	agree	disagree	strongly disagree
beverage consumption					
64	It is a good nutritional habit to drink several glasses of water daily.	47.2	48.7	3.0	1.1

Table 22: (cont.)

item number by area of measurement	item	always	usually	seldom	never
		%	%	%	%
83	Between meals I drink "soft drinks."	3.2	15.0	49.5	32.3
84	I drink fruit or vegetable juices every day.	25.1	37.5	31.6	5.8
85	I drink more than one cup of coffee in a day.	37.8	28.4	14.1	19.7
86	I drink two or more ounces of alcohol in a day.	0.2	1.8	17.8	80.2
		strongly agree	agree	disagree	strongly disagree
advertising claims					
65	Foods which supply more nutrients cost more than foods with fewer nutrients.	1.9	9.8	75.5	12.8
66	In general, highly processed foods have fewer nutrients than less highly processed foods.	9.3	54.5	34.2	2.0
67	In America today, it is nearly impossible to get all the nutrients one needs unless one takes a vitamin supplement.	4.1	21.5	64.0	10.4
68	Foods grown with natural fertilizers are more nutritious than foods with synthetic fertilizers.	7.7	38.7	49.9	3.7

Table 22: (cont.)

item number by area of measurement	item	strongly agree	agree	disagree	strongly disagree
		%	%	%	%
69	The labels on packaged food help the wise consumer to decide how nutritious a food is.	16.9	74.6	7.2	1.3
		always	usually	seldom	never
87	I read the ingredients label on a package of processed food before I buy it.	10.2	44.3	38.6	6.9
88	I read the nutritional label on the foods I buy.	8.0	40.4	42.1	9.5
		strongly agree	agree	disagree	strongly disagree
school food					
70	The lunches served in school are tasty.	26.5	68.3	4.6	0.6
71	The lunches served in school are good for me.	27.0	63.7	8.7	0.6
		always	usually	seldom	never
89	I eat the lunches served at school.	66.2	25.7	5.9	2.2
90	I buy soft drinks or "sweets" at school for snacks.	0.2	3.0	12.8	84.0

foods by about 40 percent (item 73). Most of the Florida (45) foodservice managers were concerned about eating a balanced diet. The majority indicated that they seldom ate "sweets" or vegetables for snacks, but did eat fruit.

Eating Patterns and Beverage Consumption. Most of the Kansas school foodservice personnel (78.9 percent) reported they seldom or never snacked before going to bed, and 67.5 percent did not snack between lunch and supper (items 80 and 81). Over 60 percent always or usually ate breakfast (item 79) and 95.9 percent of the school foodservice personnel agreed that it was a good nutritional habit to drink several glasses of water a day (item 64). Most of the respondents in the Florida Needs Assessment (45) reported they ate a breakfast daily and seldom ate snacks between meals or after supper.

Advertising Claims. Over 90 percent of the Kansas school foodservice personnel thought the nutrient labels on packaged foods help consumers determine the nutrient value (item 69). Only about half, however, usually or always read ingredients or nutritional labels on the foods they purchased (items 87 and 88). The majority of the Florida (45) foodservice managers read ingredient labels, but did not read nutritional labels when buying foods.

School Food. Over 90 percent of the respondents were positive about their school lunch programs (items 70 and 71) and 91.9 percent always or usually ate lunches at school. Most of the Florida (45) respondents had similar attitudes, but they reported that they seldom or never ate the school lunches.

Occupational Attitudes and Habits

The responses of Kansas school foodservice personnel to the occupational attitude and habit items are listed in Table 23. Selected attitudes of the school foodservice personnel are discussed below according to the categories suggested by PDE (59).

Coordination Between Teachers and Foodservice Personnel. Small percentages of the Kansas school foodservice personnel reported they were consulted by the teachers about nutrition topics or asked to talk to classes about nutrition (items 103 and 104), but over 55 percent believed that their talents in the area of nutrition were being used fully in their school (item 110). Only about one-fourth (26.7 percent) felt competent enough to help teachers teach nutrition to the students (item 106). Similar results were reported from the Florida Needs Assessment Project (45). Most Florida foodservice managers were not consulted by teachers on nutrition topics and the respondents did not feel competent to help teach nutrition.

Classroom and Cafeteria Practices. Over 85 percent of the school foodservice personnel in the Kansas Needs Assessment Project reported observing the habits of the students (item 92), but less than half reported they had food and nutrition-related displays in the school lunchroom (item 93). Relatively few gave special nutrition guidance to overweight and underweight students (item 94); only 13.7 percent gave such advice either frequently or sometimes. Perhaps these responses were related to those reported above on feelings of insecurity concerning classroom teaching of nutrition. The majority of the Florida (45) foodservice managers observed the eating habits of students and had nutrition

Table 23: Occupational attitudes/habits of Kansas school foodservice personnel

item number by area of measurement[1]	item	N[2]	fre-quently	some-times	rarely	never
			%	%	%	%
coordination between teacher and school foodservice personnel						
91	I coordinate lunchroom menus with teachers' instructional units in nutrition.	423	5.0	12.3	11.6	71.1
97	I talk with teachers about the eating habits of their students.	432	7.7	20.8	16.4	55.1
103	The teachers in my school consult with me when they need help with nutrition topics.	427	1.1	12.2	11.8	74.9
104	The teachers in my school ask me to talk to their classes about nutrition.	427	0.9	5.9	5.6	87.6
105	I work with the school administration regarding ways to coordinate lunchroom activities and classroom instruction.	427	6.6	5.4	9.1	78.9

[1] Item number refers to test question number in Nutrition Education Assessment Series, Food Service Personnel edition, PDE Associates, Inc., 1979.

[2] N varies because of nonresponses.

Table 23: (cont.)

item number by area of measurement	item	N	totally agree	agree	disagree	totally disagree
			%	%	%	%
106	I feel competent to help teachers teach nutrition to their classes.	412	5.1	21.6	51.0	22.3
110	I feel that my talents in the area of nutrition are being used fully in my school.	393	7.9	49.9	31.5	10.7
			fre-quently	some-times	rarely	never
classroom practices						
94	I give special nutrition guidance to overweight and underweight students.	430	2.5	11.2	13.5	72.8
102	I involve students in planning school lunch menus.	427	4.2	14.5	9.2	72.1
cafeteria practices						
92	I observe the school eating habits of students.	438	54.1	33.6	5.7	6.6
93	I have food and nutrition-related displays in the school lunchroom.	431	18.6	26.9	16.9	37.6
95	I supervise the seasoning of all foods.	430	20.2	20.7	10.9	48.2

Table 23: (cont.)

item number by area of measurement	item	N	fre-quently	some-times	rarely	never
			%	%	%	%
100	I supervise the storage of all food in the school lunchroom.	429	31.9	14.9	7.5	45.7
101	I supervise the preparation of all food in the school lunchroom.	425	28.2	12.5	9.2	50.1
in-service needs						
96	I participate in staff development activities related to ways of providing nutrition in my school.	424	9.2	14.8	13.0	63.0
			totally agree	agree	disagree	totally disagree
107	I feel I could use some in-service training before I could do a good job of helping to teach nutrition.	416	31.7	60.1	6.3	1.9
108	I feel that the in-service training I am getting makes me to do a better job in the cafeteria.	401	14.5	65.6	14.4	5.5
109	I feel that the in-service training I am getting makes me more able to help teach nutrition in the classroom.	394	5.1	38.3	41.6	15.0

Table 23: (cont.)

item number by area of measurement	item	N	totally agree	agree	disagree	totally disagree
			%	%	%	%
coordination with parents						
98	I talk with parents about the eating habits of their children.	432	3.0	18.5	18.5	60.0
99	I present nutrition-related programs for PTA, PTO or other such meetings.	429	0.9	4.0	5.6	89.5

related displays in the school lunchroom, but did not give weight control guidance to students.

In a Michigan study on training needs in school foodservice (41), respondents indicated that they were providing little nutrition education to school children. Less than 10 percent of the school foodservice personnel surveyed offered instruction on any of the nutrition related topics studied. Sixty-six percent of the respondents never gave a formal presentation in a classroom.

In-Service Needs. Over 90 percent of the school foodservice personnel in the study believed they needed in-service training before doing a "good job" of teaching nutrition (item 107). They believed the in-service training they were getting, however, enabled them to do a better job in the cafeteria (item 108). The majority of the Florida respondents (45) reported that their current in-service training did not help them in the cafeteria or in the classroom; although they did not perceive a need for in-service training to teach nutrition.

In the national study of school foodservice employees (67), 44 percent indicated a desire for more training. Reasons listed were that job performances would be improved, knowledge increased, and new techniques would be learned. The most desired courses for more training were "Nutrition," "Quantity Food Preparation," and "Menu Planning." Kende et al. (67) reported that Michigan school foodservice personnel were most interested in training related to increasing participation and public relations for the school lunch program.

Coordination with Parents. Over three-fourths of the Kansas school foodservice personnel (78.5 percent) rarely or never talked to parents

about the eating habits of their children (item 98). Also, almost 90 percent reported they never presented nutrition related programs for PTA, PTO, or other such meetings (item 99). Reports of the Florida foodservice managers were similar to the Kansas group regarding frequency of presenting nutrition-related programs to parent groups.

Relationship of Type of School Foodservice System to Occupational Attitudes and Habits of School Foodservice Personnel

To gain additional insight into the occupational attitudes and habits of Kansas school foodservice personnel, items were examined in relation to type of facility in which respondents were employed. Chi-square analysis was used to examine responses of personnel in on-premise, central, and base kitchens to the 20 occupational attitudes/habits items (Table 24). Items with significant chi-square values ($P \leq 0.005$) are discussed in the foregoing paragraphs.

Over 96 percent of the foodservice workers in central kitchens never coordinated their lunchroom menus with teachers' instructional units in nutrition. Personnel in on-premise and base kitchens reported somewhat more frequent coordination of menus with nutrition education (item 91). Over 40 percent of the on-premise foodservice workers talked with teachers about the eating habits of their students; central and base kitchen workers, however, rarely or never discussed students' eating habits with instructional personnel (item 97).

In general, foodservice workers reported that teachers rarely or never consulted with them concerning assistance with nutrition topics (item 103) or asked them to talk to their classes about nutrition (item 104). A few of the on-premise and base kitchen workers worked with school

Table 24: Relationship of nutrition education practices of foodservice personnel and type of school foodservice system (on-premise, central, or base)

item		type of system	fre-quently	some-times	rarely	never	χ^2
			%	%	%	%	
coordination between teachers and school foodservice personnel							
91	I coordinate lunchroom menus with teachers' instructional units in nutrition.	on-premise[1]	8.2	16.9	14.8	60.1	
		central[2]	0.0	3.8	0.0	96.2	24.96***
		base[3]	2.8	9.3	10.3	77.6	
97	I talk with teachers about the eating habits of their students.	on-premise	12.7	28.6	20.1	38.6	
		central	0.0	16.0	8.0	76.0	41.59***
		base	4.1	14.7	14.2	67.0	
103	The teachers in my school consult with me when they need help with nutrition topics.	on-premise	1.6	17.7	19.9	60.8	
		central	0.0	12.0	0.0	88.0	37.89***
		base	0.9	7.4	6.0	85.7	
104	The teachers in my school ask me to talk to their classes about nutrition.	on-premise	1.1	9.6	9.1	80.2	
		central	0.0	8.0	4.0	88.0	18.92*
		base	0.9	2.3	2.8	94.0	

[1] N varies from 171 to 194.

[2] N varies from 24 to 26.

[3] N varies from 198 to 219.

* $P \leq 0.05$ *** $P \leq 0.001$

Table 24: (cont.)

item		type of system	fre-quently	some-times	rarely	never	χ^2
			%	%	%	%	
105	I work with the school administrator regarding ways to coordinate lunchroom activities and classroom instruction.	on-premise	9.6	6.4	15.5	68.5	
		central	0.0	0.0	4.0	96.0	26.97***
		base	4.7	5.1	4.2	86.0	
			totally agree	agree	disagree	totally disagree	
106	I feel competent to help teachers teach nutrition to their classes.	on-premise	7.3	28.5	47.5	16.8	
		central	13.0	13.1	52.2	21.7	20.05**
		base	2.4	16.7	53.8	27.1	
110	I feel that my talents in the area of nutrition are being used fully in my school.	on-premise	8.2	57.3	28.1	6.4	
		central	4.2	29.2	45.8	20.8	13.64*
		base	8.1	46.0	32.8	13.1	
			fre-quently	some-times	rarely	never	
classroom practices							
94	I give special nutrition guidance to overweight and underweight students.	on-premise	3.7	16.5	15.4	64.4	
		central	0.0	3.8	15.4	80.8	15.29*
		base	1.8	7.4	11.6	79.2	

* $P \leq 0.05$ ** $P \leq 0.01$ *** $P \leq 0.001$

Table 24: (cont.)

item		type of system	fre-quently	some-times	rarely	never	χ^2
			%	%	%	%	
102	I involve students in planning school lunch menus.	on-premise	6.9	20.7	15.4	57.0	
		central	4.0	4.0	0.0	92.0	41.74***
		base	1.8	10.3	4.7	83.2	
cafeteria practices							
92	I observe the school eating habits of students.	on-premise	63.9	29.4	4.1	2.6	
		central	28.0	36.0	8.0	28.0	33.80***
		base	48.4	37.0	6.8	7.8	
93	I have food and nutrition-related displays in the school lunchroom.	on-premise	21.0	34.7	23.2	21.1	
		central	0.0	7.7	7.7	84.6	56.79***
		base	18.6	22.3	12.6	46.5	
95	I supervise the seasoning of all foods.	on-premise	32.6	27.8	10.2	29.4	
		central	3.8	7.7	7.7	80.8	61.34***
		base	11.5	16.1	12.0	60.4	
100	I supervise the storage of all food in the school lunchroom	on-premise	46.5	18.7	7.5	27.3	
		central	28.0	4.0	8.0	60.0	51.58***
		base	19.8	12.9	7.4	59.9	
101	I supervise the preparation of all food in the school lunch-room.	on-premise	44.1	16.1	10.8	29.0	
		central	16.7	4.2	4.1	75.0	64.66***
		base	15.8	10.2	8.4	65.6	

*** $P \leq 0.001$

Table 24: (cont.)

item		type of system	fre-quently	some-times	rarely	never	χ^2
			%	%	%	%	
in-service needs							
96	I participate in staff development activities related to ways of providing nutrition in my school.	on-premise	14.0	17.2	17.2	51.6	
		central	0.0	4.2	12.5	83.3	23.82***
		base	6.1	14.0	9.3	70.6	
			totally agree	agree	disagree	totally disagree	
107	I feel I could use some in-service training before I could do a good job of helping to teach nutrition.	on-premise	29.0	62.8	7.1	1.1	
		central	47.8	39.1	8.7	4.4	6.63
		base	32.4	60.0	5.2	2.4	
108	I feel that the in-service training I am getting makes me to do a better job in the cafeteria.	on-premise	14.5	66.3	14.0	5.2	
		central	8.7	47.8	34.8	8.7	9.30
		base	15.0	67.0	12.6	5.4	
109	I feel that the in-service training I am getting makes me more able to help teach nutrition in the classroom.	on-premise	5.8	40.7	36.1	17.4	
		central	4.4	30.4	56.5	8.7	5.56
		base	4.5	37.2	44.7	13.6	

*** $P \leq 0.001$

Table 24: (cont.)

item		type of system	frequently	sometimes	rarely	never	χ^2
			%	%	%	%	
coordination with parents							
98	I talk with parents about the eating habits of their children.	on-premise	5.8	22.2	24.3	47.7	
		central	0.0	8.0	4.0	88.0	30.01***
		base	0.9	16.5	15.1	67.5	
99	I present nutrition-related programs for PTA, PTO, or other such meetings.	on-premise	1.1	6.9	8.5	83.5	
		central	0.0	4.2	0.0	95.8	15.01*
		base	0.9	1.4	3.7	94.0	

* $P \leq 0.05$ *** $P \leq 0.001$

administrators regarding coordinating lunchroom activities and classroom instruction; however, none of the central kitchen workers reported this activity.

More foodservice workers in on-premise and central kitchens agreed they were competent to assist teachers in classroom nutrition instruction (item 106) compared to reports of foodservice employees in base kitchens. Workers in central and base kitchens disagreed more frequently than on-premise personnel that their talents in the area of nutrition were being used fully in their school (item 110).

In general, special nutrition guidance to overweight and underweight students was rarely or never given by central and base kitchen workers (item 94). Approximately 20 percent of the foodservice employees in on-premise kitchens gave nutrition guidance on weight control. On-premise personnel involved students in planning school lunch menus more often than did those in the other two types of facilities (item 102).

Almost all of the foodservice workers in on-premise type systems either frequently or sometimes observed the eating habits of students, 85.4 percent of those in base kitchens, and 64 percent of the central kitchen employees reported such activity (item 92). Over 55 percent of the foodservice workers in on-premise schools reported that they frequently or sometimes had food and nutrition-related displays in the school lunchroom. Fewer in base and central kitchens (40.9 percent and 7.7 percent, respectively) had lunchroom displays (item 93).

Data indicated that there was less opportunity to supervise the seasoning of foods in central and base kitchens (item 95). Almost half of the foodservice workers (46.5 percent) in on-premise kitchens reported that they supervised the storage of food in the school lunchroom (item

100); fewer cafeteria workers in central and base kitchens reported that they frequently supervised food storage. Approximately 44 percent of the on-premise foodservice workers reported that they frequently supervised the preparation of all food in the lunchroom, compared to 16.7 percent and 15.8 percent of central and base kitchen workers, respectively (item 101). These findings were not surprising, however, since the ratio of supervisors to employees would be greater in the larger base or central kitchen facilities. On-premise workers reported that they participated in staff development activities related to nutrition more often than did the central and base kitchen workers (item 96).

School foodservice employees in schools with food production facilities tended to discuss children's eating habits with their parents more frequently than did personnel in the other types of facilities (item 98). Few foodservice workers, regardless of the type of cafeteria system, presented nutrition-related programs for PTA, PTO, or other related meetings (item 99).

Reports of Other Nutrition Education-Related Practices

Nutrition Sources and Materials Utilized. Nutrition sources and materials used by Kansas school foodservice personnel are summarized in Table 25. Extension bulletins, television, radio, and magazines were listed fairly frequently as sources of nutrition information. Cookbooks were the most popular selected book as a nutrition source. Other nutrition sources and materials included magazines such as Better Homes and Gardens, Good Housekeeping, Ladies Home Journal, Women's Day, Family Circle, Prevention, and Reader's Digest. The most popular journal listed as a nutrition source was the School Food Service Journal.

Table 25: Percentages of Kansas school foodservice personnel using various nutrition sources and materials

nutrition source	percent[1]
school nurse	5.0
physician	10.2
home economist	9.1
home economics teacher	8.5
school foodservice personnel	68.0
television, radio	27.0
extension bulletins	31.0
books	16.3
magazines	25.5
professional journals	11.0
other	6.7

[1]N varies from 460 to 462.

Nutrition Education and School Foodservice Practices. Several other areas of nutrition-related and school foodservice practices were explored (Table 26). Foodservice personnel reported that they believed cooks and servers encouraged students to taste all the foods served at lunch more frequently than did teachers, principals, or other administrators. Over two-thirds of the respondents (68.7 percent) agreed there should be a coordination of nutrition education efforts between instructional staff and school foodservice managers. Also, most (90.7 percent) agreed that foodservice managers should participate in a nutrition education curriculum planning committee. Only 13.2 percent, however, indicated they were

Table 26: Responses of Kansas school foodservice personnel on school foodservice and nutrition education practices

item	response categories	percent[1]
school foodservice practices:		
Are all children required to take a small portion of each menu item served?	yes	70.8
	no	29.2
Are students encouraged to taste all foods served at lunch by one or more of the following?	teachers	42.2
	cooks and servers	69.3
	principal	19.9
	administrator	4.8
nutrition education practices:		
There should be a coordination of nutrition education efforts between instructional staff and the school foodservice managers.	totally agree	25.7
	agree	68.7
	disagree	4.0
	totally disagree	1.6
Foodservice managers should participate in nutrition education lesson with curriculum personnel.	totally agree	20.9
	agree	69.8
	disagree	7.9
	totally disagree	1.4
Do you participate in school's nutrition education curriculum planning committee?	yes	13.2
	no	86.8

[1] N varies from 417 to 462.

active on their school's curriculum committee on nutrition. This percentage is similar to the number of respondents in managerial positions (13.9 percent).[1] Also, in a number of schools, nutrition curriculum committees probably were not operational. In the Michigan study (41), 12 percent of the respondents said they did not need to provide nutrition education since someone else was already providing it.

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[1] Refer to Table 7.

SUMMARY

School foodservice personnel can influence school children's knowledge about foods and encourage good food habits and attitudes by serving an adequate lunch, answering questions relative to foods and nutrition, or by participating in a formalized nutrition education program. Many school foodservice personnel, however, do not have adequate training in nutrition education to accomplish these goals.

As part of the Kansas Nutrition Education and Training Program Needs Assessment Project, a mail survey was conducted to assess nutrition-related training, knowledge, attitudes, and dietary practices of school foodservice personnel who worked in the 97 randomly selected sample schools or in base or central kitchens serving the sample schools. Three hundred were employed at sample schools; 318 were employees in base or central kitchens which provided food to sample schools. Completed instruments were obtained from 464 school foodservice personnel or 75 percent.

Most of the foodservice personnel were female between the ages of 31 and 60 years of age. About one-fourth of the respondents had not completed high school and only 2.2 percent held associate, bachelor's or master's degrees. Almost 60 percent of the foodservice personnel were in job positions of head cook/cook, assistant cook, or baker.

Nearly 62 percent of the foodservice personnel reported they had not completed any type of nutrition training. A large majority of the respondents reported they had on-the-job training in preparation for their job position.

Kansas school foodservice personnel had favorable attitudes toward nutrition. Almost all of the foodservice personnel agreed that good eating habits are important to good health and indicated they were interested in the nutritional value of the food they ate. Over 85 percent thought their diet was well-balanced nutritionally.

More foodservice workers in on-premise and central kitchens believed they were competent to assist teachers in classroom nutrition instruction compared to reports of foodservice employees in base kitchens. The foodservice workers, however, reported that teachers rarely or never consulted with them concerning assistance on nutrition.

Sources of nutrition information frequently used by the Kansas school foodservice personnel were extension bulletins, television and radio programs, and magazines. Cookbooks were the most popularly selected book as a nutrition source. The most popular journal listed as a nutrition source was the School Food Service Journal.

The nutrition knowledge test scores of the school foodservice personnel throughout the state or among districts and schools did not differ significantly. Percent scores for the nutrition knowledge test ranged from 29.1 to 92.7 percent with a mean of 66.33. Kansas foodservice personnel scored relatively higher on the basic vocabulary, food selection, and food preparation than on nutrition practices, storage procedures, and advertising claims nutrition knowledge scores. Those with formal training scored significantly higher ($P \leq .05$) than those with only on-the-job training on six of the eight knowledge scores.

The nutrition-related attitudes and practices and nutrition education practices scores of Kansas school foodservice personnel differed significantly among groups defined by training background, type of group, and

job title. The managerial/supervisory personnel scored significantly higher on nutrition education practices and nutrition-related attitudes than those in other foodservice jobs. The attitude scores of foodservice personnel with formal training did not differ from those scores of foodservice personnel without such training; however, the nutrition education practices scores were significantly higher. Employees who worked in on-premise school foodservice systems had significantly higher nutrition education practices scores than did those employed in central or base kitchens. In general, nutrition knowledge scores were correlated positively with scores for nutrition-related attitudes and practices. The nutrition education practices scores were correlated positively with three of the nutrition knowledge scores.

Over two-thirds of the Kansas school foodservice personnel agreed that nutrition education efforts should be coordinated between instructional staff and school foodservice managers. Most agreed that foodservice managers should participate on nutrition education curriculum planning committees. The data from this study indicated that those employees with training, those working in on-premise facilities, and those in managerial positions were the most actively involved in nutrition education activities in their schools.

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APPENDIXES

APPENDIX A

Sampling Plan Information

THE FOLLOWING BOOK IS BADLY SPECKLED THROUGHOUT IT'S ENTIRETY DUE TO BEING POOR QUALITY PHOTOCOPIES.

THIS IS AS RECEIVED FROM CUSTOMER.

KANSAS NUTRITION EDUCATION AND TRAINING PROGRAM
NEEDS ASSESSMENT PROJECT
Kansas State University
in cooperation with the Kansas State
Department of Education

Sampling Plan

	Kansas Board of Education Districts (BED)									
	1	2	3	4	5	6	7	8	9	10
Kansas Education District Data[1]										
Number of USD's[2] in each BED	4	6	23	42	70	48	41	20	37	16
Number of elementary schools in each BED	54	75	74	147	154	143	126	59	115	111
Per cent of total Kansas elementary schools	5.1	7.1	7.0	13.9	14.6	13.5	11.9	5.6	10.9	10.5
Total number of elementary students in each BED	17,534	26,845	17,546	32,571	25,856	25,252	21,623	14,800	23,383	32,484
Total number of 5th graders in each BED	2,922	4,474	2,924	5,428	4,309	4,208	3,603	2,466	3,897	5,414
Per cent of total 5th graders in Kansas	7.4	11.3	7.4	13.7	10.9	10.6	9.1	6.2	9.8	13.7
NETP Needs Assessment Sampling Data										
Total number of schools sampled in each BED	5	7	7	14	15	14	12	6	11	10
Total number of USD's sampled	2	3	6	11	11	11	10	5	10	4
Total number of 5th graders sampled in each BED	353	506	280	615	563	580	678	246	245	764
$\frac{\text{5th graders sampled in BED}}{\text{Total 5th graders in BED}} = \%$	12.0	11.3	9.6	11.3	13.1	13.8	18.8	10.0	13.9	14.1
$\frac{\text{5th graders sampled in BED}}{\text{Total 5th graders in state}} = \%$	6.9	9.9	5.5	11.9	10.9	11.3	13.2	4.7	10.6	14.9

[1]Based on information extracted from the *Kansas Educational Directory*, 1978-79.

[2]Unified School District.

Sampling Plan (cont.)

	Kansas Board of Education Districts (BED)									
	1	2	3	4	5	6	7	8	9	10
Kansas Education District Data[1]										
Total number of kindergarten teachers in each BED	58	80	26	56	32	47	37	17	26	101
Total number of elementary teachers in each BED	767	1,777	310	658	445	659	412	257	349	1,477
NETP Needs Assessment Sampling Data										
Number kindergarten teachers in sampled schools	5	10	6	17	16	17	10	6	10	18
Number elementary teachers in sample in each BED	102	148	89	186	230	208	131	93	174	271
$\frac{\text{Number kindergarten teachers sampled in BED}}{\text{Total number kindergarten teachers in BED}} = \%$	8.6	12.5	23.0	30.4	50.0	36.2	27.0	35.3	38.5	17.8
$\frac{\text{Number elementary teachers sampled in BED}}{\text{Total number elementary teachers in BED}} = \%$	13.3	8.3	28.7	28.3	51.7	31.6	31.8	36.2	49.9	18.4

[1] Based on information extracted from the Kansas Educational Directory, 1978-1979.

APPENDIX B

Initial Correspondence to School Administrators

(Kansas State Department of Education Letterhead)

(Initial Letter to Superintendent in Selected Schools)

October 16, 1979

Dear

The Child Nutrition Amendment, P.L. 95-166, enacted by the United States Congress in 1977, provided funds to the Kansas State Department of Education for a Nutrition Education and Training Program. As a part of this legislation, a continuing needs assessment is required. Kansas State University in cooperation with the Kansas State Department of Education will conduct a needs assessment during the 1979-80 school year. The purposes of the needs assessment are to measure dietary behavior and nutrition attitudes and knowledge of children, elementary teachers, and foodservice personnel.

An approximate 10 per cent representative sample of elementary schools throughout the state will be asked to participate in the needs assessment project. The following school(s) in your district is among the 103 Kansas elementary schools randomly selected to be included in the project:

We are requesting your approval for data collection in the school(s) identified above, which would involve fifth grade children, teachers, and school foodservice personnel.

According to the data collection plan, all fifth graders at selected schools would be interviewed to determine their dietary intake using a dietary recall method. Each interview would require only about 15 minutes. Also, each child's height, weight, and skinfold thickness would be measured. Questionnaires concerning nutrition attitudes and knowledge would be administered to each class of fifth graders. Signed consents from parents and children would be obtained prior to data collection. Data would be collected during an on-site visit on a preconfirmed date to each school by a team of two to five trained interviewers from Kansas State University. On-site visits would be conducted between January 14 and April 18, 1980. The date and schedule would be planned in cooperation with the principal at each school, with as little disruption of school operations as possible.

Data from teachers would be obtained by questionnaires which would be mailed in mid-January to all elementary teachers in each school. Questionnaires also would be used to collect information from foodservice personnel at each school. If food is not prepared at the selected school, foodservice personnel at the school from where the food is transported also would be asked to complete the questionnaire. The teachers and foodservice personnel questionnaires would measure nutrition knowledge and attitudes and dietary behavior. We would need to have lists of elementary teachers and foodservice personnel provided from your office or by the principal in selected schools.

If you agree to participate in the needs assessment project, we would keep you fully informed concerning data collection procedures and you would be provided with a summary of the findings. As superintendent, your cooperation is vital to the success of this project. Results of this needs assessment will provide baseline data for planning the Nutrition Education and Training Program for the State of Kansas.

Please indicate your willingness for the schools and personnel in your district to be included in this project on the enclosed form. An envelope is provided for returning the form. We need your reply within one week to continue planning for the project. If you have any questions, please direct them to any member of the project staff at Kansas State University (913-532-5521) or to the School Food Service Section of the Kansas State Department of Education (913-296-2276).

Thank you for your cooperation. We look forward to the potential of working with you on this project.

Sincerely,

Cynthia S. Foley
Coordinator
Needs Assessment Project

Approved by:

Rita A. Hamman, Director
School Food Service Section

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics,
Restaurant and Institutional
Management

Percy Sillin, Ph.D.
Assistant Commissioner, Agency
Services
Kansas State Department of
Education

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and
Nutrition
Kansas State University

CSF:ns

Reply Form for Needs Assessment Project

_____ Approval is granted for the school or schools selected from the district to participate in the Nutrition Education Training Program Needs Assessment Project.

_____ Approval not granted.

Signed: _____
(Superintendent/s Name--Typed)

Superintendent, U.S.D. _____

If you agree to participate, please list the names of principals at the selected schools below.

School	Principal

(Letterhead)

(Initial Letter to Principal of Selected Schools)

The Child Nutrition Amendment, P.L. 95-166, enacted by the United States Congress in 1977, provided funds to the Kansas State Department of Education for a Nutrition Education and Training Program. As a part of this legislation, a continuing needs assessment is required. Kansas State University in cooperation with the Kansas State Department of Education will conduct a needs assessment during the 1979-80 school year. The purposes of the needs assessment are to measure dietary behavior and nutrition attitudes and knowledge of children, elementary teachers, and foodservice personnel.

The superintendent of your school district has granted permission for your school to be one of 103 Kansas elementary schools randomly selected for this project. Approximately 10 per cent of the Kansas elementary schools have been asked to participate in the needs assessment.

According to the data collection plan, all fifth graders at selected schools will be interviewed to determine their dietary intake using a dietary recall method. Each interview will require only about 15 minutes. Also, each child's height, weight, and skinfold thickness will be measured. Questionnaires concerning nutrition attitudes and knowledge will be administered to each class of fifth graders as a group. Completion of the questionnaire will require about 20 to 30 minutes.

Signed consents from parents and children will be obtained prior to data collection. Data will be collected during an on-site visit on a preconfirmed date to each school by a team of two to five trained interviewers from Kansas State University. On-site visits will be conducted between January 14 and April 18, 1980.

You will be contacted soon regarding the tentative date of the on-site visit and other details. We will plan the visit in cooperation with both you and the fifth grade teachers so interference with school operations will be minimal.

Data from teachers will be obtained by questionnaires which will be mailed in mid-January to all elementary teachers in each school. Questionnaires also will be used to collect information from foodservice personnel at each school. If food is not prepared at the selected school, foodservice personnel at the school from where the food is transported also will be asked to complete the questionnaire. The teachers and foodservice personnel questionnaires will measure nutrition knowledge and attitudes and dietary behavior.

We will keep you fully informed concerning data collection procedures and both you and your superintendent will be provided with a summary of findings. Results of this needs assessment will provide baseline data for planning the Nutrition Education and Training Program for the State of Kansas.

Please complete the enclosed form and return to us by the end of the week. If you have not already done so, we would like you to provide names and home addresses of elementary teachers and foodservice personnel, which can be included on, or attached to, the form. An envelope is provided for returning the form and attached lists.

Thank you for your cooperation. We look forward to meeting and working with you on this project.

Sincerely,

Cynthia S. Foley
Coordinator
Needs Assessment Project

Approved:

Rita A. Hamman, Director
School Food Service Section

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics,
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Percy Sillin, Ph.D.
Assistant Commissioner, Agency
Services
Kansas State Department of
Education

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and
Nutrition
Kansas State University

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KANSAS NUTRITION EDUCATION AND TRAINING PROGRAM
NEEDS ASSESSMENT PROJECT
Kansas State University
in cooperation with the Kansas State
Department of Education

Survey Form for Needs Assessment Project

Total number of fifth grade students _____

Number of fifth grade classes _____

Type of foodservice:

_____ Food prepared at this school
_____ Food prepared at another site and transported

_____
(Name of school where food is prepared)

Please list names and home addresses of foodservice personnel at this school below or attach roster. In addition, if food is prepared at another site please provide names of foodservice personnel or indicate where the names can be obtained.

Names of Foodservice Personnel	Home Address

-over-

APPENDIX C

The Instrument

Reproduced by written permission from
Dr. Tom D. Freijo, President,
Planning, Development & Evaluation
Associates, Inc. on June 16, 1980.

NUTRITION EDUCATION ASSESSMENT SERIES

Food Service Personnel Edition

PUBLISHED BY:

PDE Associates
P.O. Box 17288
Tampa, Florida 33682

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DIRECTIONS: For items 1-55, select the best answer. Mark only one answer for each item.

1. A Calorie is best defined as:
   a. a unit of measure for vitamins
   b. a unit of measure for energy
   c. a substitute for meat
   d. the name for a balanced meal

2. Sodium chloride is another name for:
   a. table salt
   b. white sugar
   c. brown sugar
   d. vitamin C

3. An essential nutrient is one which:
   a. the body produces without food
   b. the body needs but cannot produce enough of
   c. the body produces when it eats food
   d. is inexpensive and healthy

4. Dextrose is a kind of:
   a. vitamin
   b. carbohydrate
   c. mineral
   d. protein

5. Which of the following supplies the body with the most Calories?
   a. an ounce of protein
   b. an ounce of fat
   c. an ounce of carbohydrate
   d. an ounce of water

6. The two major types of carbohydrate are:
   a. minerals and vitamins
   b. sugars and starches
   c. fat and oil
   d. protein and minerals

7. Which of the following is an essential nutrient?
   a. glucose
   b. iron
   c. fish
   d. eggs

8. Protein is made up of:
   a. amino acids
   b. ascorbic acids
   c. meats
   d. lipids

9. Which of the following nutrients is a source of energy?
   a. carbohydrate
   b. vitamin C
   c. niacin
   d. calcium

10. The body absorbs approximately what part of the iron present in the food we consume?
    a. 10%
    b. 40%
    c. 70%
    d. 100%

11. Which of the following is not absorbed by the body, but aids in regularity?
    a. fibers
    b. niacin
    c. phosphorus
    d. vitamin K

12. Absorption takes place in the:
    a. stomach
    b. large intestine
    c. small intestine
    d. mouth

13. Which of the following nutrients do not have to be digested to be used by the body?
    a. proteins
    b. carbohydrates
    c. vitamins
    d. fats

14. Your body cannot store up extra energy from:
    a. protein
    b. carbohydrate
    c. vitamin C
    d. fat

GO ON

15. Approximately how many Calories must a person burn to lose one pound of weight?

a. 500
b. 1,500
c. 2,500
d. 3,500

16. To lose a pound of fat, an average person needs approximately how many hours of vigorous exercise?

a. ½ hour
b. 3 hours
c. 5 hours
d. 8 hours

17. Each list below contains foods that an average adult might eat in a day. Which list would avoid consuming too little or too much protein?

a. 3 eggs, 2 cups of milk, ¼ lb. of hamburger, 4 oz. of Cheddar cheese, a 12 oz. Porterhouse steak
b. ½ cup of oatmeal, 1 slice of whole wheat toast, 1 cup of milk, ¼ lb. of hamburger, 1 medium chicken thigh
c. 2 eggs, 1 cup of milk, 3 medium slices of turkey, 1 cup of cottage cheese, 1 medium chicken breast
d. ½ cup of oatmeal, 3 eggs, ¼ lb. of hamburger, 1 cup of cottage cheese, a 12 oz. Porterhouse steak

18. Which of the following would be the best nutritional advice for pregnant women?

a. Reduce intake of all nutrients.
b. Maintain customary intake of all nutrients.
c. Increase intake of protein, but reduce intake of vitamins and minerals.
d. Increase intake of all nutrients.

19. During the first 3-5 months after birth, an infant's nutritional needs can <u>best</u> be met by feeding:

a. formula
b. breast milk
c. skim milk
d. whole milk

20. Which of the following groups is <u>least</u> likely to suffer from iron deficiency?

a. small children
b. teenaged boys
c. teenaged girls
d. middle-aged men

21. The average American consumes approximately how many pounds of sugar in a year?

a. between 5 and 25 pounds
b. between 26 and 50 pounds
c. between 51 and 75 pounds
d. between 76 and 100 pounds

22. In many diets, the major source of <u>carbohydrate</u> is:

a. bread
b. fish
c. spinach
d. milk

23. Many medical experts believe that consuming too much cholesterol contributes to disease of the:

a. liver
b. kidneys
c. blood vessels
d. digestive system

24. Excessive consumption of which of the following could be toxic?

a. vitamin A
b. niacin
c. vitamin B_2
d. vitamin C

25. Which of the following is among the most serious deficiencies in America?

a. phosphorus deficiency
b. copper deficiency
c. iodine deficiency
d. iron deficiency

GO ON

26. Alcoholics frequently become undernourished. Which of the following is a proper explanation for this condition?

a. Too much alcohol causes the body to reject other nutrients.
b. Excessive alcohol consumption causes a loss of appetite.
c. Alcohol supplies the body with no nutrients.
d. Alcohol causes the body to need more nutrients than it normally requires.

27. Of the following, which is the best source of <u>high quality protein</u>?

a. milk
b. lettuce
c. bread
d. coffee

28. Which of the following is a good source of <u>riboflavin</u> (vitamin B_2)?

a. applesauce
b. orange juice
c. bacon
d. whole wheat bread

29. Which of the following are good sources of <u>iron</u>?

a. cottage cheese and peaches
b. carrots and green peas
c. applesauce and celery
d. hamburger and baked beans

30. Which of the following has the highest <u>fat</u> content?

a. a serving of lean beef
b. a raw potato
c. two slices of white bread
d. a dried fruit

31. Which of the following would be a good <u>protein substitute</u> for meat in a meal?

a. eggs
b. pancakes
c. spinach
d. squash

32. Which pair of foods below contains the best <u>protein balance</u>?

a. dried beans and rice
b. carrots and peas
c. rice and onions
d. lettuce and tomatoes

33. A new food has just been developed. It has lots of vitamin A and vitamin C. It also has a sweet taste. Which of the following groups will this food probably belong in?

a. breads and cereals
b. meats and meat substitutes
c. vegetables and fruits
d. milk and milk products

34. One of the best sources of <u>calcium</u> is:

a. whole wheat bread
b. lettuce
c. milk
d. orange juice

35. For those people who are allergic to milk, which of the following foods is a good nutritional substitute?

a. spinach
b. yogurt
c. black-eyed peas
d. orange juice

36. Which of the following foods is highest in <u>cholesterol</u> content?

a. 1 egg
b. 2 ounces of Cheddar cheese
c. 1 cup of whole milk
d. 1 cup of ice cream

37. Which of the following has the <u>lowest</u> percentage of fat?

a. whole milk
b. skim milk
c. 2% fat milk
d. chocolate milk

GO ON

38. The following nutritional label describes the nutrient content of a common food. Which food group does this food probably belong in?

Nutrition Information Per 1 Cup Serving		
Calories....110	Carbohydrate....19 grams	
Protein...6 grams	Fat.....1 gram	
Percentage of U.S. Recommended Daily Allowance (U.S. RDA)		
Protein.....10	Thiamin.....8	Calcium.2
Vitamin A.....15	Riboflavin...4	Iron...10
Vitamin C.....35	Niacin.....4	

a. meats and meat substitutes
b. fruits and vegetables
c. vitamins and minerals
d. breads and cereals

39. Which of the following meals contains the best balance of nutrients?

a. lean beef, eggs, cottage cheese, milk
b. celery, apples, whole wheat bread, unsweetened iced tea
c. baked potato, dinner roll, hard boiled eggs, unsweetened iced tea
d. turkey, baked potato, green peas, orange juice

40. Which of the following breakfasts contains the best balance of nutrients?

a. pancakes, bacon, coffee, orange juice
b. eggs, milk, orange juice, pancakes
c. pancakes, toast, orange juice, milk
d. milk, orange juice, grapefruit, coffee

41. The most prevalent food additive in terms of quantity is:

a. BHT
b. sugar
c. vitamin C
d. monosodium glutamate (MSG)

42. Salt is added to canned foods mainly:

a. for coloring
b. for bulk
c. as a preservative
d. as a nutritional supplement

43. Which of the following foods can safely be eaten raw?

a. eggs
b. broccoli
c. hamburger
d. cookie dough

44. The best way to preserve the B vitamins and ascorbic acid when cooking fresh vegetables is to:

a. soak the vegetables before cooking
b. boil the vegetables until tender
c. cook the vegetables whole and unpared
d. add butter to the vegetables before serving

45. It is a good idea to thoroughly clean a counter after cutting up raw chicken because:

a. other foods prepared on the counter will pick up the chicken flavor if the counter is not cleaned
b. the acid on the chicken skin will damage the counter
c. raw chicken sometimes carries salmonella poisoning
d. raw chicken can cause other foods to lose their nutrients

46. A turkey should not be stuffed until immediately before baking because:

a. the dressing will become soggy if left in the turkey cavity overnight
b. the dressing will lose its nutritional value if left in the turkey overnight
c. all the tenderizing juices of the turkey will be neutralized by the dressing
d. the warm dressing will allow microorganisms to grow and may cause food poisoning

GO ON

47. Fresh pork should be heated to an internal temperature of 170° F because:

a. at that temperature pork becomes tender enough to eat
b. at that temperature a chemical reaction occurs that increases the nutritional value of pork
c. at that temperature pork loses its strong odor
d. at that temperature the parasite trichinae, if present, is killed

48. Which of the following statements is true concerning what to do with a turkey served for lunch?

a. It may safely be left out for 4-6 hours before refrigerating.
b. If sliced and covered with foil, it may safely be left out for 2-4 hours before refrigerating.
c. It should be refrigerated immediately after lunch.
d. If not stuffed, it may safely be left out for up to 24 hours before refrigerating.

49. Which of the following least needs to be refrigerated?

a. milk
b. eggs
c. white bread
d. whole wheat bread

50. A good rule of thumb regarding meat removed from a freezer is:

a. never refreeze meat
b. you may refreeze meat if ice crystals are still in it
c. you may refreeze meat if it is washed after thawing
d. you may safely refreeze any thawed meat

51. The label "enriched" on a loaf of bread may only be used if which of the following nutrients have been added?

a. vitamin A, vitamin C, and vitamin D
b. thiamin, riboflavin, niacin, and iron
c. calcium, vitamin D, wheat germ, and dried yeast
d. all essential amino acids

52. A food that has been fortified is one that has had:

a. certain original nutrients replaced after processing
b. extra taste preservatives added
c. nutrients added that did not originally exist in the food
d. mineral water added

53. Which of the following advertising claims is based on established fact?

a. Eating gelatin promotes strong, healthy nails.
b. Vitamin E creams remove skin blemishes.
c. Large doses of vitamin C will cure a common cold.
d. Synthetic vitamins are as nutritiou as natural vitamins.

54. Which of the following claims is based on established fact?

a. Very large amounts of vitamin A may be toxic.
b. Honey is considerably more nutritious than white sugar.
c. A vitamin supplement is necessary to be healthy.
d. The protein in meat is of better quality than that in eggs.

55. When you buy a piece of beef marked "USDA Choice", you can be sure that the meat will:

a. be more tender than the same cut at a lower grade
b. be fresher than the same cut at a lower grade
c. be more nutritious than the same cut at a lower grade
d. weigh more than the same cut at a lower grade

GO ON

DIRECTIONS: For items 56-71, there are no right or wrong answers. Simply choose the option which describes how you feel about the statement.

56. Good eating habits are important for good health.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

57. My current diet is a well-balanced, nutritious one.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

58. Crash dieting is a good way to lose weight.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

59. I am interested in the nutritional value of what I eat.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

60. Foods higher in nutrient content are less tasty than other foods.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

61. If people simply eat what they like, they will have a nutritious diet.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

62. The best way to lose weight is to eliminate foods containing fat from the diet.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

63. Part of the pleasure of eating is sitting and talking with people I like.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

64. It is a good nutritional habit to drink several glasses of water daily.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagre

65. Foods which supply more nutrients cost more than foods with fewer nutrients.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagre

66. In general, highly processed foods have fewer nutrients than less highly processed foods.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagre

67. In America today, it is nearly impossible to get all the nutrients one needs unless one takes a vitamin supplement.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagre

68. Foods grown with natural fertilizers are more nutritious than foods grown with synthetic fertilizers.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagre

69. The labels on packaged food help the wise consumer to decide how nutritious a food is.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagre

70. The lunches served in school are tasty.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

71. The lunches served in school are good for me.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

GO ON

DIRECTIONS: For items 72-90, there are no right or wrong answers. Simply choose the option which describes how often you do the thing mentioned in the item.

72. I combine good eating habits and exercise to maintain proper body weight.
a. Always c. Seldom
b. Usually d. Never

73. I eat "sweets" for snacks.
a. Always c. Seldom
b. Usually d. Never

74. I eat fruits for snacks.
a. Always c. Seldom
b. Usually d. Never

75. I eat vegetables for snacks.
a. Always c. Seldom
b. Usually d. Never

76. I select foods to make up a balanced diet.
a. Always c. Seldom
b. Usually d. Never

77. I use a vitamin supplement.
a. Always c. Seldom
b. Usually d. Never

78 I eat foods like potato chips, corn chips or cheese curls for snacks.
a. Always c. Seldom
b. Usually d. Never

79. I eat breakfast.
a. Always b. Seldom
b. Usually d. Never

80. I eat a snack before going to bed.
a. Always c. Seldom
b. Usually d. Never

81. I eat a snack between lunch and supper
a. Always c. Seldom
b. Usually d. Never

82. After I finish a meal I feel "stuffed"
a. Always c. Seldom
b. Usually d. Never

83. Between meals I drink "soft drinks".
a. Always c. Seldom
b. Usually d. Never

84. I drink fruit or vegetable juices every day.
a. Always c. Seldom
b. Usually d. Never

85. I drink more than one cup of coffee in a day.
a. Always c. Seldom
b. Usually d. Never

86. I drink two or more ounces of alcohol in a day.
a. Always c. Seldom
b. Usually d. Never

87. I read the ingredients label on a package of processed food before I buy it.
a. Always c. Seldom
b. Usually d. Never

88. I read the nutritional label on the foods I buy.
a. Always c. Seldom
b. Usually d. Never

89. I eat the lunches served at school.
a. Always c. Seldom
b. Usually d. Never

90. I buy soft drinks or "sweets" at school for snacks.
a. Always c. Seldom
b. Usually d. Never

GO ON

DIRECTIONS: For items 91-105, choose the option which best represents how often you do the thing mentioned in the item.

91. I coordinate lunchroom menus with teachers' instructional units in nutrition.

a. Frequently c. Rarely
b. Sometimes d. Never

92. I observe the school eating habits of students.

a. Frequently c. Rarely
b. Sometimes d. Never

93. I have food and nutrition-related displays in the school lunchroom.

a. Frequently c. Rarely
b. Sometimes d. Never

94. I give special nutrition guidance to overweight and underweight students.

a. Frequently c. Rarely
b. Sometimes d. Never

95. I supervise the seasoning of all foods served in the school lunchroom.

a. Frequently c. Rarely
b. Sometimes d. Never

96. I participate in staff development activities related to ways of providing nutrition instruction in my school.

a. Frequently c. Rarely
b. Sometimes d. Never

97. I talk with teachers about the eating habits of their students.

a. Frequently c. Rarely
b. Sometimes d. Never

98. I talk with parents about the eating habits of their children.

a. Frequently c. Rarely
b. Sometimes d. Never

99. I present nutrition-related programs for PTA, PTO or other such meetings.

a. Frequently c. Rarely
b. Sometimes d. Never

100. I supervise the storage of all food in the school lunchroom.

a. Frequently c. Rarely
b. Sometimes d. Never

101. I supervise the preparation of all food in the school lunchroom.

a. Frequently c. Rarely
b. Sometimes d. Never

102. I involve students in planning school lunch menus.

a. Frequently c. Rarely
b. Sometimes d. Never

103. The teachers in my school consult with me when they need help with nutrition topics.

a. Frequently c. Rarely
b. Sometimes d. Never

104. The teachers in my school ask me to talk to their classes about nutrition.

a. Frequently c. Rarely
b. Sometimes d. Never

105. I work with the school administration regarding ways to coordinate lunchroom activities and classroom instruction.

a. Frequently c. Rarely
b. Sometimes d. Never

GO ON

DIRECTIONS: For items 106-110, choose the option which describes how you feel about the thing mentioned in the item.

106. I feel competent to help teachers teach nutrition to their classes.

a. Totally agree
b. Agree
c. Disagree
d. Totally disagree

107. I feel I could use some in-service training before I could do a good job of helping to teach nutrition.

a. Totally agree
b. Agree
c. Disagree
d. Totally disagree

108. I feel that the in-service training I am getting is helping me to do a better job in the cafeteria.

a. Totally agree
b. Agree
c. Disagree
d. Totally disagree

109. I feel that the in-service training I am getting makes me more able to help teach nutrition in the classroom.

a. Totally agree
b. Agree
c. Disagree
d. Totally disagree

110. I feel that my talents in the area of nutrition are being used fully in my school.

a. Totally agree
b. Agree
c. Disagree
d. Totally disagree

STOP

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APPENDIX D

Foodservice Personnel Response Sheet

ILLEGIBLE DOCUMENT

THE FOLLOWING DOCUMENT(S) IS OF POOR LEGIBILITY IN THE ORIGINAL

THIS IS THE BEST COPY AVAILABLE

KANSAS STATE UNIVERSITY

Needs Assessment Project

Kansas Nutrition Education and Training Program
Departments of Dietetics, Restaurant and Institutional Management
and Foods and Nutrition
Justin Hall
Manhattan, Kansas 66506
913-532-6966

Foodservice Personnel Response Sheet

Please read each item carefully in the Nutrition Education Assessment Series test booklet. Record your answers on pages 1 and 2 of this response sheet.

DIRECTIONS: For items 1-55, circle the best answer. Circle only one answer for each item.

1. a b c d	15. a b c d	29. a b c d	43. a b c d
2. a b c d	16. a b c d	30. a b c d	44. a b c d
3. a b c d	17. a b c d	31. a b c d	45. a b c d
4. a b c d	18. a b c d	32. a b c d	46. a b c d
5. a b c d	19. a b c d	33. a b c d	47. a b c d
6. a b c d	20. a b c d	34. a b c d	48. a b c d
7. a b c d	21. a b c d	35. a b c d	49. a b c d
8. a b c d	22. a b c d	36. a b c d	50. a b c d
9. a b c d	23. a b c d	37. a b c d	51. a b c d
10. a b c d	24. a b c d	38. a b c d	52. a b c d
11. a b c d	25. a b c d	39. a b c d	53. a b c d
12. a b c d	26. a b c d	40. a b c d	54. a b c d
13. a b c d	27. a b c d	41. a b c d	55. a b c d
14. a b c d	28. a b c d	42. a b c d	

DIRECTIONS: For items 56-71, there are no right or wrong answers. Simply choose the option which describes how you feel about the statement.

56. a b c d	60. a b c d	64. a b c d	68. a b c d
57. a b c d	61. a b c d	65. a b c d	69. a b c d
58. a b c d	62. a b c d	66. a b c d	70. a b c d
59. a b c d	63. a b c d	67. a b c d	71. a b c d

DIRECTIONS: For items 72-90, there are no right or wrong answers. Simply choose the option which describes how often you do the thing mentioned in the item.

72. a b c d	77. a b c d	82. a b c d	87. a b c d
73. a b c d	78. a b c d	83. a b c d	88. a b c d
74. a b c d	79. a b c d	84. a b c d	89. a b c d
75. a b c d	80. a b c d	85. a b c d	90. a b c d
76. a b c d	81. a b c d	86. a b c d	

DIRECTIONS: For items 91-105, choose the option which best represents how often you do the thing mentioned in the item.

91. a b c d	95. a b c d	99. a b c d	103. a b c d
92. a b c d	96. a b c d	100. a b c d	104. a b c d
93. a b c d	97. a b c d	101. a b c d	105. a b c d
94. a b c d	98. a b c d	102. a b c d	

DIRECTIONS: For items 106-110, choose the option which describes how you feel about the thing mentioned in the item.

106. a b c d	107. a b c d	108. a b c d	109. a b c d
			110. a b c d

GENERAL INFORMATION

Please provide the following information.

Part I: Demographic Information

1. Your age in years:

___ (1) under 21 years
___ (2) 21-30
___ (3) 31-40
___ (4) 41-50
___ (5) 51-60
___ (6) over 60

2. Please indicate:

___ (1) male
___ (2) female

3. Years employed in school food-service:

___ (1) less than 1 year
___ (2) 1-2 years
___ (3) 3-5 years
___ (4) 6-7 years
___ (5) 8 or more years

4. Job title:

_____

5. Please indicate training you have had in preparation for your position.

___ (1) on-the-job training
___ (2) short course (area vocational school)
___ (3) workshops conducted by State Department of Education
___ (4) workshop conducted by other than State Department

Part II: Educational Background

1. What is your highest level of education?

___ (1) completed grade school
___ (2) attended high school but did not finish
___ (3) completed high school
___ (4) attended college but did not complete degree
___ (5) completed associate degree
___ (6) completed bachelor's degree
___ (7) completed master's degree

2. If you have earned a bachelor's degree what was your major?

___ (1) Dietetics, Foods and Nutrition, or Institutional Management
___ (2) Home Economics Education
___ (3) Elementary or Secondary Education
___ (4) Business Administration
___ (5) Educational Administration
___ (6) Other (please specify) _____
___ (7) Does not apply

3. Have you ever had training in nutrition?

___ (1) yes
___ (2) no

4. If yes to question 3, indicate the type and the recency of your training. Check as many as apply to you.

___ (1) high school course, please specify year _____
___ (2) college course/continuing education course, specify hours and year _____
_____ semester hours
_____ quarter hours
___ (3) workshop, please specify year _____
___ (4) correspondence course, please specify year _____

(over)

Part III:

1. From which of the following do you obtain information concerning nutrition. (Check as many as apply.)

___ (1) school nurse
___ (2) physician
___ (3) home economist
___ (4) home economics teacher
___ (5) school foodservice personnel
___ (6) television, radio
___ (7) extension bulletins
___ (8) books, please specify: ____
_____
_____
___ (9) magazines, please specify:
_____
_____
___(10) professional journals, please specify: _____
_____
___(11) other _____

2. Are all children required to take a small portion of each menu item served?

___ (1) yes
___ (2) no

3. Are students encouraged to taste all foods served at lunch by one or more of the following? (Check all that apply.)

___ (1) teachers
___ (2) cooks and servers
___ (3) principal
___ (4) administrator
___ (5) foodservice supervisor/ director
___ (6) no one

4. There should be a coordination of nutrition education efforts between instructional staff and the school foodservice managers.

___ (1) totally agree
___ (2) agree
___ (3) disagree
___ (4) totally disagree

5. Foodservice managers should participate in nutrition education lesson planning with curriculum personnel.

___ (1) totally agree
___ (2) agree
___ (3) disagree
___ (4) totally disagree

6. Do you participate in your school's nutrition education curriculum planning committee?

___ (1) yes
___ (2) no

Your suggestions for the Nutrition Education and Training Program in Kansas elementary schools (e.g., needs, type of materials that would be useful, etc.):

When you have completed all items, please return this response sheet in the attached, stamped envelope to Cynthia Foley at Kansas State University.

APPENDIX E

Correspondence for Distribution of Instruments

(Letterhead)

(Cover Letter to Foodservice Personnel at Selected Schools)

January 14, 1980

Dear

In conjunction with the Kansas State Department of Education, Kansas State University is conducting a project designed to assess the nutrition knowledge and attitudes and dietary behavior of elementary teachers, children, and foodservice personnel. This project is part of the Kansas Nutrition Education and Training Program which was established with funds from the Child Nutrition Amendment P.L. 95-166, enacted by the United States Congress in 1977. The purpose of this assessment is to identify needs for nutrition education and to provide information for planning nutrition education programs.

Your school has been selected to participate in this study. All elementary teachers, fifth graders, and foodservice personnel in the selected schools are being asked to take part in the project. A representative sample of about 100 Kansas Elementary Schools has been asked to cooperate in the needs assessment. We need your cooperation for the success of the project. The superintendent in your school district and the principal in your school have approved cooperation in the project. We hope you will take part in the project, however, your participation is voluntary. All responses will be kept confidential, so please be frank and open with your answers. Your name will not be linked with your responses. Data will be summarized for the entire group of foodservice personnel.

Attached are a test booklet and a yellow response sheet. Please respond to each of the items in the test booklet on the first two pages of the yellow response sheet <u>without</u> referring to any resource material or conferring with other persons. Also, please complete the general information section on pages 3 and 4 of the yellow response sheet. The completed response sheet should be returned to us in the attached, stamped envelope. You may keep the test booklet--return <u>only</u> the yellow response sheet.

-over-

We would appreciate hearing from you within one week. Thank you for your cooperation.

Sincerely,

Cynthia S. Foley
Project Coordinator

Approved:

Rita A. Hamman, Director
School Food Service Section

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics, Restaurant and Institutional Management

Percy Sillin, Ph.D.
Assistant Commissioner, Agency Services
Kansas State Department of Education

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and Nutrition
Kansas State University

ns

(Letterhead)

(Transmittal Letter to Principal Regarding Survey of Elementary Teachers and Foodservice Personnel)

January 14, 1980

In a letter we sent to you before Christmas we described the procedure for obtaining data from the teachers and foodservice personnel in your school for the Needs Assessment Project of the Kansas Nutrition Education and Training Program.

Enclosed are the packets of materials that are to be distributed to the teachers and foodservice personnel in your school. These packets include a letter explaining the survey, a test booklet, response sheet, and a return envelope. The teachers' and foodservice personnel's names are written on the letters. Please distribute the materials to the appropriate foodservice personnel and kindergarten through sixth grade teachers in your school. Each person should return the response sheet directly to Kansas State University.

Your help in this project is greatly appreciated. Thank you for your cooperation. We look forward to meeting you at the time of our on-site visit to collect data from fifth grade students.

Sincerely,

Cynthia S. Foley
Project Coordinator

Approved:

Rita A. Hamman, Director
School Food Service Section

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics, Restaurant and Institutional Management

Percy Sillin, Ph.D.
Assistant Commissioner, Agency Services
Kansas State Department of Education

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and Nutrition
Kansas State University

ns

(Letterhead)

(Cover Letter to Foodservice Personnel in Base or Central Kitchens Providing Food to Sample Schools)

January 14, 1980

Dear

In conjunction with the Kansas State Department of Education, Kansas State University is conducting a project designed to assess the nutrition knowledge and attitudes and dietary behavior of elementary teachers, children, and foodservice personnel. This project is part of the Kansas Nutrition Education and Training Program which was established with funds from the Child Nutrition Amendment P.L. 95-166, enacted by the United States Congress in 1977. The purpose of this assessment is to identify needs for nutrition education and to provide information for planning nutrition education programs.

A representative sample of about 100 Elementary Schools has been asked to cooperate in the needs assessment. All elementary teachers, fifth graders, and foodservice personnel in the selected schools are being asked to take part in the project. If food is not prepared at the selected school, foodservice personnel at the school or center from where the food is transported also are being asked to complete the questionnaire.

A school (or schools) in your district has been selected to participate in this study. The principal(s) informed us that you are involved in the preparation of the meals served at this school, and thus you are a part of this study. We need your cooperation for the success of the project. We hope you will take part in the project, however, your participation is voluntary. All responses will be kept confidential, so please be frank and open with your answers. Your name will not be linked with your responses. Data will be summarized for the entire group of foodservice personnel.

Attached are a test booklet and a yellow response sheet. Please respond to each of the items in the test booklet on the first two pages of the yellow response sheet <u>without</u> referring to any resource material or conferring with other persons. Also please complete the general information section on pages 3 and 4 of the yellow response sheet. The completed response should be returned to us in the attached, stamped envelope. You may keep the test booklet--return only the yellow response sheet.

-over-

We would appreciate hearing from you within one week. Thank you for your cooperation.

Sincerely,

Cynthia S. Foley
Project Coordinator

Approved:

Rita A. Hamman, Director
School Food Service Section

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics, Restaurant and Institutional Management

Percy Sillin, Ph.D.
Assistant Commissioner, Agency Services
Kansas State Department of Education

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and Nutrition
Kansas State University

ns

(Letterhead)

(Transmittal Letter to School Staff Distributing Packets to Foodservice Personnel in Base or Central Kitchens)

January 16, 1980

Dear

The Child Nutrition Amendment, P.L. 95-166, enacted by the United States Congress in 1977, provided funds to the Kansas State Department of Education for a Nutrition Education and Training Program. As a part of this legislation a continuing needs assessment is required. Kansas State University in cooperation with the Kansas State Department of Education will conduct a needs assessment during the 1979-80 school year. The purposes of the needs assessment are to measure dietary behavior and nutrition attitudes and knowledge of children, elementary teachers, and foodservice personnel.

A representative sample of about 100 elementary schools has been asked to cooperate in the needs assessment. All elementary teachers, fifth graders, and foodservice personnel in the selected schools are being asked to take part in the project. If food is not prepared at the selected school, foodservice personnel at the school or center from where the food is transported also are being asked to complete the questionnaire.

Enclosed are the questionnaires to be used to collect information from your foodservice employees. A personalized letter explaining the project is attached to each booklet. We need your help in distributing these forms to the personnel. The completed responses should be returned to us in the attached, stamped envelope. They may keep the test booklet--ask them to return only the yellow response sheet.

Thank you for your cooperation. Your help will be greatly appreciated.

Sincerely,

Cynthia S. Foley
Coordinator

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics,
Restaurant and Institutional
Management

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and
Nutrition

ns

(Letterhead)

(Followup Letter to Teachers and Foodservice Personnel
Not Completing Entire Response Sheet)

March 1980

Dear _____:

Thank you for completing the test for the Needs Assessment Project. In order for the data to be used from your questionnaire, we need to have you complete the items on pages 3 and 4. This information is needed to describe the sample of teachers and foodservice personnel and for analyzing relationships in the data.

Your name will not be linked with your responses. The number on the response sheet was for followup purposes only. Data will be grouped and analyzed for the entire group of teachers and foodservice personnel.

We appreciate your cooperation. We have enclosed a stamped envelope for you to return the questionnaire to us. Thank you for your helpfulness and cooperation.

Sincerely,

Cynthia S. Foley
Project Coordinator

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics,
Restaurant and Institutional
Management

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and
Nutrition

ns

(Letterhead)

(Followup Letter to Nonresponding Teachers
and Foodservice Personnel)

February 11, 1980

Dear: _____

In January, you should have received a packet from us which included a test booklet and a response sheet. As you may recall from our earlier letter, this survey is part of the Needs Assessment Project of the Kansas Nutrition Education and Training Program. The Needs Assessment is being conducted by Kansas State University in cooperation with the Kansas State Department of Education. Data will be used for program planning for nutrition education in the State.

If you have not had time to complete the response sheet sent in the earlier mailing, we would appreciate it if you would take time to respond now. We need your help. If our letter passes your reply in the mail, thanks, and please ignore this request! We are anxious to get as many replies as possible in order for the results to be accurate and reliable. We need to receive replies from at least 65 to 70%--or more if possible.

In the event you need an additional response sheet, we are enclosing one for your convenience in replying. Hopefully, you have the test booklet; however, let us know if you need a copy. Please complete all four pages of the response sheet. The first two pages are for recording your answers to the items in the test booklet. Pages 3 and 4 will provide us some general information to use in analyzing the data.

Your name will not be linked with your responses. The number on the response sheet is for purposes of followup only. Data will be grouped and analyzed for the entire group of respondents.

-over-

We appreciate your cooperation! Enclosed is a stamped, addressed envelope for you to return the response sheet to us. Thank you.

Sincerely,

Cynthia S. Foley
Project Coordinator

Allene G. Vaden, Ph.D., R.D.
Project Co-Director and
Associate Professor of Dietetics,
Restaurant and Institutional
Management

G. Kathleen Newell, Ph.D., R.D.
Project Co-Director and
Associate Professor of Foods and
Nutrition
Kansas State University

ns

Enclosure

APPENDIX F

Form for Recording Survey Distribution and Returns

USD _____

FOODSERVICE CHECKLIST

School _____ City _____

ID no.	name	date survey sent	date survey returned	date 1st followup sent	date 1st followup returned	date 2nd followup sent	date 2nd followup returned

APPENDIX G

Coding of Questionnaire Data

CODING OF QUESTIONNAIRE DATA

Foodservice Personnel Response Sheet

BED number = 1-10
USD number = official Kansas State Department of Education Unified School District (USD) number
School number = 1-6; in cases of multiple schools in the same USD each school was assigned a number
ID number = 1-618
Questions 1-110 were keypunched as a, b, c, d

General Information Sheet

Part I. Demographic Information

1. Age
   (1) = under 21 years
   (2) = 21-30
   (3) = 31-40
   (4) = 41-50
   (5) = 51-60
   (6) = over 60

2. Sex
   (1) = male
   (2) = female

3. Years employed in school foodservice
   (1) = less than 1 year
   (2) = 1-2 years
   (3) = 3-5 years
   (4) = 6-7 years
   (5) = 8 or more years

4. Job title
   (1) = foodservice director
   (2) = manager
   (3) = supervisor/or other manager
   (4) = head cook/cook
   (5) = assistant cook
   (6) = baker
   (7) = foodservice worker
   (8) = food server
   (9) = maintenance/delivery
   (10) = cashier/secretary
   (11) = other

5. Training completed for job preparation
   (1) = on-the-job training
   (2) = short course (area vocational school)
   (3) = workshop conducted by State Department of Education
   (4) = workshop conducted by other than State Department

Part II. Educational Background

6. Education Level
   Record the highest degree if there was more than one response.
   (1) = completed grade school
   (2) = attended high school but did not finish
   (3) = completed high school
   (4) = attended college but did not complete degree
   (5) = completed associate degree
   (6) = completed bachelor's degree
   (7) = completed master's degree

7. Major if bachelor's degree completed
   (1) = Dietetics, Foods and Nutrition, or Institutional Management
   (2) = Home Economics Education
   (3) = Elementary or Secondary Education
   (4) = Business Administration
   (5) = Educational Administration
   (6) = Other
   (7) = Does not apply

8a. Nutrition training
   (1) = yes
   (2) = no

8b. Type of training
   (1) = high school course
   (2) = college course/continuing education course
   (3) = workshop
   (4) = correspondence course

8b.1. Recency and Amount of Training
   Code year of attendance for: college/continuing education course, workshop, or correspondence course.
   (1) = 1977-1979
   (2) = 1975-1976
   (3) = 1970-1974
   (4) = prior to 1970

Part III. Nutrition Education

9. Nutrition Information Sources Used
Code: 1 = yes, 2 = no
(1) = school nurse
(2) = physician
(3) = home economist
(4) = home economics teacher
(5) = school foodservice personnel
(6) = television, radio
(7) = extension bulletins
(8) = books
(9) = magazines
(10) = professional journals
(11) = other

10. Children required to take portion of each menu item
(1) = yes
(2) = no

11. Individuals encouraging students to taste foods
Code: 1 = yes, 2 = no
(1) = teachers
(2) = cooks and servers
(3) = principal
(4) = administrator
(5) = foodservice supervisor/director
(6) = no one

12. Teachers and school foodservice managers should coordinate nutrition education efforts.
(1) = totally agree
(2) = agree
(3) = disagree
(4) = totally disagree

13. Foodservice managers should participate in planning nutrition education lessons.
(1) = totally agree
(2) = agree
(3) = disagree
(4) = totally disagree

14. Nutrition education participation
(1) = yes
(2) = no

APPENDIX H

Scoring Key for Nutrition Knowledge Test

NUTRITION EDUCATION ASSESSMENT SERIES (NEAS)
FOOD SERVICE PERSONNEL EDITION

SCORING KEY FOR KNOWLEDGE ITEMS

1. b	20. d	38. b
2. a	21. d	39. d
3. b	22. a	40. b
4. b	23. c	41. b
5. b	24. a	42. c
6. b	25. d	43. b
7. b	26. b	44. c
8. a	27. a	45. c
9. a	28. d	46. d
10. a	29. d	47. d
11. a	30. a	48. c
12. c	31. a	49. c
13. c	32. a	50. b
14. c	33. c	51. b
15. d	34. c	52. c
16. d	35. b	53. d
17. b	36. a	54. a
18. d	37. b	55. a
19. b		

APPENDIX I

Memorandum and Evaluation Forms for

Nutrition Trained Panel

(Letterhead)

May 20, 1980

To: Panel for Needs Assessment Project

From: Allene G. Vaden, Ph.D., R.D.
G. Kathleen Newell, Ph.D., R.D.
Project Co-Directors

Re: Evaluation of items on questionnaires for teachers, food-service personnel and elementary children

We appreciate your willingness to serve on the expert panel to assist us in developing an approach to evaluating items on the questionnaires for the three sample groups in the Needs Assessment Project: elementary teachers, foodservice personnel, and elementary children.

Please follow the directions for each of the parts of the evaluation, Parts 1-6, and respond as indicated. If possible, would you please complete your evaluation within one week? One of the project team will be in contact with you.

If we find disagreements among the panel, we may want to meet as a group and discuss specific points of disagreement. We will contact you later if a meeting is necessary. Thank you again.

ns

KANSAS NUTRITION EDUCATION AND TRAINING PROGRAM
NEEDS ASSESSMENT PROJECT
Kansas State University
in cooperation with the Kansas State
Department of Education

Part 1. Please read each of the statements (nos. 56-71) on the attached page and indicate, as an expert in nutrition, whether you believe agreement or disagreement represents a positive attitude related to nutrition among teachers and foodservice personnel. In the space below, indicate a for agree and d for disagree. If you are not sure or believe that the item does not clearly reflect a positive or negative attitude, indicate with a question mark (?).

Please review each of the statements again and indicate the importance you would attach to each of the items in terms of its value to positive nutrition attitudes, using the following scale:

1 = extremely important
2 = important
3 = somewhat important
4 = not very important
5 = definitely not important
6 = uncertain

Item no.	What represents positive attitude? Circle: a=agree d=disagree ?=unsure	How important is the attitude? Circle: 1, 2, 3, 4, 5 or 6	Item no.	What represents positive attitude? Circle: a=agree d=disagree ?=unsure	How important is the attitude? Circle: 1, 2, 3, 4, 5 or 6
56.	a d ?	1 2 3 4 5 6	64.	a d ?	1 2 3 4 5 6
57.	a d ?	1 2 3 4 5 6	65.	a d ?	1 2 3 4 5 6
58.	a d ?	1 2 3 4 5 6	66.	a d ?	1 2 3 4 5 6
59.	a d ?	1 2 3 4 5 6	67.	a d ?	1 2 3 4 5 6
60.	a d ?	1 2 3 4 5 6	68.	a d ?	1 2 3 4 5 6
61.	a d ?	1 2 3 4 5 6	69.	a d ?	1 2 3 4 5 6
62.	a d ?	1 2 3 4 5 6	70.	a d ?	1 2 3 4 5 6
63.	a d ?	1 2 3 4 5 6	71.	a d ?	1 2 3 4 5 6

56. Good eating habits are important for good health.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

57. My current diet is a well-balanced, nutritious one.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

58. Crash dieting is a good way to lose weight.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

59. I am interested in the nutritional value of what I eat.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

60. Foods higher in nutrient content are less tasty than other foods.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

61. If people simply eat what they like, they will have a nutritious diet.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

62. The best way to lose weight is to eliminate foods containing fat from the diet.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

63. Part of the pleasure of eating is sitting and talking with people I like.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

64. It is a good nutritional habit to drink several glasses of water daily.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

65. Foods which supply more nutrients cost more than foods with fewer nutrients.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

66. In general, highly processed foods have fewer nutrients than less highly processed foods.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

67. In America today, it is nearly impossible to get all the nutrients one needs <u>unless</u> one takes a vitamin supplement.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

68. Foods grown with natural fertilizers are more nutritious than foods grown with synthetic fertilizers.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

69. The labels on packaged food help the wise consumer to decide how nutritious a food is.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

70. The lunches served in school are tasty.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

71. The lunches served in school are good for me.

a. Strongly agree c. Disagree
b. Agree d. Strongly disagree

GO ON

Part 2. Please read each of the statements on the attached page (items 72-90) and indicate, as an expert in nutrition, whether the nutrition-related practice is desirable or undesirable for teachers or foodservice personnel. Use the following scale:

D = desirable
U = undesirable
? = neither desirable nor undesirable

Review the statements again and indicate the importance you would attach to each of the items in terms of its value to positive nutrition-related practices, using the following scale:

1 = extremely important
2 = important
3 = somewhat important
4 = not very important
5 = definitely not important
6 = uncertain

Item no.	Is practice desirable or undesirable? Circle: D, U, or ?	How important is the practice? Circle: 1, 2, 3, 4, 5, or 6	Item no.	Is practice desirable or undesirable? Circle: D, U, or ?	How important is the practice? Circle: 1, 2, 3, 4, 5, or 6
72.	D U ?	1 2 3 4 5 6	82.	D U ?	1 2 3 4 5 6
73.	D U ?	1 2 3 4 5 6	83.	D U ?	1 2 3 4 5 6
74.	D U ?	1 2 3 4 5 6	84.	D U ?	1 2 3 4 5 6
75.	D U ?	1 2 3 4 5 6	85.	D U ?	1 2 3 4 5 6
76.	D U ?	1 2 3 4 5 6	86.	D U ?	1 2 3 4 5 6
77.	D U ?	1 2 3 4 5 6	87.	D U ?	1 2 3 4 5 6
78.	D U ?	1 2 3 4 5 6	88.	D U ?	1 2 3 4 5 6
79.	D U ?	1 2 3 4 5 6	89.	D U ?	1 2 3 4 5 6
80.	D U ?	1 2 3 4 5 6	90.	D U ?	1 2 3 4 5 6
81.	D U ?	1 2 3 4 5 6			

72. I combine good eating habits and exercise to maintain proper body weight.
a. Always c. Seldom
b. Usually d. Never

73. I eat "sweets" for snacks.
a. Always c. Seldom
b. Usually d. Never

74. I eat fruits for snacks.
a. Always c. Seldom
b. Usually d. Never

75. I eat vegetables for snacks.
a. Always c. Seldom
b. Usually d. Never

76. I select foods to make up a balanced diet.
a. Always c. Seldom
b. Usually d. Never

77. I use a vitamin supplement.
a. Always c. Seldom
b. Usually d. Never

78 I eat foods like potato chips, corn chips or cheese curls for snacks.
a. Always c. Seldom
b. Usually d. Never

79. I eat breakfast.
a. Always b. Seldom
b. Usually d. Never

80. I eat a snack before going to bed.
a. Always c. Seldom
b. Usually d. Never

81. I eat a snack between lunch and supper.
a. Always c. Seldom
b. Usually d. Never

82. After I finish a meal I feel "stuffed".
a. Always c. Seldom
b. Usually d. Never

83. Between meals I drink "soft drinks".
a. Always c. Seldom
b. Usually d. Never

84. I drink fruit or vegetable juices every day.
a. Always c. Seldom
b. Usually d. Never

85. I drink more than one cup of coffee in a day.
a. Always c. Seldom
b. Usually d. Never

86. I drink two or more ounces of alcohol in a day.
a. Always c. Seldom
b. Usually d. Never

87. I read the ingredients label on a package of processed food before I buy it.
a. Always c. Seldom
b. Usually d. Never

88. I read the nutritional label on the foods I buy.
a. Always c. Seldom
b. Usually d. Never

89. I eat the lunches served at school.
a. Always c. Seldom
b. Usually d. Never

90. I buy soft drinks or "sweets" at school for snacks.
a. Always c. Seldom
b. Usually d. Never

GO ON

Part 4. Please read each of the statements (nos. 91-105) on the attached page and indicate the importance you would attach to each of the nutrition education practices for school foodservice personnel, using the following scale:

1 = extremely important
2 = important
3 = somewhat important
4 = not very important
5 = definitely not important
6 = uncertain

Item no.	How important is the practice? Circle: 1, 2, 3, 4, 5, or 6	Item no.	How important is the practice? Circle: 1, 2, 3, 4, 5, or 6
91.	1 2 3 4 5 6	99.	1 2 3 4 5 6
92.	1 2 3 4 5 6	100.	1 2 3 4 5 6
93.	1 2 3 4 5 6	101.	1 2 3 4 5 6
94.	1 2 3 4 5 6	102.	1 2 3 4 5 6
95.	1 2 3 4 5 6	103.	1 2 3 4 5 6
96.	1 2 3 4 5 6	104.	1 2 3 4 5 6
97.	1 2 3 4 5 6	105.	1 2 3 4 5 6
98.	1 2 3 4 5 6		

91. I coordinate lunchroom menus with teachers' instructional units in nutrition.

a. Frequently c. Rarely
b. Sometimes d. Never

92. I observe the school eating habits of students.

a. Frequently c. Rarely
b. Sometimes d. Never

93. I have food and nutrition-related displays in the school lunchroom.

a. Frequently c. Rarely
b. Sometimes d. Never

94. I give special nutrition guidance to overweight and underweight students.

a. Frequently c. Rarely
b. Sometimes d. Never

95. I supervise the seasoning of all foods served in the school lunchroom.

a. Frequently c. Rarely
b. Sometimes d. Never

96. I participate in staff development activities related to ways of providing nutrition instruction in my school.

a. Frequently c. Rarely
b. Sometimes d. Never

97. I talk with teachers about the eating habits of their students.

a. Frequently c. Rarely
b. Sometimes d. Never

98. I talk with parents about the eating habits of their children.

a. Frequently c. Rarely
b. Sometimes d. Never

99. I present nutrition-related programs for PTA, PTO or other such meetings.

a. Frequently c. Rarely
b. Sometimes d. Never

100. I supervise the storage of all food in the school lunchroom.

a. Frequently c. Rarely
b. Sometimes d. Never

101. I supervise the preparation of all food in the school lunchroom.

a. Frequently c. Rarely
b. Sometimes d. Never

102. I involve students in planning school lunch menus.

a. Frequently c. Rarely
b. Sometimes d. Never

103. The teachers in my school consult with me when they need help with nutrition topics.

a. Frequently c. Rarely
b. Sometimes d. Never

104. The teachers in my school ask me to talk to their classes about nutrition.

a. Frequently c. Rarely
b. Sometimes d. Never

105. I work with the school administration regarding ways to coordinate lunchroom activities and classroom instruction.

a. Frequently c. Rarely
b. Sometimes d. Never

GO ON

APPENDIX J

Responses of Nutrition Trained Panel

(Tables 27-31)

Table 27 : Responses of nutrition trained panel members (N = 13) on evaluations of nutrition-related attitude items (Teacher and Food Service Personnel Editions)

item number[1]	response that indicates positive nutrition attitudes			importance to positive nutrition attitudes[2]					
	agree	disagree	unsure	1	2	3	4	5	6
	% of panel members			% of panel members					
56	100.0	--	--	92.3	7.7	--	--	--	--
57	76.9	7.7	15.4	46.1	30.8	7.7	--	--	15.4
58	23.1	76.9	--	46.1	30.8	23.1	--	--	--
59	100.0	--	--	69.2	30.8	--	--	--	--
60	15.4	69.2	15.4	30.7	15.4	30.8	15.4	--	7.7
61	7.7	76.9	15.4	30.8	23.1	38.4	--	--	7.7
62	30.8	69.2	--	46.2	30.7	15.4	7.7	--	--
63	84.6	--	15.4	16.7	41.6	16.7	25.0	--	--
64	92.3	--	7.7	53.8	30.8	15.4	--	--	--
65	15.4	84.6	--	30.8	7.7	53.8	--	7.7	--

[1]Item number refers to test question number in Nutrition Education Assessment Series, Teacher and Food Service Personnel edition, PDE Associates, Inc., 1979.

[2]Importance scale: 1 = extremely important, 2 = important, 3 = somewhat important, 4 = not very important, 5 = definitely not important, and 6 = uncertain.

Table 27: (cont.)

item number	response that indicates positive nutrition attitudes			importance to positive nutrition attitudes					
	agree	disagree	unsure	1	2	3	4	5	6
	% of panel members			% of panel members					
66	69.2	23.1	7.7	15.4	30.8	46.1	--	--	7.7
67	15.4	76.9	7.7	38.5	38.4	23.1	--	--	--
68	23.1	69.2	7.7	15.4	30.8	38.4	7.7	--	7.7
69	100.0	--	--	7.7	61.5	23.1	7.7	--	--
70[3]	38.5	--	61.5	8.3	33.3	33.4	8.3	--	16.7
71	100.0	--	--	30.8	38.4	15.4	15.4	--	--

[3]Item excluded in development of nutrition-related attitudes scale.

Table 28: Responses of nutrition trained panel members (N = 13) on evaluation of nutrition-related practice items (Teacher and Food Service Personnel Editions)

item number[1]	evaluation of practice			importance to positive nutrition practices[2]					
	desir-able	undesir-able	unsure	1	2	3	4	5	6
	— % of panel members —			% of panel members					
72	92.3	7.7	--	92.3	7.7	--	--	--	--
73	15.4	76.9	7.7	15.4	53.8	30.8	--	--	--
74	92.3	--	7.7	23.1	69.2	7.7	--	--	--
75	84.6	--	15.4	30.8	61.5	7.7	--	--	--
76	84.6	7.7	7.7	100.0	--	--	--	--	--
77[3]	7.7	38.5	53.8	8.3	8.4	50.0	8.3	8.3	16.7
78	23.1	69.2	7.7	15.4	15.4	53.8	7.7	7.7	--
79	92.3	--	7.7	61.5	38.5	--	--	--	--
80[3]	30.8	15.4	53.8	8.3	16.7	33.4	33.3	--	8.3
81	23.1	15.4	61.5	8.3	8.3	33.3	41.7	--	8.4
82	7.7	84.6	7.7	30.8	53.8	15.4	--	--	--

[1]Item number refers to test question number in Nutrition Education Assessment Series, Teacher and Food Service Personnel edition, PDE Associates, Inc., 1979.

[2]Importance scale: 1 = extremely important, 2 = important, 3 = somewhat important, 4 = not very important, 5 = definitely not important, and 6 = uncertain.

[3]Items excluded in development of nutrition-related practices scale.

Table 28: (cont.)

item number	evaluation of practice			importance to positive nutrition practices					
	desir-able	undesir-able	unsure	1	2	3	4	5	6
	— % of panel members —			— % of panel members —					
83	7.7	76.9	15.4	30.8	15.4	46.1	7.7	--	--
84	76.9	--	23.1	30.8	23.0	30.8	15.4	--	--
85[3]	15.4	23.1	61.5	8.3	--	33.3	33.4	8.3	16.7
86	7.7	69.2	23.1	23.1	38.4	30.8	7.7	--	--
87	84.6	--	15.4	7.7	61.5	30.8	--	--	--
88	92.3	--	7.7	7.7	69.2	23.1	--	--	--
89	61.5	--	38.5	16.7	41.6	16.7	16.7	--	8.3
90	15.4	69.2	15.4	46.1	38.5	7.7	--	7.7	--

Table 29: Responses of nutrition trained panel members (N = 13) on evaluation of nutrition education practices (Food Service Personnel Edition)

item number[1]	importance of practice[2]					
	1	2	3	4	5	6
	% of panel members					
91	38.4	23.1	30.8	--	--	7.7
92	61.5	38.5	--	--	--	--
93	61.5	30.8	7.7	--	--	--
94[3]	23.1	15.4	38.4	--	7.7	15.4
95[3]	15.4	38.4	7.7	23.1	--	15.4
96	53.8	38.5	7.7	--	--	--
97	38.5	46.1	--	--	--	15.4
98[3]	7.7	30.7	23.1	15.4	--	23.1
99	23.1	30.8	38.4	--	--	7.7
100[3]	46.1	30.8	--	7.7	--	15.4
101[3]	61.5	15.4	7.7	--	--	15.4
102	30.8	46.1	7.7	7.7	--	7.7
103	38.4	15.4	38.5	--	--	7.7
104	23.1	23.1	46.1	--	--	7.7
105	46.1	38.5	7.7	--	--	7.7

[1]Item number refers to test question number in Nutrition Education Assessment Series, Teacher and Food Service Personnel edition, PDE Associates, Inc., 1979.

[2]Importance scale: 1 = extremely important, 2 = important, 3 = somewhat important, 4 = not very important, 5 = definitely not important, and 6 = uncertain.

[3]Item excluded in development of nutrition education practices scale.

Table 30: Mean and standard deviation from importance ratings of nutrition trained panel for nutrition-related attitudes and practices items and priority scores assigned (Teacher and Food Service Personnel Editions)

item number	mean	standard deviation	priority score[1]
nutrition-related attitude items			
56	1.08	0.28	5
57	2.23	1.79	2
58	1.77	0.83	3
59	1.31	0.48	5
60	2.62	1.50	1
61	2.38	1.39	1
62	1.85	0.99	4
63	2.50	1.09	1
64	1.62	0.77	5
65	2.46	1.20	1
66	2.62	1.26	1
67	1.85	0.80	4
68	2.69	1.32	1
69	2.31	0.75	3
70	3.08	1.56	1
71	2.15	1.07	2
nutrition-related practice items			
72	1.08	0.28	5
73	2.15	0.69	3
74	1.85	0.55	5
75	1.77	0.60	5
76	1.00	0.00	5
77	3.50	1.51	1
78	2.77	1.09	1
79	1.38	0.51	5
80	3.25	1.29	1
81	3.42	1.24	1
82	1.85	0.69	5
83	2.31	1.03	2
84	2.31	1.11	2
85	3.83	1.40	1
86	2.23	0.93	2
87	2.23	0.60	3
88	2.15	0.55	3
89	2.67	1.44	1
90	1.85	1.14	4

[1]Refer to Table 4 for priority score grid.

Table 31: Mean and standard deviation from importance ratings of nutrition education practices items and priority scores assigned (Food Service Personnel Edition)

nutrition education practice items	mean	standard deviation	priority score[1]
91	2.23	1.42	2
92	1.38	0.51	5
93	1.46	0.66	5
94	3.00	1.73	1
95	3.00	1.68	1
96	1.54	0.66	5
97	2.23	1.74	2
98	3.38	1.71	1
99	2.46	1.33	1
100	2.31	1.84	2
101	2.08	1.85	2
102	2.23	1.42	2
103	2.31	1.44	2
104	2.54	1.33	1
105	1.92	1.38	2

[1]Refer to Table 4 for priority score grid.

APPENDIX K

Supplemental Table (Table 32)

Table 32: Responses of Kansas school foodservice personnel to nutrition knowledge questions

item number by area of measurement[1]	N[2]	responses A	B	C	D
		%	%	%	%
basic vocabulary/basic concepts					
1	457	6.3	90.2*	1.1	2.4
2	464	98.5*	0.9	0.2	0.4
3	462	1.3	49.6*	48.3	0.8
4	458	2.8	87.3*	4.4	5.5
5	462	5.0	54.8*	40.0	0.2
6	459	0.9	93.9*	4.1	1.1
7	463	21.2	75.8*	1.9	1.1
8	453	56.9*	2.2	40.2	0.7
9	462	80.7*	14.7	2.6	2.0
10	447	41.2*	32.6	16.1	10.1
11	460	93.7*	2.0	1.5	2.8
12	455	35.4	23.3	37.8*	3.5
13	453	7.7	19.2	59.8*	13.3
14	459	5.5	7.4	75.8*	11.3
nutrition practices					
15	452	13.5	40.3	14.1	32.1*
16	454	18.5	43.6	17.0	20.9*
17	453	13.7	55.4*	25.8	5.1
18	456	3.3	52.6	3.7	40.4*
19	461	17.4	78.5*	1.5	2.6
20	462	27.5	12.1	13.6	46.8*
21	454	14.3	26.7	28.2	30.8*
22	462	82.7*	9.7	2.0	5.6
23	461	5.0	2.4	91.1*	1.5
24	448	45.3*	27.0	14.7	13.0
25	456	4.8	1.1	11.2	82.9*
26	462	18.0	56.7*	15.6	9.7

[1]Item number refers to test question number in Nutrition Education Assessment Series, Foodservice edition, PDE Associates, Inc., 1979.

[2]N varies because of nonresponses.

*Correct answer.

Table 32: (cont.)

item number by area of measurement	N	responses A	B	C	D
		%	%	%	%
food selection					
27	461	84.0*	4.3	11.5	0.2
28	458	6.8	6.1	12.0	75.1*
29	454	9.5	35.7	5.5	49.3*
30	458	45.6*	4.4	48.7	1.3
31	461	95.9*	0.9	2.4	0.8
32	456	81.8*	9.2	4.4	4.6
33	460	18.0	2.4	72.4*	7.2
34	461	1.3	1.5	95.7*	1.5
35	457	12.9	50.6*	12.0	24.5
36	459	76.3*	10.2	1.7	11.8
37	464	1.7	89.2*	8.6	0.5
38	447	10.9	25.3*	6.5	57.3
39	460	5.6	2.0	3.9	88.5*
40	461	20.6	71.1*	5.0	3.3
food preparation					
41	438	12.5	42.7*	10.3	34.5
42	458	0.7	1.3	81.4*	16.6
43	459	11.8	81.0*	2.0	5.2
44	459	1.3	15.9	82.4*	0.4
45	458	3.9	0.7	94.3*	1.1
46	461	1.3	0.9	0.4	97.4*
47	462	0.8	1.1	0.9	97.2*
storage procedures					
48	462	1.3	3.9	93.7*	1.1
49	457	0.9	3.9	52.1*	43.1
50	460	74.4	23.9*	0.4	1.3

*Correct answer.

Table 32: (cont.)

item number by area of measurement	N	responses A	B	C	D
		%	%	%	%
advertising claims					
51	450	15.5	68.9*	6.9	8.7
52	456	22.1	6.6	70.4*	0.9
53	453	38.9	4.4	14.3	42.4*
54	453	36.7*	50.3	5.7	7.3
55	459	71.0*	7.9	19.8	1.3

*Correct answer.

NUTRITION-RELATED TRAINING, KNOWLEDGE, ATTITUDES, AND PRACTICES OF SELECTED KANSAS SCHOOL FOODSERVICE PERSONNEL

by

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B.S., Eastern Kentucky University, 1979

AN ABSTRACT OF A MASTER'S THESIS

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ABSTRACT

School foodservice personnel can influence school children's knowledge about foods and encourage good food habits and attitudes by serving an adequate lunch, answering questions relative to foods and nutrition, or by participating in a formalized nutrition education program. Many school foodservice personnel, however, do not have adequate training in nutrition education to accomplish these goals.

As part of the Kansas Nutrition Education and Training Program Needs Assessment Project, a mail survey was conducted to assess nutrition-related training, knowledge, attitudes, and dietary practices of school foodservice personnel in 97 randomly selected schools. Three hundred of the foodservice personnel were employed at sample schools; 318 were employees in base or central kitchens which provided food to sample schools. Completed instruments were obtained from 464 school foodservice personnel; the return rate was approximately 75 percent.

Most of the foodservice personnel were female between the ages of thirty-one and sixty years of age. About one-fourth of the respondents had not completed high school and only 2.2 percent held associate, bachelor's or master's degrees. Almost 60 percent of the foodservice personnel were in job positions of head cook/cook, assistant cook, or baker.

Nearly 62 percent of the foodservice personnel reported they had not completed any type of nutrition training. A large majority of the respondents reported they had on-the-job training in preparation for their job position.

Kansas school foodservice personnel had favorable attitudes toward nutrition. Almost all of the foodservice personnel agreed that good eating habits are important to good health and indicated they were

interested in the nutritional value of the food they ate. Over 85 percent thought their diet was well-balanced nutritionally.

More foodservice workers in on-premise and central kitchens believed they were competent to assist teachers in classroom nutrition instruction compared to foodservice employees in base kitchens. The foodservice workers, however, reported that teachers rarely or never consulted with them concerning assistance on nutrition.

Sources of nutrition information frequently used by the Kansas school foodservice personnel were extension bulletins, television and radio programs, and magazines. Cookbooks were the most popular selected book as a nutrition source. The most popular journal listed as a nutrition source was the School Food Service Journal.

The nutrition knowledge test scores of the school foodservice personnel throughout the state or among districts and schools did not differ significantly. Percent scores for the nutrition knowledge test ranged from 29.1 to 92.7 percent with a mean of 66.33.

Kansas foodservice personnel scored relatively higher on the basic vocabulary, food selection, and food preparation than on nutrition practices, storage procedures, and advertising claims nutrition knowledge scores. Those with formal training scored significantly higher ($P \leq .05$) than those with only on-the-job training on six of the eight knowledge scores.

The nutrition-related attitudes and practices and nutrition education practices scores of Kansas school foodservice personnel differed significantly. Demographic factors attributable to the differences were training, type of group, and the job title. The managerial/supervisory personnel scored significantly higher on nutrition education practices

and nutrition-related attitudes than those in other foodservice jobs. The attitude scores of foodservice personnel with formal training did not differ with those scores of foodservice personnel without such training, however, the nutrition education practices scores were significantly higher. Employees who worked in on-premise school foodservice systems had significantly higher nutrition education practices scores than did those employed in central or base kitchens. In general, nutrition knowledge scores were correlated positively with scores for nutrition-related attitudes and practices. The nutrition education practices scores were correlated positively with three of the nutrition knowledge scores.

Over two-thirds of the Kansas school foodservice personnel agreed there should be coordination of nutrition education efforts between instructional staff and school foodservice managers. Most agreed that foodservice managers should participate in a nutrition education curriculum planning committee. The data from this study indicated that those employees with training, those working in on-premise facilities, and those in managerial positions were the most actively involved in nutrition education activities in their schools.