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Effect of a heart health nutrition program on elementary school children in Piedmont, North Carolina

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EFFECT OF A HEART HEALTH NUTRITION PROGRAM ON ELEMENTARY SCHOOL CHILDREN IN PIEDMONT NORTH CAROLINA

by

Kay Ragsdale Leddon

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Approved by

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Dissertation Adviser

APPROVAL PAGE

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The purposes of this study were to determine the effect of a heart health nutrition education program on knowledge and behavior of third grade students enrolled in a public school in Piedmont North Carolina and to assess the differential effect of parent participation in such a program. Seventy-two male and female third grade students enrolled in an elementary school located in a non-metropolitan school district in Piedmont North Carolina were the subjects of this study. Data were collected using pre- and post measures. The heart health nutrition program consisted of six sessions presented over a six week period. Parents of the subjects in the treatment group received a weekly report of the classes including key concepts related to heart healthy foods. When data related to behavior as measured by subjects' indication of food preferences on selected test items were analyzed using analysis of covariance, only slightly significant differences were found for the control group. No significant differences were found for knowledge of heart health nutrition or in the total gain scores of the treatment and control groups.

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CHAPTER I

INTRODUCTION

Cardiovascular disease is the major cause of death in the United States (American Heart Association, 1988). The primary cause of cardiovascular disease is atherosclerosis which begins early in life (Berenson, McMahan, Voors, Webber, Srinivasan, Frank, Foster, & Blonde, 1980; Webber, Cresanta, Voors, & Berenson, 1983; Newman, Freedman, Voors, Bard, Srinivasan, Cresanta, Williamson, Webber, & Berenson, 1986). This disease affects large and medium size arteries, causing vascular thickening and narrowing through the accumulation of fatty, fibrous material (Holman & McGill, 1962). Several risk factors for cardiovascular disease have been identified including hypertension, hypercholesterolemia, smoking, sedentary lifestyle, diabetes mellitus, obesity, and diets high in fat and sodium (Berenson, et al., 1980; Lauer & Shekelle, 1980). Epidemiologic studies of children have revealed the presence of cardiovascular risk factors which lead to atherosclerosis in later life (Berenson, et al., 1980). The importance of health promotion among children was highlighted in the Surgeon General's report of 1980, Promoting Health/Preventing

Disease: Objectives for the Nation. In this report fifteen health priority areas were identified, and about one third of the objectives identified related directly to the health of children.

A major focus of the objectives identified included reducing the risk of cardiovascular disease among both adults and children. Behaviors that contribute to increased risk for the development of cardiovascular disease include lack of adequate exercise and a diet high in fat, sodium, and total calories. The National Adolescent Student Health Survey of 11,000 students in the eighth and tenth grades revealed that many adolescents eat foods high in fat and sugar. Nearly 39% of the students surveyed ate fried foods four or more times a week, and 59% of the snack foods consumed were foods high in fat and/or sugar (American School Health Association, 1988).

Health-related behaviors, including food preferences, are learned early in life and are influenced by family, peers, and cultural values, beliefs, and practices (Gift, Washbon, & Harrison, 1972). Health-related behaviors learned early in life are likely to be maintained (Coates, Jeffery, & Slinkard, 1981). It is therefore important to begin relatively early in life to implement health-related education and other interventions aimed at

prevention of chronic disease such as cardiovascular disease. Considerable research suggested that the school provides an appropriate setting for assisting children to learn about cardiovascular health nutrition. None of the studies cited however involved a parent participation component with third grade students. The purpose of this study was to evaluate the effect of parent participation on student's knowledge gain and choice of foods low in fat and low in salt.

Statement of the Problem

This study examined the effect of parent participation in a nutrition education program designed to promote consumption of foods low in fat and low in salt, and to increase knowledge about nutrition and foods that are low in fat and salt. This information could provide the basis for developing other cardiovascular health nutrition programs that could be used in other school systems in Piedmont North Carolina.

Assumptions

In order to conduct this study the following assumptions were made:

1. All subjects will be capable of reading and writing.
2. All subjects will respond honestly to questions.

Research Questions

The purpose of this study was to evaluate the impact on students' knowledge and behavior of a nutrition education program for third grade students enrolled in public school in Piedmont North Carolina. The goal was to help students become aware of and make heart healthy food choices at home and at school. Research questions to be addressed included:

1. Is there a difference in mean gain scores on a test on foods low in fat and salt between a treatment group participating in a cardiovascular nutrition health program that included a parent participation component and a control group participating in a program without a parent participation component?
2. Is there a difference in consumption of foods low in fat and low in salt between a treatment group participating in a cardiovascular nutrition health program that included a parent participation component and a control group participating in a program without a parent participation component?

Definitions of Terms

Food habits: characteristic and repetitive acts to provide nourishment and simultaneously meet an assortment of social and emotional goals (Gift, et al., 1972).

Heart-healthy foods: foods low in fat and salt.

Child: a young person of either sex between infancy and youth (Webster, 1971). Operationally defined for the purposes of this study as a person between the ages of eight and ten years of age.

Parent participation: engagement of a parent in an activity with his or her child. For the purposes of this study operationally defined as communication or interaction between the child and the parent or between the instructor and the parent.

CHAPTER II

REVIEW OF THE LITERATURE

The literature review presents research findings related to growth and development of school age children, parent participation in the development of food habits, diet and nutrition of school age children, and research on cardiovascular health education programs emphasizing nutrition concepts.

Growth and Development of School Age Children

A number of theories have been developed to account for changes in behavior during an individual's lifetime. The theory of Piaget (1969) focused on the quality of thinking at each life stage, from infancy through adolescence. Piaget assumed that there are qualitative differences in intelligence in each of these life stages. He has described a stage of concrete operational thought which begins at about age five or six and ends in early adolescence at about 11 or 12 years of age. At this stage children are able to appreciate cause and effect relationships, categorize objects, begin to classify systems, and appreciate hierarchies of groups. The

ability to solve problems which are concerned with real objects, rather than abstract ideas, is characteristic of this age group.

Erikson's (1950) psychosocial theory suggested stages of psychosocial development at which an individual is confronted with a unique problem requiring the integration of individual needs and skills with the social demands of the cultural environment. Erikson calls the school-age period the age of industry versus inferiority. The major theme of this stage is accomplishment of specific tasks through the development of work skills. The challenge for this age is the accomplishment of literacy and cultural skills. Education is the process through which most children work on the crisis of industry versus inferiority. The psychosocial theory suggests that an individual's fundamental attitude toward work is established during the middle-school age period. Children at this stage of development are usually eager to learn new skills, and their success can lead to increased eagerness to learn. Success and development of a sense of control in the area of accomplishment of both literacy and social competence can contribute to a positive sense of self.

Understanding cognitive and psychosocial theory as it applies to the school age child has important

implications for the design of skill building experiences appropriate to this age of development. Experiences should help the child to develop skills that lead to a sense of accomplishment and are designed to present concrete ideas rather than abstract concepts.

Parental Participation and Influence

In addition to the self-motivating factors associated with increased competence, there are important external sources of reinforcement that promote skill development. Parents and teachers are a vital source of encouragement to achievement for school aged children.

Parental support and involvement in school-based nutrition education programs has been identified as an important factor in influencing children's eating behavior (Nestor & Glotzer, 1981; Burt & Hertzler, 1978).

Burt and Hertzler (1978) conducted a study of 46 families to determine the influence of each parent on the kindergarten child's food preferences. The investigators were interested in which parent was more influential in the formation of a child's food preferences. Kindergarten children five to six years of age were interviewed and asked to respond to 32 different foods representing the Four Food Groups. Data from parents were obtained by written questionnaires sent home. The questionnaire was designed to provide insight into

associations of parental and child's food preferences. The researchers concluded that the results tended to suggest that the parents influenced the child's food preferences nearly equally.

Eppright, Fox, Fryer, Lamkin, and Vivian (1969) surveyed 2000 families and 3,444 children ranging in age from birth to six years to obtain information about eating behaviors of the children and concerns of the mother. The researchers concluded that if the children consumed the foods indicated by their mothers to be important in the daily diet, the nutritive quality might be reasonably good with the possible exception of vitamin A and C. A number of concerns related to feeding problems were revealed, including eating a limited variety of foods, eating too many "sweets", dawdling, and reluctance to eat. More than half the mothers interviewed used food as a reward, punishment, or pacification. In addition, it was determined that children made food choices more often for breakfast and for snacks.

Diets of School Age Children

The National Adolescent Student Health Survey (1988) of 11,000 students in the eighth and tenth grade revealed that many adolescents eat foods which are high in fat and sugar. Nearly 39% of the students surveyed ate fried

foods four or more times a week, and 59% of the snack foods consumed were foods high in fat and/or sugar (American School Health Association, 1988).

Farris, Cresanta, Webber, and Berenson (1986) investigated the dietary intakes of 10 and 13 year old children in a longitudinal study. The researchers concluded that the diets of the children examined were typical of the American eating pattern. These researchers also observed that intakes of fat by these children were not consistent with the current recommendations for a prudent diet.

Dietary Recommendations for School Age Children

The American Heart Association Committee report (1982) has made the following dietary recommendations for children over two years of age:

1. Adjust dietary kcalorie value to maintain weight,
2. Limit fat intake to 30% of calories,
3. Decrease cholesterol intake to less than 100 milligrams per 1000 calories,
4. Limit protein intake to about 12% to 20% of calories,
5. Adjust carbohydrate intake to 55% of calories, and,
6. Limit the use of salt and salty foods.

The U.S. Dietary Goals (Senate Select Committee, 1977) recommended dietary practices to decrease the risk of chronic diseases such as cardiovascular disease.

These recommendations were maintain desirable weight, increase consumption of complex carbohydrates, and decrease intakes of sugar, total fat, saturated fat, cholesterol, and sodium. Although the recommendations were based on adult nutrient needs, they appear to be reasonable for children older than two years of age.

The National Institutes of Health Consensus Conference on Lowering Blood Cholesterol to Prevent Heart Disease made several recommendations for healthy children older than two years of age (Consensus Conference, 1985). These recommendations were generally in agreement with the Recommended Dietary Allowances set by the Food and Nutrition Board, National Academy of Sciences, National Research Council (1989).

Selected Research on Cardiovascular Health Eduction

Several studies have been conducted to examine the outcomes of cardiovascular health education programs. The Chicago Heart Health Curriculum Program was a cardiovascular disease risk-reduction program conducted with a multiracial, urban sixth grade student population and their families (Sunseri, Alberti, Kent, Schoenberger, & Doleck, 1984). Results of this study indicated no significant differences between participants in the program.

Participants in the Heart Healthy Eating and Exercise Program (Coates, Jeffery, & Slinkard, 1981) were fourth and fifth grade students in two schools near Stanford University. Students participated in classroom activities and an exercise program. Results of this study indicated that the exercise program was unsuccessful, although there was increased knowledge of heart-healthy nutrition practices.

Walter, Hofman, Vaughan, and Wynder (1988) conducted a study of the effectiveness of an educational intervention designed to modify coronary heart disease risk factors among fourth through eighth grade students in two schools in and around New York City. The principal findings of the study were that the intervention program appeared to be associated with favorable trends in serum levels of total cholesterol among the study groups, and an increase in prevention-related knowledge.

Conclusion

A review of literature revealed little information regarding the effect of parent participation in a school heart health nutrition education program. This study was designed to provide such information on a heart health nutrition program for elementary school children.

The purposes of this study were to determine the effect of a heart health nutrition education program on knowledge and behavior of third grade students enrolled in public school in Piedmont North Carolina and to assess the differential effect of parent participation in such a program.

CHAPTER III

METHODS AND PROCEDURES

The purposes of this study were to determine the effect of a heart health nutrition education program on knowledge and behavior of third grade students enrolled in public school in Piedmont North Carolina and to assess the differential effect of parent participation in such a program

Research Design

A quasi-experimental nonrandomized control group pre-test/post-test design was used in this study. Dependent variables were nutrition knowledge and behavior. The independent variable was a parent participation component in the heart-health nutrition program. Data were collected using pre- and post-measures.

Selection of Subjects

This research study was conducted in the public elementary schools of a non-metropolitan county school system in the Piedmont area of North Carolina. Permission to conduct this research was obtained from the administrative offices of the school system involved.

There were 16 elementary schools within the selected county, one of which was selected by the administrative offices to be utilized for this study. The total school enrollment was 665 students and enrollment in the third grade at the participating elementary school was 98 students.

After receiving permission from the administrative offices of the school system involved, the researcher met with the principal and with the third grade teachers to obtain their permission to proceed with the study. Once this was accomplished, the researcher then met with the third grade teachers to develop a schedule for the conduction of the heart health nutrition classes. In addition, the researcher toured the school and visited the classrooms prior to the beginning of the study.

A convenience sample of 80 public elementary school students, both male and female, was obtained from the four 3rd grade classes. These students ranged in age from eight to ten years of age. The treatment group for the study was two third grade classes which were randomly selected and included 21 female and 21 male students. Parental consent was obtained for all 42 subjects. Three of these students were absent the day the post test was administered and were eliminated from the study, so the actual treatment group consisted of 39 subjects. The

control group consisted of students in the remaining two third grade classes including 15 male and 23 female students. Parental consent was obtained for all 38 students who served as controls in the study. Of these 38 students, three female students and two male students were absent the day the post test was administered. These five students were eliminated from the study, so that the control group consisted of 33 subjects.

Ethical Considerations

The research proposal for this study was submitted to the University of North Carolina at Greensboro, School of Human Environmental Sciences Dissertation Committee for evaluation and approval. After receiving approval, this study was submitted to the Human Subjects Review Committee of the University of North Carolina at Greensboro for ethical permission to proceed with the study.

Informed Consent

Consent was obtained from the administrative offices at the school system involved. Oral permission was obtained from the principal of the school and from the third grade teachers for utilization of their class for the purposes of this study.

Parents of all enrolled third grade students were sent a consent form which was returned prior to data

collection. The consent form (Appendix A) included an explanation of the study, the data to be collected, and the risks and benefits of participating in the study. Parents were informed that all information would be treated as confidential and that students were free to withdraw from the study at any time without penalty or prejudice.

Instrumentation

Nutrition knowledge and behaviors were measured by a paper and pencil test developed by the investigator (Appendix B). The test contained 23 items which were related to the objectives for the heart health nutrition education program. Test items in the curriculum guide for Future Fit (American Heart Association, 1985) and Nutrition Achievement Tests, K-6 (National Dairy Council and Iowa State University, 1980) provided ideas for items in the test.

A small group of third grade children enrolled in a school in another county were used to pilot test the instrument to assess its readability and clarity. Four third grade educators, one maternal-child nurse educator, and one nutritionist rated the readability, clarity, and content validity of the test. Items which appeared confusing were removed from the test. The same test was used for the pretest and the posttest. Administration of

the instrument was conducted by the researcher and the third grade teachers. Directions and questions were read aloud and students were encouraged to raise their hands for clarification.

Additional Background Information

A survey of family food consumption was developed by the researcher and sent home to all parents/guardians who had given permi sion for their child to participate in the study. The survey was distributed at the beginning of the program with a request that the form be returned to the classroom teacher within three days. Since the parents/guardians recorded their food consumption with varying degrees of accuracy, this information was believed to be too subjective and inaccurate for research purposes. Additional background information was obtained via a family survey questionnaire which was sent home with all subjects. The family survey is included in Appendix D.

Description of the Heart Health Nutrition Program

The heart-health nutrition program consisted of six sessions over a six week period which dealt with nutrition knowledge and activities designed to help children identify foods high in fat and salt content. Sessions were conducted at the same time each week and were 30 minutes in length. The first and last sessions

were used to collect the pre- and post- data. The sessions were conducted during October and November of 1989.

An outline of the curriculum is included in Appendix C. The researcher, a nutrition educator, taught the heart health nutrition program. The classes included information about the foods of the four food groups and the fat and salt content of a variety of different foods. Emphasis was placed on the selection of low fat and low salt foods.

The parent participation component consisted of a series of weekly written reports which were sent home with subjects in the experimental group. Parents were asked to review the reports with their children and in this manner were able to participate in a review of pertinent information related to high fat and high salt food choices. These weekly reports are included in Appendix E.

Data Analysis

Analysis of covariance was used to test for statistically significant differences in mean scores on the nutrition knowledge and nutrition behavior test with pretest measurements used as the covariate. Specifically, this analysis was used to see if a change in nutrition knowledge and behavior differed

significantly between subjects receiving a heart health nutrition program with a parent participation component and students receiving a heart health nutrition program with no parent participation component. An analysis was done to compare the respective increases in scores of the treatment group and the control group, both for scores reflecting knowledge and scores reflecting behavior. between the treatment group and the control group. The data for this study was analyzed using the General Linear Model (GLM) procedure of the Statistical Analysis System (SAS) (1985).

CHAPTER IV

RESULTS AND DISCUSSION

The purposes of this study were to determine the effect of a heart health nutrition education program on knowledge and behavior of third grade students enrolled in public school in Piedmont North Carolina and to assess the differential effect of parent participation in such a program.

Characteristics of the Groups

Ages of the 72 third graders ranged from eight to ten years of age. The typical subject was eight years old with one sibling. All subjects attended third grade at one of the 16 elementary schools in a semi-rural southern county. The treatment group consisted of 39 subjects. The control group consisted of 33 subjects. About 53% of the families consenting to participate in the study reported the incidence of heart disease in the family. Forty-six percent of participating families reported eating at a fast food restaurant at least once weekly and about 53% reported consumption of whole milk (Table 1).

Table 1

Background Characteristics of Subjects

Variable	N		Percent
	Treatment	Control	
Age			
8 years	24	22	57.50
9 years	12	20	40.00
10 years	2	0	2.50
	38	42	100.00
Sex			
Male	15	21	45.00
Female	23	21	55.00
	38	42	100.00
Siblings			
0	6	4	13.88
1	18	18	50.00
2	5	9	18.06
3	4	1	2.77
More than 3	3	0	2.77
	36	32	100.00
Family History of Heart Disease			
Yes	16	20	52.90
No	20	12	47.10
	36	32	100.00
Fast Food Meals/Wk			
0	7	4	16.40
1	17	14	46.30
2	0	8	26.90
3	1	3	6.00
More than 3	0	3	4.50
	25	32	100.00
Milk Consumed			
None	0	0	0.00
Whole	15	21	52.90
Low Fat	16	9	36.80
Skim	4	2	8.80
Other	1	0	1.50
	36	32	100.00

Differences in totals for each subheading are due to incomplete answers to some questions.

Results and Discussion

Analysis of covariance was used to test for differences in total scores obtained by pre- and posttest measures which included measures of heart health nutrition and choice of heart healthy foods for the experimental group and the control group of this study (Table 2). There were no significant differences between the total scores for each group ($p < 0.8830$). This lack of significant difference could be attributed to the fact that the pre-test scores were consistently high for both groups, with little opportunity for subjects to demonstrate an increase in gain score. There was also the possibility that the instrument used to collect pre- and posttest scores was not sensitive enough to detect small differences. The small sample size was another consideration which may have limited the ability to detect differences between the experimental group and the control group.

Another factor related to the high pre-test scores was the progressive environment of the school. The principal and teachers actively encouraged health education programs and activities. Previously presented health programs may have been a source of information related to healthy eating patterns. In addition, parents of the students in the control group may have

participated independently and without specific direction during the program. Parents of students in the control group did not receive the weekly reports, but could have demonstrated support for the concepts and principles taught in the program.

Table 2

Summary of Analysis of Covariance for Total Difference in Scores (N = 72)

Source	Means*	F	p
Treatment	5.736	0.02	0.8830
Control	6.069		

*Least squares means adjusted for prescore

Difference in knowledge about heart healthy foods and the four food groups obtained by pre- and posttest measures for the treatment group and the control group were analyzed using analysis of covariance (Table 3). There was no significant difference in nutrition knowledge gain ($p < 0.3703$) between the treatment group and the control group. Consistently high pre-test scores for both groups were related to the heart health nutrition knowledge items on the instrument. Lack of

instrument sensitivity may have been a factor in determining differences between means for study groups.

Table 3
Summary of Analysis of Covariance for Difference in Knowledge of Heart Health Nutrition for Treatment and Control Groups (N = 72)

Source	Means*	F	p
Treatment	5.9366	0.81	0.3703
Control	4.5275		

*Least squares means adjusted for prescore

Behavior as measured by subjects' indication of food preferences on selected test items were analyzed for the treatment and control groups using analysis of covariance (Table 4). Differences in the scores for these items were slightly significant ($p < 0.0532$) for the control group and suggest that subjects in the control group were slightly more likely to choose foods considered to be heart-healthy. The foods selected were nutritious snack foods, low fat foods, and low salt snack food items. The positive difference in the scores for the control group may have been related to participation in the heart health nutrition education program only.

Table 4

Summary of Analysis of Covariance for Difference in Heart Healthy Food Choice Behavior Among Treatment Group and Control Group (N = 72)

Source	Means*	F	p
Treatment	-0.5197	3.87	0.0532
Control	1.1596		

*Least squares means adjusted for prescore

Throughout the study the students, teachers, principal, and administrative personnel demonstrated interest and enthusiasm for the heart health nutrition program. Students were eager to take part in the class activities, and teachers displayed the students' work prominently in their respective classrooms each week of the program. An administrator for the school system attended one class in each classroom during the program. In addition, several parents came to the school to meet the researcher and to express interest and support for the study. This interest and the enthusiasm of the students as they eagerly contributed to the exciting environment of the classroom were indicators of the value and significance of this program.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purposes of this quasi-experimental study were to determine the effect of a heart health nutrition education program on knowledge and behavior of third grade students enrolled in public school in Piedmont North Carolina and to assess the differential effect of parent participation in such a program. Data were collected at the beginning of the program and again at the end of the program six weeks later (Table 2).

Instruments used in the study were developed by the researcher and included a 23-item nutrition knowledge and food choice behavior test, a parent survey of background information, and a food consumption survey. The heart health nutrition education program focused on food choices for a healthy heart with emphasis on fat and salt content of a variety of foods. The sessions were held at the same time weekly, each session lasting 30 minutes. Data were collected at the beginning of the program and again at the end of the program.

The sample consisted of 72 third grade students, both male and female. The treatment group included 39 students. The control group consisted of 33 students.

An analysis of covariance (ANCOVA) was used to compare difference in the score increases between the treatment and the control groups. The pre-test score was used as a covariate in the analysis. After the effect of the covariate had been removed, there was only a statistically significant difference in the postmeasure for food choice behavior of the control group. The analysis of covariance revealed no other significant findings. In all analyses the scores for the treatment group were not higher than those for the control group.

Conclusions

The following conclusions were drawn:

1. Subjects in the control group were found to have a statistically significant increase in scores for heart healthy food choice behavior. This effect may have been due to participation in the heart health nutrition education program.
2. No statistically significant differences were found between the group receiving the heart health nutrition program with parent participation and the group receiving the program without a parent participation

component related to knowledge of heart health nutrition.

3. No statistically significant differences were found between total gain scores for the treatment group and the control for heart health nutrition knowledge and food choice behavior.

Recommendations

This research tested the effect of parent participation on changes in heart health nutrition knowledge and food choice behavior following participation in a heart health nutrition program of third grade students in piedmont North Carolina. As a result of the findings of this study, the following recommendations are offered for development and study of school-based heart health nutrition programs:

1. Future heart health nutrition programs using a larger sample size could include all grade levels to possibly increase the development and maintenance of food choices that decrease risk of cardiovascular disease.
2. More precise instrumentation with an increased number of items particularly for older students could be developed for future research purposes.

3. Development of behavioral objectives for student learning could facilitate evaluation of student achievement for future research.
4. School systems are limited in funding and time available for activities other than the basic curriculum, therefore the recommendation is made to devise methods to include parent participation in heart health nutrition education programs. Future studies may produce significant findings regarding parent participation.

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APPENDIX A

CONSENT FORM

Please sign and return this consent to your child's teacher within two days.

I understand that participation in this study is voluntary and I give permission for my child _____(child's name) to participate in the study being conducted by

Kay R. Leddon.

_____(signature)_____(date)

Dear Parent/Guardian:

As a part of the curriculum requirements for the Doctor of Philosophy degree at the University of North Carolina at Greensboro, I am conducting a study of nutritional knowledge of heart healthy foods among school aged children. This study is under the supervision of Dr. Aden Magee, School of Human Environmental Sciences, U.N.C.G. It is hoped that this study will help health care providers and teachers better understand factors which help young children in learning to care for their own health care needs.

I am contacting you because your child is a member of one of the classes that was chosen to participate in this study. Participation is voluntary and your consent can be withdrawn at any time.

Participation will involve filling out two questionnaires during class, and a series of class discussions and activities designed to help develop understandings of heart healthy foods. Parents will also be asked to complete two questionnaires taking about thirty minutes.

Your name or your child's name will not appear on the questionnaires or in the study. Only overall results will be reported. Individual results will not affect your child's grade at all.

If you agree to let your child participate in this study, please sign the attached consent and return it to school with your child within two days.

U.N.C.G. is eager to insure that all research participants are treated in a fair and respectful manner. If you feel that you have been mistreated in any way during participation in this project, contact Dr. Aden Magee, U.N.C.G., Greensboro, N.C., 919-335-5313. Results of this study may be obtained by contacting Mrs. Leddon.

_____

Kay R. Leddon
(704) 633-6000 or 788-5993

APPENDIX B

STUDENT QUESTIONNAIRE

HEART HEALTH QUESTIONNAIRE

DIRECTIONS: Answer the questions by making a circle around the letter that you think is the best answer.

For example if you are a boy, you should draw a circle around the letter "a" to answer question number 1.

1. I am a
   a. boy
   b. girl

2. My age is
   a. 7 years
   b. 8 years
   c. 9 years
   d. 10 years

3. Food give me energy
   a. yes
   b. no

4. Food helps me grow
   a. yes
   b. no

5. If I choose the food I eat with care, it can help me to stay healthy.
   a. yes
   no. no

6. Foods that have a lot of fat or salt
   a. are good for people to eat very often
   b. are okay to eat now and then
   c. are not good to eat ever

7. Foods that are good for my heart
   a. are good for people to eat very often
   b. are okay to eat now and then
   c. are not good to eat ever

8. Which one snack would you choose to eat?
   a. cake
   b. candy
   c. chips
   d. fruit

9. When you eat do you add:
   a. lots of salt
   b. a little salt
   c. no salt

10. Which has a lot of salt?
   a. chips
   b. candy
   c. fruit
   d. raw vegetables

11. What kind of milk do you drink at home?
   a. whole milk
   b. skim milk
   c. low fat milk
   d. no milk
   e. don't know
   f. acidophilus

12. How many glasses of milk do you drink each day?
   a. 1
   b. 2
   c. 3
   d. 4
   e. more than 4

13. What kind of milk do you choose at school?
   a. whole white milk
   b. skim milk
   c. chocolate milk
   d. do not choose milk

14. How many times a week do you eat at a fast food place like Wendy's or McDonald's?
   a. 1 time a week
   b. 2 times a week
   c. 3 times a week
   d. 4 times a week
   e. 5 or more times a week
   f. don't know
   g. do not eat at fast food places

15. Which would you choose for a snack?
    a. milk
    b. ice cream
    c. chips
    d. candy

16. Certain kinds of milk have a lot of fat that is not good for you.
    a. yes
    b. no

17. Foods with a lot of fat are not good for you.
    a. yes
    b. no

18. Which food has more fat?
    a. apple
    b. banana
    c. chips
    d. bread

19. You can always tell if a food has a lot of fat.
    a. yes
    b. no

20 Which is a heart healthy meal?
    a. ham biscuit, jelly, butter
    b. hot dog, chili, ice cream
    c. turkey, whole wheat bread, skim milk
    d. cheese sandwich, potato chips, iced tea

21. Nutrients are in:
    a. only a few foods
    b. all foods
    c. only water
    d. everything

22. Which food is low in salt?
    a. ham
    b. sausage
    c. carrot sticks
    d. pickles

23. Salt contains sodium
    a. yes
    b. no

APPENDIX C

HEART HEALTH NUTRITION CURRICULUM

HEART HEALTH NUTRITION PROGRAM

I. PURPOSE: To introduce the nutrition unit and to administer the pre-test.

Basic Concept: To introduce the idea that all food contains nutrients.

Activity: Tell children briefly about the nutrition unit and administer pre-test.

II. PURPOSE: To develop the idea that food contains nutrients necessary to help individuals grow, have energy, and healthy hearts.

Basic Concept: Eating a variety of different foods is necessary for growth, energy, and health.

Activity: Children cut out food cards and group them. Develop with the class the idea of classification of foods into plant and animal groups, and the Basic Four Food Groups. Children match food cards with the appropriate group. Discuss the function of each of the food groups.

III. PURPOSE: To introduce children to a variety of foods and to help them distinguish those that should be eaten more often for a healthy heart,energy, and growth. To provide the opportunity to practice decision-making skills regarding food choices.

Basic Concept: While no foods are bad, "Heart Healthy" foods are foods that should be eaten more often for a healthy heart. Children can make sound decisions regarding food choices when informed of basic nutrition concepts.

Activity: Children select four food models from a paper bag and place the food models on a paper plate which has been given out earlier. Children decide which foods are high in fat and which are high in salt. Stickers on the back of the food models are checked to determine foods high in fat and salt, which are marked with yellow and purple stickers. "Heart Healthy" foods are marked with green stickers. Children decide which foods they want on their paper plates.

IV. PURPOSE: To help children identify foods high in fat.

Basic Concept: Some foods are high in fat even though the fat cannot be seen.

Activity: Children are provided with sample foods thatcontain high amounts of fat, such as bacon, sausage, & chocolate, as well as some foods that are low in fat, such as apple or other fruit.The samples are smeared onto brown paper and allowed to dry. The paper is examined to determine which foods left the larger spots.
Students should be able to rank the foods according to the fat content.

V. PURPOSE: To provide the opportunity to explore the fat and salt content of a fast food meal.

Basic Concept: Some foods available at a fast food restaurant are relatively high in fat and salt.

Activity: A boxed fast food meal is examined to demonstrate how much fat and salt are contained in each food of the meal. Equivalent amounts of yellow shortening and salt are measured out to show how much fat and salt are contained in a fast food meal. Children are asked to suggest alternative food choices available at a fast food restaurant.

VI. PURPOSE: To summarize basic concepts of nutrition unit and to give the post test.

Basic Concepts: All foods are "good", but some foods should be eaten more often than others for energy and growth.

Activity: Briefly summarize the basic concepts and answer any questions. Administer the post test.

APPENDIX D

PARENT SURVEY

HEART HEALTH PARENT SURVEY

I am conducting a survey related to nutrition and eating for a healthy heart with the goal of improving the health of our families and I would appreciate your answers to the following questions. The responses you give will not be reported by individual name, but will be summarized so that your individual responses will not be known. Your participation is voluntary and will not affect your child's grade in any way. Completion of this questionnaire should take ten to fifteen minutes. Please return this form to your child's teacher within two days. Thank you very much for your help.

1. Child lives with
   Mother & Father____ Mother alone___ Father alone___
   Other (please specify)_____

2. Number of children in family_____

3. Ages of children_____

4. Is there any history of heart disease in the immediate family, including grandparents?
   Yes____ Relationship_____
   No_____

5. Who makes food purchases_____
   Mother_____ Father_____Other_____
   (please specify)

6. Who prepares meals?_____
   Mother____ Father___ Both_____Other_____
   (please specify)

7. Number of meals prepared and eaten at home each day?
   1___ 2___ 3___ more than 3___

8. Number of meals eaten at a fast food restaurant each week?
   1___ 2___ 3___ 4___ 5 or more_____ None_____
   (please specify)

9. Number of meals eaten at restaurants other than fast food weekly?
   1___ 2___ 3___ 4___ 5 or more ____(please specify)

10. Type of milk purchased and consumed?
    Whole milk___ Do not purchase or drink_____
    Low fat_____ Other_____
    2% milk_____ 1% milk_____
    1/2% milk____ Skim milk____

APPENDIX E

PARENT REPORTS

Dear Parent/Guardian:

As a part of a study of nutrition, your child learned about the importance of eating foods that are low in fat and salt to have a healthy heart and body.

Please review the following information with your child:

The following foods are high in fat and should be eaten less often:

- Bacon
- Beef liver
- Biscuit
- Bologna
- Butter
- Cheese
- Chili
- Cornbread
- Frankfurter
- Fried Chicken
- Fried Fish
- Hamburger
- Ham
- Ice Cream
- Mayonnaise
- Milk Shakes
- Peanuts
- Pie
- Pizza
- Sausage
- Waffles

The following food are high in salt and should be eaten less often:

- Bacon
- Cheese
- Ham
- Hot dogs
- Mustard
- Potato chips
- Salted nuts
- Soft Drinks
- Catsup
- Salt added to food

Thank you very much for your cooperation.

Dear Parent/Guardian:

As a part of a study of nutrition your child learned about the Basic Four Food groups including which foods are in each group, the way each of these food groups help children grow and have energy.

Please go over the following information with your child:

The Basic Four Food Groups are:

Milk Group

These foods are milk or foods made from milk. Examples are:

Milk	Cottage Cheese
Yogurt	Cheddar Cheese

Foods from this group that are especially heart healthy are:

Skim Milk	Low Fat Cottage Cheese
Low Fat Milk	Reduced Fat Cheddar Cheese
Low Fat Yogurt	

Meat Group

These foods are meat, chicken, fish, turkey, and other poultry, other meats including pork.

Foods from this group that are especially heart healthy are:

Meats trimmed of fat.

Lean meats

Foods that are less heart healthy are:

Hamburger Cold Cuts Hot Dogs

Fruit and Vegetable Group

These foods include all fruits and vegetables. Examples are:

Oranges	Tomatoes
Apples	Potatoes
Grapes	Broccoli

Most of the foods in this food group are heart healthy.

Grain and Cereal Group

The foods in this group include bread, pasta, cereals, rice, and all bread products.

Most of the foods in this food group are heart healthy.

Whole grain bread	Spaghetti
Cereals	Rice

Dear Parent/Guardian:

As a part of a study of nutrition you child learned that some foods contain fat that cannot be seen and foods of this type should be eaten less often.

Please review the following information with your child:

The following foods contain a large amount of fat:

Avocado	Cookies
Cheddar Cheese	Sweet Rolls
Coconut	Whole Milk
Hot dog	Cream Cheese
Mayonnaise	Pie Crust
Hamburger	Chocolate bar
Corn oil	Potato chips
Bacon	Butter

Thank you for your help.

Dear Parent/Guardian:

As a part of a study of nutrition you child learned about fat and salt in a fast food meal.

Please go over the following information with your child:

Some foods that are high fat foods at a fast food place are:

French Fries	Mayonnaise
Onion Rings	Special Sauces
Milk Shakes	Cheese
Bacon	Fried Pies
Large Hamburgers	Fried foods of any type

Some foods that are low fat foods at a fast food place are:

Salad	Skim Milk

Ask you child if he/she knows any other low fat foods at a fast food place.

Thank you for your cooperation.

APPENDIX F

RAW DATA

Table F - 1
Background Characteristics for Treatment Group

Sub.	I.D. No.	Age	Sex	Sibling	Family Heart Disease Hist.	Fast Food Meals/Wk	Type Milk
1	01	9	M	2	Yes	1	Skim
2	02	9	M	1	No	1	Whole
3	03	9	F	*	*	*	*
4	04	9	M	1	No	1	Whole
5	05	9	M	2	Yes	2	Whole
6	06	8	M	0	No	2	Whole
7	07	9	F	1	No	0	Whole
8	08	8	M	1	No	2	Whole
9	09	8	M	0	No	2	LowFat
10	10	9	F	1	Yes	0	LowFat
11	11	9	M	2	No	0	Whole
12	12	8	M	*	*	*	*
13	13	9	M	*	*	*	*
14	14	8	F	1	No	1	Whole
15	15	8	M	*	*	*	*
16	16	8	M	3	Yes	1	Whole
17	17	8	F	2	No	1	LowFat
18	18	8	F	1	Yes	1	Whole
19	19	9	F	2	No	2	Whole
20	20	8	F	1	No	2	LowFat
21	21	8	F	1	Yes	0	LowFat
22	22	9	M	0	Yes	1	Whole
23	26	9	M	*	*	*	*
24	27	9	F	1	Yes	3	Lowfat
25	28	8	M	*	*	*	*
26	29	9	M	*	*	*	*
27	30	9	M	2	No	0	Whole
28	31	8	M	1	Yes	1	Whole
29	32	9	F	*	*	*	*
30	33	8	F	1	No	1	Whole
31	34	8	M	1	No	0	Whole
32	35	8	F	2	Yes	0	Whole
33	36	8	F	2	No	1	Whole
34	37	9	F	*	*	*	*
35	38	9	F	*	*	*	*
36	39	8	M	2	No	1	Whole
37	40	9	M	2	No	1	Whole
38	41	9	F	1	No	1	LowFat
39	42	9	F	*	*	*	*
40	43	8	F	1	No	1	LowFat
41	44	8	M	1	Yes	1	LowFat
42	45	8	F	*	*	*	*

*Data not available

Table F - 2
Background Characteristics for Control Group

Sub. No.	I.D. No.	Age	Sex	Sib-ling	Family Heart Disease Hist.	Fast Food Meals/Wk.	Type Milk
1	50	8	M	1	No	1	LowFat
2	51	8	M	1	Yes	0	LowFat
3	52	8	F	1	Yes	1	LowFat
4	53	8	F	1	Yes	1	Whole
5	54	8	F	1	Yes	2	Whole
6	55	8	F	1	Yes	1	LowFat
7	56	8	F	2	Yes	0	Whole
8	57	8	F	1	Yes	1	LowFat
9	58	9	M	3	No	1	LowFat
10	60	8	M	0	Yes	2	Skim
11	61	9	F	3	No	3	LowFat
12	62	8	F	2	No	2	LowFat
13	63	8	F	*	*	*	*
14	64	8	F	1	No	2	Whole
15	65	10	M	2	Yes	0	Whole
16	66	8	M	0	Yes	3	Skim
17	67	9	M	8	No	0	Other
18	68	9	F	1	Yes	1	Whole
19	69	9	F	1	No	1	Whole
20	70	8	F	0	Yes	0	Whole
21	71	10	M	4	No	1	LowFat
22	72	8	M	*	*	*	*
23	77	8	F	1	No	1	LowFat
24	78	8	F	*	*	*	*
25	79	8	F	1	No	1	Whole
26	80	9	M	0	No	0	Whole
27	81	9	M	1	Yes	1	Whole
28	82	8	F	0	No	1	Skim
29	83	9	M	1	Yes	*	LowFat
30	84	8	F	*	*	*	*
31	85	8	F	1	No	1	LowFat
32	86	8	F	*	*	*	*
33	87	9	F	3	No	1	Whole
34	88	9	F	4	Yes	1	Whole
35	89	9	M	0	Yes	0	LowFat
36	90	9	M	2	Yes	0	LowFat
37	91	8	F	0	No	1	LowFat
38	92	8	F	1	No	1	Whole

*Data not available