Order Number 9419156

Nutrient intake and the effectiveness of a community-based nutrition education program in reducing dietary cancer risk in adult Lumbee Indian women in Robeson County, North Carolina

Bell, Ronny Antonio, Ph.D.

The University of North Carolina at Greensboro, 1993

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

NUTRIENT INTAKE AND THE EFFECTIVENESS OF A COMMUNITY-BASED NUTRITION EDUCATION PROGRAM IN REDUCING DIETARY CANCER RISK IN ADULT LUMBEE INDIAN WOMEN IN ROBESON COUNTY, NORTH CAROLINA

by

Ronny Antonio Bell

A Dissertation Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
1993

Approved by

Helen A. Shaw
Dissertation Advisor

BELL, RONNY ANTONIO, Ph.D. Nutrient Intake and the Effectiveness of a Community-Based Nutrition Education Program in Reducing Dietary Cancer Risk in Adult Lumbee Indian Women in Robeson County, North Carolina. (1993) Directed by Dr. Helen A. Shaw. 448 pp.

The purposes of this study were to document: 1) nutrient intakes and eating patterns of adult Lumbee Indian women in Robeson County, North Carolina, and 2) the effectiveness of a community-based, nutrition education program in altering the dietary risk of cancer in these women. In a pilot study, information about eating patterns and the intake of 41 dietary constituents was obtained from 120 Lumbee women in two age categories (21-40 years, 41-60 years). Nutrient intakes were estimated using a 3-day food record, a 24-hour recall and a food frequency questionnaire, while demographic and health and eating habits were determined using an investigator-designed questionnaire. Nutrient intakes were compared to age- and gender-matched data from national surveys (NHANES II and NFCS), and from surveys of other Native American tribes. In an experimental study, a community-based, nutrition education program designed to modify the intake of dietary components associated with increased cancer risk (fat, fiber, and some antioxidant nutrients) was administered to 29 Lumbee women in six weekly sessions. A subset of 20 women from the pilot study served as controls for the experimental study. Lectures, audiovisual presentations, group interaction activities, and a variety of printed materials were included in the intervention program. Pretest, posttest (immediately following the intervention), and post-posttest (3 months following the intervention) nutrient intakes, eating patterns and nutrition knowledge scores of intervention participants were compared to those of controls. Nutrient intakes were measured using a 3-day food record and a food frequency questionnaire; eating patterns were measured using a questionnaire which emphasized fat intake; and nutrition knowledge was measured using an instrument which focused on knowledge of nutrients associated with cancer risk. None of the measured parameters changed significantly following the intervention, although some changes in nutrition knowledge and eating patterns occurred. An increase occurred in the number of participants who removed excess fat from chicken and meat before cooking or eating, and an increase in mean reported intake of fruits and vegetables approached significance at the $p \leq 0.05$ level. A longer, more intensive intervention may be necessary to produce changes in the intake of nutrients associated with cancer risk in healthy Lumbee women.

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro.

Dissertation Advisor Helen A. Shaw

Committee Members [illegible]

Martha L. Taylor

[illegible]

[illegible]

November 22, 1993

Date of Acceptance by Committee

October 20, 1993

Date of Final Oral Examination

PREFACE

"Proud to be a Lumbee Indian,
    Yes I am!
When I grow up into this world, I want to be just
    what I am.
My skin is brown, my hair is black,
    moving forward while I'm looking back.
I can be anything I want to be.

I can be a doctor or a lawyer or an Indian chief,
    Yes I can!
When I grow up into this world, I want to be just
    what I am.
My mother and father are proud of me, they want me to
    be free, to be anything I want to be.

I can be a singer or a writer or a musician, too,
    Yes I can!
When I grow up into this world, I'm gonna travel all
    over this land.
My mother and father are proud of me, they want me to
    be free, to be anything I want to be.

I can be a doctor or a lawyer or an Indian chief,
    Yes I can!
I can be a doctor or a lawyer or an Indian chief,
    Yes I can!
I can be a doctor or a lawyer or an Indian chief,
    Yes I can!"

"Proud to be a Lumbee"
By Willie French Lowery
Willie French Lowery Publishing, BMI 1977-1979
Copied with Permission

ACKNOWLEDGMENTS

Such an endeavor as this cannot be accomplished alone, certainly not to any degree of success. It is with the greatest of humility that I acknowledge and give praise to the following people who made this project possible, and, believe it or not, sometimes quite fun:

--To my lovely wife, Natalie, and our children, Stephen and Benjamin: for their patience, encouragement, emotional and spiritual support, and their belief that I could make it to the end;

--To my parents, Mr. and Mrs. James F. Bell, and to my brothers, Joey and Greg, and the rest of my extended family: for bringing me up in a Christian environment, for their financial and moral support, and for allowing me to disrupt their lives with my petty requests during this project;

--To my in-laws, Mr. and Mrs. Archie "Mack" Priest, Archie Priest, Jr., Allison, Buddy, Hannah and Joshua Caviness, and the rest of the "Trogdon gang": for love, inspiration, fishing, hunting, good food, for believing in me when they had absolutely no reason to and for turning me into a diehard conservative Republican;

--To Dr. Mark Dignan, Sharon Johnson, Karen Blinson, John Summerson, Wendy Nace, Carol Thomas, and the rest of the staff in the Department of Family Medicine at Bowman Gray School of Medicine: for taking a chance on me, for putting up with my silly questions, for making a dream come true for me and my family, for being my friend;

--To Dr. Helen Shaw and the Faculty and Staff of the Department of Foods and Nutrition at the University of North Carolina at Greensboro: for not giving up on me when they had every reason to, for pushing me when I didn't know if I wanted to go any further, for giving me more of themselves than I truly deserved;

--To Jan Poole, for technical expertise;

--To the people of Robeson County ("back home"), Mr. James Hardin and the Lumbee Regional Development Association, Dr. Stanley Knick, Thomas Maynor, the staff of the Robeson County Health Care Corporation, Clyde McMillan, and the participants in this project: for their time, efforts and understanding in making this project possible;

And, finally, to our Lord Jesus Christ, the Maker and Sustainer of all things, the First and the Last, the Good Shepherd, the Lamb of God, the Son of God and Son of Man, the Great I Am.

TABLE OF CONTENTS

	Page
APPROVAL PAGE	ii
ACKNOWLEDGMENTS	iii
LIST OF TABLES	vii
CHAPTER	
I. INTRODUCTION	1
II. REVIEW OF LITERATURE	10
Nutrition and Health Research Among Native Americans	14
Diet and Cancer	23
Dietary Intervention and Cancer	27
Nutrition Education Strategies for Research Among Native Americans	34
Dietary Data Collection	36
Summary	40
III. METHODS	43
Pilot Study	45
Experimental Study	56
Data Analysis	65
Summary of Methodology	67
IV. RESULTS	69
Pilot Study	69
Experimental Study	95
V. DISCUSSION	172
Pilot Study	174
Experimental Study	181
Summary	188
Further Research	189
BIBLIOGRAPHY	191

Page

APPENDICES

Appendix A.	Telephone Protocol..................	207
Appendix B.	Letter to Potential Subjects........	210
Appendix C.	Letter to Nonresponders.............	213
Appendix D.	Lifestyle/Health Awareness Questionnaire.......................	215
Appendix E.	24-Hour Dietary Recall..............	221
Appendix F.	Health Habits and History Questionnaire.......................	223
Appendix G.	3-Day Dietary Record................	228
Appendix H.	Reminder Letter.....................	231
Appendix I.	Thank-You Letter....................	233
Appendix J.	Lumbee Nutrition Study Apple Magnet.............................	235
Appendix K.	Personal Dietary Analysis...........	237
Appendix L.	Eating Patterns Questionnaire.......	243
Appendix M.	Nutrition Knowledge Test............	248
Appendix N.	Materials Used for Nutrition Education Class.....................	254
Appendix O.	Data Collection Tables..............	264
Appendix P.	Results of Barriers Survey..........	439
Appendix Q.	Results of Nutrition Education Class Evaluation....................	441
Appendix R.	Results of Nutrition Education Class and Materials Evaluation............	443
Appendix S.	Human Subjects Consent Forms........	446

LIST OF TABLES

Table		Page
1	Research Design Periods	44
2	Research Protocol: Pilot Study	46
3	Research Protocol: Intervention Study	57
4	Experimental Study	58
5	Outline of Intervention Sessions	59
6	Major Characteristics of Lumbee Pilot Participants	70
7	Dietary Constituents for Which Significant Differences were Found Between Instruments for Lumbee Pilot	74
8	Estimated Daily Consumption of Energy, Total Protein, Total Carbohydrates and Total Fat by Instrument and Age Group for Lumbee Pilot Phase Participants	75
9	Estimated Daily Consumption of Percent Calories from Energy Macronutrients by Instrument and Age Group for Lumbee Pilot Phase Participants	76
10	Estimated Daily Consumption of Cholesterol, Saturated Fat and Dietary Fiber by Instrument and Age Group for Lumbee Pilot Phase Participants	77
11	Estimated Daily Consumption of Antioxidant Nutrients by Instruments and Age Group for Lumbee Pilot Phase Participants	78
12	Dietary Constituents for Which Significant Differences were Found Between Age Groups for Lumbee Pilot Phase Participants	82
13	Summary of Significant Age Differences by Instrument for _t_ Test and ANOVA Comparisons for Lumbee Pilot Participants	84

Table		Page

Table		Page
14	Comparison of Lumbee Pilot Data with Dietary Recommendations and Other Native American Nutritional Studies.................	87
15	Reported Weekly Servings of Foods Obtained from the Food Frequency Questionnaire for Lumbee Pilot Phase Participants..............	90
16	Responses to Eating Habits Questions from Food Frequency Questionnaire by Lumbee Pilot Phase Participants....................	92
17	Responses to Eating Habits Questionnaire from Lifestyle/Healthy Awareness Questionnaire by Lumbee Pilot Phase Participants................................	93
18	Characteristics of Lumbee Control and Intervention Participants....................	98
19	Pretest Estimated Daily Consumption of Energy, Total Protein, Total Carbohydrates and Total Fat by Instrument for Lumbee Control and Intervention Participants........	100
20	Pretest Estimated Daily Consumption of Percent Calories from Macronutrients by Instruments for Lumbee Control and Intervention Participants....................	101
21	Pretest Estimated Daily Consumption of Cholesterol, Saturated Fat and Dietary Fiber Intake for Lumbee Control and Intervention Participants....................	102
22	Pretest Estimated Daily Consumption of Antioxidant Nutrients by Instruments for Lumbee Control and Intervention Participants................................	103
23	Pretest Dietary Constituents for Which Significant Differences were Found Between Instruments for Lumbee Control and Intervention Participants....................	105
24	Pretest Dietary Constituents for Which Significant Differences were Found Between Groups for Each Instrument for Lumbee Control and Intervention Participants........	106

Table		Page

25	Pretest Reported Weekly Servings of Foods Obtained from the Food Frequency Questionnaire for Lumbee Control and Intervention Participants....................	108
26	Pretest Responses and Mean Responses to Questions from Nutrition Knowledge Test for Lumbee Control and Intervention Participants.................................	109
27	Pretest Comparison of Responses and Mean Responses to the Eating Patterns Questionnaire for Lumbee Control and Intervention Participants.................................	114
28	Posttest Estimated Daily Consumption of Energy, Total Protein, Total Carbohydrates and Total Fat for Lumbee Control and Intervention Participants....................	123
29	Posttest Estimated Daily Consumption of Percent Calories from Energy Macronutrients for Lumbee Control and Intervention Participants.................................	124
30	Posttest Estimated Daily Consumption of Cholesterol, Saturated Fat and Dietary Fiber for Lumbee Control and Intervention Participants.................................	125
31	Posttest Estimated Daily Consumption of Antioxidant Nutrients for Lumbee Control and Intervention Participants................	126
32	Dietary Constituents for Which Significant Differences were Found Between Pretest and Posttest 3-Day Food Record Measurements for Lumbee Control and Intervention Participants.................................	127
33	Pretest and Posttest Responses and Mean Responses to Questions from Nutrition Knowledge Test for Lumbee Control and Intervention Participants....................	129
34	Post-Posttest Estimated Daily Consumption of Energy, Total Protein, Total Carbohydrates and Total Fat for Lumbee Control and Intervention Participants....................	135

Table		Page

35 Post-Posttest Estimated Daily Consumption of Percent Calories from Energy Macronutrients for Lumbee Control and Intervention Participants.................................. 136

36 Post-Posttest Estimated Daily Consumption of Cholesterol, Saturated Fat and Dietary Fiber for Lumbee Control and Intervention Participants.................................. 137

37 Post-Posttest Estimated Daily Consumption of Antioxidant Nutrients for Lumbee Control and Intervention Participants................ 138

38 Dietary Constituents for Which Significant Differences were Found Between Pretest and Post-Posttest 3-Day Food Record Measurement for Lumbee Control and Intervention Participants.................................. 139

39 Dietary Constituents for Which Significant Differences were Found Between Pretest and Post-Posttest Food Frequency Questionnaire Measurements for Lumbee Control and Intervention Participants.................... 140

40 Post-Posttest Reported Weekly Servings of Food Obtained from the Food Frequency Questionnaire for Lumbee Control and Intervention Participants.................... 142

41 Pretest and Post-Posttest Responses to Eating Habits Questions from Food Frequency Questionnaire by Lumbee Control and Intervention Participants.................... 143

42 Summary of Significant Differences Using Repeated Analysis ANOVA for Lumbee Control and Intervention Participants................ 145

43 Pretest, Posttest and Post-Posttest Responses and Mean Responses to Questions from Nutrition Knowledge Test for Lumbee Control and Intervention Participants................ 152

44 Pretest and Post-Posttest Comparison of Responses and Mean Responses to the Eating Patterns Questionnaire for Lumbee Control and Intervention Participants................ 160

Table		Page
O- 1	Demographic and Food Habits Information from the Lifestyle/Health Awareness Questionnaire and Food Frequency Questionnaire for Pilot, Control and Intervention Subjects........................	265
O- 2	Estimated Mean Daily Consumption of Energy, Macronutrient, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments and Age Groups for Lumbee Pilot Phase Participants...........................	273
0- 3	_t_ Test Comparisons of Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Age Groups for Each Instrument for Lumbee Pilot Phase Participants...........................	278
0- 4	_t_ Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments for Lumbee Pilot Phase Participants................................	285
0- 5	_t_ Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments and Age Groups for Lumbee Pilot Phase Participants...........................	290
0- 6	Comparison of Statistical Analyses by Age Group and Instrument for Lumbee Pilot Participants................................	299
0- 7	Reported Weekly Servings of Foods by Age Group Obtained from the Food Frequency Questionnaire for Lumbee Pilot Phase Participants................................	304
0- 8	Estimated Mean Daily Pretest Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments for Lumbee Control Participants................................	306

Table | Page

Table		Page
0- 9	Estimated Mean Daily Pretest Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments for Lumbee Intervention Participants....................	310
0-10	Pretest _t_ Test Comparisons of Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Age Groups for Each Instrument for Lumbee Control Participants.........................	315
0-11	Pretest _t_ Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments for Lumbee Control Participants................................	322
0-12	Pretest _t_ Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments and Age Groups for Lumbee Control Participants..................	327
0-13	Pretest _t_ Test Comparisons of Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Age Groups for Each Instrument for Lumbee Intervention Participants....................	336
0-14	Pretest _t_ Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Vitamins and Minerals by Instruments for Lumbee Intervention Participants................................	343
0-15	Pretest _t_ Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Vitamins and Minerals by Instruments and Age Groups for Lumbee Intervention Participants................................	346

Table		Page

0-16	Pretest _t_ Test Comparisons for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Group for Each Instrument for Lumbee Control and Intervention Participants........	351
0-17	Pretest Reported Weekly Servings of Foods Obtained from the Food Frequency Questionnaire for Lumbee Control and Intervention Participants....................	356
0-18	Pretest Responses to Questions from Nutrition Knowledge Test for Lumbee Control and Intervention Participants................	358
0-19	Pretest Responses to Questions from Eating Patterns Questionnaire for Lumbee Control and Intervention Participants................	362
0-20	Posttest Estimated Mean Daily Consumption and _t_ Test Comparison of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals for Lumbee Control and Intervention Participants.................................	370
0-21	_t_ Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals for Lumbee Control and Intervention Participants.................................	374
0-22	Posttest Responses to Questions from Nutrition Knowledge Test for Lumbee Control and Intervention Participants................	378
0-23	Pretest and Posttest Responses to Questions from Nutrition Knowledge Test for Lumbee Control and Intervention Participants........	382
0-24	Post-Posttest Estimated Mean Daily Consumption and _t_ Test Comparison by Group for Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals for Each Instrument for Lumbee Control and Intervention Participants........	387

Table | Page

0-25 *t* Test Comparisons and Correlations Between Pretest and Post-Posttest Times for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments for Lumbee Control and Intervention Participants.................... 391

0-26 *t* Test Comparisons and Correlations Between Posttest and Post-Posttest 3-Day Food Records for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals for Lumbee Control and Intervention Participants................................ 398

0-27 Post-Posttest Reported Weekly Servings of Foods and Eating Habits Questions Obtained from the Food Frequency Questionnaire for Lumbee Control and Intervention Participants................................ 402

0-28 *t* Test Comparisons and Correlations by Time for Mean Estimated Weekly Servings of Foods Obtained from the Food Frequency Questionnaire for Lumbee Control and Intervention Participants................................ 405

0-29 Repeated Analysis Comparison of 3-Day Food Records for Pretest, Posttest and Post-Posttest for Lumbee Control and Intervention Participants................................ 408

0-30 Repeated Analysis Comparison of Food Frequency Records for Pretest and Post-Posttest for Lumbee Control and Intervention Participants................................ 413

0-31 Pretest, Posttest and Post-Posttest Responses to Questions from Nutrition Knowledge Test for Lumbee Control and Intervention Participants................................ 418

0-32 Pretest and Post-Posttest Responses to Questions from Eating Patterns Questionnaire for Lumbee Control and Intervention Participants................................ 425

CHAPTER I

INTRODUCTION

The Lumbee Indians are a nonreservation tribe of approximately 40,000, whose traditional homeland is largely encompassed by Robeson County, in the southeastern portion of North Carolina. The county is predominantly rural, with strong agricultural (tobacco, soybeans, corn) and industrial (Converse shoes, Campbell's soup, hosiery mills, etc.) influences. The racial composition of this area is almost equally divided among blacks, whites and Lumbees. As reported in the 1990 census, persons in Robeson County who indicated race as American Indian accounted for 38% of the county's population (personal communication, Robeson County Chamber of Commerce, March, 1992). The Lumbees are one of eight tribes in North Carolina, along with the Cherokee (the only federally recognized tribe in the state), Coharie, Eno-Occaneechi, Haliwa-Saponi, Meherrin, Tuscarora (also located in Robeson County), and Waccamaw-Siouan tribes.

The Lumbee people are unique among most Native Americans in that they, for the most part, exhibit predominantly traditional European customs (language, dress, agricultural practices, Christian religion, etc.), and have done so for most of their documented history

(Dial & Eliades, 1972). Although the Lumbee people operate as a tribe and have some physical features that are characteristic of other Native Americans, no remnants of a Lumbee language exist, and traditional Native cultural and spiritual practices remain as a small part of the mainstream Lumbee culture and religion.

As a native and former resident of the Lumbee community, it is the writer's observation that food consumption among the Lumbees is reflective of the typical Southern diet. Due to the rich soil and moderate climate, many Lumbee people rely on personal gardens as a major source of fruits (cantaloupe, watermelon) and vegetables (corn, peas, beans, squash, tomatoes, cucumbers, potatoes, cruciferous vegetables). To a lesser extent, livestock (chickens, pigs, cows) are used as a food source. Other common foods consumed in this population include collard greens, "fatback", cornbread, banana pudding, and chicken with pastry.

Unlike many other Native American tribes, the Lumbees do not have access to services provided by the Indian Health Service (IHS). Consequently, information pertaining to health and nutrition is dispensed in this population through the typical routes: media, public health clinics, hospitals, and private health practitioners. Social, economic and educational services are provided by the Lumbee Regional Development Association (LRDA), the primary tribal administrative organization for the Lumbee people.

According to data gathered by the North Carolina Department of Human Resources for the North Carolina Commission of Indian Affairs (Surles, 1982, 1985), the following can be said about the health and well-being of Native Americans in North Carolina as related to deaths from chronic disease:

1. While the overall death rate from all forms of cancer is low among Native Americans in comparison to the statewide rate (179.9/100,000 vs. 332.7/100,000), deaths from cancer as a percentage of all deaths in the North Carolina Native American population increased by one-third between 1977 and 1983;

2. Among Native American adults ages 18-64, the rates of death from diabetes (36.0/100,000) and atherosclerosis (5.5/100,000) are higher than the rates for these diseases in the North Carolina population as a whole (24.4/100,000 and 3.6/100,000, respectively). This disparity is also prevalent for adults over 65 years of age in this population (atherosclerosis: 496.4/100,000 vs. 264.3/100,000; diabetes: 438.0/100,000 vs. 261.4/100,000).

Surles (1982, 1985) also reported that Native Americans in North Carolina (of which Lumbees comprise approximately 55%) are less economically and educationally inclined compared to Caucasians in the state. Approximately 27.9% of North Carolina Native Americans had family incomes at or below the poverty level, versus 10.0% of the Caucasian population. Additionally, only 41.6% of Native American males and 44.3% of Native American females in the state had obtained a high school degree (compared to 60.9% and 60.7% of Caucasian males and females, respectively).

Specific health-related data on Lumbee Indians in Robeson County are not readily available, and little research in the area of nutrition and health has been conducted in this population. In the Lumbee Child Health Project (Knick, 1986), baseline verbal and written information (anthropometry, health and nutrition characteristics) was collected from school-aged Lumbee boys and girls. However, no intervention was implemented as a part of the project. Presently, Dignan and coworkers (personal communication) are conducting a cervical cancer awareness and prevention project with Lumbee Indian women in Robeson County, which increased the possibility for implementation of the current study.

The relationship between cancer and environmental factors, including diet, is well documented in the general population (Boutwell, 1988). Specifically, a diet high in fat and/or low in fiber, which is characteristic of the traditional Southern diet, is believed to be a risk factor for cancer. Other nutrients, such as vitamins A, C and E, have been implicated as having a protective role against cancer incidence. Accordingly, organizations such as the National Cancer Institute (NCI) (1984), the National Research Council (NRC) (1982) and the American Cancer Society (ACS) (1988) have issued recommendations for lowering the dietary risk of developing cancer. These recommendations have been used to encourage the public to make dietary changes that could reduce the dietary risk believed to be associated with the development of cancer.

The lack of research data on Lumbee Indians makes it difficult to generate specific relationships between diet and health in this population. The belief that the typical Lumbee diet is low in fiber and high in fat, which is reflective of the Southern diet in the United States, leads to the supposition that this population may be at risk for cancer development. Nutrition education strategies aimed at Lumbees in Robeson County should focus on these aspects and should be modeled to affect change among those in the population who are primarily responsible for food purchasing and preparation. Since it is assumed, based on personal observations, that women in this culture have this responsibility, dietary programs conducted for Lumbees in Robeson County would be most effective if directed at females. Additionally, targeting an educationally and economically repressed community for cancer risk reduction education is consistent with the advice of Cotugna and coworkers (1992).

This research was designed to collect data on the dietary intake of Lumbee Indian women in order to document consumption of nutrients and other dietary factors believed to contribute to cancer. In addition, this research explored the effectiveness of a group-based education program in modifying the selection of food items from specific food groups and the dietary intake of nutrients believed to contribute to the risk of cancer. Two studies were conducted: 1) a pilot study to determine typical dietary intake of this subpopulation and to select dietary intake instruments appropriate for this population; and 2) an experimental study to implement a community-oriented nutrition education program aimed at reducing the dietary risks associated with the development of cancer.

One hundred twenty Lumbee Indian women were recruited to participate in the pilot study. Specifically, the aims of the pilot study were as follows:

1. To estimate the daily number of servings of fruits, vegetables, grain products, dairy products, red meats, poultry and fish, and fats.

2. To estimate intakes of daily dietary calories; fat, including total intake of fat, percent of dietary calories from fat, and

saturated/unsaturated fat ratio; micronutrients, including vitamins A, C and E and fiber.

3. To select the most appropriate dietary intake instrument(s) for this subpopulation from among a 24-hour recall, a food frequency questionnaire, and a 3-day food record.

In the experimental study, 29 Lumbee Indian women were recruited to participate in a culturally-sensitive, six-week nutrition education program designed to lower the dietary risk of cancer. Participants were exposed to a variety of educational strategies, including oral presentations, print materials, and audiovisuals. The content of the program was consistent with recommendations made by national organizations (NCI, ACS) for lowering the risk of cancer associated with dietary factors. Forty one of the pilot study subjects served as controls for the 29 subjects in the experimental study.

Pretest dietary intake data were compared between the two subject groups (control and intervention), as well as to national nutritional survey data (NHANES, NFCS), dietary data from similar Native American nutritional studies, and Recommended Dietary Allowances (RDA). Instruments used to obtain dietary data were those determined in the pilot phase as most appropriate for this population. Pre- and posttest dietary data for the intervention and control groups were analyzed to determine the effect of the intervention on nutrient intake and food selection habits. Pre- versus posttest comparisons of control subjects were reviewed to account for seasonal variations in food consumption, as well as any other non-controlled factors which may have affected dietary habits in this community during this research.

The design of the proposed research provided information to test the following hypotheses:

1. The typical diet of Lumbee Indian women in Robeson County, North Carolina, is low in dietary fiber and some micronutrients, and high in total calories, total fat, and percent of calories from fat, in comparison to guidelines established by the National Cancer Institute, the American Cancer Society, and the National Research Council (Recommended Dietary Allowances);

2. A community-based, culturally-sensitive educational intervention session designed to promote specific modifications in dietary intake that can lower cancer risk will result in favorable (increases or decreases as appropriate) changes in intake of targeted foods and nutrients.

The current project was designed to address the longstanding need for documentation of dietary practices among Native Americans. This research was ground-breaking in that it is the first to provide specific documentation of nutrient intakes among Lumbee Indians in Robeson County. Other studies have measured dietary intakes in other tribes in North Carolina, specifically the Cherokee

(Story, Tompkins, Bass, & Wakefield, 1986) and Waccamaw-Siouan (Harland, Smith, Ellis, O'Brien, & Morris, 1992) tribes, but none have focused on the Lumbees. This study generated information on both short-term and long-term dietary habits and nutrient intake within this population. Specific attention was given to understanding dietary practices in this population by focusing on usual intake of those foods (fruits and vegetables, grains, meats, dairy products, fats) and nutrients (total intake of calories, fat, dietary fiber and vitamins A, C and E) believed to have some connection with the development of cancer in the general population.

A second area addressed by this study was the effectiveness of a nutrition education program emphasizing the relationship between diet and cancer and the documentation of changes in dietary intake related to exposure to pertinent dietary information. Therefore, this study estimated the effectiveness of a group-based educational intervention in generating change in food selection and nutrient consumption among Lumbee women in Robeson County. The intervention, conducted in the Lumbee community, was the first known assessment of a dietary intervention designed to promote specific changes in eating habits of this population.

CHAPTER II

REVIEW OF LITERATURE

The following is a review of the literature pertinent to this research. Topics which are included in this discussion are: nutrition and health research among Native Americans, a review of the proposed relationship between diet and cancer, intervention studies targeting dietary cancer risk, nutrition education strategies for research among Native Americans, and dietary data collection methodology. A brief description of the history and the present status of the Lumbee people is also included in this review.

Robeson County is located in the southeastern portion of North Carolina, approximately 70 miles from the Atlantic coastline. It is the largest county in the state (950 square miles), and ranks 13th out of 100 North Carolina counties with a population of approximately 105,000 people. The racial composition of the county is divided among white (36%), black (25%) and Indian (39%) races. The county is known for its rich agricultural tradition (tobacco, soybeans, corn) but has also benefitted from an influx of manufacturing industries (Converse shoes, Campbell soup, Boise Cascade containers, etc.) over the past 30 years. There are 29 townships in the county, ranging in population size from 18,600 (Lumberton, the county seat), to only 750 (Shannon) (information provided by the Robeson County Chamber of Commerce and the Lumbee Regional Development Association, March, 1992).

Robeson County is presently the central location of two of North Carolina's eight Indian tribal groups: the Tuscarora and the Lumbee. The Lumbee tribe, approximately 40,000 in number, is the largest Native American tribe east of the Mississippi River, and the fifth largest in the nation (information provided by the Lumbee Regional Development Association, March, 1992). The origins and history of this group of people are of considerable interest and controversy among historians and archaeologists.

As early as 1730, Scottish settlers in the New World came upon an isolated group of people along the banks of the Lumber River who had physical features of Indians but exhibited an unusual grasp of English language and customs. Some historians, including Dial (1975), a Lumbee and a native of Robeson County, have proposed that this group of people descended from a "mixed breed" of the Lost Colony settlers of Roanoke Island (circa 1585) and the Hatteras tribe of Chief Manteo, who traveled south to their present location. Evidence for this theory includes oral tradition from the mid-1800's, as well as the similarity of surnames (Jones, Brooks, Sampson, Chavis) between those recorded by the Roanoke settlers and those presently prominent among Lumbees.

Hamilton MacMillan, a Robeson County historian and member of the North Carolina General Assembly, successfully petitioned the state in 1885 to recognize this group as "Indians", to be called "Croatans of Robeson County" (Woods, 1984). The name "Croatan" refers to the original location of the Hatteras tribe in Roanoke. This formal designation gave the Robeson Indians a legal name (as opposed to former classifications of "mulatto" or "free persons of color") and a right to their own schools (Blu, 1980).

More recently, archaeologists such as Knick (personal communication, April 1992) have expanded on theories of Lumbee origins to conclude that Native American tribal groups inhabited the Lumber River area prior to English settlement in the New World. The territory was subsequently infiltrated by small bands of people from the Siouan language family (Cheraw, Saponi, Waccamaw, etc.), to which some Lumbees trace their lineage, and the Iroquoian language family, to which the Tuscaroras of this area trace their roots.

Another theory of Lumbee origin suggests the movement of Cherokees of the Iroquoian language family into the Lumber River region (Dial & Eliades, 1975). This movement is believed to have occurred sometime during the early years of the Tuscarora Wars of 1711. The "Indians of Robeson County" (so named by the State Legislature in 1911) were renamed "Cherokee of Robeson County" in 1913 (Woods, 1984). Although archaeological evidence suggests that the word "Lumbee" was in use by Indian people at least as far back as early 1800s (Knick, 1992), the designation of a people group as "Lumbee" was not made official by the State Legislature until 1953 (Smith, 1990).

Today, the Lumbee people, despite a lack of full recognition by the federal government (in 1956, the U. S. Congress passed the Lumbee Act which legally recognized Lumbees as Indians, but prohibited them from services performed by the United States; Dial & Eliades, 1975), enjoy a relatively high degree of political, economical and educational prosperity. Lumbees count among their numbers health professionals, lawyers and judges, regional and state politicians, and college professors. Other notable accomplishments by the Lumbees include the first Native American mayor in the U.S. and the first Indian Normal school in the U.S. (presently Pembroke State

University). At this writing, the Lumbees are continuing in their century-long efforts to obtain full recognition from the U. S. government.

A majority of Robeson County's Lumbees reside in or around the township of Pembroke, the location of Pembroke State University and the Lumbee Regional Development Association, a state-chartered tribal government organization. Pembroke has an all-Lumbee Town Council, Mayor, and Town Manager. The present chancellor of Pembroke State University, one of 16 schools in the University of North Carolina system, is also a Lumbee (Lumbee Regional Development Association, 1990).

Nutrition and Health Research Among Native Americans

In the latter part of the 20th century, Native American tribes have experienced increasing rates of chronic diseases such as cardiovascular disease and noninsulin-dependent diabetes mellitus (NIDDM) (Berg, 1990). A major risk factor of these diseases is obesity, which is also increasing in frequency in this population. Estimated prevalence of overweight in American Indian adults is approximately 10% higher in males and 15% higher in females in comparison to the overall U.S. rate (Broussard, Johnson, Himes, Story, Fichtner, Hauck, Bachman-Carter, Hayes, Frohlich, Gray, Valway, & Gohdes, 1991). The Pima tribe of Arizona, for example, has an extremely high rate of obesity (over 60% for both men and women), and the highest reported prevalence of NIDDM of any ethnic group in the world (McGinnis & Ballard-Barbash, 1991). The relationship between these two diseases has been studied extensively in the Pima population (Broussard, et al, 1991).

A number of factors have been suggested as influencing such changes in the health of American Indians. Knowler (1981) implicated the adoption of a sedentary lifestyle and increased calorie consumption from commodity foods (commonly distributed on reservations) and other "Western" foods. Some surplus commodity foods such as cheese, milk, butter and lard are high in calories and fat. Neel (1962) introduced the classic "thrifty gene hypothesis" intimating that obesity, insulin resistance, and diabetes result from an abundant, continuous food supply to people who have developed an efficient energy-storage capability from centuries of feast-famine cycles. Canadian researchers, in a variation of this hypothesis, blame the "New World Syndrome" on the natural selection of fat storage as a survival mechanism in response to rapid social, dietary and physical activity changes (Young & Sevenhuysen, 1989).

Nutrient consumption has been documented in only a few Native American tribes in the U.S. Teufel and co-workers (1990), conducted seven consecutive 24-hour recalls in a comparison of nutrient intake and food patterns in 14 obese and 14 nonobese Hualapai Indian women in Arizona. Calorie consumption was significantly higher for the obese women, primarily as a result of consumption of foods high in carbohydrates such as sweetened beverages and grain products. Pooled intake of calories, total fat and carbohydrates in this sample were higher than that observed in a similar study conducted among Seminoles (n=54) (Mayberry & Lindeman, 1963) and lower than that seen in a study of 277 Pima Indian women (Reid, Fullmer, Pettigrew, Burch, Bennett, Miller, & Whedon, 1971). Compared to 94 Sioux women on the Standing Rock Reservation in South Dakota (Bass & Wakefield, 1974), mean energy intake was 42% higher (2,602 vs 1,497) in the Hualapai sample. Percent of calories from fat was lower in the Hualapai sample (35.0%) compared to the Pima (44.1%), Seminole (44.1%) and Standing Rock (37%) samples.

Wolfe and Sanjur (1988) documented intake of Navajo women who were receiving assistance through the USDA Food Distribution Program, which provides commodity foods and nutrition education to eligible families. Although 63% of the 107 women interviewed were overweight, mean energy intake measured from 24-hour recalls was 82% of the 1980 Recommended Dietary Allowance (RDA). Mean intake of percent calories from fat was approximately 31%, with the majority of the fat being in the form of saturated fat. Also, mean intake of vitamins A and C was well below the RDA, with commodity foods having little impact on consumption of these nutrients.

Buckley and co-workers (1992) collected 24-hour recall information from Pueblo and Navajo women in Albuquerque, New Mexico, who attended a local Indian Health Service Hospital during the latter portion of 1990. Analyses were subdivided between those women who had cervical dysplasia (cases, n = 42) and those with normal cervical cytologies (controls, n = 58). Mean intake of calories (2,405 vs 2,247, respectively) and percent calories from fat (39% vs 36%, respectively) were similar for both groups. The authors also discovered no significant difference in intake of targeted nutrients (retinol, carotenoids, folacin, vitamin C and vitamin E). However, the authors concluded that, when data were stratified for level of intake (low vs. high), women with low intake of vitamin C, vitamin E and folacin were at increased risk for cervical dysplasia according to unadjusted odds ratios.

Wilson and co-workers (1989) conducted a community-based weight reduction program on the Zuni and Pine Hill reservations in New Mexico as part of the "Eat Right" New Mexico campaign to promote health and disease prevention. Participants in the study (n = 249; 218 female, 31 male) received an educational packet consisting of five nutrition and health messages and were encouraged through diet modification and exercise to lose a pre-established amount of weight (5 pounds) in 10 weeks. Incentives (t-shirts, lapel pins, etc.) were provided for those who displayed high levels of participation and goal achievement. Local coordinators were instrumental in the development and flow of the project. One hundred twenty-three subjects (49%, 99 female, 24 male) achieved the minimum weight-loss goal after the completion of the 10-week program. Those who reached their weight-loss goal ("goal weight achievers") were also more likely to indicate making certain dietary modifications (cutting down on cream/ice cream, eating unsweetened foods for breakfast, buying bread made with whole wheat and increasing the amount of vegetables in the diet) compared to those who did not reach their weight-loss goal ("nongoal achievers").

At present, the Strong Heart Study (Lee, Welty, Fabsitz, Cowan, Le, Oopik, Cucchiara, Savage, & Howard,

1990) is being conducted among members of tribes in Arizona (Pima/Maricopa), the Dakotas (Cheyenne River Sioux, Devil's Lake Sioux and Oglala Sioux) and Oklahoma (Apache, Caddo, Comanche, Delaware, Fort Sill Apache, Kiowa and Wichita). The study is being administrated and funded by the National Heart, Lung, and Blood Institute (NHLBI) (Fackelmann, 1992). Morbidity and mortality data, along with clinical examinations, will provide estimates of previous and current incidence and risk of cardiovascular disease. The clinical portion of the study will include a 24-hour recall and food frequency questionnaire to determine usual intake of fat, calories and cholesterol.

The National Cancer Institute (NCI) began a four-year program in 1990 to identify cancer research needs among American Indians and Alaska Natives (Dresser & Burhansstipanov, 1993). A series of publications is presently being produced with Native American consultants which will be designed to assist researchers in developing and implementing cancer research among Native Americans in accordance with the health objectives of the Department of Health and Human Services (DHHS) Healthy People 2000 Report. The publications will also address the unavailability of high-fiber, low fat foods for participants in USDA Food Distribution Programs on Indian

Reservations, along with recommendations for including low fat protein foods, nutrient-dense foods and high fiber foods.

The majority of research involving Native Americans in North Carolina has been of a historical, archaeological or sociological nature. More recently, efforts have been made to document the health status and nutritional intake of these peoples. Story and co-workers (1986) conducted anthropometric and dietary investigations among Eastern Band Cherokee teenagers on the Cherokee Reservation in western North Carolina. The researchers observed significantly higher values for mean body weights, body mass indexes and tricep skinfolds for males and females compared to age- and gender-matched groups from national surveys (National Health Examination Survey, National Health and Nutrition Examination Survey). The diets of these teenagers were found to be low in iron, calcium, vitamin A and ascorbic acid with no unusual pattern of calorie and snack consumption.

Knick (1986) examined the health and eating patterns of school-aged Lumbee children in Robeson County. Information regarding availability of food, types of foods consumed and food preparation techniques was obtained from 2,048 children and their parents to gain an understanding of the relationship of these variables to general mental and physical health in Lumbee children. Of those parents who participated in the survey, Knick found that 86% believed that food consumption affected growth, and 87% expressed interest in learning about a more healthy diet. A large portion of the sample (82%) had a vegetable garden, while many fewer owned livestock (22%). Frying was listed as the most common means of food preparation (42%), although 35% stated that they used a variety of cooking methods.

Horner (1990) investigated the cancer mortality rates of Native Americans in North Carolina in the 1968-72 and 1978-82 time periods. He observed that the experience of cancer mortality in this population is similar to that of Native Americans across the nation, with "lower than expected mortality from cancers of all sites, respiratory and intrathoracic cancers, and cancers of the female breasts, but a higher than expected mortality for cancer of the cervix and uteri" (p. 941). This phenomena, suggested the author, is more specifically related to environmental factors than to genetics. Horner, as well as other researchers (Frost, Taylor, & Fries, 1992), have implicated that racial misclassification may explain the low rates of cancer mortality in Native Americans in comparison to the general U. S. population.

Harland and co-workers (1992) collected nutrient intake information using food frequency questionnaires from African-American, Caucasian, and Siouan Indian residents of Columbus County, North Carolina (which borders Robeson County to the east). Of the 291 participants in the study, 146 were African-American, 56 were Siouan Indian and 89 were Caucasian, and all were between the ages of 18 and 87 years. Dietary information was collected in the subjects' homes by a local high school home economics teacher and her daughter. The authors discovered the following from the Siouans in their study:

(1) eleven of 56 subjects (approximately 20%) were obese (four of 35 males, seven of 21 females); only four were classified as overweight (four males, no females);

(2) males consumed approximately 44 percent of their calories in the form of fat, while females consumed approximately 47%;

(3) males consumed approximately 15 grams of dietary crude fiber per day, while females consumed approximately 8 grams per day;

(4) intake levels of vitamins A and C were higher than the RDA for both males and females for all ages.

The authors concluded the study by giving the participants an analysis of their diet based on the RDA, and suggestions for dietary improvement. Although no concerted effort was made to formulate a dietary intervention program, a pamphlet published by the USDA ("The Dietary Guidelines for Americans") was given to each subject. The authors concluded that a well-designed nutrition education program would be beneficial for this population.

Diet and Cancer

Interaction between a number of environmental elements, including tobacco use, exposure to radiation and industrial pollutants, viruses, as well as diet, and other lifestyle factors account for the large majority of incidences of cancer in the U.S. (Committee on Diet and Health, National Research Council, 1989). Wynder and Gori (1977) estimate that 40% of cancers in men and 60% of cancers in women are attributable, to some degree, to dietary factors. It is generally regarded, based on estimates from a variety of epidemiological studies, that as much as 35% of all deaths due to cancer are related to diet, with a minimum of 10% to a maximum of 70% (Doll & Peto, 1981). Particular dietary factors have been implicated in cancer incidence, including high intake of fat and calories, and low intake of dietary fiber, and vitamins A, C and E.

The relationship between cancer and dietary intake of fat and total calories has been one of interest to researchers for several decades. Although the mechanism is unclear, it is believed that these two dietary components have independent effects on the onset and progression of cancer (Rogers & Longnecker, 1988; Schatzkin, Greenwald, Byar, & Clifford, 1989). In addition, investigators have shown that excess body weight or obesity, which typically accompanies a high-fat, high-calorie diet, increases the risk of cancer in several body sites, including the breast, endometrium, ovaries, colon, rectum, prostate and gall bladder (Nixon, 1990; Public Health Service, 1988).

Research in the area of dietary fat and cancer has focused on three major variables: amount of fat in the diet, amount of different types of fatty acids (saturated, monounsaturated, polyunsaturated), and the mechanism of interaction. Although several different hypotheses have been proposed, the following seem to be generally recognized as true in humans:

1. There is a stronger relationship between saturated fat intake and risk of cancer, especially cancers of the breast (Tonolio, Riboli, Protto, Charrel, & Cappa, 1989), prostate (Slattery, Schumacher, West, Robison & French, 1990), and colorectal (Willett, Stampfer, Colditz, Rosner, & Speizer, 1990) regions, in comparison to other forms of fat;

2. Cancer mortality in humans correlates better with total dietary fat intake than with the type of fat consumed (Carroll, Braden, Bell, & Kalamegham, 1986);

3. Dietary fat may interact at all stages (initiation, promotion, or progression) of the cancer-forming process in the body (Carroll, 1991).

Consistent consumption of fruits and vegetables may have a protective effect against the formation of some cancers, including those of the mouth, pharynx, stomach, colon, rectum and bladder. It is believed that this effect is due to the presence of antioxidant agents, vitamins A, C and E, found in abundance in these foods (Ziegler, 1991). These antioxidant agents serve as a defense mechanism for the body by neutralizing potential carcinogenic compounds which are presented to tissue sites, thus rendering them ineffective. The role that these nutrients play in anticarcinogenesis has been substantiated both for the individual vitamins and for these vitamins collectively (National Dairy Council, 1991).

The typical "Western" diet is very low in dietary fiber (Greenwald & Sondik, 1986). For this reason, it is speculated that high rates of colon cancer in the western world, in comparison to other areas of the world, may be associated with the intake of dietary fiber (Burkitt, 1971). This hypothesis, however, is clouded by a number of variables that may interact:

1. Some foods which are high in fiber also contain high amounts of cancer-preventive agents, such as vitamins A, C and E, phenols and indoles;

2. Diets high in fiber are also generally low in total fat, saturated fat and total calories;

3. Little is known about the effects of different types of fibers (soluble, insoluble) on the risk of cancer. (Rose, 1990)

Even without the benefit of reduced cancer risk, increasing the intake of dietary fiber is considered to be a sound dietary modification (prevention of constipation, reduction of fat and calorie intake, prevention of diverticulitis, etc.) (American Dietetic Association, 1988; American Medical Association, 1989).

In accordance with these findings, the National Cancer Institute (NCI, 1984) and the American Cancer Society (ACS, 1988) have established the following dietary recommendations to reduce the risk of cancer in the U.S. population:

1. Avoid obesity. To achieve and maintain appropriate body weight, balance energy intake and physical activity;

2. Reduce total fat intake to 30% or less of calories;

3. Include a variety of fruits (e.g., citrus fruits) and green and yellow vegetables in the daily diet;

4. Consume more high fiber foods such as whole grain cereals, fruits and vegetables. The present NCI goal is to increase average consumption of fiber in the U.S. to 20-30

grams/day by the year 2000 (Greenwald & Sondik, 1986). Mean dietary intake of fiber in the U.S. is approximately 12 grams/day (Lanza, Jones, Block, & Kessler, 1987).

These recommendations are consistent with other dietary recommendations for the U.S. population for the prevention of major chronic disease (U. S. Department of Agriculture, 1985). Based on the most recent estimates by the NCI, a minimum of 30,000 lives could be saved per year through modification of dietary habits alone (Greenwald & Sondik, 1986).

Dietary Intervention and Cancer

Recent efforts have been made to examine the effects of dietary intervention on lowering the risk of cancer. Many national health organizations have promoted such efforts, as evidenced by the increase in the National Cancer Institute's diet-related cancer prevention research budget from 2.5 million dollars in 1974, to 55 million dollars in 1988 (Greenwald, Light, McDonald, & Stern, 1990). Research has involved both clinically-based and community-based education programs as well as national media endeavors.

In 1985, the National Cancer Institute initiated the Women's Health Trial (WHT), a nationwide, multicenter intervention study. The purpose of the trial was to test the hypothesis that consumption of a low-fat diet for a 10-year period would reduce the incidence of breast cancer. The trial was terminated by NCI in 1988 because evidence to support the hypothesized relationship between dietary fat and breast cancer was deemed insufficient to justify its continuation (Urban & Baker, 1989).

In an effort to determine the feasibility of the Women's Health Trial, 303 women at high-risk for breast cancer were recruited from three clinic sites and randomized into control and dietary intervention groups (Gorbach, Morrill-LaBrode, Woods, Dwyer, Selles, Henderson, Insull, Jr., Goldman, Thompson, Clifford, & Sheppard, 1990; Henderson, Kushi, Thompson, Gorbach, Clifford, Insull, Jr., Moskowitz, & Thompson, 1990). Intervention involved 15 educational sessions over a one-year period, including individual sessions with nutritionists at 2 and 12 weeks of the intervention phase. Total energy intake among women in this group, recorded by consecutive four-day food records, decreased 25%, and total fat intake decreased from 39% to 22% of total calories by the end of the one-year period. Specific changes in food intake, such as decreases in consumption of whole milk, red meat, sweets/beverages and eggs contributed to this abatement. No significant decreases were observed in the consumption of vitamins, minerals, protein and carbohydrates.

Kristal and co-workers (1992) contacted WHT participants one year after the conclusion of the study to determine the level of adherence to dietary changes offered during the intervention period. The authors used a food frequency questionnaire and a 21-item dietary habits questionnaire to measure food intake and compliance with fat-related dietary change (avoiding fat as flavoring, avoiding meat, substituting specially manufactured low-fat foods, modifying commonly used foods to be lower in fat, and replacing high-fat foods with low-fat foods that result in change in overall cuisine). The authors discovered that participants had maintained most of the low-fat dietary habits adopted during the study. Total intake of fat increased slightly (37.0 to 41.0 grams/day), and certain dietary habits (substitution of specially manufactured low-fat foods, modification of commonly used foods) were more effectively maintained than others (replacing high-fat foods with low-fat foods, avoiding fat as flavoring and avoiding meat).

The National Cancer Institute also recently initiated the National Adjuvant Study (NAS), a collaborative trial designed to investigate the efficacy of a low-fat diet in conjunction with drug therapy for women with stage II breast cancer. In a pilot phase (Buzzard, Asp, Chlebowski, Boyar, Jeffery, Nixon, Blackburn, Jochimsen, Scanlon, Insull, Jr., Elashoff, Butrum, & Wynder, 1990), women were recruited from seven clinics nationwide based on consumption of a high-fat diet and randomized into intervention and control groups. The goal of intervention was to reduce fat intake to 15% of energy intake. Intervention subjects participated in an intensive three-month program based on the Low Fat Eating Plan (LFEP) designed by nutritionists at the participating clinic sites as well as the Nutrition Coordination Center (NCC) at the University of Minnesota. Based on information received from four-day diet records, intervention subjects decreased fat intake from 38.4% to 22.8% of total calories after three months of intervention. Total energy intake decreased by approximately 25%, with an average 2.8 kg weight loss and 7.7% decrease in total serum cholesterol. Again, no appreciable changes were observed in intake of vitamins, minerals, protein and carbohydrates.

Presently, NCI and Giant Foods, Inc., a Washington area regional supermarket, are conducting the "Eat For Health" program (Light, Tenney, Portney, Kessler, Rodgers, Patterson, Mathews, Katz, Blair, Evans, & Tuckermanty, 1989). This program is the continuation of a 1987 "Foods for Health" program initiated by the National

Heart, Lung, and Blood Institute (NHLBI). The focus of the program is the examination of the feasibility of using the supermarket as a site for consumer nutrition education. Specifically, the objectives of the program are to:

> 1. Increase consumers' knowledge about diet and health issues, with particular reference to nutrition and cancer risk reduction;
>
> 2. Positively influence consumers' attitudes toward the purchase and consumption of healthful foods;
>
> 3. Influence the food purchasing behaviors of consumers to coincide with diet and cancer control efforts. (p. 444)

The protocol includes booklets, shelf labels targeting fat and fiber content of foods, and area advertising. The program is designed to last approximately four years.

Boeckner and co-workers (1990) developed and conducted a chronic disease risk reduction course entitled "Eating Today for a Healthy Tomorrow." The course involved six, two and one-half hour sessions using teaching materials, games, food-tasting activities and goal-setting to lower dietary risk of heart disease, osteoporosis, cancer and obesity among 195 healthy adult participants. The investigators found that, according to information provided on a food-frequency questionnaire, subjects made more low-fat food choices, especially in milk and meat products, after being exposed to the educational materials. Postintervention data reflected eating habits approximately two to four weeks after completion of the course. Subjects also indicated that they were more conscious of the foods they ate and were more willing to read food labels before purchasing foods.

Fleisher and co-workers (1988) conducted a community-based intervention in association with the American Cancer Society (ACS) to educate the public about the relationship between diet and cancer. The program included: a short audiovisual presentation called, "Putting the Facts on the Table"; a review and discussion period moderated by a health educator; distribution of brochures produced by NCI ("Diet, Nutrition, and Cancer Prevention") and the authors. The program was implemented at 14 community sites and included 543 male and female adult subjects. The authors, by using pretest-posttest questionnaires, ascertained that both knowledge level and behavior significantly improved in regard to awareness and consumption of fat and fiber in foods.

Mitchell-Beren and co-workers (1989) used a community church network to access rural African-Americans to distribute information on colorectal cancer. Participants (no specific information was provided regarding the demographic characteristics of the subject population) received a packet which included materials that explained this form of cancer, its associated risk factors and warning signs, and strategies to lower risk. A follow-up telephone survey was conducted to determine the effectiveness of the educational materials in promoting change in diet and lifestyle. The authors stated that a majority of those subjects who were contacted by telephone indicated that they had made behavioral changes in their lifestyle (diet, alcohol, smoking) to lower their risk of cancer. However, no specific numbers were given to validate the authors' claims.

Varma (1990) developed and implemented a knowledge, attitude and behavior modification program for lowering cancer risk. Among 40 homemakers, using national and self-designed publications, recipes, and audiovisual materials, significant improvement from pretest to posttest was observed in specific areas of knowledge, attitude and behavior relevant to disease prevention.

The University of Minnesota Department of Public Health designed the "Win At Home Series," a home-based program designed to reduce dietary cancer risk (Finnegan, Jr., Rooney, Viswanath, Elmer, Graves, Baxter, Hertog, Mullis, & Potter, 1992). The program is a series of six booklets, each emphasizing a single dietary subject ("Vegetables," "Fruit," "Beans, Peas, and Lentils," "Lean Meats," "Great Grains," and "Lowfat Living"). Recipes, shopping and cooking tips, and various incentives are included for increased participation potential. Testing of the effectiveness of materials includes a pretest to posttest knowledge instrument.

Nutrition Education Strategies for Research Among Native Americans

The development of nutrition education intervention programs requires that a number of factors be taken into consideration, such as education level of participants, cultural factors, availability of resources, level of motivation of participants, environmental factors, and social/familial factors. Glanz (1980) suggested that the effectiveness of nutrition education intervention may be enhanced by directing attention to such factors. The unique cultural challenges in health education presented by American Indian tribes make it necessary for those developing educational materials and programs to recognize and respect such heritage. Although Native Americans are not a culturally homogenous people, some underlying characteristics can be found in most tribes: harmony with nature, present-time orientation, sharing goods with others, anonymity, noninterference with others, nonscientific explanation of natural phenomena, and respect for elders (Zintz, 1961).

Jackson and Broussard (1987) recommend the following techniques and approaches for providing nutrition education for Native Americans:

1. Recognize and respect each client's health care beliefs;
2. Learn about the community's cultural food behaviors;
3. Develop culturally relevant nutrition education programs to teach self-care skills;
4. Develop community and family support;
5. Increase involvement by American Indians (pp. 49-50).

In general, the conveyance of nutrition education messages should include culturally appropriate signs, symbols, and colors to which the population can relate. For example, including a seal, walrus or salmon in the meat group in a publication geared toward Alaska Natives should increase the relevance of this concept to its recipients. Learning and incorporating traditional foods or methods of preparation into the overall program is also important (United States Department of Agriculture, 1986).

The Lumbees present an interesting and unique challenge for health promotion. While rigidly holding to their Native heritage, all Lumbees speak English, and for the most part, exhibit traditional European cultural, medical and religious practices common in the southeastern United States. "Traditional" foods, per se, are not part of the typical Lumbee diet, and food preparation is done by usual methods (i.e., frying on the stove, microwave, baking in the oven, etc.). Food consumption by Lumbees follows the typical pattern found in the southeastern portion of the United States. The climate and rich soil in the area allow residents of the area to grow their own fruits and vegetables on personal lands.

The current study was the first attempt at a nutrition intervention program among Lumbee Indians in Robeson County. It was designed to take advantage of a public health education study in progress in the area. Dignan and coworkers (personal communication, January 1991) are presently conducting research among Lumbees in Robeson County, as well as Cherokees in Western North Carolina. A total of 1,000 women, 18 years of age and older, are being recruited in each population, half of which will receive a culturally sensitive, community health education intervention to increase screening and follow-up for cervical cancer prevention. This project has been instrumental in paving the way for nutrition research in this population.

Dietary Data Collection

The correlation between chronic disease and diet has spurred interest in the development of valid dietary data collection methods for human food consumption. At least four general methods have been used, each having its own strengths and limitations. Block (1982) has provided an extensive review of these methods and their validation.

Burke (1947) developed the dietary history method, based on the idea that the most important issue in dietary studies is the long-term history or pattern of intake. This method uses three instruments for determining dietary intake. A food-frequency questionnaire is included in the interview, which gives an estimate of usual intake of certain targeted foods. Also included are a 3-day menu record and a 24-hour recall. This method involves an extensive interview and is still used in modified forms.

A second method employs the use of the 24-hour recall, which involves the recording from memory of food consumed during a recent 24-hour period (Block, 1982). This method is short and does not require extensive training, but the information collected may not be representative of the individual's diet, considering the wide variability of food intake from day to day. A modification of this method is the use of a seven-day recall, which aims for greater representativeness, yet is subject to error due to memory loss by the respondent (Block, 1982).

A third method relies on the use of the diet record, which requires the subject to record food consumption over a given period of time (Block, 1982). Precision may be increased using this method by providing subjects with weighing scales or training in estimating portion sizes. Information may be collected on consecutive days or random days, although Larkin and co-workers (1991), based on data measured against 16-day intake records, recommend random-day samples for individuals and small groups. Diet records may also be modified to include the consumption of specific food items only. This modification has been called the record by menu methods and does not require that the subject provide quantitative information (Block, 1982).

A food frequency questionnaire is often used to obtain information on usual intake over an extensive period of time. This instrument consists of a list of food items, and requires that subjects provide general information on past consumption of specific foods (Zulkifli & Yu, 1992). These questionnaires are usually flexible in that they may be self-completed or may be implemented by an interviewer. They may also be modified based on time constraints or the particular type of food the researcher is interested in recording (Clapp, McPherson, Reed, & Hsi, 1991). Responses to food frequency questionnaires may remain relatively consistent over time (i.e., reliable) but may not necessarily be valid because of subjects' perceived beliefs about what their food habits are or what they should be (Zulkifli & Yu, 1992).

A number of researchers have explored the issue of the collection of dietary data for cancer-related epidemiological studies. Bazzarre and Myers (1978) concluded that, while no one method of dietary data collection provides the best information, the method of choice for a particular study should be consistent with the objectives of the study hypothesis and the limitations of the study design. The authors suggest the following be taken into consideration before selecting a dietary collection method:

1. Identify the nutrient(s) or food(s) of concern;

2. Document evidence that the proposed dietary agent contributes to the mortality or incidence of the disease being studied. The validity of methods by which the food intake data were collected and analyzed must also be documented;

3. Assess the range of economic and personnel resources available for implementation of the research objectives;

4. Select a dietary method consistent with the type of information required: past, usual, or current food intake data; estimates of actual food measures of food intake; and population size and distribution;

5. Develop preliminary data collection forms and training instructions for interviewers and participants;

6. Revise data collection forms and instructions as necessary;

7. Train, test, and certify interviewers in the use of standardized materials;

8. Measure reliability and validity of methodology. Check other sources of variance using an appropriate pilot study population of a sub-sample from the proposed target population; and

9. Develop the necessary data management and analysis facilities. (p. 42)

Riboli (1989) makes similar recommendations, including the need to adapt collection and analysis methods for cultural and educational sensitivity. He also implies that dietary data collection methods which provide information to compute the average daily intake of nutrients are more informative in studies on diet and cancer than those which allow simple estimation of particular foods or food groups over a longer period of time.

Summary

The Lumbee Indians of Robeson County have a long and rich history and have continued to grow socially and economically. While this group of people share many of the health-related problems associated with Native

Americans in the United States, very little health-related research has been conducted among the Lumbees. This research will add to the existing literature by providing typical dietary intake data for a Native American population. Also, this research was the first designed to change dietary and/or lifestyle habits in this population.

The relationship between diet and cancer is well-documented and is believed to account for approximately 35% of all cancer mortalities in the U.S. (Doll & Peto, 1981). Clinical and community-oriented research has been implemented nationwide to alter intake of nutrients believed to be associated with cancer risk (fat, fiber, vitamins A, C and E).

The collection of dietary intake data from human populations may be carried out using a number of techniques: 24-hour recalls, diet records, diet history, or some combination of these three. Several factors warrant consideration when determining the technique of choice in a research study, including access to the sample, resources, constraints of time, and the validity and reliability of the measurement instruments.

The current study was designed to collect baseline dietary information from adult Lumbee Indian women in

Robeson County, North Carolina. One hundred twenty Lumbee Indian women were recruited to collect dietary information during the pilot study. Three separate instruments (24-hour recall, a food frequency questionnaire, and a three-day food record) were used to collect dietary data from pilot subjects.

A group-based dietary intervention program was implemented among 29 Lumbee women during an experimental study in order to examine the effectiveness of such a program in lowering the intake of fat and increasing the intake of foods rich in fiber and antioxidant nutrients (vitamins A, C and E), thereby lowering dietary risk of cancer. Pre- and postintervention dietary data, using the three-day food record and food frequency questionnaire, were compared between subjects participating in the intervention program and a subset of pilot study subjects who served as controls. Analysis of differences between the experimental and control groups focused on postintervention (posttest and post-posttest) differences, in light of differences between the groups at pretest. When appropriate, analysis of covariance (ANCOVA) was used to test the postintervention differences between the experimental and control groups, adjusted for pretest differences.

CHAPTER III

METHODS

This research was designed to investigate the dietary practices of Lumbee Indian women in Robeson County, North Carolina, as well as to address the effectiveness of a group-based nutrition education program in promoting change in dietary practices as they relate to the risk of cancer. The research consisted of: (a) a pilot study to collect food and nutrient consumption data from 120 Lumbee Indian women to establish baseline nutrient intake data, and to select instruments appropriate for collecting dietary data in this population; (b) an experimental study to conduct a nutrition education program among 29 Lumbee Indian women and assess any changes in food and nutrient intakes following intervention. A quasi-experimental design was used, with pre-, post- and post-posttest data collected from control and intervention subjects (Table 1). The study was conducted as indicated in the following sections.

The hypotheses tested were:

1. the typical diet of Lumbee Indian women in Robeson County, North Carolina, is low in dietary fiber and some micronutrients, and high in total calories, total fat, and percent of calories from fat, compared to guidelines

TABLE 1

Research Design Periods

Study	Pretest[1]	Intervention	Post-test/Post-Posttest
Pilot[2] (n = 120)	XXX		
Experimental			
Control[3] (n = 41)	XXX		XXX
Intervention (n = 29)	XXX	XXX	XXX

[1]Pretest data compared between control and intervention groups consisted of information provided by: food frequency questionnaire (Appendix F), 3-day food record (Appendix G), nutrition knowledge test (Appendix M), eating patterns questionnaire (Appendix L), and the diet/health questionnaire (Appendix D). Pretest data will be collected during Phase I for the pilot/control group and Phase III for the Intervention group. Posttest data was collected immediately following and four months after the intervention program

[2]Pilot subjects included those subjects interviewed during the Pilot Phase of the study who did not participate in the post-intervention data collection process.

[3]Control subjects included those subjects interviewed during the Pilot Phase of the study who were also interviewed for post-intervention data collection.

established by the National Cancer Institute, the American Cancer Society, and the National Research Council (Recommended Dietary Allowance);

2. a community-based, culturally-sensitive educational intervention program designed to promote specific modifications in dietary intake that can lower cancer risk will result in favorable changes in intake of targeted foods and nutrients (decreased intake of fat, increased intake of fiber, and vitamins A, C, and E, increased consumption of fruits and vegetables) of Lumbee Indian women in Robeson County, NC.

Human subjects approval was secured from the Institutional Human Subjects Committee at The University of North Carolina at Greensboro and the Bowman Gray School of Medicine. The human subjects consent forms for both the pilot and experimental studies are in Appendix S.

Pilot Study

Dietary data were collected from 120 recruited volunteer Lumbee Indian women in Robeson County, North Carolina. The research protocol is presented in Table 2.

Part I: Predata Collection

The goal of the initial part of this study was to recruit adult Lumbee women in Robeson County to participate as subjects in this pilot phase of the study.

Prior to implementation of the project, the principal investigator appeared before the Lumbee Regional

TABLE 2

Research Protocol: Pilot Study

	Part I	Part II	Part III
OBJECTIVE	1 Obtain consent 2 Identification of sample 3 Initial contact with subjects	1 Collection of baseline data	1 Processing of raw data 2 Distribution of results to subjects 3 Make decision on instrument(s) to obtain dietary data in Intervention Phase and number of subjects needed
METHODS & ACTIVITIES	1 LRDA meeting 2 Generation of random numbers Recruit and train interviewers 3 Mail/phone contact with subjects	1 Recruit and interview subjects	1 Computer analysis of dietary data 2 Mail contact with subjects 3 Power test on data collected in Pilot Phase Subjective/objective determination on tools for dietary data collection during Intervention Phase

Development Association (LRDA) Board of Directors, headquartered in Pembroke, North Carolina, to present the goals, outline, and timeframe of the proposed research. This Board is primarily responsible for the social and political welfare of the Lumbee people, especially those who reside in Robeson County. The overall purposes of this meeting with the LRDA Board were four-fold: (1) to receive approval from the Board for the study to be performed; (2) to answer any questions the Board had about the study and its goals (i.e., regarding the overall benefits of the study for the Lumbee people, etc.); (3) to gain feedback from the Board regarding the proper and most efficient strategies for conducting research among the Lumbee people; and (4) to outline a plan for preparing the materials and results of the study for possible use among the Lumbee people upon completion of the project. A media press release was issued through this Board to make the community aware of the research and to facilitate recruitment efforts.

Following approval by the LRDA Board, a sample of 120 female Lumbee Indians, aged 21-60 years, were recruited for participation in the study. The decision to limit consideration to adult women was based on the assumption that females in this culture, as household managers, have primary control over food selection, preparation, and consumption in their households and would be more efficient in recording dietary information. The age criteria roughly correspond to age groups established by the Food and Nutrition Board (1989) for adult women. The decision to limit the sample size to 120 was based on an estimation of feasibility with regard to time and resources available to the investigator for this study.

Potential subjects were recruited by simple random-digit dialed telephone interviews. An initial sample of 300 four-digit numbers was generated with the assistance of Albert Conner, a computer programming consultant from Pembroke, and combined with local prefixes.

The screening process included verification that the number is assigned to a household within Robeson County, that the household included at least one adult Lumbee female between 21 and 60 years of age, and that there was willingness to discuss participation in the study (see Telephone Protocol, Appendix A). According to information provided by Southern Bell (personal communication), the telephone company which serves Robeson County, there are 28,808 accessible telephone numbers in the areas of Robeson County covered by Southern Bell service (Lumberton, Rowland, Pembroke, and Fairmont). Eligible phone numbers from the randomly generated list were recorded for follow-up. A maximum of three attempts were made to complete a telephone call with each number.

All calls were made from a central location in Robeson County by a local interviewer selected by the investigator. The interviewer received training in proper phone call technique by the investigator. The interviewer followed a predesigned protocol in making the initial contact. The protocol allowed the interviewer to record the name and address of those who responded positively, as well as provided information regarding the purposes of the study.

Criteria for subject participation in the study included the following characteristics: female, 21 to 60 years of age; enrolled as a member of the Lumbee Indian tribe, according to tribal standards; a resident of Robeson County for at least two years; no current record of any acute or chronic disease which could affect dietary practice; presently not on a prescribed diet or medication, including those designed to lower blood lipid levels; and available for follow-up for at least six months.

Potential subjects were subsequently contacted by mail. A letter (See Appendix B) addressed to the selected person in the home included initial screening criteria to assist the individual in making the decision to participate. The mailing also included a name and phone number if the contactee wanted to verify the authenticity of the study or if further information was needed regarding the study. A stamped, self-addressed reply card was also enclosed which allowed the potential subject greater ease in confirming or rejecting the invitation to participate in the study.

Approximately three weeks after the initial mailing, all nonresponders were contacted by mail (see Appendix C) in an attempt to receive a definite answer concerning their willingness to participate in the study. Those unable or unwilling to participate were replaced by new potential subjects until a sufficient number of confirmations were secured.

Those who were willing to participate in the study were contacted by phone by the investigator for the purpose of setting up a meeting time to begin the data collection portion of the pilot phase. Subjects provided the following information: (a) most convenient times and days of the week to meet; (b) most convenient place to meet (either at the subject's residence or at a neutral site); and (c) secondary confirmation of screening criteria and long-term accessibility.

Part II: Data Collection

The second portion of the pilot study was designed to facilitate the collection of dietary intake information from subjects selected for participation during Part I.

Subjects were contacted by the investigator (via phone) to begin the data collection for this phase of the study. A time and meeting place to conduct the interview (either in the subjects' home or workplace or in a central location) was confirmed at this time. Subjects were informed that the interview process would take approximately one hour. During the meeting time, subjects were assured of the confidentiality of the information they provided. Dietary information was secured by the investigator according to the following protocol:

(1) Subjects were asked to verbally provide information to a questionnaire (developed by the investigator; see Appendix D) designed to gain an understanding of: (a) the subject's attitudes/beliefs about cancer, diet and health; (b) personal/family health history; (c) eating and shopping habits, and accessibility to foods (garden, livestock, etc.); and (d) general family income and educational level.

(2) Subjects were asked to provide information to complete a 24-hour dietary recall (see Appendix E). Subjects were prompted for accuracy by the interviewer

using food models and food measuring utensils. Subjects were also asked to supply details regarding cooking techniques, food storage, and seasoning/condiment usage. For consistency, subjects were only asked to provide dietary recall information for days which best reflected their typical eating pattern.

(3) Subjects were given the "Health Habits and History Questionnaire" (HHHQ, National Cancer Institute, Division of Cancer Prevention and Control, National Institute of Health, Bethesda, Maryland; see Appendix F) to obtain information regarding usual dietary habits and consumption. The questionnaire included a food frequency section which was specifically designed for the collection of minimum core dietary data (Block, 1983).

(4) Subjects were given instructions for completion of a 3-day diet record (see Appendix G). Subjects recorded food intake for three nonconsecutive 24-hour periods (including at least one weekend day) using diary booklets which were given to them at the initial meeting. Those subjects who were unable to write (i.e., where illiterate, handicapped, or had other reasons) were asked to have a relative or friend record the necessary information for them. Upon completion of the food records, subjects were asked to return the diary by mail using a stamped, self-addressed envelope. Those who

did not return the food records after one month were mailed a reminder letter (see Appendix H).

All participants received a thank-you letter (see Appendix I) within one week following the interview session. Also in this mailing, subjects received in the mailing a "Lumbee Nutrition Study" apple refrigerator magnet (Appendix J) as a token of appreciation.

Part III: Pilot Data Collection Analysis and Decision Making

Information provided by subjects were analyzed according to the following guidelines:

(1) Questionnaire information (Appendix D) was used to provide general descriptors about the sample. Means, standard error of the means and percentages were determined for many of the items.

(2) Twenty-four hour recalls (Appendix E) were analyzed using the Minnesota Nutrition Data System (NDS, Minneapolis, Minnesota) which provided daily intake values for 41 dietary constituents (for a complete review of NDS specifications, refer to Neiman, Butterworth, Nieman, Lee, & Lee, 1992). Those data of primary interest included: total calories, total fat, percent of calories from fat, percentage of each type of fat (monounsaturated,

saturated, polyunsaturated), total dietary fiber, total intake of vitamins A (total vitamin A, beta-carotene and retinol), C and E (total alpha-tocopherol equivalents), and daily servings of vegetables, fruits, meats, dairy products, and fats.

(3) The Health Habits and History Questionnaires (Appendix F) were analyzed using the dietary analysis software program (DIETANAL) provided with the questionnaire by Gladys Block, formerly of the National Cancer Institute (NCI). Daily intake of energy, nutrients (protein, fat, fiber, vitamins, minerals) and servings of food groups were generated and analyzed.

(4) Diet record (Appendix G) data was analyzed in a similar fashion to the 24-hour recall data. Results from diet records were compared to 24-hour recall and food frequency data to determine the correlation between data for each dietary constituent collected with each instrument.

All subjects received, either in person or via mailing, a copy of the results of their personal dietary analysis from the 3-day diet record. This information also included general recommendations for improving their diet based on the results of the analysis (see Appendix K). Subjects also received a copy of the "Prudent Diet Cookbook" (prepared by nutritionists at Baptist Hospital, Winston-Salem, North Carolina, 1990) as a token of appreciation.

Information from all four data collection tools was analyzed to establish conclusions regarding the study population. Data were analyzed collectively and according to two age categories (21-40 years, 41-60 years). A decision was made regarding which particular dietary data tool or tools (24-hour recall, food frequency questionnaire, 3-day food record) were used for collecting pretest, posttest and post-posttest dietary information from intervention subjects and for posttest and post-posttest analyses from control subjects. This decision was based on a number of factors, including feasibility of use in this subject population, financial and time constraints, access to subjects (face-to-face versus mail), ability of subjects to respond to or use instruments, and subjective validity of instruments.

Selection of subjects to serve as controls occurred at this time. Criteria for selection were based upon: (1) verbal or written acknowledgement of willingness to continue participation in the study; (2) performance with diet instruments during pilot phase; (3) availability during the period in which data were collected; and (4) reading and writing skills appropriate for intervention materials. Selection continued until the desired number of subjects was secured.

Experimental Study

The design of this study is outlined in Table 3 with further details in Tables 4 and 5.

Part I: Predata Collection

After the Pilot study was completed and the data analyzed, recruitment began for both control and intervention subjects who participated in the experimental study. Following collection of preintervention dietary data from both control and intervention subjects, an educational intervention program was implemented in Part I of the experimental study. During this study, intervention subjects were exposed to a carefully planned, culturally sensitive educational program designed to lower dietary risk of cancer by lowering the consumption of fat and increasing the consumption of dietary fiber and fruits and vegetables (Tables 3-5).

Newspaper advertisements in the Robeson County area were used to recruit subjects for the experimental study. Selection criteria used included: (1) satisfaction of criteria described for pilot subjects; (2) willingness to participate throughout the study; (3) availability

TABLE 3

Research Protocol: Experimental Study

	Part I	Part II	Part III	Part IV
OBJECTIVE	1 Recruitment of Intervention and Control subjects	1 Collection of pretest data from intervention subjects	1 Presentation of intervention sessions/materials	1 Collection/processing of posttest and post-posttest data 2 Determination of intervention effect 3 Distribution results to subjects and community; submission of results for publication in professional journals
METHODS & ACTIVITIES	1 Mail/phone contact with subjects	1 Completion of appropriate instruments Computer analysis of data	1 Select/develop intervention materials Deliver intervention	1 Contact and interview subjects 2 Computer analysis of dietary data Statistical analysis of dietary data 3 Mail contact with subject; preparation of manuscripts

TABLE 4

Experimental Study

OBJECTIVES	METHODS	RESOURCES NEEDED	PROCESS EVALUATION
Obtain preintervention data	*Train subjects in recording dietary data *Collect dietary data	Preselected dietary data instrument	
Teach dietary evaluation skills	*Train subjects in use of instruments to assess fat and fiber	Fat Gram Counter booklets Educational materials	Subject questionnaire Peer review
	*Teach food label reading skills	Educational materials	Peer review
Teach nutrition information and behavior skills	*Panel discussions by the investigator and local Lumbee health professionals	Investigator lesson plans that include session by local Lumbee health professionals	Subject questionnaire
	*Audiovisual materials	Audiovisual equipment	Subject questionnaire
	*Brochures/reading materials	Educational materials	Subject questionnaire and Peer review
	*Restaurant/supermarket decision-making guide	Educational materials	Peer review
Obtain postintervention data from intervention and control subjects	*Collect dietary data	Preselected dietary data instrument	

TABLE 5

Outline of Intervention Sessions

	OBJECTIVES	ACTIVITIES
SESSION I:	*Introduction *Dietary data collection *Nutrition knowledge test	*Presentation to group *Group training *Group session
SESSION II:	*Distribution of nutrition information *Initial establishment of dietary goals	*Audiovisual presentations Presentation to group *Individual goal-setting
SESSION III:	*Development of dietary evaluation skills	*Training in use of Fat Gram Counter and other evaluation materials
SESSION IV:	*Distribution of nutrition information	*Panel discussion by local Lumbee health professionals and the investigator
SESSION V:	*Development of dietary evaluation skills	*Training in food label reading and restaurant food selection
SESSION VI:	*Reaffirmation of dietary goals *Distribution of nutrition information *Nutrition knowledge test	*Distribution of nutrition literature *Group session

throughout the intervention implementation and at the postintervention data collection time(s); (4) understanding of the time commitment involved in participation in the study; (5) readily available transportation to the location where the intervention programs was to be held; (6) expressed willingness to make dietary changes; and (7) reading skills consistent with materials used in the intervention program. It was recognized that satisfaction of these criteria would introduce bias into the intervention population by only including subjects with a high degree of motivation to make dietary changes.

Control subjects for the experimental study were selected by contacting subjects from the pilot study. Fifty of the one hundred twenty pilot subjects (42%) agreed to serve as controls during the experimental study.

Part II: Pretest Data Collection

Initial dietary information was collected from subjects using two of the three dietary data collection tools employed in the pilot study (food frequency questionnaire and 3-day food record). At the first meeting, subjects were given instructions for completing the data collection tool. Also, subjects were asked to provide diet and health information using the questionnaire described earlier (Appendix D). Subjects received an analysis of their diet expeditiously. Subjects were informed of the confidentiality of the information which they provided for this study.

Behavioral data, in relation to intake of fat, were collected using the Eating Patterns Questionnaire developed by researchers at the Fred Hutchinson Cancer Research Center, Seattle, Washington (See Appendix L). Information regarding the subjects' knowledge of the relationship between diet and cancer was also collected at this time, using general questions developed by the investigator (see Appendix M).

To avoid bias between pilot and experimental data, subjects who participated in the pilot study were not allowed to take part in the intervention sessions. Materials presented during the intervention sessions (brochures, recipes, booklets, etc.) were made available to control subjects upon request but following the conclusion of the study.

Part III: Educational Intervention
For Experimental Subjects

The educational intervention was presented in six consecutive weekly sessions, each weekly session being approximately one to one and one-half hours in length. The educational intervention was designed to meet the following objectives: (1) subjects would receive training in a practical method of evaluating their personal diet; and (2) subjects would receive information on nutrition and behavior skills to facilitate dietary modification. Materials used by the investigator for the intervention program were evaluated by nutrition professionals from Robeson County and the Department of Family Medicine, Bowman Gray Medical School, for cultural and educational appropriateness.

Six weekly group meetings were held to provide the participants with information regarding diet and cancer (Table 5). The meetings took place in a conference room on the campus of Pembroke State University, which is a central location in Robeson County. Nutritious snacks such as lowfat muffins, popcorn, fruits and vegetables, and apple cider were provided as an added incentive for attendance. The sessions consisted of: distribution and discussion of diet and cancer literature (American Cancer Society, National Cancer Institute, American Institute for Cancer Research), including those developed by the investigator; presentation of diet and health information by the investigator and local health professionals; audiovisual information; and restaurant and supermarket food selection scenarios developed by the investigator. A number of practical low-fat, high-fiber recipes (from the American Cancer Society and other sources) were also distributed.

Participants learned how to evaluate food items by using general food composition information and developing food label reading skills. Each person received a copy of the Fat Gram Counter (Nutrition Coordinating Center, Minneapolis, Minnesota), which provided easy access to fat content information of commonly consumed foods (See Appendix N for a description of materials used and program protocol).

During the course of the meetings, subjects were personally advised regarding their dietary habits. The subjects, as a group, were given standard percentage change target goals for lowering fat intake and increasing dietary fiber intake (i.e., 10% decrease in intake of calories from fat). Practical dietary modification was emphasized to allow greater ease in reaching the target goals.

Part IV: Data Collection (Posttest and Post-Posttest)

The final phase of the study consisted of collection of posttest and post-posttest data, data analysis and a summation report of the results to the Lumbee people.

Posttest: Immediately following the final intervention session, dietary data were collected from control and intervention subjects using the 3-day food record, based on the determination from the pilot phase. Provisions were made for data collection from intervention subjects during the final session of the intervention program. Control subjects (those subjects from the pilot study who were willing to continue in the study as controls) were contacted by mail or by phone to facilitate dietary data collection.

Evaluation of the program's effectiveness in increasing nutrition knowledge with regard to the relationship between diet and cancer was carried out by readministration of the nutrition knowledge questionnaire (described earlier) and assessing change in responses to each question. Subjects were also asked to share personal comments regarding the program's cultural and educational sensitivity.

Post-Posttest: Control and intervention subjects were contacted by mail or by phone approximately three months after the end of the intervention program to arrange collection of post-posttest data. Subjects were asked to provide information to complete 3-day food record and food frequency questionnaire dietary data tools (same as above) and the nutrition knowledge test. Also, subjects were asked to complete the Eating Patterns Questionnaire to assess differences in eating patterns in relation to intake of fat.

Data Analysis

Data analyses were conducted using the SPSS statistical software program (Chicago, Illinois), according to the following objectives:

(1) Descriptive statistics: means and standard errors of the mean for intake of calories, total fat, percent calories from fat, percent calories from types of fat (saturated, monounsaturated, polyunsaturated), dietary fiber, vitamins A, C, and E, and other nutrient information provided by dietary analysis software programs; mean intake of servings of foods according to food categories (i.e., meat, vegetables, etc.) for all subjects; means and standard errors for variables listed above for subjects in each of two age categories: 21-40 and 41-60.

(2) Hypothesis tests:

1) Comparisons of mean intake of each nutrient to:

(a) RDA values for corresponding age categories;
(b) Nationwide nutrition surveys (i.e., National Health and Nutrition Examination Survey);
(c) Recommendations by national health organizations (NCI, ACS);
(d) Nutrition studies conducted with Native American populations;

2) Student's *t*-test and repeated measures analysis of variance comparisons of pretest, posttest and post-posttest mean

nutrient and food group intake for intervention and control subjects;

3) Student's t-test time period comparisons of pretest, posttest and post-posttest nutrient and food group intake data between intervention and control subjects;

4) Comparison of pretest, posttest and post-posttest knowledge (general diet/cancer questions) and pretest and post-posttest behavior (Eating Patterns Questionnaire) for control and intervention subjects.

A minimal level of significance of 0.05 was accepted.

Subjects who participated in the study were mailed a copy of the general results of the study, along with an analysis of their individual dietary data. This information included a summary of the subjects' target goals and their actual intake values from the posttest data and/or post-posttest data. Subjects again were assured of the confidentiality of the information that they provided. A letter of appreciation was also forwarded in this final mailing. The study was concluded with a presentation of the completed report to the LRDA Board of Directors, along with an area media press release of the final results. The results will be prepared for publication in appropriate professional journals.

Summary of Methodology

Pilot Study

Part I. After meeting with the Lumbee Regional Development Association, a sample of 120 Lumbee Indian women was selected for collecting baseline diet information. Subjects were selected using random-digit telephone calls to local numbers. The investigator established convenient times and locations for interviewing each subject.

Part II. Data were obtained from each subject using a self-designed diet/health questionnaire, a 24-hour recall, a food-frequency questionnaire, and a 3-day food record.

Part III. Computer analysis of dietary data was conducted, organized, and interpreted. Comparisons of dietary instruments were made to determine which would be used during the experimental phase.

Experimental Phase

Part I. Recruitment began for participation in a nutrition education intervention focusing on the relationship between diet and cancer. Twenty-nine Indian women participated in a 6-week program.

Part II. Appropriate dietary instrument(s) (see Part II above), nutrition knowledge and eating patterns instruments were used to collect preintervention data at the beginning of the intervention.

Part III. The nutrition education intervention program was implemented. Participants were exposed to information from various sources regarding the relationship between diet and cancer.

Part IV. Posttest and post-posttest data from control and intervention subjects were collected and analyzed immediately following and four months after the intervention program. Results of the study was presented to residents of Robeson County via the media.

CHAPTER IV

RESULTS

This chapter describes the results obtained from the pilot study and from the experimental study. The hypotheses tested and the study designs were presented in Chapter III, Methods.

Pilot Study

The random-digit dialing process used initially to recruit pilot subjects proved to be ineffective in obtaining the desired number of subjects because of time and budgetary constraints. Therefore, a number of alternative recruitment methods were employed: advertisements were posted at worksites and health care clinics, an advertisement was placed in local newspapers, and word-of-mouth was used in the community. Through these efforts, a total of 165 women were recruited for the study. Using criteria indicated in Chapter III, these women were screened for participation in the pilot study of the project. One hundred and twenty women (73%) met the criteria for participation and agreed to be interviewed. Table 6 presents the ten major demographic

Table 6

Major Characteristics of Lumbee Pilot Participants ($\underline{n}$=120)

Mean Age (years)	37.9 ± 1.00
21-40 years (%)	77 (64.2)
41-60 years (%)	43 (35.8)
Mean Height (inches)	64.3 ± 0.2
Mean Weight (pounds)	158.4 ± 3.2
Mean Body Mass Index[1]	26.9 ± 0.6
Weight Classification[2] (%) from BMI Figures	
Normal Weight	59 (49.2)
Overweight	22 (18.3)
Obese	35 (29.2)
Insufficient Data	4 (3.3)
Marital Status (%)	
Single, Never Married	21 (17.5)
Married	72 (60.0)
Divorced/Separated	23 (19.2)
Widowed	4 (3.3)
Mean Number of Children	2.2 ± 0.1
Highest Level of Education Completed (%)	
Eighth through Eleventh Grade	4 (3.3)
Twelfth Grade	25 (20.8)
Community College or Two-Year Degree	24 (20.0)
Four-Year College Degree	34 (28.3)
Graduate Degree	9 (7.5)
High School Graduate Equivalence Diploma (GED)	5 (4.2)
Portion of a Post-Secondary Degree	19 (15.8)
Township (%)	
Pembroke	63 (52.5)
Lumberton	19 (15.8)
Fairmont	2 (1.7)
Maxton	13 (10.8)
Red Springs	2 (1.7)
Lumber Bridge	2 (1.7)
Shannon	5 (4.2)
Rowland	9 (7.5)
Saint Pauls	5 (4.2)

Table 6 (continued)

Employment Status (%)	
Unemployed	4 (3.3)
Student	2 (1.7)
Employed	114 (95.0)
Retail Sales	5 (4.2)
Health Care	8 (6.7)
Clerical	11 (9.2)
Lumbee Regional Development Association Employee	24 (20.0)
Education	25 (20.8)
Food Service	2 (1.7)
Retired	4 (3.3)
Housewife/Homemaker	3 (2.5)
Factory Employee	14 (11.7)
Pembroke State University Employee	8 (6.7)
Robeson County Health Care Corporation Employee	8 (6.7)
Federal/State Government	2 (1.7)

[1] Body Mass Index = weight (kg)/height^2 (m)

[2] Normal Weight = BMI < 26.0
Overweight = BMI between 26.0 and 29.0
Obese = BMI > 29.0

and anthropometric characteristics and Appendix O, Table 1 presents all demographic, anthropometric, health and dietary characteristics of this group, as derived from the Lifestyle/Health Awareness Questionnaire (Appendix D).

A large percentage of the participants in the pilot study were below 40 years of age (64.2%), married (60%), and moderately to significantly overweight (18.3% overweight, BMI > 26.0; 29.2% obese, BMI > 29.0). Using the mean height and weight for this group, a classification of overweight was established using standardized BMI charts (Table 6, footnote 2). A majority of participants were employed (96.7%), and had at least a high school education (96.7%). Over half of the participants lived in the township of Pembroke, while another 25% lived in either Lumberton or Maxton townships.

Following the interview protocol outlined in Chapter III, dietary data were collected from each participant using a 24-hour recall (Appendix E), a food frequency questionnaire (Appendix F), and a 3-day food record (Appendix G). These data were compiled for each instrument for all participants and for each of two age groups (21-40 and 41-60 years). Statistical comparisons for each of the 41 dietary constituents among the three instruments and between the two age groups were accomplished using Student's t test and analysis of variance (ANOVA) with the Statistical Package for the Social Sciences (SPSS) program (Chicago, Illinois). Pearson's correlation coefficients were also calculated to relationships between instruments. Data for the 15 dietary constituents most related to cancer risk are presented in Tables 8 through 12. Data for all 41 dietary constituents are presented in Appendix O, Tables O-2 through O-5.

Comparison of energy and nutrient intakes among the three instruments was an objective of the pilot study. Thus, the dietary constituents for which significant _t_ test differences were found between instruments for all participants are summarized in Table 7. Means for only three parameters (dietary fiber, percent calories from protein, and percent calories from carbohydrates) were significantly different when compared among all three instruments (Table 7). Lowest values for fiber and percent calories from carbohydrates, but highest values for percent calories from protein, were obtained using the food frequency questionnaire compared to the other two food intake instruments (Tables 9, 10). Significant differences in only five dietary constituents were found when the 24-hour recall and the 3-day food record were compared (Table 7). Values for the remaining 36 dietary constituents (energy, protein, carbohydrates, fat,

Table 7

Dietary Constituents for Which Significant Differences ($\underline{p} \leq 0.05$) Were Found Between Instruments for Lumbee Pilot Phase Participants

24-hour Recall & 3-day Record	**24-hour Recall & Food Freq.**	**3-day Record & Food Freq.**
	Energy	Energy
	Protein	Protein
	Carbohydrates	Carbohydrate
	Fat	Fat
	Saturated Fat	Saturated fat
		Cholesterol
Polyunsaturated Fat		
Dietary Fiber	Dietary Fiber	Dietary Fiber
	Retinol	
	Vitamin A	Vitamin C
	Vitamin C	Thiamin
	Thiamin	Riboflavin
		Niacin
	Niacin	Phosphorus
	Phosphorus	Iron
	Iron	Sodium
	Sodium	Potassium
% Calories from Protein	Potassium	% Calories from Protein
	% Calories from Protein	
% Calories from Carbohydrates		% Calories from Carbohydrates
	% Calories from Carbohydrates	
		% Calories from Fat
	% Calories from Fat	
	% Calories from Alcohol	
% Calories from PUFAs		

Table 8

Estimated Daily Consumption (Mean ± SEM) of Energy, Total Protein, Total Carbohydrates, and Total Fat by Instrument and Age Group for Lumbee Pilot Phase Participants.

	All	21-40 Years	41-60 Years	Between Age Groups1
Energy (kcal)				
24-hour recall	1520 ± 54^{b}[2] (*n*=120)[3]	1570 ± 67^{b} (*n*=77)	1430 ± 89^{b} (*n*=43)	NS
3-day food records	1538 ± 46^{b} (*n*=107)	1605 ± 62^{b} (*n*=65)	1434 ± 63^{b} (*n*=42)	NS
Food frequency	1092 ± 35^{a} (*n*=119)	1165 ± 48^{a} (*n*=76)	964 ± 42^{a} (*n*=43)	*
Protein (g)				
24-hour recall	53 ± 3^{b} (*n*=120)	54 ± 3^{b} (*n*=77)	50 ± 4^{a} (*n*=43)	NS
3-day food records	57 ± 2^{b} (*n*=107)	58 ± 2^{b} (*n*=65)	56 ± 3^{b} (*n*=42)	NS
Food frequency	44 ± 1^{a} (*n*=119)	46 ± 2^{a} (*n*=76)	41 ± 2^{a} (*n*=43)	NS
Carbohydrates (g)				
24-hour recall	198 ± 7^{b} (*n*=120)	204 ± 10^{b} (*n*=77)	188 ± 11^{b} (*n*=43)	NS
3-day food records	190 ± 6^{b} (*n*=107)	201 ± 8^{b} (*n*=65)	172 ± 8^{b} (*n*=42)	*
Food frequency	122 ± 4^{a} (*n*=119)	127 ± 6^{a} (*n*=76)	113 ± 5^{a} (*n*=43)	NS
Fat (g)				
24-hour recall	58 ± 3^{b} (*n*=120)	61 ± 3^{b} (*n*=77)	55 ± 5^{b} (*n*=43)	NS
3-day food records	62 ± 3^{b} (*n*=107)	64 ± 3^{b} (*n*=65)	59 ± 4^{b} (*n*=42)	NS
Food frequency	48 ± 2^{a} (*n*=119)	53 ± 3^{a} (*n*=76)	39 ± 2^{a} (*n*=43)	*

[1] NS represents Not Significant; * denotes a significant difference at $p<0.05$.

[2] Superscripts denote significant differences between instruments. Means with different superscripts are significantly different at $p \leq 0.05$.

[3] Values in parentheses represent the number of participants for which useable data were obtained.

Table 9

Estimated Daily Consumption (Mean ± SEM) of Percent Calories From Energy Macronutrients by Instrument and Age Group for Lumbee Pilot Phase Participants

	All	21-40 Years	41-60 Years	Between Age Groups[1]
Protein (%)				
24-hour recall	14 ± 0.5[a,2] (n=120)[3]	14 ± 0.6[a] (n=77)	14 ± 0.8[a] (n=43)	NS
3-day food records	15 ± 0.4[b] (n=107)	15 ± 0.5[a] (n=65)	16 ± 0.6[b] (n=42)	NS
Food frequency	16 ± 0.3[c] (n=119)	16 ± 0.3[b] (n=76)	17 ± 0.5[b] (n=43)	NS
Carbohydrates (%)				
24-hour recall	53 ± 1.1[c] (n=120)	52 ± 1.2[b] (n=77)	54 ± 2.0[b] (n=43)	NS
3-day food records	50 ± 0.8[a] (n=107)	50 ± 1.0[b] (n=65)	49 ± 1.3[a] (n=42)	NS
Food frequency	45 ± 0.8[b] (n=119)	44 ± 0.9[a] (n=76)	47 ± 1.3[a] (n=43)	*
Fat (%)				
24-hour recall	34 ± 0.8[a] (n=120)	34 ± 1.0[a] (n=77)	34 ± 1.5[a] (n=43)	NS
3-day food records	36 ± 0.7[a] (n=107)	35 ± 0.9[a] (n=65)	36 ± 1.1[a] (n=42)	NS
Food frequency	39 ± 0.6[b] (n=119)	40 ± 0.8[b] (n=76)	36 ± 1.1[a] (n=43)	*

[1] NS represents Not Significant; * denotes a significant difference at $p \leq 0.05$.

[2] Superscripts denote significant differences between instruments. Means with different superscripts are significantly different at $p \leq 0.05$.

[3] Values in parentheses represent the number of participants for which useable data were obtained.

Table 10

Estimated Daily Consumption (mean ± SEM) of Cholesterol, Saturated Fat, and Dietary Fiber by Instrument and Age Group for Lumbee Pilot Phase Participants

	All	21-40 Years	41-60 Years	Between Age Groups[1]
Cholesterol (mg)				
24-hour recall	186 ± 12^{ab}[2] (n=120)[3]	188 ± 13^{a} (n=77)	184 ± 22^{ab} (n=43)	NS
3-day food record	207 ± 11^{b} (n=107)	199 ± 13^{a} (n=65)	219 ± 19^{b} (n=42)	NS
Food frequency	185 ± 8^{a} (n=119)	199 ± 11^{a} (n=76)	161 ± 11^{a} (n=43)	*
Saturated Fat (g)				
24-hour recall	21 ± 1.0^{b} (n=120)	21 ± 1.1^{b} (n=77)	19 ± 1.7^{b} (n=43)	NS
3-day food record	21 ± 0.9^{b} (n=107)	22 ± 1.2^{ab} (n=65)	19 ± 1.1^{b} (n=42)	NS
Food frequency	17 ± 0.7^{a} (n=119)	19 ± 1.0^{a} (n=76)	14 ± 0.8^{a} (n=43)	*
Dietary Fiber (g)				
24-hour recall	9 ± 0.5^{b} (n=120)	9 ± 0.5^{b} (n=77)	10 ± 0.9^{b} (n=43)	NS
3-day food record	10 ± 0.4^{c} (n=107)	10 ± 0.5^{b} (n=65)	11 ± 0.6^{b} (n=42)	*
Food frequency	6 ± 0.2^{a} (n=119)	6 ± 0.3^{a} (n=76)	7 ± 0.5^{a} (n=43)	*

[1] NS represents Not Significant; * denotes a significant difference at $p \leq .05$.

[2] Superscripts denote significant differences between instruments. Means with different superscripts are significantly different at $p \leq .05$.

[3] Values in parentheses represent the number of participants for which useable data were obtained.

Table 11

Estimated Daily Consumption (Mean ± SEM) of Antioxidant Nutrients by Instruments and Age Group for Lumbee Pilot Phase Participants

	All	21-40 Years	41-60 Years	Between Age Groups[1]
Vitamin A (IU)				
24-hour recall	3045 ± 512[a][2] (n=120)[3]	2076 ± 360[a] (n=77)	4779 ± 1240[a] (n=43)	*
3-day food record	4083 ± 583[ab] (n=107)	3150 ± 579[a] (n=65)	5528 ± 1159[a] (n=42)	NS
Food frequency	5010 ± 258[b] (n=119)	4447 ± 283[b] (n=76)	6006 ± 475[a] (n=43)	*
Beta-Carotene (ug)				
24-hour recall	1399 ± 264[a] (n=120)	987 ± 212[a] (n=77)	2136 ± 623[a] (n=43)	NS
3-day food record	1835 ± 263[a] (n=107)	1521 ± 338[ab] (n=65)	2320 ± 412[a] (n=42)	NS
Food frequency	1928 ± 124[a] (n=119)	1580 ± 125[b] (n=76)	2544 ± 236[a] (n=43)	*
Retinol (ug)				
24-hour recall	213 ± 70[a] (n=120)	129 ± 17[a] (n=77)	364 ± 193[a] (n=43)	NS
3-day food record	307 ± 84[ab] (n=107)	184 ± 20[b] (n=65)	498 ± 209[a] (n=42)	NS
Food frequency	458 ± 38[b] (n=119)	461 ± 50[c] (n=76)	453 ± 58[a] (n=43)	NS
Vitamin C (mg)				
24-hour recall	55 ± 5[a] (n=120)	45 ± 5[a] (n=77)	72 ± 11[a] (n=43)	*
3-day food record	56 ± 4[a] (n=107)	49 ± 4[a] (n=65)	66 ± 7[a] (n=42)	*
Food frequency	70 ± 4[b] (n=119)	66 ± 4[b] (n=76)	77 ± 7[a] (n=43)	NS

Table 11 (continued)

	All	21-40 Years	41-60 Years	Between Age Groups[1]
Vitamin E (mg ATE[4])				
24-hour recall	6 ± 0.4^a (n=120)	5 ± 0.4^a (n=77)	7 ± 0.8^a (n=43)	NS
3-day food record	6 ± 0.3^a (n=107)	6 ± 0.4^a (n=65)	7 ± 0.6^a (n=42)	NS

[1] NS represents Not Significant; * denotes a significant difference at $p \leq 0.05$.

[2] Superscripts denote significant differences between instruments. Means with different superscripts are significantly different at $p \leq 0.05$.

[3] Values in parentheses represent the number of participants for which useable data were obtained.

[4] ATE = Alpha-Tocopherol Equivalents

The food frequency questionnaire was not designed to estimate intake of vitamin E.

alcohol, saturated fat, monounsaturated fat, cholesterol, animal protein, vegetable protein, vitamin A, beta-carotene, retinol, vitamin C, vitamin E, thiamin, riboflavin, niacin, folacin, vitamin B12, vitamin B6, phosphorus, magnesium, iron, zinc, copper, sodium, potassium, calcium, caffeine, percent calories from fat, percent calories from alcohol, percent calories from saturated fat, percent calories from monounsaturated fat, P:S ratio, and CSI ratio) were similar when either the 24-hour recall or the 3-day food record were used (Tables 8-11; Appendix O, Table O-4). In contrast, means for 13 dietary constituents (energy, protein, carbohydrates, fat, saturated fat, fiber, thiamin, niacin, phosphorus, iron, sodium, potassium, and percent calories from carbohydrates) were significantly greater and three (vitamin C, percent calories from protein and percent calories from fat) were significantly lower when the 24-hour recall or the 3-day food record was compared to the food frequency questionnaire (Table 7). Retinol consumption was greater using the food frequency questionnaire than the 24-hour recall, and cholesterol consumption was greater using the 3-day food record than using the food frequency questionnaire (Tables 7, 10, 11). Thus, the 3-day food record and the 24-hour recall were more consistent in measuring intakes of dietary constituents than the food frequency questionnaire.

When the data were analyzed by age group, significant differences in single nutrients, energy, or fiber intakes were found in one or two but not in all three instruments (Table 12). Significant differences in intakes between age groups were found in two instruments for only four parameters: vitamin C, magnesium and potassium (24-hour recall and 3-day food record); and dietary fiber (3-day food record and food frequency questionnaire). Differences in intakes between age groups were found for ten dietary constituents using the food frequency questionnaire, while seven were found for the 3-day food record and four for the 24-hour recall (Table 12). Using the 24-hour recall, 21-40 year-old subjects consumed significantly less ($p \leq 0.05$) vitamin A, vitamin C, magnesium, and potassium than 41-60 year-old subjects (Table 11; Appendix O, Table 0-3). Using the 3-day food record, 21-40 year-old participants consumed significantly more total carbohydrates (Table 8), and significantly less dietary fiber (Table 10), vitamin C (Table 11), folacin, vitamin B6, magnesium, and potassium (Appendix O, Table 0-3) than the 41-60 year-old group. Using the food frequency measurement, 21-40 year-old participants consumed significantly more total energy and total fat

Table 12

Dietary Constituents for Which Significant Differences ($p \leq 0.05$) Were Found Between Age Groups for Lumbee Pilot Phase Participants

24-hour Recall	**3-day Food Record**	**Food Frequency**
		Energy
	Carbohydrates	
		Fat
		Saturated Fat
		Cholesterol
	Dietary Fiber	Dietary Fiber
Vitamin A		Vitamin A
		Beta-Carotene
Vitamin C	Vitamin C	
	Folacin	
	Vitamin B6	
Magnesium	Magnesium	
		Sodium
Potassium	Potassium	
		% Calories from Carbohydrates
		% Calories from Fat

(Table 8), total saturated fat and cholesterol (Table 10), sodium (Appendix O, Table 0-3), and percent calories from fat (Table 9); and significantly less dietary fiber (Table 10), vitamin A and beta-carotene (Table 11), and percent calories from carbohydrates (Table 9) than 41-60 year-old participants. Thus, no consistent pattern occurred across instruments for age group differences, with the food frequency questionnaire indicating more age group differences than the other two instruments.

Table 13 summarizes significant age group differences for each instrument for $\underline{t}$ test and ANOVA comparisons (see also Appendix O, Table 0-6). Inconsistencies between analyses occurred for only four nutrients across all instruments ($\underline{t}$ test: magnesium for 24-hour recall, sodium for food frequency; ANOVA: copper for 24-hour recall, vitamin A for 3-day food record). For each nutrient comparison for which inconsistencies between analyses were found, the tests were close to the established level of significance. For example, the $\underline{p}$ value associated with the $\underline{t}$ value for the 3-day food record for vitamin A, which was significant at $\underline{p} \leq 0.05$ (0.046) using the ANOVA test, was 0.071 using the $\underline{t}$ test analysis. Similarly, the $\underline{p}$ value associated with the $\underline{F}$ value for the 24-hour recall for magnesium, which was significant at $\underline{p} \leq 0.05$ (0.023) using the $\underline{t}$ test, was 0.056 using the ANOVA test (Appendix

Table 13

Summary of Significant Age Differences by Instrument for *t* Test and ANOVA Comparisons for Lumbee Pilot Participants

24-Hour Recall		3-Day Food Record		Food Frequency	
t Test	ANOVA	*t* Test	ANOVA	*t* Test	ANOVA
				Energy	Energy
		Carbohydrates	Carbohydrates		
				Fat	Fat
				Saturated Fat	Saturated Fat
				Cholesterol	Cholesterol
		Dietary Fiber	Dietary Fiber	Dietary Fiber	Dietary Fiber
Vitamin A	Vitamin A		**Vitamin A**	Vitamin A	Vitamin A
				Beta-Carotene	Beta-Carotene
Vitamin C	Vitamin C	Vitamin C	Vitamin C		
		Folacin	Folacin		
		Vitamin B6	Vitamin B6		
Magnesium		Magnesium	Magnesium		
				Sodium	
	Copper				
Potassium	Potassium	Potassium	Potassium		
				% Cals. CHO	% Cals. CHO
				% Cals. Fat	% Cals. Fat

O, Table 0-6). Thus, the _t_ test and ANOVA analyses were very similar in detecting significance for dietary constituents between age groups for all three instruments.

Correlations between instruments were determined for each dietary constituent in order to provide another means of identifying those instruments with the greatest similarity in measuring reported intakes. Although correlations above 0.5 were seldom found (using all participants, two were found; and four were found in age group relationships), the number of significant correlations for dietary constituents measured in all three instruments was greatest between the 3-day food record and the food frequency questionnaire (17 in Table 0-4, Appendix O and 23 in Table 0-5, Appendix O). This analysis suggested that the 3-day food record and the food frequency questionnaire were more similar in ability to estimate intakes of these dietary constituents than either were when compared with the 24-hour recall.

The decision was made to use the 3-day food record and the food frequency questionnaire for measurement of food intake during the experimental phase of the project. The decision to use the 3-day food record was based on the following factors: high congruence between reported mean nutrient consumption for the 24-hour recall and the 3-day food record (see Table 7), coupled with high return rates for 3-day food records in the pilot phase (107 of 120, 89%), and time constraints for conducting face-to-face 24-hour recalls. The food frequency questionnaire was retained in order to aid in estimating long-term consumption of the various food groups.

Table 14 compares the pilot data for energy, dietary fiber, and selected nutrients for each instrument to similar data from other nutritional studies conducted with Native American tribes. The U. S. average consumption of these dietary constituents from national nutrition surveys (National Health and Nutrition Examination Survey II, and the Nationwide Food Consumption Survey of 1987-88) for comparable age and gender groups, and recommended intakes from the Recommended Dietary Allowances, National Cancer Institute, Dietary Guidelines for Americans, or Dietary Goals for the United States are also presented in this table.

The mean intake of energy and dietary fiber for the pilot participants was considerably lower than the intakes recommended (Table 14). Data for these parameters from the 3-day food records and 24-hour recalls more closely resembled these recommendations, as well as the U.S. averages, than the lower values generated by the food frequency questionnaire. Reported weekly mean intake of

Table 14

Comparison of Lumbee Pilot Data With Dietary Recommendations and Other Native American Nutritional Studies

	PILOT DATA[1]	1989 RDAs; OTHER RECOMMENDA-TIONS[2]	U.S. AVERAGE[3]	HARLAND STUDY[4]	BUCKLEY STUDY[5]	WOLFE STUDY[6]	BASS STUDY[7]	MAYBERRY STUDY[8]	TEUFEL STUDY[9]	REID STUDY[10]
ENERGY (kilocalories)	1520 1538 1093	1900-2200	1401-1687 1466-1577	1643	2247 2405	1632	1497	1864	2554	3164
FAT (g)	58 62 48	N/A	57-68 60.1-64.7	89	104 90	56	61	90	99.7	155
SATURATED FAT (g)	21 21 17	<10% OF CALORIES	20-24 21.1-23.5	28	N/A	N/A	N/A	32	40.0	55.9
% CALORIES FROM:										
CARBOHYDRATES	53 50 45	58	44-47 45.7-47.7	39	46 49	54	51	44	52.5	44.0
FAT	34 36 39	30	35.2-36.9 35.5-37.3	47.3	39 36	31	37	44	35.0	44.1
PROTEIN	14 15 16	12	15-16 12.3-13.2	13.7	14 15	16	14	12	12.5	11.5
VITAMIN A (IUs)	3045 4083 5010	4000	3951-5507 5046-6076	7440	N/A	3205	4635	N/A	N/A	N/A
VITAMIN C (mg)	55 56 70	60	83-107 76-91	77	157 206	62	49	N/A	N/A	N/A
VITAMIN E (mg ATE*)	5.9 6.3 N/A	8	6.6-7.12 6.7-7.2	N/A	10 11	N/A	N/A	N/A	N/A	N/A
DIETARY FIBER (g)	9.2 10.2 6.0	20-30	8.1-11.1 10.3-12.5	8	N/A	3.1	N/A	N/A	4.7	N/A
FRUIT SERVINGS/WEEK	4.6	14 (2/DAY)		N/A	N/A	N/A	N/A	N/A	N/A	N/A
VEG. SERVINGS/WEEK	8.8	21 (3/DAY)		N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 14 (continued)

[1]Pilot Data: Top value = 24-hour recall; Middle value = 3-day food record; Bottom Value = Food frequency questionnaire.

[2]Recommended intake of saturated fat based on Nutrition and Your Health: Dietary Guidelines for Americans. U.S. Department of Agriculture and U.S. Department of Health and Human Services, Home and Garden Bulletin No. 232, 2nd edition, 1985. Recommended percent Calories from energy nutrients based on Dietary Goals for the United States, 2nd edition, U.S. Senate Select Committee on Nutrition and Human Needs, 1976. Intake of dietary fiber and fruits and vegetables based on recommendations by the National Cancer Institute and the United States Department of Agriculture.

[3]U.S. averages based on data from National Health and Nutrition Examination Survey II (top) and the Nationwide Food Consumption Survey (1987-88, bottom) for women of comparable age.

[4]N = 21 Waccamaw-Siouan Indian women ages 18 to 87 years. Dietary measurement instrument used: Gladys Block Food Frequency Questionnaire.

[5]N = 42 case (top value) and 58 control (bottom value) southwestern American Indian women ages 18-67. Dietary measurement instrument used: 24-hour recalls.

[6]N = 107 Navajo Indian women ages 20 to 90 years. Dietary measurement instrument used: 24-hour recalls.

[7]N = 94 Sioux Indian women ages 19-75. Dietary measurement instrument used: 24-hour recalls.

[8]N = 34 Seminole Indian women (mean age 39 years). Dietary measurement instrument used: 24-hour recalls.

[9]N = 28 Hualapai Indian women ages 18-35 years. Dietary measurement instrument used: 7 consecutive-day 24-hour recalls.

[10]N = 277 Pima Indian women (diabetic and non-diabetic) ages 25 to 44 years. Dietary measurement instrument used: 24-hour recalls.

*ATE = Alpha Tocopherol Equivalents

fruits and vegetables was also considerably lower than the intakes recommended by the National Cancer Institute (see footnote 2, Table 14). For all instruments, reported mean percent calories from fat was higher than the recommendation of 30%, but closely resembled U.S. averages. Also, means for percent calories from carbohydrates for all instruments were somewhat lower than recommendations, especially for the food frequency questionnaire, but compared more closely with U.S. averages. The mean intake of vitamin A using the 3-day food record was closest to the RDA level compared to a lower mean for the 24-hour recall and a higher mean for the food frequency questionnaire. Means for all other parameters compared closely with recommendations and U.S. averages. Intakes of energy, fat, percent of calories from fat, and vitamin A, as measured by the same food frequency questionnaire used in the present study, were considerably higher for the females in the Harland study (Waccamaw-Siouan Indians of Columbus County, NC) than for the Lumbee participants.

Table 15 presents the mean weekly number of servings from several food groups generated from responses to questions on the food frequency questionnaire (Appendix O, Table O-7). The younger age group reported eating

Table 15

Reported (Mean ± SEM) Weekly Servings of Foods Obtained from the Food Frequency Questionnaire for Lumbee Pilot Phase Participants

Food Group	Weekly Servings All (n=119)	21-40 (n=76)	41-60 (n=43)
Fruit or Juice	5.5 ± 0.4	4.8 ± 0.4[a1]	6.9 ± 0.7[b]
Citrus Fruit or Juice	2.4 ± 0.2	2.4 ± 0.3	2.5 ± 0.4
Vegetables	11.5 ± 0.5	11.0 ± 0.6	12.4 ± 1.1
Vegetables, Excluding Potatoes and Rice	7.0 ± 0.5	6.1 ± 0.5[a]	8.5 ± 1.0[b]
Salad	1.6 ± 0.1	1.5 ± 0.2	1.8 ± 0.2
Carrots	0.9 ± 0.1	0.7 ± 0.1[a]	1.2 ± 0.2[b]
Tomatoes	1.3 ± 0.2	1.1 ± 0.2	1.6 ± 0.3
Deep Yellow or Dark Green Vegetables	2.6 ± 0.2	2.0 ± 0.2[a]	3.6 ± 0.4[b]
Fish or Chicken	2.6 ± 0.2	2.5 ± 0.2	2.9 ± 0.3
Fried Fish or Chicken	1.2 ± 0.1	1.3 ± 0.1	1.1 ± 0.1
Whole Grain or Bran Cereals	1.9 ± 0.3	1.3 ± 0.3[a]	2.8 ± 0.4[b]
Eggs	1.2 ± 0.1	1.3 ± 0.2	1.0 ± 0.1
Alcoholic Beverages	0.1 ± 0.02	0.04 ± 0.02	0.86 ± 0.05
Beef	2.3 ± 0.2	2.6 ± 0.2[b]	1.8 ± 0.2[a]
Pork	0.8 ± 0.07	0.9 ± 0.09[b]	0.6 ± 0.11[a]
Hot Dogs or Luncheon Meats	1.7 ± 0.2	2.1 ± 0.3[b]	1.1 ± 0.2[a]
Butter or Margarine	1.3 ± 0.2	1.4 ± 0.3	1.1 ± 0.4
Cheeses, Excluding Cottage Cheese	1.3 ± 0.1	1.5 ± 0.2[b]	0.9 ± 0.2[a]
Whole Milk	0.8 ± 0.2	1.1 ± 0.2[a]	0.2 ± 0.1[b]
Ice Cream	1.1 ± 0.1	1.1 ± 0.2	0.9 ± 0.2
Pastries, Sweets, Sodas, Sugars	13.4 ± 0.9	15.0 ± 1.2[b]	10.6 ± 1.3[a]

[1] Superscripts denote significant differences between age groups. Means with different superscripts are significantly different at $p \leq 0.05$.

significantly fewer servings of fruit or juice, vegetables (excluding rice and potatoes), carrots, deep yellow or dark green vegetables, and whole grain or bran cereals; they reported consuming significantly more servings of beef, pork, hot dogs or luncheon meats, cheese (excluding cottage cheese), whole milk, and pastries, sweets, sodas, and sugars than the older age group.

Tables 16 and 17 summarize responses to questions regarding eating habits obtained from the food frequency questionnaire and the Lifestyle/Health Awareness Questionnaire (see also Appendix O, Table O-1). A majority of the subjects indicated that they do not eat the visible fat on meat and the skin on chicken. However, the variability of distribution of responses for removing skin from chicken was greater than for eating the visible fat on meat. For example, 34% indicated that they often or always ate skin on chicken, whereas 85% said they seldom or never ate the visible fat on meat. Also, 51% indicated that they seldom or never remove the skin on chicken, whereas only 9% said that they often or always eat visible fat on meat.

Pilot participants indicated that they consume approximately nine servings of vegetables (excluding salads and potatoes) per week, or a little more than one per day. By contrast, pilot participants consume less

Table 16

Responses (Number and %) to Eating Habits Questions From Food Frequency Questionnaire by Lumbee Pilot Phase Participants (n=119)

	Seldom/Never	Sometimes	Often/ Always
"How often do you eat the skin on chicken?"	61 (50.8%)	17 (14.2%)	41 (34.2%)
"How often do you eat the visible fat on meat?"	102 (85.0%)	6 (5.0%)	11 (9.2%)
"How often do you add salt to your food?"	44 (36.7%)	14 (11.7%)	61 (50.8%)
"How often do you add pepper to your food?"	30 (25.0%)	15 (12.5%)	74 (61.7%)

"Not counting salads or potatoes, about how many servings of vegetables do you eat per week?"

8.8

"Not counting juices, how many servings of fruits do you usually eat per week?"

4.6

"Do you use a vitamin/mineral supplement?"

Yes	No
46 (38.3%)	73 (60.8)

Table 17

Responses (Number and %) to Eating Habits Questions From Lifestyle/Health Awareness Questionnaire by Lumbee Pilot Phase Participants ($\underline{n}$=120).

	Yes	No
"Have you been instructed by a health professional to change your diet or lifestyle recently?"	46 (38.3%)	74 (61.7%)
"Do you consider yourself to be a healthy person?"	111 (92.5%)	7 (5.8%)
"Have you made any dietary changes in the past few years that you still adhere to today?"	91 (75.8%)	29 (24.2%)
"Do you exercise on a regular basis?"	58 (48.3%)	62 (51.7%)
"Do you have direct access to:		
Garden	99 (82.5%)	
Livestock	24 (20.0%)	
Fruit Trees/Vines	61 (50.8%)	
Fishing/Hunting Game"	46 (38.3%)	
"Do you now smoke?"	28 (23.3%)	92 (76.7%)
"Do you consume alcoholic beverages?"	14 (11.3%)	106 (88.3%)
"Do you feel that diet plays a role in cancer risk?"	63 (52.5%)	57 (47.5%)
"How would you classify your typical diet?"		
Very Good	5 (4.2%)	
Good	51 (42.5%)	
Not Good	26 (21.7%)	
Poor	36 (30.0%)	
No Response	2 (1.7%)	

than five servings of fruits (excluding juices) per week, or less than one per day. More than one-third (38%) indicated that they take some type of vitamin and/or mineral supplement on a regular basis.

A large proportion (92.5%) of the subjects indicated that they considered themselves to be healthy, yet over half (52%) felt that they had a diet that they would classify as either not good or poor (Table 17). Approximately three-fourths of the participants (76%) reported that they had made one or more specific dietary changes in the past five years to which they still adhered (see Appendix O, Table 0-1 for delineation of specific changes made). The most frequently reported change (61 of 91, or 67%) was in cooking technique/cooking oil, that is, changing from frying to baking.

Questions regarding access to foods revealed that most women (83%) have direct access to the produce from a garden, either their own personal garden, or that of a family member (Table 17). Approximately one-half (51%) indicated that they have access to fruit from trees and vines, while there appears to be less access to livestock (20%) and wild game (38%). Most participants (88%) were the primary buyers of food and did the food preparation for the family (Appendix O, Table 0-1). Almost half (48.3%) of the women indicated that they exercise on a regular basis. Almost one-fourth (23.3%) indicated that they smoke tobacco, and 11% said that they consume alcoholic beverages (beer, wine, liquor, or mixed drinks).

Subjects were asked if they felt that there was a link between diet and the risk of developing cancer (Table 17). They were then asked if they knew of a specific relationship between diet and cancer (see Lifestyle/Health Awareness Questionnaire in Appendix D). Over 50% were able to make a credible connection between diet and cancer, while 11% of those identified a relationship between dietary fat and cancer and 47% indicated a connection between cancer and more than one dietary component (for list of responses, see Appendix O, Table O-1).

Experimental Study

Participants in the pilot study were contacted by mail to determine their willingness to participate in the experimental study. A total of 50 women (42%) agreed to participate and were designated as controls.

During the Winter and Spring of 1993, a media campaign was employed to recruit area Lumbee women for participation in the experimental study. An advertisement for subjects appeared in area newspapers for a 6-week period. The same criteria used for inclusion in the pilot study were used for inclusion in the experimental study, that is: a Lumbee Indian woman between the ages of 21-60 years; presently not on a medically-prescribed diet or diet-altering medication; and, presently free from any diet-altering condition, including chronic illness or pregnancy. A total of 78 women responded to the advertisement and agreed to participate in the experimental phase. However, despite numerous attempts to retain participants through follow-up letters and phone calls, only 29 women (37%) attended at least one of the six education classes. Class attendance was monitored for every session. Almost half (13, 46.4% of total attendees) of the participants attended at least five classes, and 22 of 29 (76%) attended at least four classes (Table 18). Only one person who attended at least one session did not provide any pretest questionnaire information.

A barriers survey was conducted to determine the reasons for the low response rate (see Appendix P for a list of responses). Twenty of the 49 surveys (41%) that were mailed to nonparticipants were returned. One-half of the respondents to the survey (10) indicated that a schedule conflict kept them from participating in the program. Personal or family illness was also listed as a significant contributor to absenteeism.

Pretest

Table 18 provides selected characteristics of the control and intervention participants. Forty-one of the 50 women (82%) who agreed to participate as controls returned completed Eating Patterns Questionnaires (Appendix L) and Nutrition Knowledge Tests (Appendix M) mailed at the time of the beginning of the education program. Twenty-eight of the 29 intervention subjects (97%) provided at least some portion of the questionnaire information (Eating Patterns Questionnaire, Nutrition Knowledge Test, Food Frequency Questionnaire, 3-day food record) presented at the first class. Appendix O, Table O-1 presents responses to all questions from the Lifestyle/Health Awareness questionnaire for the 41 control and 28 intervention participants.

Mean weight and body mass index were significantly higher for the intervention group than the control group (Table 18). Over half of the intervention subjects were classified as obese according to BMI standards (54%), compared to 29% for the control group. Intervention subjects were less likely to exercise on a regular basis (10, 35.7% versus 23, 56.1% for controls), and somewhat more likely to have a negative perception of their health and eating habits (Appendix O, Table O-1). Seventy-one percent indicated that they had a "not good" or "very

Table 18

Characteristics of Lumbee Control (n=41) and Intervention (n=28) Participants

	Control	Intervention
Mean Age (yr)	39 ± 1.8	37 ± 2.0
Age 21-40 years (number, %)	25 (61.0%)	20 (71.4)
Age 41-60 years (number, %)	16 (39.0%)	8 (28.6)
Mean Height (inches)	64 ± 0.4	64 ± 0.6
Mean Weight (pounds)	160 ± 6.0	187 ± 8.3[1]
Mean Body Mass Index	27.3 ± 1.1	31.6 ±1.3[1]
Weight Classification (using BMI figures): number, %)		
Normal Weight	17 (41.5%)	6 (21.4%)
Overweight	11 (26.8%)	6 (21.4%)
Obese	12 (29.3%)	15 (53.6%)
No Response	1 (2.4%)	1 (3.6%)
Marital Status (number, %)		
Single, Never Married	6 (14.6%)	5 (17.9%)
Married	26 (63.4%)	18 (64.3%)
Divorced/Separated	9 (22.0%)	4 (14.3%)
Widowed	0 (0.0%)	1 (3.6%)
Mean Number of Children	2.0 ± 0.2	2.1 ± 0.3
Class Attendance		
Six Classes		6 (21.4%)
Five Classes		7 (25.0%)
Four Classes		9 (32.1%)
Three Classes		3 (10.7%)
Two Classes		1 (3.6%)
One Class		2 (7.1%)

[1] Significant differences between groups at ($p \leq 0.05$)

poor" diet, versus 48% of controls. Similarly, a smaller percentage of intervention subjects considered themselves to be healthy compared to controls (19 (67.9%) versus 38 (92.7%), respectively). A larger percentage of control subjects (25, 61%) could make a connection between diet and cancer compared to intervention subjects (11, 39.3%). A smaller percentage of intervention participants had some postsecondary education (46%) compared to controls (71%).

Tables 19 and 20 present comparisons of pretest mean energy and macronutrient consumption for control and intervention subjects. Using 3-day food records, control subjects had a significantly higher mean intake of total energy and total carbohydrates compared to intervention subjects. For food frequency questionnaires, calculated intake of total energy and total protein was significantly lower for control subjects compared to the intervention group. When mean reported intakes were compared between instruments, differences occurred more frequently for control than for intervention subjects (Tables 19 and 20). The food frequency questionnaire indicated lower mean intakes for all macronutrients except percent calories from protein and percent calories from fat.

Tables 21 and 22 present comparisons between the two participant groups and the two instruments for cholesterol, saturated fat, and dietary fiber, and for

Table 19

Pretest Estimated Daily Consumption (Mean ± SEM) of Energy, Total Protein, Total Carbohydrates, and Total Fat by Instrument for Lumbee Control and Intervention Participants[1]

	Control	Intervention	Between Groups[3]
Energy (kcal)			
3-day food records	1623 ± 61[b2]	1404 ± 92[a]	*
Food frequency	1078 ± 61[a]	1350 ± 119[a]	*
Protein (g)			
3-day food records	59 ± 2[b]	54 ± 3[a]	NS
Food frequency	42 ± 2[a]	54 ± 5[a]	*
Carbohydrates (g)			
3-day food records	208 ± 9[b]	178 ± 11[a]	*
Food frequency	124 ± 7[a]	151 ± 13[a]	NS
Fat (g)			
3-day food records	63 ± 3[b]	54 ± 5[a]	NS
Food frequency	46 ± 3[a]	59 ± 6[a]	NS

[1] _n_ for Control = 40 for 3-day food record and 41 for food frequency questionnaire. _n_ for Intervention = 25 for 3-day food record and 27 for food frequency questionnaire.

[2] Superscripts denote significant differences between instruments. Means with different superscripts are significantly different at $p \leq 0.05$.

[3] NS represents Not Significant; * denotes a significant difference at $p \leq 0.05$.

Table 20

Pretest Estimated Daily Consumption (Mean ± SEM) of Percent Calories From Macronutrients by Instruments for Lumbee Control and Intervention Participants[1]

	Control	Intervention	Between Groups[3]
Protein			
3-day food records	15 ± 0.5[a2]	16 ± 0.7[a]	NS
Food frequency	16 ± 0.5[a]	16 ± 0.6[a]	NS
Carbohydrates			
3-day food records	51 ± 0.1[b]	51 ± 1.2[a]	NS
Food frequency	47 ± 1.2[a]	46 ± 1.9[a]	NS
Fat			
3-day food records	35 ± 1.0[a]	34 ± 1.3[a]	NS
Food frequency	38 ± 1.0[b]	38 ± 1.5[b]	NS

[1] *n* for Control = 40 for 3-day food record and 41 for food frequency questionnaire. *n* for Intervention = 25 for 3-day food record and 27 for food frequency questionnaire.

[2] Superscripts denote significant differences between instruments using Student's *t*-test. Means with different superscripts are significantly different at $p \leq 0.05$.

[3] NS represents Not Significant; * denotes a significant difference at $p \leq 0.05$.

Table 21

Pretest Estimated Daily Consumption (Mean ± SEM) of Cholesterol, Saturated Fat, and Dietary Fiber Intake for Lumbee Control and Intervention Participants[1]

	Control	Intervention	Between Groups[3]
Cholesterol (mg)			
3-day food record	207 ± 11[a2]	196 ± 19[a]	NS
Food frequency	173 ± 14[a]	218 ± 26[a]	NS
Saturated Fat (g)			
3-day food record	21 ± 1.1[b]	19 ± 1.6[a]	NS
Food frequency	16 ± 1.2[a]	22 ± 2.3[a]	*
Dietary Fiber (g)			
3-day food record	11 ± 0.5[b]	12 ± 1.1[b]	NS
Food frequency	6 ± 0.3[a]	8 ± 0.8[a]	NS

[1] *n* for Control = 40 for 3-day food record and 41 for food frequency questionnaire. *n* for Intervention = 25 for 3-day food record and 27 for food frequency questionnaire.

[2] Superscripts denote significant differences between instruments. Means with different superscripts are significantly different at $p \leq 0.05$.

[3] NS represents Not Significant; * denotes a significant difference at $p \leq 0.05$.

Table 22

Pretest Estimated Daily Consumption (Mean ± SEM) of Antioxidant Nutrients by Instruments for Lumbee Control and Intervention Participants[1]

	Control	Intervention	Between Groups[3]
Vitamin A (IU)			
3-day food record	3890 ± 677[a2]	4056 ± 804[a]	NS
Food frequency	4786 ± 377[a]	6698 ± 924[a]	NS
Beta Carotene (ug)			
3-day food record	1891 ± 400[a]	1982 ± 469[a]	NS
Food frequency	1975 ± 198[a]	2383 ± 326[a]	NS
Retinol (ug)			
3-day food record	220 ± 22[a]	210 ± 32[a]	NS
Food frequency	388 ± 49[b]	561 ± 77[b]	NS
Vitamin C (mg)			
3-day food record	59 ± 6[a]	78 ± 10[a]	NS
Food frequency	68 ± 6[a]	117 ± 17[b]	*
Vitamin E (mg ATE[4])			
3-day food record	7 ± 0.5	6 ± 0.5	NS

[1] n for Control = 40 for 3-day food record and 41 for food frequency questionnaire. n for Intervention = 25 for 3-day food record and 27 for food frequency questionnaire.

[2] Superscripts denote significant differences between instruments. Means with different superscripts are significantly different at $p \leq 0.05$.

[3] NS represents Not Significant; * denotes a significant difference at $p \leq 0.05$.

[4] ATE = Alpha-Tocopherol Equivalents

The food frequency questionnaire was not designed to estimate intake of vitamin E.

several antioxidant nutrients. No significant differences were observed for 3-day food records, while vitamin C and saturated fat intake were significantly higher for intervention subjects compared to controls when the food frequency questionnaire was used. The food frequency instrument indicated lower means for saturated fat and dietary fiber and a higher mean for retinol in controls, while it resulted in a lower mean for dietary fiber and higher means for retinol and vitamin C in intervention participants.

Tables 23 and 24 summarize significant differences for all 41 nutrients by instrument and group, respectively (see also Appendix O, Tables O-8 to O-16). More differences occurred between instruments for control participants (13) than for intervention participants (5) (Table 23). Also, more group differences were observed using the food frequency questionnaire (10) than the 3-day food record (2) (Table 24).

Pretest nutrient data for 3-day food records and food frequency questionnaires for control participants were compared to that of pilot participants who did not participate in the experimental period to determine the consistency between the two groups (Appendix O, Table O-16). The means for only three dietary constituents (carbohydrates, sodium and calcium) were significantly

Table 23

Pretest Dietary Constituents for Which Significant Differences ($p \leq 0.05$) Were Found Between Instruments for Lumbee Control and Intervention Participants

Control Participants	Intervention Participants
3-day food record vs. Food frequency	3-day food record vs. Food frequency
Energy	
Protein	
Carbohydrates	
Fat	
Saturated Fat	
Dietary Fiber	Dietary Fiber
Retinol	Retinol
	Vitamin C
Thiamin	Thiamin
Riboflavin	
Niacin	
Phosphorus	
Iron	
Sodium	Sodium
Potassium	
% Calories from Carbohydrates	
% Calories from Fat	% Calories from Fat

Table 24

Pretest Dietary Constituents for Which Significant Differences ($\underline{P}$ $\leq$0.05) Were Found Between Groups for Each Instrument for Lumbee Control and Intervention Participants

3-day Food Record	Food Frequency
Energy	Energy
Carbohydrates	
	Protein
	Saturated Fat
	Vitamin C
	Thiamin
	Riboflavin
	Niacin
	Potassium
	Phosphorus
	Iron
	Calcium

different between groups using the 3-day food records, while no dietary constituents were significantly different between the two groups using the food frequency questionnaire. Thus, the control participants in the experimental study seem to adequately represent the pilot sample from which they were selected.

Table 25 outlines mean reported weekly food group consumption for control and intervention participants (see also Appendix O, Table 0-17). Only two significant differences were observed for food groups (citrus fruit or juice, and butter or margarine), with higher values being reported by intervention participants.

Table 26 compares responses by group to questions from the Nutrition Knowledge Test (see also Appendix O, Table 0-18). There was general agreement between groups for the most frequent response to each question. For questions pertaining to fat, the intervention group gave a "I Don't Know/Not Sure" (C) response more frequently (five of ten questions: 4, 7, 8, 9, and 10) than did the control group (two of ten questions: 8 and 9). Mean responses for one question (10) were significantly different between groups. For questions pertaining to fiber, "I Don't Know/Not Sure" was more frequently cited for two questions in both groups (questions 15 and 18).

Table 25

Pretest Reported (Mean ± SEM) Weekly Servings of Foods Obtained From the Food Frequency Questionnaire for Lumbee Control and Intervention Participants

Food Groups	Weekly Servings Control (n=41)	Intervention (n=27)
Fruit or Juice	5.9 ± 0.7	9.2 ± 1.6
Citrus Fruit or Juice	2.1 ± 0.4[a]	5.8 ± 1.4[b]
Vegetables	10.6 ± 0.7	12.9 ± 1.7
Vegetables, Excluding Potatoes and Rice	5.9 ± 0.5	6.9 ± 1.0
Salad	1.6 ± 0.2	1.4 ± 0.3
Carrots	0.9 ± 0.2	0.7 ± 0.2
Tomatoes	0.8 ± 0.2	0.6 ± 0.2
Deep Yellow or Dark Green Vegetables	2.5 ± 0.3	3.5 ± 0.6
Fish or Chicken	2.5 ± 0.2	2.8 ± 0.5
Fried Fish or Chicken	1.2 ± 0.1	1.5 ± 0.2
Whole Grain or Bran Cereals	2.3 ± 0.5	1.6 ± 0.5
Eggs	1.1 ± 0.2	1.4 ± 0.3
Alcoholic Beverages	0.02± 0.01	0.52± 0.40
Beef	2.2 ± 0.3	3.1 ± 0.5
Pork	0.6 ± 0.1	0.8 ± 0.1
Hot Dogs or Luncheon Meats	1.3 ± 0.2	1.5 ± 0.3
Butter or Margarine	0.9 ± 0.3[a]	2.6 ± 0.7[b]
Cheeses, Excluding Cottage Cheese	1.1 ± 0.2	2.0 ± 0.6
Whole Milk	0.8 ± 0.3	0.8 ± 0.4
Ice Cream	1.2 ± 0.3	0.8 ± 0.2
Pastries, Sweets, Sodas, Sugars	12.7 ± 1.3	16.1 ± 2.4

[1] Superscripts denote significant differences between groups. Means with different superscripts are significantly different at $p \leq 0.05$.

Table 26

Pretest Responses (Percentages) and Mean (± SEM) Responses to Questions From Nutrition Knowledge Test for Lumbee Control and Intervention Participants[1]

	1[2]	2	3	4	5	Mean ± SEM[4]
A. FATS IN FOODS						
1. Sherbet has less fat than ice cream	37% 38%	39%[3] 35%	17% 27%	2% 0%	5% 0%	2.00 ± 0.16 1.88 ± 0.16
2. The fat in chicken is almost all in the skin	34% 56%	59% 41%	2% 0%	5% 0%	0% 4%	1.78 ± 0.11 1.56 ± 0.16
3. When it comes to fat, potato chips and pretzels are about the same	0% 4%	5% 19%	27% 4%	39% 50%	29% 23%	3.93 ± 0.14 3.69 ± 0.23
4. At a fastfood restaurant, a fried fish sandwich has more calories and fat than a hamburger	2% 15%	15% 0%	34% 50%	42% 27%	7% 8%	3.37 ± 0.14 3.12 ± 0.22
5. Margarine has the same amount of fat as butter	5% 7%	17% 19%	5% 22%	66% 44%	7% 7%	3.54 ± 0.16 3.26 ± 0.21
6. Fish has almost as much fat as meat, it's just a different kind of fat	0% 4%	10% 12%	35% 24%	43% 52%	13% 8%	3.58 ± 1.33 3.48 ± 0.19
7. Creamy salad dressings (ranch, 1000 islands, etc.) have more fat than clear Italian dressing	0% 7%	51% 22%	20% 37%	20% 26%	10% 7%	2.88 ± 0.17 3.04 ± 0.20
8. Certain cuts of beef, like flank steak, are as low in fat as chicken	0% 4%	22% 19%	59% 48%	12% 30%	7% 0%	3.05 ± 0.13 3.04 ± 0.16
9. Powdered coffee creamers have a lot less fat than whole milk	2% 11%	29% 22%	37% 33%	27% 26%	5% 7%	3.02 ± 0.15 2.96 ± 0.22

Table 26 (continued)

		1	2	3	4	5	Mean ± SEM
10.	Many foods that are high in protein are also high in fat	7% 4%	37% 19%	29% 35%	27% 31%	0% 12%	$2.76^{a5} \pm 0.15$ $3.27^{b} \pm 0.20$
B.	<u>FIBER IN FOODS</u>						
11.	Most of the fiber in some fruits and vegetables (like apples, squash, cucumbers) is found in the skin	18% 26%	58% 59%	18% 4%	8% 11%	0% 0%	2.15 ± 0.13 2.00 ± 0.17
12.	Practically all Americans get enough fiber in their diet	0% 0%	7% 4%	2% 0%	54% 56%	37% 41%	4.20 ± 0.13 4.33 ± 0.13
13.	Brown rice or wild rice has more dietary fiber than white rice	10% 41%	56% 44%	29% 15%	5% 0%	0% 0%	$2.29^{b} \pm 0.11$ $1.74^{a} \pm 0.14$
14.	Popcorn and potato chips have about the same amount of fiber in a typical serving	0% 0%	5% 4%	29% 22%	54% 59%	12% 15%	3.73 ± 0.12 3.85 ± 0.14
15.	Per serving, lettuce has more dietary fiber than grapefruit	0% 0%	32% 26%	56% 56%	12% 11%	0% 7%	2.80 ± 0.10 3.00 ± 0.16
16.	Beans like kidney beans and lima beans are very good sources of dietary fiber	10% 41%	46% 37%	20% 19%	22% 4%	2% 0%	$2.61^{b} \pm 0.16$ $1.85^{a} \pm 0.17$
17.	Whole wheat bread has more than twice as much dietary fiber as white ("light") bread	12% 41%	59% 41%	22% 15%	7% 4%	0% 0%	$2.24^{b} \pm 0.12$ $1.81^{a} \pm 0.16$
18.	Beef like roasts and steaks are a very good source of dietary fiber	0% 0%	5% 7%	46% 44%	46% 30%	2% 19%	3.46 ± 0.10 3.59 ± 0.17

Table 26 (continued)

		1	2	3	4	5	Mean ± SEM
19.	All types of breakfast cereals are great sources of dietary fiber	3%	5%	5%	**68%**	20%	3.80 ± 0.13
		4%	4%	0%	**67%**	26%	4.01 ± 0.17
20.	Cooking fruits and vegetables greatly diminishes their fiber content	15%	**48%**	20%	13%	5%	2.45 ± 0.17
		8%	**41%**	33%	19%	0%	2.63 ± 0.17
C.	VITAMINS A, C, AND E IN FOODS						
21.	Dark green vegetables like turnips and mustard are very good sources of vitamin A	13%	**51%**	31%	3%	3%	2.31 ± 0.13
		27%	**46%**	23%	4%	0%	2.04 ± 0.16
22.	Beta-Carotene, found in foods like carrots, can be used like vitamin A in the body	5%	38%	**58%**	0%	0%	2.53^{b} ± 0.10
		26%	33%	**41%**	0%	0%	2.15^{a} ± 0.16
23.	Beef liver is a very good low-fat source of vitamin A	0%	13%	**65%**	20%	3%	3.13 ± 0.10
		11%	19%	**52%**	11%	7%	2.85 ± 0.20
24.	Dark green vegetables like mustard and peppers are very good sources of vitamin C	5%	31%	**39%**	23%	3%	2.87^{b} ± 0.15
		26%	26%	**44%**	4%	0%	2.26^{a} ± 0.17
25.	Some fruits like cantaloupe and tomatoes are high in both vitamin A and vitamin C	8%	**58%**	33%	3%	0%	2.30 ± 0.10
		11%	**44%**	**44%**	0%	0%	2.33 ± 0.13
26.	The content of vitamin A, C, and E in a food is not at all affected by cooking and processing	0%	5%	30%	**48%**	18%	3.78 ± 0.13
		0%	4%	**56%**	26%	15%	3.52 ± 0.15
27.	Palm oil is a healthier source of vitamin E for cooking than corn oil	0%	10%	**71%**	7%	12%	3.22 ± 0.12
		0%	15%	**58%**	23%	4%	3.15 ± 0.14

Table 26 (continued)

		1	2	3	4	5	Mean ± SEM
28.	Lean red meats are healthy sources of vitamin C	0%	3%	**55%**	38%	5%	3.45 ± 0.10
		0%	4%	**48%**	33%	15%	3.59 ± 0.15
29.	Milk and other dairy products are often fortified with vitamin A	15%	**37%**	29%	20%	0%	2.54 ± 0.15
		8%	**50%**	31%	12%	0%	2.46 ± 0.16
30.	All cooking oils are good sources of vitamin E	0%	2%	**49%**	37%	12%	3.59 ± 0.12
		0%	11%	**56%**	26%	7%	3.30 ± 0.15

[1] Top values, n=41 for control participants; Bottom values, n=27 for intervention participants.

[2] 1 = "I Strongly Agree" 2 = "I Agree"; 3 = "I Don't Know/Not Sure"; 4 = "I Disagree"; 5 = "I Strongly Disagree".

[3] Most frequent response is in bold face.

[4] Means and standard errors were obtained by assigning a value of 1 to response "I Strongly Agree", 2 to response "I Agree", 3 to response "I Dont' Know/Not Sure", 4 to response "I Disagree", and 5 to response "I Strongly Disagree", regardless of the direction of the correct response.

[5] Superscripts denote a significant difference ($p \leq 0.05$) was observed between groups using Student's t-test. Significantly lower values are denoted with an "a", and significantly higher values are denoted with a "b".

Mean responses between groups were significantly different for 3 of the 10 questions (13, 16, 17). Questions pertaining to antioxidant vitamins appeared to be the most difficult to answer for both groups. The intervention group chose "I Don't Know/Not Sure" more frequently for eight of the ten questions (questions 22, 23, 24, 25, 26, 27, 28, and 30) than did the control group (six questions). For four of those questions (23, 25, 26, 27, and 30), "I Don't Know/Not Sure" represented 50% or more of the total responses for the intervention group. Similarly, the control group had difficulty with six of the ten questions (questions 22, 23, 24, 27, 28, and 30). The "I Don't Know/Not Sure" response represented 50% or more of total responses for four of those six questions (22, 23, 27, and 28). Mean responses for two of the ten questions (22 and 24) were significantly different for the two groups.

Table 27 outlines responses to the Eating Patterns Questionnaire (see also Appendix O, Table O-19). General agreement between groups was observed for responses to most questions. Intervention subjects appeared more likely to eat chicken fried and to add butter or margarine to cooked vegetables, and less likely to choose extra lean ground beef over the past three months, choose low-fat milk or low-fat frozen desserts, and eat fried tortillas

Table 27

Pretest Comparison of Responses (Percentages) and Mean Responses (± SEM) to the Eating Patterns Questionnaire for Lumbee Control and Intervention Participants[1]

1. Ate Fish

Yes	33	(80.5%)	No	8	(19.5%)
	26	(92.9%)		2	(7.1%)

A.	Boiled, Baked, Poached	6%[2]	12%	30%	**36%**[3]	3.14 ± 0.18
		4%	12%	27%	**46%**	3.30 ± 0.18
B.	Fried	**49%**	21%	27%	3%	1.85 ± 0.16
		50%	19%	19%	8%	1.84 ± 0.21

2. Ate Chicken

Yes	41	(100.0%)	No	0	(0.0%)
	28	(100.0%)		0	(0.0%)

A.	Broiled, Baked	20%	28%	**43%**	10%	2.43 ± 0.15
		19%	26%	**44%**	11%	2.48 ± 0.18
B.	Fried	15%	31%	**41%**	13%	2.51 ± 0.15
		39%	23%	27%	12%	2.12 ± 0.21
C.	Took Off Skin	32%	5%	16%	**47%**	2.79 ± 0.22
		16%	16%	28%	**40%**	2.92 ± 0.22

3. Ate Spaghetti or Noodles

Yes	40	(97.6%)	No	1	(2.4%)
	26	(92.9%)		2	(7.1%)

A.	Plain, or Without Meat	23%	15%	28%	**35%**	2.75 ± 0.19
		27%	8%	15%	**50%**	2.88 ± 0.26

Table 27 (continued)

4.	Ate Red Meat					
	Yes 38 (92.7%) No 3 (7.3%)					
	28 (100.0%) 0 (0.0%)					
	A. Trimmed Visible Fat	**47%**	11%	29%	13%	2.08 ± 0.19
		36%	11%	25%	29%	2.46 ± 0.24
5.	Ate Ground Beef					
	Yes 36 (87.8%) No 5 (12.2%)					
	Yes 27 (96.4%) No 1 (3.6%)					
	A. Chose Extra Lean	**42%**	22%	22%	14%	2.08 ± 0.18
		30%	19%	**33%**	19%	2.41 ± 0.22
6.	Ate a Main Meal Without	0%	20%	**42%**	39%	3.20 ± 0.12
	Meat, Fish, Eggs, Cheese	0%	21%	21%	**57%**	3.36 ± 0.16
7.	Drank Milk					
	Yes 38 (92.7%) No 3 (7.3%)					
	26 (92.9%) 2 (7.1%)					
	A. Chose Very Low Fat or	**37%**	18%	16%	29%	2.37 ± 0.21
	Skim	19%	15%	12%	**54%**	3.00 ± 0.24
8.	Ate Cheese					
	Yes 36 (90.0%) No 4 (10.0%)					
	26 (92.9%) 2 (7.1%)					

Table 27 (continued)

A.	Chose Low-Fat	14%	22%	31%	**33%**	$2.83^{a4} \pm 0.18$
		4%	15%	23%	**58%**	$3.34^{b} \pm 0.18$
9.	Ate Frozen Desserts					
	Yes 36 (90.0%) No 4 (10.0%)					
	26 (92.9%) 2 (7.1%)					
A.	Chose Ice Milk, Nonfat, Ice Cream, Frozen Yogurt, Sherbet	17%	**31%**	25%	28%	$2.64^{a} \pm 0.18$
		0%	23%	**31%**	46%	$3.23^{b} \pm 0.16$
10.	Ate Cooked Vegetables					
	Yes 39 (97.5%) No 1 (0.0%)					
	28 (100.0%) 0 (0.0%)					
A.	Added Butter, Margarine	26%	26%	13%	**34%**	2.55 ± 0.20
		41%	26%	15%	19%	2.11 ± 0.22
11.	Ate Potatoes					
	Yes 40 (100.0%) No 0 (0.0%)					
	28 (100.0%) 0 (0.0%)					
A.	Fried	10%	23%	**50%**	18%	2.75 ± 0.14
		22%	7%	**44%**	26%	2.74 ± 0.21
12.	Ate Boiled, Baked Potatoes					
	Yes 40 (100.0%) No 0 (0.0%)					
	27 (96.4%) 1 (3.6%)					

Table 27 (continued)

	A.	Without Butter,	18%	8%	8%	**58%**	3.15 ± 0.18
		Margarine, Sour Cream	11%	15%	11%	**59%**	3.23 ± 0.22
13.	Ate Green Salads						
	Yes	37 (92.5%) No 3 (7.5%)					
		28 (100.0%) 0 (0.0%)					
	A.	Without Dressing	11%	0%	8%	**70%**	3.55 ± 0.18
			11%	7%	0%	**61%**	3.41 ± 0.24
	B.	Used Low-Calorie	27%	14%	**38%**	16%	2.46 ± 0.19
		Dressing	25%	7%	**39%**	21%	2.62 ± 0.22
14.	Ate Dessert						
	Yes	39 (97.5%) No 1 (2.5%)					
		28 (100.0%) 0 (0.0%)					
	A.	With Cream, Whipped	0%	8%	18%	**71%**	3.66 ± 0.10
		Topping	0%	4%	36%	**57%**	3.56 ± 0.11
	B.	Had Only Fruit	8%	**41%**	28%	21%	2.63 ± 0.15
			4%	21%	**43%**	25%	2.96 ± 0.16
15.	Ate Snacks						
	Yes	40 (97.6%) No 1 (2.4%)					
		28 (100.0%) 0 (0.0%)					
	A.	Had Raw Vegetables	3%	13%	**43%**	35%	3.19 ± 0.13
			0%	11%	**36%**	**36%**	3.30 ± 0.15
	B.	Had Fresh Fruits	15%	**40%**	30%	8%	2.32 ± 0.14
			14%	32%	**46%**	4%	2.41 ± 0.15

Table 27 (continued)

16.	Ate Bread Rolls, Muffins					
	Yes 41 (100.0%) No 0 (0.0%)					
	28 (100.0%) 0 (0.0%)					
A.	Without Butter,	**56%**	29%	12%	2%	1.61[a] ± 0.13
	Margarine	**32%**	18%	25%	25%	2.43[b] ± 0.23
17.	Ate Tortillas					
	Yes 21 (51.2%) No 20 (48.8%)					
	12 (42.9%) 16 (57.1%)					
A.	Fried	**29%**	19%	**29%**	14%	2.32 ± 0.25
		33%	25%	25%	17%	2.25 ± 0.33
B.	Without Butter,	**57%**	0%	5%	27%	2.05[a] ± 0.33
	Margarine	8%	17%	17%	**42%**	3.10[b] ± 0.35
18.	Ate Sauted, Pan Fried Food					
	Yes 35 (85.4%) No 6 (14.6%)					
	26 (92.9%) 2 (7.1%)					
A.	Used Non-Stick Spray	20%	9%	**40%**	31%	2.83 ± 0.19
		19%	8%	23%	**50%**	3.04 ± 0.23
19.	Cooked Red Meat					
	Yes 37 (90.2%) No 4 (9.8%)					
	28 (100.0)%) 0 (0.0%)					
A.	Trimmed Fat Before	**35%**	22%	24%	19%	2.27 ± 0.19
	Cooking	**39%**	7%	14%	**39%**	2.54 ± 0.26

Table 27 (continued)

20. Cooked Chicken						
Yes 40 (97.6%) No 1 (2.4%)						
27 (96.4%) 1 (3.6%)						
A.	Removed Skin Before Cooking	33%	5%	13%	**50%**	2.80 ± 0.22
		15%	11%	33%	**41%**	3.00 ± 0.21
21. Used Mayonnaise						
Yes 33 (80.5%) No 8 (19.5%)						
24 (85.7%) 4 (14.3%)						
A.	Used Lowfat or Nonfat Product	27%	12%	24%	**36%**	$2.70^a \pm 0.22$
		13%	8%	8%	**71%**	$3.38^b \pm 0.22$
Eating Patterns Scores						
	Total	2.66 ± 0.08				
		2.86 ± 0.09				
	Factor 1 Score (Modify meat)	2.55 ± 0.11				
		2.73 ± 0.15				
	Factor 2 Score (Avoid fat as flavoring)	2.34 ± 0.08				
		2.58 ± 0.11				
	Factor 3 Score (Replace, general foods)	2.96 ± 0.13				
		3.16 ± 0.13				
	Factor 4 Score (Substitute)	$2.60^a \pm 0.13$				
		$3.08^b \pm 0.12$				

Table 27 (continued)

Factor 5 Score (Replace, fruits/vegetables)	2.85 ± 0.11 2.78 ± 0.13

[1] Top value, n=41 for control participants; Bottom values, n=28 for intervention participants.

[2] Responses from left to right (1 to 4): "Usually/Always"; "Often"; "Sometimes"; "Rarely/Never".

[3] Most frequent response is in bold face.

[4] Superscripts denote a significant difference ($p \leq 0.05$) was observed between groups. Significantly lower values are denoted with an "a", and significantly higher values are denoted with a "b".

without butter or margarine, than control subjects. A majority of participants in both groups indicated that, over the past three months, they rarely or never took the skin off chicken before it was cooked or eaten; ate boiled, baked or poached fish; chose specially manufactured lowfat food products like cheese and mayonnaise; and ate boiled or baked potatoes without butter or margarine. Both groups frequently indicated that they usually or always ate fish fried and trimmed visible fat from red meat before cooking or eating. Mean scores for individual questions showed that control subjects more frequently chose lowfat cheeses (question 8a), chose lowfat frozen desserts (question 9a), ate bread without butter or margarine (question 16a), and ate tortillas without butter or margarine (question 17b) compared to intervention subjects. Mean scores for the total eating pattern questionnaire, and for 5 fat factors, ranged from 2.34 (factor 2, avoid fat as flavoring) to 2.85 (factor 5, replace, fruits and vegetables) for controls, and from 2.58 (factor 2) to 3.16 (factor 3, replace, general foods). Mean scores between groups were significantly different for factor 4 (substitution).

Posttest

Tables 28 and 29 present reported posttest mean energy and macronutrient intakes for control and intervention subjects as obtained from 3-day food records. Food frequency questionnaires were not administered at the posttest time of 6 weeks following the pretest, since the food frequency questionnaire is designed to estimate long term nutrient and food group consumption. The relatively short time between pretest and posttest did not warrant the administration of this instrument. Twenty-one control (51%) and 21 intervention (72%) subjects returned posttest food records. No significant differences in mean consumption were found for any of these parameters between the two groups. Similarly, no differences were observed for intake of cholesterol, saturated fat, and dietary fiber intake (Table 30), or for antioxidant nutrients (Table 31).

Table 32 summarizes statistically significant differences between the pretest and the posttest means for each group when nutrient intakes were estimated from 3-day food records (see also Appendix O, Tables O-20 and O-21). For intervention participants, only calcium intake significantly decreased from pretest to posttest (Appendix O, Table O-21). Decreases in the mean intake of total energy, total carbohydrates (Table 28) and saturated fat

Table 28

Posttest Estimated Daily Consumption (Mean ± SEM) of Energy, Total Protein, Total Carbohydrates, and Total Fat for Lumbee Control and Intervention Participants[1]

	Control	Intervention	Between Groups[2]
Energy (kcal) 3-day food records	1355 ± 82[a3]	1312 ± 70	NS
Protein (g) 3-day food records	56 ± 4	53 ± 4	NS
Carbohydrates (g) 3-day food records	175 ± 10[a]	166 ± 9	NS
Fat (g) 3-day food records	49 ± 5[a]	50 ± 4	NS

[1] _n_ = 21 for control participants; _n_ = 21 for intervention participants.

[2] NS represents Not Significant.

[3] Superscripts denote a significant difference ($p \leq 0.05$) was observed between pretest (Table 18) and posttest 3-day food record measurement for each group using Student's t-test. Significantly lower posttest values are denoted with an "a".

Table 29

Posttest Estimated Daily Consumption (Mean ± SEM) of Percent Calories From Energy Macronutrients for Lumbee Control and Intervention Participants[1]

	Control	Intervention	Between Groups[2]
Protein 3-day food records	17 ± 1.0	16 ± 0.8	NS
Carbohydrates 3-day food records	52 ± 1.9	51 ± 1.7	NS
Fat 3-day food records	32 ± 1.7	34 ± 1.6	NS

[1] n = 21 for control participants; n =21 for intervention participants.

[2] NS represents Not Significant.

Table 30

Posttest Estimated Daily Consumption (Mean ± SEM) of Cholesterol, Saturated Fat, and Dietary Fiber for Lumbee Control and Intervention Participants[1]

	Control	Intervention	Between Groups[2]
Cholesterol (mg) 3-day food record	171 ± 24	194 ± 20	NS
Saturated Fat (g) 3-day food record	16 ± 1.5[a3]	17 ± 1.3	NS
Dietary Fiber (g) 3-day food record	11 ± 1.0	11 ± 1.4	NS

[1] *n* = 21 for control participants; *n* =21 for intervention participants.

[2] NS represents Not Significant.

[3] Superscripts denote a significant difference ($p \leq 0.05$) was observed between pretest and posttest 3-day food record measurement for each group using Student's *t*-test. Significantly lower posttest values are denoted with an "a".

Table 31

Posttest Estimated Daily Consumption (Mean ± SEM) of Antioxidant Nutrients for Lumbee Control and Intervention Participants[1]

	Control	Intervention	Between Groups[2]
Vitamin A (IU) 3-day food record	4651 ± 1377	4141 ± 865	NS
Beta Carotene (ug) 3-day food record	1694 ± 622	1998 ± 499	NS
Retinol (ug) 3-day food record	547 ± 173	241 ± 44	NS
Vitamin C (mg) 3-day food record	63 ± 10	80 ± 10	NS
Vitamin E (mg ATE[3]) 3-day food record	8 ± 1.7	6 ± 0.7	NS

[1] *n* = 21 for control participants; *n* =21 for intervention participants.

[2] NS represents Not Significant.

[3] ATE = Alpha-Tocopherol Equivalents

Table 32

Dietary Constituents for Which Significant Differences ($p \leq 0.05$) Were Found Between Pretest and Posttest 3-Day Food Record Measurements for Lumbee Control and Intervention Participants

Control Participants	Intervention Participants
Significantly lower from pretest to post-test	Significantly lower from pretest to post-test
Energy	Calcium
Carbohydrates	
Fat	
Saturated Fat	
Monounsaturated Fat	
Polyunsaturated Fat	
Sodium	
CSI Ratio	

(Table 30) approached significance ($\underline{p} \leq 0.10$). No increases in mean intakes of intervention participants were found for any of the dietary constituents. For control subjects, the intake of total energy, total carbohydrates, total fat (Table 28), saturated fat (Table 30), monounsaturated fat, polyunsaturated fat, and sodium (Appendix O, Table 0-21) were significantly lower at the posttest measurement. Similarly, CSI ratio decreased significantly compared to pretest measurements for control subjects (Appendix O, Table 0-21).

Table 33 compares pretest and posttest responses to questions from the Nutrition Knowledge Test for control and intervention subjects (see also Appendix O, Tables 0-22 and 0-23). No general change in frequency of responses occurred between pretest and posttest measurements for control subjects. For intervention subjects, a noticeable shift in frequency of responses occurred for questions 6, 7, 9, 10, 18, 23, 24, and 26. For each of these questions, the shift in responses was away from "I Don't Know/Not Sure" to a more definitive response. For example, from the pretest questionnaires, 52% of intervention respondents were not sure ("I Don't Know/Not Sure") and 11% disagreed that beef liver is a good lowfat source of vitamin A (Question 23). By contrast, 55% of responses to the same question in the posttest was "I

Table 33

Pretest and Posttest Responses (Percentages) and Mean (± SEM) Responses to Questions from Nutrition Knowledge Test for Lumbee Control and Intervention Participants[1]

	1[2]	2	3	4	5	Mean ± SEM[3]
A. FATS IN FOODS						
1. Sherbet has less fat than ice cream	37%	39%[4]	17%	2%	5%	2.00 ± 0.16
	40%	45%	10%	10%	5%	1.85 ± 0.22
	38%	35%	27%	0%	0%	1.88[b5] ± 0.16
	65%	35%	0%	0%	0%	1.32[a] ± 0.11
2. The fat in chicken is almost all in the skin	34%	59%	2%	5%	0%	1.78 ± 0.11
	20%	70%	0%	10%	0%	2.00 ± 0.18
	56%	41%	0%	0%	4%	1.56 ± 0.16
	65%	20%	10%	5%	0%	1.55 ± 0.20
3. When it comes to fat, potato chips and pretzels are about the same	0%	5%	27%	39%	29%	3.93 ± 0.14
	0%	10%	10%	55%	25%	3.95 ± 0.20
	4%	19%	4%	50%	23%	3.69 ± 0.23
	5%	10%	0%	50%	35%	3.95 ± 0.26
4. At a fastfood restaurant, a fried fish sandwich has more calories and fat than a hamburger	2%	15%	34%	42%	7%	3.37[b] ± 0.14
	0%	25%	40%	35%	0%	3.10[a] ± 0.18
	15%	0%	50%	27%	8%	3.12 ± 0.22
	15%	15%	40%	30%	0%	2.95 ± 0.22
5. Margarine has the same amount of fat as butter	5%	17%	5%	66%	7%	3.54 ± 0.16
	0%	5%	15%	75%	5%	3.80 ± 0.14
	7%	19%	22%	44%	7%	3.26 ± 0.21
	15%	25%	15%	40%	5%	2.95 ± 0.28
6. Fish has almost as much fat as meat, it's just a different kind of fat	0%	10%	35%	43%	13%	3.58 ± 1.33
	0%	10%	10%	70%	10%	3.79 ± 0.18
	4%	12%	24%	52%	8%	3.48 ± 0.19
	5%	35%	25%	35%	0%	3.06 ± 0.21

Table 33 (continued)

		1	2	3	4	5	Mean ± SEM
7.	Creamy salad dressings (ranch, 1000 islands, etc.) have more fat than clear Italian dressing	0%	51%	20%	20%	10%	2.88 ± 0.17
		0%	45%	20%	30%	5%	2.95 ± 0.22
		7%	22%	37%	26%	7%	3.04 ± 0.20
		5%	50%	20%	25%	0%	2.65 ± 0.21
8.	Certain cuts of beef, like flank steak, are as low in fat as chicken	0%	22%	59%	12%	7%	3.05 ± 0.13
		0%	40%	35%	25%	0%	2.85 ± 0.18
		4%	19%	48%	30%	0%	3.04 ± 0.16
		10%	35%	35%	20%	0%	2.65 ± 0.21
9.	Powdered coffee creamers have a lot less fat than whole milk	2%	29%	37%	27%	5%	3.02 ± 0.15
		5%	15%	40%	40%	0%	3.15 ± 0.20
		11%	22%	33%	26%	7%	2.96 ± 0.22
		15%	10%	20%	55%	0%	3.15 ± 0.25
10.	Many foods that are high in protein are also high in fat	7%	37%	29%	27%	0%	2.76 ± 0.15
		0%	45%	25%	30%	0%	2.85 ± 0.20
		4%	19%	35%	31%	12%	3.27 ± 0.20
		5%	40%	20%	35%	0%	2.79 ± 0.22
B.	<u>FIBER IN FOODS</u>						
11.	Most of the fiber in some fruits and vegetables (like apples, squash, cucumbers) is found in the skin	18%	58%	18%	8%	0%	2.15 ± 0.13
		10%	85%	0%	5%	0%	2.00 ± 0.13
		26%	59%	4%	11%	0%	2.00 ± 0.17
		40%	50%	5%	5%	0%	1.75 ± 0.18
12.	Practically all Americans get enough fiber in their diet	0%	7%	2%	54%	37%	4.20 ± 0.13
		0%	10%	0%	45%	45%	4.25 ± 0.20
		0%	4%	0%	56%	41%	4.33 ± 0.13
		5%	5%	0%	60%	30%	4.05 ± 0.22

Table 33 (continued)

		1	2	3	4	5	Mean ± SEM
13.	Brown rice or wild rice has more dietary fiber than white rice	10%	56%	29%	5%	0%	2.29 ± 0.11
		15%	60%	20%	5%	0%	2.15 ± 0.17
		41%	44%	15%	0%	0%	1.74 ± 0.14
		35%	50%	15%	0%	0%	1.80 ± 0.16
14.	Popcorn and potato chips have about the same amount of fiber in a typical serving	0%	5%	29%	54%	12%	3.73 ± 0.12
		0%	5%	25%	65%	5%	3.70 ± 0.16
		0%	4%	22%	59%	15%	3.85 ± 0.14
		5%	5%	20%	50%	20%	3.75 ± 0.23
15.	Per serving, lettuce has more dietary fiber than grapefruit	0%	32%	56%	12%	0%	2.80 ± 0.10
		0%	20%	55%	25%	0%	3.05 ± 0.15
		0%	26%	56%	11%	7%	3.00 ± 0.16
		10%	30%	35%	25%	0%	2.75 ± 0.22
16.	Beans like kidney beans and lima beans are very good sources of dietary fiber	10%	46%	20%	22%	2%	$2.61^{b} \pm 0.16$
		5%	85%	10%	0%	0%	$2.05^{a} \pm 0.09$
		41%	37%	19%	4%	0%	1.85 ± 0.17
		45%	45%	10%	0%	0%	1.65 ± 0.15
17.	Whole wheat bread has more than twice as much dietary fiber as white ("light") bread	12%	59%	22%	7%	0%	2.24 ± 0.12
		10%	65%	25%	0%	0%	2.15 ± 0.13
		41%	41%	15%	4%	0%	1.81 ± 0.16
		35%	35%	25%	5%	0%	2.00 ± 0.21
18.	Beef like roasts and steaks are a very good source of dietary fiber	0%	5%	46%	46%	2%	3.46 ± 0.10
		0%	11%	42%	47%	0%	3.37 ± 0.16
		0%	7%	44%	30%	19%	3.59 ± 0.17
		0%	10%	20%	50%	20%	3.80 ± 0.20

Table 33 (continued)

		1	2	3	4	5	Mean ± SEM
19.	All types of breakfast cereals are great sources of dietary fiber	3%	5%	5%	68%	20%	3.80 ± 0.13
		0%	10%	0%	65%	25%	4.05 ± 0.20
		4%	4%	0%	67%	26%	4.01 ± 0.17
		0%	0%	15%	60%	25%	4.10 ± 0.14
20.	Cooking fruits and vegetables greatly diminishes their fiber content	15%	48%	20%	13%	5%	2.45 ± 0.17
		5%	63%	11%	21%	0%	2.50 ± 0.22
		8%	41%	33%	19%	0%	2.63 ± 0.17
		10%	50%	10%	25%	5%	2.65 ± 0.25
C.	VITAMINS A, C, AND E IN FOODS						
21.	Dark green vegetables like turnips and mustard are very good sources of vitamin A	13%	51%	31%	3%	3%	2.31 ± 0.13
		0%	63%	32%	5%	0%	2.44 ± 0.15
		27%	46%	23%	4%	0%	2.04 ± 0.16
		25%	60%	10%	5%	0%	1.95 ± 0.18
22.	Beta-Carotene, found in foods like carrots, can be used like vitamin A in the body	5%	38%	58%	0%	0%	2.53 ± 0.10
		5%	55%	35%	5%	0%	2.42 ± 0.16
		26%	33%	41%	0%	0%	2.15 ± 0.16
		20%	55%	25%	0%	0%	2.05 ± 0.15
23.	Beef liver is a very good low-fat source of vitamin A	0%	13%	65%	20%	3%	3.13 ± 0.10
		0%	11%	74%	16%	0%	3.11 ± 0.11
		11%	19%	52%	11%	7%	2.85^{a} ± 0.20
		0%	10%	30%	55%	5%	3.55^{b} ± 0.17
24.	Dark green vegetables like mustard and peppers are very good sources of vitamin C	5%	31%	39%	23%	3%	2.87 ± 0.15
		0%	37%	42%	16%	5%	2.94 ± 0.21
		26%	26%	44%	4%	0%	2.26 ± 0.17
		15%	50%	30%	5%	0%	2.25 ± 0.18

Table 33 (continued)

		1	2	3	4	5	Mean ± SEM
25.	Some fruits like cantaloupe and tomatoes are high in both vitamin A and vitamin C	8%	**58%**	33%	3%	0%	2.30 ± 0.10
		5%	**65%**	25%	5%	0%	2.32 ± 0.15
		11%	**44%**	**44%**	0%	0%	2.33 ± 0.13
		20%	**55%**	25%	0%	0%	2.05 ± 0.15
26.	The content of vitamin A, C, and E in a food is not at all affected by cooking and processing	0%	5%	30%	**48%**	18%	3.78 ± 0.13
		0%	0%	35%	**60%**	5%	3.68 ± 0.13
		0%	4%	**56%**	26%	15%	3.52 ± 0.15
		0%	5%	20%	**70%**	5%	3.75 ± 0.14
27.	Palm oil is a healthier source of vitamin E for cooking than corn oil	0%	10%	**71%**	7%	12%	3.22 ± 0.12
		0%	21%	**53%**	16%	11%	3.16 ± 0.21
		0%	15%	**58%**	23%	4%	3.12 ± 0.14
		5%	5%	**55%**	30%	5%	3.21 ± 0.20
28.	Lean red meats are healthy sources of vitamin C	0%	3%	**55%**	38%	5%	3.45 ± 0.10
		0%	16%	37%	**48%**	0%	3.28 ± 0.18
		0%	4%	**48%**	33%	15%	3.59 ± 0.15
		0%	26%	32%	**42%**	0%	3.16 ± 0.19
29.	Milk and other dairy products are often fortified with vitamin A	15%	**37%**	29%	20%	0%	2.54 ± 0.15
		0%	**65%**	25%	10%	0%	2.45 ± 0.15
		8%	**50%**	31%	12%	0%	2.46 ± 0.16
		20%	**55%**	15%	10%	0%	2.16 ± 0.21
30.	All cooking oils are good sources of vitamin E	0%	2%	**49%**	37%	12%	3.59^{b} ± 0.12
		0%	10%	**50%**	40%	0%	3.30^{a} ± 0.15
		0%	11%	**56%**	26%	7%	3.30 ± 0.15
		0%	5%	**60%**	35%	0%	3.30 ± 0.13

[1] Top values, n=41 (pretest) and n=20 (posttest) for control participants; Bottom values, N=27 (pretest) and n=20 (posttest) for intervention participants.

[2] 1 = "I Strongly Agree" 2 = "I Agree"; 3 = "I Don't Know/Not Sure"; 4 = "I Disagree"; 5 = "I Strongly Disagree".

[3] Means and standard errors were obtained by assigning a value of 1 to response "I Stongly Agree", 2 to response "I Agree", 3 to response "I Don't Know/Not Sure", 4 to response "I Disagree", and 5 to response "I Strongly Disagree", regardless of the direction of the correct response.

[4] Most frequent response is in bold face.

[5] Superscripts denote a significant difference ($p \leq 0.05$) was observed between responses for pretest and posttest using Student's t test. Significantly lower values are denoted with an "a", and significantly higher values are denoted with a "b".

Disagree" and only 30% gave a response of "I Don't Know/Not Sure." Mean responses significantly changed for two questions (1 and 23) for intervention subjects, and three questions (4, 16, and 30) for control subjects.

Post-Posttest

Tables 34 through 37 present comparisons of post-posttest mean reported consumption of energy, macronutrients, and percent calories from macronutrients, cholesterol, saturated fat, dietary fiber, and antioxidant nutrients measured by 3-day food records and food frequency questionnaires for control and intervention participants (also see Appendix O, Table 24). Nineteen control (46%) and 20 intervention (69%) subjects returned at least some portion of the post-posttest questionnaires, while 18 control (44%) and 15 intervention (54%) subjects completed food frequency questionnaires. No significant differences were observed between group means for either instrument for any of these parameters.

Tables 38 and 39 summarize significant differences in mean intakes of dietary constituents between the pretest and post-posttest times for 3-day food records and food frequency questionnaires, respectively, for control and intervention participants (also see Appendix O, Tables O-25 and O-26). It is immediately evident that for

Table 34

Post-Posttest Estimated Daily Consumption (Mean ± SEM) of Energy, Total Protein, Total Carbohydrates, and Total Fat for Lumbee Control and Intervention Participants

	Control	Intervention	Between Groups[1]
Energy (kcal)			
3-day food records	1343 ± 74[a2] (n=19)	1323 ± 103 (n=20)	NS
Food Frequency	1253 ± 155[b] (n=18)	1212 ± 168 (n=15)	NS
Protein (g)			
3-day food records	53 ± 4 (n=19)	51 ± 5 (n=20)	NS
Food Frequency	56 ± 11[b] (n=18)	55 ± 8 (n=15)	NS
Carbohydrates (g)			
3-day food records	178 ± 11[a] (n=19)	170 ± 13 (n=20)	NS
Food Frequency	145 ± 13[b] (n=18)	136 ± 20 (n=15)	NS
Fat (g)			
3-day food records	48 ± 4[a] (n=19)	50 ± 5 (n=20)	NS
Food Frequency	50 ± 7 (n=18)	50 ± 7 (n=15)	NS

[1] NS represents Not Significant.

[2] Superscripts denote a significant difference ($p \leq 0.05$) was observed between pretest and post-posttest for each group. Significantly lower posttest values are denoted with an "a", and significantly higher posttest values are denoted with a "b".

Table 35

Post-Posttest Estimated Daily Consumption (Mean ± SEM) of Percent Calories From Energy Macronutrients for Lumbee Control and Intervention Participants

	Control	Intervention	Between Groups[1]
Protein			
3-day food records	16 ± 0.7 (n=19)	15 ± 0.6 (n=20)	NS
Food Frequency	17 ± 0.9 (n=18)	18 ± 0.6 (n=15)	NS
Carbohydrates			
3-day food records	52 ± 1.9 (n=19)	51 ± 1.7 (n=20)	NS
Food Frequency	48 ± 1.8 (n=18)	45 ± 1.9 (n=15)	NS
Fat			
3-day food records	32 ± 2.1 (n=19)	34 ± 1.8 (n=20)	NS
Food Frequency	35 ± 1.3 (n =18)	37 ± 1.9 (n=15)	NS

[1] NS represents Not Significant.

Table 36

Post-Posttest Estimated Daily Consumption (Mean ± SEM) of Cholesterol, Saturated Fat, and Dietary Fiber Lumbee Control and Intervention Participants

	Control	Intervention	Between Groups[1]
Cholesterol (mg)			
3-day food record	167 ± 15[a2] (n=19)	156 ± 18 (n=20)	NS
Food Frequency	186 ± 32 (n=18)	242 ± 57 (n=15)	NS
Saturated Fat (g)			
3-day food record	16 ± 1.4[a] (n=19)	17 ± 1.8 (n=20)	NS
Food Frequency	18 ± 2.9 (n=18)	18 ± 2.7 (n=15)	NS
Dietary Fiber (g)			
3-day food record	10 ± 0.9 (n=19)	12 ± 1.1 (n=20)	NS
Food Frequency	8 ± 0.8[b] (n=18)	8 ± 1.3 (n=15)	NS

[1] NS represents Not Significant.

[2] Superscripts denote a significant difference ($p \leq 0.05$) was observed between pretest and posttest 3-day food record measurement for each group. Significantly lower posttest values are denoted with an "a", and significantly higher posttest values are denoted with a "b".

Table 37

Post-Posttest Estimated Daily Consumption (Mean ± SEM) of Antioxidant Nutrients for Lumbee Control and Intervention Participants

	Control	Interventio	Between Groups[1]
Vitamin A (IU)			
3-day food record	4378 ± 901 (n=19)	3881 ± 79 (n=20)	NS
Food Frequency	6860 ± 1271 (n=18)	9927 ± 3839 (n=15)	NS
Beta Carotene (ug)			
3-day food record	1773 ± 476 (n=19)	1651 ± 344 (n=20)	NS
Food Frequency	2383 ± 536 (n=18)	3139 ± 943 (n=15)	NS
Retinol (ug)			
3-day food record	426 ± 153 (n=19)	338 ± 146 (n=20)	NS
Food Frequency	744 ± 140 (n=18)	1224 ± 640 (n=15)	NS
Vitamin C (mg)			
3-day food record	73 ± 12 (n=19)	69 ± 11 (n=20)	NS
Food Frequency	89 ± 11 (n=18)	111 ± 18 (n=15)	NS
Vitamin E (mg ATE[3])			
3-day food record	6 ± 0.8[a2] (n=19)	6 ± 0.7 (n=20)	NS

[1] NS represents Not Significant.

[2] Superscripts denote a significant difference ($p \leq 0.05$) was observed between pretest and posttest 3-day food record measurement for each group. Significantly lower posttest values are denoted with an "a", and significantly higher posttest values are denoted with a "b".

[3] ATE = Alpha-Tocopherol Equivalents

The food frequency questionnaire was not designed to estimate intake of vitamin E.

Table 38

Dietary Constituents for Which Significant Differences ($p \leq 0.05$) Were Found Between Pretest and Post-Posttest 3-day Food Record Measurement for Lumbee Control and Intervention Participants

Control Participants	Intervention Participants
Significantly lower from pretest to post-posttest	
Energy Carbohydrates Fat Saturated Fat Monounsaturated Fat Polyunsaturated Fat Cholesterol Vegetable Protein Vitamin E Riboflavin Phosphorus Sodium Calcium[1] CSI Ratio	None significantly different

[1] Calcium intake was also significantly different ($p \leq 0.05$) between posttest and post-posttest for control participants.

Table 39

Dietary Constituents for Which Significant Differences ($p \leq 0.05$) Were Found Between Pretest and Post-Posttest Food Frequency Questionnaire Measurements for Lumbee Control and Intervention Participants

Control Participants	Intervention Participants
Significantly higher from pre-test to post-posttest	
Energy Protein Carbohydrates Calcium Phosphorus Iron Sodium Potassium Thiamin Riboflavin Niacin Dietary Fiber Retinol	None significantly different

intervention participants no significant differences were found between the pretest and post-posttest times for either instrument. For control participants, intake of energy, carbohydrates, fat (Table 34), saturated fat, cholesterol (Table 36), vitamin E (Table 37), monounsaturated fat, polyunsaturated fat, vegetable protein, riboflavin, phosphorus, sodium, calcium, and CSI ratio (Appendix O, Table 0-24) significantly decreased from pretest to post-posttest as indicated by 3-day food records. Only calcium intake significantly decreased from the posttest to the post-posttest for this group (Appendix O, Table 0-26). Conversely, intake significantly increased for control subjects from pretest to post-posttest for energy, protein, carbohydrates (Table 34), dietary fiber (Table 36), calcium, phosphorus, iron, sodium, potassium, thiamin, riboflavin, niacin, and retinol (Appendix O, Table 0-24) as indicated by the food frequency questionnaire.

Table 40 compares post-posttest mean reported weekly food group consumption for both participant groups (also see Appendix O, Table 0-27). No significant differences were found between groups for any of the measured food groups. Also, for both groups, no significant differences were found over time (comparison of pretest to post-posttest) for any of the food groups (Appendix O, Table 0-

Table 40

Post-Posttest Reported (Mean ± SEM) Weekly Servings of Foods Obtained From the Food Frequency Questionnaire for Lumbee Control and Intervention Participants

Food Group	Weekly Servings Control (n =18)	Intervention (n=15)	Between Groups[1]
Fruit or Juice	6.7 ± 1.2	7.0 ± 1.2	NS
Citrus Fruit or Juice	2.9 ± 0.8	4.2 ± 0.8	NS
Vegetables	12.4 ± 1.6	15.8 ± 3.6	NS
Vegetables, Excluding Potatoes and Rice	7.2 ± 1.2	10.0 ± 2.0	NS
Salad	1.6 ± 0.3	1.8 ± 0.6	NS
Carrots	0.8 ± 0.2	1.1 ± 0.2	NS
Tomatoes	0.7 ± 0.4	1.8 ± 0.9	NS
Deep Yellow or Dark Green Vegetables	2.7 ± 0.5	3.8 ± 0.8	NS
Fish or Chicken	3.3 ± 0.7	2.7 ± 0.5	NS
Fried Fish or Chicken	1.1 ± 0.1	1.0 ± 0.2	NS
Whole Grain or Bran Cereals	2.8 ± 0.7	4.2 ± 1.2	NS
Eggs	0.4 ± 0.1	1.6 ± 0.9	NS
Alcoholic Beverages	0.03± 0.02	0.25± 0.23	NS
Beef	2.7 ± 0.8	2.0 ± 0.5	NS
Pork	0.5 ± 0.1	0.8 ± 0.3	NS
Hot Dogs or Luncheon Meats	1.4 ± 0.3	1.6 ± 0.6	NS
Butter or Margarine	2.3 ± 1.1	1.6 ± 0.5	NS
Cheeses, Excluding Cottage Cheese	1.1 ± 0.4	2.0 ± 0.9	NS
Whole Milk	0.6 ± 0.4	2.0 ± 1.4	NS
Ice Cream	0.8 ± 0.2	0.7 ± 0.2	NS
Pastries, Sweets, Sodas, Sugars	13.9 ± 3.1	10.7 ± 3.0	NS

[1] NS represents Not Significant.

Table 41

Pretest and Post-Posttest Responses (Number and %) to Eating Habits Questions from Food Frequency Questionnaire by Lumbee Control and Intervention Participants[1]

	Seldom/Never	Sometimes	Often/Always
"How often do you eat the skin on chicken?"	19 (46.3%)	6 (14.6%)	16 (39.0%)
	8 (42.1%)	6 (31.6%)	5 (26.3%)
	10 (37.0%)	10 (37.0%)	7 (25.9%)
	10 (58.9%)	5 (29.4%)	2 (11.8%)
"How often do you eat the visible fat on meat?"	34 (82.9%)	3 (7.3%)	4 (9.8%)
	17 (89.5%)	2 (10.5%)	0 (0.0%)
	16 (59.3%)	10 (37.0%)	1 (3.7%)
	14 (82.4%)	2 (11.8%)	1 (5.9%)
"How often do you add salt to your food?"	17 (41.5%)	4 (9.8%)	20 (48.8%)
	9 (47.4%)	5 (26.3%)	5 (26.3%)
	4 (14.8%)	12 (44.4%)	11 (40.7%)
	6 (35.3%)	7 (41.2%)	3 (17.6%)
"How often do you add pepper to your food?"	12 (29.3%)	5 (12.2%)	24 (58.5%)
	2 (10.5%)	5 (26.3%)	12 (63.2%)
	3 (11.1%)	12 (44.4%)	12 (44.4%)
	5 (29.4%)	6 (35.3%)	6 (35.3%)

"Not counting salads or potatoes, about how many servings of vegetables do you eat per week?"

	Control	Intervention
Pretest	9.9 ± 1.1	9.8 ± 1.0
Post-posttest	8.5 ± 1.2	14.9 ± 2.0

"Not counting juices, how many servings of fruits do you usually eat per week?"

	Control	Intervention
Pretest	4.8 ± 0.7	5.0 ± 0.7
Post-posttest	5.4 ± 0.9	6.6 ± 1.2

[1] Top values, n = 41 for pre-test control participants, n = 19 for post-posttest control participants; Bottom values, n = 27 for pretest intervention participants, n = 17 for post-posttest intervention participants.

28). A reported increase over time in consumption of whole grain foods for intervention subjects approached significance ($p \leq 0.10$).

Table 41 compares pretest and post-posttest responses to eating habits questions from the food frequency questionnaire for control and intervention participants (also see Appendix O, Tables 0-27 and 0-28 for servings from food groups). For intervention participants, percentages of persons seldom eating visible fat on meat and removing skin from chicken slightly increased over time. Also, increases were observed over time in reported weekly intake of fruits and vegetables for intervention participants, although not significant at the established p level.

A comparison was made between t test analyses and a repeated analysis ANOVA for pretest, posttest and post-posttest nutrient data. Table 42 summarizes significant differences found using the repeated analysis ANOVA for the 3-day food record and the food frequency questionnaire (see also Appendix O, Tables 0-29 and 0-30). No significant differences ($p \leq 0.05$) were found for any nutrient between control and intervention participants at any time period using the 3-day food record measurements (Table 42A). Three dietary constituents (energy, fat and saturated fat) were significantly different between

Table 42

A. Summary of Significant Differences Using Repeated Analysis ANOVA for Lumbee Control and Intervention Participants

Group differences[1]		Time Differences[2]		Group by Time[3]	
Column I	Column II	Column III	Column IV	Column V	Column VI
3-day Record	Food Frequency	3-day Record	Food Frequency	3-day Record	Food Frequency
		Energy			Energy
		Carbohydrates			Carbohydrates
		Fat			Fat
		Saturated Fat			Saturated Fat
		Monounsaturated Fat			
		Polyunsaturated Fat			
		Cholesterol			
Vitamin E					
	Vitamin C				
		Phosphorus			
		Sodium			
		Calcium	Calcium		
			% Protein Calories		
		CSI Ratio			
	Weekly Citrus Fruits				Weekly Beef
	Reported Vegs. Per Week				

[1] Group differences compare means for all nutrient measurements at every time period for control versus intervention participants (2 means compared for each nutrient)

[2] Time differences compare means for all nutrient measurement for control and intervention combined for pretest versus posttest versus post-posttest periods for 3-day food record (three means compared for each nutrient); and for pretest versus post-posttest for food frequency questionnaire (2 means compared)

[3] Group by time differences compares means for all nutrient measurements for each time period and group (6 means compared for 3-day food records, 4 means compared for food frequency questionnaire

Table 42 (continued)

B. Summary of Sources of Significant Differences for Food Frequency Variables Using Repeated Analysis ANOVA

Column II[1]		Column IV[2]		Column VI[3]	
Group		Time		Group by Time	
Vitamin C	**Control vs intervention**	Calcium	**Pretest vs Postposttest**	Energy	**Pretest control vs intervention**
Weekly Citrus Fruits	**Control vs intervention**	% Calories Protein	**Pretest vs Postposttest**	Fat	**Pretest control vs intervention**
Reported Vegs. Per Week	**Control vs intervention**			Carbohydrate	**Pretest control vs intervention at 0.10**
				Saturated Fat	**Pretest control vs intervention**
				Weekly Beef	**No interaction effects at p<0.10**

[1] Based on sources from Column II, Table 42A
[2] Based on sources from Column IV, Table 42A
[3] Based on sources from Column VI, Table 42A

C. Summary of Significant Time Differences for 3-day Food Records Using Repeated Analysis ANOVA

Pretest to Posttest	Pretest to Post-posttest	Pretest to Posttest/Pretest to Post-posttest
Carbohydrate	Polyunsaturated Fat Cholesterol Phosphorus	Energy Fat Saturated Fat Monounsaturated Fat

Table 42 (continued)

D. Summary of Significant Nutrient Differences for Lumbee Control Versus Intervervention Participants for Each Time Period Using

t Test and Repeated Analysis Comparisons

3-day food records

Pretest		Posttest		Post-posttest	
t test	ANOVA	*t* test	ANOVA	*t* test	ANOVA
Energy Carbohydrates	None	None	None	None	None

Food Frequency Questionnaire

Pretest		Post-posttest	
t test	ANOVA	*t* test	ANOVA
Energy Protein Saturated Fat Vitamin C Riboflavin Niacin Potassium Phosphorus Iron Calcium	Energy Carbohydrate Fat Saturated Fat	None	None

Table 42 (continued)

E. Summary of Significant Period Differences for Lumbee Control Participants[1] for Each Instrument for t Test and ANOVA Comparisons

3-day food record

Pretest to Posttest		Pretest to Post-posttest		Posttest to Post-posttest	
t test	ANOVA	t test	ANOVA	t test	ANOVA
Energy*[2]	None	Energy*	None	Calcium	None
Carbohydrate*		Carbohydrate			
Fat*		Fat*			
Saturated Fat*		Saturated Fat*			
Monounsaturated Fat*		Monounsaturated Fat*			
Polyunsaturated Fat		Polyunsaturated Fat*			
Sodium*		Cholesterol*			
CSI Ratio*		Vegetable Protein			
		Vitamin E			
		Riboflavin			
		Phosphorus*			
		Sodium*			
		CSI Ratio*			

Food Frequency Questionnaire

Pretest to Post-posttest

t test	ANOVA
Energy	None
Protein	
Carbohydrate	
Calcium*	
Phosphorus	
Iron	
Sodium	
Potassium	
Thiamin	
Riboflavin	
Niacin	
Dietary Fiber	
Retinol	

[1] No significant differences found at any time period for any nutrient (except calcium from pretest to posttest) for intervention participants using 3-day food record

[2] * indicates significant time difference (see footnote 2, Table 42A) using repeated analysis ANOVA

control and intervention participants at pretest using the food frequency questionnaire, while differences for mean pretest carbohydrate intake were close to the established level of significance (Table 42B). Means for combined nutrient data for each instrument and for all participants were compared at each time period (Table 42A). For 3-day food record data (Table 42C), two dietary constituents were significantly lower from pretest to posttest only (carbohydrate and sodium), four were significantly lower from pretest to post-posttest only (polyunsaturated fat, cholesterol, phosphorus and calcium) and five were significantly lower at both time comparisons (energy, fat, saturated fat, monounsaturated fat and CSI ratio). By comparison, only two time differences were observed using food frequency data (calcium and percent calories from protein) (Table 42B). Means for combined data at all time periods for each participant group were compared (Table 42A). Only one nutrient was significantly different between groups using 3-day food record data (vitamin E) or food frequency questionnaire data (vitamin C). Mean weekly intake of one food group (citrus fruits) and reported weekly vegetable intake was significantly different between groups.

Tables 42D through 42F summarize significant nutrient differences found using both *t* test and ANOVA analyses.

More pretest nutrient differences were observed between control and intervention participants using the _t_ test in comparison to the ANOVA for both 3-day food records (two versus none) and food frequency questionnaires (10 versus four) (Table 42D). No nutrient differences between groups were observed at the other time periods for either instrument using either analysis method. For control participants, more significant differences between time periods were observed using the _t_ test in comparison to the ANOVA (Table 42E). Using 3-day food record data, 10 dietary constituents (energy, carbohydrate, fat, saturated fat, monounsaturated fat, polyunsaturated fat, sodium and CSI ratio) were significantly different from pretest to posttest, 14 dietary constituents (energy, carbohydrate, fat, saturated fat, monounsaturated fat, polyunsaturated fat, cholesterol, vegetable protein, vitamin E, riboflavin, phosphorus, sodium, calcium and CSI ratio) were significantly different from pretest to posttest, and one nutrient (calcium) was significantly different from posttest to post-posttest using _t_ test analyses. By contrast, no significant differences were found between time periods using ANOVA analyses. Using food frequency questionnaire data for control participants, 13 nutrients (energy, protein, carbohydrate, calcium, phosphorus, iron, sodium, potassium, thiamin, riboflavin, niacin, dietary fiber and retinol) were significantly different from pretest to post-posttest using *t* test analyses, while none were significant using the ANOVA analyses. Thus, the ANOVA analyses appeared to be a more conservative estimate of significance compared to the *t* test for data for control subjects, and did not provide new information regarding differences for the intervention data.

Table 43 presents percentages of responses to questions from the Nutrition Knowledge Test (also see Appendix O, Table O-31) for the pretest, posttest, and post-posttest for control and intervention participants. For intervention subjects, an "I Don't Know/Not Sure" response was more frequently given for seven of the 30 questions (4, 8, 9, 15, 23, 27, and 28) for the post-posttest, compared to 15 of the 30 questions (4, 7, 8, 9, 10, 15, 18, 22, 23, 24, 25, 26, 27, 28, 30) for the pretest. For questions pertaining to fat, noticeable shifts in responses occurred for questions 4, 5, 6, 7, 9, and 10 from pretest to post-posttest. For example, 58% of intervention participants agreed or strongly agreed that many foods high in protein are also high in fat (question 10) at the post-posttest, compared to only 23% at the pretest. Also, 63% of intervention respondents agreed or strongly agreed that margarine and butter have the same amount of fat at the post-posttest, compared to only 26%

Table 43

Pretest, Posttest and Post-Posttest Responses (Percentages) and Mean (± SEM) Responses to Questions From Nutrition Knowledge Test for Lumbee Control and Intervention Participants[1]

	1[2]	2	3	4	5	Mean ± SEM[4]
A. FATS IN FOODS						
1. Sherbet has less fat	37%	39%[3]	17%	2%	5%	2.00 ± 0.16
than ice cream	40%	45%	10%	10%	5%	1.85 ± 0.22
	74%	21%	0%	5%	0%	1.37 ± 0.18
	38%	35%	27%	0%	0%	1.88 ± 0.16
	65%	35%	0%	0%	0%	1.32 ± 0.11
	42%	42%	11%	5%	0%	1.83 ± 0.20
2. The fat in chicken is almost	34%	59%	2%	5%	0%	1.78 ± 0.11
all in the skin	20%	70%	0%	10%	0%	2.00 ± 0.18
	42%	58%	0%	0%	0%	1.58 ± 0.12
	56%	41%	0%	0%	4%	1.56 ± 0.16
	65%	20%	10%	5%	0%	1.55 ± 0.20
	47%	37%	5%	11%	0%	1.79 ± 0.22
3. When it comes to fat, potato	0%	5%	27%	39%	29%	3.93 ± 0.14
chips and pretzels are about	0%	10%	10%	55%	25%	3.95 ± 0.20
the same	0%	0%	11%	74%	16%	4.05 ± 0.12
	4%	19%	4%	50%	23%	3.69 ± 0.23
	5%	10%	0%	50%	35%	3.95 ± 0.26
	11%	16%	5%	42%	26%	3.67 ± 0.31
4. At a fastfood restaurant,	2%	15%	34%	42%	7%	3.37 ± 0.14
a fried fish sandwich has	0%	25%	40%	35%	0%	3.10 ± 0.18
more calories and fat than	11%	21%	37%	32%	0%	2.89 ± 0.23
a hamburger						
	15%	0%	50%	27%	8%	3.12 ± 0.22
	15%	15%	40%	30%	0%	2.95 ± 0.22
	21%	37%	26%	11%	5%	2.44 ± 0.27

Table 43 (continued)

		1	2	3	4	5	Mean $\pm$ SEM
5.	Margarine has the same amount of fat as butter	5%	17%	5%	66%	7%	3.54 ± 0.16
		0%	5%	15%	75%	5%	3.80 ± 0.14
		5%	11%	21%	47%	16%	3.58 ± 0.25
		7%	19%	22%	44%	7%	$3.26^{bs} \pm 0.21$
		15%	25%	15%	40%	5%	2.95 ± 0.28
		26%	37%	11%	26%	0%	$2.37^{a} \pm 0.27$
6.	Fish has almost as much fat as meat, it's just a different kind of fat	0%	10%	35%	43%	13%	3.58 ± 1.33
		0%	10%	10%	70%	10%	3.79 ± 0.18
		5%	16%	16%	58%	5%	3.39 ± 0.24
		4%	12%	24%	52%	8%	3.48 ± 0.19
		5%	35%	25%	35%	0%	3.06 ± 0.21
		11%	37%	26%	21%	5%	2.82 ± 0.27
7.	Creamy salad dressings (ranch, 1000 islands, etc.) have more fat than clear Italian dressing	0%	51%	20%	20%	10%	2.88 ± 0.17
		0%	45%	20%	30%	5%	2.95 ± 0.22
		11%	53%	11%	21%	5%	2.58 ± 0.26
		7%	22%	37%	26%	7%	$3.04^{b} \pm 0.20$
		5%	50%	20%	25%	0%	2.65 ± 0.21
		16%	42%	16%	26%	0%	$2.53^{a} \pm 0.25$
8.	Certain cuts of beef, like flank steak, are as low in fat as chicken	0%	22%	59%	12%	7%	3.05 ± 0.13
		0%	40%	35%	25%	0%	2.85 ± 0.18
		0%	21%	63%	11%	5%	3.00 ± 0.17
		4%	19%	48%	30%	0%	$3.04^{b} \pm 0.16$
		10%	35%	35%	20%	0%	2.65 ± 0.21
		11%	47%	32%	11%	0%	$2.42^{a} \pm 0.19$
9.	Powdered coffee creamers have a lot less fat than whole milk	2%	29%	37%	27%	5%	3.02 ± 0.15
		5%	15%	40%	40%	0%	3.15 ± 0.20
		0%	26%	37%	32%	5%	3.16 ± 0.21
		11%	22%	33%	26%	7%	2.96 ± 0.22
		15%	10%	20%	55%	0%	3.15 ± 0.25
		16%	37%	11%	21%	16%	2.84 ± 0.32

Table 43 (continued)

		1	2	3	4	5	Mean ± SEM
10.	Many foods that are high in protein are also high in fat	7%	37%	29%	27%	0%	2.76 ± 0.15
		0%	45%	25%	30%	0%	2.85 ± 0.20
		0%	37%	26%	37%	0%	3.00 ± 0.20
		4%	19%	35%	31%	12%	3.27 ± 0.20
		5%	40%	20%	35%	0%	2.79 ± 0.22
		5%	53%	16%	21%	5%	2.72 ± 0.25
B.	FIBER IN FOODS						
11.	Most of the fiber in some fruits and vegetables (like apples, squash, cucumbers) is found in the skin	18%	58%	18%	8%	0%	2.15^{b} ± 0.13
		10%	85%	0%	5%	0%	2.00 ± 0.13
		32%	63%	5%	0%	0%	1.74^{a} ± 0.13
		26%	59%	4%	11%	0%	2.00 ± 0.17
		40%	50%	5%	5%	0%	1.75 ± 0.18
		42%	47%	0%	11%	0%	1.79 ± 0.21
12.	Practically all Americans get enough fiber in their diet	0%	7%	2%	54%	37%	4.20 ± 0.13
		0%	10%	0%	45%	45%	4.25 ± 0.20
		0%	11%	0%	53%	32%	4.37 ± 0.33
		0%	4%	0%	56%	41%	4.33 ± 0.13
		5%	5%	0%	60%	30%	4.05 ± 0.22
		5%	5%	0%	47%	42%	4.16 ± 0.25
13.	Brown rice or wild rice has more dietary fiber than white rice	10%	56%	29%	5%	0%	2.29 ± 0.11
		15%	60%	20%	5%	0%	2.15 ± 0.17
		32%	53%	11%	5%	0%	1.89 ± 0.19
		41%	44%	15%	0%	0%	1.74 ± 0.14
		35%	50%	15%	0%	0%	1.80 ± 0.16
		32%	58%	0%	5%	5%	1.95 ± 0.24

Table 43 (continued)

		1	2	3	4	5	Mean ± SEM
14.	Popcorn and potato chips have about the same amount of fiber in a typical serving	0%	5%	29%	54%	12%	3.73 ± 0.12
		0%	5%	25%	65%	5%	3.70 ± 0.16
		0%	5%	21%	63%	11%	3.79 ± 0.16
		0%	4%	22%	59%	15%	3.85 ± 0.14
		5%	5%	20%	50%	20%	3.75 ± 0.23
		0%	16%	16%	47%	21%	3.74 ± 0.23
15.	Per serving, lettuce has more dietary fiber than grapefruit	0%	32%	56%	12%	0%	2.80 ± 0.10
		0%	20%	55%	25%	0%	3.05 ± 0.15
		0%	21%	47%	32%	0%	3.11 ± 0.17
		0%	26%	56%	11%	7%	3.00 ± 0.16
		10%	30%	35%	25%	0%	2.75 ± 0.22
		16%	11%	42%	21%	5%	3.21 ± 0.41
16.	Beans like kidney beans and lima beans are very good sources of dietary fiber	10%	46%	20%	22%	2%	2.61 ± 0.16
		5%	85%	10%	0%	0%	2.05 ± 0.09
		26%	42%	21%	5%	0%	2.42 ± 0.41
		41%	37%	19%	4%	0%	1.85 ± 0.17
		45%	45%	10%	0%	0%	1.65 ± 0.15
		47%	42%	5%	0%	5%	1.74 ± 0.23
17.	Whole wheat bread has more than twice as much dietary fiber as white ("light") bread	12%	59%	22%	7%	0%	2.24 ± 0.12
		10%	65%	25%	0%	0%	2.15 ± 0.13
		16%	74%	11%	0%	0%	1.95 ± 0.12
		41%	41%	15%	4%	0%	1.81 ± 0.16
		35%	35%	25%	5%	0%	2.00 ± 0.21
		21%	63%	16%	0%	0%	1.95 ± 0.14
18.	Beef like roasts and steaks are a very good source of dietary fiber	0%	5%	46%	46%	2%	3.46 ± 0.10
		0%	11%	42%	47%	0%	3.37 ± 0.16
		0%	11%	37%	42%	5%	3.74 ± 0.34
		0%	7%	44%	30%	19%	3.59 ± 0.17
		0%	10%	20%	50%	20%	3.80 ± 0.20
		0%	16%	32%	42%	11%	3.47 ± 0.21

Table 43 (continued)

		1	2	3	4	5	Mean ± SEM
19.	All types of breakfast cereals are great sources of dietary fiber	3%	5%	5%	68%	20%	3.80 ± 0.13
		0%	10%	0%	65%	25%	4.05 ± 0.20
		5%	5%	16%	58%	16%	3.72 ± 0.24
		4%	4%	0%	67%	26%	4.01 ± 0.17
		0%	0%	15%	60%	25%	4.10 ± 0.14
		0%	26%	5%	53%	16%	3.58 ± 0.25
20.	Cooking fruits and vegetables greatly diminishes their fiber content	15%	48%	20%	13%	5%	2.45 ± 0.17
		5%	63%	11%	21%	0%	2.50 ± 0.22
		11%	63%	11%	16%	0%	2.33 ± 0.21
		8%	41%	33%	19%	0%	2.63 ± 0.17
		10%	50%	10%	25%	5%	2.65 ± 0.25
		32%	37%	5%	26%	0%	2.26 ± 0.27
C.	<u>VITAMINS A, C, AND E IN FOODS</u>						
21.	Dark green vegetables like turnips and mustard are very good sources of vitamin A	13%	51%	31%	3%	3%	2.31 ± 0.13
		0%	63%	32%	5%	0%	2.44 ± 0.15
		16%	68%	11%	5%	0%	2.06 ± 0.17
		27%	46%	23%	4%	0%	2.04 ± 0.16
		25%	60%	10%	5%	0%	1.95 ± 0.18
		47%	47%	5%	0%	0%	1.61 ± 0.14
22.	Beta-Carotene, found in foods like carrots, can be used like vitamin A in the body	5%	38%	58%	0%	0%	2.53 ± 0.10
		5%	55%	35%	5%	0%	2.42 ± 0.16
		5%	63%	26%	5%	0%	2.33 ± 0.16
		26%	33%	41%	0%	0%	2.15 ± 0.16
		20%	55%	25%	0%	0%	2.05 ± 0.15
		32%	42%	16%	5%	5%	2.32 ± 0.42

Table 43 (continued)

		1	2	3	4	5	Mean ± SEM
23.	Beef liver is a very good low-fat source of vitamin A	0%	13%	65%	20%	3%	3.13 ± 0.10
		0%	11%	74%	16%	0%	3.11 ± 0.11
		5%	32%	53%	11%	0%	2.72 ± 0.18
		11%	19%	52%	11%	7%	2.85 ± 0.20
		0%	10%	30%	55%	5%	3.55 ± 0.17
		16%	21%	11%	26%	21%	3.47 ± 0.45
24.	Dark green vegetables like mustard and peppers are very good sources of vitamin C	5%	31%	39%	23%	3%	$2.87^b \pm 0.15$
		0%	37%	42%	16%	5%	2.94 ± 0.21
		11%	42%	32%	16%	0%	$2.47^a \pm 0.21$
		26%	26%	44%	4%	0%	2.26 ± 0.17
		15%	50%	30%	5%	0%	2.25 ± 0.18
		32%	42%	16%	11%	0%	2.05 ± 0.22
25.	Some fruits like cantaloupe and tomatoes are high in both vitamin A and vitamin C	8%	58%	33%	3%	0%	$2.30^b \pm 0.10$
		5%	65%	25%	5%	0%	2.32 ± 0.15
		11%	74%	11%	5%	0%	$2.11^a \pm 0.16$
		11%	44%	44%	0%	0%	2.33 ± 0.13
		20%	55%	25%	0%	0%	2.05 ± 0.15
		32%	53%	11%	5%	0%	1.89 ± 0.19
26.	The content of vitamin A, C, and E in a food is not at all affected by cooking and processing	0%	5%	30%	48%	18%	3.78 ± 0.13
		0%	0%	35%	60%	5%	3.68 ± 0.13
		0%	5%	21%	53%	16%	4.11 ± 0.34
		0%	4%	56%	26%	15%	3.52 ± 0.15
		0%	5%	20%	70%	5%	3.75 ± 0.14
		11%	11%	16%	63%	0%	3.32 ± 0.24
27.	Palm oil is a healthier source of vitamin E for cooking than corn oil	0%	10%	71%	7%	12%	3.22 ± 0.12
		0%	21%	53%	16%	11%	3.16 ± 0.21
		0%	32%	47%	5%	16%	3.05 ± 0.24
		0%	15%	58%	23%	4%	3.12 ± 0.14
		5%	5%	55%	30%	5%	3.21 ± 0.20
		11%	11%	37%	32%	11%	3.17 ± 0.27

Table 43 (continued)

		1	2	3	4	5	Mean $\pm$ SEM
28.	Lean red meats are healthy sources of vitamin C	0%	3%	**55%**	38%	5%	3.45 $\pm$ 0.10
		0%	16%	37%	**48%**	0%	3.28 $\pm$ 0.18
		0%	11%	37%	42%	11%	3.53 $\pm$ 0.19
		0%	4%	**48%**	33%	15%	3.59 $\pm$ 0.15
		0%	26%	32%	**42%**	0%	3.16 $\pm$ 0.19
		5%	5%	**47%**	26%	11%	3.63 $\pm$ 0.37
29.	Milk and other dairy products are often fortified with vitamin A	15%	**37%**	29%	20%	0%	2.54 $\pm$ 0.15
		0%	**65%**	25%	10%	0%	2.45 $\pm$ 0.15
		0%	**74%**	21%	5%	0%	2.32 $\pm$ 0.13
		8%	**50%**	31%	12%	0%	2.46 $\pm$ 0.16
		20%	**55%**	15%	10%	0%	2.16 $\pm$ 0.21
		16%	**63%**	16%	5%	0%	2.11 $\pm$ 0.18
30.	All cooking oils are good sources of vitamin E	0%	2%	**49%**	37%	12%	3.59 $\pm$ 0.12
		0%	10%	**50%**	40%	0%	3.30 $\pm$ 0.15
		0%	5%	37%	**47%**	11%	3.63 $\pm$ 0.18
		0%	11%	**56%**	26%	7%	3.30 $\pm$ 0.15
		0%	5%	**60%**	35%	0%	3.30 $\pm$ 0.13
		11%	0%	21%	**42%**	21%	3.95 $\pm$ 0.39

[1] Top values, n=41 (pretest), n=20 (posttest), and n=19 (post-posttest) for control participants; Bottom values, n=27 (pretest), n=20 (posttest), and n=19 (post-posttest) for intervention participants.

[2] 1 = "I Strongly Agree" 2 = "I Agree"; 3 = "I Don't Know/Not Sure"; 4 = "I Disagree"; 5 = "I Strongly Disagree".

[3] Most frequent response is in bold face.

[4] Means and standard errors were obtained by assigning a value of 1 to response "I Stongly Agree", 2 to response "I Agree", 3 to response "I Don't Know/Not Sure", 4 to response "I Disagree", and 5 to response "I Strongly Disagree", regardless of the direction of the correct response.

[5] Superscripts denote a significant difference ($p \leq 0.05$) was observed between responses for pretest and post-posttest using Student's t test. Significantly lower values are denoted with an "a", and significantly higher values are denoted with a "b".

at the pretest (question 5). For questions pertaining to fiber, responses to only one question (18) shifted from the pretest time to post-posttest time. For this question, 53% of intervention participants disagreed or strongly disagreed that beef is a good source of dietary fiber at the post-posttest, compared to 49% at the pretest. "I Don't Know/Not Sure" responses for this question decreased from 44% at pretest to 20% at posttest and 32% at post-posttest. For questions pertaining to antioxidant vitamins, shifts in responses occurred for two questions (23 and 26), and major shifts from "I Don't Know/Not Sure" to more definitive responses from pretest to post-posttest occurred for five questions (22, 23, 24, 26, and 30). For example, for question 23, the percentage of intervention subjects responding "I Don't Know/Not Sure" decreased from 52% at pretest to 11% at post-posttest. Also for question 23, 60% at posttest, and 47% at post-posttest, disagreed or strongly disagreed that beef liver is a lowfat source of vitamin A, compared to only 18% at pretest. Mean responses for three questions changed significantly from pretest to post-posttest for intervention subjects (5, 7, and 8) and control subjects (11, 24, and 25), respectively.

Table 44 outlines pretest and post-posttest responses to questions from the Eating Patterns Questionnaire (see

Table 44

Pretest and Post-Posttest Comparison of Responses (Percentages) and Mean (± SEM) Responses to the Eating Patterns Questionnaire for Lumbee Control and Intervention Participants[1]

1.	Ate Fish						
	Yes 33 (80.5%) No 8 (19.5%)						
	15 (78.9%) 4 (21.1%)						
	26 (92.9%) 2 (7.1%)						
	13 (72.2%) 5 (27.8%)						
	A.	Boiled, Baked, Poached	6%[2]	12%	30%	**36%**[3]	3.14 ± 0.18
			13%	13%	27%	**33%**	2.92 ± 0.31
			4%	12%	27%	**46%**	3.30 ± 0.18
			8%	8%	**39%**	31%	3.10 ± 0.29
	B.	Fried	**49%**	21%	27%	3%	1.85 ± 0.16
			20%	**27%**	20%	13%	2.33 ± 0.31
			50%	19%	19%	8%	1.84 ± 0.21
			39%	15%	8%	23%	2.18 ± 0.40
2.	Ate Chicken						
	Yes 41 (100.0%) No 0 (0.0%)						
	19 (100.0%) 0 (0.0%)						
	28 (100.0%) 0 (0.0%)						
	18 (100.0%) 0 (0.0%)						
	A.	Broiled, Baked	20%	28%	**43%**	10%	2.43 ± 0.15
			21%	32%	**37%**	5%	2.28 ± 0.21
			19%	26%	**44%**	11%	2.48 ± 0.18
			17%	**44%**	28%	0%	2.13 ± 0.18

Table 44 (continued)

B.	Fried	15%	31%	**41%**	13%	2.51 ± 0.15
		11%	21%	**42%**	16%	2.71 ± 0.22
		39%	23%	27%	12%	2.12 ± 0.21
		11%	17%	**39%**	11%	2.64 ± 0.25
C.	Took Off Skin	32%	5%	16%	**47%**	$2.79^{b} \pm 0.22$
		42%	21%	21%	16%	$2.11^{a} \pm 0.26$
		16%	16%	28%	**40%**	$2.92^{b} \pm 0.22$
		44%	22%	22%	6%	$1.88^{a} \pm 0.24$
3.	Ate Spaghetti or Noodles					
	Yes 40 (97.6%) No 1 (2.4%)					
	17 (89.5%) 2 (10.5%)					
	26 (92.9%) 2 (7.1%)					
	17 (94.4%) 1 (5.6%)					
A.	Plain, or Without Meat	23%	15%	28%	**35%**	2.75 ± 0.19
		12%	18%	29%	**41%**	3.00 ± 0.26
		27%	8%	15%	**50%**	2.88 ± 0.26
		6%	18%	35%	**41%**	3.12 ± 0.23
4.	Ate Red Meat					
	Yes 38 (92.7%) No 3 (7.3%)					
	17 (89.5%) 2 (10.5%)					
	28 (100.0%) 0 (0.0%)					
	18 (100.0%) 0 (0.0%)					
A.	Trimmed Visible Fat	**47%**	11%	29%	13%	2.08 ± 0.19
		47%	29%	18%	6%	1.82 ± 0.23
		36%	11%	25%	29%	$2.46^{b} \pm 0.24$
		67%	22%	6%	6%	$1.50^{a} \pm 0.20$

Table 44 (continued)

5.	Ate Ground Beef					
	Yes 36 (87.8%) No 5 (12.2%)					
	17 (89.5%) 2 (10.5%)					
	Yes 27 (96.4%) No 1 (3.6%)					
	18 (100.0%) 0 (0.0%)					
	A. Chose Extra Lean	**42%**	22%	22%	14%	2.08 ± 0.18
		35%	**41%**	18%	6%	1.94 ± 0.22
		30%	19%	**33%**	19%	2.41 ± 0.22
		50%	11%	28%	11%	2.00 ± 0.27
6.	Ate a Main Meal Without Meat, Fish, Eggs, Cheese	0%	20%	**42%**	39%	3.20 ± 0.12
		11%	16%	**47%**	21%	2.83 ± 0.22
		0%	21%	21%	**57%**	$3.36^{b} \pm 0.16$
		0%	33%	**44%**	17%	$2.82^{a} \pm 0.18$
7.	Drank Milk					
	Yes 38 (92.7%) No 3 (7.3%)					
	19 (100.0%) 0 (0.0%)					
	26 (92.9%) 2 (7.1%)					
	17 (94.4%) 1 (5.6%)					
	A. Chose Very Low Fat or Skim	**37%**	18%	16%	29%	2.37 ± 0.21
		47%	26%	11%	16%	1.95 ± 0.26
		19%	15%	12%	**54%**	3.00 ± 0.24
		35%	18%	18%	29%	2.42 ± 0.31
8.	Ate Cheese					
	Yes 36 (90.0%) No 4 (10.0%)					
	15 (78.9%) 4 (21.1%)					
	26 (92.9%) 2 (7.1%)					
	16 (88.9%) 2 (11.1%)					

Table 44 (continued)

	A. Chose Low-Fat	14%	22%	31%	**33%**	2.83 ± 0.18
		13%	13%	27%	**47%**	3.07 ± 0.28
		4%	15%	23%	**58%**	3.34 ± 0.18
		13%	6%	31%	**50%**	3.19 ± 0.26
9.	Ate Frozen Desserts					
	Yes 36 (90.0%) No 4 (10.0%)					
	19 (100.0% 0 (0.0%)	.				
	26 (92.9%) 2 (7.1%)					
	16 (88.9%) 2 (11.1%)					
	A. Chose Ice Milk, Nonfat, Ice Cream, Frozen Yogurt, Sherbet	17%	**31%**	25%	28%	2.64 ± 0.18
		21%	**26%**	**26%**	**26%**	2.58 ± 0.28
		0%	23%	**31%**	46%	3.23 ± 0.16
		31%	13%	**50%**	6%	2.31 ± 0.25
10.	Ate Cooked Vegetables					
	Yes 39 (97.5%) No 1 (0.0%)					
	17 (89.5%) 2 (10.5%)					
	28 (100.0%) 0 (0.0%)					
	18 (100.0%) 0 (0.0%)					
	A. Added Butter, Margarine	26%	26%	13%	**34%**	2.55^a ± 0.20
		24%	18%	18%	**41%**	2.76^b ± 0.30
		41%	26%	15%	19%	2.11^a ± 0.22
		17%	11%	**39%**	33%	2.89^b ± 0.25
11.	Ate Potatoes					
	Yes 40 (100.0%) No 0 (0.0%)					
	19 (100.0%) 0 (0.0%)					
	28 (100.0%) 0 (0.0%)					
	17 (94.4%) 1 (5.6%)					

Table 44 (continued)

	A. Fried	10%	23%	**50%**	18%	2.75 ± 0.14
		5%	16%	**53%**	26%	3.00 ± 0.19
		22%	7%	**44%**	26%	2.74 ± 0.21
		11%	6%	**53%**	29%	3.00 ± 0.23
12.	Ate Boiled, Baked Potatoes					
	Yes 40 (100.0%) No 0 (0.0%)					
	18 (89.5%) 1 (10.5%)					
	27 (96.4%) 1 (3.6%)					
	18 (100.0%) 0 (0.0%)					
A.	Without Butter, Margarine, Sour Cream	18%	8%	8%	**58%**	3.15 ± 0.18
		6%	11%	22%	**61%**	3.39 ± 0.22
		12%	15%	12%	**62%**	3.23 ± 0.22
		11%	22%	28%	**33%**	2.88 ± 0.26
13.	Ate Green Salads					
	Yes 37 (92.5%) No 3 (7.5%)					
	17 (89.5%) 2 (10.5%)					
	28 (100.0%) 0 (0.0%)					
	18 (100.0%) 0 (0.0%)					
	A. Without Dressing	11%	0%	8%	**70%**	3.55 ± 0.18
		6%	0%	18%	**65%**	3.60 ± 0.21
		11%	7%	0%	**61%**	3.41 ± 0.24
		17%	11%	11%	**39%**	2.92 ± 0.34
	B. Used Low-Calorie Dressing	27%	14%	**38%**	16%	2.46 ± 0.19
		29%	24%	**29%**	18%	2.35 ± 0.27
		25%	7%	**39%**	21%	2.62 ± 0.22
		33%	22%	28%	6%	2.06 ± 0.25

Table 44 (continued)

14.	Ate Dessert					
	Yes 39 (97.5%) No 1 (2.5%)					
	19 (100.0%) 0 (0.0%)					
	28 (100.0%) 0 (0.0%)					
	17 (94.4%) 1 (5.6%)					
A.	With Cream, Whipped	0%	8%	18%	**71%**	3.66 ± 0.10
	Topping	.0%	0%	21%	**74%**	3.78 ± 0.10
		0%	4%	36%	**57%**	$3.56^{a} \pm 0.11$
		0%	6%	6%	**77%**	$3.80^{b} \pm 0.15$
B.	Had Only Fruit	8%	**41%**	28%	21%	2.63 ± 0.15
		11%	16%	**47%**	16%	2.76 ± 0.22
		4%	21%	**43%**	25%	$2.96^{b} \pm 0.16$
		18%	24%	**53%**	0%	$2.38^{a} \pm 0.20$
15.	Ate Snacks					
	Yes 40 (97.6%) No 1 (2.4%)					
	18 (94.7%) 1 (5.3%)					
	28 (100.0%) 0 (0.0%)					
	17 (94.4%) 0 (0.0%)					
A.	Had Raw Vegetables	3%	13%	**43%**	35%	3.19 ± 0.13
		0%	11%	**44%**	33%	3.25 ± 0.17
		0%	11%	**36%**	**36%**	$3.30^{b} \pm 0.15$
		24%	18%	**29%**	12%	$2.36^{a} \pm 0.29$
B.	Had Fresh Fruits	15%	**40%**	30%	8%	2.32 ± 0.14
		17%	28%	**50%**	0%	2.35 ± 0.19
		14%	32%	**46%**	4%	2.41 ± 0.15
		29%	**35%**	29%	6%	2.12 ± 0.23

Table 44 (continued)

16.	Ate Bread Rolls, Muffins					
	Yes 41 (100.0%) No 0 (0.0%)					
	19 (100.0%) 0 (0.0%)					
	28 (100.0%) 0 (0.0%)					
	16 (88.9%) 1 (5.6%)					
A.	Without Butter,	**56%**	29%	12%	2%	1.61 ± 0.13
	Margarine	**53%**	21%	16%	11%	1.84 ± 0.25
		32%	18%	25%	25%	2.43 ± 0.23
		44%	13%	13%	25%	2.20 ± 0.34
17.	Ate Tortillas					
	Yes 21 (51.2%) No 20 (48.8%)					
	9 (47.4%) 10 (52.6%)					
	12 (42.9%) 16 (57.1%)					
	7 (38.9%) 10 (55.6%)					
A.	Fried	**29%**	19%	**29%**	14%	2.32 ± 0.25
		0%	0%	**67%**	33%	3.33 ± 0.17
		33%	25%	25%	17%	2.25 ± 0.33
		29%	0%	**43%**	29%	2.71 ± 0.47
B.	Without Butter,	**57%**	0%	5%	29%	2.05 ± 0.33
	Margarine	**44%**	11%	11%	11%	1.86 ± 0.46
		8%	17%	17%	**42%**	3.01 ± 0.35
		14%	14%	14%	**29%**	2.80 ± 0.58
18.	Ate Sauted, Pan Fried Food					
	Yes 35 (85.4%) No 6 (14.6%)					
	16 (84.2%) 3 (15.8%)					
	26 (92.9%) 2 (7.1%)					
	15 (83.3%) 2 (11.1%)					

Table 44 (continued)

	A. Used Non-Stick Spray	20%	9%	**40%**	31%	2.83 ± 0.19
		19%	25%	**31%**	25%	2.63 ± 0.27
		19%	8%	23%	**50%**	3.04 ± 0.23
		27%	7%	13%	**53%**	2.93 ± 0.35
19.	Cooked Red Meat					
	Yes 37 (90.2%) No 4 (9.8%)					
	17 (89.5%) 2 (10.5%)					
	28 (100.0%) 0 (0.0%)					
	17 (94.4%) 0 (0.0%)					
	A. Trimmed Fat Before Cooking	**35%**	22%	24%	19%	2.27 ± 0.19
		53%	18%	18%	12%	1.88 ± 0.27
		39%	7%	14%	**39%**	$2.54^{b} \pm 0.26$
		77%	6%	6%	12%	$1.52^{a} \pm 0.26$
20.	Cooked Chicken					
	Yes 40 (97.6%) No 1 (2.4%)					
	18 (94.7%) 1 (5.3%)					
	27 (96.4%) 1 (3.6%)					
	17 (94.4%) 0 (5.6%)					
	A. Removed Skin Before Cooking	33%	5%	13%	**50%**	2.80 ± 0.22
		28%	17%	17%	**39%**	2.67 ± 0.30
		15%	11%	33%	**41%**	$3.00^{b} \pm 0.21$
		35%	24%	12%	24%	$2.25^{a} \pm 0.31$
21.	Used Mayonnaise					
	Yes 33 (80.5%) No 8 (19.5%)					
	14 (73.7%) 5 (26.3%)					
	24 (85.7%) 4 (14.3%)					
	15 (83.3%) 2 (11.1%)					

Table 44 (continued)

A. Used Lowfat or Nonfat Product	27%	12%	24%	**36%**	2.70 ± 0.22
	29%	21%	21%	**29%**	2.50 ± 0.33
	13%	8%	8%	**71%**	3.38 ± 0.22
	40%	7%	20%	33%	2.47 ± 0.35

Eating Patterns Scores

	Pretest	Post-posttest
Total	2.66 ± 0.08	2.50 ± 0.11
	2.86^{b} ± 0.09	2.44^{a} ± 0.10
Factor 1 Score (Modify meat)	2.55^{b} ± 0.11	2.18^{a} ± 0.16
	2.73^{b} ± 0.15	2.12^{a} ± 0.16
Factor 2 Score (Avoid fat as flavoring)	2.34 ± 0.08	2.27 ± 0.11
	2.58 ± 0.11	2.20 ± 0.12
Factor 3 Score (Replace, general foods)	2.96 ± 0.13	2.89 ± 0.20
	3.16 ± 0.13	3.00 ± 0.14
Factor 4 Score (Substitute)	2.60 ± 0.13	2.45 ± 0.17
	3.08^{b} ± 0.12	2.50^{a} ± 0.16
Factor 5 Score (Replace, fruits/vegetables)	2.85 ± 0.11	2.80 ± 0.16
	2.78 ± 0.13	2.35 ± 0.19

[1] Top value, _n_=41 for pretest control participants, and _n_=19 for post-posttest control participants; Bottom values, _n_=28 for pretest intervention participants, and _n_=18 for post-posttest intervention participants.

[2] Responses from left to right (1 to 4): "Usually/Always"; "Often"; "Sometimes"; "Rarely/Never".

[3] Most frequent response is in bold faced.

[4] Superscripts denote a significant difference ($p \leq 0.05$) was observed between responses for pretest and post-posttest. Significantly lower values are denoted with an "a", and significantly higher values are denoted with a "b".

also Appendix O, Table 0-32). A substantial increase occurred from pretest to post-posttest for the percentage of intervention subjects who indicated that they always or usually removed the skin from chicken over the past three months (16% versus 44%). Only 6% indicated that they rarely or never removed the skin on chicken at post-posttest, compared to 40% at pretest. The percentage of those who always or usually trimmed visible fat from meat increased from 36% to 67% from pretest to post-posttest. An increase was seen in the number of participants who chose a lower fat milk (19% at pretest versus 35% at post-posttest), as well as a decrease in those who rarely or never chose a lower fat milk (54% at pretest versus 29% at post-posttest). An increase was also seen in the number of persons who indicated that they usually or always trimmed visible fat from meat before cooking (39% at pretest versus 77% at post-posttest). The same trend was seen for the question pertaining to removing skin from chicken before cooking (15% at pretest versus 35% at post-posttest). Use of lowfat or nonfat mayonnaise increased substantially from pretest (13%) to post-posttest (40%). Similarly, 71% of respondents indicated that they rarely or never used a lowfat or nonfat mayonnaise at pretest, compared to 33% at post-posttest. According to significant mean responses, from pretest to post-posttest intervention subjects more frequently took the skin off chicken before eating (question 2c) or cooking (question 20a), trimmed visible fat from meat before eating (question 4a) or cooking (question 19a), ate a main meal without meat, fish eggs, or cheese (question 6), and had only fruit for dessert (question 14b) or raw vegetables as a snack (question 15a), and less frequently added butter or margarine to cooked vegetables (10a). Mean eating pattern factor scores (see Appendix L for a definition of factors) significantly decreased (from less frequently to more frequently) for the total eating pattern score (the summation of all five eating patterns), and for two factors (1, modification of meat; and 4, substitution of foods) for intervention subjects, compared to one factor (1) for control subjects (see Appendix O, Table 0-32).

Appendix Q presents results of participant evaluations of the nutrition education classes, which were completed immediately following each session. In general, participants rated the sessions as excellent or good on all questions. A less favorable response was given for the question regarding the length of time each session in comparison to other aspects of the program. Appendix R presents responses to questions regarding the materials used in the nutrition education classes, as well as questions pertaining to specific dietary changes made as a result of being a part of the program. A total of 20 evaluations (71%) were received. A majority of participants indicated that they frequently changed cooking oil (11, 55%) ate more fat-free or lowfat products (10, 50%), ate more fruits and vegetables (13, 65%), and fried foods less often (11, 55%) at the post-posttest time point. Participants indicated that they were not as likely to change to whole wheat bread and to change to lower fat milk.

CHAPTER V

DISCUSSION

The Lumbee Indians of Robeson County, North Carolina, share a rich heritage in a rural, tri-racial community. With a tribal enrollment of over 40,000 people, the Lumbees are the largest North American Indian tribe east of the Mississippi River, and the fifth largest tribe in the United States. The present study is the first attempt to obtain information regarding eating habits, nutrient intake and nutrition knowledge from a segment of this population, adult Lumbee Indian women in Robeson County. This study determined the intake of 41 dietary constituents of these Native American women as a group and by age category, as well as the effectiveness of a community-based, culturally sensitive nutrition education program in reducing the consumption of dietary constituents that may contribute to the risk of cancer.

The research was divided into a pilot study and an experimental study. In the pilot study, dietary information was collected from 120 women using a 24-hour recall, a 3-day food record, a food frequency questionnaire and a Lifestyle/Health Awareness questionnaire. Nutrient data were analyzed to determine the effects of two variables: two age groups (21 to 40 years versus 41 to 60 years) were assessed to determine whether an appreciable difference in intake occurred between younger and older women in this population; and three food intake instruments (24-hour recall, 3-day food record, and food frequency questionnaire) were compared to determine which provided the best estimation of nutrient intakes in this population. Nutrient intakes were also compared to data from nutritional studies involving other Native American tribes, as well as to national nutrition surveys and to the Recommended Dietary Allowances (RDA).

During the experimental study, 29 adult Lumbee Indian women participated in a six-week educational program designed to emphasize dietary patterns which are believed to lower cancer risk: increasing the intake of foods rich in dietary fiber and antioxidant vitamins (vitamins A, C and E, carotene and retinol) and lowering the intake of fat. Nutrient intakes and knowledge of nutrition in selected areas were measured prior to the beginning of the first session (pretest), at the conclusion of the six-week educational program (posttest), and three months after the last session (post-posttest) and compared to similar data from 41 control participants selected from the pilot population. Nutrient intake was estimated at the pretest and the post-posttest times using the 3-day food record and the food frequency questionnaire. Only the 3-day food record was used to estimate nutrient intake at the posttest time. Nutrition knowledge was measured using a 30-item questionnaire designed by the investigator which emphasized knowledge of fat, fiber and antioxidant vitamins. Eating patterns were estimated at the pretest and post-posttest times using an Eating Patterns Questionnaire which focused on modifications of fat intake.

Pilot Study

Time and expense constraints which occurred during the initial recruitment of participants for the pilot study required an expansion of the recruitment strategy, and prevented obtaining a true random sampling of females. To obtain enough subjects it was necessary to solicit participants from the Lumbee community at large rather than selecting them by a random sampling technique. Thus, the ability to generalize these data to the whole Lumbee female population is limited.

Based on information collected from the Lifestyle/Health Awareness Questionnaire (Appendix D), the pilot participants may not adequately represent the overall adult Lumbee Indian female population, particularly with regard to educational level and employment. A large proportion of the pilot participants were employed outside the home or were attending secondary school (91%) and had at least a high school education (96.7%). The educational level of the pilot group is not consistent with findings by Surles (1982, 1985), who stated that less than half (44.3%) of the Native American women in North Carolina have at least a high school education. Additionally, the 1990 census of the state of North Carolina reports that 50.4% of all Lumbee Indians in Robeson County over 24 years of age have less than a high school education. The relatively high percentage (52.5%) of subjects giving an informed affirmative response to the question of the relationship between diet and cancer may be related to the high level of education; however, this finding is consistent with findings from the 1987 National Health Interview Survey (Cotugna, Subar, Heimendinger, & Kahle, 1992). In this latter survey, 73% of 22,043 adults, of which 75% had at least a high school education, made a similar affirmation.

Nutrient intakes derived from pilot participants paralleled recommendations from the RDA and other organizations for most dietary constituents, with a few notable exceptions. Percent calories from fat ranged from

13% (24-hour recall) to 30% (food frequency questionnaire) higher than the 30% of total calories recommended by the National Cancer Institute and other organizations. Dietary fiber intake was 50% or more below recommendations, but closely resembled the intakes reported in national surveys. Intakes of several nutrients (magnesium, iron, zinc, calcium, vitamin E and vitamin B6) were approximately 75% or less of RDA values, with differences between reported intake and the RDA for some of these nutrients (magnesium, zinc, vitamin E and calcium) being more pronounced in the 21-40 than in the 41-60 year old group.

Significant differences in the intake of some nutrients were observed between age groups. The intake of vitamin C was significantly lower for the younger compared to the older age group using both 24-hour recalls and 3-day food records. The intake of dietary fiber for the younger age group was lower than the older group as measured by 3-day food records, while intake of vitamin A was lower for the younger age group using the 24-hour recall and the food frequency questionnaire. In general agreement with these nutrient intakes, weekly reported servings of fruits and vegetables (fruit or juice; vegetables, excluding potatoes and rice; carrots; deep yellow or dark green vegetables), as well as whole grain or bran cereals, were significantly lower for the younger age group compared to the older age group. Reported frequency of consumption of high-fat, high-calorie foods, such as beef, pork, hot dogs or luncheon meats, cheese, whole milk, and pastries, sweets, sodas and sugars were significantly higher for the younger than the older age group. This contrast in food intake with age is consistent with the findings of Slesinger and co-workers (1980), who found that subjects from younger age groups consumed less fruits and vegetables, less breads and cereal, fewer sources of calcium, and did not follow typical eating patterns in comparison to subjects from older age groups.

The disparity found in this sample between the relatively adequate consumption of vitamins A and C and the low intake of fiber and of fruits and vegetables merits consideration. One possible explanation is that citrus juice consumption, which is a good source of vitamin C but is low in fiber, was not included in the question on weekly fruit consumption in Table 15. Citrus fruit or juice constituted almost 50% of all reported fruit or juice intake, according to the food frequency questionnaire responses (Table 14). Another possibility is the wide range within the pilot group of total vitamin

A intake resulting from rich food sources of vitamin A and beta-carotene. Some foods, such as cantaloupe, tomatoes and carrots provide at least 100% of the RDA for vitamin A per serving. Very high intake of vitamin A from these food sources by a small proportion of the group could mask a very low intake by a larger proportion of the group, resulting in a wide range of intakes within the population. For example, the coefficient of variation for total vitamin A intake as measured by the 24-hour recall was 1.84, 2.07 for beta-carotene, and 3.62 for retinol, amounts which represent the highest variations for any of the measured dietary constituents. By comparison, the coefficient of variation for energy intake for the same instrument was 0.39. This finding of large variation in vitamin A intakes is consistent with that of other studies. For example, Nelson and co-workers (1989) observed that as many as 21- to 38-day food records may be required to adequately assess intake of vitamin A precursors, namely retinol and carotenes, for adult women compared to 6- to 8-day food records for energy.

Inconsistencies observed in nutrient intakes obtained from the 3-day food record and 24-hour recall in comparison to those from the food frequency questionnaire suggest that the food frequency questionnaire is not measuring intakes in the same way. Thus, the food frequency questionnaire may not be as appropriate for determining nutrient intake in this population as are the other two instruments. The food frequency instrument used in this project has been used successfully in national nutrition surveys, including the 1987 National Health Interview Survey (Block & Subar, 1992). Foods frequently listed by participants in the 3-day food record and 24-hour recall, such as banana pudding, shrimp, and "barbecue", were not included in the food frequency questionnaire. Similarly, foods rarely eaten in this community, such as spinach, liver, and broiled or baked fish, are part of the 60-item food list. The questionnaire allows for the addition of only one frequently eaten food not listed on the 60-item list. In addition, the food frequency questionnaire does not take into account dietary modification, such as trimming excess fat from meat and removing skin on chicken. This may account for the higher estimation of percent of calories from fat in the food frequency questionnaire compared to the estimate of calories from fat generated from the 3-day food record and 24-hour recall. The food frequency questionnaire used in this project was selected because of its short length, ease of implementation, and sensitivity to parameters associated with dietary risk of cancer.

By contrast, significant correlations in intakes of dietary constituents were more frequent when 3-day food records were compared to food frequency questionnaires than when comparisons were made between 3-day food records and 24-hour recalls, or between 24-hour recalls and food frequency questionnaires. These findings were of interest, considering the difference between the instruments mentioned above, and also since the 24-hour recalls and 3-day food records were analyzed with the same software program (University of Minnesota Nutrient Data System), while food frequency questionnaires were analyzed with a separate software program (DIETANAL) provided by the developer of the instrument. This difference may not be meaningful, since very few of the correlations, while significant at the $p \leq 0.05$ level, were above 0.500.

A majority of the women (76%) in the pilot phase indicated that they had made one or more "healthful" changes in their diets in the past five years, and had made modifications in their diets to reduce fat intake, such as trimming excess fat from meat and removing skin from chicken prior to cooking or eating. A majority (83%) also had direct access to a garden for food, and considered themselves to be healthy (92.5%). However, over half (52%) classified their diet as either not good or poor, while almost one-third (29%) could be classified as obese. Also, means reported for intake of fruits and vegetables were lower than guidelines established by the National Cancer Institute. The disparity between these findings is of interest for those who would consider developing a community health education program for this population in the future. For example, consumption of the readily accessible fruits and vegetables in this community could be strongly emphasized. Also, community programs emphasizing weight loss through exercise as well as dietary modifications may decrease the incidence of obesity and enhance the perceptions of diet in this population.

Experimental Phase

Initially, the response to the advertisement for the intervention program was positive. Despite extensive efforts to obtain confirmation of interest in the program by potential subjects, only 29 of the 78 contacts (37%) attended at least one of the education sessions. Over one-half of the nonparticipants (29 of 49, 59%) did not respond to the barriers survey mailed after the second program session. This lack of response to the survey did not allow for an effective elucidation of the reasons for the low participation rate in the program, and a corresponding change to compensate for potential barriers.

Of those who did return the survey, one-half (10 of 20, 50%) indicated that they had a specific conflict in their schedule with the time the classes were offered, and over one-third (7 of 20, 35%) indicated that a personal or family illness did not allow them to participate. A number of participants in the intervention did indicate verbally that a number of people in the Robeson County area were contracting influenza during the time period in which the intervention program was offered.

Pretest dietary, nutrient, nutrition knowledge, and eating patterns data were collected and analyzed during the first week of the experimental period. Three-day food records and responses to food frequency questionnaires were collected from intervention and control participants. Comparison of the mean intakes of dietary constituents between the two groups suggested strong similarity between them. Significant differences between the two participant groups occurred for two of 41 nutrients (energy and carbohydrates) using 3-day food records and 10 of 24 nutrients (energy, protein, saturated fat, vitamin C, riboflavin, niacin, potassium, phosphorus, iron and calcium) for food frequency questionnaires. Intake of energy, the only constituent significantly different for both instruments, was significantly lower for 3-day food records and significantly higher for food frequency questionnaires for intervention compared to control participants. Thus, pretest analyses of dietary constituents indicated few differences between the two groups, especially with respect to fat, fiber and antioxidant nutrients.

Observed differences in pretest data between control and intervention participants from the Lifestyle/Health Awareness questionnaire suggested that intervention participants were more likely than control participants to benefit from a nutrition education program. Intervention subjects had significantly higher mean body weight, higher percentages of overweight and obesity, lower perception of personal diet and health, and were less likely to exercise than control subjects.

Nutrient intakes for intervention participants did not change significantly from the pretest to the posttest, a period of approximately 6-8 weeks, from the posttest to the post-posttest, a period of three months, and from the pretest to the post-posttest, a period of approximately five months. Thus, intakes of dietary constituents of greatest interest in this research, fat, fiber and antioxidant vitamins did not change appreciably between the pretest and any of the posttests. Possibly the most likely reason for this contrast in response is the level of motivation of the participants. Participants in the present study were selected by media advertisement from a small geographic area, and were free of any chronic illnesses. Subjects in the Gorbach study (1990) were selected from three clinic sites, and identified to be at increased risk for breast cancer based on possession of one or more risk factors (family history, one or more benign breast biopsies, first birth after age 30 or nulliparous, or a history of breast biopsy with atypical epithelial hyperplasia). Similarly, subjects in the Buzzard study (1990) were postmastectomy patients with stage II breast cancer and with a fat intake greater than 30% of total energy. Given the status of the subjects in the latter two studies, it is possible that they were more motivated to make dietary changes than the participants in the present study.

Another probable explanation for this finding is the relatively short period of time (six weeks) of the intervention program. Other studies of similar format that were successful in reducing fat intake were much longer than the present study. Gorbach and co-workers (1990) observed a decrease in fat intake from 39% to 22% of total calories in an intervention study spanning a one-year period. Similarly, Buzzard and co-workers (1990) observed a comparable decrease in fat intake (from 38.4% to 22.8% of total calories) in subjects who participated in a three-month intervention program. The intensity of the interaction between investigators and participants in producing dietary change compared to the present study may also account for this disparity between the findings of the present study and that of these other studies. Gorbach and co-workers (1990) reported that each participant in their intervention program had individual sessions with trained nutritionists twice during the first three months of the program. Participants in the Buzzard study (1990) received six individual counseling sessions by trained nutritionists during the three-months intervention program.

The level of participation of subjects in the intervention was relatively high and probably does not explain the lack of response. Over three-fourths of participants (22 of 29, 76%) attended at least four of the six sessions, and handout materials were provided for those sessions that were missed.

In contrast to intervention subjects, the intakes by control participants of eight dietary constituents (energy, carbohydrates, fat, saturated fat, monounsaturated fat, polyunsaturated fat, sodium and CSI ratio) decreased significantly from the pretest to the posttest and the pretest to the post-posttest, but not from the posttest to the post-posttest. The disparity in response between the two groups may have been influenced by the time period in which pretest data were collected from control subjects. As part of the pilot phase, data collection and analysis for control subjects occurred during a one-year period prior to the beginning of the intervention phase. Therefore, seasonal differences in food intake may have occurred in the control participants that were not as prominent in the intervention participants. This suggestion is supported by the fact that no significant differences in nutrient intake (with the exception of calcium) occurred for control participants from the posttest to the post-posttest period three months later.

Changes in responses to questions from the Nutrition Knowledge Test for intervention participants from the pretest to the posttest, compared to a lack of change for control subjects, suggests that there was some increase in nutrition knowledge as a result of the nutrition education class. This trend is similarly evident for participant groups in a comparison of pretest to post-posttest responses, suggesting not only a change in knowledge, but also a retention of knowledge over the three-month period. Similarly, participants reported changes in eating patterns between the pretest to post-posttest, such as removing skin from chicken before eating and/or cooking, trimming excess fat from meat, and increased use of low-fat milk and reduced fat mayonnaise. Reported intake of fruits and vegetables increased moderately but not significantly over the same time period.

The contrast between the apparent changes in eating habits and nutrition knowledge with the lack of change in dietary constituents over time for intervention participants deserves mention. The nutrient analysis program for the 3-day food record (NDS) is designed to detect specific modifications in intake of foods, such as trimming the visible fat from meat, removing the skin from chicken, or consuming a modified-fat product, which would affect total fat intake. Participants were trained prior to filling out the food records to be as explicit as possible in recording food intake. However, it is possible that participants did not provide enough information regarding the modification of foods (listed above) that they made as a result of participation in the study. Information not provided by participants on the food records regarding any of the aforementioned modifications was entered as "unknown" in the program. Another possible explanation for this contrast is that eating patterns to lower intake of fat that were emphasized during the intervention program may have been offset by increases in food consumption or other changes in eating patterns not emphasized during the program.

The evaluation by participants of the nutrition education class, and the materials used in the class, provides an opportunity for participant analysis of the educational program. With the exception of the length of time of each class, analysis of the cultural and educational appropriateness of the materials used in the nutrition education program was judged favorably by the participants.

Summary

The present research is the first to document nutrient intake and the effectiveness of a nutrition education program among Lumbee Indians in Robeson County, North Carolina. The following hypotheses were tested:

1. The typical diet of Lumbee Indian women in Robeson County, North Carolina, is low in dietary fiber and some micronutrients, and high in total calories, total fat, and percent calories from fat, compared to guidelines established by the National Cancer Institute, the American Cancer Society, and the National Research Council (Recommended Dietary Allowance);

The intake of dietary fiber in the Lumbee pilot sample was much lower (50% or greater) than the recommendations of the national health organizations, but resembled the levels of intake found in national surveys and a survey of other Native American tribes. The intake of fat and percent calories from fat also paralleled that of other populations, and ranged from 13 to 30 percent higher than recommendations, depending on the instrument used for estimation. The intakes of antioxidant vitamins were within 75 percent of the RDAs.

2. A community-based, culturally sensitive educational intervention session designed to promote specific modifications in dietary intake that can lower cancer risk will result in favorable (increases or decreases as appropriate) changes in the intake of targeted foods and nutrients.

The nutrition education program, despite contributing to some changes in knowledge and eating patterns, did not result in any significant changes in nutrient or food group intakes within a three-month period when measured using 3-day food records and food frequency questionnaires. However, favorable changes in nutrition knowledge occurred, and some changes in eating patterns were reported.

Further Research

Further research in this population is warranted in order to understand how the dietary habits of adult Indian women may be influenced. In the present study, adequate random sampling of the adult Lumbee female population was not accomplished. Random sampling may be accomplished in this population with a more extensive telephone random-digit dialing process, or by sampling from tribal rolls, which were not available for this study.

A more extensive, longer-term nutrition education program may be more effective in changing knowledge, dietary intake and behavior in this population. Longer programs of similar format have been successful in changing dietary habits in a direction favorable to lowering the dietary risk of cancer (Buzzard, et al, 1990; Gorbach, et al, 1990), especially with regard to dietary fat intake. Providing up to one year of education, and more interaction with health professionals would be expected to provide a greater change in fat, fiber and antioxidant nutrient intakes. Also, an intervention program targeting a high risk portion of this population (family history of cancer, obese, tobacco users, very poor dietary habits), who would presumably have a high level of motivation as a result of their risk level, may be more effective in favorably changing nutrient intake.

BIBLIOGRAPHY

Albanes, D. (1987). Caloric intake, body weight, and cancer: A review. Nutrition and Cancer, 9, 199-217.

American Cancer Society. (1988). Changing the course: Eating to reduce cancer risk. Public education publication. Atlanta, GA: Author.

American Dietetic Association. (1988). Position of the ADA: Health implications of dietary fiber. Journal of the American Dietetic Association, 88, 216.

American Medical Association, Council on Scientific Affairs. (1989). Dietary fiber and health. Journal of the American Medical Association, 262, 542-546.

Ammerman, A. S., Haines, P. S., DeVellis, R. F., Strogatz, D. S., Keyserling, T. C., Simpson, R. J., Jr., & Siscovick, D. S. (1992). A brief dietary assessment to guide cholesterol reduction in low-income individuals: Design and validation. Journal of the American Dietetic Association, 91, 1385-1390.

Bal, D. G., & Foerster, S. B. (1991). Changing the American diet: Impact on cancer prevention policy recommendations and program implications for the American Cancer Society. Cancer, 67, 2671-2680.

Balshem, M., Amsel, Z., Workman, S., Balshem, A., & Engstrom, P. (1988). Development of a nutrition education program for a blue collar community. In L. W. Engstrom, P. N. Anderson, & L. E. Mortenson (Eds.), Advances in cancer control: Cancer control research and the emergence of the oncology product line (pp. 65-76). New York: Alan R. Liss.

Barton, G. L. (1967). The most ironic story in American history. Charlotte, NC: Associated Printing Corporation.

Bass, M. A., & Wakefield, L. M. (1974). Nutrient intake and food patterns of Indians on Standing Rock Reservation. Journal of the American Dietetic Association, 64, 36-41.

Bazzarre, T. L., & Myers, M. P. (1978). The collection of food intake data in cancer epidemiology studies. Nutrition and Cancer, 1, 22-45.

Bazzarre, T. L., & Yuhas, J. A. (1983). Comparative evaluation of methods of collecting food intake data for cancer epidemiology studies. Nutrition and Cancer, 5, 201-214.

Bergman, E. A., Boyungs, J. C., & Erickson, M. L. (1990). Comparison of a food frequency questionnaire and a 3-day diet record. Journal of the American Dietetic Association, 90, 1431-1432.

Berg, G. M. (1990). Diabetes risk is high for Native Americans. Obesity and Health, 4, 49-52.

Berrino, F., Panico, S., & Muti, P. (1989). Dietary fat, nutritional status and endocrine-associated cancers. In A. B. Miller (Ed.), Diet and the aetiology of cancer (pp. 1-12). New York: Springer Verlag.

Block, G. (1982). A review of validations of dietary assessment methods. American Journal of Epidemiology, 115, 492-505.

Block, G. (1989). Human Dietary Assessment: Methods and issues. Preventive Medicine, 18, 653-660.

Block, G., Hartman, A. M., Dresser, C. M., Carroll, M. D., Gannon, J., & Gardner, L. (1986). A data-based approach to diet questionnaire design and testing. American Journal of Epidemiology, 124, 453-469.

Block, G., Rosenberger, W. F., & Patterson, B. H. Calories, fat and cholesterol: Intake patterns in the US population by race, sex, and age. American Journal of Public Health, 78, 1150-1155.

Block, G. & Subar, A. F. (1992). Estimates of nutrient intake from a food frequency questionnaire: The 1987 National Health Interview Survey. Journal of the American Dietetic Association, 92, 969-977.

Blu, K. I. (1980). The Lumbee problem: The making of an American Indian people. London: Cambridge University Press.

Boeckner, L. S., Kohn, H., & Rockwell, S. K. (1990). A risk-reduction nutrition course for adults. Journal of the American Dietetic Association, 90, 260-263.

Bosley, B. (1959). Nutrition in the Indian Health Program. Journal of the American Dietetic Association, 35, 905-909.

Boutwell, R. K. (1988). An overview of the role of diet and nutrition in carcinogenesis. In G. P. Tryfiates & K. N. Prasad (Eds.), Nutrition, Growth and Cancer (pp. 81-104). New York: Alan R. Liss.

Brammer, S. H., & DeFelice, R. L. (1980). Dietary advice in regard to risk for colon and breast cancer. Preventive Medicine, 9, 544-549.

Broussard, B. A., Johnson, A., Himes, J. H., Story, M., Fichtner, R., Hauck, F., Bachman-Carter, K., Hayes, J., Frohlich, K., Gray, N., Valway, S., & Gohdes, D. (1991). Prevalence of obesity in American Indians and Alaska Natives. American Journal of Clinical Nutrition, 53, 1535S-1542S.

Buckley, D. I., McPherson, R. S., North, C. Q., & Becker, T. M. (1992). Dietary micronutrient and cervical dyusplasia in southwestern American Indian women. Nutrition and Cancer, 17, 179-185.

Burke, B. S. (1947). The diet history as a tool in research. Journal of the American Dietetic Association, 23, 1041-1046.

Burkitt, D. P. (1971). Epidemiology of cancer of the colon and rectum. Cancer, 28, 3-13.

Buzzard, I. M., Asp, E. H., Chlebowski, R. T., Boyar, A. P., Jeffery, R. W., Nixon, D. W., Blackburn, G. L., Jochimsen, P. R., Scanlon, E. F., Insull, W., Jr., Elashoff, R. M., Butrum, R., Wynder, E. L. (1990). Diet intervention methods to reduce fat intake: Nutrient and food group composition of self-selected low-fat diets. Journal of the American Dietetic Association, 90, 42-50, 53.

Carroll, K. K. (1991). Dietary fats and cancer. American Journal of Clinical Nutrition, 53, 1064S-1067S.

Carroll, K. K., Braden, L. M., Bell, J. A., & Kalamegham, R. (1986). Fat and cancer. Cancer, 58, 1818-1825. Clapp, J. A., McPherson, R. S., Reed, D. B., & Hsi, B. P. (1991). Comparison of a food frequency questionnaire using reported vs standard portion sizes for classifying individuals according to nutrient intake. Journal of the American Dietetic Association, 91, 316-320.

Cleveland, L. E., & Pfeffer, A. B. (1987). Planning diets to meet the National Research Council's guidelines for reducing cancer risk. Journal of the American Dietetic Association, 87, 162-168.

Committee on Diet and Health, Food and Nutrition Board, Commission on Life Sciences, National Research Council. (1989). Diet and health: Implications for reducing chronic disease risk. Washington, DC: National Academy Press.

Committee on Diet, Nutrition, and Cancer, Assembly of Life Sciences, National Research Council. (1982). Diet, nutrition, and cancer. Washington, DC: National Academy Press.

Cotugna, N., Subar, A. F., Heimendinger, J., & Kahle, L. (1992). Nutrition and cancer prevention knowledge, beliefs, attitudes, and practices: The 1987 National Health Interview Survey. Journal of the American Dietetic Association, 92, 963-968.

Dial, A. L., & Eliades, D. K. (1975). The only land I know: A history of the Lumbee Indians. San Franciso: Indian Historian Press.

Doll, R. (1990). Symposium on "diet and cancer": An overview of the epidemiological evidence linking diet and cancer. Proceedings of the Nutrition Society, 49, 199-131.

Doll, R. & Peto, R. (1981). The causes of cancer. Quantitative estimates of avoidable risks of cancer in the United States today. Journal of the National Cancer Institute, 66, 1191-1308.

Dresser, C. M. & Burhansstipanov, L. (1993). Documenting the cancer research needs of American Indians and Alaska Natives. Journal of the American Dietetic Association, 93, A-97.

Engle, A., Hebert, J. R., & Reddy, B. S. (1990). Relationships between food consumption and dietary intake among healthy volunteers and implications for meeting dietary goals. Journal of the American Dietetic Association, 90, 526-530, 533.

Evans, W. K. (1971). To die game: The story of the Lowry band, Indian guerrillas of the Reconstruction. Baton Rouge: Louisiana State University Press.

Fackelmann, K. (1992). Strong heart, weak heart. Science News, 142, 168-170.

Finnegan, J. R., Jr., Rooney, B., Viswanath, K., Elmer, P., Graves, K., Baxter, J., Hertog, J., Mullis, R., & Potter, J. (1992). Process evaluation of a home-based program to reduce diet-related cancer risk: The "win at home series." Health Education Quarterly, 19, 233-248.

Fischer, C. A., Crockett, S. J., Heller, K. E., & Skauge, L. H. (1991). Nutrition knowledge, attitudes, and practices of older and younger elderly in rural areas. Journal of the American Dietetic Association, 91, 1398-1401.

Food and Nutrition Board, Committee on Life Sciences, National Research Council. (1989). Recommended Dietary Allowance, 10th revised edition. Washington, DC: National Academy Press.

Fortmann, S. P., Williams, P. T., Hulley, S. B., Haskell, W. L., & Farquhar, J. W. Effect of health education on dietary behavior: the Sstanford three community study. American Journal of Clinical Nutrition, 34, 2030-2038.

Frost, F., Taylor, V., & Fries, E. (1992). Racial misclassification of Native Americans in a surveillance, epidemiology, and end results cancer registry. Journal of the National Cancer Institute, 84, 957-962.

Giovannucci, E., Stampfer, M. J., Colditz, G, Rimm, E. B., & Willett, W. C. (1992). Relationship of diet to risk of colorectal adenoma in men. Journal of the National Cancer Institute, 84, 91-98.

Glanz, K. (1985). Nutrition education for risk factor and patient education: A review. Preventive Medicine, 14, 721-752.

Glanz, K. (1980). Compliance with dietary regimens: Its magnitude, measurement, and determinants. Preventive Medicine, 9, 787-804.

Gorbach, S. L., Morrill-LaBrode, A., Woods, M. N., Dwyer, J. T., Selles, W. D., Henderson, M., Insull, W., Jr., Goldman, S., Thompson, D., Clifford, C., & Sheppard, L. (1990). Changes in food patterns during a low-fat dietary intervention in women. Journal of the American Dietetic Association, 90, 802-809.

Graham, S., Marshall, J., Mettlin, C., Rzepka, T., Nemoto, T., & Byers, T. (1982). Diet in the epidemiology of breast cancer. American Journal of Epidemiology, 116, 68-75.

Greenwald, P., Light, L., McDonald, S. S., & Stern, H. R. (1990). Strategies for cancer prevention through diet modification. Medical Oncology & Tumor Pharmacotherapy, 7, 199-208.

Gridley, G., McLaughlin, J. K., Block, G., Blot, W. J., Winn, D. M., Greenberg, R. S., Schoenberg, J. B., Preston-Martin, S., Austin, D. F., & Fraumeni, J. F., Jr. (1990). Diet and oral and pharyngeal cancer among blacks. Nutrition and Cancer, 14, 219-225.

Gray, C. H., Colome, J. S., & Curry-Daly, J. R. (1987). Elective cancer education: How effective from a public health viewpoint? American Journal of Public Health, 77, 1207-1209.

Greenwald, P., & Sondik, E. J. (1986). Cancer control objectives for the nation: 1985-2000. NCI Monographs, 2, 3-11.

Haines, P. S., Hungerford, D. W., Popkin, B. M., & Guilkey, D. K. (1992). Eating patterns and energy and nutrient intakes of US women. Journal of the American Dietetic Association, 92, 698-707.

Hargreaves, M. K., Baquet, C., & Gamshadzahi, A. (1989). Diet, nutritional status, and cancer risk in American Blacks. Nutrition and Cancer, 12, 1-28.

Harland, B. F., Smith, S. A., Ellis, R., O'Brien, R., & Morris, E. R. (1992). Comparison of the nutrient intakes of Blacks, Siouan Indians, and Whites in Columbus County, North Carolina. Journal of the American Dietetic Association, 92, 348-350.

Henderson, M. M., Kushi, L. H., Thompson, D. J., Gorbach, S. L., Clifford, C. K., Insull, W., Jr., Moskowitz, M., & Thompson, R. S. (1990). Feasibility of a randomized trial of a low-fat diet for the prevention of breast cancer: Dietary compliance in the women's health trial vanguard study. Preventive Medicine, 19, 115-133.

Ho, E. E., Atwood, J. R., Benedict, J., Ritenbaugh, C., Sheehan, E. T., Abrams, C., Alberts, D., & Meyskens, F. L., Jr. (1991). A community-based feasibility study using wheat bran fiber supplementation to lower colon cancer risk. Preventive Medicine, 20, 213-225.

Holm, L. E. (1990). Nutritional intervention studies in cancer prevention. Medical Oncology & Tumor Pharmacotherapy, 7, 209-215.

Horner, R. D. (1990). Cancer mortality in Native Americans in North Carolina. American Journal of Public Health, 80, 940-944.

Humble, C. G., Samet, J. M., & Skipper, B. E. (1984). Comparison of self- and surrogate-reported dietary information. American Journal of Epidemiology, 119, 86-98.

Jackson, M. Y. (1986). Nutrition in American Indian health: Past, present, and future. Journal of the American Dietetic Association, 86, 1561-1565.

Jackson, M. Y., & Broussard, B. A. (1987). Cultural challenges in nutrition education among American Indians. Diabetes Educator, 13, 47-50.

Jackson, M. Y., & Godfrey, F. (1990). Federal nutrition services for American Indian and Alaska Native elders. Journal of the American Dietetic Association, 90, 568-571.

Jepson, C. J., Kessler, L. G., Portnoy, B., & Gibbs, T. (1991). Black-White differences in cancer prevention knowledge and behavior. American Journal of Public Health, 81, 501-504.

Karvetti, R. L., & Knuts, L. R. (1992). Validity of the estimated food diary: Comparison of two-day recorded and observed food and nutrient intakes. Journal of the American Dietetic Association, 92, 580-584.

Kesteloot, H., Lesaffre, E., & Joossens, J. V. (1991). Dairy fat, saturated animal fat, and cancer risk. Preventive Medicine, 20, 226-236.

Knekt P., Albanes, D., Seppanen, R., Aromaa, A., Jarvinen, R., Hyvonen, L., Teppo, L., & Pukkala, E. (1990). Dietary fat and risk of breast cancer. American Journal of Clinical Nutrition, 52, 903-908.

Knick, S. G. (1986). Growing up down home: Health and growth in the Lumbee nation (Doctoral dissertation, University of Indiana, 1986). Dissertation Abstracts International, 234, 1614A.

Knick, S. G. (1992). How long have the Lumbees been here? The Robesonian, p. 4A.

Knowler, W. C., Pettitt, D. J., Savage, P. J., & Bennett, P. H. (1981). Diabetes incidence in Pima Indians: Contributions of obesity and parental diabetes. American Journal of Epidemiology, 113, 144-156.

Kristal, A. R., Shattuck, A. L., & Henry, H. J. (1990). Patterns of dietary behavior associated with selecting diets low in fat: Reliability and validity of a behavioral approach to dietary assessment. Journal of the American Dietetic Association, 90, 214-220.

Kristal, A. R., White, E., Shattuck, A. L., Curry, S., Anderson, G. L., Fowler, A., & Urban, N. (1992). Long-term maintenance of a low-fat diet: Durability of fat-related dietary habits in the women's health trial. Journal of the American Dietetic Association, 92, 553-559.

Kritchevsky, D. (1986). Diet, nutrition, and cancer: The role of fiber. Cancer, 58, 1830-1836.

Lanza, E., Jones, Y., Block, G., & Kessler, L. (1987). Dietary fiber intake in the U.S. population. American Journal of Clinical Nutrition, 46, 790-797.

Larkin, F. A., Metzner, H. L., & Guire, K. E. (1991). Comparison of three consecutive-day and three random-day records of dietary intake. Journal of the American Dietetic Association, 91, 1538-1542.

Lee, E. T., Welty, T. K., Fabsitz, R., Cowan, L. D., Le, N. A., Oopik, A. J., Cucchiara, A. J., Savage, P. J., & Howard, B. V. (1990). The strong heart study: A study of cardiovascular disease in American Indians, Design and methods. American Journal of Epidemiology, 132, 1141-1155.

Lee, J., Kolonel, L. N., & Hankin, J. H. (1983). On establishing the interchangeability of different dietary-intake assessment methods used in studies of diet and cancer. Nutrition and Cancer, 5, 215-218.

Light, L., Tenney, J., Portney, B., Kessler, L., Rodgers, A. B., Patterson, B., Mathews, O., Katz, E., Blair, J. E., Evans, S. K, & Tuckermanty, E. (1989). Eat for health: A nutrition and cancer control supermarket intervention. Public Health Reports, 104, 443-450.

Loehrer, P. J., Greger, H. A., Weinberger, M., Musick, B., Miller, M., Nichols, C., Bryan, J., Higgs, D., & Brock, D. (1991). Knowledge and beliefs about cancer in a socioeconomically disadvantaged population. Cancer, 68, 1665-1671.

Lumbee Regional Development Association. (1990). Lumbee tribal governance. Pembroke, NC: Author

Lyon, J. L., Gardner, J. W., West, D. W., & Mahoney, A. M. (1983). Methodological issues in epidemiological studies of diet cancer. Cancer Research, 43 (supp.), 2392s-2396s.

Mahoney, M. C., Michalek, A. M., Cummings, M., Nasca, P. C., & Emrich, L. J. (1989). Cancer mortality in a northeastern Native American population. Cancer, 64, 187-190.

Mayberry, R. H., & Lindeman, R. D. (1963). A survey of chronic disease and diet in Seminole Indians in Oklahoma. American Journal of Clinical Nutrition, 13, 127-134.

McCann, B. S., Retzlaff, B. M., Dowdy, A. A., Walden, C. E., & Knopp, R. H. (1990). Promoting adherence to low-fat, low-cholesterol diets: Review and recommendations. Journal of the American Dietetic Association, 90, 1408-1414, 1417.

McGinnis, J. M., & Ballard-Barbash, R. M. (1991). Obesity in minority populations: Policy implications of research. American Journal of Clinical Nutrition, 53, 1512S-1514S.

Mitchell-Beren, M. E., Dodds, M. E., Choi, K. L., & Waskerwitz, T. R. (1989). A colorectal cancer prevention, screening, and evaluation program in community Black churches. Ca: A Cancer Journal for Clinicians, 39, 115-118.

National Cancer Institute. (1984). Cancer prevention: Good news; better news; best news. Washington, DC: Department of Health and Human Services. (DHHS publication no. (NIH) 84-2671).

National Cancer Institute. (1992). Making health communication programs work. Washington, DC: Department of Health and Human Services. (NIH publication no. 92-1493).

National Dairy Council. (1991). Diet and cancer prevention: A perspective. Dairy Council Digest, 62, 1-6.

Neel, J. V. (1962). Diabetes mellitus: A "thrifty" gene genotype rendered detrimental by "progress"? American Journal of Human Genetics, 14, 353-362.

Nelson, M., Black, A. E., Morris, J. A., & Cole, T. J. (1989). Between- and within-subject variation in nutrient intake from infancy to old age: estimating the number of days required to rank dietary intakes with desired precision. American Journal of Clinical Nutrition, 50, 155-167.

Nieman, D. C., Butterworth, D. E., Nieman, C. N., Lee, K. E., & Lee, R. D. (1992). Comparison of six microcomputer dietary analysis systems with the USDA nutrient data base for standard reference. Journal of the American Dietetic Association, 92, 48-56.

Nitzke, S. (1989). Improving the effectiveness of nutrition education materials for low literacy clients. Nutrition Today, September/October, 17-23.

Nixon, D. W. (1990). Nutrition and cancer: American Cancer Society guidelines, programs and initiatives. CA-A Cancer Journal for Clinicians, 40, 71-75.

Nixon, D. W. (1991). Cancer prevention clinical trials. Hematology/Oncology Clinics of North America, 5, 185-189.

Nomura, A., Henderson, B. E., & Lee, J. (1978). Breast cancer and diet among the Japanese in Hawaii. American Journal of Clinical Nutrition, 31, 2020-2025.

Osborne, N. G., & Feit, M. D. (1992). The use of race in medical research. Journal of the American Medical Association, 267, 275-279.

Palmer, S. (1986). Dietary considerations for risk reduction. Cancer, 58, 1949-1953.

Patterson, B. H., Block, G., Rosenberger, W. F., Pee, D., & Kahle, L. L. Fruits and vegetables in the American diet: Data from the NHANES II survey. American Journal of Public Health, 80, 1443-1449.

Potischman, N., McCulluch, C. E., Byers, T., Nemoto, T., Stubbe, N., Milch, R., Parker, R., Rasmussen, K. M., Root, M., Graham, S., & Campbell, T. C. (1990). Breast cancer and dietary and plasma concentrations of carotenoids and vitamin A. American Journal of Clinical Nutrition, 52, 909-915.

Public Health Service. (1988). The Surgeon General's report on nutrition and health. Department of Health and Human Services (PHS) 88-50211. Washington, DC: US Government Printing Office.

Randall, E., Marshall, J. R., Graham, S., & Brasure, J. (1991). High-risk health behaviors associated with various dietary patterns. Nutrition and Cancer, 16, 135-151.

Randall, E., Marshall, J. R., Brasure, J., & Graham, S. (1991). Patterns in food use and compliance with NCI dietary guidelines. Nutrition and Cancer, 15, 141-158.

Reid, J. M., Fullmer, S. D., Pettigrew, K. D., Burch, T. A., Bennett, P. H., Miller, M., & Whedon, G. D. (1971). Nutrient intake of Pima Indian women: Relationships to diabetes and gallbladder disease. American Journal of Clinical Nutrition, 24, 1281-1289.

Riboli, E. (1989). Methodological issues in the investigation of diet and cancer in humans. In A. B. Miller (Ed.), Diet and the aetiology of cancer (pp. 55-63). New York: Springer Verlag.

Rogers, A. E., & Longnecker, M. P. (1988). Dietary and nutritional influences on cancer: A review of epidemiological and experimental data. Laboratory Investigation, 59, 729-759.

Rohans, T. E., & Bain, C. J. (1987). Diet in the etiology of breast cancer. Epidemiologic Reviews, 9, 120-145.

Rose, D. P. (1990). Dietary fiber and breast cancer. Nutrition and Cancer, 13, 1-8.

Schatzkin, A. P., Greenwald, D. P., Byar, D. P., & Clifford, C. K. (1989). The dietary fat-breast cancer hypothesis is alive. Journal of the American Medical Association, 261, 3284-3287.

Shankar, S., & Lanza, E. (1991). Dietary fiber and cancer prevention. Hematology/Oncology Clinics of North America, 5, 25-41.

Slattery, M. L., Schumacher, M. C., West, D. W., Robison, L. M., & French, T. K. (1990). Food-consumption trends between adolescent and adult years and subsequent risk of prostate cancer. American Journal of Clinical Nutrition, 52, 752-757.

Slesinger, D. P., McDivitt, M., & O'Donnell, F. M. (1980). Food patterns in an urban population: Age and sociodemographic correlates. Journal of Gerontology, 35, 432-441.

Smith, J. M. (1990). The Lumbee Methodists: Getting to know them. Zebulon, NC: Theo. Davis & Sons.

Smith-Schneider, L. M., Sigman-Grant, M. J., & Kris-Etherton, P. M. (1992). Dietary fat reduction strategies. Journal of the American Dietetic Association, 92, 34-38.

Story, M., Tompkins, R. A., Bass, M. A., & Wakefield, L. M. (1986). Anthropometric measurements and dietary intakes of Cherokee Indian teenagers in North Carolina. Journal of the American Dietetic Association, 86, 1555-1560.

Stuff, J. E., Garza, C., Smith, E. O., Nichols, B. L., & Montandon, C. M. (1983). A comparison of dietary methods in nutritional studies. American Journal of Clinical Nutrition, 37, 300-306.

Surles, K. B. (1982). Update on the health status of American Indians in North Carolina: Special report series by the N.C. Department of Human Resources, prepared for the North Carolina Commission of Indian Affairs.

Surles, K. B. (1985). Update on the health status of American Indians in North Carolina: Special report series by the N.C. Department of Human Resources, prepared for the North Carolina Commission of Indian Affairs.

Teufel, N. I., & Dufour, D. L. (1990). Patterns of food use and nutrient intake of obese and nonobese Hualapai Indian women in Arizona. Journal of the American Dietetic Association, 90, 1229-1235.

Toniolo, P., Riboli, E., Protto, F., Carrel, M., & Cappa, A. P. M. (1989). Calorie-providing nutrients and risk of breast cancer. Journal of the National Cancer Institute, 81, 278-286.

United States Department of Agriculture. (1984). Nutrition education for Native Americans: A guide for nutrition educators. Publication No. FNS-249.

United States Department of Agriculture. (1986). Cross-cultural counseling: A guide for nutrition and health counselors. Publication No. FNS-250.

United States Department of Agriculture and United States Department of Health and Human Services. (1985). Nutrition and your health: Dietary guidelines for Americans. Home and Garden Bulletin No. 232, Second Edition.

Urban, N., & Baker, M. (1989). The women's health trial as an investment. Medical Decision Making, 9, 59-64.

Varma, R. N. (1990). Changes in knowledge, attitude and behavior of participants in a self-instruction nutrition program to lower cancer risk. Journal of the American Dietetic Association, 90, A-128.

Weisburger, J. H. & Wynder, E. L. (1991). Dietary fat intake and cancer. Hematology/Oncology Clinics of North America, 5, 7- 23.

Wetley, T. K. (1991). Health implications of obesity in American Indians and Alaska Natives. American Journal of Clinical Nutrition, 53, 1616S-1620S.

Wiggins, C. L., Becker, T. M., Key, C. R., & Samet, J. M. (1989). Stomach cancer among New Mexico's American Indians, Hispanic whites, and non-hispanic whites. Cancer Research, 49, 1595-1599.

Willett, W. C., Sampson, L., Stampfer, M. J., Rosner, B., Bain, C., Witschi, J., Hennekens, C. H., & Speizer, F. E. Reproducibility and validity of a semiquantitative food frequency questionnaire. American Journal of Epidemiology, 122, 51-65.

Willett, W. C., Stampfer, M. J., Colditz, G. A., Rosner, B. A., Hennekens, C. H., & Speizer, F. E. (1987). Dietary fat and the risk of breast cancer. New England Journal of Medicine, 316, 22-28.

Willett, W. C., Stampfer, M. J., Colditz, G. A., Rosner, B. A., & Speizer, F. E. (1990). Relation of meat, fat, and fiber intake to the risk of colon cancer in a prospective study among women. New England Journal of Medicine, 323, 1664-1672.

Wilson, R., Smith, J., Marfin, A. M., & Helgerson, S. (1989). A low-cost competitive approach to weight reduction in a Native American community. International Journal of Obesity, 13, 731-738.

Winick, M. (1991). Calories and cancer. Hematology/Oncology Clinics of North America, 5, 1-6.

Wolfe, W. S., & Sanjur, D. (1988). Contemporary diet and body weight of Navajo women receiving food assistance: An ethnographic and nutritional intervention. Journal of the American Dietetic Association, 88, 822-827.

Woods, R. D. (1984). Indians of North Carolina: An Indian studies skillstext for eighth and ninth graders to accompany Unity curriculum guide. Lumberton, NC: Robeson County Board of Education.

Workman, S., Amsel, Z., Balshem, A., & Engstrom, P. (1988). Cancer control in a defined population: Results of the "beat the odds" education program. In P. E. Engstrom, P. N. Anderson, & L. E. Mortenson (Eds.), Advances in cancer control: Cancer control research and the emergence of the oncology product line (pp. 55-64). New York: Alan R. Liss.

Young, T. K., & Sevenhuysen, G. (1989). Obesity in northern Canadian Indians: Patterns, determinants, and consequences. American Journal of Clinical Nutrition, 49, 786-793.

Ziegler, R. G. (1991). Vegetables, fruits, and carotenoids and risk of cancer. American Journal of Clinical Nutrition, 53, 251S-259S.

Zintz. M. V. (1961). The Indian research study: The adjustment of Indian and non-Indian children in the public schools of New Mexico, 1957-1960 Final Report. Albuquerque, NM: College of Education, University of New Mexico.

Zulkifli, S. N., & Yu, S. M. (1992). The food frequency method for dietary assessment. Journal of the American Dietetic Association, 92, 681-685.

APPENDIX A

TELEPHONE PROTOCOL

APPENDIX A

TELEPHONE INTERVIEW PROTOCOL

Our goal is to obtain 125 "yes" responses to participation in this project. This will be the first contact with any of the potential subjects, so it is very important to make a good first impression.

1. Using the list of four-digit random numbers, begin dialing phone numbers. You will be initially using the "521" prefix for the Pembroke area to go along with the random four-digit suffix.

   Example: If the first four-digit number on the list is 9240, then you will dial "521-9240".

2. If the response to the number you have dialed results in any of the following, go to the next number on your list and repeat step 1:

   --Busy signal **(circle and come back to it later)**
   --No one answers **(circle and come back to it later)**
   --The number is to a non-residential phone (i.e, business, government office, church, etc.) **(cross off the list)**

3. If the response to the number you have dialed results in contact with someone at a place of residence, begin the conversation **(Note: If a young child answers the phone, ask to speak to their mother)**:

   "Hello, my name is ______________________. Your phone number has been selected at random as part of a nutrition research study underway here in Robeson County. We are trying to locate adult Lumbee women who would be willing to participate in the study. Is there an adult Lumbee Indian woman between the ages of 25-55 in your home?

Yes	No
Continue conversation. Go to Step 4.	Thank them for their time and cross their name off your list. Go to next number.

4. Ask to speak to that person (if you are not speaking to them already).

OK	Not home
Continue conversation. Go to Step 5.	Ask for their name and if there is a time when you can call back. Circle number on your list, making a note ofthe person's name and time you can call back.

5. Once you have that person on the line, you will go through a screening process to see if the person is eligible to participate in the study. If this person is not the person who initially picked up the phone, you will have to begin the conversation by going through the conversation piece in Step 3 (i.e., you will have to tell them who you are and why you are calling).

You will then continue the conversation:

"Ronny Bell, who is a native of Pembroke, is doing a study on the nutritional habits of Lumbee Indian women as part of his doctoral degree at the University of North Carolina at Greensboro. He is looking for 125 adult women in the Pembroke area who are willing to be interviewed about their eating habits. The interview will take about an hour, and can be done at your convenience. The information you provide will be completely confidential. As compensation for your time, Mr. Bell will be providing you with a complete analysis of your diet, along with a free cookbook. Would you be willing to participate?"

Yes	No
Continue conversation. Go to Step 6.	Thank them for their time and cross that number off the list. Go to next number.

Note: If they need more information about the study, and would like to talk to someone else, take their name and a convenient call time/date, and tell them that I will call them in the next day or two. Go to next number on the list. Make sure you make a note of it in the designate area on the next pages.

6. Continue the conversation.

"Mr. Bell will be sending you a letter to verify your response and to give you further information about the study. I need to get your mailing address.

Name: ______________________________
Phone Number: ______________________
Mailing Address:______________________________________
____

"Thank you very much for your time and your willingness to participate. You will be receiving your letter from Mr. Bell within the next two weeks."

Put a check beside that number on your list. Go to next number on the list and repeat process.

PERSONS WHO WOULD LIKE A PERSONAL CONTACT

NAME	PHONE #	TIME/DATE TO CALL

APPENDIX B

LETTER TO POTENTIAL SUBJECTS

Dear

Thank you for your willingness to participate in this study. In order to continue the screening process, I need to get more information from you. Please answer the following questions, then return the next page in the enclosed, self-addressed, stamped envelope. Your answers to these questions will determine whether you are eligible to be a part of this study.

1. Are you a female, tribally enrolled Lumbee living in Robeson County?

   Yes No

2. Are you between the ages of 21-60 years?

   Yes No

3. Have you been a resident of Robeson County for at least the past two years?

   Yes No

4. Do you not have, nor never had, any form of cancer?
   (ANSWER "YES" IF YOU DO <u>NOT</u> HAVE, OR HAVE NEVER HAD, CANCER)
   Yes No

5. Do you not take any prescribed medicines at this time?
   (ANSWER "YES" IF YOU DO <u>NOT</u> TAKE PRESCRIPTION MEDICINE AT THIS TIME)
   Yes No

6. Will you be available for participation in this study for the next 6 months?

   Yes No

7. Are you not on any type of special diet at this time?
   (ANSWER "YES" IF YOU ARE <u>NOT</u> ON A SPECIAL DIET AT THIS TIME)
   Yes No

If you do not understand how you should respond to some of the questions, please look at the response sheet on the next page. Feel free to call me at 521-4622 if you have any questions. Thank you again! I look forward to hearing from you very soon.

Sincerely,

Ronny Bell

Please check the appropriate response and return this sheet in the enclosed envelope. Your prompt and proper response to these questions is critical!

( ) Yes! I would be glad to be in the Nutrition Research Study. I answered "Yes" to all of the screening questions.

( ) No! I may not be eligible to participate in this study because:

( ) I could not answer "Yes" to all the questions from the first page. Please specify which of the following statements applies to you (check all that apply)

( ) I am not a female Lumbee Indian (See Question #1)
( ) I am not tribally enrolled (See Question #1)
( ) I am not between the ages of 21 and 60 (See Question #2)
(Please indicate present age:_______)
( ) I have not lived in Robeson County for the past two years (See Question #3)
( ) I now have, or have had, cancer of some form (See Question #4. **<u>If you have, or have had, some form of cancer, you should have answered "No" to Question #4</u>**.
( ) I am presently taking a prescribed medication (See Question #5)
Please specify which medication(s) you are now taking: ____________________________
<u>If you are taking a prescribed medication, you should have answered "No" to Question #5.</u>
( ) I will not be available for follow-up for the next 6 months (See Question #6)
( ) I am now on a special diet (See Question # 7)
Please specify the type of diet you are now on:
____
<u>If you are on a special diet, you should have answered "No" to Question #7.</u>

Depending on our response rate, you may still be eligible to participate in the study even if you did not answer "Yes" to these questions.

( ) I prefer not to participate for personal reasons

<u>Remember that the information you provide will be strictly confidential</u>!!!!.

Please fill in the information below
Name: ____________________________________
Mailing Address: ____________________________________
____
Phone Number: ______________________________

THANK YOU VERY MUCH

APPENDIX C

LETTER TO NONRESPONDERS

Dear

A few weeks ago, I mailed you a copy of a screening questionnaire for participation in the Lumbee Nutrition Research Study. I requested that you respond to the questions on the questionnaire and send back the second page in the enclosed envelope in order to help me in the process of selecting participants in the study.

To date, I have not received your response. I realize that a number of things may have happened, like it may have gotten lost in the mail, or you may have misplaced it. I have also come to learn that some of the questions may have been a little confusing.

I have enclosed a copy of the questionnaire, which has been updated to make it more simple. If you have not already mailed your copy of your responses to me, please fill out this questionnaire and send it in the enclosed envelope. **It is important that I receive your response as soon as possible no matter what your responses are on the questionnaire.** If, for any reason, you have questions about the questionnaire, or about the study, please feel free to call me at 521-4622. Thank you very much.

Ronny Bell

Lumbee Nutrition Research Study

APPENDIX D

LIFESTYLE/HEALTH AWARENESS QUESTIONNAIRE

LIFESTYLE/HEALTH AWARENESS QUESTIONNAIRE

SUBJECT NAME/IDENTIFICATION NUMBER: ______________________________
DATE/TIME OF INTERVIEW: ____________________________
INTERVIEWER: _________________________________

"I would like to ask you some questions about your lifestyle and your awareness of health issues. This will give a general idea of you as a person and your attitudes toward personal health. If you do not know the answer to a question, please feel free to respond by saying, "I don't know." Please be assured that the information you provide is strictly confidential!"

HEALTH INFORMATION

1. ARE THERE ANY ILLNESSES (DIABETES, HEART DISEASE, HIGH BLOOD PRESSURE, etc.) WHICH ARE COMMON (OR "RUN") IN YOUR FAMILY? (Please circle your response)

Yes No Don't Know

Illness(es): ____

2. HAVE YOU BEEN INSTRUCTED BY A DOCTOR OR OTHER HEALTH PROFESSIONAL TO CHANGE YOUR DIET AND/OR LIFESTYLE IN ANY WAY IN THE LAST FIVE YEARS? (Please circle your response)

Yes No Don't Know

Change(s) Made: ______________________________________

Reason(s) for Change(s): ______________________________

3. WOULD YOU CONSIDER YOURSELF TO BE A FAIRLY HEALTHY PERSON? (Please circle your response)

Yes No Don't Know

Why or why not? ____

4. WHERE DO YOU RECEIVE MOST OF YOUR INFORMATION ABOUT DIET AND HEALTH? (Please circle all your responses)

a. Doctor's office/Health clinic
b. Newspaper/Radio/Television/Magazine
c. Friends/Family members/Spouse
d. Church/Civic organization/Social club
e. Work/School

5. DO YOU PRESENTLY FOLLOW AN EXERCISE PLAN? (Please circle your response)

Yes No

5A. IF YES, WHAT TYPE(S) OF EXERCISE DO YOU DO? (Please circle all that apply)

a. Walking
b. Jogging/Running
c. Aerobics
d. Tennis
e. Golf
f. Swimming
Other (specify): ______________________________

5B. HOW OFTEN DO YOU EXERCISE? (Please circle your response)

a. More than once/day
b. Once a day
c. 4-5 times/week
d. 2-3 times/week
e. Once/week
f. Less than once/week

DIETARY INFORMATION

6. WHO IS THE PRIMARY FOOD BUYER FOR YOU AND YOUR FAMILY? (Please circle your response)

Yourself
Other member of household (specify): _______________

7. WHO IS RESPONSIBLE FOR THE MAJORITY OF THE FOOD PREPARATION FOR YOU AND YOUR FAMILY? (Please circle your response)

Yourself
Other member of household (specify): _______________

8. HAVE YOU MADE ANY PERSONAL CHANGES IN YOUR DIET IN THE PAST FIVE YEARS THAT YOU STILL FOLLOW TODAY? (Please circle your response)

Yes No Don't Know

Change(s) Made (Please circle all that apply):
a. Cut down on salt (sodium)
b. Cut down on sugar/Use more artificial sweeteners
c. Cut down on sweets (desserts)
d. Cut down on meats/Eat less red meat and/or pork
e. Drink lowfat milk instead of whole milk
f. Eat more foods with fiber/more fruit and vegetables
g. Change cooking technique/cooking oils
h. Other (specify): ______________________________

8A. WHY DID YOU MAKE THE CHANGE(S) IN YOUR DIET? (Please circle all that apply)

a. Lose weight
b. Suggested by doctor/health professional/family member/friend
c. Response to media information (newspaper, TV, etc.)
d. Desire to be more healthy
e. Other (specify): ___________________________

9. IN GENERAL, HOW OFTEN DO YOU EAT A MEAL THAT WAS PREPARED OUTSIDE YOUR HOME? (RESTAURANT, FAST FOOD, RELATIVE, CHURCH, PRE-PREPARED FOODS, CAFETERIA) (Please circle your response)

a. More than once a day
b. Once a day
c. 3-4 times per week
d. 1-2 times per week
e. 1-2 times per month
f. Less than once a month

9A. PLEASE INDICATE THREE OF YOUR MOST COMMON SOURCES OF FOOD COOKED OUTSIDE THE HOME.

1. ______________________________

2. ______________________________

3. ______________________________

10. DO YOU AND YOUR FAMILY HAVE DIRECT ACCESS TO FOODS FROM ANY OF THE FOLLOWING SOURCES? (Please circle your response)

			OWNER
a. Garden	Yes	No	__________
b. Livestock (chickens, cows, etc.)	Yes	No	__________
c. Fruit trees/vines	Yes	No	__________
d. Fishing/Hunting	Yes	No	__________

10A. PLEASE LIST FOODS WHICH ARE COMMONLY EATEN IN THE HOUSEHOLD THAT ARE OBTAINED THROUGH THESE SOURCES. (Write down all responses)

FOOD EATEN TIME OF YEAR EATEN FREQUENCY

CANNING? __________ FREEZING? __________

11. WHICH OF THE FOLLOWING DO YOU USUALLY COOK WITH? (Please circle your response. More than one option may be given)

a. Soft margarine
b. Stick margarine
c. Butter
d. Oil
e. Lard, fatback, bacon fat
f. Pam or no oil
g. Other (specify)______________________________

12. WHAT KIND OF FAT DO YOU USUALLY ADD TO VEGETABLES, POTATOES, ETC.? (Please circle your response. More than one option can be given)

a. Don't add fat
b. Soft margarine
c. Stick margarine
d. Butter
e. Oil
f. Lard, fatback, bacon fat

13. *HOW DO YOU TYPICALLY PREPARE THE FOLLOWING FOODS?* (Please check your response)

	FRY	BAKE	BROIL/ROAST	GRILL
a. CHICKEN	______	______	______	______
b. FISH	______	______	______	______
c. PORK	______	______	______	______
d. HAMBURGER	______	______	______	______

14. HOW WOULD YOU PERSONALLY CLASSIFY YOUR TYPICAL DIET (OR, HOW DO YOU FEEL ABOUT YOUR DIET)? (Please circle your response)

a. I have a very good diet
b. I have a good diet, but would like to change some things
c. I do not have a good diet
d. I have a very poor diet, and would consider getting professional assistance to change my diet

CANCER AWARENESS INFORMATION

15. DO YOU PRESENTLY SMOKE? (Please circle your response)

Yes No

15A. IF YES, HOW MUCH DO YOU SMOKE PER DAY (in number of packs)? (Please write your response)

Number of packs per day: ____________
Brand of cigarette: __________________

16. DO YOU PRESENTLY CONSUME ALCOHOLIC BEVERAGES? (NOTE: THIS QUESTION MAY MAKE YOU UNCOMFORTABLE. IF SO, YOU CAN OPT TO NOT ANSWER (Please circle your response)

Yes No Refuse to answer

16A. IF YES, WHAT TYPES OF BEVERAGES DO YOU DRINK, AND HOW MUCH OF EACH DO YOU DRINK PER WEEK? (Please write your response)

Type beverage Amount/week

17. DO YOU FEEL THAT A PERSON'S DIET CAN HAVE A STRONG IMPACT ON THEIR RISK OF GETTING CANCER? (Please circle your response)

Yes No Don't Know

17A. IF YES, IN WHAT WAYS DO YOU THINK DIET PLAYS A ROLE IN CANCER RISK? (Please write your response(s).

GENERAL INFORMATION

1. AGE: ________ 2. OCCUPATION: ______________________
3. HEIGHT/WEIGHT: __________________ 4. NUMBER OF CHILDREN: ___

5. NUMBER OF PEOPLE LIVING IN HOUSEHOLD PRESENTLY: ____________

6. FORMAL EDUCATION LEVEL
(Please circle your response. Response should reflect last year of school **completed**)

Below 7th grade 10th grade Community college degree
8th grade 11th grade 2-year college degree
9th grade 12th grade 4-year college degree
Graduate level degree
Other (specify) _________________________

7. GENERAL YEARLY FAMILY INCOME RANGE (OPTIONAL):
   (Please circle your response)

   Less than 10,000 dollars
   10,000 - 20,000 dollars
   20,000 - 30,000 dollars
   40,000 - 50,000 dollars
   50,000 - 75,000 dollars
   Greater than 75,000 dollars

8. MARITAL STATUS (Please circle your response)

   A. Single, never married
   B. Married
   C. Divorced/Separated
   D. Widowed

APPENDIX E

24-HOUR DIETARY RECALL

24-HOUR RECALL SHEET

SUBJECT NAME/IDENTIFICATION NUMBER: ______________________________
DATE/TIME OF INTERVIEW: ____
INTERVIEWER: ____

"I will now ask you to do what is called a 24-hour recall. You will be asked to recall all the food and beverages, and the amounts of each, you have eaten in the past 24 hours. We will start with the present time and work backwards. You may use these food models to help you estimate portions sizes. Please include any condiments (salt, sugar, ketchup, etc.) which you added to the food after it was prepared. Please be as descriptive as possible about each food or beverage (i.e., preparation method, ingredients, etc.).

MEAL (Breakfast, Lunch, Dinner/Supper, Snack): ____________________
TIME OF DAY: ___________________________

FOODS EATEN AMOUNT

MEAL (Breakfast, Lunch, Dinner/Supper, Snack): ____________________
TIME OF DAY: ___________________________

FOODS EATEN AMOUNT

MEAL (Breakfast, Lunch, Dinner/Supper, Snack): ____________________
TIME OF DAY: ___________________________

FOODS EATEN AMOUNT

MEAL (Breakfast, Lunch, Dinner/Supper, Snack): ____________________
TIME OF DAY: ___________________________

FOODS EATEN AMOUNT

MEAL (Breakfast, Lunch, Dinner/Supper, Snack): ____________________
TIME OF DAY: ___________________________

FOODS EATEN AMOUNT

APPENDIX F

HEALTH HABITS AND HISTORY QUESTIONNAIRE

1 8

HEALTH HABITS AND DIET QUESTIONNAIRE

This form asks you a variety of questions about your background, environment, and habits, which may affect or be related to your health. The information you provide will help scientists to understand more about the causes of disease. This questionnaire will take about 12-15 minutes to complete. Please fill in the information requested, or place a check in the appropriate space. If you are not sure about an answer, please estimate.

THIS SPACE FOR OFFICE USE

TODAY'S DATE: Month __ - Day __ - Year __ (11 … 16)

Please PRINT YOUR NAME (name of study participant)

17 LAST 31 FIRST 40 MIDDLE 48 — A 79 80

1-10*

ADDRESS: 11 STREET 34

35 CITY 49 STATE 52 ZIP 61 — 62 ___ State Code

TELEPHONE: (___) - ___ - ____ 64 73 — B 79 80

1. When were you born? ___/___/___ Month Day Year — 11

2. How old are you? ___ years — 18 ___

3. Sex: 1 ___ Male 2 ___ Female — 20 ___

4. Race or ethnic background:
   1 ___ White, not of Hispanic origin 4 ___ American Indian/Alaskan native
   2 ___ Black, not of Hispanic origin 5 ___ Asian
   3 ___ Hispanic 6 ___ Pacific Islander — 21 ___

5. Please circle the highest grade in school you have completed:
   1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17+ — 22 ___

6. How tall are you? ___ feet ___ inches 7. How much do you weigh? ___ pounds — 24

8. Do you smoke cigarettes now? 1 ___ No 2 ___ Yes — 30 ___
   IF YES: On the average, about how many cigarettes a day do you smoke now? ___ cigarettes — 31 ___

9. During the past year, have you taken any vitamins or minerals? | 33 ___
1 ___ No 2 ___ Yes, fairly regularly 3 ___ Yes, but not regularly   If Yes,

What do you take fairly regularly?	# of PILLS per DAY, WEEK, etc.		
Multiple Vitamins			
One-a-day type	___ pills per ___		34 ___
Stress-tabs type	___ pills per ___		37 ___
Therapeutic, Theragran type	___ pills per ___	How many milligrams or IUs per pill?	40 ___
Other Vitamins			
Vitamin A	___ pills per ___	___ IU per pill	43 ___
Vitamin C	___ pills per ___	___ mg per pill	47 ___
Vitamin E	___ pills per ___	___ IU per pill	51 ___
Calcium or dolomite	___ pills per ___	___ mg per pill	55 ___

Other (What?) 1 ___ Yeast 2 ___ Selenium 3 ___ Zinc 4 ___ Iron 5 ___ Beta-carotene
6 ___ Cod liver oil 7 ___ Other ___ | 59 ___

Please list the brand of multiple vitamin/mineral you usually take: ___

C
79 80

10. This section is about your *usual* eating habits. Thinking back over the past year, how often do you usually eat the foods listed on the next page?

First, check (✓) whether your usual serving size is small, medium or large. (A small portion is about one-half the medium serving size shown, or less; a large portion is about one-and-a-half times as much, or more.)

Then, put a *NUMBER* in the most appropriate column to indicate *HOW OFTEN*, on the average, you eat the food. You may eat bananas *twice a week* (put a *2 in the "week"* column). If you never eat the food, check "Rarely/Never." Please DO NOT SKIP foods. And please BE CAREFUL which column you put your answer in. It will make a big difference if you say "Hamburger once a day" when you mean "Hamburger once a week"!

One item says "in season." Indicate how often you eat this just in the 2-3 month time when that food is in season. (Be careful about overestimating here.)
Please look at the *example* below. This person
1) eats a medium serving of cantaloupe once a week, in season.
2) has ½ grapefruit about twice a month.
3) has a small serving of sweet potatoes about 3 times a year.
4) has a large hamburger or cheeseburger or meat loaf about four times a week.
5) never eats liver.

EXAMPLE:

	Medium Serving	Your Serving Size S	M	L	How often? Day	Week	Month	Year	Rarely/Never
Cantaloupe (in season)	¼ medium		✓			1			
Grapefruit	(½)		✓				2		
Sweet potatoes, yams	½ cup	✓						3	
Hamburger, cheeseburger, meat loaf	1 medium			✓		4			
Liver	4 oz.								✓

FOR OFFICE USE
Q 9, mg or IU: 1 = 50-100 2 = 200-250 3 = 400-500 4 = 1000 5 = 5000 6 = 10,000 7 = 20,000-25,000 8 = 50,000 9 = Unk.

On the following two pages, code the four characters for each food as follows:

S-1	No. Times	Dy-1
M-2		Wk-2
L-3		Mo-3
NS-9	NS-99	Yr-4
		Nev-5
		NS-9

If respondent places a checkmark in the "How often" columns, do not impute "01", once. Instead, code "99", Not Stated. If respondent does not check a portion size, do not impute medium, but code "9".

FRUITS & VEGETABLES	Medium Serving	Your Serving Size S	M	L	How often? Day	Week	Month	Year	Rarely/ Never	OFFICE USE
EXAMPLE – Apples, applesauce, pears	(1) or ½ cup		✓			4				
Apples, applesauce, pears	(1) or ½ cup									11 ____
Cantaloupe (in season)	¼ medium									15 ____
Oranges	1 medium									19 ____
Orange juice or grapefruit juice	6 oz. glass									23 ____
Grapefruit	(½)									27 ____
Other fruit juices, fortified fruit drinks	6 oz. glass									31 ____
Beans such as baked beans, pintos, kidney, limas, or in chili	¾ cup									35 ____
Tomatoes, tomato juice	(1) or 6 oz.									39 ____
Broccoli	½ cup									43 ____
Spinach	½ cup									47 ____
Mustard greens, turnip greens, collards	½ cup									51 ____
Cole slaw, cabbage, sauerkraut	½ cup									55 ____
Carrots, or mixed vegetables containing carrots	½ cup									59 ____
Green salad	1 med. bowl									63 ____
Salad dressing, mayonnaise (including on sandwiches)	2 Tblsp.									67 ____
French fries and fried potatoes	¾ cup									71 ____
Sweet potatoes, yams	½ cup									75 ____ D 79 80
Other potatoes, incl. boiled, baked, potato salad, mashed	(1) or ½ cup									11 ____
Rice	¾ cup									15 ____
MEAT, MIXED DISHES, LUNCH ITEMS		S	M	L	Da	Wk	Mo	Yr	Nv	
Hamburgers, cheeseburgers, meat loaf	1 medium									19 ____
Beef—steaks, roasts	4 oz.									23 ____
Beef stew or pot pie with carrots, other vegetables	1 cup									27 ____
Liver, including chicken livers	4 oz.									31 ____
Pork, including chops, roasts	2 chops or 4 oz.									35 ____
Fried chicken	2 sm. or 1 lg. piece									39 ____
Chicken or turkey, roasted, stewed or broiled	2 sm. or 1 lg. piece									43 ____
Fried fish or fish sandwich	4 oz. or 1 sand.									47 ____
Other fish, broiled, baked	4 oz.									51 ____
Spaghetti, lasagna, other pasta with tomato sauce	1 cup									55 ____
Hot dogs	2 dogs									59 ____
Ham, lunch meats	2 slices									63 ____
Vegetable soup, vegetable beef, minestrone, tomato soup	1 med. bowl									67 ____
BREADS / SALTY SNACKS / SPREADS		S	M	L	Da	Wk	Mo	Yr	Nv	
White bread (including sandwiches), bagels, etc., crackers	2 slices, 3 cracks									71 ____
Dark bread, including whole wheat, rye, pumpernickel	2 slices									75 ____ E 79 80
Corn bread, corn muffins, corn tortillas	1 med. piece									11 ____
Salty snacks (such as chips, popcorn)	2 handfuls									15 ____
Peanuts, peanut butter	2 Tblsp.									19 ____
Margarine on bread or rolls	2 pats									23 ____
Butter on bread or rolls	2 pats									27 ____
BREAKFAST FOODS		S	M	L	Da	Wk	Mo	Yr	Nv	
High fiber, bran or granola cereals, shredded wheat	1 med. bowl									31 ____
Highly fortified cereals, such as Product 19, Total, or Most	1 med. bowl									35 ____
Other cold cereals, such as Corn Flakes, Rice Krispies	1 med. bowl									39 ____
Cooked cereals	1 med. bowl									43 ____
Eggs — 1 egg = small,	2 eggs = medium									47 ____
Bacon	2 slices									51 ____
Sausage	2 patties or links									55 ____

SWEETS	Medium Serving	Your Serving Size S	M	L	How often? Day	Week	Month	Year	Rarely/Never	OFFICE USE
Ice cream	1 scoop									59 ____
Doughnuts, cookies, cakes, pastry	1 pc. or 3 cookies									63 ____
Pies	1 med. slice									67 ____
Chocolate candy	small bar, 1 oz.									71 ____
DAIRY PRODUCTS, BEVERAGES		S	M	L	Da	Wk	Mo	Yr	Nv	
Cheeses and cheese spreads, not including cottage	2 slices or 2 oz.									75 ____ F 79 80
Whole milk and bevs. with whole milk (not incl. on cereal)	8 oz. glass									11 ____
2% milk and bevs. with 2% milk (not incl. on cereal)	8 oz. glass									15 ____
Skim milk, 1% milk or buttermilk (not incl. on cereal)	8 oz. glass									19 ____
Regular soft drinks (not diet)	12 oz. can or bottle									23 ____
Beer	12 oz. can or bottle									27 ____
Wine	1 med. glass									31 ____
Liquor	1 shot									35 ____
Milk or cream in coffee or tea	1 Tblsp.									39 ____
Sugar in coffee or tea, or on cereal	2 teaspn.									43 ____

	1 Seldom/Never	2 Sometimes	3 Often/Always	OFFICE USE
11. How often do you eat the skin on chicken?	____	____	____	47 _
How often do you eat the fat on meat?	____	____	____	48 _
How often do you add salt to your food?	____	____	____	49 _
How often do you add pepper to your food?	____	____	____	50 _

12. Not counting salad or potatoes, about how many servings of vegetables do you eat per day or per week? ______ (vegetables) per ______ (day, week) — 51 ___

13. Not counting juices, how many servings of fruits do you usually eat per day or per week? ______ (fruits) per ______ (day, week) — 54 ___

G 79 80

THANK YOU VERY MUCH for taking the time to fill out this information.

Reviewed by ______________________

APPENDIX G

3-DAY DIETARY RECORD

Please read these instructions before you record your information.

3 DAY DIETARY RECORD

SUBJECT NAME/IDENTIFICATION NUMBER: ______________________________
DATE/TIME OF INTERVIEW: ______________________________________
INTERVIEWER: ____

INSTRUCTIONS FOR COMPLETING 3 DAY DIETARY RECORD

1. Please record all the foods and beverages you drink for 3 non-consecutive 24-hour periods. At least one of the three 24-hour periods should be a weekend day (Saturday or Sunday).

2. Please write down at the top of the page the day and date of each day that you are recording. Try to use days which are typical for you in regard to food consumption (i.e., if you know you are going to a big party with refreshments, don't use that day).

3. Begin each recording day in the morning with your first meal, and end it with the last food you eat before you go to bed (do not overlap days). Try to record foods immediately after eating so it will be accurate and complete.

4. Please record the following for each food:

   Time of day eaten
   Meal (Breakfast, Lunch, Dinner, Snack)
   Amount (using standard household measurements: cup, tablespoon, teaspoon, slice, ounce)
   Condiments (salt, pepper, sugar, artificial sweeteners, ketchup, mayonnaise, cream, gravy/sauces, etc.)
   Brand name of store-bought food/beverage items
   Restaurant name if food eaten outside the home

5. For mixed dishes, such as casseroles and desserts, record approximate amounts of main ingredients eaten.
   Example: for a chicken and rice casserole, record
   2 oz. chicken, white meat
   1/2 c. rice
   2 T cream of chicken soup

   For sandwiches, list ingredients separately.
   Example: for a tuna salad sandwich, record:
   1/2 c. tuna, packed in water
   1 T mayonnaise, diet
   1 sl tomato
   1 leaf lettuce, iceberg
   2 sl whole wheat bread

6. Please be as descriptive as possible in recording each food. Include preparation technique (fried, baked, etc.), fats/oils used in cooking, food storage method (i.e., tuna packed in water or oil, fruit packed in water or syrup, freeze-dried, etc.), name brands, etc.

7. Use the following codes:

Portion sizes	Meal Time Code
Cup = c	Breakfast = B
Tablespoon = T	Mid-Morning Snack = M
Teaspoon = t	Lunch (Midday meal) = L
Slice = sl	Afternoon Snack = A
Ounce = oz	Dinner/Supper (Evening Meal) = D
	Evening Snack = E

8. Please be descriptive as possible in you consumption of the foods. For example, if you eat the skin on a fruit or vegetable, record that. If you eat the fat along the edge of a piece of beef, or if you eat (or don't eat) the skin on poultry, record that. Also, record the type of milk (whole, 2%, 1%, 1/2%, skim) that you drink or use in food preparation. Anyway, I think you get the idea.

DAY 1

SUBJECT NAME: ______________________________
DATE: ______________________

MEAL TIME CODE | TIME OF DAY | FOOD DESCRIPTION | AMOUNT

DAY 2

SUBJECT NAME: ______________________________
DATE: ______________________

MEAL TIME CODE | TIME OF DAY | FOOD DESCRIPTION | AMOUNT

DAY 3

SUBJECT NAME: ______________________________
DATE: ______________________

MEAL TIME CODE | TIME OF DAY | FOOD DESCRIPTION | AMOUNT

APPENDIX H

REMINDER LETTER

Dear

This is just a note to thank you again for participating in the Lumbee Nutrition Study, and to remind you to go ahead and send me your 3-day food record. If at all possible, please send it sometime within the next week.

If you have already sent your records, then either something happened in the mail, or it is on its way. If that is the case, I need to find out what has happened. If you have sent your records sometime within the last week, then just disregard this letter. If it has been longer than that since you sent it, please contact me at 521-4622 so I can figure out what to do about this situation. Also, if you have misplaced your record sheets, you can call me and I will give you another set.

Thanks again for your efforts!!!

Sincerely,

Ronny Bell
Lumbee Nutrition Study

APPENDIX I

THANK-YOU LETTER

Dear

I would like to thank you very much for working around your schedule and allowing me the privilege of coming into your home to do the dietary interviews. I am in the process of analyzing the information that you gave me, so you should be hearing back from in a few weeks. At that time, you will be receiving a complete analysis of your diet (with any suggestions that may be needed) along with a cookbook and other small gifts as a token of my appreciation for your participation. You will also receive information sometime in the future about the final results of the study, so be on the lookout for that. I anticipate that these results will also be published in the Carolina Indian Voice, and maybe other local newspapers.

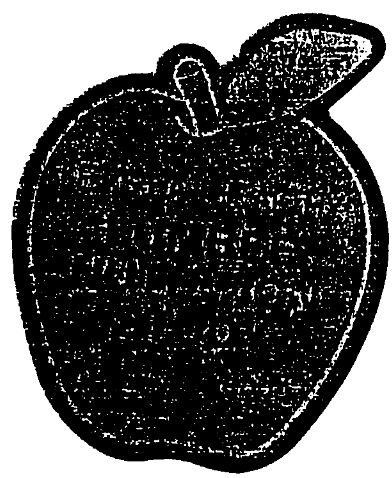
Again, much thanks for your participation. Hope to see you again soon!!

Sincerely,

Ronny Bell
Lumbee Nutrition Research Study

APPENDIX J

LUMBEE NUTRITION STUDY APPLE MAGNET



APPENDIX K

PERSONAL DIETARY ANALYSIS

Dear

Enclosed you will find a copy of the results of your dietary analysis. This analysis is based on the 3-day diet record information you provided me with, and should reasonably reflect your typical diet.

I have underlined particular areas which are important in regard to your consumption of certain nutrients. The recommendations that go along with each nutrient are for you to take into consideration in making changes in your eating habits. This information may also be useful for you in the future if you should have some medical problem (such as low blood iron) which would require dietary treatment. Feel free to let your doctor or other health professional take a look at these results.

I hope this will be beneficial to you. Also, I hope you enjoy the cookbook. Thanks for your time and effort!!

Sincerely,

Ronny Bell
Lumbee Nutrition Study

P.S. If you would like to discuss these results, feel free to call me at 521-4622.

TIPS ON HOW TO INTERPRET YOUR DIETARY ANALYSIS

PAGE 1

Page 1 is a list of your **daily** intake of several nutrients. Some of the phrases or abbreviations may not be familiar to you, so I'll "decode" them for you:

Energy: Another way of saying Calories
CHO: Carbohydrates (starch and sugar)
SFA/MFA/PFA: Saturated fat, monounsaturated fat, polyunsaturated fat. These three make up your total fat intake

Total Alpha-toc eq: A fancy way of saying "vitamin E"
P:S ratio: Ratio of intake of polyunsaturated fat to saturated fat CSI ratio: Cholesterol/Saturated Fat ratio
MG: Milligrams/ MCG: Micrograms/GM: Grams/IU: International Units

PAGE 2

Page 2 is a list of selected nutrients and their comparison to the Recommended Dietary Allowance. For example, 75% means that you are eating 75% of the Recommended Dietary Allowance for that particular nutrient. The recommendations I have written in on Page 1 are also based on the RDA. Consumption over 100% means that you are probably getting more of that nutrient than you actually need.

For those nutrients which are below 75% (indicated by an *), I have listed food sources which will help you increase consumption of that nutrient in your diet.

PAGE 3

I have written out the RDAs for each of the nutrients listed on page 1. Compare these numbers to the numbers reflecting your intake on pages 1 and 2.

PAGE 4

I have written out food sources for those nutrients which your consumption is low.

NUTRIENT	RDA/General Recommendation
Energy	1500-2500 Calories (see Below)
Protein	####
Total CHO	####
Total FAT	####
Alcohol	####
Total SFA	####
Total MFA	####
Total PFA	####
Cholesterol	Less than 300 milligrams
Animal Protein	####
Vegetable Protein	####
Dietary Fiber	25-35 Grams
Total Vitamin A	4000 International Units
Beta-Carotene	####
Retinol	####
Total Alpha-toc Eq	8 milligrams
Vitamin C	60 milligrams
Thiamin	1.0-1.1 milligrams
Riboflavin	1.2-1.3 milligrams
Niacin	13-15 milligrams
Folacin (Folic Acid)	180 micrograms
Vitamin B12	2.0 micrograms
Vitamin B6	1.6 milligrams
Phosphorus	800 milligrams
Magnesium	280 milligrams
Iron	10-15 milligrams
Zinc	12 milligrams
Copper	1.5-3.0 milligrams
Sodium	2400 milligrams or less
Potassium	At least 2000 milligrams
Calcium	800-1200 milligrams
Caffeine	####
% Calories from protein	15-20%
% Calories from carbohydrates	50-55%
% Calories from fat	30% or less
% Calories from alcohol	####
% Calories from SFA	10% or less
% Calories from MFA	10%
% Calories from PFA	10%
P:S ratio	1 or higher
CSI ratio	16 or lower

= no RDA established

Energy needs differ from person to person, and vary based on age, body size, exercise/lifestyle, etc.

DIET RECOMMENDATIONS

NUTRIENT SOURCES	GOOD FOOD
Vitamin A	Fortified milk (preferably low-fat) and other dairy products Spinach and other dark leaky vegetables Orange fruits (cantaloupe, peaches) and vegetables (squash, carrots, sweet potatoes, pumpkin)
Vitamin E	Vegetable oils, whole grain foods, nuts and seeds Green leafy vegetables
Dietary Fiber	Whole grain food products (whole wheat bread, brown rice, whole grain noodles, etc.) Fruits and vegetables, especially beans, prunes, carrots and apples High-fiber breakfast cereals (oatmeal, oat bran, All Bran, Grape-Nuts, etc.)
Thiamin (Vitamin B1)	Lean pork, Whole grain foods and enriched white breads Occurs in most nutritious foods in modest amounts
Riboflavin (Vitamin B2)	Milk and other dairy products Whole grain foods and enriched white breads Leafy green vegetables
Niacin	Milk, poultry, fish, lean meats Whole grain foods and enriched white breads High-protein foods
Vitamin C (Ascorbic Acid)	Citrus fruits (oranges, grapefruit, etc.) and fruit juices Cantaloupe, strawberries, potatoes, peppers, tomatoes, cabbage-type vegetables Vitamin C enriched foods (CHECK THE LABEL)
Folacin (Folic Acid)	Leafy green vegetables, beans (legumes), seeds
Vitamin B12	Lean meat, fish, poultry, shellfish Low-fat milk, cheese
Vitamin B6	Leafy green vegetables, lean meats, fish, poultry, shellfish, beans (legumes), whole grain foods
Phosphorus	Most all foods

Magnesium	Nuts and legumes, whole grain foods, dark green vegetables, seafoods
Iron	Lean red meats, fish, poultry, beans, dried fruits (prunes, raisins) Whole grain foods and enriched white breads NOTE: Vitamin C helps the body absorb iron better (for example, drinking orange juice with an iron-rich meal or supplement)
Zinc	High-protein foods (meats, fish poultry, legumes) Whole grain products
Calcium	Milk and milk products (preferably low-fat) Fish (with bones) Beans (legumes)
Potassium	Most fruits, especially bananas Milk and milk products (preferably low-fat)

TIPS FOR LOWERING DIETARY FAT, SATURATED FAT AND CHOLESTEROL

1. Use lower-fat food products instead of the whole-fat food products (for example, low-fat milk instead of whole milk; choosing leaner cuts of meat; reduced calorie salad dressing and mayonnaise).

2. Limit intake of red meats; substitute fish and poultry (chicken and turkey) for red meats.

3. Remove skin from poultry; trim excess fat from meats.

4. Use no more than 5 to 8 teaspoons of fats and oils per day for cooking.

5. Avoid using lard, bacon fat, fatback and butter. Substitute with margarine and vegetable oils (corn, canola, olive, etc.).

6. Make lower-fat substitutions in recipes:

Use:	Instead of:
Non-fat milk	Whole milk
Yogurt	Sour cream
1 tbsp cornstarch	1 egg yolk
Part-skim, low-fat cheese	Regular cheeses
Evaporated nonfat milk	Cream

APPENDIX L

EATING PATTERNS QUESTIONNAIRE

EATING PATTERNS QUESTIONNAIRE

These questions are about the way you ate over the past 3 months. Please circle your response.

MEAT, FISH AND MAIN DISHES

IN THE PAST 3 MONTHS ...	Usually or Always	Often	Sometimes	Rarely or Never
1. Did you eat fish? NO ☐ YES ☐ → When you ate fish, how often was it: (answer both)				
a. broiled, baked or poached?	1	2	3	4
b. fried?	1	2	3	4
2. Did you eat chicken? NO ☐ YES ☐ → When you ate chicken, how often did you: (answer all three)				
a. have it broiled or baked?	1	2	3	4
b. have it fried?	1	2	3	4
c. take off the skin?	1	2	3	4
3. Did you eat spaghetti or noodles? NO ☐ YES ☐ → When you ate spaghetti or noodles, how often did you eat them plain, or with a red sauce or tomato sauce without meat?	1	2	3	4
4. Did you eat red meat (beef, pork, lamb)? NO ☐ YES ☐ → When you ate red meat, how often did you trim all the visible fat?	1	2	3	4
5. Did you eat ground beef (hamburger)? NO ☐ YES ☐ → When you ate ground beef, how often did you choose extra lean (low fat) ground beef?	1	2	3	4
6. How often did you have a dinner or your main meal without any meat, fish, eggs or cheese?	1	2	3	4

MILK AND CHEESE

IN THE PAST 3 MONTHS ...	Usually or Always	Often	Sometimes	Rarely or Never
7. Did you drink milk or use milk on cereal? NO ☐ YES ☐ → When you had milk, how often was it very low fat (1%) or nonfat, skim milk?	1	2	3	4

8. Did you eat cheese (include on sandwiches or in cooking)?

NO	YES						
☐	☐ →	When you ate cheese, how often was it specially-made, low fat (diet) cheese?	1	2	3	4

9. Did you eat frozen desserts (ice cream, sherbet, etc.)?

NO	YES					
☐	☐ →	When you ate frozen desserts, how often did you choose ice milk, nonfat ice cream (such as Simple Pleasures), frozen yogurt, or sherbet?	1	2	3	4

FRUITS, VEGETABLES AND SALADS

IN THE PAST 3 MONTHS ...

10. Did you eat cooked vegetables?

NO	YES					
☐	☐ →	When you ate cooked vegetables, how often did you add butter or margarine?	1	2	3	4

11. Did you eat potatoes?

NO	YES					
☐	☐ →	When you ate potatoes, how often were they fried (french fries, hash browns, etc.)?	1	2	3	4

12. Did you eat boiled or baked potatoes?

NO	YES					
☐	☐ →	When you ate boiled or baked potatoes, how often did you eat them without butter, margarine, or sour cream?	1	2	3	4

13. Did you eat green salads?

NO	YES					
☐	☐ →	When you ate green salads, how often did you:				
	answer both	a. use no dressing?	1	2	3	4
		b. use low calorie, diet dressing?	1	2	3	4

DESSERTS & SNACKS

IN THE PAST 3 MONTHS ...

14. Did you eat dessert?

NO	YES					
☐	☐ →	When you ate dessert, how often did you:				
	answer both	a. put cream or whipped cream on top?	1	2	3	4
		b. have only fruit for dessert?	1	2	3	4

	Usually or Always	Often	Sometimes	Rarely or Never
15. Did you eat snacks? NO ☐ YES ☐ → When you ate snacks, how often did you eat: [answer both]				
a. raw vegetables?	1	2	3	4
b. fresh fruit?	1	2	3	4

BREADS, ROLLS, MUFFINS, AND TORTILLAS

IN THE PAST 3 MONTHS ...

	Usually or Always	Often	Sometimes	Rarely or Never
16. Did you eat bread, roll, or muffins? NO ☐ YES ☐ → When you ate bread, rolls or muffins, how often did you eat them without butter or margarine?	1	2	3	4
17. Did you eat tortillas (plain or as part of a mixed dish)? NO ☐ YES ☐ → When you ate tortillas, how often: [answer both]				
a. were they crispy or fried?	1	2	3	4
b. did you eat them without butter or margarine?	1	2	3	4

FOOD PREPARATION

IN THE PAST 3 MONTHS ...

	Usually or Always	Often	Sometimes	Rarely or Never
18. Did you saute or pan fry any foods? NO ☐ YES ☐ → When you sauted or pan fried foods, how often did you use Pam® or other non-stick spray instead of oil, margarine, or butter?	1	2	3	4
19. Did you cook red meat (beef, pork, lamb)? NO ☐ YES ☐ → When you cooked red meat, how often did you trim all the fat <u>before</u> cooking?	1	2	3	4
20. Did you cook chicken? NO ☐ YES ☐ → When you cooked chicken, how often did you remove the skin <u>before</u> cooking?	1	2	3	4
21. Did you use mayonnaise? NO ☐ YES ☐ → When you used mayonnaise, how often did you use low fat or nonfat mayonnaise?	1	2	3	4

Thank You.

Definition of Eating Patterns Factors

Total Eating Patterns Score = Sum of All Items Answered / Total Number of Items Answered

Factor 1 = Modification of Meat

= Sum of Scores to Questions 1A, 1B, 2A, 2B, 2C, 4, 5, 19, 20 / Number of These Questions Answered

Factor 2 = Avoiding Fat as Flavoring

= Sum of Scores to Questions 10, 11, 12, 13A, 14A, 16, 17A, 17B / Number of These Questions Answered

Factor 3 = Replacement of General Foods

= Sum of Scores to Questions 3 and 6 / Number of These Questions Answered

Factor 4 = Substitution of High-Fat foods for Low-Fat Foods

= Sum of Scores to Questions 7, 8, 13B, 18, 21 / Number of These Questions Answered

Factor 5 = Replacement with Fruits and Vegetables

= Sum of Scores to Questions 14B, 15A, 15B / Number of These Questions Answered

APPENDIX M

NUTRITION KNOWLEDGE TEST

NUTRITION KNOWLEDGE TEST

Please circle the response which best reflects your answer to the following questions.

		I STRONGLY AGREE	I AGREE	I DON'T KNOW/NOT SURE	I DISAGREE	I STRONGLY DISAGREE
A.	FATS IN FOODS					
1.	Sherbet has less fat than ice cream	1	2	3	4	5
2.	The fat in chicken is almost all in the skin	1	2	3	4	5
3.	When it comes to fat, potato chips and pretzels are about the same	1	2	3	4	5
4.	At a fastfood restaurant, a fried fish sandwich has more calories and fat than a hamburger	1	2	3	4	5
5.	Margarine has the same amount of fat as butter	1	2	3	4	5
6.	Fish has almost as much fat as meat, it's just a different kind of fat	1	2	3	4	5
7.	Creamy salad dressings (ranch, 1000 islands, etc.) have more fat than clear Italian dressing	1	2	3	4	5
8.	Certain cuts of beef, like flank steak, are as low in fat as chicken	1	2	3	4	5
9.	Powdered coffee creamers have a lot less fat than whole milk	1	2	3	4	5

		I STRONGLY AGREE	I AGREE	I DON'T KNOW/NOT SURE	I DISAGREE	I STRONGLY DISAGREE
10.	Many foods that are high in protein are also high in fat	1	2	3	4	5

B. FIBER IN FOODS

		I STRONGLY AGREE	I AGREE	I DON'T KNOW/NOT SURE	I DISAGREE	I STRONGLY DISAGREE
11.	Most of the fiber in some fruits and vegetables (like apples, squash, cucumbers) is found in the skin	1	2	3	4	5
12.	Practically all Americans get enough fiber in their diet	1	2	3	4	5
13.	Brown rice or wild rice has more dietary fiber than white rice	1	2	3	4	5
14.	Popcorn and potato chips have about the same amount of fiber in a typical serving	1	2	3	4	5
15.	Per serving, lettuce has more dietary fiber than grapefruit	1	2	3	4	5
16.	Beans like kidney beans and lima beans are very good sources of dietary fiber	1	2	3	4	5
17.	Whole wheat bread has more than twice as much dietary fiber as white ("light") bread	1	2	3	4	5
18.	Beef like roasts and steaks are a very good source of dietary fiber	1	2	3	4	5

		I STRONGLY AGREE	I AGREE	I DON'T KNOW/NOT SURE	I DISAGREE	I STRONGLY DISAGREE
19.	All types of breakfast cereals are great sources of dietary fiber	1	2	3	4	5
20.	Cooking fruits and vegetables greatly diminishes their fiber content	1	2	3	4	5

C. <u>VITAMINS A, C, AND E IN FOODS</u>

		I STRONGLY AGREE	I AGREE	I DON'T KNOW/NOT SURE	I DISAGREE	I STRONGLY DISAGREE
21.	Dark green vegetables like turnips and mustard are very good sources of vitamin A	1	2	3	4	5
22.	Beta-Carotene, found in foods like carrots, can be used like vitamin A in the body	1	2	3	4	5
23.	Beef liver is a very good low-fat source of vitamin A	1	2	3	4	5
24.	Dark green vegetables like mustard and peppers are very good sources of vitamin C	1	2	3	4	5
25.	Some fruits like cantaloupe and tomatoes are high in both vitamin A and vitamin C	1	2	3	4	5
26.	The content of vitamin A, C, and E in a food is not at all affected by cooking and processing	1	2	3	4	5

		I STRONGLY AGREE	I AGREE	I DON'T KNOW/NOT SURE	I DISAGREE	I STRONGLY DISAGREE
27.	Palm oil is a healthier source of vitamin E for cooking than corn oil	1	2	3	4	5
28.	Lean red meats are healthy sources of vitamin C	1	2	3	4	5
29.	Milk and other dairy products are often fortified with vitamin A	1	2	3	4	5
30.	All cooking oils are good sources of vitamin E	1	2	3	4	5

QUESTIONNAIRE EVALUATION

1. How long did it take you to complete this test (please write your response on the line below)?

   ____________ Minutes

2. Were the questions easy to understand (did the sentence structure make sense, did you recognize all the words that were used, etc.)?

   Yes **No**

3. If you answered "No" to this question, please tell me which question(s) were **not** easy to understand (write in the number(s) of those questions on the line below).

   _____ _____ _____ _____ _____ _____ _____ _____ _____
   _____ _____ _____ _____ _____ _____ _____ _____ _____

4. Would you like to make any comments about any of the questions in this test (please write your comments below)? Make sure you tell me which question(s) you are referring to.

Please circle the highest level of education that you **completed**

6th grade	10th grade	Some 4-year college
7th grade	11th grade	Some technical college/2-year college
8th grade	12th grade	4-year college degree
9th grade		Technical college/2-year college degree
		Some graduate school
		Graduate school degree

What age range do you fall into, based on your last birthday (circle your response)?

21-30 years 31-40 years 41-50 years 51-60 years

APPENDIX N

MATERIALS USED FOR NUTRITION EDUCATION CLASS

List of Materials Used for Nutrition Education Class

Audio/Visual

Title	Producer
"Diet, Nutrition, and Cancer (video)	American Institute for Cancer Research
"Diet, Nutrition and Cancer Prevention (slides)	Parley International

Literature

Title	Producer
"A Prudent Diet" (cookbook)	North Carolina Baptist Hospital
"Fat Gram Counter" (booklet)	University of Minnesota School of Public Health
"AICR Grocery Shopping List"	American Institute for Cancer Research
"Sneak Health Into Your Snack" (Brochure)	American Institute for Cancer Research
"Dietary Fiber to Lower Cancer Risk" (Brochure)	American Institute for Cancer Research
"Cancer Information: Where to Find Help" (Brochure)	American Institute for Cancer Research
"Cooking Solo" ·(Brochure)	American Institute for Cancer Research
"All About Fat and Cancer" (Brochure)	American Institute for Cancer Research
"No Time to Cook" (Brochure)	American Institute for Cancer Research
"Cook's Day Off" (Brochure)	American Institute for Cancer Research
"Eat More Fruits and Vegetables" (Brochure)	National Cancer Institute
"Eat More Salads for Better Health" (Brochure)	National Cancer Institute
"Instead Of's: Modifying Recipes for Better Health" (Booklet)	Allegheny County Health Department, Pennsylvania
*"Let's Eat Healthy" (Brochure)	Ronny Bell/Bowman Gray Medical School
"AICR Nutrition Notes" (Notepad)	American Institute for Cancer Research

"Great Moments in Food History" (Calendar) — American Institute for Cancer Research

**"Let's Eat Healthy is a two-fold informational brochure developed by the investigator. The readability score of the brochure, using the SMOG Readability formula, is 44 (approximately 9th grade reading level). The brochure includes photos of Indian residents of Robeson County and reads as follows:

Page 1 (Front Page)

Let's Eat Healthy! 5 simple tips to lower dietary risk of cancer

Page 2

Let's Eat Healthy! Our people can live longer and better by making healthy changes in our diet and lifestyle......

Page 3

The more we learn about the way we live and eat, the more we know how much our diet and lifestyle affects our health. In earlier times, Indian people were healthy because they were active and ate foods that were low in fat and high in fiber. Today, many of the health problems we see in our community are linked to a change in eating habits and less active daily routines.

Did you know that experts on health now believe that about 1/3 of all cancer deaths in the United States can be traced to poor eating habits?

What can we do?

The National Cancer Institute and the American Cancer Society offer these easy ways to help reduce cancer risk:

Page 4

1. Eat Less Fat: Use skim or low-fat milk instead of whole ("sweet") milk; choose low-fat snacks like fruit or pretzels instead of doughnuts or chips; try baking or broiling instead of frying; trim excess fat from meats and poultry and skip the fatback in vegetables!

2. Eat More High-Fiber Foods: Select whole-wheat instead of white ("light") bread; choose low-sugar, whole-grain cereals for breakfast; try to eat at least five servings of fresh fruits and vegetables each day.

3. Eat More Foods High in Vitamin A and Vitamin C: Citrus fruits (oranges and grapefruit) and dark green, orange, or yellow vegetables (collard greens, squash and sweet potatoes) are good sources of fiber and vitamins A and C.

Page 4

4. Limit the Amount of Salt-Cured and Smoked Foods: Smoked, salt-cured and grilled meats contain small levels of carcinogens (cancer-causing agents). Eating too much of these foods increases cancer risk.

5. Maintain a Healthy Body Weight: Too much body fat in not healthy, not only for cancer risk, but also for risk of heart disease, high blood pressure and diabetes ("sugar"). Proper eating habits and regular

exercise (walking, bike riding, aerobics) can help you "take it off and keep it off."

Page 5 (Back Page)

For More Information:

National Cancer Institute	1(800) 422-6237
	1(800) 4-CANCER
American Cancer Society	1(800) 227-2345

This brochure is published by Ronny Bell, M.Ed. of Pembroke, in cooperation with the Department of Family and Community Medicine of the Bowman Gray School of Medicine of Wake Forest University, Winston-Salem, North Carolina 27157.

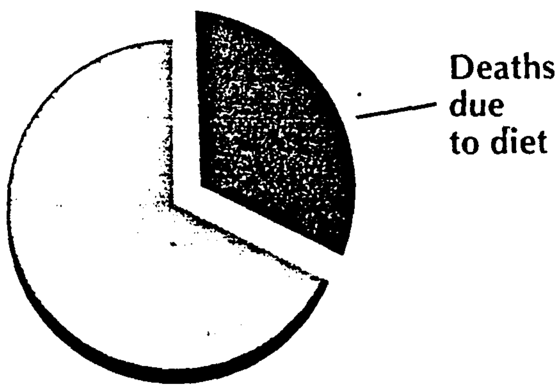
Funding for this brochure is provided by the National Cancer Institute Grant #2-163-811-7673

Let's Eat Healthy!

5 *simple* **tips** ***to lower*** *dietary risk of* **Cancer**

The more we learn about the way we live and eat, the more we know how much our diet and lifestyle affects our health. In earlier times, Indian people were healthy because they were active and ate foods that were low in fat and high in fiber. Today, many of the health problems we see in our community are linked to a change in eating habits and less active daily routines.

Did you know that experts on health now believe that about **1/3 of all cancer deaths** in the United States can be traced to poor eating habits?

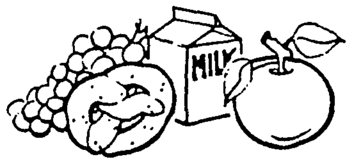


What can we do?

The National Cancer Institute and the American Cancer Society offer these easy ways to help reduce cancer risk:

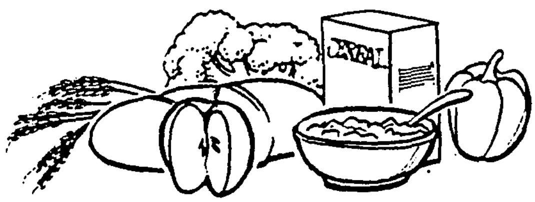
1 *Eat less FAT*

Use skim or low-fat milk instead of whole ("sweet") milk; choose low-fat snacks like fruit or pretzels instead of doughnuts or chips; try baking or broiling instead of frying; trim excess fat from meats and poultry and skip the fatback in vegetables!



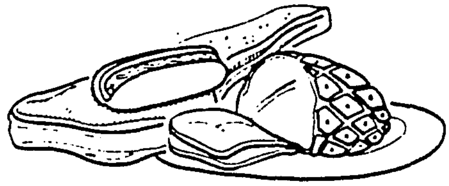
2 *Eat more HIGH-FIBER foods*

Select whole-wheat instead of white ("light") bread; choose low-sugar, whole-grain cereals for breakfast; try to eat at least five servings of fresh fruits and vegetables each day.



3 *Eat more foods high in VITAMIN A & VITAMIN C*

Citrus fruits (oranges and grapefruit) and dark green, orange, or yellow vegetables (collard greens, squash and sweet potatoes) are good sources of fiber **and** vitamins A and C.



4 *LIMIT the amount of salt-cured & smoked foods*

Smoked, salt-cured and grilled meats contain small levels of *carcinogens* (cancer-causing agents). Eating too much of these foods increases cancer risk.

5 *Maintain a HEALTHY BODY WEIGHT*

Too much body fat is **not healthy,** not only for cancer risk, but also for risk of heart disease, high blood pressure and diabetes ("sugar"). Proper eating habits and regular exercise (walking, bike riding, aerobics) can help you "take it off and keep it off."

Let's Eat Healthy!

*Our people **can** live longer and better by making healthy changes in our diet and lifestyle...*

For more information:

National Cancer Institute 1 (800) 422-6237
1 (800) 4-CANCER

American Cancer Society 1 (800) 227-2345

This brochure is published by Ronny Bell, M.Ed. of Pembroke, in cooperation with the Department of Family and Community Medicine of The Bowman Gray School of Medicine of Wake Forest University. Winston-Salem, North Carolina 27157.

Funding for this brochure is provided by the
National Cancer Institute
Grant #2-163-811-7673

WAKE FOREST
UNIVERSITY

APPENDIX O

DATA COLLECTION TABLES

Table O-1

Demographic and Food Habits Information (Number and %) from the Lifestyle/Health Awareness Questionnaire and Food Frequency Questionnnaire for Pilot, Control and Intervention Subjects.

	PILOT (N=120)		CONTROL (N=41)		INTERVENTION (N=28)	
TOWNSHIP						
PEMBROKE	63	(52.5)	23	(56.1)	21	(75.0)
LUMBERTON	19	(15.8)	7	(17.1)	4	(14.3)
FAIRMONT	2	(1.7)	0	(0.0)	0	(0.0)
MAXTON	13	(10.8)	6	(14.6)	3	(10.7)
RED SPRINGS	2	(1.7)	1	(2.4)	0	(0.0)
LUMBER BRIDGE	2	(1.7)	0	(0.0)	0	(0.0)
SHANNON	5	(4.2)	1	(2.4)	0	(0.0)
ROWLAND	9	(7.5)	1	(2.4)	0	(0.0)
SAINT PAULS	5	(4.2)	2	(4.9)	0	(0.0)
HAS ANYONE IN YOUR IMMEDIATE BLOOD FAMILY (PARENT, GRANDPARENT, SIBLING, AUNT/UNCLE) HAD A CHRONIC ILLNESS, SUCH AS CANCER, DIABETES, STROKE, HEART DISEASE, ETC.						
YES	102	(85.0)	33	(80.5)	24	(85.7)
NO	18	(15.0)	8	(19.5)	4	(14.3)
HAVE YOU BEEN INSTRUCTED BY A DOCTOR OR OTHER HEALTH PROFESSIONAL TO CHANGE YOUR DIET OR LIFESTYLE IN THE PAST FIVE YEARS						
YES	46	(38.3)	16	(39.0)	12	(42.9)
NO	74	(61.7)	25	(61.0)	16	(57.1)
DO YOU CONSIDER YOURSELF TO BE A HEALTHY PERSON?						
YES	111	(92.5)	38	(92.7)	19	(67.9)
NO	7	(5.8)	2	(4.9)	6	(21.4)
N/A	2	(1.7)	1	(2.4)	3	(10.7)
WHERE DO YOU RECEIVE INFORMATION ABOUT DIET AND HEALTH?						
DOCTORS OFFICE/CLINIC	48	(40.0)	18	(43.9)	15	(53.6)
MEDIA	92	(76.7)	30	(73.2)	20	(71.4)

Table O-1 (continued)

	PRIMARY FOOD BUYER/FOOD COOKER		PRIMARY FOOD BUYER/FOOD COOKER		PRIMARY FOOD BUYER/FOOD COOKER	
SELF	105 (87.5)	106 (88.3)	35 (85.4)	35 (85.4)	24 (85.7)	24 (85.7)
SPOUSE	7 (5.8)	3 (2.5)	4 (9.8)	1 (2.4)	2 (7.1)	1 (3.6)
PARENT	6 (5.0)	9 (7.5)	2 (4.9)	4 (9.8)	2 (7.1)	2 (10.7)
CHILD	2 (1.7)	1 (0.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
GRANDPARENT	0 (0.0)	1 (0.8)	0 (0.0)	1 (2.4)	0 (0.0)	0 (0.0)

HAVE YOU MADE ANY DIETARY CHANGES IN THE PAST FIVE YEARS THAT YOU STILL ADHERE TO TODAY?

YES	91 (75.8)	31 (75.6)	25 (89.3)
NO	29 (24.2)	10 (24.4)	3 (10.7)

TYPES OF DIETARY CHANGES MADE:

DECREASE SALT	24 (26.4)	6 (19.4)	14 (56.0)
DECREASE SUGAR/ INCREASE SWEETENERS	13 (14.3)	4 (12.9)	15 (60.0)
DECREASE "SWEETS"	14 (15.4)	4 (12.9)	13 (52.0)
DECREASE MEATS	24 (26.4)	8 (25.8)	11 (44.0)
CHANGE MILK TYPE	9 (9.9)	2 (6.5)	12 (48.0)
EAT MORE HIGH FIBER FOODS	23 (25.3)	8 (25.8)	16 (64.0)
EAT MORE FRUIT/ VEGETABLES	25 (27.5)	10 (32.3)	16 (64.0)
CHANGE COOKING TECHNIQUE/OILS	61 (67.0)	20 (64.5)	15 (60.0)
DECREASE HIGH-CALORIE DRINKS/ INCREASE WATER CONSUMPTION	19 (20.9)	8 (25.8)	1 (4.0)
DECREASE BREAD/ STARCHY FOODS	5 (5.5)	3 (9.8)	0 (0.0)
READ FOOD LABELS	13 (14.3)	7 (22.6)	0 (0.0)
OTHER CHANGES	25 (27.5)	10 (32.3)	2 (8.0)

Table O-1 (continued)

WHY DID YOU MAKE CHANGES IN YOUR DIET?						
LOSE WEIGHT	11	(8.5)	4	(9.8)	2	(7.1)
SUGGESTION	12	(10.0)	3	(7.3)	1	(3.6)
MEDIA	2	(1.7)	2	(4.9)	0	(0.0)
DESIRE TO BE MORE HEALTY	8	(6.7)	1	(2.4)	1	(3.6)
OTHER REASONS	5	(4.2)	3	(7.3)	0	(0.0)
COMBINATION	53	(44.2)	18	(43.9)	21	(75.0)
HOW OFTEN DO YOU EAT A MEAL OUTSIDE YOUR HOME?						
MORE THAN ONCE/DAY	3	(2.8)	1	(2.4)	2	(7.1)
ONCE/DAY	26	(21.7)	9	(22.0)	4	(14.3)
5-6 TIMES/WEEK	5	(4.2)	2	(4.9)	1	(3.6)
3-4 TIMES/WEEK	25	(20.8)	9	(22.0)	7	(25.0)
1-2 TIMES/WEEK	49	(40.8)	19	(46.3)	7	(25.0)
1-2 TIMES/MONTH	12	(10.0)	1	(2.4)	4	(14.3)
LESS THAN ONCE/MONTH	0	(0.0)	0	(0.0)	3	(10.7)
DO YOU HAVE DIRECT ACCESS TO FOODS FROM THE FOLLOWING SOURCES?						
GARDEN	99	(82.5)	36	(87.8)	18	(64.3)
LIVESTOCK	24	(20.0)	11	(26.8)	5	(17.9)
FRUIT TREES/VINES	61	(50.8)	24	(58.5)	8	(28.6)
FISHING/HUNTING	46	(38.3)	16	(39.0)	13	(46.4)
HOW DO YOU PERSONALLY FEEL ABOUT YOUR DIET?						
VERY GOOD DIET	5	(4.2)	0	(0.0)	1	(3.6)
GOOD DIET	51	(42.5)	20	(48.8)	7	(25.0)
NOT A GOOD DIET	26	(21.7)	9	(22.0)	11	(39.3)
VERY POOR DIET	36	(30.0)	11	(26.8)	9	(32.1)
N/A	2	(1.7)	1	(2.4)	0	(0.0)
DO YOU NOW SMOKE?						
YES	28	(23.3)	4	(9.8)	4	(14.3)
NO	92	(76.7)	37	(90.2)	24	(85.7)

Table O-1 (continued)

DO YOU CONSUME ALCOHOLIC BEVERAGES?

YES	14	(11.3)	4	(9.8)	3	(10.7)
NO	106	(88.3)	37	(90.2)	25	(89.3)

DO YOU FEEL THAT DIET HAS AN EFFECT ON RISK OF GETTING CANCER?

YES	63	(52.5)	25	(61.0)	11	(39.3)
NO	57	(47.5)	16	(39.0)	15	(53.6)

WHAT WAY DO YOU THINK DIET PLAYS A ROLE IN CANCER RISK?

FAT	13	(10.8)	6	(14.6)	5	(17.9)
FOOD ADDITIVES	5	(4.2)	2	(4.9)	1	(3.6)
PESTICIDES	4	(3.3)	0	(0.0)	1	(3.6)
FIBER	8	(6.7)	5	(12.2)	2	(7.1)
FRUITS/VEGETABLES	5	(4.2)	3	(7.3)	0	(0.0)
OTHER	8	(6.7)	4	(9.8)	0	(0.0)
MORE THAN ONE	20	(47.5)	5	(12.2)	2	(7.1)

OCCUPATION

UNEMPLOYED	4	(3.3)	0	(0.0)	1	(3.6)
STUDENT	2	(1.7)	2	(4.9)	3	(10.7)
RETAIL SALES	5	(4.2)	1	(2.4)	1	(3.6)
HEALTH CARE	8	(6.7)	1	(2.4)	0	(0.0)
CLERICAL	11	(9.2)	2	(4.9)	9	(32.1)
LRDA EMPLOYEE	24	(20.0)	8	(19.5)	0	(0.0)
EDUCATION	25	(20.8)	10	(24.4)	4	(14.3)
FOOD SERVICE	2	(1.7)	1	(2.4)	1	(3.6)
RETIRED	4	(3.3)	2	(4.9)	2	(7.1)
HOUSEWIFE/HOMEMAKER	3	(2.5)	1	(2.4)	3	(10.7)
FACTORY EMPLOYEE	14	(11.7)	3	(7.3)	0	(0.0)
PSU EMPLOYEE	8	(6.7)	6	(14.6)	0	(0.0)
ROBESON COUNTY HEALTH CARE CORPORATION	8	(6.7)	4	(9.8)	0	(0.0)
FEDERAL/STATE EMPLOYEE	2	(1.7)	0	(0.0)	2	(7.1)
OTHER	0	(0.0)	0	(0.0)	2	(7.1)

Table O-1 (continued)

MEAN AGE ± SEM:	37.858 ± 0.993	39.049 ± 1.833	37.857 ± 1.997
21-40	77 (64.2)	25 (61.0)	20 (71.4)
41-60	43 (35.8)	16 (39.0)	8 (28.6)
MEAN HEIGHT ± SEM	64.296 ± 0.205	64.012 ± 0.381	64.018 ± 0.579
MEAN WEIGHT ± SEM	158.414 ± 3.191	159.525 ± 5.924	186.815 ± 8.266
MEAN BMI ± SEM	26.918 ± 0.559	27.349 ± 1.112	31.579 ± 1.251
WEIGHT CLASSIFICATION			
NORMAL WEIGHT	59 (49.2)	17 (41.5)	6 (21.4)
OVERWEIGHT	22 (18.3)	11 (26.8)	6 (21.4)
OBESE	35 (29.2)	12 (29.3)	15 (53.6)
NO ANSWER	4 (3.3)	1 (2.4)	1 (3.6)
MEAN NUMBER OF CHILDREN ± SEM	2.208 ± 0.136	2.049 ± 0.218	2.071 ± 0.304
HIGHEST LEVEL OF EDUCATION COMPLETED			
EIGHTH GRADE	1 (0.8)	0 (0.0)	0 (0.0)
NINTH GRADE	0 (0.0)	0 (0.0)	0 (0.0)
TENTH GRADE	2 (1.7)	0 (0.0)	1 (3.6)
ELEVENTH GRADE	1 (0.8)	0 (0.0)	0 (0.0)
TWELFTH GRADE	25 (20.8)	7 (17.1)	14 (50.0)
COMMUNITY COLLEGE OR TWO-YEAR DEGREE	24 (20.0)	5 (12.2)	4 (14.1)
FOUR-YEAR DEGREE	34 (28.3)	16 (39.0)	4 (14.1)
GRADUATE DEGREE	9 (7.5)	4 (9.8)	0 (0.0)
GED	5 (4.2)	0 (0.0)	0 (0.0)
PORTION OF DEGREE	19 (15.8)	9 (22.0)	5 (17.9)

Table O-1 (continued)

FAMILY INCOME						
TEN THOUSAND OR BELOW	7	(5.8)	0	(0.0)	4	(14.3)
TEN/TWENTY THOUSAND	31	(25.8)	9	(22.0)	7	(25.0)
TWENTY/THIRTY THOUSAND	24	(20.0)	5	(12.2)	6	(21.4)
THIRTY/FORTY THOUSAND	11	(9.2)	6	(14.6)	1	(3.6)
FORTY/FIFTY THOUSAND	16	(13.3)	8	(19.5)	1	(3.6)
FIFTY/SEVENTY-FIVE THOUSAND	19	(15.8)	8	(19.5)	2	(7.1)
ABOVE SEVENTY-FIVE THOUSAND	8	(6.7)	4	(9.8)	0	(0.0)
NO RESPONSE	4	(3.3)	1	(2.4)	7	(25.0)
MARITAL STATUS						
SINGLE, NEVER MARRIED	21	(17.5)	6	(14.6)	5	(17.9)
MARRIED	72	(60.0)	26	(63.4)	18	(64.3)
DIVORCED/SEPARATED	23	(19.2)	9	(22.0)	4	(14.3)
WIDOWED	4	(3.3)	0	(0.0)	1	(3.6)
REPORTED AVERAGE WEEKLY INTAKE OF:						
VEGETABLES:	8.807 ± 0.598		9.854 ± 1.090		9.846 ± 1.043	
FRUITS:	4.639 ± 0.422		4.805 ± 0.703		4.962 ± 0.680	
REPORTED SUPPLEMENT USE:						
YES:	46	(38.3)	20	(48.8)	7	(25.0)
NO:	73	(60.8)	21	(51.2)	16	(57.1)
UNKNOWN:	1	(0.8)	0	(0.0)	5	(17.9)
REPORTED CONSUMPTION OF:						
SKIN ON CHICKEN						
SELDOM/NEVER	61	(50.8)	19	(46.3)	10	(35.7)
SOMETIMES	17	(14.2)	6	(14.6)	10	(35.7)
OFTEN ALWAYS	41	(34.2)	16	(39.0)	7	(25.0)
N/A	1	(0.8)	0	(0.0)	1	(3.6)

Table O-1 (continued)

VISIBLE FAT ON MEAT			
SELDOM/NEVER	102 (85.0)	34 (82.9)	16 (57.1)
SOMETIMES	6 (5.0)	3 (7.3)	10 (35.7)
OFTEN/ALWAYS	11 (9.2)	4 (9.8)	1 (3.6)
N/A	1 (0.8)	0 (0.0)	1 (3.6)
ADDED SALT TO FOOD			
SELDOM/NEVER	44 (36.7)	17 (41.5)	4 (14.3)
SOMETIMES	14 (11.7)	4 (9.8)	12 (42.9)
OFTEN/ALWAYS	61 (50.8)	30 (48.8)	11 (39.3)
N/A	1 (0.8)	0 (0.0)	1 (3.6)
ADDED PEPPER TO FOOD			
SELDOM/NEVER	30 (25.0)	12 (29.3)	3 (10.7)
SOMETIMES	15 (12.5)	5 (12.2)	12 (42.9)
OFTEN/ALWAYS	74 (61.7)	24 (58.5)	12 (42.9)
N/A	1 (0.8)	0 (0.0)	1 (3.6)

REPORTED WEEKLY INTAKE (MEAN ± SEM) OF FOOD GROUPS (FROM FOOD FREQUENCY QUESTIONNAIRE):

FRUIT OR JUICE	5.547 ± 0.385	5.878 ± 0.659	9.237 ± 1.552
CITRUS FRUIT OR JUICE	2.441 ± 0.221	2.149 ± 0.353	5.811 ± 1.365
VEGETABLES	11.472 ± 0.526	10.566 ± 0.651	12.881 ± 1.710
VEGETABLES, EXCLUDING POTATOES, RICE	6.957 ± 0.462	5.927 ± 0.521	6.937 ± 1.007
SALAD	1.621 ± 0.135	1.580 ± 0.195	1.404 ± 0.289
CARROTS	0.850 ± 0.104	0.907 ± 0.182	0.707 ± 0.223
TOMATOES	1.289 ± 0.158	0.800 ± 0.150	0.556 ± 0.190
DEEP YELLOW OR DARK GREEN VEGETABLES	2.583 ± 0.197	2.537 ± 0.287	3.478 ± 0.575
FISH OR CHICKEN	2.632 ± 0.174	2.507 ± 0.162	2.844 ± 0.463
WHOLE GRAIN OR BRAN CEREALS	1.856 ± 0.270	2.271 ± 0.474	1.578 ± 0.491
EGGS	1.187 ± 0.121	1.124 ± 0.206	1.367 ± 0.322
ALCOHOLIC BEVERAGES	0.055 ± 0.022	0.022 ± 0.014	0.515 ± 0.385
BEEF	2.318 ± 0.151	2.178 ± 0.273	3.059 ± 0.511
PORK	0.771 ± 0.070	0.639 ± 0.072	0.763 ± 0.142
HOT DOGS OR LUNCHEON MEATS	1.725 ± 0.181	1.283 ± 0.180	1.456 ± 0.292
BUTTER OR MARGARINE	1.273 ± 0.221	0.895 ± 0.253	2.644 ± 0.730

Table O-1 (continued)

CHEESES, EXCLUDING COTTAGE CHEESE	1.276 ± 0.138	1.110 ± 0.205	1.996 ± 0.563
WHOLE MILK	0.788 ± 0.165	0.837 ± 0.302	0.796 ± 0.369
ICE CREAM	1.050 ± 0.143	1.188 ± 0.275	0.837 ± 0.209
PASTRIES, SWEETS, SODAS SUGARS	13.419 ± 0.931	12.717 ± 1.306	16.078 ± 2.379
FRIED FISH/CHICKEN	1.207 ± 0.081	1.237 ± 0.109	1.530 ± 0.234

Table O-2

Estimated Mean Daily Consumption (± SEM) of Energy, Macronutrient, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments and Age Groups for Lumbee Pilot Phase Participants.

	24-HOUR RECALL			3-DAY RECORDS			FOOD FREQUENCY		
	TOTAL (N=120)	21-40 (N=77)	41-60 (N=43)	TOTAL (N=107)	21-40 (N=65)	41-60 (N=42)	TOTAL (N=119)	21-40 (N=76)	41-60 (N=43)
ENERGY (kcal)	1519.975 ±54.119	1569.768 ±67.569	1430.811 ±89.830	1537.816 ±45.691	1605.175 ±62.246	1433.571 ±62.880	1092.509 ±35.312	1165.118 ±48.064	964.177 ±42.308
PROTEIN (g)	52.651 ±2.506	54.115 ±3.145	50.030 ±4.167	57.151 ±1.801	57.977 ±2.354	55.874 ±2.813	44.178 ±1.491	46.205 ±1.974	40.595 ±2.121
CARBOHY-DRATES (g)	198.280 ±7.449	203.817 ±9.727	188.365 ±11.334	190.165 ±6.036	201.542 ±8.355	172.557 ±7.673	122.231 ±4.120	127.174 ±5.655	113.495 ±5.313
FAT (g)	58.484 ±2.651	60.566 ±3.064	54.756 ±4.962	61.772 ±2.500	63.663 ±3.405	58.847 ±3.577	47.999 ±1.929	52.874 ±2.572	39.384 ±2.300
ALCOHOL (g)	0.006 ±0.003	0.004 ±0.003	0.009 ±0.007	0.403 ±0.249	0.247 ±0.203	0.644 ±0.553	N/A[1]	N/A	N/A
SATURATED FAT (g)	20.520 ±0.966	21.402 ±1.146	18.940 ±1.741	20.683 ±0.857	21.533 ±1.201	19.366 ±1.136	16.883 ±0.740	18.771 ±0.999	13.547 ±0.832
MONOUNSATUR-ATED FAT (g)	23.285 ±1.184	24.372 ±1.376	21.339 ±2.194	24.829 ±1.073	25.575 ±1.419	23.675 ±1.631	N/A	N/A	N/A
POLYUNSATUR-ATED FAT (g)	10.061 ±0.525	10.079 ±0.580	10.030 ±1.044	11.551 ±0.554	11.728 ±0.735	11.276 ±0.847	N/A	N/A	N/A
CHOLESTEROL (mg)	186.347 ±11.709	187.905 ±13.434	183.557 ±22.339	206.936 ±10.584	199.281 ±12.527	218.782 ±18.791	185.137 ±8.157	199.025 ±10.845	160.591 ±11.122
ANIMAL PROTEIN (g)	37.446 ±2.215	38.979 ±2.802	34.700 ±3.617	41.016 ±1.581	41.834 ±2.069	39.750 ±2.463	N/A	N/A	N/A
VEGETABLE PROTEIN (g)	14.631 ±0.684	14.579 ±0.828	14.723 ±1.215	15.674 ±0.492	15.740 ±0.626	15.572 ±0.803	N/A	N/A	N/A

Table O-2 (continued)

DIETARY FIBER (g)	9.238 ±0.463	8.693 ±0.537	10.214 ±0.851	10.180 ±0.371	9.576 ±0.470	11.115 ±0.581	6.027 ±0.248	5.564 ±0.275	6.844 ±0.463
TOTAL VITA-MIN A (IU)	3044.679 ±511.676	2076.353 ±360.170	4778.659 ±1240.258	4083.460 ±582.999	3149.859 ±579.039	5528.318 ±1159.689	5009.950 ±257.532	4446.543 ±283.393	6005.737 ±474.581
BETA-CARO TENE (ug)	1399.035 ±264.465	987.262 ±211.663	2136.395 ±622.642	1834.731 ±262.756	1521.096 ±337.929	2320.117 ±411.587	1928.421 ±123.834	1580.186 ±124.921	2543.907 ±236.342
RETINOL (ug)	212.957 ±70.318	128.654 ±16.928	363.920 ±193.191	306.988 ±83.622	183.888 ±20.428	497.501 ±208.785	458.034 ±38.063	460.908 ±50.140	452.953 ±57.699
VITAMIN E (mg ATE)	5.874 ±0.388	5.315 ±0.399	6.876 ±0.798	6.329 ±0.318	6.182 ±0.385	6.556 ±0.551	N/A	N/A	N/A
VITAMIN C (mg)	54.976 ±5.072	45.216 ±4.533	72.453 ±11.202	55.667 ±3.779	49.232 ±4.408	65.625 ±6.571	70.411 ±3.767	66.309 ±4.299	77.660 ±7.072
THIAMIN (mg)	1.125 ±0.048	1.161 ±0.062	1.060 ±0.077	1.208 ±0.040	1.207 ±0.053	1.210 ±0.062	0.730 ±0.025	0.762 ±0.033	0.674 ±0.034
RIBOFLAVIN (mg)	1.101 ±0.053	1.048 ±0.055	1.195 ±0.110	1.220 ±0.056	1.146 ±0.056	1.334 ±0.111	1.036 ±0.042	1.055 ±0.055	1.002 ±0.063
NIACIN (mg)	14.774 ±0.745	14.909 ±0.941	14.533 ±1.232	16.272 ±0.506	16.379 ±0.644	16.105 ±0.827	10.778 ±0.360	11.237 ±0.489	9.967 ±0.477
FOLACIN (ug)	154.344 ±9.371	141.527 ±11.617	177.294 ±15.411	169.106 ±8.680	149.900 ±9.233	198.830 ±15.964	N/A	N/A	N/A
VITAMIN B12 (ug)	4.341 ±0.766	3.037 ±0.571	6.378 ±1.853	3.412 ±0.588	2.713 ±0.167	4.493 ±1.472	N/A	N/A	N/A
VITAMIN B6 (mg)	1.121 ±0.054	1.055 ±0.066	1.239 ±0.093	1.254 ±0.045	1.157 ±0.054	1.404 ±0.073	N/A	N/A	N/A
PHOSPHORUS (mg)	746.827 ±29.899	750.180 ±37.481	740.823 ±50.141	805.268 ±26.169	803.988 ±33.856	807.249 ±41.730	673.761 ±23.946	691.234 ±31.018	642.877 ±37.231
MAGNESIUM (mg)	170.675 ±6.910	158.990 ±7.826	191.599 ±12.761	178.595 ±6.011	168.907 ±7.329	193.588 ±9.961	N/A	N/A	N/A

Table O-2 (continued)

DIETARY FIBER (g)	9.238 ±0.463	8.693 ±0.537	10.214 ±0.851	10.180 ±0.371	9.576 ±0.470	11.115 ±0.581	6.027 ±0.248	5.564 ±0.275	6.844 ±0.463
TOTAL VITA-MIN A (IU)	3044.679 ±511.676	2076.353 ±360.170	4778.659 ±1240.258	4083.460 ±582.999	3149.859 ±579.039	5528.318 ±1159.689	5009.950 ±257.532	4446.543 ±283.393	6005.737 ±474.581
BETA-CARO TENE (ug)	1399.035 ±264.465	987.262 ±211.663	2136.395 ±622.642	1834.731 ±262.756	1521.096 ±337.929	2320.117 ±411.587	1928.421 ±123.834	1580.186 ±124.921	2543.907 ±236.342
RETINOL (ug)	212.957 ±70.318	128.654 ±16.928	363.920 ±193.191	306.988 ±83.622	183.888 ±20.428	497.501 ±208.785	458.034 ±38.063	460.908 ±50.140	452.953 ±57.699
VITAMIN E (mg ATE)	5.874 ±0.388	5.315 ±0.399	6.876 ±0.798	6.329 ±0.318	6.182 ±0.385	6.556 ±0.551	N/A	N/A	N/A
VITAMIN C (mg)	54.976 ±5.072	45.216 ±4.533	72.453 ±11.202	55.667 ±3.779	49.232 ±4.408	65.625 ±6.571	70.411 ±3.767	66.309 ±4.299	77.660 ±7.072
THIAMIN (mg)	1.125 ±0.048	1.161 ±0.062	1.060 ±0.077	1.208 ±0.040	1.207 ±0.053	1.210 ±0.062	0.730 ±0.025	0.762 ±0.033	0.674 ±0.034
RIBOFLAVIN (mg)	1.101 ±0.053	1.048 ±0.055	1.195 ±0.110	1.220 ±0.056	1.146 ±0.056	1.334 ±0.111	1.036 ±0.042	1.055 ±0.055	1.002 ±0.063
NIACIN (mg)	14.774 ±0.745	14.909 ±0.941	14.533 ±1.232	16.272 ±0.506	16.379 ±0.644	16.105 ±0.827	10.778 ±0.360	11.237 ±0.489	9.967 ±0.477
FOLACIN (ug)	154.344 ±9.371	141.527 ±11.617	177.294 ±15.411	169.106 ±8.680	149.900 ±9.233	198.830 ±15.964	N/A	N/A	N/A
VITAMIN B12 (ug)	4.341 ±0.766	3.037 ±0.571	6.378 ±1.853	3.412 ±0.588	2.713 ±0.167	4.493 ±1.472	N/A	N/A	N/A
VITAMIN B6 (mg)	1.121 ±0.054	1.055 ±0.066	1.239 ±0.093	1.254 ±0.045	1.157 ±0.054	1.404 ±0.073	N/A	N/A	N/A
PHOSPHORUS (mg)	746.827 ±29.899	750.180 ±37.481	740.823 ±50.141	805.268 ±26.169	803.988 ±33.856	807.249 ±41.730	673.761 ±23.946	691.234 ±31.018	642.877 ±37.231
MAGNESIUM (mg)	170.675 ±6.910	158.990 ±7.826	191.599 ±12.761	178.595 ±6.011	168.907 ±7.329	193.588 ±9.961	N/A	N/A	N/A

Table O-2 (continued)

IRON (mg)	9.093 ±0.417	8.734 ±0.462	9.736 ±0.816	9.285 ±0.347	9.295 ±0.422	9.269 ±0.602	6.782 ±0.228	7.067 ±0.314	6.277 ±0.291
ZINC (mg)	8.480 ±0.818	7.202 ±0.423	10.770 ±2.128	7.878 ±0.544	7.378 ±0.335	8.651 ±1.287	N/A	N/A	N/A
COPPER (mg)	1.054 ±0.104	0.865 ±0.051	1.393 ±0.269	0.876 ±0.048	0.818 ±0.031	0.965 ±0.111	N/A	N/A	N/A
SODIUM (mg)	2315.426 ±101.196	2372.427 ±124.889	2213.356 ±173.335	2515.488 ±71.416	2591.590 ±96.971	2397.711 ±101.586	1600.371 ±62.444	1686.208 ±84.250	1448.660 ±84.004
POTASSIUM (mg)	1642.211 ±68.657	1510.561 ±78.815	1877.957 ±122.807	1687.807 ±51.667	1580.253 ±64.478	1854.260 ±80.168	1417.663 ±45.367	1438.091 ±55.848	1381.558 ±78.169
CALCIUM (mg)	406.112 ±25.244	397.829 ±34.850	420.943 ±33.098	465.950 ±22.350	463.131 ±31.917	470.313 ±28.782	436.839 ±20.637	436.541 ±25.673	437.367 ±35.087
CAFFEINE (mg)	173.749 ±17.329	164.376 ±22.691	190.534 ±26.372	145.336 ±13.007	135.199 ±15.736	161.025 ±22.501	N/A	N/A	N/A
% CALS. PRO.	13.898 ±0.492	13.919 ±0.618	13.860 ±0.824	15.213 ±0.374	14.868 ±0.478	15.746 ±0.600	16.450 ±0.300	16.175 ±0.359	16.935 ±0.535
% CALS. CHO	52.799 ±1.070	52.192 ±1.242	53.886 ±2.000	49.752 ±0.803	50.412 ±1.041	48.730 ±1.261	45.156 ±0.764	43.942 ±0.898	47.302 ±1.348
% CALS. FAT	34.117 ±0.824	34.452 ±0.986	33.516 ±1.485	35.545 ±0.676	35.038 ±0.879	36.329 ±1.057	38.875 ±0.646	40.229 ±0.751	36.481 ±1.120
% CALS. ALCOHOL	0.003 ±0.002	0.002 ±0.001	0.006 ±0.005	0.167 ±0.101	0.119 ±0.103	0.241 ±0.203	0.092 ±0.037	0.082 ±0.043	0.112 ±0.068
% CALS. SFA	11.939 ±0.320	12.126 ±0.393	11.605 ±0.553	11.885 ±0.243	11.788 ±0.309	12.035 ±0.397	N/A	N/A	N/A
% CALS. MFA	13.435 ±0.405	13.750 ±0.477	12.871 ±0.739	14.211 ±0.329	14.032 ±0.406	14.488 ±0.558	N/A	N/A	N/A
% CALS. PFA	5.991 ±0.252	5.865 ±0.293	6.216 ±0.470	6.702 ±0.211	6.524 ±0.277	6.979 ±0.323	N/A	N/A	N/A

Table O-2 (continued)

P:S RATIO	0.544 ±0.027	0.528 ±0.033	0.575 ±0.048	0.584 ±0.021	0.569 ±0.025	0.607 ±0.035	0.603 ±0.023	0.596 ±0.026	0.615 ±0.044
CSI RATIO[2]	30.043 ±1.387	31.011 ±1.638	28.307 ±2.531	31.236 ±1.262	31.712 ±1.700	30.500 ±1.868	N/A	N/A	N/A

[1] N/A = Data not generated by the instrument for this variable.
[2] CSI Ratio = (1.01 x g saturated fat) + (0.05 x mg cholesterol).

Table O-3

t-Test Comparisons of Mean (SEM) Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Age Groups for Each Instrument for Lumbee Pilot Phase Participants.

	24-HOUR RECALL		3-DAY RECORDS		FOOD FREQUENCY	
	MEAN + SEM	T-VALUE(p)	MEAN + SEM	T-VALUE(p)	MEAN + SEM	T-VALUE(p)
ENERGY	1569.768	1.24 (0.220)	1605.175	1.85 (0.066)	1165.118	3.14 (0.002)
(kcal)	± 67.569[1]		± 62.246[3]		± 48.064[5]	
	1430.811		1433.571		964.177	
	± 89.830[2]		± 62.880[4]		± 42.308[6]	
PROTEIN (g)	54.114	0.78 (0.436)	57.977	0.57 (0.571)	46.205	1.83 (0.070)
	± 3.145		± 2.354		± 1.974	
	50.030		55.874		40.595	
	± 4.167		± 2.813		± 2.121	
CARBOHYRATES	203.817	0.99 (0.322)	201.542	2.56 (0.012)	127.174	1.76 (0.081)
(g)	± 9.727		± 8.355		± 5.655	
	188.365		172.557		113.495	
	± 11.334		± 7.673		± 5.313	
FAT (g)	60.566	1.05 (0.295)	63.663	0.94 (0.349)	52.874	3.91 (0.000)[7]
	± 3.064		± 3.405		± 2.572	
	54.756		58.847		39.384	
	± 4.962		± 3.577		± 2.300	
ALCOHOL (g)	0.003	-0.73 (0.469)	0.247	-0.67 (0.503)	N/A[8]	
	± 0.003		± 0.203			
	0.009		0.644			
	± 0.007		± 0.553			

Table O-3 (continued)

SATURATED FAT (g)	21.403 ± 1.146 18.940 ± 1.741	1.22 (0.223)	21.533 ± 1.201 19.366 ± 1.136	1.24 (0.219)	18.771 ± 0.999 13.547 ± 0.832	4.02 (0.000)
MONOUNSATUR-ATED FAT (g)	24.372 ± 1.376 21.339 ± 2.194	1.23 (0.221)	25.575 ± 1.419 23.675 ± 1.631	0.86 (0.390)	N/A	
POLYUNSATUR-ATED FAT (g)	10.079 ± 0.580 10.030 ± 1.044	0.04 (0.967)	11.728 ± 0.735 11.276 ± 0.847	0.40 (0.693)	N/A	
CHOLESTEROL (mg)	187.905 ± 13.434 183.557 ± 22.339	0.18 (0.860)	199.281 ± 12.527 218.782 ± 18.791	-0.90 (0.371)	199.025 ± 10.845 160.591 ± 11.122	2.30 (0.023)
ANIMAL PROTEIN (g)	38.979 ± 2.802 34.700 ± 3.617	0.93 (0.357)	41.834 ± 2.069 39.750 ± 2.463	0.64 (0.522)	N/A	
VEGETABLE PROTEIN (g)	14.579 ± 0.828 14.723 ± 1.215	-0.10 (0.920)	15.740 ± 0.626 15.572 ± 0.803	0.17 (0.868)	N/A	
DIETARY FIBER (g)	8.693 ± 0.537 10.214 ± 0.851	-1.59 (0.116)	9.576 ± 0.470 11.115 ± 0.581	-2.06 (0.042)	5.565 ± 0.275 6.844 ± 0.463	-2.53 (0.013)

Table O-3 (continued)

VITAMIN A	2076.353	-2.09 (0.042)	3149.859	-1.83 (0.071)	4446.543	-3.01 (0.003)
(IU)	± 360.170		± 579.039		± 283.393	
	4778.659		5528.318		6005.737	
	±1240.258		±1159.689		± 474.581	
BETA-CAROTENE	987.262	-1.75 (0.086)	1521.096	-1.49 (0.138)	1580.186	-3.61 (0.001)
(ug)	± 211.663		± 337.929		± 124.921	
	2136.395		2320.117		2543.907	
	± 622.642		± 411.587		± 236.342	
RETINOL	128.654	-1.21 (0.232)	183.888	-1.49 (0.142)	460.908	0.10 (0.921)
(ug)	± 16.928		± 20.428		± 50.140	
	363.920		497.501		452.954	
	±193.191		±208.785		± 57.699	
VITAMIN E	5.315	-1.75 (0.085)	6.182	-0.57 (0.568)	N/A	
(mg ATE)	± 0.399		± 0.385			
	6.876		6.556			
	± 0.798		± 0.551			
VITAMIN C	45.216	-2.25 (0.028)	49.232	-2.15 (0.034)	66.309	-1.45 (0.148)
(mg)	± 4.533		± 4.408		± 4.299	
	72.453		65.625		77.661	
	± 11.202		± 6.571		± 7.072	
THIAMIN	1.161	1.01 (0.314)	1.207	-0.04 (0.967)	0.762	1.70 (0.091)
(mg)	± 0.062		± 0.053		± 0.033	
	1.060		1.210		0.674	
	± 0.077		± 0.062		± 0.034	
RIBOFLAVIN	1.048	-1.19 (0.293)	1.146	-1.51 (0.136)	1.055	0.60 (0.546)
(mg)	± 0.055		± 0.056		± 0.055	
	1.195		1.334		1.002	
	± 0.110		± 0.111		± 0.063	

Table O-3 (continued)

NIACIN (mg)	14.909	0.24 (0.810)	16.379	0.26 (0.793)	11.237	1.86 (0.066)
	± 0.941		± 0.644		± 0.489	
	14.533		16.105		9.967	
	± 1.232		± 0.827		± 0.477	
FOLACIN (ug)	141.527	-1.85 (0.067)	149.900	-2.65 (0.010)	N/A	
	± 11.617		± 9.233			
	177.294		198.830			
	± 15.411		± 15.964			
VITAMIN B12 (ug)	3.203	-1.64 (0.108)	2.713	-1.20 (0.236)	N/A	
	± 0.571		± 0.167			
	6.378		4.493			
	± 1.853		± 1.472			
VITAMIN B6 (mg)	1.055	-1.65 (0.102)	1.157	-2.76 (0.007)	N/A	
	± 0.066		± 0.054			
	1.239		1.404			
	± 0.093		± 0.073			
PHOSPHORUS (mg)	750.180	0.15 (0.881)	803.988	-0.06 (0.952)	691.234	0.97 (0.334)
	± 37.481		± 33.856		± 31.018	
	740.823		807.249		642.877	
	± 50.141		± 41.730		± 37.231	
MAGNESIUM (mg)	158.990	-2.30 (0.023)	168.907	-2.03 (0.044)	N/A	
	± 7.826		± 7.329			
	191.599		193.588			
	± 12.761		± 9.961			
IRON (mg)	8.734	-1.07 (0.289)	9.295	0.04 (0.971)	7.067	1.85 (0.067)
	± 0.462		± 0.422		± 0.314	
	9.736		9.269		6.277	
	± 0.816		± 0.602		± 0.291	

Table O-3 (continued)

ZINC (mg)	7.202	-1.64 (0.107)	7.378	-0.96 (0.343)	N/A	
	± 0.423		± 0.335			
	10.770		8.651			
	± 2.128		± 1.287			
COPPER (mg)	0.865	-1.92 (0.061)	0.818	-1.29 (0.205)	N/A	
	± 0.051		± 0.031			
	1.393		0.965			
	± 0.269		± 0.111			
SODIUM (mg)	2372.427	0.75 (0.453)	2591.590	1.33 (0.186)	1686.208	2.00 (0.048)
	±124.889		± 96.971		± 84.250	
	2213.356		2397.711		1448.661	
	±173.335		±101.586		± 84.004	
POTASSIUM (mg)	1510.561	-2.63 (0.010)	1580.253	-2.66 (0.009)	1438.091	0.60 (0.552)
	± 78.815		± 64.478		± 55.848	
	1877.957		1854.260		1381.558	
	±122.807		± 80.168		± 78.169	
CALCIUM (mg)	397.829	-0.48 (0.632)	463.131	-0.16 (0.876)	436.541	-0.02 (0.985)
	± 34.850		± 31.917		± 25.673	
	420.943		470.313		437.367	
	± 33.098		± 28.782		± 35.087	
CAFFEINE (mg)	164.376	-0.72 (0.471)	135.200	-0.97 (0.335)	N/A	
	± 22.691		± 15.736			
	190.534		161.025			
	± 26.372		± 22.501			
% CALS. PRO.	13.919	0.06 (0.954)	14.868	-1.15 (0.254)	16.175	-1.22 (0.226)
	± 0.618		± 0.478		± 0.359	
	13.860		15.746		16.935	
	± 0.824		± 0.600		± 0.535	

Table O-3 (continued)

% CALS. CHO.	52.192	-0.76 (0.450)	50.412	1.02 (0.309)	43.942	-2.15 (0.034)
	± 1.242		± 1.041		± 0.898	
	53.886		48.730		47.302	
	± 2.000		± 1.261		± 1.348	
% CALS. FAT	34.452	0.54 (0.588)	35.038	-0.93 (0.353)	40.229	2.87 (0.005)
	± 0.986		± 0.879		± 0.751	
	33.516		36.329		36.481	
	± 1.485		± 1.057		± 1.120	
% CALS. ALCOHOL	0.002	-0.95 (0.345)	0.119	-0.54 (0.592)	0.082	-0.37 (0.711)
	± 0.001		± 0.103		± 0.043	
	0.006		0.241		0.112	
	± 0.005		± 0.203		± 0.068	
% CALS. SFA	12.126	0.78 (0.438)	11.788	-0.50 (0.621)	N/A	
	± 0.393		± 0.309			
	11.605		12.035			
	± 0.553		± 0.397			
% CALS. MFA	13.750	1.04 (0.300)	14.032	-0.68 (0.501)	N/A	
	± 0.477		± 0.406			
	12.871		14.488			
	± 0.739		± 0.558			
% CALS. PFA	5.865	-0.67 (0.505)	6.524	-1.05 (0.294)	N/A	
	± 0.293		± 0.277			
	6.216		6.979			
	± 0.470		± 0.323			
P:S RATIO	0.528	-0.83 (0.410)	0.569	-0.90 (0.371)	0.596	-0.41 (0.685)
	± 0.033		± 0.025		± 0.026	
	0.575		0.607		0.615	
	± 0.048		± 0.035		± 0.044	

Table O-3 (continued)

CSI RATIO[9]	31.011 ± 1.638 28.307 ± 2.531	0.93 (0.352)	31.712 ± 1.700 30.500 ± 1.868	0.47 (0.641)	N/A

[1] Top values, N=77 for 24-hour recalls for 21-40 year olds
[2] Bottom values, N=43 for 24-hour recalls for 41-60 year olds
[3] Top values, N=65 for 3-day food records for 21-40 year olds
[4] Bottom values, N=42 for 3-day food records for 41-60 year olds
[5] Top values, N=76 for food frequency questionnaires for 21-40 year olds
[6] Top values, N=43 for food frequency questionnaires for 41-60 year olds
[7] P values of 0.000 represent values less than 0.0005
[8] Data not generated by the instrument for this variable
[9] CSI ratio = (1.01 x g saturated fat) + (0.05 x mg cholesterol)

Table O-4

t-Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments for Lumbee Pilot Phase Participants.

	24-HOUR RECALL VS. 3-DAY FOOD RECORD (N=107)		24-HOUR RECALL VS. FOOD FREQUENCY (N=119)		3-DAY FOOD RECORD VS. FOOD FREQUENCY (N=107)	
	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)
ENERGY	-0.33 (0.743)	0.226 (0.019)	7.99 (0.000)[1]	0.354 (0.000)	9.98 (0.000)	0.382 (0.000)
PROTEIN	-1.57 (0.120)	0.153 (0.116)	3.10 (0.002)	0.133 (0.151)	6.54 (0.000)	0.244 (0.011)
CARBO-HYDRATES	0.95 (0.345)	0.261 (0.007)	10.98 (0.000)	0.410 (0.000)	11.16 (0.000)	0.312 (0.001)
FAT	-1.08 (0.282)	0.252 (0.009)	3.69 (0.000)	0.282 (0.002)	5.93 (0.000)	0.414 (0.000)
ALCOHOL	-1.60 (0.112)	-0.024 (0.804)	N/A[2]	N/A	N/A	N/A
SATURATED FAT	-0.30 (0.765)	0.206 (0.033)	3.39 (0.001)	0.285 (0.002)	4.89 (0.000)	0.455 (0.000)
MONOUNSATUR-ATED FAT	-1.10 (0.275)	0.235 (0.015)	N/A	N/A	N/A	N/A
POLYUNSAT-URATED FAT	-2.36 (0.020)	0.378 (0.000)	N/A	N/A	N/A	N/A

Table O-4 (continued)

CHOLESTEROL	-1.27	0.164	0.10	0.276	2.11	0.236
	(0.206)	(0.094)	(0.917)	(0.002)	(0.037)	(0.014)
ANIMAL	-1.44	0.195	N/A	N/A	N/A	N/A
PROTEIN	(0.152)	(0.044)				
VEGETABLE	-1.38	0.187	N/A	N/A	N/A	N/A
PROTEIN	(0.171)	(0.053)				
DIETARY	-2.02	0.170	6.87	0.231	10.21	0.180
FIBER	(0.046)	(0.080)	(0.000)	(0.012)	(0.000)	(0.063)
VITAMIN A	-1.11	0.037	-3.60	0.153	-1.68	0.293
	(0.270)	(0.708)	(0.000)	(0.098)	(0.095)	(0.002)
BETA-	-0.97	0.057	-1.91	0.190	-0.51	0.286
CAROTENE	(0.333)	(0.560)	(0.058)	(0.038)	(0.613)	(0.003)
RETINOL	-0.71	0.026	-3.09	0.040	-1.61	0.142
	(0.481)	(0.790)	(0.003)	(0.666)	(0.109)	(0.144)
VITAMIN E	-0.68	0.302	N/A	N/A	N/A	N/A
	(0.500)	(0.002)				
VITAMIN C	0.12	0.136	-2.94	0.371	-2.76	0.242
	(0.904)	(0.164)	(0.004)	(0.000)	(0.007)	(0.012)
THIAMIN	-1.45	0.131	7.76	0.156	11.14	0.144
	(0.149)	(0.180)	(0.000)	(0.090)	(0.000)	(0.138)
RIBOFLAVIN	-1.43	0.135	-1.04	0.087	3.21	0.204
	(0.156)	(0.165)	(0.301)	(0.344)	(0.002)	(0.035)

Table O-4 (continued)

NIACIN	-1.78	0.171	5.22	0.171	10.74	0.286
	(0.078)	(0.079)	(0.000)	(0.063)	(0.000)	(0.003)
FOLACIN	-1.42	0.094	N/A	N/A	N/A	N/A
	(0.160)	(0.334)				
VITAMIN B12	1.14	0.018	N/A	N/A	N/A	N/A
	(0.255)	(0.856)				
VITAMIN B6	-1.77	0.075	N/A	N/A	N/A	N/A
	(0.080)	(0.444)				
PHOSPHORUS	-1.35	0.117	2.04	0.097	4.32	0.185
	(0.179)	(0.230)	(0.043)	(0.295)	(0.000)	(0.057)
MAGNESIUM	-0.91	0.218	N/A	N/A	N/A	N/A
	(0.364)	(0.024)				
IRON	0.20	0.153	5.05	0.079	6.81	0.156
	(0.840)	(0.116)	(0.000)	(0.393)	(0.000)	(0.110)
ZINC	0.76	0.098	N/A	N/A	N/A	N/A
	(0.451)	(0.316)				
COPPER	1.61	-0.019	N/A	N/A	N/A	N/A
	(0.111)	(0.849)				
SODIUM	-1.72	0.157	6.74	0.225	11.76	0.309
	(0.089)	(0.106)	(0.000)	(0.014)	(0.000)	(0.001)
POTASSIUM	-0.49	0.130	2.89	0.053	4.43	0.163
	(0.627)	(0.182)	(0.005)	(0.565)	(0.000)	(0.093)

Table O-4 (continued)

CALCIUM	-1.56 (0.121)	0.151 (0.120)	-0.88 (0.381)	0.032 (0.728)	1.22 (0.225)	0.190 (0.050)
CAFFEINE	1.92 (0.057)	0.518 (0.000)	N/A	N/A	N/A	N/A
% CALORIES PROTEIN	-2.68 (0.009)	0.336 (0.000)	-4.83 (0.000)	0.208 (0.023)	-2.98 (0.004)	0.255 (0.008)
% CALORIES CHOS	2.92 (0.004)	0.368 (0.000)	6.63 (0.000)	0.248 (0.007)	5.14 (0.000)	0.421 (0.000)
% CALORIES FAT	-1.71 (0.091)	0.305 (0.001)	-5.25 (0.000)	0.251 (0.006)	-4.46 (0.000)	0.446 (0.000)
% CALORIES ALCOHOL	-1.63 (0.106)	-0.023 (0.815)	-2.42 (0.017)	0.020 (0.829)	0.88 (0.381)	0.654) (0.000)
% CALORIES SFA	-0.11 (0.916)	0.263 (0.006)	N/A	N/A	N/A	N/A
% CALORIES MFA	-1.76 (0.081)	0.285 (0.003)	N/A	N/A	N/A	N/A
% CALORIES PFA	-2.71 (0.008)	0.349 (0.000)	N/A	N/A	N/A	N/A
P/S RATIO	-1.37 (0.173)	0.294 (0.002)	-1.61 (0.111)	0.068 (0.464)	-0.59 (0.558)	0.154 (0.114)
CSI RATIO	-0.75 (0.456)	0.176 (0.069)	N/A	N/A	N/A	N/A

Table O-4 (continued)

[1] P values of 0.000 are less than 0.0005.
[2] N/A = Data not generated by the instrument for this variable.

Table O-5

t-Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments and Age Groups for Lumbee Pilot Phase Participants.

	24-HOUR RECALL VS. 3-DAY FOOD RECORD		24-HOUR RECALL VS. FOOD FREQUENCY		3-DAY FOOD RECORD VS. FOOD FREQUENCY	
	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)
ENERGY	-0.43[1] (0.670)	0.200 (0.111)	5.99[3] (0.000)[7]	0.368 (0.001)	7.11[5] (0.000)	0.363 (0.003)
	0.03[2] (0.973)	0.239 (0.128)	5.30[4] (0.000)	0.277 (0.072)	7.36[6] (0.000)	0.340 (0.028)
PROTEIN	-0.84 (0.402)	0.123 (0.328)	2.45 (0.017)	0.252 (0.028)	4.68 (0.000)	0.282 (0.023)
	-1.50 (0.142)	0.192 (0.223)	1.89 (0.065)	-0.168 (0.281)	4.60 (0.000)	0.155 (0.326)
CARBO-HYDRATES	0.22 (0.826)	0.222 (0.076)	8.37 (0.000)	0.403 (0.000)	8.49 (0.000)	0.252 (0.043)
	1.43 (0.161)	0.314 (0.043)	7.22 (0.000)	0.408 (0.007)	8.01 (0.000)	0.424 (0.005)
FAT	-0.90 (0.373)	0.282 (0.023)	2.22 (0.030)	0.283 (0.013)	3.49 (0.001)	0.430 (0.000)
	-0.61 (0.547)	0.200 (0.204)	3.14 (0.003)	0.263 (0.088)	5.48 (0.000)	0.351 (0.023)

Table O-5 (continued)

ALCOHOL	-1.21	-0.019	N/A[8]	N/A	N/A	N/A
	(0.230)	(0.880)				
	-1.15	-0.039				
	(0.258)	(0.809)				
SATURATED FAT	-0.32	0.221	1.93	0.303	2.60	0.445
	(0.753)	(0.077)	(0.057)	(0.008)	(0.012)	(0.000)
	-0.08	0.166	3.06	0.210	5.33	0.439
	(0.934)	(0.292)	(0.004)	(0.176)	(0.000)	(0.004)
MONOUNSAT- URATED FAT	-0.75	0.268	N/A	N/A	N/A	N/A
	(0.455)	(0.031)				
	-0.80	0.174	N/A	N/A	N/A	N/A
	(0.430)	(0.270)				
POLYUNSAT- URATED FAT	-2.21	0.381	N/A	N/A	N/A	N/A
	(0.031)	(0.002)				
	-1.05	0.386	N/A	N/A	N/A	N/A
	(0.300)	(0.012)				
CHOLESTEROL	-0.47	0.049	-0.80	0.387	0.27	0.281
	(0.640)	(0.700)	(0.427)	(0.001)	(0.791)	(0.023)
	-1.42	0.293	0.96	0.094	2.93	0.237
	(0.164)	(0.059)	(0.344)	(0.548)	(0.006)	(0.131)

Table O-5 (continued)

ANIMAL	-0.68	0.171	N/A	N/A	N/A	N/A
PROTEIN	(0.497)	(0.173)				
	-1.52	0.223				
	(0.137)	(0.156)				
VEGETABLE	-1.18	0.170	N/A	N/A	N/A	N/A
PROTEIN	(0.244)	(0.177)				
	-0.73	0.212				
	(0.470)	(0.177)				
DIETARY	-1.53	0.160	5.61	0.151	8.12	0.129
FIBER	(0.131)	(0.204)	(0.000)	(0.192)	(0.000)	(0.308)
	-1.30	0.131	3.96	0.273	6.15	0.147
	(0.200)	(0.407)	(0.000)	(0.077)	(0.000)	(0.352)
VITAMIN A	-1.40	-0.008	-5.08	-0.007	-2.34	0.441
	(0.166)	(0.946)	(0.000)	(0.954)	(0.023)	(0.000)
	-0.41	-0.006	-0.98	0.163	-0.45	0.107
	(0.684)	(0.969)	(0.333)	(0.296)	(0.654)	(0.499)
BETA-	-1.18	-0.036	-2.44	0.085	-0.17	0.166
CAROTENE	(0.241)	(0.775)	(0.017)	(0.465)	(0.863)	(0.186)
	-0.24	0.087	-0.65	0.169	-0.62	0.366
	(0.814)	(0.582)	(0.520)	(0.278)	(0.541)	(0.017)

Table O-5 (continued)

RETINOL	-2.30	0.403	-6.28	0.006	-4.98	0.392
	(0.025)	(0.001)	(0.000)	(0.956)	(0.000)	(0.001)
	-0.44	-0.009	-0.45	0.076	0.17	0.164
	(0.663)	(0.957)	(0.654)	(0.627)	(0.867)	(0.298)
VITAMIN E	-1.55	0.349	N/A	N/A	N/A	N/A
	(0.127)	(0.004)				
	0.44	0.253	N/A	N/A	N/A	N/A
	(0.665)	(0.106)				
VITAMIN C	-0.56	0.117	-3.87	0.284	-2.58	0.189
	(0.575)	(0.351)	(0.000)	(0.013)	(0.012)	(0.131)
	0.58	0.078	-0.50	0.418	-1.33	0.237
	(0.566)	(0.625)	(0.621)	(0.005)	(0.191)	(0.130)
THIAMIN	-0.67	0.135	6.12	0.164	8.41	0.249
	(0.507)	(0.284)	(0.000)	(0.158)	(0.000)	(0.045)
	-1.54	0.125	4.37	0.095	7.26	-0.067
	(0.131)	(0.432)	(0.000)	(0.543)	(0.000)	(0.674)
RIBOFLAVIN	-1.16	0.177	-0.05	0.240	2.19	0.478
	(0.249)	(0.158)	(0.963)	(0.037)	(0.032)	(0.000)
	-0.90	0.080	1.45	-0.099	2.42	-0.072
	(0.375)	(0.614)	(0.153)	(0.526)	(0.020)	(0.652)

Table O-5 (continued)

NIACIN	-1.09	0.138	3.85	0.211	8.24	0.355
	(0.281)	(0.272)	(0.000)	(0.067)	(0.000)	(0.004)
	-1.53	0.224	3.54	0.068	6.84	0.156
	(0.133)	(0.154)	(0.001)	(0.663)	(0.000)	(0.324)
FOLACIN	-0.62	0.101	N/A	N/A	N/A	N/A
	(0.536)	(0.425)				
	-1.44	0.007	N/A	N/A	N/A	N/A
	(0.158)	(0.965)				
VITAMIN B12	0.89	-0.132	N/A	N/A	N/A	N/A
	(0.376)	(0.295)				
	0.84	0.004	N/A	N/A	N/A	N/A
	(0.404)	(0.980)				
VITAMIN B6	-1.03	-0.016	N/A	N/A	N/A	N/A
	(0.305)	(0.898)				
	-1.51	0.076	N/A	N/A	N/A	N/A
	(0.138)	(0.634)				
PHOPHORUS	-0.84	0.077	1.37	0.157	3.25	0.289
	(0.406)	(0.542)	(0.174)	(0.177)	(0.002)	(0.019)
	-1.13	0.182	1.55	-0.025	2.87	0.009
	(0.264)	(0.247)	(0.129)	(0.872)	(0.007)	(0.954)

Table O-5 (continued)

MAGNESIUM	-0.87	0.131	N/A	N/A	N/A	N/A
	(0.386)	(0.298)				
	-0.37	0.261	N/A	N/A	N/A	N/A
	(0.712)	(0.095)				
IRON	-0.76	0.128	3.23	0.147	5.22	0.257
	(0.450)	(0.309)	(0.002)	(0.204)	(0.000)	(0.039)
	0.50	0.181	4.01	0.010	4.37	-0.022
	(0.620)	(0.250)	(0.000)	(0.949)	(0.000)	(0.889)
ZINC	-0.27	0.077	N/A	N/A	N/A	N/A
	(0.785)	(0.545)				
	0.90	0.079	N/A	N/A	N/A	N/A
	(0.373)	(0.618)				
COPPER	0.81	0.134	N/A	N/A	N/A	N/A
	(0.422)	(0.289)				
	1.44	-0.080	N/A	N/A	N/A	N/A
	(0.158)	(0.616)				
SODIUM	-1.43	0.101	5.25	0.257	9.02	0.374
	(0.158)	(0.424)	(0.000)	(0.025)	(0.000)	(0.002)
	-0.94	0.245	4.19	0.132	7.47	0.107
	(0.351)	(0.118)	(0.000)	(0.400)	(0.000)	(0.498)

Table O-5 (continued)

POTASSIUM	-0.67 (0.508)	0.125 (0.322)	0.88 (0.382)	0.069 (0.551)	2.15 (0.035)	0.239 (0.055)
	0.00 (0.997)	0.017 (0.916)	3.52 (0.001)	0.066 (0.674)	4.35 (0.000)	0.087 (0.582)
CALCIUM	-1.04 (0.304)	0.109 (0.386)	-0.82 (0.415)	0.038 (0.747)	1.09 (0.280)	0.271 (0.029)
	-1.40 (0.168)	0.284 (0.069)	-0.34 (0.733)	-0.020 (0.898)	0.59 (0.561)	-0.031 (0.845)
CAFFEINE	1.42 (0.161)	0.405 (0.001)	N/A	N/A	N/A	N/A
	1.44 (0.157)	0.715 (0.000)	N/A	N/A	N/A	N/A
% CALORIES PROTEIN	-1.21 (0.232)	0.357 (0.004)	-3.58 (0.001)	0.303 (0.008)	-2.50 (0.015)	0.272 (0.029)
	-2.92 (0.006)	0.324 (0.036)	-3.23 (0.002)	-0.064 (0.685)	-1.65 (0.106)	0.211 (0.180)
% CALORIES CHOS	1.44 (0.155)	0.286 (0.021)	5.79 (0.000)	0.152 (0.190)	5.52 (0.000)	0.322 (0.009)
	2.92 (0.006)	0.501 (0.001)	3.33 (0.002)	0.356 (0.019)	1.19 (0.243)	0.647 (0.000)

Table O-5 (continued)

% CALORIES	-0.86	0.292	-5.27	0.217	-5.77	0.428
FROM FAT	(0.391)	(0.018)	(0.000)	(0.059)	(0.000)	(0.000)
	-1.63	0.329	-1.88	0.291	-0.03	0.584
	(0.110)	(0.033)	(0.067)	(0.058)	(0.974)	(0.000)
% CALORIES	-1.15	-0.018	-1.85	0.144	0.38	0.486
ALCOHOL	(0.253)	(0.886)	(0.068)	(0.214)	(0.704)	(0.000)
	-1.16	-0.039	-1.54	-0.052	0.84	0.818
	(0.254)	(0.808)	(0.131)	(0.741)	(0.406)	(0.000)
% CALORIES	0.28	0.203	N/A	N/A	N/A	N/A
SFA	(0.784)	(0.105)				
	-0.54	0.355	N/A	N/A	N/A	N/A
	(0.594)	(0.021)				
% CALORIES	-0.71	0.268	N/A	N/A	N/A	N/A
MFA	(0.479)	(0.031)				
	-1.88	0.320	N/A	N/A	N/A	N/A
	(0.067)	(0.039)				
% CALORIES	-2.29	0.349	N/A	N/A	N/A	N/A
PFA	(0.025)	(0.004)				
	-1.48	0.340	N/A	N/A	N/A	N/A
	(0.146)	(0.028)				

Table O-5 (continued)

P:S RATIO	-1.19	0.206	-1.61	0.112	-0.83	0.194
	(0.240)	(0.100)	(0.112)	(0.337)	(0.409)	(0.121)
	-0.70	0.393	-0.62	-0.007	-0.01	0.108
	(0.485)	(0.010)	(0.536)	(0.963)	(0.993)	(0.494)
CSI RATIO	-0.42	0.176	N/A	N/A	N/A	N/A
	(0.678)	(0.161)				

[1] Top values, 21-40 year olds, N=65 for matched pairs
[2] Bottom values, 41-60 year olds, N=42 for matched pairs
[3] Top values, 21-40 year olds, N=76 for matched pairs
[4] Bottom values, 41-60 year olds, N=43 for matched pairs
[5] Top values, 21-40 year olds, N=65 for matched pairs
[6] Bottom values, 41-60 year olds, N=42 for matched pairs
[7] P values of 0.000 are less than 0.0005
[8] N/A = Data not generated by the instrument for this variable

Table O-6

Comparison of Statistical Analyses by Age Group and Instrument for Lumbee Pilot Participants

	T-tests				ANOVA			
	All subjects[1]	21-40[2]	41-60[3]	T-value (p)	Matched subjects (N=107)	21-40 (N=65)	41-60 (N=42)	F-Value (p)
Energy	1520	1570	1431	1.24 (0.220)	1516	1568	1437	1.20 (0.277)
(kcal)	1538	1605	1434	1.85 (0.066)	1538	1605	1434	3.44 (0.066)
	1093	1165	964	3.14 (0.002)	1077	1146	970	**5.94 (0.017)**
Protein (g)	53	54	50	0.78 (0.436)	52	55	49	0.98 (0.325)
	57	58	56	0.57 (0.571)	57	58	56	0.32 (0.571)
	44	46	41	1.83 (0.070)	44	45	41	2.16 (0.145)
Carbohy-	198	204	188	0.99 (0.322)	198	204	189	0.85 (0.358)
drates (g)	190	202	173	2.56 (0.012)	190	202	173	5.75 (0.018)
	122	127	113	1.76 (0.081)	121	125	114	1.48 (0.227)
Fat (g)	58	61	55	1.05 (0.295)	58	60	55	0.57 (0.451)
	62	64	59	0.94 (0.349)	62	64	59	0.88 (0.349)
	48	53	39	3.91 (0.000)[4]	47	52	40	10.18 (0.002)
Saturated	21	21	19	1.22 (0.223)	20	21	19	0.75 (0.389)
Fat (g)	21	22	19	1.24 (0.219)	21	22	19	1.53 (0.219)
	17	19	14	4.02 (0.000)	17	18	14	10.55 (0.002)
Monounsat-	23	24	21	1.23 (0.221)	23	24	22	0.93 (0.338)
urated Fat	25	26	24	0.86 (0.390)	25	26	24	0.75 (0.390)
(g)	N/A[5]	N/A	N/A					
Polyunsat-	10	10	10	0.04 (0.967)	10	10	10	0.01 (0.903)
urated Fat	12	12	11	0.40 (0.693)	12	12	11	0.16 (0.693)
(g)	N/A	N/A	N/A					
Cholesterol	186	188	184	0.18 (0.860)	188	190	183	0.07 (0.796)
(mg)	207	199	219	-0.90 (0.371)	207	199	219	0.81 (0.371)
	185	199	161	2.30 (0.023)	182	196	162	4.32 (0.040)

Table O-6 (continued)

Animal Protein (g)	37	39	35	0.93 (0.357)	37	39	34	1.30 (0.256)
	41	42	40	0.64 (0.522)	41	42	40	0.41 (0.522)
	N/A	N/A	N/A					
Vegetable	15	15	15	-0.10 (0.920)	15	15	15	0.00 (0.960)
Protein (g)	16	16	16	0.17 (0.868)	16	16	16	0.03 (0.868)
	N/A	N/A	N/A					
Dietary	9.2	8.7	10.2	-1.59 (0.116)	9.1	8.5	9.9	2.00 (0.160)
Fiber (g)	10.2	9.6	11.1	-2.06 (0.042)	10.2	9.6	11.1	4.23 (0.042)
	6.0	5.6	6.8	-2.53 (0.013)	6.0	5.4	6.8	7.87 (0.006)
Vitamin A	3045	2076	4779	-2.09 (0.042)	3196	2146	4821	5.58 (0.021)
(IU)	4083	3150	5528	-1.83 (0.071)	4083	3150	5528	4.08 (0.046)
	5010	4447	6006	-3.01 (0.003)	5040	4372	6074	9.54 (0.003)
Beta-	1399	987	2136	-1.75 (0.086)	1462	1019	2148	3.60 (0.061)
Carotene	1834	1521	2320	-1.49 (0.138)	1835	1521	2320	2.23 (0.138)
(ug)	1928	1580	2544	-3.61 (0.001)	1966	1580	2563	14.13 (0.000)
Retinol	213	129	364	-1.21 (0.232)	227	134	371	2.18 (0.143)
(ug)	307	184	498	-1.49 (0.142)	307	184	498	3.43 (0.067)
	458	461	453	0.10 (0.921)	448	439	462	0.08 (0.784)
Vitamin E	5.9	5.3	6.9	-1.75 (0.085)	6.0	5.4	6.9	3.00 (0.086)
(mg ATE)	6.3	6.2	6.6	-0.57 (0.568)	6.3	6.2	6.6	0.33 (0.568)
	N/A	N/A	N/A					
Vitamin C	55	45	72	-2.25 (0.028)	56	46	73	6.06 (0.015)
(mg)	56	49	66	-2.15 (0.034)	56	49	66	4.64 (0.034)
	70	66	78	-1.45 (0.148)	68	63	77	3.38 (0.069)
Thiamin	1.1	1.2	1.1	1.01 (0.314)	1.1	1.2	1.1	0.63 (0.427)
(mg)	1.2	1.2	1.2	-0.04 (0.967)	1.2	1.2	1.2	0.00 (0.967)
	0.7	0.8	0.7	1.70 (0.091)	0.7	0.7	0.7	1.34 (0.249)
Riboflavin	1.1	1.0	1.2	-1.19 (0.293)	1.1	1.1	1.2	1.37 (0.244)
(mg)	1.2	1.1	1.3	-1.51 (0.136)	1.2	1.1	1.3	2.76 (0.099)
	1.0	1.1	1.0	0.60 (0.546)	1.0	1.0	1.0	0.00 (0.970)

Table O-6 (continued)

Niacin (mg)	15	15	15	0.24 (0.810)	15	15	14	0.34 (0.559)
	16	16	16	0.26 (0.793)	16	16	16	0.07 (0.793)
	11	11	10	1.86 (0.066)	11	11	10	1.48 (0.227)
Folacin (ug)	154	142	177	-1.85 (0.067)	152	140	169	2.13 (0.147)
	169	150	199	-2.65 (0.010)	169	150	199	8.08 (0.005)
	N/A	N/A	N/A					
Vitamin B12 (ug)	4.3	3.0	6.4	-1.64 (0.108)	4.6	3.4	6.5	3.32 (0.071)
	3.4	2.7	4.5	-1.20 (0.236)	3.4	2.7	4.5	2.21 (0.140)
	N/A	N/A	N/A					
Vitamin B6 (mg)	1.1	1.1	1.2	-1.65 (0.102)	1.1	1.1	1.2	1.95 (0.165)
	1.3	1.2	1.4	-2.76 (0.007)	1.3	1.2	1.4	7.62 (0.007)
	N/A	N/A	N/A					
Phosphorus (mg)	747	750	741	0.15 (0.881)	752	760	739	0.10 (0.756)
	805	804	807	-0.06 (0.952)	805	804	807	0.00 (0.952)
	674	691	643	0.97 (0.334)	665	676	649	0.27 (0.602)
Magnesium (mg)	171	159	192	-2.30 (0.023)	171	160	188	3.72 (0.056)
	179	169	194	-2.03 (0.044)	179	169	194	4.14 (0.044)
	N/A	N/A	N/A					
Iron (mg)	9.1	8.7	9.7	-1.07 (0.289)	9.2	8.8	9.7	0.97 (0.328)
	9.3	9.3	9.3	0.04 (0.971)	9.3	9.3	9.3	0.00 (0.971)
	6.8	7.1	6.3	1.85 (0.067)	6.7	6.9	6.3	1.46 (0.229)
Zinc (mg)	8.5	7.2	10.8	-1.64 (0.107)	8.6	7.2	10.8	3.86 (0.052)
	7.9	7.4	8.7	-0.96 (0.343)	7.9	7.4	8.7	1.31 (0.255)
	N/A	N/A	N/A					
Copper (mg)	1.1	0.9	1.4	-1.92 (0.061)	1.1	0.9	1.4	5.37 (0.022)
	0.9	0.8	1.0	-1.29 (0.205)	0.9	0.8	1.0	2.32 (0.130)
	N/A	N/A	N/A					
Sodium (mg)	2315	2372	2213	0.75 (0.453)	2307	2359	2227	0.34 (0.560)
	2515	2592	2398	1.33 (0.186)	2515	2592	2398	1.77 (0.186)
	1600	1686	1449	2.00 (0.048)	1580	1651	1469	1.98 (0.162)

Table O-6 (continued)

Potassium	1642	1511	1878	-2.63 (0.010)	1647	1514	1853	5.55 (0.020)
(mg)	1688	1580	1854	-2.66 (0.009)	1688	1580	1854	7.09 (0.009)
	1418	1438	1382	0.60 (0.552)	1403	1416	1383	0.11 (0.738)
Calcium	406	398	421	-0.48 (0.632)	415	413	418	0.01 (0.938)
(mg)	466	463	470	-0.16 (0.876)	466	463	470	0.02 (0.876)
	437	437	437	-0.02 (0.985)	432	424	444	0.20 (0.652)
Caffeine	174	164	191	-0.72 (0.471)	177	170	189	0.23 (0.632)
(mg)	145	135	161	-0.97 (0.335)	145	135	161	0.94 (0.335)
	N/A	N/A	N/A					
% Cals.	14	14	14	0.06 (0.954)	14	14	13	0.29 (0.589)
Protein	15	15	16	-1.15 (0.254)	15	15	16	1.32 (0.254)
	16	16	17	-1.22 (0.226)	16	16	17	1.28 (0.260)
% Cals.	53	52	54	-0.76 (0.450)	53	53	54	0.35 (0.557)
CHO	50	50	49	1.02 (0.309)	50	50	49	1.04 (0.309)
	45	44	47	-.215 (0.034)	45	44	47	4.60 (0.034)
% Cals.	34	34	34	0.54 (0.588)	34	34	34	0.01 (0.940)
Fat	36	35	35	-0.93 (0.353)	36	35	36	0.87 (0.353)
	39	40	36	2.87 (0.005)	39	40	36	8.22 (0.005)
% Cals.	12	12	12	0.78 (0.438)	12	12	12	0.07 (0.796)
SFA	12	12	12	-0.50 (0.621)	12	12	12	0.25 (0.621)
	N/A	N/A	N/A					
% Cals.	13	14	13	1.04 (0.330)	13	14	13	0.42 (0.518)
MFA	14	14	14	-0.68 (0.501)	14	14	14	0.46 (0.501)
	N/A	N/A	N/A					
% Cals.	6.0	5.9	6.2	-0.67 (0.505)	6.0	6.0	6.3	0.92 (0.340)
PFA	6.7	6.5	7.0	-1.05 (0.294)	6.7	6.5	7.0	1.11 (0.294)
	N/A	N/A	N/A					
P:S Ratio	0.5	0.5	0.6	-0.83 (0.410)	0.5	0.5	0.6	0.72 (0.399)
	0.6	0.6	0.6	-0.90 (0.371)	0.6	0.6	0.6	0.81 (0.371)
	0.6	0.6	0.6	-0.41 (0.685)	0.6	0.6	0.6	0.05 (0.830)

Table O-6 (continued)

CSI Ratio[6]	30 31 N/A	31 32 N/A	28 31 N/A	0.93 (0.352) 0.47 (0.641)	30 31	31 31	29 31	0.51 (0.477) 0.22 (0.641)

[1] For all subjects, Top values: 24-hour recalls, N=120; Middle values: 3-day food records, N=107; Bottom values: food frequency, N=119.
[2] For 21-40 year olds, Top values: 24-hour recalls, N=77; Middle values: 3-day food records, N=65; Bottom values: food frequency, N=76.
[3] For 41-60 year olds, Top values: 24-hour recalls, N=43; Middle values: 3-day food records, N=42; Bottom values: food frequency, N=43.
[4] P values of 0.000 are less than 0.0005.
[5] N/A = Data not generated by the instrument for this nutrient.
[6] CSI Ratio = (1.01 x g saturated fat) + (0.05 x mg cholesterol).

Table O-7

Reported (Mean ± SEM) Weekly Servings of Foods by Age Group Obtained From the Food Frequency Questionnaire for Lumbee Pilot Phase Participants

	TOTAL (N=119)	21-40 YEARS (N=76)	41-60 YEARS (N=43)	T-VALUE (p)
FRUIT OR JUICE	5.547 ± 0.385	4.805 ± 0.421	6.858 ± 0.727	-2.44 (0.017)
CITRUS FRUIT OR JUICE	2.441 ± 0.221	2.408 ± 0.252	2.500 ± 0.422	-0.20 (0.842)
VEGETABLES	11.472 ± 0.526	10.971 ± 0.555	12.358 ± 1.071	-1.15 (0.255)
VEGETABLES, EXC. POTATOES/RICE	6.957 ± 0.462	6.087 ± 0.451	8.495 ± 0.963	-2.27 (0.027)
SALADS	1.621 ± 0.135	1.492 ± 0.160	1.849 ± 0.243	-1.27 (0.206)
CARROTS	0.850 ± 0.104	0.659 ± 0.115	1.186 ± 0.194	-2.50 (0.014)
TOMATOES	1.289 ± 0.158	1.128 ± 0.170	1.574 ± 0.314	-1.25 (0.215)
DEEP YELLOW OR DARK GREEN VEGETABLES	2.583 ± 0.197	2.018 ± 0.179	3.581 ± 0.403	-3.54 (0.001)
FISH OR CHICKEN	2.632 ± 0.174	2.472 ± 0.221	2.914 ± 0.282	-1.22 (0.225)
FRIED FISH OR CHICKEN	1.207 ± 0.081	1.282 ± 0.110	1.074 ± 0.110	1.34 (0.184)
WHOLE GRAIN OR BRAN CEREAL	1.856 ± 0.270	1.317 ± 0.340	2.809 ± 0.408	-2.73 (0.007)
EGGS	1.187 ± 0.121	1.287 ± 0.172	1.012 ± 0.142	1.24 (0.219)

Table O-7 (continued)

ALCOHOLIC BEVERAGES	0.055 ± 0.022	0.038 ± 0.017	0.086 ± 0.054	-0.85 (0.399)
BEEF	2.318 ± 0.151	2.617 ± 0.194	1.791 ± 0.219	2.70 (0.008)
PORK	0.771 ± 0.070	0.891 ± 0.089	0.558 ± 0.105	2.33 (0.021)
HOT DOGS OR LUNCHEON MEATS	1.725 ± 0.181	2.063 ± 0.260	1.128 ± 0.173	3.00 (0.003)
BUTTER OR MARGARINE	1.273 ± 0.221	1.368 ± 0.280	1.105 ± 0.363	0.57 (0.569)
CHEESES, EXCLUDING COTTAGE CHEESE	1.276 ± 0.138	1.482 ± 0.194	0.914 ± 0.155	2.29 (0.024)
WHOLE MILK	0.788 ± 0.165	1.107 ± 0.245	0.226 ± 0.102	3.32 (0.001)
ICE CREAM	1.050 ± 0.143	1.125 ± 0.182	0.919 ± 0.234	0.69 (0.491)
PASTRIES, SWEETS, SODAS, SUGARS	13.419 ± 0.931	15.036 ± 1.214	10.563 ± 1.336	2.35 (0.020)

Table O-8

Estimated Mean Daily Pretest Consumption (± SEM) of Energy, Macronutrient, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments for Lumbee Control Participants.

	24-HOUR RECALL			3-DAY RECORDS			FOOD FREQUENCY		
	TOTAL (N=41)	21-40 (N=25)	41-60 (N=16)	TOTAL (N=40)	21-40 (N=25)	41-60 (N=15)	TOTAL (N=41)	21-40 (N=25)	41-60 (N=16)
ENERGY (kcal)	1525.307 ±101.811	1605.318 ±140.361	1400.291 ±140.958	1623.130 ±61.270	1673.915 ±79.107	1538.489 ±95.857	1078.029 ±60.511	1179.432 ±88.775	919.588 ±50.727
PROTEIN (g)	52.578 ±4.846	52.380 ±6.860	52.888 ±6.551	58.533 ±2.476	59.692 ±3.181	56.600 ±4.024	42.412 ±2.437	46.164 ±3.490	36.550 ±2.527
CARBOHY-DRATES (g)	200.674 ±12.886	218.401 ±18.410	172.977 ±14.262	208.073 ±8.699	217.599 ±11.180	192.195 ±13.276	124.239 ±6.601	129.548 ±10.027	115.944 ±6.231
FAT (g)	58.157 ±4.925	58.960 ±5.755	56.903 ±9.100	63.081 ±3.284	63.735 ±4.409	61.991 ±4.944	46.429 ±3.288	53.456 ±4.533	35.450 ±3.051
ALCOHOL (g)	0.003 ±0.003	0.000 ±0.000	0.008 ±0.008	0.158 ±0.109	0.108 ±0.105	0.241 ±0.236	N/A[1]	N/A	N/A
SATURATED FAT (g)	20.027 ±1.843	21.055 ±2.127	18.422 ±3.410	20.886 ±1.117	21.581 ±1.453	19.728 ±1.757	16.154 ±1.291	19.004 ±1.814	11.700 ±0.997
MONOUNSATUR-ATED FAT (g)	23.011 ±2.183	23.605 ±2.644	22.082 ±3.871	25.117 ±1.360	25.551 ±1.884	24.393 ±1.882	N/A	N/A	N/A
POLYUNSATUR-ATED FAT (g)	10.455 ±0.992	9.564 ±1.034	11.846 ±1.959	12.294 ±0.819	11.749 ±0.987	13.201 ±1.451	N/A	N/A	N/A
CHOLESTEROL (mg)	186.652 ±22.167	177.255 ±25.012	201.334 ±42.075	206.529 ±11.393	204.281 ±14.878	209.766 ±18.184	172.946 ±13.786	205.328 ±19.035	122.350 ±10.625
ANIMAL PROTEIN (g)	36.808 ±4.150	36.872 ±5.819	36.707 ±5.746	41.197 ±2.242	42.250 ±2.948	39.443 ±3.486	N/A	N/A	N/A
VEGETABLE PROTEIN (g)	15.230 ±1.115	15.021 ±1.592	15.555 ±1.465	16.887 ±0.661	17.060 ±0.830	16.598 ±1.126	N/A	N/A	N/A

Table O-8 (continued)

DIETARY FIBER (g)	9.195 ±0.722	7.802 ±0.758	11.372 ±1.269	11.009 ±0.527	10.170 ±0.693	12.406 ±0.688	6.107 ±0.345	5.508 ±0.427	7.044 ±0.513
TOTAL VITAMIN A (IU)	4170.716 ±1100.138	2733.747 ±1000.469	6415.979 ±2284.052	3889.591 ±677.070	3371.680 ±829.969	4752.777 ±1162.814	4785.873 ±377.445	4394.148 ±521.260	5397.944 ±503.259
BETA-CAROTENE (ug)	2150.165 ±647.752	1341.281 ±590.733	3414.045 ±1349.106	1891.119 ±400.257	1616.595 ±505.949	2348.658 ±659.386	1974.500 ±197.719	1721.092 ±261.520	2370.450 ±281.090
RETINOL (ug)	174.412 ±29.977	148.624 ±38.633	214.704 ±47.242	219.916 ±21.833	202.068 ±25.557	249.663 ±39.670	388.317 ±48.609	389.080 ±63.334	387.125 ±78.216
VITAMIN E (mg ATE)	6.512 ±0.715	5.527 ±0.682	8.051 ±1.440	6.992 ±0.499	6.508 ±0.589	7.798 ±0.885	N/A	N/A	N/A
VITAMIN C (mg)	58.429 ±7.715	52.107 ±9.481	68.307 ±13.089	58.674 ±6.144	53.489 ±8.125	67.316 ±9.124	68.185 ±5.691	61.892 ±6.246	78.019 ±10.640
THIAMIN (mg)	1.105 ±0.077	1.116 ±0.109	1.088 ±0.106	1.310 ±0.060	1.338 ±0.082	1.263 ±0.086	0.720 ±0.039	0.740 ±0.057	0.688 ±0.046
RIBOFLAVIN (mg)	1.106 ±0.085	1.069 ±0.117	1.164 ±0.123	1.300 ±0.063	1.269 ±0.079	1.351 ±0.108	1.010 ±0.067	1.040 ±0.092	0.962 ±0.097
NIACIN (mg)	15.511 ±1.510	15.104 ±2.227	16.149 ±1.771	17.101 ±0.770	16.969 ±0.957	17.319 ±1.337	10.559 ±0.537	10.948 ±0.791	9.950 ±0.602
FOLACIN (ug)	157.994 ±16.520	126.120 ±16.872	207.798 ±29.700	179.819 ±14.699	168.692 ±16.957	198.365 ±27.278	N/A	N/A	N/A
VITAMIN B12 (ug)	4.137 ±1.177	2.430 ±0.386	6.804 ±2.885	2.650 ±0.192	2.724 ±0.248	2.527 ±0.311	N/A	N/A	N/A
VITAMIN B6 (mg)	1.109 ±0.089	0.961 ±0.114	1.339 ±0.127	1.331 ±0.070	1.194 ±0.083	1.561 ±0.104	N/A	N/A	N/A
PHOSPHORUS (mg)	771.866 ±61.720	801.870 ±89.886	724.985 ±74.779	845.270 ±39.151	862.646 ±54.294	816.309 ±53.553	661.680 ±39.567	705.880 ±56.369	592.619 ±47.252
MAGNESIUM (mg)	175.198 ±12.816	157.128 ±16.065	203.431 ±19.748	185.305 ±8.341	177.764 ±11.356	197.873 ±11.416	N/A	N/A	N/A

Table O-8 (continued)

IRON (mg)	9.905 ±0.883	8.614 ±0.940	11.921 ±1.638	9.858 ±0.478	9.958 ±0.567	9.691 ±0.880	6.615 ±0.353	6.940 ±0.519	6.106 ±0.388
ZINC (mg)	9.597 ±1.936	7.093 ±0.891	13.511 ±4.686	7.679 ±0.408	7.902 ±0.523	7.309 ±0.662	N/A	N/A	N/A
COPPER (mg)	1.231 ±0.271	0.859 ±0.107	1.812 ±0.660	0.851 ±0.036	0.866 ±0.051	0.825 ±0.046	N/A	N/A	N/A
SODIUM (mg)	2346.690 ±170.441	2382.959 ±238.617	2290.019 ±236.250	2697.566 ±92.988	2732.052 ±126.044	2640.089 ±135.884	1543.485 ±104.426	1676.512 ±153.352	1335.631 ±104.888
POTASSIUM (mg)	1620.972 ±119.967	1434.558 ±157.082	1912.245 ±165.482	1753.931 ±69.481	1655.400 ±91.726	1918.149 ±93.497	1412.732 ±68.540	1468.316 ±98.445	1325.881 ±83.952
CALCIUM (mg)	478.182 ±54.804	541.358 ±85.529	379.468 ±34.209	529.360 ±40.960	541.248 ±62.357	509.545 ±36.171	438.588 ±33.641	459.916 ±45.951	405.263 ±48.303
CAFFEINE (mg)	169.983 ±25.146	171.730 ±36.323	167.253 ±31.965	148.837 ±22.879	151.610 ±28.787	144.215 ±38.968	N/A	N/A	N/A
% CALS. PRO.	13.530 ±0.751	12.472 ±0.631	15.183 ±1.599	14.586 ±0.473	14.420 ±0.515	14.862 ±0.945	15.988 ±0.469	16.008 ±0.579	15.956 ±0.816
% CALS. CHO	54.033 ±1.770	55.461 ±2.067	51.802 ±3.190	51.413 ±0.123	52.205 ±1.454	50.093 ±1.768	46.837 ±1.151	44.288 ±1.354	50.819 ±1.654
% CALS. FAT	33.364 ±1.334	32.768 ±1.593	34.294 ±2.391	34.709 ±0.978	33.893 ±1.279	36.068 ±1.489	37.832 ±1.018	40.128 ±1.146	34.244 ±1.548
% CALS. ALCOHOL	0.002 ±0.002	0.000 ±0.000	0.005 ±0.005	0.061 ±0.043	0.038 ±0.036	0.100 ±0.098	0.024 ±0.016	0.040 ±0.025	0.000 ±0.000
% CALS. SFA	11.396 ±0.509	11.639 ±0.593	11.017 ±0.935	11.490 ±0.354	11.530 ±0.448	11.423 ±0.596	N/A	N/A	N/A
% CALS. MFA	12.990 ±0.677	12.936 ±0.808	13.076 ±1.225	13.816 ±0.446	13.569 ±0.600	14.278 ±0.656	N/A	N/A	N/A
% CALS. PFA	6.211 ±0.492	5.476 ±0.503	7.359 ±0.937	6.758 ±0.327	6.193 ±0.307	7.701 ±0.651	N/A	N/A	N/A

Table O-8 (continued)

P:S RATIO	0.582 ±0.052	0.488 ±0.045	0.729 ±0.106	0.604 ±0.032	0.546 ±0.026	0.700 ±0.068	0.649 ±0.038	0.604 ±0.042	0.720 ±0.070
CSI RATIO[2]	29.560 +2.698	30.128 +3.226	28.673 +4.863	31.421 +1.477	32.026 +1.952	30.414 +2.278	N/A	N/A	N/A

[1] N/A = Data not generated by the instrument for this variable.
[2] CSI Ratio = (1.01 x g saturated fat) + (0.05 x mg cholesterol)

Table O-9

Estimated Mean Daily Pretest Consumption (± SEM) of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments for Lumbee Intervention Participants.

	3-DAY RECORDS			FOOD FREQUENCY		
	TOTAL (N=25)	21-40 (N=17)	41-60 (N=8)	TOTAL (N=27)	21-40 (N=19)	41-60 (N=8)
ENERGY (kcal)	1404.428 ±92.525	1457.638 ±130.180	1291.356 ±82.001	1350.533 ±118.776	1376.984 ±136.691	1287.713 ±248.877
PROTEIN (g)	54.314 ±2.779	55.025 ±3.782	52.804 ±3.580	54.048 ±5.044	53.242 ±5.133	55.963 ±12.539
CARBOHY-DRATES (g)	177.538 ±11.232	180.122 ±15.707	172.049 ±12.131	151.074 ±12.945	152.226 ±16.309	148.338 ±21.785
FAT (g)	53.904 ±4.813	57.838 ±6.694	45.544 ±3.979	58.963 ±5.949	53.242 ±5.133	55.963 ±12.539
ALCOHOL (g)	0.833 ±0.824	1.219 ±1.211	0.011 ±0.011	N/A[1]	N/A	N/A
SATURATED FAT (g)	18.686 ±1.623	19.858 ±2.256	16.196 ±1.489	21.815 ±2.340	22.226 ±2.206	20.838 ±6.222
MONOUNSATUR-ATED FAT (g)	21.238 ±2.077	22.934 ±2.883	17.635 ±1.769	N/A	N/A	N/A
POLYUNSATUR-ATED FAT (g)	9.843 ±1.050	10.684 ±1.379	8.056 ±1.377	N/A	N/A	N/A

Table O-9 (continued)

CHOLESTEROL (mg)	195.796 ±19.012	198.255 ±26.882	190.573 ±18.895	217.926 ±26.232	209.911 ±27.871	236.962 ±61.713
ANIMAL PROTEIN (g)	38.533 ±2.321	39.514 ±3.082	36.450 ±3.267	N/A	N/A	N/A
VEGETABLE PROTEIN (g)	15.406 ±1.216	15.116 ±1.678	16.023 ±1.443	N/A	N/A	N/A
DIETARY FIBER (g)	11.693 ±1.104	10.834 ±1.423	13.519 ±1.588	7.530 ±0.848	7.158 ±0.950	8.413 ±1.829
TOTAL VITA-MIN A (IU)	4055.538 ±804.355	2446.396 ±451.497	7318.714 ±1906.767	6697.763 ±923.626	6065.647 ±959.044	8199.038 ±2149.266
BETA-CARO-TENE (ug)	1982.443 ±469.068	1083.689 ±217.806	3892.295 ±1166.492	2382.722 ±326.033	2393.605 ±421.613	2356.875 ±496.780
RETINOL (ug)	209.678 ±32.052	192.578 ±41.945	246.016 ±46.734	561.259 ±77.291	551.000 ±103.402	585.625 ±97.312
VITAMIN E (mg ATE)	5.524 ±0.513	5.446 ±0.698	5.690 ±0.670	N/A	N/A	N/A
VITAMIN C (mg)	77.652 ±10.418	72.406 ±11.708	88.799 ±21.702	117.852 ±16.663	124.500 ±21.862	102.063 ±22.604
THIAMIN (mg)	1.174 ±0.072	1.156 ±0.093	1.213 ±0.112	0.959 ±0.087	0.989 ±0.120	0.888 ±0.079
RIBOFLAVIN (mg)	1.187 ±0.083	1.166 ±0.117	1.233 ±0.083	1.344 ±0.123	1.321 ±0.164	1.400 ±0.159

Table O-9 (continued)

NIACIN (mg)	15.213 ±0.750	15.339 ±0.952	14.946 ±1.268	13.833 ±1.347	14.084 ±1.655	13.238 ±2.437
FOLACIN (ug)	199.272 ±21.894	190.362 ±26.802	218.207 ±39.641	N/A	N/A	N/A
VITAMIN B12 (ug)	2.262 ±0.196	2.336 ±0.259	2.104 ±0.279	N/A	N/A	N/A
VITAMIN B6 (mg)	1.195 ±0.073	1.164 ±0.096	1.261 ±0.105	N/A	N/A	N/A
PHOSPHORUS (mg)	781.752 ±45.257	778.066 ±64.110	789.584 ±44.367	829.619 ±71.845	813.337 ±86.535	868.288 ±136.636
MAGNESIUM (mg)	181.556 ±13.290	172.069 ±16.325	201.716 ±22.639	N/A	N/A	N/A
IRON (mg)	8.804 ±0.617	8.411 ±0.773	9.639 ±1.019	8.985 ±0.900	9.032 ±1.133	8.875 ±1.523
ZINC (mg)	6.820 ±0.370	6.843 ±0.474	6.770 ±0.610	N/A	N/A	N/A
COPPER (mg)	0.765 ±0.049	0.762 ±0.067	0.773 ±0.066	N/A	N/A	N/A
SODIUM (mg)	2397.561 ±156.300	2497.079 ±211.556	2186.085 ±186.991	1893.385 ±164.589	1915.968 ±200.759	1839.750 ±304.729
POTASSIUM (mg)	1712.836 ±108.235	1658.855 ±140.010	1827.546 ±165.942	1838.293 ±153.784	1896.279 ±193.137	1700.575 ±254.568

Table O-9 (continued)

CALCIUM (mg)	470.426 ±45.021	447.791 ±55.400	518.528 ±79.522	576.122 ±58.461	556.579 ±76.596	622.538 ±81.087
CAFFEINE (mg)	116.082 ±19.548	107.968 ±18.866	133.323 ±47.987	N/A	N/A	N/A
% CALS. PRO.	16.195 ±0.724	16.059 ±1.002	16.485 ±0.848	16.081 ±0.613	15.737 ±0.818	16.900 ±0.697
% CALS. CHO	50.905 ±1.202	49.801 ±1.483	53.251 ±1.906	45.733 ±1.930	44.758 ±2.366	48.050 ±3.378
% CALS. FAT	33.586 ±1.262	34.481 ±1.691	31.683 ±1.553	38.400 ±1.505	39.700 ±1.849	35.313 ±2.365
% CALS. ALCOHOL	0.369 ±0.364	0.539 ±0.535	0.006 ±0.006	0.600 ±0.398	0.621 ±0.525	0.550 ±0.550
% CALS. SFA	11.738 ±0.522	11.882 ±0.631	11.433 ±0.981	N/A	N/A	N/A
% CALS. MFA	13.057 ±0.646	13.456 ±0.888	12.208 ±0.699	N/A	N/A	N/A
% CALS. PFA	6.145 ±0.372	6.461 ±0.447	5.474 ±0.645	N/A	N/A	N/A
P:S RATIO	0.560 ±0.049	0.574 ±0.052	0.531 ±0.112	0.544 ±0.046	0.596 ±0.047	0.421 ±0.100
CSI RATIO[2]	28.664 ±2.365	29.971 ±3.389	25.889 ±1.592	N/A	N/A	N/A

Table O-9 (continued)

[1] N/A = Data not generated by the instrument for this variable
[2] CSI Ratio = (1.01 x g saturated fat) + (0.05 x mg cholesterol)

Table O-10

Pretest t-Test Comparisons of Mean (SEM) Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Age Groups for Each Instrument for Lumbee Control Participants.

	24-HOUR RECALL		3-DAY RECORDS		FOOD FREQUENCY	
	MEAN + SEM	T-VALUE(p)	MEAN + SEM	T-VALUE(p)	MEAN + SEM	T-VALUE(p)
ENERGY	1605.318	0.98 (0.332)	1673.915	1.07 (0.290)	1179.432	2.54 (0.015)
(kcal)	±140.361[1]		± 79.107[3]		± 88.775[5]	
	1400.291		1538.489		919.588	
	±140.958[2]		± 95.857[4]		± 50.727[6]	
PROTEIN (g)	52.380	-0.05 (0.960)	59.692	0.60 (0.552)	46.164	2.23 (0.032)
	± 6.860		± 3.181		± 3.490	
	52.888		56.600		36.550	
	± 6.551		± 4.024		± 2.527	
CARBOHYRATES	218.401	1.76 (0.085)	217.599	1.43 (0.160)	129.548	1.15 (0.257)
(g)	± 18.410		± 11.180		± 10.027	
	172.977		192.195		115.944	
	± 14.262		± 13.276		± 6.231	
FAT (g)	58.960	0.20 (0.842)	63.735	0.25 (0.801)	53.456	3.30 (0.002)
	± 5.755		± 4.409		± 4.533	
	56.903		61.991		35.450	
	± 9.100		± 4.944		± 3.051	
ALCOHOL	0.000	0.00 (1.000)	0.108	-0.52 (0.612)	N/A[7]	
(g)	± 0.000		± 0.105			
	0.008		0.241			
	± 0.008		± 0.236			

Table O-10 (continued)

SATURATED FAT (g)	21.055 ± 2.127 18.422 ± 3.410	0.69 (0.493)	21.581 ± 1.453 19.728 ± 1.757	0.80 (0.429)	19.208 ± 1.814 11.700 ± 0.997	3.53 (0.001)
MONOUNSATUR-ATED FAT (g)	23.605 ± 2.644 22.082 ± 3.871	0.34 (0.738)	25.551 ± 1.884 24.393 ± 1.882	0.41 (0.686)	N/A	
POLYUNSATUR-ATED FAT (g)	9.564 ± 1.034 11.846 ± 1.959	-1.13 (0.267)	11.749 ± 0.987 13.201 ± 1.451	-0.86 (0.398)	N/A	
CHOLESTEROL (mg)	177.255 ± 25.012 201.334 ± 42.075	-0.53 (0.603)	204.587 ± 14.878 209.766 ± 18.184	-0.22 (0.829)	205.328 ± 19.035 122.350 ± 10.625	3.81 (0.001)
ANIMAL PROTEIN (g)	36.872 ± 5.819 36.708 ± 5.746	0.02 (0.985)	42.250 ± 2.948 39.443 ± 3.486	0.60 (0.551)	N/A	
VEGETABLE PROTEIN (g)	15.021 ± 1.592 15.555 ± 1.465	-0.23 (0.819)	17.060 ± 0.830 16.598 ± 1.126	0.33 (0.740)	N/A	
DIETARY FIBER (g)	7.802 ± 0.758 11.372 ± 1.269	-2.58 (0.014)	10.170 ± 0.693 12.406 ± 0.688	-2.14 (0.038)	5.508 ± 0.427 7.044 ± 0.513	-2.28 (0.028)

Table O-10 (continued)

VITAMIN A	2733.747	-1.48 (0.155)	3371.680	-0.99 (0.330)	4394.148	-1.31 (0.198)
(IU)	±1000.469		± 829.969		±521.260	
	6415.979		4752.777		5397.944	
	±2284.052		±1162.814		±503.259	
BETA-	1341.281	-1.41 (0.174)	1616.595	-0.88 (0.383)	1721.092	-1.64 (0.110)
CAROTENE	± 590.733		±505.949		±261.520	
(ug)	3414.045		2348.658		2370.450	
	±1349.106		±659.386		±281.090	
RETINOL	148.624	-1.08 (0.288)	202.068	-1.06 (0.297)	389.080	0.02 (0.985)
(ug)	± 38.633		± 25.557		± 63.334	
	214.704		249.663		387.125	
	± 47.242		± 39.670		± 78.216	
VITAMIN E	5.527	-1.58 (0.128)	6.508	-1.26 (0.215)	N/A	
(mg ATE)	± 0.682		± 0.589			
	8.051		7.798			
	± 1.440		± 0.885			
VITAMIN C	52.107	-1.02 (0.312)	53.489	-1.09 (0.282)	61.892	-1.40 (0.170)
(mg)	± 9.481		± 8.125		± 6.246	
	68.307		67.316		78.019	
	± 13.089		± 9.124		± 10.640	
THIAMIN	1.116	0.17 (0.863)	1.338	0.60 (0.554)	0.740	0.65 (0.521)
(mg)	± 0.109		± 0.082		± 0.057	
	1.088		1.263		0.688	
	± 0.106		± 0.086		± 0.046	
RIBOFLAVIN	1.069	-0.54 (0.592)	1.269	-0.62 (0.537)	1.040	0.56 (0.580)
(mg)	± 0.117		± 0.079		± 0.092	
	1.164		1.351		0.962	
	± 0.123		± 0.108		± 0.097	

Table O-10 (continued)

NIACIN	15.104	-0.33 (0.740)	16.969	-0.22 (0.829)	10.948	1.00 (0.322)
(mg)	± 2.227		± 0.957		± 0.791	
	16.149		17.319		9.950	
	± 1.771		± 1.337		± 0.602	
FOLACIN	126.120	-2.58 (0.014)	168.692	-0.98 (0.335)	N/A	
(ug)	± 16.872		± 16.957			
	207.798		198.365			
	± 29.700		± 27.278			
VITAMIN B12	2.430	-1.50 (0.153)	2.724	0.49 (0.626)	N/A	
(ug)	± 0.386		± 0.248			
	6.804		2.527			
	± 2.885		± 0.311			
VITAMIN B6	0.961	-2.16 (0.037)	1.194	-2.74 (0.009)	N/A	
(mg)	± 0.114		± 0.083			
	1.339		1.561			
	± 0.127		± 0.104			
PHOSPHORUS	801.870	0.60 (0.550)	862.646	0.57 (0.573)	705.880	1.41 (0.165)
(mg)	± 89.886		± 54.294		± 56.369	
	724.985		816.309		592.619	
	± 74.779		± 53.553		± 47.252	
MAGNESIUM	157.128	-1.81 (0.078)	177.764	-1.17 (0.248)	N/A	
(mg)	± 16.065		± 11.356			
	203.431		197.873			
	± 19.748		± 11.416			
IRON (mg)	8.614	-1.88 (0.067)	9.958	0.27 (0.790)	6.940	1.29 (0.206)
	± 0.940		± 0.567		± 0.519	
	11.921		9.691		6.106	
	± 1.638		± 0.880		± 0.388	

Table O-10 (continued)

ZINC (mg)	7.093	-1.35 (0.197)	7.902	0.70 (0.489)	N/A	
	± 0.891		± 0.523			
	13.511		7.309			
	± 4.686		± 0.662			
COPPER (mg)	0.859	-1.43 (0.174)	0.866	0.55 (0.587)	N/A	
	± 0.107		± 0.051			
	1.812		0.825			
	± 0.660		± 0.046			
SODIUM (mg)	2382.959	0.26 (0.794)	2732.052	0.47 (0.638)	1676.512	1.83 (0.074)
	±238.617		±126.044		±153.352	
	2290.019		2640.089		1335.631	
	±236.250		±135.884		±104.888	
POTASSIUM (mg)	1434.558	-2.02 (0.051)	1655.400	-1.89 (0.066)	1468.316	1.01 (0.317)
	±157.082		± 91.726		± 98.445	
	1912.245		1918.149		1325.881	
	±165.482		± 93.497		± 83.952	
CALCIUM (mg)	541.358	1.76 (0.089)	541.248	0.44 (0.663)	459.916	0.79 (0.435)
	± 85.529		± 62.357		± 45.951	
	379.468		509.545		405.263	
	± 34.209		± 36.171		± 48.303	
CAFFEINE (mg)	171.730	0.09 (0.932)	151.610	0.15 (0.878)	N/A	
	± 36.323		± 28.787			
	167.253		144.215			
	± 31.965		± 38.968			
% CALS. PRO.	12.472	-1.58 (0.131)	14.420	-0.45 (0.656)	16.008	0.05 (0.958)
	± 0.631		± 0.515		± 0.579	
	15.183		14.862		15.956	
	± 1.599		± 0.945		± 0.816	

Table O-10 (continued)

% CALS. CHO.	55.461	1.01 (0.319)	52.205	0.91 (0.369)	44.288	-3.04 (0.004)
	± 2.067		± 1.454		± 1.354	
	51.802		50.093		50.819	
	± 3.190		± 1.768		± 1.654	
% CALS. FAT	32.768	-0.55 (0.583)	33.893	-1.08 (0.287)	40.128	3.11 (0.003)
	± 1.593		± 1.279		± 1.146	
	34.294		36.068		34.244	
	± 2.391		± 1.489		± 1.548	
% CALS. ALCOHOL	0.000	0.00 (1.000)	0.038	-0.60 (0.557)	N/A	
	± 0.000		± 0.036			
	0.005		0.100			
	± 0.005		± 0.098			
% CALS. SFA	11.639	0.59 (0.558)	11.530	0.15 (0.885)	N/A	
	± 0.593		± 0.448			
	11.018		11.423			
	± 0.935		± 0.596			
% CALS. MFA	12.936	-0.10 (0.921)	13.569	-0.71 (0.482)	N/A	
	± 0.808		± 0.600			
	13.076		14.227			
	± 1.225		± 0.656			
% CALS. PFA	5.476	-1.93 (0.061)	6.193	-2.09 (0.049)	N/A	
	± 0.503		± 0.307			
	7.359		7.701			
	± 0.937		± 0.651			
P:S RATIO	0.488	-2.09 (0.049)	0.546	-2.12 (0.048)	0.604	-1.51 (0.138)
	± 0.045		± 0.026		± 0.042	
	0.729		0.700		0.720	
	± 0.106		± 0.068		± 0.070	

Table O-10 (continued)

CSI RATIO[8]	30.128 ± 3.226	0.26 (0.796)	32.026 ± 1.952	0.52 (0.604)	N/A
	28.673 + 4.863		30.414 + 2.278		

[1] Top values, N=25 for 24-hour recalls for 21-40 year olds
[2] Bottom values, N=16 for 24-hour recalls for 41-60 year olds
[3] Top values, N=25 for 3-day food records for 21-40 year olds
[4] Bottom values, N=15 for 3-day food records for 41-60 year olds
[5] Top values, N=25 for food frequency questionnaires for 21-40 year olds
[6] Bottom values, N=15 for food frequency questionnaires for 41-60 year olds
[7] N/A = Data not generated by the instrument for this variable
[8] CSI Ratio = (1.01 x g saturated fat) + (0.05 x mg cholesterol)

Table O-11

Pretest t-Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments for Lumbee Control Participants.

	24-HOUR RECALL VS. 3-DAY FOOD RECORD (N=40)		24-HOUR RECALL VS. FOOD FREQUENCY (N=41)		3-DAY FOOD RECORD VS. FOOD FREQUENCY (N=40)	
	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)
ENERGY	-0.78 (0.438)	0.129 (0.429)	4.90 (0.000)[1]	0.463 (0.000)	7.75 (0.000)	0.364 (0.021)
PROTEIN	-1.34 (0.188)	0.139 (0.391)	2.14 (0.038)	0.295 (0.061)	4.87 (0.000)	0.140 (0.389)
CARBO-HYDRATES	-0.44 (0.660)	0.239 (0.138)	7.08 (0.000)	0.546 (0.000)	8.44 (0.000)	0.209 (0.196)
FAT	-0.69 (0.493)	0.019 (0.905)	2.35 (0.024)	0.316 (0.044)	4.37 (0.000)	0.368 (0.019)
ALCOHOL	-1.42 (0.164)	-0.037 (0.820)	N/A[2]	N/A	N/A	N/A
SATURATED FAT	-0.26 (0.795)	0.061 (0.708)	1.99 (0.053)	0.269 (0.089)	3.32 (0.002)	0.362 (0.022)
MONOUNSATUR-ATED FAT	-0.66 (0.515)	-0.022 (0.890)	N/A	N/A	N/A	N/A
POLYUNSAT-URATED FAT	-1.51 (0.140)	0.247 (0.125)	N/A	N/A	N/A	N/A

Table O-11 (continued)

CHOLESTEROL	-0.84 (0.408)	0.147 (0.366)	0.63 (0.531)	0.347 (0.026)	1.98 (0.055)	0.193 (0.234)
ANIMAL PROTEIN	-1.20 (0.238)	0.184 (0.256)	N/A	N/A	N/A	N/A
VEGETABLE PROTEIN	-1.50 (0.141)	0.229 (0.155)	N/A	N/A	N/A	N/A
DIETARY FIBER	-3.29 (0.002)	0.381 (0.015)	4.36 (0.000)	0.282 (0.074)	8.67 (0.000)	0.218 (0.176)
VITAMIN A	0.27 (0.792)	0.240 (0.136)	0.57 (0.573)	0.217 (0.174)	-1.50 (0.142)	0.413 (0.008)
BETA-CAROTENE	0.39 (0.699)	0.215 (0.182)	0.29 (0.774)	0.352 (0.024)	-0.25 (0.807)	0.442 (0.004)
RETINOL	-1.23 (0.225)	0.145 (0.371)	-3.71 (0.001)	-0.019 (0.906)	-3.28 (0.002)	-0.004 (0.979)
VITAMIN E	-0.56 (0.580)	0.261 (0.104)	N/A	N/A	N/A	N/A
VITAMIN C	0.00 (0.999)	0.285 (0.075)	-1.39 (0.172)	0.487 (0.001)	-1.22 (0.231)	0.306 (0.055)
THIAMIN	-2.14 (0.039)	0.145 (0.372)	4.68 (0.000)	0.121 (0.449)	8.47 (0.000)	0.093 (0.568)
RIBOFLAVIN	-1.92 (0.063)	0.133 (0.413)	0.96 (0.341)	0.158 (0.325)	3.24 (0.002)	0.153 (0.345)

Table O-11 (continued)

NIACIN	-1.27 (0.213)	0.152 (0.348)	3.37 (0.002)	0.249 (0.116)	7.65 (0.000)	0.207 (0.200)
FOLACIN	-1.71 (0.094)	0.213 (0.187)	N/A	N/A	N/A	N/A
VITAMIN B12	1.36 (0.182)	0.329 (0.038)	N/A	N/A	N/A	N/A
VITAMIN B6	-2.16 (0.037)	0.088 (0.591)	N/A	N/A	N/A	N/A
PHOSPHORUS	-1.04 (0.304)	0.093 (0.567)	1.62 (0.112)	0.157 (0.326)	3.17 (0.003)	0.008 (0.961
MAGNESIUM	-1.08 (0.286)	0.302 (0.059)	N/A	N/A	N/A	N/A
IRON	0.06 (0.953)	0.282 (0.078)	3.73 (0.001)	0.205 (0.199)	5.71 (0.000)	0.126 (0.440)
ZINC	1.04 (0.306)	0.302 (0.058)	N/A	N/A	N/A	N/A
COPPER	1.39 (0.173)	0.004 (0.979)	N/A	N/A	N/A	N/A
SODIUM	-1.88 (0.068)	0.226 (0.162)	4.68 (0.000)	0.294 (0.062)	8.93 (0.000)	0.180 (0.266)
POTASSIUM	-1.36 (0.183)	0.250 (0.119)	1.48 (0.147)	-0.043 (0.791)	3.37 (0.002)	-0.037 (0.819)

Table O-11 (continued)

CALCIUM	-0.76 (0.452)	0.020 (0.902)	0.60 (0.553)	-0.067 (0.680)	1.62 (0.114)	0.050 (0.758)
CAFFEINE	0.71 (0.482)	0.426 (0.006)	N/A	N/A	N/A	N/A
% CALORIES PROTEIN	-2.10 (0.043)	0.200 (0.215)	-2.82 (0.008)	0.031 (0.847)	-1.99 (0.053)	-0.058 (0.721)
% CALORIES CHOS	1.48 (0.148)	0.308 (0.053)	3.59 (0.001)	0.105 (0.514)	2.86 (0.007)	0.071 (0.661)
% CALORIES FAT	-0.62 (0.537)	0.073 (0.652)	-2.84 (0.007)	0.123 (0.442)	-2.34 (0.025)	0.174 (0.282)
% CALORIES ALCOHOL	-1.38 (0.175)	-0.037 (0.822)	-1.43 (0.161)	-0.039 (0.807)	0.80 (0.429)	0.027 (0.866)
% CALORIES SFA	0.08 (0.940)	0.212 (0.198)	N/A	N/A	N/A	N/A
% CALORIES MFA	-0.80 (0.430)	-0.009 (0.956)	N/A	N/A	N/A	N/A
% CALORIES PFA	-0.97 (0.338)	0.318 (0.046)	N/A	N/A	N/A	N/A
P:S RATIO	-0.48 (0.635)	0.432 (0.005)	-1.06 (0.298)	0.042 (0.793)	-0.81 (0.424)	0.135 (0.406)
CSI RATIO	-0.52 (0.641)	0.076 (0.641)	N/A	N/A	N/A	N/A

Table O-11 (continued)

[1] P values of 0.000 are less than 0.0005
[2] N/A = Data not generated by the instrument for this variable

Table O-12

Pretest t-Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments and Age Groups for Lumbee Control Participants.

	24-HOUR RECALL VS. 3-DAY FOOD RECORD		24-HOUR RECALL VS. FOOD FREQUENCY		3-DAY FOOD RECORD VS. FOOD FREQUENCY	
	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)
ENERGY	-0.46[1] (0.650)	0.167 (0.426)	3.64[3] (0.001)	0.558 (0.004)	4.82[5] (0.000)[7]	0.259 (0.212)
	-0.68[2] (0.505)	-0.024 (0.932)	3.20[4] (0.006)	-0.009 (0.974)	8.60[6] (0.000)	0.695 (0.004)
PROTEIN	-1.00 (0.329)	0.074 (0.725)	1.02 (0.316)	0.468 (0.018)	2.90 (0.008)	0.024 (0.910)
	-0.95 (0.360)	0.292 (0.291)	2.16 (0.369)	-0.241 (0.369)	5.14 (0.000)	0.407 (0.132)
CARBO-HYDRATES	0.04 (0.968)	0.155 (0.460)	6.06 (0.000)	0.608 (0.001)	6.38 (0.000)	0.155 (0.458)
	-1.06 (0.308)	0.308 (0.263)	3.86 (0.002)	0.133 (0.622)	5.87 (0.000)	0.345 (0.208)
FAT	-0.72 (0.476)	0.180 (0.389)	1.09 (0.285)	0.543 (0.005)	1.94 (0.064)	0.301 (0.144)
	-0.25 (0.804)	0.229 (0.412)	2.19 (0.045)	-0.072 (0.791)	7.66 (0.000)	0.720 (0.002)

Table O-12 (continued)

ALCOHOL	-1.03	0.000	N/A[8]	N/A	N/A	N/A
	(0.313)	(1.000)				
	-0.98	-0.073				
	(0.343)	(0.796)				
SATURATED	-0.22	0.170	0.99	0.453	1.30	0.280
FAT	(0.826)	(0.416)	(0.334)	(0.023)	(0.206)	(0.176)
	-0.14	-0.114	1.79	-0.227	6.06	0.671
	(0.887)	(0.685)	(0.094)	(0.398)	(0.000)	(0.006)
MONOUNSAT-	-0.64	0.141	N/A	N/A	N/A	N/A
URATED FAT	(0.526)	(0.502)				
	-0.27	-0.336	N/A	N/A	N/A	N/A
	(0.791)	(0.221)				
POLYUNSAT-	-1.84	0.312	N/A	N/A	N/A	N/A
URATED FAT	(0.078)	(0.129)				
	-0.39	0.143	N/A	N/A	N/A	N/A
	(0.704)	(0.610)				
CHOLESTEROL	-1.00	0.133	-1.45	0.646	-0.03	0.217
	(0.328)	(0.527)	(0.159)	(0.000)	(0.973)	(0.298)
	-0.17	0.166	1.86	0.082	4.92	0.354
	(0.867)	(0.555)	(0.083)	(0.763)	(0.000)	(0.196)

Table O-12 (continued)

ANIMAL PROTEIN	-0.87 (0.391)	0.137 (0.513)	N/A	N/A	N/A	N/A
	-0.86 (0.402)	0.290 (0.295)	N/A	N/A	N/A	N/A
VEGETABLE PROTEIN	-1.20 (0.240)	0.135 (0.521)	N/A	N/A	N/A	N/A
	-0.91 (0.376)	0.449 (0.093)	N/A	N/A	N/A	N/A
DIETARY FIBER	-3.23 (0.004)	0.493 (0.012)	3.04 (0.006)	0.292 (0.157)	6.61 (0.000)	0.277 (0.181)
	-1.42 (0.179)	-0.075 (0.792)	3.20 (0.006)	0.032 (0.905)	5.49 (0.000)	-0.230 (0.410)
VITAMIN A	-0.49 (0.629)	-0.006 (0.977)	-1.48 (0.152)	-0.014 (0.948)	-1.20 (0.244)	0.265 (0.201)
	0.85 (0.412)	0.401 (0.138)	0.48 (0.641)	0.389 (0.137)	-0.88 (0.392)	0.673 (0.006)
BETA-CAROTENE	-0.35 (0.731)	-0.037 (0.861)	-0.62 (0.543)	0.122 (0.562)	-0.21 (0.839)	0.245 (0.238)
	0.90 (0.383)	0.406 (0.133)	0.86 (0.405)	0.545 (0.029)	-0.13 (0.896)	0.770 (0.001)

Table O-12 (continued)

RETINOL	-1.33 (0.196)	0.270 (0.191)	-3.00 (0.006)	-0.184 (0.378)	-3.02 (0.006)	0.257 (0.214)
	-0.39 (0.703)	-0.102 (0.718)	-2.14 (0.049)	0.255 (0.344)	-1.55 (0.142)	-0.398 (0.141)
VITAMIN E	-1.27 (0.217)	0.266 (0.199)	N/A	N/A	N/A	N/A
	0.30 (0.767)	0.181 (0.518)	N/A	N/A	N/A	N/A
VITAMIN C	-0.12 (0.903)	0.202 (0.333)	-1.00 (0.326)	0.285 (0.167)	-1.09 (0.286)	0.451 (0.024)
	0.17 (0.869)	0.373 (0.170)	-0.98 (0.342)	0.670 (0.005)	-0.63 (0.542)	0.060 (0.832)
THIAMIN	-1.75 (0.093)	0.136 (0.517)	3.50 (0.002)	0.287 (0.165)	6.06 (0.000)	0.030 (0.886)
	-1.21 (0.248)	0.168 (0.550)	3.03 (0.008)	-0.408 (0.117)	6.50 (0.000)	0.270 (0.330)
RIBOFLAVIN	-1.46 (0.156)	0.059 (0.778)	0.23 (0.817)	0.326 (0.111)	2.21 (0.037)	0.272 (0.189)
	-1.23 (0.241)	0.249 (0.371)	1.18 (0.256)	-0.195 (0.470)	2.36 (0.033)	-0.063 (0.823)

Table O-12 (continued)

NIACIN	-0.81 (0.425)	0.139 (0.509)	2.00 (0.057)	0.354 (0.083)	5.31 (0.000)	0.169 (0.420)
	-1.22 (0.244)	0.221 (0.429)	3.19 (0.006)	-0.130 (0.632)	5.75 (0.000)	0.352 (0.199)
FOLACIN	-1.90 (0.069)	0.126 (0.549)	N/A	N/A	N/A	N/A
	-0.38 (0.712)	0.238 (0.394)	N/A	N/A	N/A	N/A
VITAMIN B12	-0.65 (0.522)	0.028 (0.894)	N/A	N/A	N/A	N/A
	1.63 (0.125)	0.632 (0.011)	N/A	N/A	N/A	N/A
VITAMIN B6	-1.58 (0.127)	-0.094 (0.655)	N/A	N/A	N/A	N/A
	-1.48 (0.162)	0.058 (0.837)	N/A	N/A	N/A	N/A
PHOSPHORUS	-0.59 (0.563)	0.030 (0.888)	1.03 (0.314)	0.252 (0.225)	1.99 (0.058)	-0.015 (0.942)
	-1.16 (0.267)	0.265 (0.340)	1.35 (0.198)	-0.259 (0.332)	2.92 (0.011)	0.008 (0.977)

Table O-12 (continued)

MAGNESIUM	-1.15 (0.263)	0.172 (0.411)	N/A	N/A	N/A	N/A
	-0.15 (0.880)	0.504 (0.055)	N/A	N/A	N/A	N/A
IRON	-1.44 (0.164)	0.308 (0.134)	1.87 (0.074)	0.359 (0.078)	4.00 (0.001)	0.034 (0.870)
	1.41 (0.180)	0.313 (0.257)	3.60 (0.003)	0.175 (0.517)	4.20 (0.001)	0.344 (0.210)
ZINC	-0.78 (0.445)	-0.018 (0.932)	N/A	N/A	N/A	N/A
	1.43 (0.175)	0.612 (0.015)	N/A	N/A	N/A	N/A
COPPER	-0.07 (0.944)	0.327 (0.111)	N/A	N/A	N/A	N/A
	1.48 (0.162)	-0.090 (0.749)	N/A	N/A	N/A	N/A
SODIUM	-1.49 (0.169)	0.204 (0.328)	2.99 (0.009)	0.335 (0.101)	5.68 (0.000)	0.127 (0.544)
	-1.24 (0.236)	0.277 (0.317)	3.92 (0.001)	0.155 (0.566)	9.16 (0.000)	0.353 (0.197)

Table O-12 (continued)

POTASSIUM	-1.33 (0.195)	0.194 (0.353)	-0.20 (0.846)	0.152 (0.469)	1.44 (0.164)	0.062 (0.769)
	-0.41 (0.687)	0.165 (0.558)	2.75 (0.015)	-0.396 (0.129)	4.25 (0.001)	-0.153 (0.587)
CALCIUM	0.00 (0.999)	-0.053 (0.803)	0.83 (0.417)	-0.039 (0.852)	1.10 (0.282)	0.094 (0.656)
	-3.15 (0.007)	0.171 (0.542)	-0.36 (0.724)	-0.491 (0.054)	1.34 (0.201)	-0.175 (0.534)
CAFFEINE	0.51 (0.617)	0.271 (0.190)	N/A	N/A	N/A	N/A
	0.68 (0.505)	0.805 (0.000)	N/A	N/A	N/A	N/A
% CALORIES PROTEIN	-2.35 (0.027)	-0.030 (0.885)	-4.22 (0.000)	0.043 (0.837)	-2.05 (0.052)	-0.001 (0.997)
	-0.55 (0.593)	0.357 (0.191)	-0.44 (0.669)	0.032 (0.908)	-0.76 (0.457)	-0.116 (0.680)
% CALORIES CHOS	1.50 (0.147)	0.276 (0.182)	5.51 (0.000)	0.356 (0.081)	4.19 (0.000)	0.097 (0.643)
	0.52 (0.609)	0.323 (0.241)	0.27 (0.789)	-0.012 (0.966)	-0.61 (0.550)	0.278 (0.317)

Table O-12 (continued)

% CALORIES FROM FAT	-0.59 (0.561)	0.129 (0.538)	-4.81 (0.000)	0.413 (0.040)	-4.21 (0.000)	0.259 (0.211)
	-0.26 (0.797)	-0.086 (0.759)	-0.02 (0.987)	-0.101 (0.711)	-1.33 (0.203)	0.363 (0.184)
% CALORIES ALCOHOL	-1.05 (0.306)	0.000 (1.000)	-1.59 (0.125)	0.000 (1.000)	-0.06 (0.955)	0.097 (0.646)
	-0.96 (0.352)	-0.073 (0.796)	1.00 (0.333)	0.000 (1.000)	1.02 (0.324)	0.000 (1.000)
% CALORIES SFA	0.16 (0.876)	0.149 (0.478)	N/A	N/A	N/A	N/A
	-0.07 (0.942)	0.299 (0.280)	N/A	N/A	N/A	N/A
% CALORIES MFA	-0.64 (0.527)	0.040 (0.851)	N/A	N/A	N/A	N/A
	-0.46 (0.651)	-0.118 (0.674)	N/A	N/A	N/A	N/A
% CALORIES PFA	-1.43 (0.166)	0.309 (0.132)	N/A	N/A	N/A	N/A
	-0.10 (0.920)	0.171 (0.543)	N/A	N/A	N/A	N/A

Table O-12 (continued)

P:S RATIO	-1.35	0.374	-2.29	0.340	-1.56	0.509
	(0.189)	(0.065)	(0.031)	(0.096)	(0.132)	(0.009)
	0.31	0.332	0.06	-0.295	-0.04	-0.218
	(0.763)	(0.226)	(0.952)	(0.2657	(0.967)	(0.434)
CSI RATIO	-0.56	0.207	N/A	N/A	N/A	N/A
	(0.583)	(0.320)				
	-0.17	-0.128	N/A	N/A	N/A	N/A
	(0.868)	(0.651)				

[1] Top values, 21-40 year olds, N=25 for matched pairs
[2] Bottom values, 41-60 year olds, N=15 for matched pairs
[3] Top values, 21-40 year olds, N=25 for matched pairs
[4] Bottom values, 41-60 year olds, N=16 for matched pairs
[5] Top values, 21-40 year olds, N=25 for matched pairs
[6] Bottom values, 41-60 year olds, N=15 for matched pairs
[7] P values of 0.000 are less than 0.0005
[8] N/A = Data not generated by the instrument for this variable

Table O-13

Pretest t-Test Comparisons of Mean (SEM) Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Age Groups for Each Instrument for Lumbee Intervention Participants.

	3-DAY RECORDS		FOOD FREQUENCY	
	MEAN + SEM	T-VALUE(p)	MEAN + SEM	T-VALUE(p)
ENERGY	1457.638	1.08 (0.291)	1376.984	0.34 (0.739)
(kcal)	±130.180[1]		±136.691[3]	
	1291.356		1287.713	
	± 82.001[2]		±248.877[4]	
PROTEIN (g)	55.025	0.37 (0.718)	53.242	-0.24 (0.811)
	± 3.782		± 5.133	
	52.804		55.963	
	± 3.580		± 12.539	
CARBOHYRATES	180.122	0.33 (0.745)	152.226	0.13 (0.894)
(g)	± 15.707		± 16.309	
	172.049		148.338	
	± 12.131		± 21.785	
FAT (g)	57.838	1.58 (0.128)	61.663	0.69 (0.495)
	± 6.694		± 6.378	
	45.544		52.550	
	± 3.979		± 13.668	
ALCOHOL (g)	1.219	1.00 (0.333)	N/A[5]	
	± 1.211			
	0.011			
	± 0.011			

Table O-13 (continued)

SATURATED	19.858	1.36 (0.189)	22.226	0.21 (0.838)
FAT (g)	± 2.256		± 2.206	
	16.196		20.838	
	± 1.489		± 6.222	
MONOUNSATUR-	22.934	1.57 (0.131)	N/A	
ATED FAT	± 2.883			
(g)	17.635			
	± 1.769			
POLYUNSATUR-	10.684	1.18 (0.251)	N/A	
ATED FAT	± 1.379			
(g)	8.056			
	± 1.377			
CHOLESTEROL	198.255	0.18 (0.855)	209.911	-0.46 (0.647)
(mg)	± 26.882		± 27.871	
	190.573		236.963	
	± 18.895		± 61.713	
ANIMAL	39.514	0.61 (0.549)	N/A	
PROTEIN	± 3.082			
(g)	36.450			
	± 3.267			
VEGETABLE	15.116	-0.34 (0.736)	N/A	
PROTEIN	± 1.678			
(g)	16.023			
	± 1.443			
DIETARY	10.834	-1.14 (0.265)	7.158	-0.67 (0.510)
FIBER	± 1.423		± 0.950	
(g)	13.519		8.413	
	± 1.588		± 1.829	

Table O-13 (continued)

VITAMIN A	2446.397	-2.49 (0.038)	6065.647	-1.06 (0.301)
(IU)	± 451.497		± 959.044	
	7318.714		8199.038	
	±1906.767		±2149.266	
BETA-	1083.689	-2.37 (0.048)	2393.605	0.05 (0.960)
CAROTENE	± 217.806		±421.613	
(ug)	3892.295		2356.875	
	±1166.492		±496.780	
RETINOL	192.578	-0.77 (0.448)	551.000	-0.20 (0.843)
(ug)	± 41.945		±103.402	
	246.016		585.625	
	± 46.734		± 97.312	
VITAMIN E	5.447	-0.22 (0.830)	N/A	
(mg ATE)	± 0.698			
	5.690			
	± 0.670			
VITAMIN C	72.407	-0.73 (0.475)	124.500	0615 (0.549)
(mg)	± 11.708		± 21.862	
	88.799		102.063	
	± 21.702		± 22.604	
THIAMIN	1.156	-0.36 (0.721)	0.990	0.71 (0.483)
(mg)	± 0.093		± 0.120	
	1.213		0.888	
	± 0.112		± 0.079	
RIBOFLAVIN	1.166	-0.37 (0.717)	1.321	-0.29 (0.776)
(mg)	± 0.117		± 0.164	
	1.233		1.400	
	± 0.083		± 0.159	

Table O-13 (continued)

NIACIN	15.339	0.24 (0.813)	14.084	0.28 (0.780)
(mg)	± 0.952		± 1.655	
	14.946		13.238	
	± 1.268		± 2.437	
FOLACIN	190.362	-0.59 (0.564)	N/A	
(ug)	± 26.802			
	218.208			
	± 39.641			
VITAMIN B12	2.336	0.55 (0.591)	N/A	
(ug)	± 0.259			
	2.104			
	± 0.279			
VITAMIN B6	1.164	-0.62 (0.544)	N/A	
(mg)	± 0.096			
	1.261			
	± 0.105			
PHOSPHORUS	778.066	-0.12 (0.908)	813.337	-0.34 (0.734)
(mg)	± 64.110		± 86.535	
	789.584		868.288	
	± 44.367		±136.636	
MAGNESIUM	172.069	-1.04 (0.308)	N/A	
(mg)	± 16.325			
	201.716			
	± 22.639			
IRON (mg)	8.411	-0.92 (0.365)	9.032	0.08 (0.939)
	± 0.773		± 1.133	
	9.639		8.875	
	± 1.019		± 1.523	

Table O-13 (continued)

ZINC (mg)	6.843	-0.09 (0.929)	N/A	
	± 0.474			
	6.770			
	± 0.610			
COPPER (mg)	0.762	-0.10 (0.922)	N/A	
	± 0.067			
	0.773			
	± 0.066			
SODIUM (mg)	2497.079	0.93 (0.364)	1915.968	0.21 (0.837)
	±211.556		±200.759	
	2186.085		1839.750	
	±186.991		±304.729	
POTASSIUM (mg)	1658.855	-0.72 (0.479)	1896.279	0.57 (0.571)
	±140.010		±193.137	
	1827.546		1700.575	
	±165.942		±254.568	
CALCIUM (mg)	447.791	-0.73 (0.475)	556.579	-0.51 (0.616)
	± 55.400		± 76.596	
	518.528		622.538	
	± 79.522		± 81.087	
CAFFEINE (mg)	107.968	-0.60 (0.556)	N/A	
	± 18.866			
	133.323			
	± 47.987			
% CALS. PRO.	16.059	-0.27 (0.790)	15.737	-0.86 (0.397)
	± 1.002		± 0.818	
	16.485		16.900	
	± 0.848		± 0.697	

Table O-13 (continued)

% CALS. CHO.	49.801	-1.36 (0.186)	44.758	-0.77 (0.447)
	± 1.483		± 2.366	
	53.251		48.050	
	± 1.906		± 3.378	
% CALS. FAT	34.481	1.04 (0.311)	39.700	1.35 (0.189)
	± 1.691		± 1.849	
	31.683		35.313	
	± 1.553		± 2.365	
% CALS. ALCOHOL	0.539	1.00 (0.334)	0.621	0.08 (0.937)
	± 0.535		± 0.525	
	0.006		0.550	
	± 0.006		± 0.550	
% CALS. SFA	11.882	0.39 (0.697)	N/A	
	± 0.631			
	11.433			
	± 0.981			
% CALS. MFA	13.456	0.90 (0.378)	N/A	
	± 0.888			
	12.208			
	± 0.699			
% CALS. PFA	6.461	1.26 (0.229)	N/A	
	± 0.447			
	5.474			
	± 0.645			
P:S RATIO	0.574	0.40 (0.693)	0.596	1.81 (0.083)
	± 0.052		± 0.047	
	0.531		0.421	
	± 0.112		± 0.100	

Table O-13 (continued)

CSI RATIO[6]	29.971 ± 3.389	1.09 (0.288)	N/A
	25.889 ± 1.592		

[1] Top values, N=17 for 3-day food records for 21-40 year olds
[2] Bottom values, N=8 for 3-day food records for 41-60 year olds
[3] Top values, N=19 for food frequency questionnaires for 21-40 year olds
[4] Bottom values, N=8 for food frequency questionnaires for 41-60 year olds
[5] N/A = Data not generated by the instrument for this variable
[6] CSI Ratio = (1.01 x g saturated fat) + (0.05 x mg cholesterol)

Table O-14

Pretest t-Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Vitamins and Minerals by Instruments for Lumbee Intervention Participants.

	3-DAY FOOD RECORD VS. FOOD FREQUENCY (N=24)	
	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)
ENERGY	0.57 (0.575)	0.422 (0.040)
PROTEIN	0.15 (0.879)	0.291 (0.168)
CARBOHYDRATES	1.99 (0.059)	0.349 (0.094)
FAT	-0.68 (0.504)	0.440 (0.032)
SATURATED FAT	-1.11 (0.280)	0.376 (0.070)
CHOLESTEROL	-1.06 (0.301)	0.537 (0.007)
DIETARY FIBER	3.96 (0.001)	0.270 (0.201)
VITAMIN A	-1.91 (0.068)	0.126 (0.556)

Table O-14 (continued)

BETA-CAROTENE	-0.38 (0.710)	0.206 (0.334)
RETINOL	-5.14 (0.000)	0.507 (0.012)
VITAMIN C	-2.18 (0.040)	0.243 (0.252)
THIAMIN	2.58 (0.017)	0.238 (0.263)
RIBOFLAVIN	-0.86 (0.399)	0.387 (0.062)
NIACIN	1.22 (0.234)	0.394 (0.057)
PHOSPHORUS	-0.29 (0.775)	0.327 (0.119)
IRON	0.26 (0.799)	0.283 (0.181)
SODIUM	3.13 (0.005)	0.330 (0.115)
POTASSIUM	-0.54 (0.592)	0.203 (0.343)
CALCIUM	-1.30 (0.207)	0.352 (0.091)

Table O-14 (continued)

% CALORIES PROTEIN	0.01 (0.989)	0.423 (0.040)
% CALORIES CHOS	2.07 (0.050)	0.043 (0.842)
% CALORIES FAT	-2.08 (0.049)	-0.068 (0.751)
% CALORIES ALCOHOL	-1.53 (0.139)	0.907 (0.000)[1]
P:S RATIO	0.22 (0.826)	-0.091 (0.672)

[1] P values of 0.000 are less than 0.005

Table O-15

Pretest t-Test Comparisons and Correlations for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Vitamins and Minerals by Instruments and Age Groups for Lumbee Intervention Participants.

	3-DAY FOOD RECORD VS. FOOD FREQUENCY	
	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)
ENERGY	0.66[1]	0.396
	(0.520)	(0.129)
	0.02[2]	0.604
	(0.987)	(0.113)
PROTEIN	0.44	0.132
	(0.669)	(0.627)
	-0.30	0.674
	(0.772)	(0.067)
CARBOHYDRATES	1.60	0.338
	(0.130)	(0.200)
	1.16	0.389
	(0.283)	(0.341)
FAT	-0.37	0.386
	(0.719)	(0.140)
	-0.64	0.752
	(0.544)	(0.032)

Table O-15 (continued)

SATURATED FAT	-0.70 (0.496)	0.408 (0.117)
	-0.83 (0.435)	0.516 (0.190)
CHOLESTEROL	-0.66 (0.520)	0.678 (0.004)
	-0.80 (0.452)	0.329 (0.427)
DIETARY FIBER	3.37 (0.004)	0.415 (0.110)
	2.05 (0.080)	-0.063 (0.883)
VITAMIN A	-3.62 (0.003)	0.647 (0.007)
	-0.26 (0.800)	-0.362 (0.378)
BETA-CAROTENE	-2.96 (0.010)	0.694 (0.003)
	1.20 (0.268)	-0.018 (0.966)

Table O-15 (continued)

RETINOL	-3.55	0.456
	(0.003)	(0.076)
	-4.58	0.677
	(0.003)	(0.065)
VITAMIN C	-2.22	0.284
	(0.042)	(0.287)
	-0.50	0.275
	(0.634)	(0.510)
THIAMIN	1.58	0.215
	(0.136)	(0.423)
	3.10	0.442
	(0.017)	(0.272)
RIBOFLAVIN	-0.41	0.350
	(0.690)	(0.184)
	-1.33	0.624
	(0.224)	(0.098)
NIACIN	0.87	0.233
	(0.397)	(0.385)
	0.99	0.737
	(0.356)	(0.037)

Table O-15 (continued)

PHOSPHORUS	0.07 (0.942)	0.302 (0.256)
	-0.66 (0.533)	0.516 (0.190)
IRON	-0.01 (0.991)	0.296 (0.265)
	0.48 (0.647)	0.260 (0.535)
SODIUM	2.80 (0.014)	0.260 (0.330)
	1.42 (0.198)	0.600 (0.115)
POTASSIUM	-0.93 (0.365)	0.299 (0.261)
	0.41 (0.691)	-0.021 (0.961)
CALCIUM	-0.78 (0.447)	0.289 (0.277)
	-1.28 (0.240)	0.491 (0.216)

Table O-15 (continued)

% CALORIES PROTEIN	0.21 (0.838)	0.430 (0.096)
	-0.45 (0.663)	0.315 (0.447)
% CALORIES CHO	1.40 (0.183)	-0.269 (0.313)
	2.38 (0.049)	0.798 (0.018)
% CALORIES FAT	-1.59 (0.132)	-0.240 (0.370)
	-1.59 (0.156)	0.380 (0.353)
% CALORIES ALCOHOL	-1.76 (0.098)	0.992 (0.000)[3]
	-0.99 (0.357)	-0.143 (0.736)
P:S RATIO	-0.40 (0.698)	0.018 (0.946)
	0.65 (0.539)	-0.287 (0.490)

[1] Top values, 21-40 year olds, N=16 for matched pairs
[2] Bottom values, 41-60 year olds, N=8 for matched pairs
[3] P values of 0.000 are less than 0.0005

Table O-16

Pretest t-Test Comparisons for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Group for Each Instrument for Lumbee Control and Intervention Participants.

	3-DAY FOOD RECORDS	
	CONTROL VS. PILOT NON-CONTROL (N=40) (N=67) T-VALUE (p)	CONTROL VS. INTERVENTION (N=40) (N=25) T-VALUE (p)
ENERGY	1.45 (0.150)	2.05 (0.044)
PROTEIN	0.59 (0.556)	1.10 (0.275)
CARBOHYDRATES	2.34 (0.021)	2.16 (0.035)
FAT	0.44 (0.664)	1.63 (0.108)
ALCOHOL	-0.96 (0.339)	-0.81 (0.424)
SATURATED FAT	0.20 (0.843)	1.15 (0.253)
MONOUNSATURATED FAT	0.23 (0.822)	1.63 (0.108)
POLYUNSATURATED FAT	1.04 (0.303)	1.85 (0.070)
CHOLESTEROL	-0.03 (0.973)	0.52 (0.608)
ANIMAL PROTEIN	0.09 (0.930)	0.79 (0.434)
VEGETABLE PROTEIN	1.93 (0.056)	1.07 (0.291)

Table O-16 (continued)

DIETARY FIBER	1.74 (0.084)	-0.56 (0.580)
VITAMIN A	-0.29 (0.775)	-0.11 (0.914)
BETA-CAROTENE	0.17 (0.869)	-0.15 (0.885)
RETINOL	-1.03 (0.305)	0.27 (0.785)
VITAMIN E	1.63 (0.107)	1.96 (0.055)
VITAMIN C	0.61 (0.541)	-1.68 (0.098)
THIAMIN	1.97 (0.052)	1.43 (0.159)
RIBOFLAVIN	1.24 (0.216)	1.09 (0.281)
NIACIN	1.27 (0.207)	1.65 (0.103)
FOLACIN	0.95 (0.343)	-0.77 (0.446)
VITAMIN B12	-1.28 (0.205)	1.35 (0.183)
VITAMIN B6	1.33 (0.186)	1.29 (0.202)
PHOSPHORUS	1.18 (0.239)	1.04 (0.303)
MAGNESIUM	0.86 (0.391)	0.25 (0.802)
IRON	1.28 (0.204)	1.36 (0.180)
ZINC	-0.28 (0.780)	1.45 (0.152)

Table O-16 (continued)

COPPER	-0.49 (0.624)	1.42 (0.161)
SODIUM	2.16 (0.034)	1.76 (0.083)
POTASSIUM	0.99 (0.325)	0.34 (0.739)
CALCIUM	2.23 (0.028)	0.94 (0.352)
CAFFEINE	0.21 (0.836)	1.09 (0.281)
% CALORIES PROTEIN	-1.42 (0.159)	-1.95 (0.056)
% CALORIES CHOS	1.61 (0.110)	0.30 (0.767)
% CALORIES FAT	-0.96 (0.342)	0.71 (0.482)
% CALORIES ALCOHOL	-1.03 (0.307)	-0.84 (0.409)
% CALORIES SFA	-1.26 (0.211)	-0.41 (0.684)
% CALORIES MFA	-0.93 (0.355)	1.00 (0.322)
% CALORIES PFA	0.20 (0.838)	1.21 (0.231)
P:S RATIO	0.76 (0.448)	0.78 (0.439)
CSI RATIO	0.13 (0.900)	1.04 (0.300)

Table O-16 (continued)

	FOOD FREQUENCY	
	CONTROL VS. PILOT NON-CONTROL (N=41) (N=78) T-VALUE (p)	CONTROL VS. INTERVENTION (N=41) (N=27) T-VALUE (p)
ENERGY	-0.30 (0.768)	-2.04 (0.048)
PROTEIN	-0.86 (0.393)	-2.08 (0.045)
CARBOHYDRATES	0.35 (0.725)	-1.85 (0.072)
FAT	-0.59 (0.557)	-1.84 (0.072)
SFA	-0.71 (0.477)	-2.12 (0.040)
CHOLESTEROL	-1.08 (0.280)	-1.52 (0.137)
DIETARY FIBER	0.26 (0.799)	-1.55 (0.129)
VITAMIN A	-0.63 (0.530)	-1.92 (0.064)
BETA-CAROTENE	0.27 (0.789)	-1.14 (0.260)
RETINOL	-1.50 (0.138)	-2.00 (0.050)
VITAMIN C	-0.43 (0.670)	-2.82 (0.008)
THIAMIN	-0.31 (0.756)	-2.51 (0.016)
RIBOFLAVIN	-0.45 (0.650)	-2.38 (0.022)

Table O-16 (continued)

NIACIN	-0.44 (0.660)	-2.26 (0.030)
POTASSIUM	-0.08 (0.938)	-2.53 (0.016)
PHOSPHORUS	-0.36 (0.716)	-2.05 (0.047)
SODIUM	-0.66 (0.511)	-1.89 (0.063)
IRON	-0.53 (0.598)	-2.45 (0.019)
CALCIUM	0.06 (0.951)	-2.04 (0.048)
% CALORIES PROTEIN	-1.12 (0.267)	-0.12 (0.903)
% CALORIES CHOS	1.61 (0.111)	0.52 (0.603)
% CALORIES FAT	-1.17 (0.243)	-0.32 (0.746)
% CALORIES ALCOHOL	-1.80 (0.075)	-1.44 (0.161)
P:S RATIO	1.49 (0.140)	1.74 (0.086)

Table O-17

Pretest Reported (Mean ± SEM) Weekly Servings of Foods Obtained From the Food Frequency Questionnaire for Lumbee Control and Intervention Participants.

	CONTROL (N=41)	INTERVENTION (N=27)	T-VALUE (p)
FRUIT OR JUICE	5.878 ± 0.659	9.237 ± 1.552	-1.99 (0.054)
CITRUS FRUIT OR JUICE	2.149 ± 0.353	5.811 ± 1.365	-2.60 (0.015)
VEGETABLES	10.566 ± 0.651	12.881 ± 1.710	-1.27 (0.214)
VEGETABLES, EXCLUDING POTATOES/RICE	5.927 ± 0.521	6.937 ± 1.007	-0.89 (0.378)
SALAD	1.580 ± 0.195	1.404 ± 0.289	0.53 (0.600)
CARROTS	0.907 ± 0.182	0.707 ± 0.223	0.69 (0.490)
TOMATOES	0.800 ± 0.150	0.556 ± 0.190	1.01 (0.314)
DEEP YELLOW OR DARK GREEN VEGETABLES	2.537 ± 0.287	3.478 ± 0.575	-1.46 (0.151)
FISH OR CHICKEN	2.507 ± 0.162	2.844 ± 0.463	-0.69 (0.496)
FRIED FISH OR CHICKEN	1.237 ± 0.109	1.530 ± 0.234	-1.14 (0.263)
WHOLE GRAIN OR BRAN CEREAL	2.271 ± 0.474	1.578 ± 0.491	0.98 (0.331)
EGGS	1.124 ± 0.206	1.367 ± 0.322	-0.67 (0.508)

Table O-17 (continued)

ALCOHOL	0.022 ± 0.014	0.515 ± 0.385	-1.28 (0.212)
BEEF	2.178 ± 0.273	3.059 ± 0.511	-1.52 (0.136)
PORK	0.639 ± 0.072	0.763 ± 0.142	-0.78 (0.440)
HOT DOGS OR LUNCHEON MEATS	1.283 ± 0.180	1.456 ± 0.292	-0.53 (0.596)
BUTTER OR MARGARINE	0.895 ± 0.253	2.644 ± 0.730	-2.26 (0.030)
CHEESE, EXCLUDING COTTAGE CHEESE	1.110 ± 0.205	1.996 ± 0.563	-1.48 (0.148)
WHOLE MILK	0.837 ± 0.302	0.796 ± 0.369	0.08 (0.933)
ICE CREAM	1.188 ± 0.275	0.837 ± 0.209	1.02 (0.313)
PASTRIES, SWEETS, SODAS, SUGAR	12.717 ± 1.306	16.078 ± 2.379	-1.24 (0.223)

Table O-18

Pretest Responses (Number and %) to Questions From Nutrition Knowledge Test for Lumbee Control and Intervention Participants[1].

		I STRONGLY AGREE	I AGREE	I DON'T KNOW/NOT SURE	I DISAGREE	I STRONGLY DISAGREE
A.	<u>FATS IN FOODS</u>					
1.	Sherbet has less fat than ice cream	15 (36.6)	16 (39.0)	7 (17.1)	1 (2.4)	2 (4.9)
		·10 (38.5)	9 (34.6)	7 (26.9)	0 (0.0)	0 (0.0)
2.	The fat in chicken is almost all in the skin	14 (34.1)	24 (58.5)	1 (2.4)	2 (4.9)	0 (0.0)
		15 (55.6)	11 (40.7)	0 (0.0)	0 (0.0)	1 (3.7)
3.	When it comes to fat, potato chips and pretzels are about the same	0 (0.0)	2 (4.9)	11 (26.8)	16 (39.0)	12 (29.3)
		1 (3.8)	5 (19.2)	1 (3.8)	13 (50.0)	6 (23.1)
4.	At a fastfood restaurant, a fried fish sandwich has more calories and fat than a hamburger	1 (2.4)	6 (14.6)	14 (34.1)	17 (41.5)	3 (7.3)
		4 (15.4)	0 (0.0)	13 (50.0)	7 (26.9)	2 (7.7)
5.	Margarine has the same amount of fat as butter	2 (4.9)	7 (17.1)	2 (4.9)	27 (65.9)	3 (7.3)
		2 (7.4)	5 (18.5)	6 (22.2)	12 (44.4)	2 (7.4)
6.	Fish has almost as much fat as meat, it's just a different kind of fat	0 (0.0)	4 (10.0)	14 (35.0)	17 (42.5)	5 (12.5)
		1 (4.0)	3 (12.0)	6 (24.0)	13 (52.0)	2 (8.0)
7.	Creamy salad dressings (ranch, 1000 islands, etc.) have more fat than clear Italian dressing	0 (0.0)	21 (51.2)	8 (19.5)	8 (19.5)	4 (9.8)
		2 (7.4)	6 (22.2)	10 (37.0)	7 (25.9)	2 (7.4)
8.	Certain cuts of beef, like flank steak, are as low in fat as chicken	0 (0.0)	9 (22.0)	24 (58.5)	5 (12.2)	3 (7.3)
		1 (3.7)	5 (18.5)	13 (48.1)	8 (29.6)	0 (0.0)
9.	Powdered coffee creamers have a lot less fat than whole milk	1 (2.4)	12 (29.3)	15 (36.6)	11 (26.8)	2 (4.9)
		3 (11.1)	6 (22.2)	9 (33.3)	7 (25.9)	2 (7.4)

Table O-18 (continued)

10.	Many foods that are high in protein are also high in fat	3 (7.3) 1 (3.8)	15 (36.6) 5 (19.2)	12 (29.3) 9 (34.6)	11 (26.8) 8 (30.8)	0 (0.0) 3 (11.5)
B.	<u>FIBER IN FOODS</u>					
11.	Most of the fiber in some fruits and vegetables (like apples, squash, cucumbers) is found in the skin	7 (17.5) 7 (25.9)	23 (57.5) 16 (59.3)	7 (17.5) 1 (3.7)	3 (7.5) 3 (11.1)	0 (0.0) 0 (0.0)
12.	Practically all Americans get enough fiber in their diet	0 (0.0) 0 (0.0)	3 (7.3) 1 (3.7)	1 (2.4) 0 (0.0)	22 (53.7) 15 (55.6)	15 (36.6) 11 (40.7)
13.	Brown rice or wild rice has more dietary fiber than white rice	4 (9.8) 11 (40.7)	23 (56.1) 12 (44.4)	12 (29.3) 4 (14.8)	2 (4.9) 0 (0.0)	0 (0.0) 0 (0.0)
14.	Popcorn and potato chips have about the same amount of fiber in a typical serving	0 (0.0) 0 (0.0)	2 (4.9) 1 (3.7)	12 (29.3) 6 (22.2)	22 (53.7) 16 (59.3)	5 (12.2) 4 (14.8)
15.	Per serving, lettuce has more dietary fiber than grapefruit	0 (0.0) 0 (0.0)	13 (31.7) 7 (25.9)	23 (56.1) 15 (55.6)	5 (12.2) 3 (11.1)	0 (0.0) 2 (7.4)
16.	Beans like kidney beans and lima beans are very good sources of dietary fiber	4 (9.8) 11 (40.7)	19 (46.3) 10 (37.0)	8 (19.5) 5 (18.5)	9 (22.0) 1 (3.7)	1 (2.4) 0 (0.0)
17.	Whole wheat bread has more than twice as much dietary fiber as white ("light") bread	5 (12.2) 11 (40.7)	24 (58.5) 11 (40.7)	9 (22.0) 4 (14.8)	3 (7.3) 1 (3.7)	0 (0.0) 0 (0.0)
18.	Beef like roasts and steaks are a very good source of dietary fiber	0 (0.0) 0 (0.0)	2 (4.9) 2 (7.4)	19 (46.3) 12 (44.4)	19 (46.3) 8 (29.6)	1 (2.4) 5 (18.5)
19.	All types of breakfast cereals are great sources of dietary fiber	1 (2.5) 1 (3.7)	2 (5.0) 1 (3.7)	2 (5.0) 0 (0.0)	27 (67.5) 18 (66.7)	8 (20.0) 7 (25.9)

Table O-18 (continued)

20.	Cooking fruits and vegetables greatly diminishes their fiber content	6 (15.0) 2 (8.4)	19 (47.5) 11 (40.7)	8 (20.0) 9 (33.3)	5 (12.5) 5 (18.5)	2 (5.0) 0 (0.0)
C.	<u>VITAMINS A, C, AND E IN FOODS</u>					
21.	Dark green vegetables like turnips and mustard are very good sources of vitamin A	5 (12.8) 7 (26.9)	20 (51.3) 12 (46.2)	12 (30.8) 6 (23.1)	1 (2.6) 1 (3.8)	1 (2.6) 0 (0.0)
22.	Beta-Carotene, found in foods like carrots, can be used like vitamin A in the body	2 (5.0) 7 (25.9)	15 (37.5) 9 (33.3)	23 (57.5) 11 (40.7)	0 (0.0) 0 (0.0)	0 (0.0) 0 (0.0)
23.	Beef liver is a very good low-fat source of vitamin A	0 (0.0) 3 (11.1)	5 (12.5) 5 (18.5)	26 (65.0) 14 (51.9)	8 (20.0) 3 (11.1)	1 (2.5) 2 (7.4)
24.	Dark green vegetables like mustard and peppers are very good sources of vitamin C	2 (5.1) 7 (25.9)	12 (30.8) 7 (25.9)	15 (38.5) 12 (44.4)	9 (23.1) 1 (3.7)	1 (2.6) 0 (0.0)
25.	Some fruits like cantaloupe and tomatoes are high in both vitamin A and vitamin C	3 (7.5) 3 (11.1)	23 (57.5) 12 (44.4)	13 (32.5) 12 (44.4)	1 (2.5) 0 (0.0)	0 (0.0) 0 (0.0)
26.	The content of vitamin A, C, and E in a food is not at all affected by cooking and processing	0 (0.0) 0 (0.0)	2 (5.0) 1 (3.7)	12 (30.0) 15 (55.6)	19 (47.5) 7 (25.9)	7 (17.5) 4 (14.8)
27.	Palm oil is a healthier source of vitamin E for cooking than corn oil	0 (0.0) 0 (0.0)	4 (9.8) 4 (15.4)	29 (70.7) 15 (57.7)	3 (7.3) 6 (23.1)	5 (12.2) 1 (3.8)
28.	Lean red meats are healthy sources of vitamin C	0 (0.0) 0 (0.0)	1 (2.5) 1 (3.7)	22 (55.0) 13 (48.1)	15 (37.5) 9 (33.3)	2 (5.0) 4 (14.8)
29.	Milk and other dairy products are often fortified with vitamin A	6 (14.6) 2 (7.7)	15 (36.6) 13 (50.0)	12 (29.3) 8 (30.8)	8 (19.5) 3 (11.5)	0 (0.0) 0 (0.0)

Table O-18 (continued)

30.	All cooking oils are good sources of vitamin E	0 (0.0)	1 (2.4)	20 (48.8)	15 (36.6)	5 (12.2)
		0 (0.0)	3 (11.1)	15 (55.6)	7 (25.9)	2 (7.4)

[1] Top values, N=41 for control participants; Bottom values, N=27 for intervention participants

Table O-19

Pretest Responses (Number and %) to Questions From Eating Patterns Questionnaires for Lumbee Control and Intervention Participants[1].

IN THE PAST 3 MONTHS:	USUALLY OR ALWAYS	OFTEN	SOMETIMES	RARELY OR NEVER
1. DID YOU EAT FISH?				
YES 33 (80.5) NO	8 (19.5)			
26 (92.9)	2 (7.1)			
WHEN YOU ATE FISH, HOW OFTEN WAS IT:				
A. BROILED, BAKED OR POACHED?	2 (6.1)	4 (12.1)	10 (30.3)	12 (36.4)
	1 (3.8)	3 (11.5)	7 (26.9)	12 (46.2)
B. FRIED?	16 (48.5)	7 (21.2)	9 (27.3)	1 (3.0)
	13 (50.0)	5 (19.2)	5 (19.2)	2 (7.7)
2. DID YOU EAT CHICKEN?				
YES 41 (100.0) NO	0 (0.0)			
28 (100.0)	0 (0.0)			
WHEN YOU ATE CHICKEN, HOW OFTEN DID YOU:				
A. HAVE IT BROILED OR BAKED?	8 (20.0)	11 (27.5)	17 (42.5)	4 (10.0)
	5 (18.5)	7 (25.9)	12 (44.4)	3 (11.1)
B. HAVE IT FRIED?	6 (15.4)	12 (30.8)	16 (41.0)	5 (12.8)
	10 (38.5)	6 (23.1)	7 (26.9)	3 (11.5)
C. TAKE OFF THE SKIN?	12 (31.6)	2 (5.3)	6 (15.8)	18 (47.4)
	4 (16.0)	4 (16.0)	7 (28.0)	10 (40.0)

Table O-19 (continued)

3.	DID YOU EAT SPAGHETTI OR NOODLES?					
	YES	40 (97.6)	NO	1 (2.4)		
		26 (92.9)		2 (7.1)		
	WHEN YOU ATE SPAGHETTI OR NOODLES,HOW OFTEN DID YOU EAT THEM PLAIN, OR WITH A RED SAUCE OR TOMATO SAUCE WITHOUT MEAT?	9 (22.5) 7 (26.9)		6 (15.0) 2 (7.7)	11 (27.5) 4 (15.4)	14 (35.0) 13 (50.0)
4.	DID YOU EAT RED MEAT (BEEF, PORK, LAMB)?					
	YES	38 (92.7)	NO	3 (7.3)		
		28 (100.0)	NO	0 (0.0)		
	WHEN YOU ATE RED MEAT, HOW OFTEN DID YOU TRIM ALL THE VISIBLE FAT?	18 (47.4) 10 (35.7)		4 (10.5) 3 (10.7)	11 (28.9) 7 (25.0)	5 (13.2) 8 (28.6)
5.	DID YOU EAT GROUND BEEF (HAMBURGER)?					
	YES	36 (87.8)	NO	5 (12.2)		
		27 (96.4)	NO	1 (3.6)		
	WHEN YOU ATE GROUND BEEF, HOW OFTEN DID YOU CHOOSE EXTRA LEAN (LOW FAT) GROUND BEEF?	15 (41.7) 8 (29.6)		8 (22.2) 5 (18.5)	8 (22.2) 9 (33.3)	5 (13.9) 5 (18.5)

Table 0-19 (continued)

6.	DID OFTEN DID YOU HAVE A DINNER OR YOUR MAIN MEAL WITHOUT ANY MEAT, FISH, EGGS, OR CHEESE?	0 (0.0) 0 (0.0)	8 (19.5) 6 (21.4)	17 (41.5) 6 (21.4)	16 (39.0) 16 (57.1)
7.	DID YOU DRINK MILK OR USE MILK ON CEREAL?				
	YES 38 (92.7) NO 3 (7.3) 26 (92.9) NO 2 (7.1)				
	WHEN YOU HAD MILK, HOW OFTEN WAS IT VERY LOW FAT (1%) OR NONFAT, SKIM MILK?	14 (36.8) 5 (19.2)	7 (18.4) 4 (15.4)	6 (15.8) 3 (11.5)	11 (28.9) 14 (53.8)
8.	DID YOU EAT CHEESE (INCLUDING ON SANDWICHES OR IN COOKING)?				
	YES 36 (90.0) NO 4 (10.0) 26 (92.9) 2 (7.1)				
	WHEN YOU ATE CHEESE, HOW OFTEN WAS IT SPECIALLY-MADE, LOW FAT (DIET) CHEESE?	5 (13.9) 1 (3.8)	8 (22.2) 4 (15.4)	11 (30.6) 6 (23.1)	12 (33.3) 15 (57.7)
9.	DID YOU EAT FROZEN DESSERTS (ICE CREAM, SHERBET, ETC.)?				
	YES 36 (90.0) NO 4 (10.0) 26 (92.9) 2 (7.1)				

Table O-19 (continued)

	WHEN YOU ATE FROZEN DESSERTS, HOW OFTEN DID YOU CHOOSE ICE MILK, NONFAT ICE CREAM (SUCH AS SIMPLE PLEASURES), FROZEN YOGURT, OR SHERBET?	6 (16.7) 0 (0.0)	11 (30.6) 6 (23.1)	9 (25.0) 8 (30.8)	10 (27.8) 12 (46.2)
10.	DID YOU EAT COOKED VEGETABLES?				
	YES	39 (97.5) 28 (100.0)	NO	1 (0.0) 0 (0.0)	
	WHEN YOU ATE COOKED VEGETABLES, HOW OFTEN DID YOU ADD BUTTER OR MARGARINE?	10 (25.6) 11 (39.3)	10 (25.6) 7 (25.0)	5 (12.8) 4 (14.3)	13 (33.3) 5 (17.9)
11.	DID YOU EAT POTATOES?				
	YES	40 (100.0) 28 (100.0)	NO	0 (0.0) 0 (0.0)	
	WHEN YOU ATE POTATOES, HOW OFTEN WERE THEY FRIED (FRENCH FRIES, HASH BROWNS, ETC.)?	4 (10.0) 6 (21.4)	9 (22.5) 2 (7.1)	20 (50.0) 12 (42.9)	7 (17.5) 7 (25.0)
12.	DID YOU EAT BOILED OR BAKED POTATOES?				
	YES	40 (100.0) 27 (96.4)	NO	0 (0.0) 1 (3.6)	
	WHEN YOU ATE BOILED OR BAKED POTATOES, HOW OFTEN DID YOU EAT THEM WITHOUT BUTTER, MARGARINE, OR SOUR CREAM?	7 (17.5) 3 (11.1)	3 (7.5) 4 (14.8)	7 (7.5) 3 (11.1)	23 (57.5) 16 (59.3)

Table O-19 (continued)

13. DID YOU EAT GREEN SALADS?

YES	37 (92.5)	NO	3	(7.5)
	28 (100.0)		0	(0.0)

WHEN YOU ATE GREEN SALADS,
HOW OFTEN DID YOU:

A. USE NO DRESSING?	4 (10.8)	0 (0.0)	3 (8.1)	26 (70.3)
	3 (10.7)	2 (7.1)	0 (0.0)	17 (60.7)
B. USE LOW CALORIE,	10 (27.0)	5 (13.5)	14 (37.8)	6 (16.2)
DIET DRESSING?	7 (25.0)	2 (7.1)	11 (39.3)	6 (21.4)

14. DID YOU EAT DESSERT?

YES	39 (97.5)	NO	1	(2.5)
	28 (100.0)		0	(0.0)

WHEN YOU ATE DESSERT, HOW
OFTEN DID YOU:

A. PUT CREAM OR WHIPPED	0 (0.0)	3 (7.7)	7 (17.9)	28 (71.2)
CREAM ON TOP?	0 (0.0)	1 (3.6)	10 (35.7)	16 (57.1)
B. HAVE ONLY FRUIT FOR	3 (7.7)	16 (41.0)	11 (28.2)	8 (20.5)
DESSERT?	1 (3.6)	6 (21.4)	12 (42.9)	7 (25.0)

15. DID YOU EAT SNACKS?

YES	40 (97.6)	NO	1 (2.4)
	28 (100.0)		0 (0.0)

Table O-19 (continued)

WHEN YOU ATE SNACKS, HOW OFTEN DID YOU EAT:				
A. RAW VEGETABLES?	1 (2.5)	5 (12.5)	17 (42.5)	14 (35.0)
	0 (0.0)	3 (10.7)	10 (35.7)	10 (35.7)
B. FRESH FRUITS?	6 (15.0)	16 (40.0)	12 (30.0)	3 (7.5)
	4 (14.3)	9 (32.1)	13 (46.4)	1 (3.6)
16. DID YOU EAT BREAD, ROLLS, OR MUFFINS?				
YES 41 (100.0)	NO 0 (0.0)			
28 (100.0)	0 (0.0)			
WHEN YOU ATE BREAD, ROLLS, OR MUFFINS, HOW OFTEN DID YOU EAT THEM WITHOUT BUTTER OR MARGARINES?	23 (56.1)	12 (29.3)	5 (12.2)	1 (2.4)
	9 (32.1)	5 (17.9)	7 (25.0)	7 (25.0)
17. DID YOU EAT TORTILLAS (PLAIN OR AS PART OF A MIXED DISH)?				
YES 21 (51.2)	NO 20 (48.8)			
12 (42.9)	16 (57.1)			
WHEN YOU ATE TORTILLAS, HOW OFTEN:				
A. WERE THEY CRISPY OR FRIED?	6 (28.6)	4 (19.0)	6 (28.6)	3 (14.3)
	4 (33.3)	3 (25.0)	3 (25.0)	2 (16.7)
B. DID YOU EAT THEM WITHOUT BUTTER OR MARGARINE?	12 (57.1)	0 (0.0)	1 (4.8)	6 (26.6)
	1 (8.3)	2 (16.6)	2 (16.6)	5 (41.7)

Table O-19 (continued)

18. DID YOU SAUTE OR PAN FRY ANY FOODS?				
YES	35 (85.4)	NO	6 (14.6)	
	26 (92.9)		2 (7.1)	
WHEN YOU SAUTED OR PAN FRIED FOODS, HOW OFTEN DID YOU USE PAM OR OTHER NON-STICK SPRAY INSTEAD OF OIL, MARGARINE, OR BUTTER?	7 (20.0) 5 (19.2)	3 (8.6) 2 (7.7)	14 (40.0) 6 (23.1)	11 (31.4) 13 (50.0)
19. DID YOU COOK RED MEAT (BEEF, PORK, LAMB)?				
YES	37 (90.2)	NO	4 (9.8)	
	28 (100.0)		0 (0.0)	
WHEN YOU COOKED RED MEAT, HOW OFTEN DID YOU TRIM ALL THE FAT BEFORE COOKING?	13 (35.1) 11 (39.3)	8 (21.6) 2 (7.1)	9 (24.3) 4 (14.3)	7 (18.9) 11 (39.3)
20. DID YOU COOK CHICKEN?				
YES	40 (97.6)	NO	1 (2.4)	
	27 (96.4)		1 (3.6)	
WHEN YOU COOKED CHICKEN, HOW OFTEN DID YOU REMOVE THE SKIN BEFORE COOKING?	13 (32.5) 4 (14.8)	2 (5.0) 3 (11.1)	5 (12.5) 9 (33.3)	20 (50.0) 11 (40.7)

Table O-19 (continued)

21. DID YOU USE MAYONNAISE?

YES	33 (80.5) 24 (85.7)	NO	8 (19.5) 4 (14.3)		
WHEN YOU USED MAYONNAISE, HOW OFTEN DID YOU USE LOW FAT OR NONFAT MAYONNAISE?			9 (27.3) 3 (12.5)	4 (12.1) 2 (8.3)	8 (24.2) 2 (8.3)	12 (36.4) 17 (70.8)

	Mean composite scores
TOTAL EATING PATTERN SCORE	2.662 ± 0.082 2.865 ± 0.087
EATING PATTERN 1 (AVIOD FAT)	2.554 ± 0.112 2.726 ± 0.146
EATING PATTERN 2 (AVOID MEAT)	2.343 ± 0.084 2.581 ± 0.112
EATING PATTERN 3 (MODIFICATION)	2.963 ± 0.129 3.161 ± 0.131
EATING PATTERN 4 (SUBSTITUTION)	2.600 ± 0.131 3.082 ± 0.116
EATING PATTERN 5 (REPLACEMENT)	2.846 ± 0.112 2.779 ± 0.126

[1] Top values, N=41 for control participants; Bottom values, N=28 for intervention participants.

Table O-20

Posttest Estimated Mean Daily Consumption (± SEM) and t-Test Comparison of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals for Lumbee Control and Intervention Participants.

	CONTROL (N=21)	INTERVENTION (N=21)	T-VALUES (p)
ENERGY (kcal)	1355.110 ± 82.431	1312.143 ± 70.160	0.40 (0.694)
PROTEIN (g)	55.981 ± 4.333	52.864 ± 3.861	0.54 (0.594)
CARBOHYDRATES (g)	174.655 ± 9.802	165.851 ± 9.132	0.66 (0.515)
FAT (g)	49.318 ± 4.821	50.379 ± 4.143	-0.17 (0.868)
ALCOHOL (g)	0.013 ± 0.007	0.017 ± 0.006	-0.41 (0.687)
SATURATED FAT (g)	16.068 ± 1.541	16.508 ± 1.300	-0.22 (0.828)
MONOUNSATURATED FAT (g)	19.397 ± 2.124	19.905 ± 1.927	-0.18 (0.860)
POLYUNSATURATED FAT (g)	10.089 ± 1.084	10.060 ± 0.994	0.02 (0.984)
CHOLESTEROL (mg)	171.634 ± 23.850	194.266 ± 19.907	-0.73 (0.471)

Table O-20 (continued)

ANIMAL PROTEIN (g)	40.441 ± 3.957	37.131 ± 3.157	0.65 (0.517)
VEGETABLE PROTEIN (g)	15.162 ± 0.839	15.365 ± 1.097	-0.15 (0.884)
DIETARY FIBER (g)	10.550 ± 1.005	11.302 ± 1.371	-0.44 (0.661)
TOTAL VITAMIN A (IU)	4650.558 ±1376.838	4140.561 ±865.224	0.31 (0.755)
BETA-CAROTENE (ug)	1693.692 ±621.949	1997.580 ±499.207	-0.38 (0.705)
RETINOL (ug)	547.146 ±173.037	241.829 ± 43.890	1.71 (0.101)
VITAMIN E (mg ATE)	7.985 ± 1.663	5.720 ± 0.660	1.27 (0.213)
VITAMIN C (mg)	62.516 ± 10.255	80.384 ± 10.188	-1.24 (0.224)
THIAMIN (mg)	1.301 ± 0.123	1.232 ± 0.103	0.43 (0.672)
RIBOFLAVIN (mg)	1.360 ± 0.161	1.184 ± 0.093	0.95 (0.351)
NIACIN (mg)	18.446 ± 1.468	15.498 ± 1.080	1.62 (0.114)

Table O-20 (continued)

FOLACIN (ug)	225.323 ± 36.655	203.349 ± 23.191	0.51 (0.616)
VITAMIN B12 (ug)	4.428 ± 0.859	2.924 ± 0.607	1.43 (0.161)
VITAMIN B6 (mg)	1.431 ± 0.150	1.217 ± 0.102	1.18 (0.246)
PHOSPHORUS (mg)	822.892 ± 59.672	779.222 ± 61.132	0.51 (0.612)
MAGNESIUM (mg)	183.904 ± 11.188	183.252 ± 19.188	0.03 (0.997)
IRON (mg)	11.770 ± 1.579	9.505 ± 0.805	1.28 (0.211)
ZINC (mg)	8.162 ± 1.060	9.457 ± 2.529	-0.47 (0.641)
COPPER (mg)	0.890 ± 0.074	0.882 ± 0.135	0.05 (0.961)
SODIUM (mg)	2252.812 ±138.604	2402.887 ±197.205	-0.62 (0.805)
POTASSIUM (mg)	1657.770 ±123.955	1703.595 ±136.154	-0.25 (0.805)
CALCIUM (mg)	506.059 ± 53.289	408.703 ± 34.283	1.54 (0.132)

Table O-20 (continued)

CAFFEINE (mg)	123.118 ± 29.796	99.431 ± 21.517	0.64 (0.523)
% CALS. PRO.	16.714 ± 0.982	16.060 ± 0.809	0.51 (0.610)
% CALS. CHO	52.435 ± 1.865	51.254 ± 1.762	0.46 (0.648)
% CALS. FAT	31.796 ± 1.726	33.876 ± 1.562	-0.89 (0.377)
% CALS. ALCOHOL	0.006 ± 0.003	0.009 ± 0.003	-0.72 (0.473)
% CALS. SFA	10.346 ± 0.623	11.200 ± 0.535	-1.04 (0.305)
% CALS. MFA	12.413 ± 0.825	13.248 ± 0.776	-0.74 (0.465)
% CALS. PFA	6.579 ± 0.426	6.762 ± 0.462	-0.29 (0.773)
P:S RATIO	0.668 ± 0.050	0.620 ± 0.046	0.72 (0.477)
CSI RATIO[1]	24.809 ± 2.394	26.388 ± 1.892	-0.52 (0.608)

[1] CSI Ratio = (1.01 x g saturated fat) + (0.05 x mg cholesterol)

Table O-21

t-Test Comparisons and Correlations (Pretest vs. Posttest) for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals for Lumbee Control and Intervention Participants.

	CONTROLS (N=21)		INTERVENTION (N=20)	
	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)
ENERGY	3.57 (0.002)	0.494 (0.023)	1.88 (0.076)	0.249 (0.290)
PROTEIN	1.32 (0.203)	0.480 (0.028)	0.83 (0.418)	0.261 (0.266)
CARBOHYDRATES	2.95 (0.008)	0.500 (0.021)	2.02 (0.058)	0.161 (0.498)
FAT	2.99 (0.007)	0.218 (0.342)	1.29 (0.212)	0.273 (0.244)
ALCOHOL	0.94 (0.360)	0.117 (0.613)	1.00 (0.331)	0.208 (0.380)
SATURATED FAT	3.10 (0.006)	0.307 (0.175)	1.85 (0.080)	0.280 (0.232)
MONOUNSATURATED FAT	2.78 (0.012)	0.193 (0.401)	1.14 (0.270)	0.229 (0.332)
POLYUNSATURATED FAT	2.41 (0.026)	0.073 (0.754)	0.43 (0.674)	0.403 (0.078)
CHOLESTEROL	1.76 (0.094)	0.093 (0.689)	0.54 (0.597)	0.072 (0.762)

Table O-21 (continued)

ANIMAL PROTEIN	0.69	0.265	0.65	0.262
	(0.500)	(0.246)	(0.524)	(0.264)
VEGETABLE PROTEIN	2.09	0.336	0.91	0.466
	(0.050)	(0.137)	(0.375)	(0.038)
DIETARY FIBER	0.66	0.177	1.02	0.477
	(0.519)	(0.444)	(0.322)	(0.034)
VITAMIN A	-0.07	0.404	0.17	0.100
	(0.947)	(0.070)	(0.863)	(0.676)
BETA-CAROTENE	0.72	0.354	0.17	0.124
	(0.480)	(0.115)	(0.867)	(0.604)
RETINOL	-1.61	0.190	0.14	0.586
	(0.123)	(0.408)	(0.893)	(0.007)
VITAMIN E	0.30	0.280	0.49	0.371
	(0.771)	(0.219)	(0.627)	(0.107)
VITAMIN C	0.53	0.226	-0.20	0.634
	(0.599)	(0.325)	(0.845)	(0.003)
THIAMIN	0.95	0.111	0.07	0.556
	(0.355)	(0.633)	(0.944)	(0.011)
RIBOFLAVIN	0.35	0.128	1.07	0.340
	(0.733)	(0.580)	(0.296)	(0.142)
NIACIN	-0.13	0.398	0.35	0.451
	(0.899)	(0.074)	(0.729)	(0.046)

Table O-21 (continued)

FOLACIN	-0.45	-0.017	0.67	0.632
	(0.658)	(0.941)	(0.511)	(0.003)
VITAMIN B12	-1.76	0.182	-0.89	0.192
	(0.093)	(0.430)	(0.387)	(0.417)
VITAMIN B6	-0.08	0.316	0.99	0.552
	(0.936)	(0.162)	(0.332)	(0.012)
PHOSPHORUS	1.72	0.479	0.95	0.367
	(0.100)	(0.028)	(0.354)	(0.112)
MAGNESIUM	1.13	0.275	0.70	0.420
	(0.273)	(0.227)	(0.495)	(0.066)
IRON	-0.65	0.260	-0.19	0.376
	(0.525)	(0.254)	(0.851)	(0.102)
ZINC	-0.20	0.335	-0.91	0.020
	(0.846)	(0.138)	(0.375)	(0.933)
COPPER	-0.19	0.209	-0.53	0.239
	(0.848)	(0.364)	(0.605)	(0.311)
SODIUM	3.30	0.349	0.95	0.501
	(0.004)	(0.121)	(0.353)	(0.025)
POTASSIUM	1.53	0.400	0.98	0.572
	(0.143)	(0.072)	(0.340)	(0.008)
CALCIUM	1.61	0.337	2.13	0.429
	(0.124)	(0.136)	(0.047)	(0.059)

Table O-21 (continued)

CAFFEINE	1.36 (0.190)	0.739 (0.000)	1.09 (0.289)	0.575 (0.008)
% CALORIES PROTEIN	-1.94 (0.066)	0.201 (0.382)	-0.82 (0.424)	0.696 (0.001)
% CALORIES CHOS	-0.99 (0.332)	-0.038 (0.871)	0.27 (0.787)	0.203 (0.391)
% CALORIES FAT	1.86 (0.077)	-0.051 (0.827)	-0.24 (0.815)	0.192 (0.417)
% CALORIES ALCOHOL	0.93 (0.361)	0.066 (0.777)	1.00 (0.332)	0.179 (0.449)
% CALORIES SFA	1.64 (0.116)	-0.031 (0.895)	0.58 (0.568)	0.141 (0.552)
% CALORIES MFA	1.79 (0.088)	0.055 (0.813)	-0.12 (0.903)	0.180 (0.448)
% CALORIES PUFA	1.30 (0.208)	0.028 (0.905)	-1.62 (0.123)	0.501 (0.025)
P:S RATIO	-0.22 (0.829)	0.259 (0.258)	-0.87 (0.394)	0.356 (0.124)
CSI RATIO	3.07 (0.006)	0.306 (0.177)	1.43 (0.169)	0.142 (0.551)

Table O-22

Posttest Responses (Number and %) to Questions from Nutrition Knowledge Test for Lumbee Control and Intervention Participants[1].

		I STRONGLY AGREE	I AGREE	I DON'T KNOW/NOT SURE	I DISAGREE	I STRONGLY DISAGREE
A.	FATS IN FOODS					
1.	Sherbet has less fat than ice cream	8 (40.0)	9 (45.0)	2 (10.0)	0 (0.0)	1 (0.0)
		13 (65.0)	7 (35.0)	0 (0.0)	0 (0.0)	0 (0.0)
2.	The fat in chicken is almost all in the skin	4 (20.0)	14 (70.0)	0 (0.0)	2 (10.0)	0 (0.0)
		13 (65.0)	4 (20.0)	2 (10.0)	1 (5.0)	0 (0.0)
3.	When it comes to fat, potato chips and pretzels are about the same	0 (0.0)	2 (10.0)	2 (10.0)	11 (55.0)	5 (25.0)
		1 (5.0)	2 (10.0)	0 (0.0)	10 (50.0)	7 (35.0)
4.	At a fastfood restaurant, a fried fish sandwich has more calories and fat than a hamburger	0 (0.0)	5 (25.0)	8 (40.0)	7 (35.0)	0 (0.0)
		3 (15.0)	3 (15.0)	8 (40.0)	6 (30.0)	0 (0.0)
5.	Margarine has the same amount of fat as butter	0 (0.0)	1 (5.0)	3 (15.0)	15 (75.0)	1 (5.0)
		3 (15.0)	5 (25.0)	3 (15.0)	8 (40.0)	1 (5.0)
6.	Fish has almost as much fat as meat, it's just a different kind of fat	0 (0.0)	2 (10.0)	2 (10.0)	14 (70.0)	2 (10.0)
		1 (5.0)	7 (35.0)	5 (25.0)	7 (35.0)	0 (0.0)
7.	Creamy salad dressings (ranch, 1000 islands, etc.) have more fat than clear Italian dressing	0 (0.0)	9 (45.0)	4 (20.0)	6 (30.0)	1 (5.0)
		1 (5.0)	10 (50.0)	4 (20.0)	5 (25.0)	0 (0.0)
8.	Certain cuts of beef, like flank steak, are as low in fat as chicken	0 (0.0)	8 (40.0)	7 (35.0)	5 (25.0)	0 (0.0)
		2 (10.0)	7 (35.0)	7 (35.0)	4 (20.0)	0 (0.0)

Table O-22 (continued)

9.	Powdered coffee creamers have a lot less fat than	1 (5.0)	3 (15.0)	8 (40.0)	8 (40.0)	0 (0.0)
	whole milk	3 (15.0)	2 (10.0)	4 (20.0)	11 (55.0)	0 (0.0)
10.	Many foods that are high in	0 (0.0)	9 (45.0)	5 (25.0)	6 (30.0)	0 (0.0)
	protein are also high in fat	1 (5.0)	8 (40.0)	4 (20.0)	7 (35.0)	0 (0.0)
B.	<u>FIBER IN FOODS</u>					
11.	Most of the fiber in some	2 (10.0)	17 (85.0)	0 (0.0)	1 (5.0)	0 (0.0)
	fruits and vegetables (like apples, squash, cucumbers) is found in the skin	8 (40.0)	10 (50.0)	1 (5.0)	1 (5.0)	0 (0.0)
12.	Practically all Americans	0 (0.0)	2 (10.0)	0 (0.0)	9 (45.0)	9 (45.0)
	get enough fiber in their diet	1 (5.0)	1 (5.0)	0 (0.0)	12 (60.0)	6 (30.0)
13.	Brown rice or wild rice has	3 (15.0)	12 (60.0)	4 (20.0)	1 (5.0)	0 (0.0)
	more dietary fiber than white rice	7 (35.0)	10 (50.0)	3 (15.0)	0 (0.0)	0 (0.0)
14.	Popcorn and potato chips have	0 (0.0)	1 (5.0)	5 (25.0)	13 (65.0)	1 (5.0)
	about the same amount of fiber in a typical serving	1 (5.0)	1 (5.0)	4 (20.0)	10 (50.0)	4 (20.0)
15.	Per serving, lettuce has more	0 (0.0)	4 (20.7)	11 (55.0)	5 (25.0)	0 (0.0)
	dietary fiber than grapefruit	2 (10.0)	6 (30.0)	7 (35.0)	5 (25.0)	0 (0.0)
16.	Beans like kidney beans and	1 (5.0)	17 (85.0)	2 (10.0)	0 (0.0)	0 (0.0)
	lima beans are very good sources of dietary fiber	9 (45.0)	9 (45.0)	2 (10.0)	0 (0.0)	0 (0.0)
17.	Whole wheat bread has more	2 (10.0)	13 (65.0)	5 (25.0)	0 (0.0)	0 (0.0)
	than twice as much dietary fiber as white ("light") bread	7 (35.0)	7 (35.0)	5 (25.0)	1 (5.0)	0 (0.0)
18.	Beef like roasts and steaks	0 (0.0)	2 (10.5)	8 (42.1)	9 (47.4)	0 (0.0)
	are a very good source of dietary fiber	0 (0.0)	2 (10.0)	4 (20.0)	10 (50.0)	4 (0.0)

Table O-22 (continued)

19.	All types of breakfast cereals are great sources of dietary fiber	0 (0.0)	2 (10.0)	0 (0.0)	13 (65.0)	5 (25.0)
		0 (0.0)	0 (0.0)	3 (15.0)	12 (60.0)	5 (25.0)
20.	Cooking fruits and vegetables greatly diminishes their fiber content	1 (5.3)	12 (63.2)	2 (10.5)	4 (21.1)	0 (0.0)
		2 (10.0)	10 (50.0)	2 (10.0)	5 (25.0)	1 (5.0)
C.	VITAMINS A, C, AND E IN FOODS					
21.	Dark green vegetables like turnips and mustard are very good sources of vitamin A	0 (0.0)	12 (63.2)	6 (31.6)	1 (5.3)	0 (0.0)
		5 (25.0)	12 (60.0)	2 (10.0)	1 (5.0)	0 (0.0)
22.	Beta-Carotene, found in foods like carrots, can be used like vitamin A in the body	1 (5.0)	11 (55.0)	7 (35.0)	1 (5.0)	0 (0.0)
		4 (20.0)	11 (55.0)	5 (25.0)	0 (0.0)	0 (0.0)
23.	Beef liver is a very good low-fat source of vitamin A	0 (0.0)	2 (10.5)	14 (73.7)	3 (15.8)	0 (0.0)
		0 (0.0)	2 (10.0)	6 (30.0)	11 (55.0)	1 (5.0)
24.	Dark green vegetables like mustard and peppers are very good sources of vitamin C	0 (0.0)	7 (36.8)	8 (42.1)	3 (15.8)	1 (5.3)
		3 (15.0)	10 (50.0)	6 (30.0)	1 (5.0)	0 (0.0)
25.	Some fruits like cantaloupe and tomatoes are high in both vitamin A and vitamin C	1 (5.0)	13 (65.0)	5 (25.0)	1 (5.0)	0 (0.0)
		4 (20.0)	11 (55.0)	5 (25.0)	0 (0.0)	0 (0.0)
26.	The content of vitamin A, C, and E in a food is not at all affected by cooking and processing	0 (0.0)	0 (0.0)	7 (35.0)	12 (60.0)	1 (5.0)
		0 (0.0)	1 (5.0)	4 (20.0)	14 (70.0)	1 (5.0)
27.	Palm oil is a healthier source of vitamin E for cooking than corn oil	0 (0.0)	4 (21.1)	10 (52.6)	3 (15.8)	2 (10.5)
		1 (5.0)	1 (5.0)	11 (55.0)	6 (30.0)	1 (5.0)
28.	Lean red meats are healthy sources of vitamin C	0 (0.0)	3 (15.8)	7 (36.8)	9 (47.4)	0 (0.0)
		0 (0.0)	5 (26.3)	6 (31.6)	8 (42.1)	0 (0.0)

Table O-22 (continued)

29.	Milk and other dairy products are often fortified with vitamin A	0 (0.0)	13 (65.0)	5 (25.0)	2 (10.0)	0 (0.0)
		4 (20.0)	11 (55.0)	3 (15.0)	2 (10.0)	0 (0.0)
30.	All cooking oils are good sources of vitamin E	0 (0.0)	2 (10.0)	10 (50.0)	8 (40.0)	0 (0.0)
		0 (0.0)	1 (5.0)	12 (60.0)	7 (35.0)	0 (0.0)

[1] Top values, N=20 for control participants; Bottom values, N=20 for intervention participants.

Table O-23

Pretest and Posttest Responses (Number and %) to Questions from Nutrition Knowledge Test for Lumbee Control and Intervention Participants[1].

	I STRONGLY AGREE	I AGREE	I DON'T KNOW/NOT SURE	I DISAGREE	I STRONGLY DISAGREE
A. <u>FATS IN FOODS</u>					
1. Sherbet has less fat than ice cream	15 (36.6)	16 (39.0)	7 (17.1)	1 (2.4)	2 (4.9)
	8 (40.0)	9 (45.0)	2 (10.0)	0 (0.0)	1 (0.0)
	10 (38.5)	9 (34.6)	7 (26.9)	0 (0.0)	0 (0.0)
	13 (65.0)	7 (35.0)	0 (0.0)	0 (0.0)	0 (0.0)
2. The fat in chicken is almost all in the skin	14 (34.1)	24 (58.5)	1 (2.4)	2 (4.9)	0 (0.0)
	4 (20.0)	14 (70.0)	0 (0.0)	2 (10.0)	0 (0.0)
	15 (55.6)	11 (40.7)	0 (0.0)	0 (0.0)	0 (0.0)
	13 (65.0)	4 (20.0)	2 (10.0)	1 (5.0)	0 (0.0)
3. When it comes to fat, potato chips and pretzels are about the same	0 (0.0)	2 (4.9)	11 (26.8)	16 (39.0)	12 (29.3)
	0 (0.0)	2 (10.0)	2 (10.0)	11 (55.0)	5 (25.0)
	1 (3.8)	5 (19.2)	1 (3.8)	13 (50.0)	6 (23.1)
	1 (5.0)	2 (10.0)	0 (0.0)	10 (50.0)	7 (35.0)
4. At a fastfood restaurant, a fried fish sandwich has more calories and fat than a hamburger	1 (2.4)	6 (14.6)	14 (34.1)	17 (41.5)	3 (7.3)
	0 (0.0)	5 (25.0)	8 (40.0)	7 (35.0)	0 (0.0)
	4 (15.4)	0 (0.0)	13 (50.0)	7 (26.9)	2 (7.7)
	3 (15.0)	3 (15.0)	8 (40.0)	6 (30.0)	0 (0.0)
5. Margarine has the same amount of fat as butter	2 (4.9)	7 (17.1)	2 (4.9)	27 (65.9)	3 (7.3)
	0 (0.0)	1 (5.0)	3 (15.0)	15 (75.0)	1 (5.0)
	2 (7.4)	5 (18.5)	6 (22.2)	12 (44.4)	2 (7.4)
	3 (15.0)	5 (25.0)	3 (15.0)	8 (40.0)	1 (5.0)

Table O-23 (continued)

6.	Fish has almost as	0 (0.0)	4 (10.0)	14 (35.0)	17 (42.5)	5 (12.5)
	much fat as meat, it's	0 (0.0)	2 (10.0)	2 (10.0)	14 (70.0)	2 (10.0)
	just a different kind					
	of fat	1 (4.0)	3 (12.0)	6 (24.0)	13 (52.0)	2 (8.0)
		1 (5.0)	7 (35.0)	5 (25.0)	7 (35.0)	0 (0.0)
7.	Creamy salad dressings	0 (0.0)	21 (51.2)	8 (19.5)	8 (19.5)	4 (9.8)
	(ranch, 1000 islands,	0 (0.0)	9 (45.0)	4 (20.0)	6 (30.0)	1 (5.0)
	etc.) have more fat					
	than clear Italian	2 (7.4)	6 (22.2)	10 (37.0)	7 (25.9)	2 (7.4)
	dressing	1 (5.0)	10 (50.0)	4 (20.0)	5 (25.0)	0 (0.0)
8.	Certain cuts of beef,	0 (0.0)	9 (22.0)	24 (58.5)	5 (12.2)	3 (7.3)
	like flank steak, are	0 (0.0)	8 (40.0)	7 (35.0)	5 (25.0)	0 (0.0)
	as low in fat as chicken					
		1 (3.7)	5 (18.5)	13 (48.1)	8 (29.6)	0 (0.0)
		2 (10.0)	7 (35.0)	7 (35.0)	4 (20.0)	0 (0.0)
9.	Powdered coffee	1 (2.4)	12 (29.3)	15 (36.6)	11 (26.8)	2 (4.9)
	creamers have a lot	1 (5.0)	3 (15.0)	8 (40.0)	8 (40.0)	0 (0.0)
	less fat than whole					
	milk	3 (11.1)	6 (22.2)	9 (33.3)	7 (25.9)	2 (7.4)
		3 (15.0)	2 (10.0)	4 (20.0)	11 (55.0)	0 (0.0)
10.	Many foods that are	3 (7.3)	15 (36.6)	12 (29.3)	11 (26.8)	0 (0.0)
	high in protein are	0 (0.0)	9 (45.0)	5 (25.0)	6 (30.0)	0 (0.0)
	also high in fat					
		1 (3.8)	5 (19.2)	9 (34.6)	8 (30.8)	3 (11.5)
		1 (5.0)	8 (40.0)	4 (20.0)	7 (35.0)	0 (0.0)
B.	<u>FIBER IN FOODS</u>					
11.	Most of the fiber in	7 (17.5)	23 (57.5)	7 (17.5)	3 (7.5)	0 (0.0)
	some fruits and	2 (10.0)	17 (85.0)	0 (0.0)	1 (5.0)	0 (0.0)
	vegetables (like apples,					
	squash, cucumbers) is	7 (25.9)	16 (59.3)	1 (3.7)	3 (11.1)	0 (0.0)
	found in the skin	8 (40.0)	10 (50.0)	1 (5.0)	1 (5.0)	0 (0.0)

Table O-23 (continued)

12.	Practically all Americans get enough fiber in their diet	0 (0.0)	3 (7.3)	1 (2.4)	22 (53.7)	15 (36.6)
		0 (0.0)	2 (10.0)	0 (0.0)	9 (45.0)	9 (45.0)
		0 (0.0)	1 (3.7)	0 (0.0)	15 (55.6)	11 (40.7)
		1 (5.0)	1 (5.0)	0 (0.0)	12 (60.0)	6 (30.0)
13.	Brown rice or wild rice has more dietary fiber than white rice	4 (9.8)	23 (56.1)	12 (29.3)	2 (4.9)	0 (0.0)
		3 (15.0)	12 (60.0)	4 (20.0)	1 (5.0)	0 (0.0)
		11 (40.7)	12 (44.4)	4 (14.8)	0 (0.0)	0 (0.0)
		7 (35.0)	10 (50.0)	3 (15.0)	0 (0.0)	0 (0.0)
14.	Popcorn and potato chips have about the same amount of fiber in a typical serving	0 (0.0)	2 (4.9)	12 (29.3)	22 (53.7)	5 (12.2)
		0 (0.0)	1 (5.0)	5 (25.0)	13 (65.0)	1 (5.0)
		0 (0.0)	1 (3.7)	6 (22.2)	16 (59.3)	4 (14.8)
		1 (5.0)	1 (5.0)	4 (20.0)	10 (50.0)	4 (20.0)
15.	Per serving, lettuce has more dietary fiber than grapefruit	0 (0.0)	13 (31.7)	23 (56.1)	5 (12.2)	0 (0.0)
		0 (0.0)	4 (20.7)	11 (55.0)	5 (25.0)	0 (0.0)
		0 (0.0)	7 (25.9)	15 (55.6)	3 (11.1)	2 (7.4)
		2 (10.0)	6 (30.0)	7 (35.0)	5 (25.0)	0 (0.0)
16.	Beans like kidney beans and lima beans are very good sources of dietary fiber	4 (9.8)	19 (46.3)	8 (19.5)	9 (22.0)	1 (2.4)
		1 (5.0)	17 (85.0)	2 (10.0)	0 (0.0)	0 (0.0)
		11 (40.7)	10 (37.0)	5 (18.5)	1 (3.7)	0 (0.0)
		9 (45.0)	9 (45.0)	2 (10.0)	0 (0.0)	0 (0.0)
17.	Whole wheat bread has more than twice as much dietary fiber as white ("light") bread	5 (12.2)	24 (58.5)	9 (22.0)	3 (7.3)	0 (0.0)
		2 (10.0)	13 (65.0)	5 (25.0)	0 (0.0)	0 (0.0)
		11 (40.7)	11 (40.7)	4 (14.8)	1 (3.7)	0 (0.0)
		7 (35.0)	7 (35.0)	5 (25.0)	1 (5.0)	0 (0.0)
18.	Beef like roasts and steaks are a very good source of dietary fiber	0 (0.0)	2 (4.9)	19 (46.3)	19 (46.3)	1 (2.4)
		0 (0.0)	2 (10.5)	8 (42.1)	9 (47.4)	0 (0.0)
		0 (0.0)	2 (7.4)	12 (44.4)	8 (29.6)	5 (18.5)
		0 (0.0)	2 (10.0)	4 (20.0)	10 (50.0)	4 (20.0)

Table O-23 (continued)

19.	All types of breakfast cereals are great sources of dietary fiber	1 (2.5)	2 (5.0)	2 (5.0)	27 (67.5)	8 (20.0)
		0 (0.0)	2 (10.0)	0 (0.0)	13 (65.0)	5 (25.0)
		1 (3.7)	1 (3.7)	0 (0.0)	18 (66.7)	7 (25.9)
		0 (0.0)	0 (0.0)	3 (15.0)	12 (60.0)	5 (25.0)
20.	Cooking fruits and vegetables greatly diminishes its fiber content	6 (15.0)	19 (47.5)	8 (20.0)	5 (12.5)	2 (5.0)
		1 (5.3)	12 (63.2)	2 (10.5)	4 (21.1)	0 (0.0)
		2 (8.4)	11 (40.7)	9 (33.3)	5 (18.5)	0 (0.0)
		2 (10.0)	10 (50.0)	2 (10.0)	5 (25.0)	1 (5.0)
C.	<u>VITAMINS A, C, AND E IN FOODS</u>					
21.	Dark green vegetables vegetables like turnips and mustard are very good sources of vitamin A	5 (12.8)	20 (51.3)	12 (30.8)	1 (2.6)	1 (2.6)
		0 (0.0)	12 (63.2)	6 (31.6)	1 (5.3)	0 (0.0)
		7 (26.9)	12 (46.2)	6 (23.1)	1 (3.8)	0 (0.0)
		5 (25.0)	12 (60.0)	2 (10.0)	1 (5.0)	0 (0.0)
22.	Beta-Carotene, found in foods like carrots, can be used like vitamin A in the body	2 (5.0)	15 (37.5)	23 (57.5)	0 (0.0)	0 (0.0)
		1 (5.0)	11 (55.0)	7 (35.0)	1 (5.0)	0 (0.0)
		7 (25.9)	9 (33.3)	11 (40.7)	0 (0.0)	0 (0.0)
		4 (20.0)	11 (55.0)	5 (25.0)	0 (0.0)	0 (0.0)
23.	Beef liver is a very good low-fat source of vitamin A	0 (0.0)	5 (12.5)	26 (65.0)	8 (20.0)	1 (2.5)
		0 (0.0)	2 (10.5)	14 (73.7)	3 (15.8)	0 (0.0)
		3 (11.1)	5 (18.5)	14 (51.9)	3 (11.1)	2 (7.4)
		0 (0.0)	2 (10.0)	6 (30.0)	11 (55.0)	1 (5.0)
24.	Dark green vegetables like mustard and pepper are good sources of vitamin A	2 (5.1)	12 (30.8)	15 (38.5)	9 (23.1)	1 (2.6)
		0 (0.0)	7 (36.8)	8 (42.1)	3 (15.8)	1 (5.3)
		7 (25.9)	7 (25.9)	12 (44.4)	1 (3.7)	0 (0.0)
		3 (15.0)	10 (50.0)	6 (30.0)	1 (5.0)	0 (0.0)

Table O-23 (continued)

25.	Some fruits like	3 (7.5)	23 (57.5)	13 (32.5)	1 (2.5)	0 (0.0)
	cantaloupe and	1 (5.0)	13 (65.0)	5 (25.0)	1 (5.0)	0 (0.0)
	tomatoes are high in					
	both vitamin A	3 (11.1)	12 (44.4)	12 (44.4)	0 (0.0)	0 (0.0)
	and vitamin C	4 (20.0)	11 (55.0)	5 (25.0)	0 (0.0)	0 (0.0)
26.	The content of	0 (0.0)	2 (5.0)	12 (30.0)	19 (47.5)	7 (17.5)
	vitamin A, C and E	0 (0.0)	0 (0.0)	7 (35.0)	12 (60.0)	1 (5.0)
	is not at all affected					
	by cooking and	0 (0.0)	1 (3.7)	15 (55.6)	7 (25.9)	4 (14.8)
	processing	0 (0.0)	1 (5.0)	4 (20.0)	14 (70.0)	1 (5.0)
27.	Palm oil is a	0 (0.0)	4 (9.8)	29 (70.7)	3 (7.3)	5 (12.2)
	healthier source of	0 (0.0)	4 (21.1)	10 (52.6)	3 (15.8)	2 (10.5)
	vitamin E for cooking					
	than corn oil	0 (0.0)	4 (15.4)	15 (57.7)	6 (23.1)	1 (3.8)
		1 (5.0)	1 (5.0)	11 (55.0)	6 (30.0)	1 (5.0)
28.	Lean red meats are	0 (0.0)	1 (2.5)	22 (55.0)	15 (37.5)	2 (5.0)
	sources of vitamin C	0 (0.0)	3 (15.8)	7 (36.8)	9 (47.4)	0 (0.0)
		0 (0.0)	1 (3.7)	13 (48.1)	9 (33.3)	4 (14.8)
		0 (0.0)	5 (26.8)	6 (31.6)	8 (42.1)	0 (0.0)
29.	Milk and other dairy	6 (14.6)	15 (36.6)	12 (29.3)	8 (19.5)	0 (0.0)
	products are often	0 (0.0)	13 (65.0)	5 (25.0)	2 (10.0)	0 (0.0)
	fortified with					
	vitamin A	2 (7.7)	13 (50.0)	8 (30.8)	3 (11.5)	0 (0.0)
		4 (20.0)	11 (55.0)	3 (15.0)	2 (10.0)	0 (0.0)
30.	All cooking oils	0 (0.0)	1 (2.4)	20 (48.8)	15 (36.6)	5 (12.2)
	are good sources	0 (0.0)	2 (10.0)	10 (50.0)	8 (40.0)	0 (0.0)
	of vitamin E					
		0 (0.0)	3 (11.1)	15 (55.6)	7 (25.9)	2 (7.4)
		0 (0.0)	1 (5.0)	12 (60.0)	7 (35.0)	0 (0.0)

[1] Top values, N=41 for pretest control participants and N=20 for post-test control participants. Bottom values, N=27 for pretest intervention participants and N=20 for post-test intervention participants.

Table O-24

Post-posttest Estimated Mean (± SEM) Daily Consumption and t-Test Comparison by Group for Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals for Each Instrument for Lumbee Control and Intervention Participants.

	3-DAY FOOD RECORDS			FOOD FREQUENCY		
	CONTROL (N=19)	INTERVENTION (n=20)	T-VALUES (p)	CONTROL (N=18)	INTERVENTION (N=15)	T-VALUES (p)
ENERGY (kcal)	1343.013 ± 74.013	1323.568 ±102.582	0.15 (0.880)	1253.339 ±155.115	1212.400 ±168.077	0.18 (0.859)
PROTEIN (g)	52.940 ± 3.760	51.082 ± 4.591	0.31 (0.757)	56.394 ± 10.758	54.613 ± 7.921	0.13 (0.898)
CARBOHYDRATES (g)	177.750 ± 11.441	169.591 ± 13.049	0.47 (0.642)	145.189 ± 13.303	135.833 ± 20.376	0.40 (0.695)
FAT (g)	47.779 ± 3.979	50.287 ± 4.953	-0.39 (0.697)	50.450 ± 7.309	50.080 ± 7.006	0.04 (0.971)
ALCOHOL (g)	0.017 ± 0.011	0.009 ± 0.005	0.66 (0.516)	N/A[1]	N/A	N/A
SATURATED FAT (g)	16.029 ± 1.394	17.123 ± 1.839	-0.47 (0.641)	18.383 ± 3.126	18.340 ± 2.712	0.01 (0.992)
MONOUNSATURATED FAT (g)	18.855 ± 1.861	19.946 ± 2.068	-0.39 (0.698)	N/A	N/A	N/A
POLYUNSATURATED FAT (g)	9.043 ± 0.799	9.465 ± 1.035	-0.32 (0.751)	N/A	N/A	N/A
CHOLESTEROL (mg)	167.048 ± 15.474	156.165 ± 18.061	0.46 (0.651)	186.144 ± 32.482	242.053 ± 57.123	-0.89 (0.382)
ANIMAL PROTEIN (g)	38.137 ± 3.408	34.424 ± 3.919	0.71 (0.481)	N/A	N/A	N/A
VEGETABLE PROTEIN (g)	14.417 ± 1.014	16.204 ± 1.212	-1.12 (0.268)	N/A	N/A	N/A

Table O-24 (continued)

DIETARY FIBER (g)	10.442 ± 0.944	11.586 ± 1.102	-0.78 (0.438)	7.528 ± 0.778	7.887 ± 1.322	-0.24 (0.809)
TOTAL VITAMIN A (IU)	4378.161 ± 901.217	3881.355 ±793.894	0.41 (0.681)	6860.417 ±1270.977	9927.407 ±3838.578	-0.76 (0.459)
BETA-CAROTENE (ug)	1773.265 ±475.577	1650.676 ±344.441	0.21 (0.835)	2383.450 ±536.387	3139.193 ±943.211	-0.73 (0.473)
RETINOL (ug)	425.652 ±152.784	337.908 ±145.916	0.42 (0.680)	743.833 ±139.522	1224.333 ±640.484	-0.73 (0.475)
VITAMIN E (mg ATE)	5.951 ± 0.764	5.152 ± 0.573	0.84 (0.405)	N/A	N/A	N/A
VITAMIN C (mg)	73.070 ± 12.077	69.275 ± 11.046	0.23 (0.818)	88.600 ± 11.237	110.940 ± 17.690	-1.10 (0.279)
THIAMIN (mg)	1.229 ± 0.071	1.148 ± 0.123	0.57 (0.575)	0.939 ± 0.102	0.947 ± 0.164	-0.04 (0.967)
RIBOFLAVIN (mg)	1.181 ± 0.085	1.134 ± 0.134	0.30 (0.766)	1.500 ± 0.241	1.720 ± 0.424	-0.47 (0.641)
NIACIN (mg)	16.427 ± 1.178	15.085 ± 1.356	0.74 (0.462)	14.261 ± 2.005	13.653 ± 2.914	0.18 (0.861)
FOLACIN (ug)	184.255 ± 15.941	192.204 ± 20.599	-0.30 (0.764)	N/A	N/A	N/A
VITAMIN B12 (ug)	3.937 ± 0.762	3.446 ± 1.004	0.39 (0.701)	N/A	N/A	N/A
VITAMIN B6 (mg)	1.375 ± 0.085	1.139 ± 0.113	1.65 (0.106)	N/A	N/A	N/A
PHOSPHORUS (mg)	745.994 ± 52.469	745.361 ± 76.465	0.01 (0.995)	890.217 ±159.663	924.260 ±143.363	-0.16 (0.877)
MAGNESIUM (mg)	175.611 ± 10.136	177.809 ± 14.172	-0.12 (0.901)	N/A	N/A	N/A

Table O-24 (continued)

IRON (mg)	10.848 ± 1.171	9.148 ± 0.836	1.19 (0.241)	9.122 ± 1.236	9.067 ± 1.814	0.03 (0.979)
ZINC (mg)	11.561 ± 3.010	7.068 ± 0.587	1.47 (0.159)	N/A	N/A	N/A
COPPER (mg)	0.998 ± 0.143	0.825 ± 0.090	1.03 (0.307)	N/A	N/A	N/A
SODIUM (mg)	2316.541 ±134.406	2350.068 ±218.154	-0.13 (0.897)	1876.167 ±260.857	1909.873 ±287.123	-0.09 (0.931)
POTASSIUM (mg)	1789.779 ±112.048	1649.860 ±124.039	0.83 (0.409)	1876.800 ±270.236	1910.633 ±274.627	-0.09 (0.931)
CALCIUM (mg)	427.822 ± 32.923	434.234 ± 65.775	-0.09 (0.931)	637.100 ±134.298	667.673 ±102.008	-0.18 (0.862)
CAFFEINE (mg)	134.451 ± 30.577	94.431 ± 24.992	1.03 (0.311)	N/A	N/A	N/A
% CALS. PRO.	15.801 ± 0.711	15.453 ± 0.643	0.36 (0.719)	16.878 ± 0.879	17.933 ± 0.634	-0.94 (0.355)
% CALS. CHO	53.091 ± 2.219	51.826 ± 1.637	0.46 (0.647)	48.400 ± 1.752	45.140 ± 1.899	1.26 (0.217)
% CALS. FAT	31.943 ± 2.143	33.706 ± 1.753	-0.64 (0.526)	35.350 ± 1.253	37.053 ± 1.944	-0.76 (0.453)
% CALS. ALCOHOL	0.008 ± 0.006	0.005 ± 0.003	0.55 (0.589)	N/A	N/A	N/A
% CALS. SFA	10.603 ± 0.641	11.200 ± 0.535	-0.77 (0.448)	N/A	N/A	N/A
% CALS. MFA	12.547 ± 1.071	13.416 ± 0.857	-0.64 (0.528)	N/A	N/A	N/A
% CALS. PFA	6.226 ± 0.558	6.341 ± 0.439	-0.16 (0.872)	N/A	N/A	N/A

Table O-24 (continued)

P:S RATIO	0.598 ± 0.045	0.602 ± 0.059	-0.05 (0.956)	0.603 (0.046)	0.538 (0.046)	0.99 (0.328)
CSI RATIO[2]	24.542 ± 2.072	25.100 ± 2.631	-0.17 (0.869)	N/A	N/A	N/A

[1] N/A = Data not generated by the instrument for this variable
[2] CSI Ratio = (1.01 x g saturated fat) + (0.05 x mg cholesterol)

Table O-25

t-Test Comparisons and Correlations Between Pretest and Post-posttest Times for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals by Instruments for Lumbee Control and Intervention Participants.

	3-DAY FOOD RECORD			
	CONTROLS (N=19)		INTERVENTION (N=19)	
	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)
ENERGY	3.51 (0.003)	0.438 (0.061)	0.53 (0.600)	-0.089 (0.717)
PROTEIN	2.01 (0.059)	0.493 (0.032)	0.35 (0.730)	-0.168 (0.491)
CARBOHYDRATES	2.97 (0.008)	0.617 (0.005)	0.54 (0.595)	0.012 (0.962)
FAT	2.89 (0.010)	-0.145 (0.553)	0.43 (0.670)	0.009 (0.972)
ALCOHOL	1.38 (0.186)	-0.41 (0.868)	1.00 (0.330)	-0.102) (0.677)
SATURATED FAT	3.22 (0.005)	0.101 (0.681)	0.53 (0.605)	0.094 (0.703)
MONOUNSATURATED FAT	2.65 (0.016)	-0.259 (0.284)	0.31 (0.763)	0.036 (0.885)

Table O-25 (continued)

POLYUNSATURATED FAT	2.37	-0.137	0.36	-0.023
	(0.029)	(0.576)	(0.723)	(0.924)
CHOLESTEROL	2.37	0.261	0.87	-0.420
	(0.029)	(0.280)	(0.394)	(0.074)
ANIMAL PROTEIN	1.59	0.433	0.58	-0.212
	(0.130)	(0.064)	(0.569)	(0.383)
VEGETABLE PROTEIN	2.13	0.541	-0.60	0.274
	(0.047)	(0.017)	(0.556)	(0.256)
DIETARY FIBER	0.36	0.539	0.27	0.589
	(0.727)	(0.017)	(0.792)	(0.008)
VITAMIN A	-0.34	-0.019	0.47	-0.151
	(0.740)	(0.939)	(0.646)	(0.536)
BETA-CAROTENE	0.14	-0.001	0.87	-0.159
	(0.888)	(0.998)	(0.398)	(0.517)
RETINOL	-1.28	0.379	-0.92	0.562
	(0.217)	(0.110)	(0.371)	(0.012)
VITAMIN E	2.86	0.530	0.50	-0.045
	(0.010)	(0.020)	(0.622)	(0.854)
VITAMIN C	-0.45	0.354	0.40	0.158
	(0.660)	(0.137)	(0.692)	(0.519)
THIAMIN	1.57	0.298	0.13	0.132
	(0.135)	(0.216)	(0.900)	(0.589)

Table O-25 (continued)

RIBOFLAVIN	2.19 (0.042)	0.524 (0.021)	0.35 (0.732)	-0.014 (0.954)
NIACIN	0.95 (0.356)	0.364 (0.125)	-0.09 (0.930)	0.068 (0.782)
FOLACIN	-0.11 (0.912)	0.120 (0.626)	0.73 (0.477)	0.557 (0.013)
VITAMIN B12	-1.18 (0.252)	0.355 (0.136)	-1.27 (0.221)	0.203 (0.405)
VITAMIN B6	0.57 (0.578)	0.196 (0.422)	0.45 (0.661)	0.235 (0.333)
PHOSPHORUS	2.32 (0.032)	0.463 (0.046)	0.37 (0.719)	0.097 (0.692)
MAGNESIUM	1.23 (0.236)	0.583 (0.009)	0.36 (0.721)	0.318 (0.185)
IRON	-0.29 (0.774)	0.298 (0.215)	-0.43 (0.669)	0.367 (0.123)
ZINC	-1.07 (0.300)	0.300 (0.212)	-0.56 (0.580)	0.159 (0.516)
COPPER	-0.79 (0.440)	0.115 (0.641)	-0.71 (0.490)	0.201 (0.409)
SODIUM	3.35 (0.004)	0.501 (0.029)	0.05 (0.963)	-0.091 (0.711)

Table O-25 (continued)

POTASSIUM	-0.19 (0.852)	0.634 (0.004)	0.43 (0.670)	0.354 (0.137)
CALCIUM	2.53 (0.021)	0.367 (0.122)	0.56 (0.581)	0.014 (0.956)
CAFFEINE	-0.45 (0.658)	0.749 (0.000)	0.80 (0.434)	0.118 (0.630)
% CALORIES PROTEIN	-1.42 (0.173)	-0.153 (0.532)	0.48 (0.637)	0.685 (0.001)
% CALORIES CHOS	-1.23 (0.234)	-0.119 (0.628)	-0.14 (0.893)	0.367 (0.122)
% CALORIES FAT	1.58 (0.130)	-0.089 (0.719)	-0.22 (0.832)	0.388 (0.101)
% CALORIES ALCOHOL	1.33 (0.200)	-0.033 (0.893)	1.00 (0.330)	-0.096 (0.696)
% CALORIES SFA	1.98 (0.063)	-0.003 (0.992)	0.28 (0.786)	0.424 (0.070)
% CALORIES MFA	1.52 (0.145)	0.000 (0.999)	-0.60 (0.554)	0.338 (0.156)
% CALORIES PUFA	0.70 (0.491)	-0.016 (0.947)	-0.07 (0.941)	0.320 (0.182)
P:S RATIO	-0.76 (0.457)	0.177 (0.467)	-0.08 (0.936)	0.221 (0.362)

Table O-25 (continued)

CSI RATIO	3.26 (0.004)	0.173 (0.479)	0.68 (0.503)	-0.191 (0.434)

FOOD FREQUENCY QUESTIONNAIRE

	CONTROLS (N=18)		INTERVENTION (N=15)	
	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)
ENERGY	-2.21 (0.041)	0.571 (0.013)	1.20 (0.250)	0.300 (0.278)
PROTEIN	-2.17 (0.045)	0.667 (0.002)	0.40 (0.692)	0.194 (0.488)
CARBOHYDRATES	-2.32 (0.033)	0.457 (0.057)	1.10 (0.290)	0.281 (0.310)
FAT	-1.71 (0.105)	0.563 (0.015)	1.55 (0.144)	0.392 (0.148)
SATURATED FAT	-2.10 (0.051)	0.672 (0.002)	1.42 (0.178)	0.386 (0.155)
CHOLESTEROL	-1.12 (0.276)	0.339 (0.169)	-0.15 (0.883)	0.199 (0.478)
DIETARY FIBER	-2.39 (0.028)	0.404 (0.096)	0.30 (0.768)	0.439 (0.101)
VITAMIN A	-2.09 (0.052)	0.373 (0.127)	-0.48 (0.642)	-0.066 (0.814)

Table O-25 (continued)

BETA-CAROTENE	-1.16 (0.264)	0.367 (0.134)	-0.39 (0.705)	-01144 (0.686)
RETINOL	-2.78 (0.013)	0.300 (0.226)	-1.01 (0.331)	0.388 (0.153)
VITAMIN C	-1.77 (0.094)	0.338 (0.170)	0.52 (0.608)	0.384 (0.158)
THIAMIN	-2.81 (0.012)	0.358 (0.145)	0.24 (0.811)	0.312 (0.258)
RIBOFLAVIN	-3.00 (0.008)	0.664 (0.003)	-0.62 (0.544)	0.220 (0.431)
NIACIN	-2.51 (0.022)	0.370 (0.131)	0.39 (0.704)	0.100 (0.724)
PHOSPHORUS	-2.51 (0.023)	0.783 (0.000)[1]	-0.19 (0.856)	0.206 (0.461)
IRON	-2.71 (0.015)	0.371 (0.130)	0.37 (0.718)	0.125 (0.658)
SODIUM	-2.27 (0.037)	0.442 (0.066)	0.37 (0.715)	0.273 (0.325)
POTASSIUM	-2.72 (0.014)	0.706 (0.001)	0.13 (0.897)	0.324 (0.239)
CALCIUM	-2.54 (0.021)	0.821 (0.000)	-0.46 (0.652)	0.368 (0.178)

Table O-25 (continued)

% CALORIES PROTEIN	-1.15 (0.268)	0.263 (0.292)	-2.10 (0.055)	0.267 (0.336)
% CALORIES CHOS	0.32 (0.756)	0.566 (0.014)	0.10 (0.925)	0.233 (0.404)
% CALORIES FAT	0.57 (0.576)	0.325 (0,188)	0.91 (0.376)	0.536 (0.039)
% CALORIES ALCOHOL	0.19 (0.854)	0.219 (0.382)	1.04 (0.315)	1.000 (0.000)
P:S RATIO	1.59 (0.129)	0.572 (0.013)	0.52 (0.609)	0.459 (0.085)

[1] P values of 0.000 are less than 0.0005

Table O-26

t-Test Comparisons and Correlations Between Posttest and Post-posttest 3-Day Food Records for Mean Estimated Daily Consumption of Energy, Macronutrients, Cholesterol, Dietary Fiber, Alcohol, Caffeine, Vitamins and Minerals for Lumbee Control and Intervention Participants.

	CONTROLS (N=14)		INTERVENTION (N=18)	
	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)
ENERGY	0.11 (0.917)	0.493 (0.073)	-0.13 (0.899)	0.528 (0.024)
PROTEIN	0.36 (0.726)	0.663 (0.010)	0.30 (0.767)	0.354 (0.149)
CARBOHYDRATES	-0.04 (0.972)	0.651 (0.012)	-0.69 (0.500)	0.450 (0.061)
FAT	0.19 (0.855)	0.280 (0.333)	0.33 (0.749)	0.456 (0.057)
ALCOHOL	0.56 (0.583)	0.640 (0.014)	1.13 (0.273)	0.017 (0.947)
SATURATED FAT	0.15 (0.882)	0.350 (0.219)	-0.25 (0.805)	0.360 (0.143)
MONOUNSATURATED FAT	0.14 (0.888)	0.207 (0.478)	0.42 (0.682)	0.494 (0.037)
POLYUNSATURATED FAT	0.44 (0.666)	0.372 (0.191)	0.97 (0.347)	0.432 (0.073)
CHOLESTEROL	-0.63 (0.542)	0.470 (0.090)	1.97 (0.065)	0.230 (0.358)

Table O-26 (continued)

ANIMAL PROTEIN	0.22 (0.831)	0.659 (0.010)	0.79 (0.438)	0.287 (0.248)
VEGETABLE PROTEIN	0.57 (0.580)	0.491 (0.074)	-1.44 (0.168)	0.292 (0.240)
DIETARY FIBER	0.17 (0.870)	0.560 (0.037)	-1.76 (0.096)	0.389 (0.111)
VITAMIN A	0.12 (0.904)	0.255 (0.380)	0.22 (0.830)	-0.157 (0.534)
BETA-CAROTENE	-0.13 (0.898)	0.498 (0.070)	0.57 (0.575)	-0.247 (0.324)
RETINOL	0.35 (0.731)	-0.056 (0.849)	-0.81 (0.431)	0.331 (0.180)
VITAMIN E	1.15 (0.270)	0.180 (0.537)	1.45 (0.164)	0.608 (0.007)
VITAMIN C	-0.55 (0.595)	0.526 (0.053)	0.08 (0.936)	0.296 (0.233)
THIAMIN	1.21 (0.248)	-0.077 (0.795)	0.00 (1.000)	0.479 (0.044)
RIBOFLAVIN	1.15 (0.273)	0.014 (0.961)	-0.07 (0.942)	-0.528 (0.024)
NIACIN	1.08 (0.298)	0.124 (0.672)	0.04 (0.965)	0.530 (0.024)

Table O-26 (continued)

FOLACIN	1.29	0.088	-0.46	0.594
	(0.220)	(0.764)	(0.649)	(0.010)
VITAMIN B12	0.03	0.137	-0.34	0.213
	(0.975)	(0.641)	(0.736)	(0.396)
VITAMIN B6	0.86	0.125	0.23	0.444
	(0.405)	(0.671)	(0.822)	(0.065)
PHOSPHORUS	1.74	0.751	-0.07	0.417
	(0.106)	(0.002)	(0.945)	(0.085)
MAGNESIUM	1.19	0.668	-1.09	0.497
	(0.257)	(0.009)	(0.289)	(0.036)
IRON	0.77	0.517	0.14	0.541
	(0.457)	(0.059)	(0.887)	(0.020)
ZINC	-0.94	0.100	0.80	-0.058
	(0.365)	(0.733)	(0.434)	(0.818)
COPPER	-0.82	0.390	0.06	0.048
	(0.429)	(0.168)	(0.949)	(0.851)
SODIUM	-0.17	0.402	-0.34	0.217
	(0.866)	(0.155)	(0.736)	(0.386)
POTASSIUM	-0.50	0.720	-0.45	0.516
	(0.628)	(0.004)	(0.656)	(0.028)
CALCIUM	2.20	0.660	-0.52	0.117
	(0.047)	(0.010)	(0.611)	(0.643)

Table O-26 (continued)

CAFFEINE	0.69 (0.503)	0.921 (0.000)[1]	-0.01 (0.992)	0.338 (0.171)
% CALORIES PROTEIN	0.26 (0.802)	0.734 (0.003)	0.77 (0.452)	0.526 (0.025)
% CALORIES CHOS	-0.03 (0.975)	0.237 (0.415)	-0.68 (0.504)	0.141 (0.577)
% CALORIES FAT	0.10 (0.922)	0.373 (0.189)	0.42 (0.680)	0.408 (0.093)
% CALORIES ALCOHOL	0.33 (0.793)	0.300 (0.290)	1.11 (0.284)	0.173 (0.493)
% CALORIES SFA	0.20 (0.846)	0.438 (0.117)	-0.14 (0.887)	0.244 (0.330)
% CALORIES MFA	0.07 (0.946)	0.324 (0.258)	0.23 (0.821)	0.445 (0.064)
% CALORIES PUFA	0.12 (0.906)	0.524 (0.055)	1.18 (0.252)	0.363 (0.139)
P:S RATIO	0.31 (0.759)	0.609 (0.021)	0.30 (0.767)	0.255 (0.308)
CSI RATIO	-0.18 (0.863)	0.447 (0.109)	0.67 (0.510)	0.245 (0.327)

[1] P values of 0.000 are less than 0.0005

Table O-27

Post-posttest Reported (Mean ± SEM) Weekly Servings of Foods and Eating Habits Questions Obtained from the Food Frequency Questionnaire for Lumbee Control and Intervention Participants.

	CONTROL (N=18)	INTERVENTION (N=15)	T-VALUE (p)
FRUIT OR JUICE	6.689 ± 1.172	7.047 ± 1.224	-0.21 (0.835)
CITRUS FRUIT OR JUICE	2.939 ± 0.774	4.167 ± 0.835	-1.08 (0.290)
VEGETABLES	12.406 ± 1.627	15.800 ± 3.645	-0.85 (0.405)
VEGETABLES, EXCLUDING POTATOES/RICE	7.150 ± 1.197	9.980 ± 2.040	-1.20 (0.244)
SALAD	1.611 ± 0.301	1.833 ± 0.586	-0.34 (0.739)
CARROTS	0.794 ± 0.212	1.107 ± 0.232	-0.99 (0.328)
TOMATOES	0.722 ± 0.400	1.820 ± 0.923	-1.09 (0.289)
DEEP YELLOW OR DARK GREEN VEGETABLES	2.700 ± 0.541	3.813 ± 0.761	-1.22 (0.232)
FISH OR CHICKEN	3.311 ± 0.708	2.653 ± 0.476	0.77 (0.477)
FRIED FISH OR CHICKEN	1.050 ± 0.145	1.007 ± 0.212	0.17 (0.863)
WHOLE GRAIN OR BRAN CEREAL	2.844 ± 0.735	4.180 ± 1.160	-1.00 (0.323)

Table O-27 (continued)

EGGS	0.433 ± 0.099	1.573 ± 0.905	-1.25 (0.230)
ALCOHOL	0.033 ± 0.020	0.247 ± 0.233	-0.91 (0.376)
BEEF	2.733 ± 0.785	2.007 ± 0.460	0.80 (0.432)
PORK	0.517 ± 0.092	0.793 ± 0.266	-0.98 (0.340)
HOT DOGS OR LUNCHEON MEATS	1.400 ± 0.313	1.607 ± 0.641	-0.29 (0.775)
BUTTER OR MARGARINE	2.300 ± 1.051	1.567 ± 0.508	0.63 (0.536)
CHEESE, EXCLUDING COTTAGE CHEESE	1.100 ± 0.400	2.040 ± 0.914	-0.94 (0.358)
WHOLE MILK	0.556 ± 0.398	1.953 ± 1.376	-0.98 (0.343)
ICE CREAM	0.806 ± 0.157	0.660 ± 0.169	0.63 (0.533)
PASTRIES, SWEETS, SODAS, SUGAR	13.922 ± 3.072	10.740 ± 3.014	0.73 (0.470)

	Seldom/Never	Sometimes	Often/Always
"How often do you eat the skin on chicken?"	8 (42.1%) 10 (58.9%)	6 (31.6%) 5 (29.4%)	5 (26.3%) 2 (11.8%)

Table O-27 (continued)

"How often do you eat the visible fat on meat?"	17 (89.5%) 14 (82.4%)	2 (10.5%) 2 (11.8%)	0 (0.0%) 1 (5.9%)
"How often do you add salt to your food?"	9 (47.4%) 6 (35.3%)	5 (26.3%) 7 (41.2%)	5 (26.3%) 3 (17.6%)
"How often do you add pepper to your food?"	2 (10.5%) 5 (29.4%)	5 (26.3%) 6 (35.3%)	12 (63.2%) 6 (35.3%)

"Not counting salads and potatoes, about how many servings of vegetables do you eat per week?"

8.474 ± 1.246
14.882 ± 1.981

"Not counting juices, how many servings of fruits do you usually eat per week?"

5.421 ± 0.893
6.647 ± 1.242

Top values: Controls; Bottom values: Intervention

Table O-28

t-Test Comparisons and Correlations by Time (Pretest, Post-posttest) for Mean Estimated Weekly Servings of Foods Obtained from the Food Frequency Questionnaire for Lumbee Control and Intervention Participants.

	CONTROL (N=18)		INTERVENTION (N=15)	
	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)	T-VALUE (p-VALUE)	CORRELATION (p-VALUE)
FRUIT OR JUICE	-1.05 (0.307)	0.287 (0.248)	1.16 (0.267)	0.275 (0.322)
CITRUS FRUIT OR JUICE	-1.55 (0.140)	0.439 (0.068)	0.52 (0.609)	0.073 (0.796)
VEGETABLES	-1.36 (0.192)	0.352 (0.152)	-0.34 (0.737)	0.193 (0.490)
VEGETABLES, EXC. POTATOES/RICE	-1.20 (0.248)	0.530 (0.024)	-0.93 (0.370)	0.370 (0.175)
SALAD	-0.02 (0.984)	0.634 (0.005)	-0.51 (0.615)	0.159 (0.571)
CARROTS	0.28 (0.782)	0.052 (0.836)	-0.86 (0.405)	0.387 (0.154)
TOMATOES	0.00 (1.000)	0.804 (0.000)[1]	-1.09 (0.295)	0.184 (0.512)
DEEP YELLOW OR DARK GREEN VEGETABLES	0.03 (0.976)	0.460 (0.055)	0.49 (0.632)	0.352 (0.198)

Table O-28 (continued)

FISH OR CHICKEN	-1.43 (0.170)	0.162 (0.520)	0.52 (0.613)	0.700 (0.004)
FRIED FISH OR CHICKEN	0.29 (0.779)	0.460 (0.055)	1.44 (0.173)	0.618 (0.014)
WHOLE GRAIN OR BRAN CEREAL	-0.31 (0.757)	0.636 (0.005)	-1.88 (0.081)	0.421 (0.118)
EGGS	1.69 (0.109)	0.614 (0.007)	-0.28 (0.785)	-0.073 (0.796)
ALCOHOL	0.00 (1.000)	0.766 (0.000)	1.02 (0.327)	1.000 (0.000)
BEEF	-1.60 (0.127)	0.489 (0.039)	1.49 (0.159)	0.046 (0.870)
PORK	1.65 (0.117)	0.607 (0.008)	-0.22 (0.828)	0.199 (0.478)
HOT DOGS OR LUNCHEON MEATS	-1.21 (0.243)	0.454 (0.059)	-0.43 (0.677)	0.161 (0.567)
BUTTER OR MARGARINE	-1.10 (0.288)	0.330 (0.181)	1.48 (0.162)	-0.103 (0.716)
CHEESE, EXCLUDING COTTAGE CHEESE	-0.85 (0.407)	0.547 (0.019)	-0.06 (0.953)	0.332 (0.226)
WHOLE MILK	0.02 (0.983)	0.181 (0.473)	-0.86 (0.402)	0.395 (0.145)

Table O-28 (continued)

ICE CREAM	0.35 (0.727)	0.865 (0.000)	0.84 (0.414)	0.465 (0.081)
PASTRIES, SWEETS, SODAS, SUGAR	-0.46 (0.653)	0.766 (0.000)	1.45 (0.168)	0.426 (0.113)
REPORTED WEEKLY INTAKE OF:				
VEGETABLES	0.22 (0.831)	0.418 (0.075)	-1.83 (0.086)	0.029 (0.913)
FRUITS	-0.93 (0.365)	0.324 (0.176)	-1.44 (0.168)	0.629 (0.007)

[1] P values of 0.000 are less than 0.0005

Table O-29

Repeated Analysis Comparison of 3-Day Food Records for Pretest, Posttest, and Post-posttest for Lumbee Control and Intervention Participants

	Control (N=14)	Intervention (N=17)	Group Comparison F-Value (p)	Time Comparison F-Value (p)	Group by Time F-Value (p)
Energy (kcal)	1664[1] 1336[2] 1326[3]	1453 1238 1289	1.28 (0.267)	6.31 (0.003)	0.53 (0.589)
Protein (g)	61 53 51	56 51 51	0.20 (0.661)	2.29 (0.111)	0.31 (0.738)
Carbohydrates (g)	203 178 179	186 156 168	1.63 (0.212)	3.94 (0.025)	0.18 (0.840)
Fat (g)	69 47 47	55 47 47	0.88 (0.357)	6.39 (0.003)	1.44 (0.245)
Saturated Fat (g)	23 15 15	19 15 17	0.29 (0.593)	7.38 (0.001)	1.45 (0.242)
Monounsaturated Fat (g)	27 19 19	21 18 18	1.05 (0.315)	4.81 (0.012)	1.08 (0.345)
Polyunsaturated Fat (g)	14 10 9	10 9 9	1.38 (0.249)	4.99 (0.010)	1.64 (0.202)

Table O-29 (continued)

Cholesterol	225	193	0.13 (0.717)	3.35 (0.042)	1.53 (0.226)
(mg)	154	187			
	170	148			
Animal	45	39	0.35 (0.561)	2.09 (0.134)	0.35 (0.707)
Protein (g)	37	37			
	36	34			
Vegetable	16	16	0.02 (0.888)	1.27 (0.288)	1.26 (0.292)
Protein (g)	15	14			
	15	17			
Dietary Fiber	11	13	0.53 (0.473)	1.49 (0.234)	2.02 (0.142)
(g)	11	10			
	11	12			
Vitamin A	4674	4902	0.01 (0.921)	0.09 (0.918)	0.04 (0.962)
(IU)	4765	4622			
	4542	4142			
Beta-Carotene	2203	2448	0.38 (0.543)	0.57 (0.570)	0.17 (0.844)
(ug)	1610	2310			
	1694	1738			
Retinol (ug)	299	245	2.54 (0.122)	1.02 (0.367)	0.88 (0.418)
	624	230			
	514	372			
Vitamin E	9	6	6.96 (0.013)	2.19 (0.121)	0.52 (0.595)
(mg ATE)	9	5			
	7	5			
Vitamin C (mg)	76	80	0.07 (0.788)	0.11 (0.897)	0.12 (0.886)
	69	78			
	76	75			

Table O-29 (continued)

Thiamin (mg)	1.5	1.2	3.03 (0.092)	1.81 (0.172)	1.14 (0.327)
	1.4	1.1			
	1.2	1.2			
Riboflavin (mg)	1.5	1.3	2.79 (0.106)	1.70 (0.191)	0.98 (0.380)
	1.5	1.1			
	1.2	1.2			
Niacin (mg)	18	16	2.38 (0.134)	0.70 (0.500)	0.73 (0.486)
	19	15			
	16	15			
Folacin (ug)	210	224	0.30 (0.587)	0.62 (0.543)	1.75 (0.183)
	263	189			
	193	202			
Vitamin B12 (ug)	3.2	2.4	1.71 (0.202)	1.46 (0.240)	0.08 (0.925)
	4.4	3.1			
	4.4	3.6			
Vitamin B6 (mg)	1.5	1.3	3.04 (0.092)	0.85 (0.434)	0.50 (0.612)
	1.5	1.2			
	1.3	1.2			
Phosphorus (mg)	946	827	0.47 (0.500)	3.70 (0.031)	1.11 (0.337)
	811	728			
	722	763			
Magnesium (mg)	196	197	0.08 (0.785)	1.48 (0.236)	1.31 (0.278)
	191	166			
	176	186			
Iron (mg)	11	10	3.79 (0.061)	0.44 (0.643)	0.72 (0.490)
	13	9			
	12	9			

Table O-29 (continued)

Zinc (mg)	8	7	1.06 (0.312)	0.58 (0.563)	1.19 (0.312)
	9	10			
	13	7			
Copper (mg)	0.85	0.81	0.62 (0.439)	0.63 (0.537)	0.28 (0.759)
	0.90	0.86			
	1.05	0.86			
Sodium (mg)	2758	2483	0.20 (0.659)	3.40 (0.040)	0.57 (0.570)
	2232	2164			
	2264	2346			
Potassium (mg)	1775	1811	0.00 (0.994)	1.31 (0.277)	0.08 (0.922)
	1662	1622			
	1725	1725			
Calcium (mg)	684	515	2.28 (0.142)	4.00 (0.024)	1.71 (0.189)
	548	404			
	433	459			
Caffeine (mg)	119	121	0.14 (0.714)	0.36 (0.702)	0.35 (0.709)
	125	95			
	113	96			
% Cals. Protein	15	16	0.67 (0.420)	0.64 (0.530)	0.16 (0.851)
	16	16			
	15	16			
% Cals. CHO	49	52	0.16 (0.692)	1.51 (0.229)	1.46 (0.240)
	54	51			
	54	52			
% Cals. Fat	37	33	0.00 (0.982)	1.77 (0.180)	1.77 (0.179)
	31	33			
	31	33			

Table O-29 (continued)

% Cals. SFA	12	11	0.31 (0.583)	2.34 (0.105)	1.25 (0.295)
	10	11			
	10	11			
% Cals. MFA	15	13	0.06 (0.808)	1.06 (0.352)	1.24 (0.298)
	12	13			
	12	13			
% Cals. PFA	7	6	0.45 (0.510)	0.76 (0.474)	1.65 (0.200)
	6	7			
	6	6			
P:S Ratio	0.60	0.59	0.29 (0.596)	0.33 (0.721)	0.06 (0.941)
	0.65	0.62			
	0.63	0.58			
CSI Ratio[4]	34	29	0.30 (0.586)	6.82 (0.002)	1.28 (0.285)
	23	25			
	24	24			

[1] Top values: Pretest
[2] Middle values: Posttest
[3] Bottom values: Post-posttest
[4] CSI Ratio = (1.01 x g saturated fat) + (0.05 x mg cholesterol).

Table O-30

Repeated Analysis Comparison of Food Frequency Records for Pretest and Post-posttest for Lumbee Control and Intervention Participants.

	Control (N=18)	Intervention (N=15)	Group Comparison F-Value (p)	Time Comparison F-Value (p)	Group by Time F-Value (p)
Energy (kcal)	973[1] 1253[2]	1441 1212	1.65 (0.208)	0.06 (0.812)	5.24 (0.029)
Protein (g)	38 56	59 55	1.06 (0.312)	1.29 (0.265)	3.04 (0.091)
Fat (g)	40 50	63 50	1.93 (0.174)	0.07 (0.791)	5.32 (0.028)
Carbohydrates (g)	117 145	159 136	1.00 (0.324)	0.04 (0.835)	4.83 (0.036)
Calcium (mg)	398 637	621 668	1.10 (0.302)	4.24 (0.048)	1.91 (0.177)
Phosphorus (mg)	597 890	895 924	1.30 (0.262)	2.83 (0.103)	1.90 (0.178)
Iron (mg)	6 9	10 9	1.96 (0.171)	1.06 (0.310)	2.91 (0.098)
Sodium (mg)	1345 1876	2023 1910	1.90 (0.178)	1.23 (0.276)	2.91 (0.098)
Potassium (mg)	1302 1877	1948 1911	1.70 (0.202)	2.42 (0.130)	3.14 (0.086)
Vitamin A (IU)	4383 6860	7949 9927	2.72 (0.109)	1.24 (0.274)	0.02 (0.902)

Table O-30 (continued)

Thiamin (mg)	0.67	0.99	1.76 (0.194)	1.60 (0.215)	2.89 (0.099)
	0.94	0.95			
Riboflavin (mg)	0.94	1.46	1.71 (0.200)	3.60 (0.067)	0.48 (0.492)
	1.50	1.72			
Niacin (mg)	10	15	1.29 (0.265)	0.87 (0.357)	2.69 (0.111)
	14	14			
Vitamin C (mg)	67	121	5.48 (0.026)	0.26 (0.615)	2.04 (0.163)
	89	111			
Saturated Fat (g)	13	23	2.11 (0.156)	0.00 (1.000)	5.83 (0.022)
	18	18			
Cholesterol (mg)	149	233	2.79 (0.105)	0.49 (0.490)	0.18 (0.676)
	186	242			
Dietary Fiber (g)	6	8	1.69 (0.203)	0.93 (0.343)	2.27 (0.142)
	8	8			
Retinol Equivalent	666	1173	2.08 (0.159)	2.05 (0.162)	0.01 (0.905)
	1141	1574			
Carotene (ug)	1792	2715	1.96 (0.172)	0.79 (0.382)	0.02 (0.885)
	2383	3139			
Retinol (ug)	368	610	1.24 (0.274)	2.97 (0.095)	0.17 (0.681)
	744	1224			
P:S Ratio	0.7	0.6	1.70 (0.202)	2.14 (0.154)	0.47 (0.496)
	0.6	0.5			
% Fat Calories	36	39	1.10 (0.302)	1.11 (0.301)	0.07 (0.788)
	35	37			

Table O-30 (continued)

% Protein	16	16	0.72 (0.404)	4.57 (0.041)	0.15 (0.697)
Calories	17	18			
% Carbohydrate	49	45	2.43 (0.130)	0.07 (0.793)	0.01 (0.918)
Calories	48	45			
Weekly servings of:					
Fruit or Juice	5.3	8.9	2.16 (0.152)	0.08 (0.783)	2.51 (0.124)
	6.7	7.0			
Citrus Fruit or	1.8	4.9	5.61 (0.024)	0.06 (0.801)	1.52 (0.228)
Juice	2.9	4.2			
Vegetables	10.2	14.4	2.31 (0.139)	0.79 (0.382)	0.04 (0.834)
	12.4	15.8			
Vegetables,	5.9	8.1	2.19 (0.149)	2.07 (0.160)	0.08 (0.773)
Except Rice,	7.2	10.0			
Potatoes					
Salad	1.6	1.5	0.01 (0.915)	0.27 (0.610)	0.25 (0.622)
	1.6	1.8			
Carrots	0.9	0.8	0.17 (0.685)	0.13 (0.716)	0.60 (0.444)
	0.8	1.1			
Tomatoes	0.7	0.8	1.04 (0.316)	1.29 (0.264)	1.29 (0.264)
	0.7	1.8			
Deep Yellow or	2.7	4.3	2.80 (0.104)	0.21 (0.649)	0.18 (0.671)
Orange Vegs.	2.7	3.8			
Fish or Chicken	2.3	2.9	0.01 (0.935)	0.91 (0.347)	2.03 (0.165)
	3.3	2.7			

Table O-30 (continued)

Whole Grains or Bran Cereals	2.7 2.8	2.1 4.2	0.17 (0.686)	3.52 (0.070)	2.42 (0.130)
Eggs	1.0 0.4	1.3 1.6	2.02 (0.165)	0.09 (0.770)	0.74 (0.396)
Beef	1.6 2.7	3.5 2.0	0.59 (0.447)	0.10 (0.760)	4.81 (0.036)
Pork	0.7 0.5	0.7 0.8	0.88 (0.356)	0.05 (0.818)	0.48 (0.492)
Hot Dogs or Luncheon Meats	1.0 1.4	1.3 1.6	0.31 (0.582)	0.87 (0.359)	0.01 (0.915)
Butter or Margarine	1.2 2.3	3.2 1.6	0.56 (0.459)	0.13 (0.718)	3.36 (0.076)
Cheese	0.8 1.1	2.0 2.0	3.03 (0.092)	0.15 (0.703)	0.07 (0.793)
Whole Milk	0.6 0.6	0.9 2.0	1.07 (0.308)	0.72 (0.404)	0.75 (0.395)
Ice Cream	0.9 0.8	0.9 0.7	0.07 (0.796)	0.69 (0.411)	0.11 (0.742)
Pastries, Sweets, Sodas, Sugars	13.0 13.9	15.3 10.7	0.02 (0.902)	1.03 (0.318)	2.32 (0.138)
Fried Fish or Chicken	1.1 1.1	1.3 1.0	0.10 (0.759)	1.62 (0.213)	0.80 (0.378)

Table O-30 (continued)

Reported Weekly Intake of:

Vegetables, not Including Salads or Potatoes	8.8 8.5	10.6 14.9	6.35 (0.017)	2.15 (0.152)	2.90 (0.098)
Fruits, not Including Juice	4.4 5.4	5.2 6.6	0.69 (0.410)	2.70 (0.109)	0.08 (0.781)

[1] Top values: Pretest
[2] Bottom values: Post-posttest

Table O-31

Pretest, Posttest and Post-posttest Responses (Number and %) to Questions from Nutrition Knowledge Test for Lumbee Control and Intervention Participants[1].

	I STRONGLY AGREE	I AGREE	I DON'T KNOW/NOT SURE	I DISAGREE	I STRONGLY DISAGREE
A. FATS IN FOODS					
1. Sherbet has less fat than ice cream	15 (36.6)	16 (39.0)	7 (17.1)	1 (2.4)	2 (4.9)
	8 (40.0)	9 (45.0)	2 (10.0)	0 (0.0)	1 (0.0)
	14 (73.7)	4 (21.1)	0 (0.0)	1 (5.3)	0 (0.0)
	10 (38.5)	9 (34.6)	7 (26.9)	0 (0.0)	0 (0.0)
	13 (65.0)	7 (35.0)	0 (0.0)	0 (0.0)	0 (0.0)
	8 (42.1)	8 (42.1)	2 (10.5)	1 (5.3)	0 (0.0)
2. The fat in chicken is almost all in the skin	14 (34.1)	24 (58.5)	1 (2.4)	2 (4.9)	0 (0.0)
	4 (20.0)	14 (70.0)	0 (0.0)	2 (10.0)	0 (0.0)
	8 (42.1)	11 (57.9)	0 (0.0)	0 (0.0)	0 (0.0)
	15 (55.6)	11 (40.7)	0 (0.0)	0 (0.0)	0 (0.0)
	13 (65.0)	4 (20.0)	2 (10.0)	1 (5.0)	0 (0.0)
	9 (47.4)	7 (36.8)	1 (5.3)	2 (10.5)	0 (0.0)
3. When it comes to fat, potato chips and pretzels are about the same	0 (0.0)	2 (4.9)	11 (26.8)	16 (39.0)	12 (29.3)
	0 (0.0)	2 (10.0)	2 (10.0)	11 (55.0)	5 (25.0)
	0 (0.0)	0 (0.0)	2 (10.5)	14 (73.7)	3 (15.8)
	1 (3.8)	5 (19.2)	1 (3.8)	13 (50.0)	6 (23.1)
	1 (5.0)	2 (10.0)	0 (0.0)	10 (50.0)	7 (35.0)
	2 (10.5)	3 (15.8)	1 (5.3)	8 (42.1)	5 (26.3)
4. At a fastfood restaurant, a fried fish sandwich has more calories and fat than a hamburger	1 (2.4)	6 (14.6)	14 (34.1)	17 (41.5)	3 (7.3)
	0 (0.0)	5 (25.0)	8 (40.0)	7 (35.0)	0 (0.0)
	2 (10.5)	4 (21.1)	7 (36.8)	6 (31.6)	0 (0.0)
	4 (15.4)	0 (0.0)	13 (50.0)	7 (26.9)	2 (7.7)
	3 (15.0)	3 (15.0)	8 (40.0)	6 (30.0)	0 (0.0)
	4 (21.1)	7 (36.8)	5 (26.3)	2 (10.5)	1 (5.3)

Table O-31 (continued)

5. Margarine has the same amount of fat as butter	2 (4.9)	7 (17.1)	2 (4.9)	27 (65.9)	3 (7.3)
	0 (0.0)	1 (5.0)	3 (15.0)	15 (75.0)	1 (5.0)
	1 (5.3)	2 (10.5)	4 (21.1)	9 (47.4)	3 (15.8)
	2 (7.4)	5 (18.5)	6 (22.2)	12 (44.4)	2 (7.4)
	3 (15.0)	5 (25.0)	3 (15.0)	8 (40.0)	1 (5.0)
	5 (26.3)	7 (36.8)	2 (10.5)	5 (26.3)	0 (0.0)
6. Fish has almost as much fat as meat, it's just a different kind of fat	0 (0.0)	4 (10.0)	14 (35.0)	17 (42.5)	5 (12.5)
	0 (0.0)	2 (10.0)	2 (10.0)	14 (70.0)	2 (10.0)
	1 (5.3)	3 (15.8)	3 (15.8)	11 (57.9)	1 (5.3)
	1 (4.0)	3 (12.0)	6 (24.0)	13 (52.0)	2 (8.0)
	1 (5.0)	7 (35.0)	5 (25.0)	7 (35.0)	0 (0.0)
	2 (10.5)	7 (36.8)	5 (26.3)	4 (21.1)	1 (5.3)
7. Creamy salad dressings (ranch, 1000 islands, etc.) have more fat than clear Italian dressing	0 (0.0)	21 (51.2)	8 (19.5)	8 (19.5)	4 (9.8)
	0 (0.0)	9 (45.0)	4 (20.0)	6 (30.0)	1 (5.0)
	2 (10.5)	10 (52.6)	2 (10.5)	4 (21.1)	1 (5.3)
	2 (7.4)	6 (22.2)	10 (37.0)	7 (25.9)	2 (7.4)
	1 (5.0)	10 (50.0)	4 (20.0)	5 (25.0)	0 (0.0)
	3 (15.8)	8 (42.1)	3 (15.8)	5 (26.3)	0 (0.0)
8. Certain cuts of beef, like flank steak, are as low in fat as chicken	0 (0.0)	9 (22.0)	24 (58.5)	5 (12.2)	3 (7.3)
	0 (0.0)	8 (40.0)	7 (35.0)	5 (25.0)	0 (0.0)
	0 (0.0)	4 (21.1)	12 (63.2)	2 (10.5)	1 (5.3)
	1 (3.7)	5 (18.5)	13 (48.1)	8 (29.6)	0 (0.0)
	2 (10.0)	7 (35.0)	7 (35.0)	4 (20.0)	0 (0.0)
	2 (10.5)	9 (47.4)	6 (31.6)	2 (10.5)	0 (0.0)
9. Powdered coffee creamers have a lot less fat than whole milk	1 (2.4)	12 (29.3)	15 (36.6)	11 (26.8)	2 (4.9)
	1 (5.0)	3 (15.0)	8 (40.0)	8 (40.0)	0 (0.0)
	0 (0.0)	5 (26.3)	7 (36.8)	6 (31.6)	1 (5.3)
	3 (11.1)	6 (22.2)	9 (33.3)	7 (25.9)	2 (7.4)
	3 (15.0)	2 (10.0)	4 (20.0)	11 (55.0)	0 (0.0)
	3 (15.8)	7 (36.8)	2 (10.5)	4 (21.1)	3 (15.8)

Table O-31 (continued)

10. Many foods that are	3 (7.3)	15 (36.6)	12 (29.3)	11 (26.8)	0 (0.0)
high in protein are	0 (0.0)	9 (45.0)	5 (25.0)	6 (30.0)	0 (0.0)
also high in fat	0 (0.0)	7 (36.8)	5 (26.8)	7 (36.8)	0 (0.0)
	1 (3.8)	5 (19.2)	9 (34.6)	8 (30.8)	3 (11.5)
	1 (5.0)	8 (40.0)	4 (20.0)	7 (35.0)	0 (0.0)
	1 (5.3)	10 (52.6)	3 (15.8)	4 (21.1)	1 (5.3)
B. <u>FIBER IN FOODS</u>					
11. Most of the fiber in	7 (17.5)	23 (57.5)	7 (17.5)	3 (7.5)	0 (0.0)
some fruits and	2 (10.0)	17 (85.0)	0 (0.0)	1 (5.0)	0 (0.0)
vegetables (like apples,	6 (31.6)	12 (63.2)	1 (5.3)	0 (0.0)	0 (0.0)
squash, cucumber) is					
found in the skin	7 (25.9)	16 (59.3)	1 (3.7)	3 (11.1)	0 (0.0)
	8 (40.0)	10 (50.0)	1 (5.0)	1 (5.0)	0 (0.0)
	8 (42.1)	9 (47.4)	0 (0.0)	2 (10.5)	0 (0.0)
12. Practically all	0 (0.0)	3 (7.3)	1 (2.4)	22 (53.7)	15 (36.6)
Americans get enough	0 (0.0)	2 (10.0)	0 (0.0)	9 (45.0)	9 (45.0)
fiber in their diet	0 (0.0)	2 (10.5)	0 (0.0)	10 (52.6)	6 (31.6)
	0 (0.0)	1 (3.7)	0 (0.0)	15 (55.6)	11 (40.7)
	1 (5.0)	1 (5.0)	0 (0.0)	12 (60.0)	6 (30.0)
	1 (5.3)	1 (5.3)	0 (0.0)	9 (47.4)	8 (42.1)
13. Brown rice or wild rice	4 (9.8)	23 (56.1)	12 (29.3)	2 (4.9)	0 (0.0)
has more dietary fiber	3 (15.0)	12 (60.0)	4 (20.0)	1 (5.0)	0 (0.0)
than white rice	6 (31.6)	10 (52.6)	2 (10.5)	1 (5.3)	0 (0.0)
	11 (40.7)	12 (44.4)	4 (14.8)	0 (0.0)	0 (0.0)
	7 (35.0)	10 (50.0)	3 (15.0)	0 (0.0)	0 (0.0)
	6 (31.6)	11 (57.9)	0 (0.0)	1 (5.3)	1 (5.3)
14. Popcorn and potato chips	0 (0.0)	2 (4.9)	12 (29.3)	22 (53.7)	5 (12.2)
have about the same	0 (0.0)	1 (5.0)	5 (25.0)	13 (65.0)	1 (5.0)
amount of fiber in a	0 (0.0)	1 (5.3)	4 (21.1)	12 (63.2)	2 (10.5)
typical serving					
	0 (0.0)	1 (3.7)	6 (22.2)	16 (59.3)	4 (14.8)
	1 (5.0)	1 (5.0)	4 (20.0)	10 (50.0)	4 (20.0)
	0 (0.0)	3 (15.8)	3 (15.8)	9 (47.4)	4 (21.1)

Table O-31 (continued)

15. Per serving, lettucee has more dietary fiber than grapefruit	0 (0.0)	13 (31.7)	23 (56.1)	5 (12.2)	0 (0.0)
	0 (0.0)	4 (20.7)	11 (55.0)	5 (25.0)	0 (0.0)
	0 (0.0)	4 (21.1)	9 (47.4)	6 (31.6)	0 (0.0)
	0 (0.0)	7 (25.9)	15 (55.6)	3 (11.1)	2 (7.4)
	2 (10.0)	6 (30.0)	7 (35.0)	5 (25.0)	0 (0.0)
	3 (15.8)	2 (10.5)	8 (42.1)	4 (21.1)	1 (5.3)
16. Beans like kidney beans and lima beans are very good sources of dietary fiber	4 (9.8)	19 (46.3)	8 (19.5)	9 (22.0)	1 (2.4)
	1 (5.0)	17 (85.0)	2 (10.0)	0 (0.0)	0 (0.0)
	5 (26.3)	8 (42.1)	4 (21.1)	1 (5.3)	0 (0.0)
	11 (40.7)	10 (37.0)	5 (18.5)	1 (3.7)	0 (0.0)
	9 (45.0)	9 (45.0)	2 (10.0)	0 (0.0)	0 (0.0)
	9 (47.4)	8 (42.1)	1 (5.3)	0 (0.0)	1 (5.3)
17. Whole wheat bread has more than twice as much dietary fiber as white ("light") bread	5 (12.2)	24 (58.5)	9 (22.0)	3 (7.3)	0 (0.0)
	2 (10.0)	13 (65.0)	5 (25.0)	0 (0.0)	0 (0.0)
	3 (15.8)	14 (73.7)	2 (10.5)	0 (0.0)	0 (0.0)
	11 (40.7)	11 (40.7)	4 (14.8)	1 (3.7)	0 (0.0)
	7 (35.0)	7 (35.0)	5 (25.0)	1 (5.0)	0 (0.0)
	4 (21.1)	12 (63.2)	3 (15.8)	0 (0.0)	0 (0.0)
18. Beef like roasts and steaks are a very good source of dietary fiber	0 (0.0)	2 (4.9)	19 (46.3)	19 (46.3)	1 (2.4)
	0 (0.0)	2 (10.5)	8 (42.1)	9 (47.4)	0 (0.0)
	0 (0.0)	2 (10.5)	7 (36.8)	8 (42.1)	1 (5.3)
	0 (0.0)	2 (7.4)	12 (44.4)	8 (29.6)	5 (18.5)
	0 (0.0)	2 (10.0)	4 (20.0)	10 (50.0)	4 (20.0)
	0 (0.0)	3 (15.8)	6 (46.2)	8 (42.1)	2 (10.5)
19. All types of breakfast cereals are great sources of dietary fiber	1 (2.5)	2 (5.0)	2 (5.0)	27 (67.5)	8 (20.0)
	0 (0.0)	2 (10.0)	0 (0.0)	13 (65.0)	5 (25.0)
	1 (5.3)	1 (5.3)	3 (15.8)	11 (57.9)	3 (15.8)
	1 (3.7)	1 (3.7)	0 (0.0)	18 (66.7)	7 (25.9)
	0 (0.0)	0 (0.0)	3 (15.0)	12 (60.0)	5 (25.0)
	0 (0.0)	5 (26.3)	1 (5.3)	10 (52.6)	3 (15.8)

Table O-31 (continued)

20. Cooking fruits and	6 (15.0)	19 (47.5)	8 (20.0)	5 (12.5)	2 (5.0)
vegetables greatly	1 (5.3)	12 (63.2)	2 (10.5)	4 (21.1)	0 (0.0)
diminish their	2 (10.5)	12 (63.2)	2 (10.5)	3 (15.8)	0 (0.0)
fiber content					
	2 (8.4)	11 (40.7)	9 (33.3)	5 (18.5)	0 (0.0)
	2 (10.0)	10 (50.0)	2 (10.0)	5 (25.0)	1 (5.0)
	6 (31.6)	7 (36.8)	1 (5.3)	5 (26.3)	0 (0.0)
C. <u>VITAMINS A, C, AND E IN FOODS</u>					
21. Dark green vegetables	5 (12.8)	20 (51.3)	12 (30.8)	1 (2.6)	1 (2.6)
like turnips and mustard	0 (0.0)	12 (63.2)	6 (31.6)	1 (5.3)	0 (0.0)
are very good sources of	3 (15.8)	13 (68.4)	2 (10.5)	1 (5.3)	0 (0.0)
vitamin A					
	7 (26.9)	12 (46.2)	6 (23.1)	1 (3.8)	0 (0.0)
	5 (25.0)	12 (60.0)	2 (10.0)	1 (5.0)	0 (0.0)
	9 (47.4)	9 (47.4)	1 (5.3)	0 (0.0)	0 (0.0)
22. Beta-Carotene, found in	2 (5.0)	15 (37.5)	23 (57.5)	0 (0.0)	0 (0.0)
foods like carrots, can	1 (5.0)	11 (55.0)	7 (35.0)	1 (5.0)	0 (0.0)
be used like vitamin A	1 (5.3)	12 (63.2)	5 (26.3)	1 (5.3)	0 (0.0)
in the body					
	7 (25.9)	9 (33.3)	11 (40.7)	0 (0.0)	0 (0.0)
	4 (20.0)	11 (55.0)	5 (25.0)	0 (0.0)	0 (0.0)
	6 (31.6)	8 (42.1)	3 (15.8)	1 (5.3)	0 (0.0)
23. Beef liver is a very	0 (0.0)	5 (12.5)	26 (65.0)	8 (20.0)	1 (2.5)
good low-fat source of	0 (0.0)	2 (10.5)	14 (73.7)	3 (15.8)	0 (0.0)
vitamin A	1 (5.3)	6 (31.6)	10 (52.6)	2 (10.5)	0 (0.0)
	3 (11.1)	5 (18.5)	14 (51.9)	3 (11.1)	2 (7.4)
	0 (0.0)	2 (10.0)	6 (30.0)	11 (55.0)	1 (5.0)
	3 (15.8)	4 (21.1)	2 (10.5)	5 (26.3)	4 (21.1)
24. Dark green vegetables	2 (5.1)	12 (30.8)	15 (38.5)	9 (23.1)	1 (2.6)
like mustard and peppers	0 (0.0)	7 (36.8)	8 (42.1)	3 (15.8)	1 (5.3)
are very good sources	2 (10.5)	8 (42.1)	6 (31.6)	3 (15.8)	0 (0.0)
of vitamin C					
	7 (25.9)	7 (25.9)	12 (44.4)	1 (3.7)	0 (0.0)
	3 (15.0)	10 (50.0)	6 (30.0)	1 (5.0)	0 (0.0)
	6 (31.6)	8 (42.1)	3 (15.8)	2 (10.5)	0 (0.0)

25. Some fruits like	3 (7.5)	23 (57.5)	13 (32.5)	1 (2.5)	0 (0.0)
canteloupe and tomatoes	1 (5.0)	13 (65.0)	5 (25.0)	1 (5.0)	0 (0.0)
are high in both	2 (10.5)	14 (73.7)	2 (10.5)	1 (5.3)	0 (0.0)
vitamins A and C					
	3 (11.1)	12 (44.4)	12 (44.4)	0 (0.0)	0 (0.0)
	4 (20.0)	11 (55.0)	5 (25.0)	0 (0.0)	0 (0.0)
	6 (31.6)	10 (52.6)	2 (10.5)	1 (5.3)	0 (0.0)
26. The content of vitamin	0 (0.0)	2 (5.0)	12 (30.0)	19 (47.5)	7 (17.5)
A, C and E in a food	0 (0.0)	0 (0.0)	7 (35.0)	12 (60.0)	1 (5.0)
is not at all affected	0 (0.0)	1 (5.3)	4 (21.1)	10 (52.6)	3 (15.8)
by cooking and processing					
	0 (0.0)	1 (3.7)	15 (55.6)	7 (25.9)	4 (14.8)
	0 (0.0)	1 (5.0)	4 (20.0)	14 (70.0)	1 (5.0)
	2 (10.5)	2 (10.5)	3 (15.8)	12 (63.2)	0 (0.0)
27. Palm oil is a healthier	0 (0.0)	4 (9.8)	29 (70.7)	3 (7.3)	5 (12.2)
source of vitamin E for	0 (0.0)	4 (21.1)	10 (52.6)	3 (15.8)	2 (10.5)
cooking than corn oil	0 (0.0)	6 (31.6)	9 (47.4)	1 (5.3)	3 (15.8)
	0 (0.0)	4 (15.4)	15 (57.7)	6 (23.1)	1 (3.8)
	1 (5.0)	1 (5.0)	11 (55.0)	6 (30.0)	1 (5.0)
	2 (10.5)	2 (10.5)	7 (36.8)	6 (31.6)	2 (10.5)
28. Lean red meats are	0 (0.0)	1 (2.5)	22 (55.0)	15 (37.5)	2 (5.0)
healthy sources of	0 (0.0)	3 (15.8)	7 (36.8)	9 (47.4)	0 (0.0)
vitamin C	0 (0.0)	2 (10.5)	7 (36.8)	8 (42.1)	2 (10.5)
	0 (0.0)	1 (3.7)	13 (48.1)	9 (33.3)	4 (14.8)
	0 (0.0)	5 (26.8)	6 (31.6)	8 (42.1)	0 (0.0)
	1 (5.3)	1 (5.3)	9 (47.4)	5 (26.3)	2 (10.5)
29. Milk and other dairy	6 (14.6)	15 (36.6)	12 (29.3)	8 (19.5)	0 (0.0)
products are often	0 (0.0)	13 (65.0)	5 (25.0)	2 (10.0)	0 (0.0)
fortified with	0 (0.0)	14 (73.7)	4 (21.1)	1 (5.3)	0 (0.0)
vitamin A					
	2 (7.7)	13 (50.0)	8 (30.8)	3 (11.5)	0 (0.0)
	4 (20.0)	11 (55.0)	3 (15.0)	2 (10.0)	0 (0.0)
	3 (15.8)	12 (63.2)	3 (15.8)	1 (5.3)	0 (0.0)

Table O-31 (continued)

30. All cooking oils are good sources of vitamin E	0 (0.0) 0 (0.0) 0 (0.0)	1 (2.4) 2 (10.0) 1 (5.3)	20 (48.8) 10 (50.0) 7 (36.8)	15 (36.6) 8 (40.0) 9 (47.4)	5 (12.2) 0 (0.0) 2 (10.5)
	0 (0.0) 0 (0.0) 2 (10.5)	3 (11.1) 1 (5.0) 0 (0.0)	15 (55.6) 12 (60.0) 4 (21.1)	7 (25.9) 7 (35.0) 8 (42.1)	2 (7.4) 0 (0.0) 4 (21.1)

[1] Top values, N=41 for pretest control participants, N=20 for post-test control participants, and N=19 for post-posttest control participants.
Bottom values, N=27 for pretest intervention participants and N=20 for post-test intervention participants, and N=19 for post-posttest intervention participants.

Table O-32

Pretest and Post-posttest Responses (Number and %) to Questions from Eating Patterns Questionnaires for Lumbee Control and Intervention Participants[1].

IN THE PAST 3 MONTHS:		USUALLY OR ALWAYS	OFTEN	SOMETIMES	RARELY OR NEVER
1. DID YOU EAT FISH?					
YES	33 (80.5)	NO 8 (19.5)			
	15 (78.9)	4 (21.1)			
	26 (92.9)	2 (7.1)			
	13 (72.2)	5 (27.8)			
WHEN YOU ATE FISH, HOW OFTEN WAS IT:					
A. BROILED, BAKED OR POACHED?		2 (6.1)	4 (12.1)	10 (30.3)	12 (36.4)
		2 (13.3)	2 (13.3)	4 (26.7)	5 (33.3)
		1 (3.8)	3 (11.5)	7 (26.9)	12 (46.2)
		1 (7.6)	1 (7.6)	5 (38.5)	4 (30.8)
B. FRIED?		16 (48.5)	7 (21.2)	9 (27.3)	1 (3.0)
		3 (20.0)	4 (26.7)	3 (20.0)	2 (13.3)
		13 (50.0)	5 (19.2)	5 (19.2)	2 (7.7)
		5 (38.5)	2 (15.4)	1 (7.6)	3 (23.1)

Table O-32 (continued)

2. DID YOU EAT CHICKEN?

YES	41 (100.0)	NO	0 (0.0)
	19 (100.0)		0 (0.0)
	28 (100.0)		0 (0.0)
	18 (100.0)		0 (0.0)

WHEN YOU ATE CHICKEN, HOW OFTEN DID YOU:

A. HAVE IT BROILED OR BAKED?	8 (20.0)	11 (27.5)	17 (42.5)	4 (10.0)
	4 (21.1)	6 (31.6)	7 (36.8)	1 (5.3)
	5 (18.5)	7 (25.9)	12 (44.4)	3 (11.1)
	3 (16.7)	8 (44.4)	5 (27.8)	0 (0.0)
B. HAVE IT FRIED?	6 (15.4)	12 (30.8)	16 (41.0)	5 (12.8)
	2 (10.5)	4 (21.1)	8 (42.1)	3 (15.8)
	10 (38.5)	6 (23.1)	7 (26.9)	3 (11.5)
	2 (11.1)	3 (16.7)	7 (38.9)	2 (11.1)
C. TAKE OFF THE SKIN?	12 (31.6)	2 (5.3)	6 (15.8)	18 (47.4)
	8 (42.1)	4 (21.1)	4 (21.1)	3 (15.8)
	4 (16.0)	4 (16.0)	7 (28.0)	10 (40.0)
	8 (44.4)	4 (22.2)	4 (22.2)	1 (5.6)

3. DID YOU EAT SPAGHETTI OR NOODLES?

YES	40 (97.6)	NO	1 (2.4)
	17 (89.5)		2 (10.5)
	26 (92.9)		2 (7.1)
	17 (94.4)		1 (5.6)

Table O-32 (continued)

	WHEN YOU ATE SPAGHETTI OR NOODLES,HOW OFTEN DID YOU EAT THEM PLAIN, OR WITH A RED SAUCE OR TOMATO SAUCE WITHOUT MEAT?	9 (22.5)	6 (15.0)	11 (27.5)	14 (35.0)
		2 (11.8)	3 (17.6)	5 (29.4)	7 (41.2)
		7 (26.9)	2 (7.7)	4 (15.4)	13 (50.0)
		1 (5.9)	3 (17.6)	6 (35.3)	7 (41.2)

4. DID YOU EAT RED MEAT (BEEF, PORK, LAMB)?

YES	38 (92.7)	NO	3 (7.3)
	17 (89.5)		2 (10.5)
	28 (100.0)	NO	0 (0.0)
	18 (100.0)		0 (0.0)

WHEN YOU ATE RED MEAT, HOW OFTEN DID YOU TRIM ALL THE VISIBLE FAT?	18 (47.4)	4 (10.5)	11 (28.9)	5 (13.2)
	8 (47.0)	5 (29.4)	3 (17.6)	1 (5.9)
	10 (35.7)	3 (10.7)	7 (25.0)	8 (28.6)
	12 (66.7)	4 (22.2)	1 (5.6)	1 (5.6)

5. DID YOU EAT GROUND BEEF (HAMBURGER)?

YES	36 (87.8)	NO	5 (12.2)
	17 (89.5)		2 (10.5)
	27 (96.4)	NO	1 (3.6)
	18 (100.0)		0 (0.0)

Table O-32 (continued)

	WHEN YOU ATE GROUND BEEF, HOW OFTEN DID YOU CHOOSE EXTRA LEAN (LOW FAT) GROUND BEEF?	15 (41.7)	8 (22.2)	8 (22.2)	5 (13.9)
		6 (35.3)	7 (41.2)	3 (17.6)	1 (5.9)
		8 (29.6)	5 (18.5)	9 (33.3)	5 (18.5)
		9 (50.0)	2 (11.1)	5 (27.8)	2 (11.1)
6.	DID OFTEN DID YOU HAVE A DINNER OR YOUR MAIN MEAL WITHOUT ANY MEAT, FISH EGGS, OR CHEESE?	0 (0.0)	8 (19.5)	17 (41.5)	16 (39.0)
		2 (10.5)	3 (15.8)	9 (47.4)	4 (21.1)
		0 (0.0)	6 (21.4)	6 (21.4)	16 (57.1)
		0 (0.0)	6 (33.3)	8 (44.4)	3 (16.7)

7. DID YOU DRINK MILK OR USE MILK ON CEREAL?

YES	38 (92.7)	NO	3 (7.3)
	19 (100.0)		0 (0.0)
	26 (92.9)	NO	2 (7.1)
	17 (94.4)		1 (5.6)

WHEN YOU HAD MILK, HOW OFTEN WAS IT VERY LOW FAT (1%) OR NONFAT, SKIM MILK?	14 (36.8)	7 (18.4)	6 (15.8)	11 (28.9)
	9 (47.4)	5 (26.3)	2 (10.5)	3 (15.8)
	5 (19.2)	4 (15.4)	3 (11.5)	14 (53.8)
	6 (35.3)	3 (17.6)	3 (17.6)	5 (29.4)

Table 0-32 (continued)

8. DID YOU EAT CHEESE (INCLUDING ON SANDWICHES OR IN COOKING)?

YES	36 (90.0)	NO	4 (10.0)
	15 (78.9)		4 (21.1)
	26 (92.9)		2 (7.1)
	16 (88.9)		2 (11.1)

WHEN YOU ATE CHEESE, HOW OFTEN WAS IT SPECIALLY-MADE, LOW FAT (DIET) CHEESE?	5 (13.9)	8 (22.2)	11 (30.6)	12 (33.3)
	2 (13.3)	2 (13.3)	4 (26.7)	7 (46.7)
	1 (3.8)	4 (15.4)	6 (23.1)	15 (57.7)
	2 (12.5)	1 (6.3)	5 (31.3)	8 (50.0)

9. DID YOU EAT FROZEN DESSERTS (ICE CREAM, SHERBET, ETC.)?

YES	36 (90.0)	NO	4 (10.0)
	19 (100.0)		0 (0.0)
	26 (92.9)		2 (7.1)
	16 (88.9)		2 (11.1)

WHEN YOU ATE FROZEN DESSERTS, HOW OFTEN DID YOU CHOOSE ICE MILK, NONFAT ICE CREAM (SUCH AS SIMPLE PLEASURES), FROZEN YOGURT, OR SHERBET?	6 (16.7)	11 (30.6)	9 (25.0)	10 (27.8)
	4 (21.1)	5 (26.3)	5 (26.3)	5 (26.3)
	0 (0.0)	6 (23.1)	8 (30.8)	12 (46.2)
	5 (31.3)	2 (12.5)	8 (50.0)	1 (6.3)

Table O-32 (continued)

10. DID YOU EAT COOKED VEGETABLES?

YES	39 (97.5)	NO	1 (0.0)				
	17 (89.5)		2 (10.5)				
	28 (100.0)		0 (0.0)				
	18 (100.0)		0 (0.0)				
WHEN YOU ATE COOKED VEGETABLES, HOW OFTEN DID YOU ADD BUTTER OR MARGARINE?				10 (25.6)	10 (25.6)	5 (12.8)	13 (33.3)
				4 (23.5)	3 (17.6)	3 (17.6)	7 (41.2)
				11 (39.3)	7 (25.0)	4 (14.3)	5 (17.9)
				3 (16.7)	2 (11.1)	7 (38.9)	6 (33.3)

11. DID YOU EAT POTATOES?

YES	40 (100.0)	NO	0 (0.0)				
	19 (100.0)		0 (0.0)				
	28 (100.0)		0 (0.0)				
	17 (94.4)		1 (5.6)				
WHEN YOU ATE POTATOES, HOW OFTEN WERE THEY FRIED (FRENCH FRIES, HASH BROWNS, ETC.)?				4 (10.0)	9 (22.5)	20 (50.0)	7 (17.5)
				1 (5.3)	3 (15.8)	10 (52.6)	5 (26.3)
				6 (21.4)	2 (7.1)	12 (42.9)	7 (25.0)
				2 (11.2)	1 (5.9)	9 (52.9)	5 (29.4)

Table O-32 (continued)

12. DID YOU EAT BOILED OR BAKED POTATOES?							
	YES	40 (100.0)O		0 (0.0)			
		18 (94.7)		1 (5.3)			
		27 (96.4)		1 (3.6)			
		18 (100.0)		0 (0.0)			
WHEN YOU ATE BOILED OR BAKED POTATOES, HOW OFTEN DID YOU EAT THEM WITHOUT BUTTER, MARGARINE, OR SOUR CREAM?				7 (17.5)	3 (7.5)	7 (7.5)	23 (57.5)
				1 (5.6)	2 (11.1)	4 (22.2)	11 (61.1)
				3 (11.1)	4 (14.8)	3 (11.1)	16 (59.3)
				2 (11.1)	4 (22.2)	5 (27.8)	6 (33.3)
13. DID YOU EAT GREEN SALADS?							
	YES	37 (92.5)	NO	3 (7.5)			
		17 (89.5)		2 (10.5)			
		28 (100.0)		0 (0.0)			
		18 (100.0)		0 (0.0)			
WHEN YOU ATE GREEN SALADS, HOW OFTEN DID YOU: A. USE NO DRESSING?				4 (10.8)	0 (0.0)	3 (8.1)	26 (70.3)
				1 (5.9)	0 (0.0)	3 (17.6)	11 (64.7)
				3 (10.7)	2 (7.1)	0 (0.0)	17 (60.7)
				3 (16.7)	2 (11.1)	2 (11.1)	7 (38.9)

Table O-32 (continued)

B. USE LOW CALORIE, DIET DRESSING?	10 (27.0)	5 (13.5)	14 (37.8)	6 (16.2)
	5 (29.4)	4 (23.5)	5 (29.4)	3 (17.6)
	7 (25.0)	2 (7.1)	11 (39.3)	6 (21.4)
	6 (33.3)	4 (22.2)	5 (27.8)	1 (5.6)

14. DID YOU EAT DESSERT?

YES	39 (97.5)	NO	1 (2.5)
	19 (100.0)		0 (0.0)
	28 (100.0)		0 (0.0)
	17 (94.4)		1 (5.6)

WHEN YOU ATE DESSERT, HOW OFTEN DID YOU:

A. PUT CREAM OR WHIPPED CREAM ON TOP?	0 (0.0)	3 (7.7)	7 (17.9)	28 (71.2)
	0 (0.0)	0 (0.0)	4 (21.1)	14 (73.7)
	0 (0.0)	1 (3.6)	10 (35.7)	16 (57.1)
	0 (0.0)	1 (5.9)	1 (5.9)	13 (76.5)
B. HAVE ONLY FRUIT FOR DESSERT?	3 (7.7)	16 (41.0)	11 (28.2)	8 (20.5)
	2 (10.5)	3 (15.8)	9 (47.4)	3 (15.8)
	1 (3.6)	6 (21.4)	12 (42.9)	7 (25.0)
	3 (17.6)	4 (23.5)	9 (52.9)	0 (0.0)

Table O-32 (continued)

15. DID YOU EAT SNACKS?								
	YES	40 (97.6)	NO	1 (2.4)				
		18 (94.7)		1 (5.3)				
		28 (100.0)		0 (0.0)				
		17 (94.4)		0 (0.0)				
WHEN YOU ATE SNACKS, HOW OFTEN DID YOU EAT:								
A. RAW VEGETABLES?					1 (2.5)	5 (12.5)	17 (42.5)	14 (35.0)
					0 (0.0)	2 (11.1)	8 (44.4)	6 (33.3)
					0 (0.0)	3 (10.7)	10 (35.7)	10 (35.7)
					4 (23.5)	3 (17.6)	5 (29.4)	2 (11.8)
B. FRESH FRUITS?					6 (15.0)	16 (40.0)	12 (30.0)	3 (7.5)
					3 (16.7)	5 (27.8)	9 (50.0)	0 (0.0)
					4 (14.3)	9 (32.1)	13 (46.4)	1 (3.6)
					5 (29.4)	6 (35.3)	5 (29.4)	1 (5.9)
16. DID YOU EAT BREAD, ROLLS, OR MUFFINS?								
	YES	41 (100.0)	NO	0 (0.0)				
		19 (100.0)						
		28 (100.0)		0 (0.0)				
		16 (88.9)		1 (5.6)				

Table O-32 (continued)

WHEN YOU ATE BREAD, ROLLS, OR MUFFINS, HOW OFTEN DID YOU EAT THEM WITHOUT BUTTER OR MARGARINES?	23 (56.1)	12 (29.3)	5 (12.2)	1 (2.4)
	10 (52.6)	4 (21.1)	3 (15.8)	2 (10.5)
	9 (32.1)	5 (17.9)	7 (25.0)	7 (25.0)
	7 (43.8)	2 (12.5)	2 (12.5)	4 (25.0)

17. DID YOU EAT TORTILLAS (PLAIN OR AS PART OF A MIXED DISH)?

YES	21 (51.2)	NO	20 (48.8)
	9 (47.4)		10 (52.6)
	12 (42.9)		16 (57.1)
	7 (38.9)		10 (55.6)

WHEN YOU ATE TORTILLAS, HOW OFTEN:

A. WERE THEY CRISPY OR FRIED?	6 (28.6)	4 (19.0)	6 (28.6)	3 (14.3)
	0 (0.0)	0 (0.0)	6 (66.7)	3 (33.3)
	4 (33.3)	3 (25.0)	3 (25.0)	2 (16.7)
	2 (28.6)	0 (0.0)	3 (42.9)	2 (28.6)
B. DID YOU EAT THEM WITHOUT BUTTER OR MARGARINE?	12 (57.1)	0 (0.0)	1 (4.8)	6 (28.6)
	4 (44.4)	1 (11.1)	1 (11.1)	1 (11.1)
	1 (8.3)	2 (16.6)	2 (16.6)	5 (41.7)
	1 (14.3)	1 (14.3)	1 (14.3)	2 (28.6)

Table O-32 (continued)

18. DID YOU SAUTE OR PAN FRY ANY FOODS?

YES	35 (85.4)	NO	6 (14.6)
	16 (84.2)		3 (15.8)
	26 (92.9)		2 (7.1)
	15 (83.3)		2 (11.1)

WHEN YOU SAUTED OR PAN FRIED FOODS, HOW OFTEN DID YOU USE PAM OR OTHER NON-STICK SPRAY INSTEAD OF OIL, MARGARINE, OR BUTTER?	7 (20.0)	3 (8.6)	14 (40.0)	11 (31.4)
	3 (18.8)	4 (25.0)	5 (31.3)	4 (25.0)
	5 (19.2)	2 (7.7)	6 (23.1)	13 (50.0)
	4 (26.7)	1 (6.7)	2 (13.3)	8 (53.3)

19. DID YOU COOK RED MEAT (BEEF, PORK, LAMB)?

YES	37 (90.2)	NO	4 (9.8)
	17 (89.5)		2 (10.5)
	28 (100.0)		0 (0.0)
	17 (94.4)		0 (0.0)

WHEN YOU COOKED RED MEAT, HOW OFTEN DID YOU TRIM ALL THE FAT BEFORE COOKING?	13 (35.1)	8 (21.6)	9 (24.3)	7 (18.9)
	9 (52.9)	3 (17.6)	3 (17.6)	2 (11.8)
	11 (39.3)	2 (7.1)	4 (14.3)	11 (39.3)
	13 (76.5)	1 (5.9)	1 (5.9)	2 (11.8)

Table O-32 (continued)

20. DID YOU COOK CHICKEN?

YES	40 (97.6)	NO	1 (2.4)
	18 (94.7)		1 (5.3)
	27 (96.4)		1 (3.6)
	17 (94.4)		0 (5.6)

WHEN YOU COOKED CHICKEN, HOW OFTEN DID YOU REMOVE THE SKIN BEFORE COOKING?	13 (32.5)	2 (5.0)	5 (12.5)	20 (50.0)
	5 (27.8)	3 (16.7)	3 (16.7)	7 (38.9)
	4 (14.8)	3 (11.1)	9 (33.3)	11 (40.7)
	6 (35.3)	4 (23.5)	2 (11.8)	4 (23.5)

21. DID YOU USE MAYONNAISE?

YES	33 (80.5)	NO	8 (19.5)
	14 (73.7)		5 (26.3)
	24 (85.7)		4 (14.3)
	15 (83.3)		2 (11.1)

WHEN YOU USED MAYONNAISE, HOW OFTEN DID YOU USE LOW FAT OR NONFAT MAYONNAISE?	9 (27.3)	4 (12.1)	8 (24.2)	12 (36.4)
	4 (28.6)	3 (21.4)	3 (21.4)	4 (28.6)
	3 (12.5)	2 (8.3)	2 (8.3)	17 (70.8)
	6 (40.0)	1 (6.7)	3 (20.0)	5 (33.3)

Table O-32 (continued)

	Mean composite scores
TOTAL EATING PATTERN SCORE	2.662 ± 0.082
	2.502 ± 0.110
	2.865 ± 0.087
	2.436 ± 0.097
EATING PATTERN 1 (AVOID FAT)	2.554 ± 0.112
	2.179 ± 0.155
	2.726 ± 0.146
	2.114 ± 0.164
EATING PATTERN 2 (AVOID MEAT)	2.343 ± 0.084
	2.267 ± 0.105
	2.581 ± 0.112
	2.194 ± 0.126
EATING PATTERN 3 (MODIFICATION)	2.963 ± 0.129
	2.886 ± 0.202
	3.161 ± 0.131
	2.971 ± 0.145
EATING PATTERN 4 (SUBSTITUTION)	2.600 ± 0.131
	2.455 ± 0.166
	3.082 ± 0.116
	2.502 ± 0.171

Table 0-32 (continued)

EATING PATTERN 5 (REPLACEMENT)	2.846 ± 0.112 2.797 ± 0.155
	2.779 ± 0.126 2.314 + 0.199

[1] Top values, N=41 for pretest control participants, and N=19 for post-posttest control participants; Bottom values, N=28 for pretest intervention participants, and N=18 for post-posttest intervention participants.

APPENDIX P

RESULTS OF BARRIERS SURVEY

Results of Barriers Survey

Which of the following is the reason(s) why you were not able to participate in the nutrition education classes?

Conflict in your schedule with the time the classes were offered	10
Personal or family illness	7
Lack of transportation	2
Classes were not held in a convenient location for you	0
Family commitments	4
The classes were not what you thought they would be (for example, classes on weight loss)	2

Were there more than one reason why you were unable to come to the classes?

Yes	No
4	16

A total of 20 responses were received (41% of non-participants)

APPENDIX Q

RESULTS OF NUTRITION EDUCATION CLASS EVALUATION

Results of Nutrition Education Class Evaluation Completed at the Close of Each Class Session

	Excellent	Good	Fair	Poor	N/A
How would you rate this session with regard to:					
A. Your ability to understand the information and materials presented?					
Session 2	8	5	0	0	1
Session 3	15	3	0	0	0
Session 4	12	2	1	0	0
Session 5	14	3	0	0	0
B. The quality of the information and materials presented?					
Session 2	10	4	0	0	1
Session 3	17	1	0	0	0
Session 4	12	3	0	0	0
Session 5	15	2	0	0	0
C. The cultural appropriateness of the information and materials presented (did you feel that the presentation was appropriate for Lumbee Indian women?					
Session 2	11	3	0	0	0
Session 3	14	4	0	0	0
Session 4	14	1	0	0	0
Session 5	12	4	0	0	1

APPENDIX R

RESULTS OF NUTRITION EDUCATION CLASS AND MATERIALS EVALUATION

Results of Nutrition Education Class and Materials Evaluation[1]

How would you rate the following materials that were used in the nutrition education classes (circle your response)?

	Very Good	Good	Fair	Poor
Fat Gram Counter	11	8	0	0
Calender	9	8	2	0
"No Time to Cook"	6	11	1	0
"Cook's Day Off"	9	9	1	0
"Cancer Information: Where to Find Help"	14	4	1	0
"Dietary Fiber to Lower Cancer Risk"	13	6	0	0
"Cooking Solo"	9	10	0	0
"Sneak Health into Your Snacks"	8	10	1	0
"All About Fat and Cancer Risk"	13	5	0	0
"Eat More Fruits and Vegetables"	12	7	0	0
"Eat More Salads for Better Health"	13	7	0	0
"Modifying Recipes For Better Health"	12	6	0	0
"The Prudent Diet Cookbook"	11	7	1	0
"Let's Eat Healthy: Five Simple Tips For Lowering Cancer Risk"	12	7	0	0

Have you used any of the following (please circle your response):

	Frequently	Some	Not at all
Fat Gram Counter	6	10	1
"Modifying Recipes For Better Health"	2	14	2
"The Prudent Diet Cookbook"	3	10	6
Recipes from handouts, booklets, etc. handed out in class	2	13	3

Which of the following are you now doing as a result of taking this class and reading the materials provided in the class? If you did these things before taking the class, do not circle them.

	Yes, Frequently	Some	Never
Change cooking oil	11	4	0
Eat more fat-free or low-fat products (like mayonnaise, salad dressing, cheese)	10	6	0
Change to a lower-fat milk	6	4	5
Take the skin off chicken before cooking or eating	8	6	2
Change to whole wheat bread	3	8	5
Eat more fruits and vegetables	13	4	0
Eat more meals without meat	9	7	1
Fry foods less	11	6	0

[1] Twenty surveys were completed and returned.

APPENDIX S

HUMAN SUBJECTS CONSENT FORMS

CONSENT FORM

I understand that I am being asked to participate in a research study being conducted by Ronny Bell, a graduate student in the Department of Foods and Nutrition at The University of North Carolina at Greensboro. The study is entitled, Nutrient Intake and the Effectiveness of a Nutrition Education Program in Reducing Dietary "Cancer Risk in Adult Lumbee Indian Women in Robeson County, North Carolina.

I understand that this study involves my participation in a series of nutrition education sessions. I understand that I will be asked to provide information about my health and eating habits. I understand that all information that I provide will be kept confidential.

I have been informed about the potential risks/benefits of participating in this research study. I have been given the opportunity to ask questions about the study and was assured that I can withdraw from participation at any time without penalty or prejudice.

If I have further questions about this project, or if I have questions about the rights of a research subject, I may contact Dr. Helen Shaw in the Department of Foods and Nutrition at UNC-Greensboro at (919) 334-5313 or the Office of Research Services at (919 334-5878.

Signature

Date

Witness to Oral Presentation
and Signature of Subject

CONSENT FORM

I understand that I am being asked to participate in a research study being conducted by Ronny Bell, a graduate student in the Department of Foods and Nutrition at The University of North Carolina at Greensboro. The study is entitled, Nutrient Intake and the Effectiveness of a Nutrition Education Program in Reducing Dietary Cancer Risk in Adult Lumbee Indian Women in Robeson County, North Carolina.

I understand that this study involves being interviewed regarding my dietary and health habits. I understand that the interview(s) will last approximately 1 hour and will be done at my convenience. I understand that all information that I provide will be kept confidential.

I have been informed about the potential risks/benefits of participating in this research study. I have been given the opportunity to ask questions about the study and was assured that I can withdraw from participation at any time without penalty or prejudice.

If I have any further questions about this project, or if I have questions about the rights of a research participant, I may contact Dr. Helen Shaw in the Department of Foods and Nutrition at UNC-Greensboro at (919) 334-5313 or the Office of Research Services at (919) 334-5878.

Signature ______________________ Date ____________

Witness ______________________