

Nutrition Education and Food Choices Among African American Teenagers at a Southern Parochial High School in Alabama, United States – A Case Study

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ABSTRACT

The objective of the study was to evaluate the effectiveness of a three-week nutrition education intervention on high school students' choices of food. The study design was based on paired comparisons of the servings of food in an ideal meal plan with a 24-hour recall, students' meal plan, and an observed meal. The subjects comprised a sample of ($n = 19$) tenth grade students enrolled at a historically black, parochial, high school. Paired t tests were used to compare the differences for all measurements presented in the analyses. Analysis shows that the students ate on a daily basis significantly more fats and sweets than was ideal for good health ($p=0.05$). Also, after one week of nutrition instruction students constructed meal plans which were lower than ideal in two nutrition areas, vegetables ($p>0.01$), and dairy products ($p>0.001$). After three weeks of nutrition education, they consumed significantly larger amounts of fats and sweets ($p > 0.01$), and significantly smaller amounts of fruit ($p > 0.01$), vegetables ($p > 0.01$), and dairy products ($p > 0.001$), than was ideal for their health. After the intensive nutrition education programme, students still chose foods that were high in fats and sweets, and low in vegetables, fruits, and dairy products, showing that it would take more than just formally educating youths, to prevent chronic diseases in the later stages of life. Targeting families, in an effort to encourage parents to begin modeling good nutrition early in their children's lives, is essential for forming lifestyle patterns, which promote good health into adulthood.

INTRODUCTION

It is accepted among nutrition experts that cardiovascular diseases begin in childhood, (Freedman *et al.*, 1999) and that the cardiovascular disease status of adults is a direct result of nutritional habits formed during childhood (Kelder *et al.*, 1994). This understanding, therefore, demands that nutritional interventions aimed at the control of obesity and cardiovascular diseases should begin during childhood. The nutritional status of

children and adolescents demands attention since only one in five youths eat the recommended five servings of fruits and vegetables per day. "Fifty-one percent of children and teens eat less than one serving a day of fruit and 29% eat less than one serving of vegetables per day; that are not fried" (American Heart Association, 2003). Some studies have shown that a high intake of fruits and vegetables may be protective against cardiovascular disease. Adequate servings of fruits and

vegetables can lower the risk of lung cancer because of the stored carotenoids and reduce the risks of many types of cancer (Hu, 2003; Steffen *et al.*, 2003).

Studies have shown that skipping breakfast is unhealthy (Niklas, O'Neil & Myers, 2004). People who eat breakfast are more productive and more efficient than those who skip breakfast. Omitting breakfast may impair memory and mental performance. According to the US Department of Agriculture, 64% of boys and 86% of US girls do not get an adequate amount of calcium. Teens who have the habit of consuming a sufficient amount of calcium during breakfast have the tendency to consume more calcium foods throughout the day. It is important to have enough calcium during the stage of a youth's bone mass development in order to reduce the chance of osteoporosis in adulthood. Numerous studies have also shown that adults and youths who consume a balanced breakfast are generally of normal weight, and those who skip breakfast are likely to be overweight (Nutrition Information Resource Centre, 2001; Bird, 1998).

Along with skipping breakfast, researchers at the University of North Carolina in a recent study have indicated that "children are snacking more today than 25 years ago (University of North Carolina, 2001)." This study also shows that children today take in about 25 percent of their calories in snacks. Although snacks help to keep children's energy levels high, they provide less calcium than regular meals and are higher in calories and fat. Thus, one of the main problems concerning snacks is the rising number of chronic diseases that will continue to develop when children continue to increase their consumption of soft drinks, chips, and salty snacks, and decrease their intake of fruits, vegetables, and milk (University of North Carolina, 2001).

Children are faced with food and beverage decisions on a daily basis at home, school, a friend's house, at the movies, at a party, or at the mall. In order to reduce bad eating habits or promote healthier eating habits, as suggested by the American Dietetic Association in *Healthy Habits for Healthy Kids*, "Parents can help their children reach wellness goals by making healthy changes at home" (Maillet, 2003).

Frances Berg in her book titled *Children and Teens Afraid to Eat: Helping Youth in Today's Weight-Obesity World* mentions that one-shot programmes with no long-term effort do not work (Berg, 2001). It is suggested that in order to develop a programme that makes good use of time, money, and energy, the programme must be sustainable over time. When parents and other educators work together to teach children about responsible nutrition, they help them make wise decisions about their health.

Nutrition among African Americans

Many of the cardiovascular diseases linked to bad eating habits are exacerbated in African Americans. According to the American Heart Association, "the prevalence of high blood pressure in African Americans in the United States is among the highest in the world." Among African Americans, 45% of men and 46% of women have total blood cholesterol levels over 200mg/dL (American Heart Association, 2003). Coronary heart disease, one of the cardiovascular diseases, remains the most common cause of mortality among African Americans, and these trends may be due in part to the higher prevalence of predisposing coronary heart disease risk factors among blacks (Willems *et al.*, 1997). In fact, the diet consumed by Black Americans is associated with the etiology and pathogenesis of several chronic diseases, which predisposes Blacks to an excess chronic

disease burden and is thus a major contributor to racial health disparities (Blocker & Forrester-Anderson, 2004).

More specifically, nearly 81% of urban African American women investigated in a study by Kayrooz *et al.* (1998), consumed more high-fat and fried food than their White counterparts. Overall, the Black diet has been described as being high in fat and salt, and low in fruits, vegetables, fibre, and calcium (Kumanyika, 1993). African Americans living in Southeastern United States consume diets associated with increased chronic disease risk, and are more prone to coronary heart diseases and other chronic diseases, than their counterparts in other regions of the country (Greenberg & Schneider, 1991; Greenberg *et al.*, 1998).

In light of the diet-related health disparities among African Americans as compared to the larger American society, there is no doubt that research aimed at intervening in these disparities is appropriate. This study of the food choices among a group of African American teenagers was conducted among a class of tenth graders attending a parochial high school in Huntsville, Alabama, in the Southeastern part of the United States. The objective of the research component of this nutrition intervention effort was to measure the extent to which a three-week educational programme influenced the food choices of a sample of tenth graders.

METHODS

This study was part of a nutrition intervention effort among high school students ($n = 19$), carried out by the 2003-2004 dietetic interns. The purpose of the exercise was: (1) To help a class of tenth grade students plan for a healthy tomorrow by learning how to prepare nutrition meals and incorporate daily exercise into their schedule; (2) To train the dietetic interns to work individually and

also cohesively; (3) To help the dietetic interns develop confidence in sharing their nutritional knowledge with the public; (4) To strengthen the dietetic interns' nutritional assessment and counseling skills.

Subjects

Participants of this nutrition intervention project included 10th grade students enrolled at a historically black, parochial, high school in Huntsville, Alabama. Of the high school students in the sample, only 1% of them ate a balanced breakfast, 16% of those students ate an unbalanced breakfast, and 73% of them skipped breakfast altogether. Most of the students' intake had inadequate servings of fruits and vegetables, dairy products, and they consumed too much sweets and fat.

Data Collection

The research aspect of the programme evaluated the effectiveness of nutrition education on high school students' choices of food. The dietetic interns met with the high school students once a week for three weeks. Along with their efforts to fulfill the educational component of the programme, the interns collected data on six nutrition areas at each step of the development of the educational and research design. These nutrition areas are: 1) starches, 2) vegetables, 3) fruits, 4) meat groups, 5) dairy products, and 6) fats and sweets. The first step consisted of eliciting a 24-hour food recall from each student. The recall was reviewed with students, and nutrition education was provided to reinforce positive eating habits and dietary changes. The second step of the design required the interns to construct a prescribed meal plan outlining the ideal servings of food in the six nutritional areas. The third step had students construct an individual meal plan, applying the knowledge that they had learnt

thus far. The meal plans were analysed using Nat version 2.0, to determine the nutritional value of the food from each nutritional area.

For the fourth step in the study design, the students were taken to a Chinese buffet for lunch, where they were able to apply the knowledge that they had learnt thus far in this exercise by choosing the foods from the six areas as mentioned earlier. Interns recorded on a checklist, the portion size and food choices of the students during lunch. These data were combined with data from students' breakfast and dinner food diaries for that day. All three meals were analysed using Nat version 2.0. In addition, interns carried out careful observations of students as they selected and ate their food. The objective of the observation of the partial meal was to try to ascertain whether the students seemed reluctant, eager, or enthusiastic about the experience of choosing and eating their meals. Other relevant quantitative data consisting of measurements for blood pressure, percent body fat, and BMI for each student were also collected.

Hypotheses

With the use of these data we pursued the following hypotheses:

- H₁: There are significant differences between students' normal eating habits (as measured by 24 hour recall), and an ideal meal plan for persons of this age group.
- H₂: There are significant differences between an ideal meal plan for persons of this age group, and a meal plan constructed by the students themselves, after a period of nutrition education.
- H₃: There are significant differences between an ideal meal plan, and the combined partially observed and actual meal chosen and consumed by students.

Analysis of Data

We documented the number of servings of food in six nutrition areas for each student, at each of the four steps of the study design. For analysis of these data, the paired-sample t test was used. Statistical significance was based on the 0.05 alpha level. This procedure enabled a comparison of the group means for the six nutrition areas at each of the four steps of the study process. The qualitative data consisted of the subjective assessments of the students' nutritional status based on 24-hour food recall, combined with the observational reports mentioned above. Both types of data were analysed and reported in order to present a clear picture of the impact of the nutrition education programme carried out among the study sample.

RESULTS

The study sample showed demographic and health characteristics consistent with a healthy group of teenagers (Table 1).

The sample consisted of young persons in their mid teens (14.95 years), with blood pressure levels well within what is considered normal and healthy for this age group. Their BMI and percentage of body fat both show that this group is relatively healthy.

Table 2 is an analysis of hypothesis # 1, which investigates the differences between the ideal meal plan for each student, as constructed by the interns, and the students' normal eating habits, as measured by a 24-hour recall. This table shows that students consumed significantly more fats and sweets on a daily basis ($p = .05$), than was ideal for their long-term health (mean diff. = 3.63 servings). However, their normal consumption of vegetables, fruit, and dairy products were significantly lower than the amounts that

Table 1. Demographic and health characteristics of study sample (n = 19)

<i>Characteristics</i>	<i>Mean</i>	<i>Standard Deviation</i>
Age (years)	14.95	± 0.405
Systolic blood pressure (mm Hg)	110.68	± 17.96
Diastolic blood pressure (mm Hg)	71.53	± 11.102
BMI-for-age percentiles	69.69	± 33.98
% Body Fat	25.57	± 9.83
Gender	% of sample	
Male	32%	
Female	68%	

Table 2. Paired differences between an ideal meal plan and students' normal eating habits (24 hr recall)

<i>Nutrition Categories</i>	<i>Paired Differences</i>			
	<i>Mean</i>	<i>Std. Dev.</i>	<i>T</i>	<i>Sig.</i>
Fats and Sweets	-3.63	7.58	-2.086	.050
Vegetables	2.65	2.08	5.565	.000
Fruit	2.47	2.14	5.029	.000
Meat	0.68	2.79	1.069	.299
Dairy products	2.02	1.18	7.459	.000
Starches	1.47	3.25	1.973	.064

constituted a healthy diet ($p > 0.01$), on all three of these nutrient areas. Their consumption of starches can be described as marginally significantly lower than was ideal. Only their consumption of meats was ideal for long-term health.

We next examined possible differences between the ideal meal plan for each student, as constructed by the interns, and the meal plans which the students constructed for themselves after a week of nutrition instruction (hypothesis # 2). Table 3 shows that after one week of nutrition instruction, students constructed meal plans for themselves which were lower than ideal in two nutrition areas. These areas are vegetables ($p > 0.01$), and dairy products ($p > 0.001$). In all other nutritional areas there were no significant differ-

ences between the ideal number of servings, and the meal plans which students constructed for themselves.

For an analysis of hypothesis # 3, we compared the meals, which students chose and consumed, with an ideal meal plan along the six nutrition areas. Table 4 shows that the tenth graders in this sample chose and consumed significantly larger amounts of fats and sweets ($p > 0.01$) than is ideal for long-term health. This table also shows that students ate significantly less than healthy amounts of vegetables ($p > 0.01$), fruit ($p > 0.01$), and dairy products ($p > 0.001$). There were no significant differences between the ideal meal and the meals that students actually ate in the areas of meat, and starches.

Table 3. Paired differences between an ideal meal plan, and meal plans which students constructed for themselves

Nutrition Categories	Paired Differences		T	Sig.
	Mean	Std. Dev.		
Fats and Sweets	-1.36	3.87	-1.539	.141
Vegetables	1.21	1.71	3.070	.007
Fruit	0.60	1.83	1.442	.167
Meat	0.10	2.13	0.215	.832
Dairy products	1.52	1.31	5.091	.000
Starches	0.52	3.48	0.658	.519

Table 4. Paired differences between an ideal meal plan, and the combined partially observed and actual meals, chosen and consumed by students

Nutrition Categories	Paired Differences		T	Sig.
	Mean	Std. Dev.		
Fats and Sweets	-4.65	5.02	-4.038	.001
Vegetables	1.13	1.57	3.122	.006
Fruit	1.68	2.26	3.245	.004
Meat	-0.02	3.60	-0.32	.975
Dairy products	1.26	1.24	4.440	.000
Starches	-1.44	5.07	-1.243	.230

DISCUSSION

According to the article *Guidelines for School Health Programs to Promote Lifelong Healthy Eating*, nutrition education should centre on preventing youths from developing chronic diseases during adulthood. "Some of the physiological processes that lead to diet-related chronic disease begin in childhood" (Kelder *et al.*, 1994). Unhealthy eating practices that contribute to chronic diseases are established early in life; young persons having unhealthy eating habits tend to maintain these habits as they age. Thus, it is important to teach people healthy eating patterns when they are young, in order to reduce high-risk eating behaviours and physiological risk

factors that are difficult to change once they have been established during childhood (CDC, 1996).

It is a culture pattern in America where parents reward children for good behaviour or good deeds with sweet foods or candy. Equally prominent in American culture is the use of desserts, which are often sweet. In addition, there is a ready availability of candy in public places, sold in vending machines, and even in school cafeterias. It is little wonder, therefore, that young people in this society consume larger amounts of sweet foods, which in turn affects their future health status. This culture pattern was evident with the tenth graders of this sample, who consumed significantly more amounts of fats and

sweets than recommended, on a daily basis. What is painfully evident is that after three weeks of nutrition education, and when given the chance to choose for themselves from an "all you could eat" source, these young people ate greater amounts of fats and sweets than they would have even consumed on a daily basis. This is shown by the greater significance of the coefficient for this category (Table 4), showing a paired comparison of their actual choices with an ideal meal, as compared to Table 2, showing a paired comparison of their 24-hour recall with an ideal meal.

By comparing the information from three national surveys from 1977 through 1996, it is evident that children today are consuming more snacks than two decades ago when researchers at the University of North Carolina found that "the average size of snacks and calories per snack remain relatively constant, the number of times children eat between meals has increased" (University of North Carolina, 2001). Another recent study has also supported this survey, showing that instead of drinking milk, water, or natural fruit juice, which are healthier and more nutritious, young persons are consuming more sweetened beverages and getting fatter (Health Unlimited Ministries, 2005).

The belief that children who "eat their vegetables" tend to be healthy, is also very popular in American culture. This belief, however, constitutes an ideal culture pattern rather than an actual culture pattern. While it is well known that vegetables are an important part of a balanced diet, this ideal is hardly enforced by parents, or modeled in meal preparation in American society. This study shows that our sample of tenth graders ate on a daily basis, less vegetables, fruits, and dairy products, than was healthy. Their own meal plans were also significantly deficient in vegetables and dairy products.

After evaluating the three-week nutrition education intervention that was

conducted in the local high school, of greatest concern from a nutrition education perspective was the fact that, when given an opportunity to choose a meal after three weeks of nutrition education, they chose meals that were also deficient in vegetables, fruit, and dairy products. It is evident that their choices were influenced more by their childhood nutrition socialisation, than the nutrition education classes, which they had taken. They had reverted to the identical pattern, as their 24-hour recall, when faced with the opportunity to choose their own meal.

Because it is evident that children today are faced with food decisions everywhere, parents and guardians could help the children develop good food choice habits by starting at home (Maillet, 2003). "Weight can be affected by many factors, but environment is often a major component (Maillet, 2003)." Healthy eating does not become a habit overnight. A three-week nutrition education intervention programme may only introduce the importance of healthy eating to the students, but does not completely help them weave this habit into their lives. It takes time and effort to make healthy eating become part of a daily routine; healthy eating habits are a result of life-long education and practice.

According to the obesity article featured on the Coalition for a Healthy and Active America (CHAA) website, parental influence in choice is important in lifestyle habits; it is often the most important factor in helping a child make healthy changes (Coalition for a Healthy and Active America, 2004). Researches have shown that children are often more willing to eat healthy foods and be active if they see their parents or other family members doing these things first (Maillet, 2003). Children learn from examples. When parents implement daily exercise and emphasise healthy eating, children will begin to develop these habits at an early age. Every member of the family will

benefit from healthier eating and exercise habits. Another way for parents to help their children develop a healthy attitude toward food is to eat daily meals together. When parents have meals together with their children, this helps to establish a regular meal schedule, introduce new foods, and monitor the food intake and nutritional needs. In order to ensure their children are eating and receiving the appropriate amounts of calories, proteins, minerals and vitamins to help them grow, parents need to provide a variety of nutritious foods that are low in fat and sugar (Maillet, 2003).

Frances Berg states that prevention involves intervention at three levels: the primary level aims at preventing eating and weight problems in the general population; the secondary level focuses on early stage problems or high-risk individuals; and the tertiary level is the treatment of weight and eating problems (Berg, 2001). The sooner preventive programmes reaching all students with the same health implementation from school staff can effectively be put in place, the less need there will be for treatment. "Prevention is a marathon, not a sprint," says Linda Johnson, Director of School Health Programs for the North Dakota Department of Public Instruction (Johnson, 1999). "Many prevention programs have fallen short because our approach has been single-pronged and of short duration (Johnson, 1999)." Throughout this research, it is evident that along with the needs assessment, objectives, and research, a successful prevention programme also needs to include ongoing evaluations. Supported by Frances Berg's research, the idea of helping children to develop healthy eating habits and to bring about change is a continuous effort among the caretakers at home, in school, and in the community (Berg, 2001).

CONCLUSION

Teaching nutrition education to the high school population significantly increases the knowledge of the students in planning healthy, well-balanced meals. However, our findings suggested that follow-up nutrition interventions, and more intensive nutrition programmes are needed as a permanent part of the high school curriculum, to help students practise what they have learned. As the proverb says, "habits are learned behaviours", health care professionals need to continuously show interest in educating this age group, to help them build good nutritional habits, which would promote better health into adulthood. Although schools are very effective institutions for nutrition education, other institutions which occupy a large part of teenagers' lives should be co-opted into the effort to improve dietary habits and thereby improve the health of the next generation. Health professionals such as doctors, nurses, dietitians, health educators, psychologists, sociologists, social workers and other interested parties, would do well to build programmes that target families, in an effort to encourage parents to begin modeling good nutrition early in their children's lives. Habits gained in this way would transform into lifestyle patterns, which promote good health into adulthood.

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