

---

# Influences on Fruit and Vegetable Procurement and Consumption Among Urban African-American Public Housing Residents, and Potential Strategies for Intervention

Sharada Shankar, PhD, MPH  
Department of Epidemiology  
Johns Hopkins School of Public Health

Ann Klassen, PhD  
Department of Health Policy  
and Management  
Johns Hopkins School of Public Health

Epidemiological evidence suggests that diets high in fruits and vegetables provide protective effects from numerous diseases. Data show that consumption of fruits and vegetables is much lower in low socioeconomic groups. This study assessed the food-purchasing behaviors and barriers to consuming fruits and vegetables among African-American women living in public housing in an urban city. Face-to-face data collection methods included interviews of two focus groups of 10 women each and structured-questionnaire interviews of 230 women. The focus groups addressed the issues of barriers to fruit and vegetable consumption by the families; the structured-questionnaire interviews focused on food-purchasing and food-preparation behaviors. Results indicated that the women wanted to increase fruit and vegetable consumption by their family, but several barriers existed: Cost, poor cooking skills, lack of social support, and childhood eating patterns. The women made several key suggestions for interventions: Stipends for participants, pictures to illustrate text, older community members to serve as session leaders, and empathetic and noncondescending teaching styles.

**D**iets high in fruits and vegetables have been shown to protect against an array of diseases, cancer included (24,25). Carotenoids and vitamin C protect against cataracts (26) and oxidation of cholesterol in the arteries (9). Increased consumption of fruits and vegetables has been shown to reduce elevated blood pressure levels (1), and also to increase significantly iron absorption, thus minimizing iron deficiency anemia (10,31).

Both ethnicity and socioeconomic resources have been linked to variations in the consumption of fruits and vegetables. Consumption of fruits

and vegetables is lower among low-income populations than among their counterparts (15,27). Additionally, the intake of fruits and vegetables is generally lower among African Americans than among Whites (11,16,19).

Various factors affect consumption of fruits and vegetables by low-income families. Intervention approaches must consider barriers to purchase, preparation, and consumption as separate yet interconnected issues. Although removing barriers to the purchase and preparation of fruits and vegetables is a necessary first step, barriers to consumption must also be addressed.

---

For example, low-income shoppers may be reluctant to risk scarce dollars on foods that are unlikely to be consumed by their families. Moreover, food patterns of African Americans vary according to economic, regional, and social influences of each community. Mainstays of African-American food patterns have drawn on eating habits of several cultures: that of seventeenth and eighteenth century West Africans, culture associated with American Slavery, and the culture of the post-Civil War rural South (3,4,13).

One focus group identified cost, limited storage space, time involved in preparing food, and difficulty in changing one's own and children's behavior as major barriers among low-income White women who lived in housing projects (21). Some of the barriers to consuming fruits and vegetables among low-income women who participated in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) were unavailability, time and effort to prepare the foods, and preferences for other foods(28).

One limitation of existing work in this area is that data are often collected from respondents who do not live within the same community; hence, shopping experiences could differ. Also, an overemphasis on data collection with participants in programs such as WIC limits our knowledge to families with very young children.

This study attempts to overcome these issues by focusing on women in a wide age range, all living in one specific community (23). Therefore, this explanatory study assessed food-purchasing behaviors of public housing residents in one specific area in an urban city and the barriers they encountered to consuming fruits and vegetables.

## Methods

### Data Collection and Sample

For this exploratory research, we were interested in both the frequency and patterns of behaviors: such as shopping, meal planning, and food consumption, as well as attitudes and beliefs about foods and dietary practices. The use of two complementary methods of data collection, focus group interviews and more structured questionnaire interviews, allows for both qualitative and quantitative measurement and analyses. From the questionnaire interview data, we could determine the prevalence of certain food behaviors and which groups within our low-income population were most likely to practice these behaviors. From the more qualitative focus group discussions, we could gain insight into the beliefs and attitudes associated with the reported behaviors. The use of multiple methods of data collection, such as those we used, provides triangulation and strengthens the external validity of our findings (2). These findings are crucial in developing targeted and tailored interventions.

### Structured Interviews

We conducted surveys in late 1997 to assess the food-purchasing behavior of public housing residents in one area of an urban city. The food-purchasing behavior questionnaire consisted of 22 questions and included:

- Sociodemographic information (age, education, employment, and number of years lived in public housing).
- Household structure and composition.
- Shopping behaviors including how often, where (corner stores vs. supermarket) and who purchased the food, and whether the food purchaser made a grocery list before shopping.

- Information on who was responsible for preparing the food and whether there was a household main meal consumed by all the family members.

Questionnaire items were developed by the investigators or adapted from a questionnaire of the Food Marketing Institute (8). The Food Marketing Institute collects data periodically by telephone interview on food-purchasing trends, attitudes, and behaviors from a representative U.S. population. Our newly developed questionnaire was pilot-tested among a small number of respondents.

The face-to-face interviews were conducted by trained African-American interviewers who lived in the urban community. African-American women ages 18 and older (N=230) who lived in one of three public housing complexes were recruited, by "word of mouth," to participate. This nonprobability sampling method, in which initial participants are used to recruit other members of a community, is called "snowball sampling" (2). A small cash remuneration was provided to the participants. The interviews ranged from 15 to 20 minutes and were conducted in respondents' homes or in nearby community centers.

### Focus Groups

Two focus group interviews were conducted, with 10 women, ages 30 to 65, participating in each session. One participant was recruited from each public housing complex within the targeted political jurisdictions in the southeastern section of the urban city. The sessions lasted 2 hours. Each participant received a remuneration of food coupons. The focus group interviews were conducted by a professional African-American female consultant. The questions used in the focus groups were developed using

standard focus group methods (18) to elicit perception of barriers to the purchase, preparation, and consumption of fruits and vegetables. The questions were reviewed by several nutritionists, behavioral scientists, anthropologists, and health educators. In addition, the questions were tested by several target audiences to determine whether the questions were pertinent to this community. Themes used in the focus groups included preparation, cost, access, information, and program participation (table 1).

### Analysis

From the questionnaires, we calculated descriptive statistics for the sample's demographic characteristics, as well as food-purchasing behaviors. Student *t* test and chi-squares were used to identify differences in food-purchasing and cooking behaviors by the sample's demographics. Statistical Analysis System (SAS) version 6.12 was used to perform the analysis (22).

The tape-recorded interviews of the focus groups were later transcribed. The two authors read the transcribed material and made independent notes of themes and patterns. We looked at clusters of concepts and ideas between the focus groups (table 1). The theme that emerged focused on barriers to fruit and vegetable consumption, as well as views on behavior-change programs. Original quotes were selected as examples, and the responses that were specific and based on personal experiences were given more consideration than vague and nonspecific responses.

### Results

The sample that completed the structured questionnaire comprised 230 women who were 18 to 91 years old (table 2). More than half of the women (56 percent) were less than

**Table 1. Focus group themes and questions**

#### Theme 1—Barriers

What are some of the reasons why people do not buy and eat fruits and vegetables?  
 What are some of the problems in preparing fruits and vegetables?  
 Do you think cost is an issue for people in your community for eating fruits and vegetables?  
 How can we change issues of cost?  
 Do you think that having access to fruits and vegetables is a problem for people in your community? How can this problem be resolved?  
 Do you think that people just have not heard that eating fruits and vegetables are good for them?

#### Theme 2—Motivators

What are the things that motivate people to make a change in their eating habit?  
 Where do people get information on food? Do they provide information on eating more fruits and vegetables?  
 What was the last such information you saw or heard? What made you pay attention to it?  
 As a result of it, did you make a change in your behavior in eating more fruits and vegetables?

#### Theme 3—Programs

Have you ever participated in a program that was related to improving your health status?  
 What specific aspect of this program did you like or did not like?  
 Do you think your friends and neighbors would participate in a program that encouraged them to eat more fruits and vegetables?  
 Where and at what time of day should the program take place?  
 Who do you think would be a good person to lead the program?  
 How would you make the program become a part of the community so that it continued even when the money was gone that started it?

41 years old and had less than a high school education (55 percent), and almost four-fifths (79 percent) were not working (unemployed, retired, a student, or a homemaker). Analysis of the households in which the women lived showed that most (89 percent) lived in households of six or fewer people. The average household consisted of 3.8 people, a somewhat larger figure than the 1999 national average of 2.5 for African Americans

(29). Most of the women lived in households with people less than 18 years old (70 percent) and had lived in public housing for at least 6 years (63 percent). Over one-third of the women (36 percent) were single parents.

#### Structured Interviews

Dinner was the main meal for most of the respondents (72 percent), and almost all households consume this meal together (96 percent) (table 3).

Use of prepared or “fast” food occurs at least once a week for 55 percent of the respondents. One person, usually the survey respondent, did most of the shopping (75 percent) and shopped for food once every other week (31 percent). About two-fifths (41 percent) of the households plan their meals before buying food, compared with cooking whatever is on hand.

Compared with corner or convenience stores, supermarkets are the main place for food shopping (94 percent), with 70 percent of respondents shopping at markets that are within 10 blocks of their homes. An equal number of respondents (50 percent) use and don’t use an automobile to shop. About one-quarter (22 percent) walk to food markets some of the time (data not shown).

Women who eat dinner as a main meal are significantly older than those whose main meal is at other times of the day (44 vs. 38 years old) (table 4). Those who are living with other adults and children in their households, and those who work are both less likely to be the sole preparer of meals in their home: 34 and 36 percent, respectively. Patterns of fast-food consumption vary among these respondents. Women who live with children in their households, either as single parents or with other adults, are significantly more likely to eat fast food at least once a week than those without children in their households. In addition, younger respondents, and those who currently work, are also more likely than their counterparts to eat fast food.

Overall, sociodemographic characteristics of the women did not significantly affect food-shopping behavior (table 5). For this sample, age is the only significant predictor of shopping frequency, with older women,

**Table 2. Demographic characteristics of urban African-American women residing in public housing: Structured interviews**

Characteristic	Statistic
Sample (n)	230
	<i>Mean</i>
Women’s age (years)	43
Household size	3.8
Years in public housing	13
	<i>Percent</i>
<b>Individual characteristics</b>	
Age (years)	
<20	6
21-40	50
41-60	28
>60	16
Education	
Less than 8th grade	9
8th - 11th grades	46
High school	35
Beyond high school	10
Employment status	
Working full- or part-time	17
Unemployed	34
Retired/student/homemaker	45
Other/don’t know	4
<b>Household characteristics</b>	
Number of people in household	
1-3	47
4-6	42
7-10	11
Number of persons < 18 years in household	
None	30
1-3	50
4-7	20
Household composition	
Lives alone	15
Lives with adult(s)	15
Single parent	36
Lives with adult(s) and child(ren)	34
Years in public housing	
0-5	37
6-10	21
11+	42

**Focus group participants cited cost as the primary structural barrier to fruit and vegetable consumption.**

**Table 3. Cooking and food-purchasing behaviors of urban African-American women residing in public housing: Structured interviews**

Characteristic	Statistic
Sample (n)	230
	<i>Percent</i>
Main meal of the day	
Dinner	72
Other	28
Most people in household eat main meal together	
Yes	96
No	4
Meal preparer	
Self only	79
Other <sup>1</sup>	21
Use of fast-food per week	
1-7 times each week	55
Never/seldom	45
Grocery shopper	
Self only	75
Other <sup>1</sup>	25
Frequency of food shopping	
Once a week or more	26
Once every 2 weeks	31
Once a month	23
As we need food	20
When most food shopping is done	
Beginning of the month	49
Middle of the month	35
End of the month	4
No preference/anytime	12
How cooking is planned	
Plan before buying	41
Cook what is on hand	52
Both	7
Where most food shopping is done	
Supermarket	
Yes	94
No	6
Corner/convenience store	
Yes	4
No	96
Distance to supermarket	
Less than 5 blocks	37
5-10 blocks	33
More than 10 blocks	30
Car used to shop	
Yes	50
No	50
Food received from other sources <sup>2</sup>	
SHARE program <sup>3</sup>	12
WIC program <sup>4</sup>	24
Community co-op	16
Other	15
None	45

<sup>1</sup>Other includes the respondent and another person who share the responsibility.

<sup>2</sup>A single subject may receive food from more than one category.

<sup>3</sup>Self-Help and Resource Exchange.

<sup>4</sup>Women, Infants and Children.

**Table 4. Meal patterns of African-American women <sup>1</sup> residing in public housing, by demographic characteristics: Structured interviews**

Characteristic	Main meal is dinner		Meals made by self only		Fast-food used once a week or more	
	Yes	No	Yes	No	Yes	No
Age (years)	44	38*	43	41	38	47*
Years in public housing	14	11	13	16	13	15
	<i>Mean</i>					
	<i>Percent</i>					
Household composition						
Lives alone	71	29	97	3	33	67
Lives with adult(s)	76	24	71	29	45	55
Single parent	70	30	89	11	63	37
Lives with adult(s) and child(ren)	71	29	66	34*	60	40*
Employment status						
Working	72	28	64	36	71	29
Not working	71	29	82	18*	50	50*
Education						
Less than high school	83	17	87	13	33	67
High school or more	70	30	78	22	43	57*
Distance to the supermarket						
1-5 blocks	65	35	74	26	56	44
More than 5 blocks	76	24	82	18	54	46
Uses car to shop						
Yes	73	27	75	25	58	42
No	70	30	83	17	51	49

<sup>1</sup> n=230.

\*Women using these meal patterns are significantly different, based on *t* tests (age) and chi-square tests (categorical variables), at  $p < 0.05$ .

on average 48 years old, being more likely to report shopping at least every week. Frequency of planning before buying food and using nonpurchased food (received through WIC or charitable organizations) are consistent across the entire sample, with about half of the respondents reporting these behaviors.

### Focus Groups

Focus group participants cited cost as the primary structural barrier to fruit and vegetable consumption. They identified some fruits and vegetables

as more economical than others but believed fruits and vegetables overall were costly, compared with other foods, especially by volume or portion. Volume and the ability to provide family members with a significant quantity of food were an important dimension of the cost theme. For example, grapes and apples were mentioned often as highly desirable fruits in terms of taste but were impractical, compared with potatoes prepared as home fries, in terms of “filling up” the family.

*“They [fruits and vegetables] cost more than some of the other things we can eat. If you buy starches, you can stretch them. Two cucumbers for \$1 maybe, then where is the rest of the salad? You know you are going to want more than cucumbers in your salad. . . . You see, if you have eight kids, you have to be able to have enough food for all of them. Say you buy apples, you have to buy eight of them or at least 10. That’s quite a big bill for apples.”*

**Table 5. Food-purchasing behaviors of African-American women <sup>1</sup>residing in public housing, by demographic characteristics: Structured interviews**

Characteristic	Plans before buying food		Shops at least every week		Uses free food	
	Yes	No	Yes	No	Yes	No
Age (years)	42	43	48	41*	43	43
Years in public housing	12	14	13	14	14	13
	<i>Mean</i>					
	<i>Percent</i>					
Household composition						
Lives alone	57	43	41	59	54	46
Lives with adult(s)	29	71	29	71	47	53
Single parent	48	52	20	80	58	42
Lives with adult(s) and child(ren)	47	53	23	77	55	45
Employment status						
Working	56	44	15	85	41	59
Not working	46	54	27	73	57	43
Education						
Less than high school	39	61	39	61	61	39
High school or more	48	52	24	76	54	46
Distance to the supermarket						
1-5 blocks	44	56	30	70	59	41
Less than 5 blocks	49	51	23	77	53	47
Uses car to shop						
Yes	49	51	23	77	51	49
No	45	55	28	72	59	41

<sup>1</sup> n=230.

\*Women with these food-purchasing behaviors are significantly different, based on *t* tests (age) and chi-square tests (categorical variables), at  $p < 0.05$ .

*“I don’t buy my fruits or vegetables unless they are on sale. . . . You can clip a coupon for a can good, but you never see a coupon for fresh fruits and vegetables.”*

*“We need to think of a way to put money in the area specifically for fruits and vegetables. That’s all you can use [those] little green coupons [referring to food stamps] for: fruits and vegetables. You can’t buy meat, you can’t buy [anything]. Just fruits and vegetables every month.”*

Most respondents acknowledged that their usual meals did not meet their own standards for nutrition but that it was often beyond their financial and emotional skills to plan and prepare complex meals. Foods such as Oodles of Noodles<sup>®</sup> were mentioned often in contrast; they were seen as inexpensive, easier to store and prepare rapidly, and reliably acceptable as a meal to children.

Low- or no-cost food programs were discussed as avenues to decrease the cost of fruits and vegetables but were

seen as a less desirable source of food, compared with directly purchasing food. This was in part because of the uncertain quality and the schedule and volume of distribution. It was also considered less durable because of how the food was distributed. The method used tainted the perceived value of the food. Several respondents described a program in which local farm trucks dumped surplus potatoes onto the ground near the housing complexes.

*“They shouldn’t just throw it on the ground. We are taught not to eat off the ground.”*

---

**They [women] asked for activities to learn and share menus that would meet several criteria: Convenience and cost, health, and children's tastes.**

*"It's like we are animals. It does something to the way your children feel. Even though they know you may . . . get food stamps but to see you go out there and get that food [off the ground]—they don't understand it."*

Compared with the significance of cost, only a few other structural barriers were considered important. Some respondents, however, did discuss barriers such as carrying canned fruits and vegetables home from the store and freezing or storing sufficient fruits and vegetables in small apartments.

As women and heads of households, most participants described themselves as cooking for others as well as for themselves; many spoke of the difficulty of balancing the family's and children's preferences with budgeting and cooking constraints. They frequently compared their situations to their parents', they believed they were making a conscious decision to allow their children more choices in foods than they had been given.

*"I think the times we are living in make a difference. For example, when I was growing up, if they put string beans or squash in front of me, or anything else that was in season that they could afford, I ate it. . . . Today's parents say if they don't like it 'get on up.'"*

*"I believe it is an emotional thing. When I was growing up, you had to eat what they gave you. I just thought that was so mean, and I swore that I wasn't going to treat my children like that. They don't want it, they do not have to eat it."*

*"You shouldn't have to eat fruits and vegetables if you don't like them."*

Knowledge of vegetable preparation techniques was discussed. Many women believed that there was less knowledge of cooking techniques in their communities than in previous generations. They also believed that older women in general were more knowledgeable about food-preparation skills. Few women acknowledged their own need for education in this area; however, some indicated that when cooking, they asked their mothers for information.

When asked what could make people change their eating behaviors, women universally favored small group processes, led by both peers and educators. They asked for activities to learn and share menus that would meet several criteria: Convenience and cost, health, and children's tastes. They believed that participatory activities, including sessions for family and children to eat the foods and share menus developed, would help them use their new knowledge and menus to make a sustainable transition from group to home use. Barriers to use of text-based educational materials were also discussed; the respondents agreed that "pictures will definitely do the trick." Perceived drawbacks to previous programs focused on program leaders' lack of understanding of the emotional difficulties inherent in changing one's behavior and the perception that participants had been talked to as though they were unknowledgeable.

*"It may not be that I don't know how [to cook]. It may be that I [have] this esteem problem or that I want somebody to share [the meal] with; my 2-year-old sitting up here and playing in the food [isn't] enough for me to stand up in the kitchen [for] 2 hours."*

---

This comment highlights the lack of social support these women believe exists regarding their meal-preparation and eating activities.

## Discussion

This study explored the food-purchasing behaviors and barriers to consuming fruits and vegetables among women residing in an urban area. Our study was focused in a relatively homogeneous residential area, so respondents shared a common geography for stores and resources. They, as well, shared common social and cultural backgrounds. These commonalities allowed us to focus on the psychological and social dimensions of shopping and eating behaviors. This homogeneity, however, is also a limitation. The sample was drawn from a small area of a city, and no comparison was made with other groups. Snowball sampling was used to recruit the respondents. Thus the results of the focus groups and structured interviews may not be representative of larger populations. However, our results are supported by existing work in this area.

Previous studies reporting focus group interviews assessing the barriers to fruit and vegetable consumption have used low-income populations attending food-related programs (21,28). For example, one study focused on the barriers among women with young children who were participating in the Expanded Food and Nutrition Education Program (EFNEP) (21). Another focused on low-income women participating in the WIC program (28). Similar to these studies, our study showed that childhood eating/feeding practices and consumption of fruits and vegetables are linked. Positive or negative influences on fruit and vegetable consumption in relation to

life course events have been described by several investigators(6,14,20,28).

Overwhelmingly, our study revealed that the main barriers to increased fruit and vegetable consumption were social and psychological. Many were interpersonal in nature and involved the costs and benefits of preparing vegetables for other family members, especially children. For example, similar to respondents in the EPNEP study (21), our respondents reported that childhood memories of being forced to eat vegetables were a deterrent to requiring their children to eat an adequate amount of vegetables.

Barriers to purchasing and consuming fruits and vegetables and food in this community were widely driven by the external as well as internal factors. Consistent with other findings(17), our findings indicate that the cost of fruits and vegetables was a major deterrent. In the urban setting of our study, the availability of fruits and vegetables in stores was not a major issue; getting to the store, however, could have been because only half of the sample used an automobile for shopping. In this public housing community, frequency of shopping in a supermarket ranged from once a month to more than once a week, with the median frequency being once every 2 weeks. This may be, in part, due to lack of access to automobiles. In comparison, the Food Marketing Institute (8) reports that, on average, the general public visits a supermarket 2.2 times per week.

The lower frequency of shopping in this population reduces the likelihood of a constant supply of fresh produce in the home throughout the month. Economic influences are no doubt a strong influence on this shopping schedule, because the beginning of the calendar month—when benefits are issued—was the most common shopping date. This schedule suggests that strategies for

buying and storing canned fruits and vegetables for the end of the month will be more successful than trying to promote more frequent purchase of costly fresh produce.

Although several organizations provided free or subsidized foods in the study community, purchased food was most desirable and most commonly used because of poor distribution practices. Cultural meanings differ significantly between rural and urban settings; while placing foods such as potatoes on the ground may be a routine event to food growers, it was interpreted as offensive by many in the study community.

It was evident, from the focus groups and structured interviews, that women had a major role and responsibility for purchasing food and preparing meals, a finding which is consistent with another study (17). From these data, we see that an evening meal is the central meal. Moreover, in most cases, all members of the household consumed the evening meal together. This meal is likely to be one in which the food choices made by the person preparing the meal could potentially influence the diet of all household members. Our results belie the stereotype of low-income households having little structure in their meals, and this is a positive starting point for interventions. In addition, the participants were knowledgeable about what constituted healthful food choices and were very much interested in learning more about nutrition. To take the next step in developing knowledge and skills among this population, nutrition professionals must use interventions that take advantage of these positive avenues for behavior change.

Lack of social support for shopping, meal preparation, and eating activities were expressed during the focus group. Educational programs, therefore,

---

should be organized to address socio-emotional issues such as encouraging meal preparers to car pool and partner with friends for cooking, as well as eat with friends. Acquiring these skills will be beneficial for single parents struggling with children's issues about fruits and vegetables. The clustered housing structure of these communities is an asset to reinforce these skills.

Despite some differences, it appears that women with relatively more socioeconomic resources (i.e., those who have completed high school or are currently working) do behave somewhat differently from those with less resources, but overall these households do not vary substantially in their food-related behaviors. This may indicate that similar strategies for promoting food-related behavior change could benefit all types of households within these public housing complexes.

Through these focus groups, we explored the issue of how this community would like to seek and receive information and which styles of approach are acceptable during intervention. The leaders of interventions would be most successful if they were older women from the community, and as such would merit respect as successful and knowledgeable homemakers. This reinforces the value placed on culturally relevant life experiences, rather than textbook solutions from the majority culture, for solving problems in this community. Respondents did not want to be talked to as unknowledgeable learners. Thus the information must be communicated in ways which are culturally respectful and socioemotionally supportive.

Ralston and Cohen(20) suggest several strategic approaches for delivering nutrition education among Black elders, many of which may be relevant for educating African-American communities in urban areas.

Several nutrition education interventions have been conducted among low-income populations, with results showing a positive intervention effect among Minnesota participants in EFNEP (12). A pilot project to increase fruits and vegetable consumption among the EFNEP population in Massachusetts has shown a positive effect working through existing social networks (7). A church-based, culturally sensitive intervention among African-American women has been effective in increasing fruit and vegetable consumption(5). Others (30) have shown that cooking events were more effective than the 5 A Day advertising campaign alone in increasing understanding of the 5 A Day message among low-income families.

In developing nutrition education programs for urban populations, such as the public housing community we studied, professionals who work with these groups should highlight the use of urban resources such as local farmers' market and personal gardens. In addition, educational strategies should emphasize nonperishable foods, including dried fruits and frozen or concentrated juices, included in the 5 A Day program.

For this urban sample of African-American women who lived in a public housing, homogeneous community, many barriers may make it difficult to assimilate information as currently disseminated from national nutrition campaigns, thereby limiting the benefits these campaigns may provide. Coupling educational activities with peer and social intervention will enhance the probability of effectiveness for national campaigns among the groups in our society who most need them.

## Acknowledgment

This research was funded, in part, through NCI CA61807 and NCI CA77184-01.

---

## References

1. Appel, L.J., Moore, T.J., Obarzanek, E., Vollmer, W.M., Svetkey, L.P., Sacks, F.M., Bray, G.A., Bogt, T.M., Cutler, J.A., Windhauser, M.M., Lin, P.-H., Karanja, N., Simons-Morton, D., McCullough, M., Swain, J., Steele, P., Evans, M.A., Miller, E.R., and Harsha, D.W. (DASH Collaborative Research Group). 1997. A clinical trial of the effects of dietary patterns on blood pressure. *New England Journal of Medicine* 336(16):1117-1124.
2. Babbie, E. 1994. *The Practice of Social Research, 7<sup>th</sup> Edition*. Wadsworth, Belmont, CA.
3. Bronner, Y., Burke, C., and Joubert, B.J. 1994. African-American/soul food ways and nutrition counseling. *Topics in Clinical Nutrition* 9(2):20-27.
4. Byars, D. 1996. Traditional African American foods and African Americans. *Agriculture and Human Values* 13(1):74-78.
5. Barnhart, M.J., Massavar-Rahmani, Y., Nelson, M., Rainford, Y., and Wylie-Rosset, J. 1998. An innovative, culturally-sensitive dietary intervention to increase fruit and vegetable intake among African-American women: A pilot study. *Topics in Clinical Nutrition* 13(2):63-71.
6. Devine, C.M., Wolfe, W.S., Frongillo, E.A., and Bisogni, C.A. 1999. Life-course events and experiences: Association with fruit and vegetable consumption in 3 ethnic groups. *Journal of the American Dietetic Association* 99(3):309-314.
7. Emmons, M.K., Macario, E., Sorensen, G., Hunt, M.K., and Rudd, R.E. 1999. Nutrition education for cancer prevention among low-income populations: An extension of the EFNEP model. *Journal of Nutrition Education* 31(1):47-53.
8. Food Marketing Institute. 1996. *Trends in the United States. Consumer Attitudes and the Supermarket*. Food Marketing Institute, Washington, DC.
9. Gey, K.F., Moser, U.K., Jordan, P., Stahelin, H.B., Eichholzer, M., and Ludin, E. 1993. Increased risk of cardiovascular disease at sub-optimal plasma concentrations of essential antioxidants: An epidemiological update with special attention to carotene and vitamin C. *American Journal of Clinical Nutrition* 57 (5 suppl):787S-797S.
10. Greger, J.L. 1999. Nondigestible carbohydrates and mineral bio-availability. *Journal of Nutrition* 129:1434S-1435S.
11. Hargreaves, M.K., Baquet, C., and Gamshadzah, A. 1989. Diet, nutritional status, and cancer risk in American blacks. *Nutrition and Cancer* 12(1):1-28.
12. Hartman, T.J., McCarthy, P.R., Park, R.J., Schuster, E., and Kushi, L.H. 1997. Results of a community-based low-literacy nutrition education program. *Journal of Community Health* 22(5):325-341.
13. Kittler, P.G. and Sucher, K. 1989. *Food and Culture in America*. Van Nostrand Reinhold, New York, NY.

- 
14. Krebs-Smith, S.M. 1995. Psychosocial factors associated with fruit and vegetable consumption. *American Journal of Health Promotion* 10(2):98-104.
  15. Krebs-Smith, S.M., Cook, D.A., Subar, A.F., Cleveland, L., and Friday, J. 1995. US adults' fruits and vegetable intakes, 1989 to 1991: A revised baseline for the Healthy People 2000 Objective. *American Journal of Public Health* 85(12):1623-1629.
  16. Kumanyika, S., Shankar, S., Mitchell, P., Ganganna, P., Smith, S.A., Thompson, L., and Tuckermanty, E. 1990. Recommended strategies for dietary modification. Report of the Technical Advisory Panel on Dietary Modification. U.S. Department of Health and Human Services, Bureau of Cancer Control, Washington, DC.
  17. Macario, E., Emmons, K.M., Sorensen, G., Hunt, M.K., and Rudd, R. 1998. Factors influencing nutrition education for patients with low literacy skills. *Journal of the American Dietetic Association* 98(5):559-564.
  18. Morgan, D.L. and Krueger, R.A. 1998. *The Focus Group Kit*. Sage Publishing, Thousand Oaks, CA.
  19. Patterson, B.H., Block, G., Rosenberger, W., Pee, D., and Kahle, L. 1990. Fruit and vegetables in the American diet: Data from the NHANES II survey. *American Journal of Public Health* 80(12):1443-1449.
  20. Ralston, P.A. and Cohen, N. 1999. Nutrition education for elders: A strategic approach for delivery. *Journal of Nutrition Education* 31(4):230-234.
  21. Reicks, M., Randall, J.L., and Haynes, B.J. 1994. Factors affecting consumption of fruits and vegetables by low-income families. *Journal of the American Dietetic Association* 94(11):1309-1311.
  22. The SAS System for Windows (computer program). Release 6.12. 1996. The SAS Institute, Inc., Cary, NC.
  23. Shankar, S., Subar, A.F., Hartman, A.M., Jobe, J.B., and Ziegler, R.G. 1998. Development of a food frequency questionnaire for an African-American population. *International Journal of Nutrition*. 3<sup>rd</sup> International Conference on Dietary Assessment Methods.
  24. Steinmetz, K.A. and Potter, J.D. 1991. Vegetables, fruit and cancer, 1. Epidemiology. *Cancer Causes and Control* 2(5):325-357.
  25. Steinmetz, K.A. and Potter, J.D. 1996. Vegetables, fruit and cancer prevention: A review. *Journal of the American Dietetic Association* 96(10):1027-1039.
  26. Taylor, A., Jacques, P.F., and Epstein, E.M. 1995. Relations among aging, antioxidant status, and cataracts. *American Journal of Clinical Nutrition* 62(6 suppl):1439S-1447S.

- 
27. Thompson, B., Demark-Wahnefried, W., Taylor, G., McClelland, J.W., Stables, G., Haves, S., Feng, Z., Topor, M., Heimendinger, J., Reynolds, K.D., and Cohen, N. 1999. Baseline fruit and vegetable intake among adults in seven 5 A Day study centers located in diverse geographic areas. *Journal of the American Dietetic Association* 99:1241-1248.
28. Treiman, K., Freimuth, V., Daamron, D., Lasswell, J., Alinker, J., Havas, P., Langenberg, P., and Feldman, R. 1996. Attitudes and behaviors related to fruits and vegetables among low-income women in the WIC program. *Journal of Nutrition Education* 28:149-156.
29. United States Census Bureau. Projected Number of Households by Type, Race and Hispanic Origin: 1995 to 2010, Series 3. [On-line] Available: <http://www.census.gov/population/projections/nation/hh-fam/table4n.txt>.
30. Weaver, M., Poehlitz, M., and Hutchison, S. 1999. 5 A Day for low-income families: Evaluation of an advertising campaign and cooking events. *Journal of Nutrition Education* 31(3):161-169.
31. World Cancer Research Fund and American Institute of Cancer Research. 1997. *Food, Nutrition and Prevention of Cancer: A Global Perspective*. Washington, DC.