

# Food Shopping Perceptions, Behaviors, and Ability to Purchase Healthful Food Items in the Lower Mississippi Delta

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## ABSTRACT

**Objective:** To examine the agreement between perceptions, behaviors, and ability to purchase healthful food in the Lower Mississippi Delta (LMD).

**Design:** A regional food store survey of healthful food options in supermarkets, small/medium stores, and convenience stores. Focus group discussions were conducted on shopping perceptions and behaviors.

**Setting:** Counties in Arkansas, Louisiana, and Mississippi.

**Participants:** Eighty-one LMD residents, 18-60+ years of age.

**Main Outcome Measure:** Perceptions of healthful food and ability to acquire these food items across store types.

**Analysis:** Focus group data were analyzed using thematic coding. Summary food store statistics were weighted, and estimates were constructed using SUDAAN 9. Data triangulation was achieved by comparing focus group findings with food availability data.

**Results:** A majority (> 85%) of supermarkets had selected vegetables, breads, and cereals perceived as healthful, whereas availability was limited in small to medium grocery stores and convenience stores. Skim milk, perceived as healthful, was limited in all store types.

**Conclusions and Implications:** Limited availability and perceived costs of healthful food in the LMD influenced purchasing behaviors. Attitudes and perceptions should be incorporated into intervention development to improve food choices in conjunction with increasing the availability of healthful food in the LMD.

**Key Words:** shopping perceptions, food supply, rural, attitudes (*J Nutr Educ Behav.* 2011;43:339-348.)

## INTRODUCTION

Following the healthful diet recommendations of the Dietary Guidelines for Americans could help lower the incidence or severity of chronic diseases.<sup>1</sup> The Dietary Guidelines for Americans recommends consuming a healthful diet that emphasizes fruit, vegetables, whole grains, and fat-free

or low-fat milk and milk products; that includes lean meats, poultry, fish, beans, eggs, and nuts; and that is low in saturated fats, *trans* fats, cholesterol, salt (sodium), and added sugars.<sup>1</sup> Few Americans follow the dietary guidelines, and low-income individuals are less likely to follow them.<sup>1-3</sup> Several studies have identified barriers associated with

eating healthful food.<sup>4-6</sup> Barriers identified by low-income individuals that prevented them from eating more healthful food include high prices and difficulty in accessing healthful food.<sup>4-6</sup>

Environmental, social, and individual factors influence food intake, which in turn affects the risk of many chronic diseases. Influences on food choices include knowledge of the relationship between diet and health; educational attainment and affordability; and availability and accessibility of food.<sup>7-11</sup> Availability and affordability of healthful food in the local food environment may influence food choices. Food recommended by health authorities is sometimes more expensive and less available in poor areas. Emerging research has shown a link between the local food environment and healthful food choices.<sup>12-17</sup> Difficulty in changing dietary behavior may

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stem from characteristics of the local environment that either reduce people's motivation to adopt a healthful diet or make changes difficult or impossible to achieve.<sup>7</sup> Nutrition-related attitudes and behaviors can be influenced by cultural, psychosocial, and socioeconomic factors.<sup>18</sup> Social Cognitive Theory (SCT) has been used extensively to explain beliefs and motivations of individuals for adopting preventive health behaviors.<sup>19-21</sup> Social Cognitive Theory conceptualizes behavior in terms of a 3-way dynamic and reciprocal interaction between personal factors, environmental influences, and behavior.

Approximately 5.3 million people in Arkansas, Louisiana, and Mississippi live in the Lower Mississippi Delta (LMD) region.<sup>22</sup> Similar to other rural areas, adults living in the LMD are more likely to experience higher rates of chronic diseases, such as type 2 diabetes, cancer, hypertension, and cardiovascular disorders.<sup>23-25</sup> Mortality rates from these diseases are much higher in the LMD states than nationally.<sup>26,27</sup> High rates of food insecurity, poverty, unemployment, and lack of educational attainment further complicate efforts to improve health in this high-risk, predominantly minority population.<sup>26</sup> Food access is limited in rural areas, particularly in the LMD.<sup>26</sup> Adults in the region consume 20% fewer servings of fruits and vegetables compared with national intakes and have higher intakes of fats and lower intakes of several micronutrients.<sup>28</sup> Children in the LMD generally have lower intakes of calcium, iron, and vitamins A, C, riboflavin, and B-6 compared with children nationally.<sup>28</sup> Low-income residents have limited access to supermarkets.<sup>29</sup>

Research conducted by the Consortium involved several components, Foods of Our Delta Study (FOODS 2000),<sup>30</sup> a focus group study (FGS),<sup>31</sup> and a food store survey (FSS).<sup>29</sup> This article reflects the analyses of a subset of data from 2 components of research, the FGS and the FSS, focusing on factors influencing nutrition-related health issues in the LMD. The authors' purpose was to examine the 2 data sets to compare food acquisition perceptions of Delta residents with actual availability of food within

the Delta Nutrition Intervention Research Initiative (NIRI) core food basket. Examining the 2 data sets together may provide insight relative to dietary quality in the LMD as reflected by Healthy Eating Index scores,<sup>3</sup> which can then inform community-based participatory research intervention efforts. This study investigated whether LMD residents' perceptions and knowledge of healthful food contradict the actual availability of healthful food in this region.

The SCT served as the framework for understanding the determinants of a change in healthful food acquisition. The reciprocal nature of the determinants of nutrition behavior in SCT makes it possible for nutrition intervention efforts to be directed at personal, external, or behavioral factors. Food choices are influenced by personal and environmental factors. In this study, linking these factors provides information for planning sustainable nutrition interventions in the LMD.

## METHODS

### Development of Data Collection Instruments

The FGS collected information from Delta residents on their perceptions of the problems associated with the acquisition and consumption of healthful food, food security, grocery shopping, and factors that influence behavioral changes in the consumption of healthful food.<sup>31</sup> The FSS evaluated the availability of food in 18 counties representing a larger 36-county region of the LMD of Arkansas, Louisiana, and Mississippi.<sup>29</sup> The 9 focus group counties were included within the 18-county study area. The methodology for FGS and the FSS was determined by the Delta NIRI Consortium research team. The Delta NIRI is a multistate, multi-institution consortium whose mission is to improve the nutrition-related health of LMD residents through community-based participatory research.<sup>26</sup>

**Focus group study.** Nine focus groups centering on the topic of food acquisition were conducted, 1 in each of 9 counties in Arkansas, Louisiana, and Mississippi, as part of a larger focus

group study on factors affecting consumption of healthful food.<sup>33</sup> The 9 counties were chosen randomly from 18 counties selected as intervention counties for the FOODS 2000 study.<sup>30</sup> Focus groups were conducted between July and September 2001 on varying days of the week at local churches, community centers, and the Louisiana Cooperative Extension Service offices.

A minimum of 8 to 10 people were recruited for each session through a variety of means, which included word-of-mouth contacts by community agency representatives and posting flyers in grocery stores, local businesses, and churches. The investigators used a participant application form to screen volunteers and collect demographic data. Participants were required to be: 18 years of age or older, a resident of the selected community, and the primary person responsible for preparing meals and purchasing food for the household. Participants were served light refreshments and given a \$50.00 gift certificate as an incentive to offset any inconvenience that might have resulted from involvement in the study. Participants signed an informed consent form before each session. Institutional Review Board approval was obtained from Southern University and A&M College, Pennington Biomedical Research Center, University of Southern Mississippi, Alcorn State University, University of Arkansas at Pine Bluff, and Arkansas Children's Research Institute.

The research team designed discussion questions to identify the food acquisition perceptions of residents. Questions were informed by the constructs and reciprocal interactions posited in SCT and provided information on factors supporting or interfering with healthful food acquisition (Table 1). The research team developed 12 open-ended questions, arranged from general to specific.<sup>32</sup> University faculty and staff at 4 of the project institutions reviewed the questions for content and clarity; modifications were made based on their suggestions. Pilot focus group sessions were conducted in the 3 states to pretest the focus group questions and methodology. Only logistic adjustments were made in recruiting participants as a result of pilot-testing. Focus groups were conducted according to

**Table 1.** Healthful Food Acquisition Focus Group Discussion Questions

1. Tell us your name and where you live.
2. Where do people shop for groceries in your community?
3. How do people get to the grocery stores in your community? How far do you travel to get to the grocery stores?
4. Are there places in your community that you will not go to shop? Why?
5. How often do you shop for: a) fruits and vegetables? b) other healthful food?
6. Think back to the last time you were shopping for food for your family. What types of healthful food were in your shopping cart? What types of fruits or vegetables were in your shopping cart?
7. What influenced your decision about purchasing healthful food including fruits or vegetables?
8. As you make shopping decisions, what's your opinion of fresh, frozen, and canned vegetables and fruits? Which do you prefer and why? What's your opinion of healthful food? Which do you prefer and why?
9. If you could make changes in the grocery store where you shop, what changes would you make? Probe: variety, what do you mean? Lower prices, how?
10. What are some ideas that might get people to purchase more healthful food including fruits and vegetables while at the grocery store? Which of these would work for you? Probe: What do you mean? How would this work?
11. We have talked about things that affect you purchasing healthful food including fruits and vegetables. What would it take for you to eat more healthful food including fruits or vegetables?
12. The goal of our discussion is to discover how to get people to eat more healthful food including fruits and vegetables in order to stay healthy. Have we missed anything?

standard procedures.<sup>32</sup> The focus group team, consisting of a team leader, moderator, and recorder, was trained by a nationally recognized expert in focus group methodology and evaluation.<sup>32</sup> The team leader supervised and assisted with the overall flow of the sessions, including setting up, greeting participants, helping with snacks, and distributing participant incentives. The moderator led the discussion and was assisted by the recorder, who taped the discussions and took field notes. During the sessions, participants were encouraged to speak until all views were expressed followed by additional probing and clarification. The same focus group team conducted all 9 sessions. The duration of each focus group session was 50-65 minutes. A quality control monitor attended all sessions and observed the structure of each session relative to delivery of questions by the moderator and to taping and debriefing procedures. The quality control monitor was also available to address all field operation problems.

Using the transcripts, field notes, and moderator/recorder reports, the focus group team reviewed the data for the purpose of identifying recurring trends and patterns among the focus group sessions.<sup>32</sup> These data were coded and sorted using the organizing framework of the discussion guide. The focus group team, including members of the writing group, identified emerging themes from a list of most frequent responses by 3 or more focus groups and categorized themes according to SCT constructs. Each writing group member reviewed the summary of emerging themes as part of a process of reaching consensus for the final summarization. Representative quotes were included with the emerging themes. A descriptive summary of findings, which highlighted the most frequent and dominant responses, was then compiled. Finally, an independent consultant skilled in focus group analysis reviewed data, transcripts, field notes, and summary reports prior to preparation

of the final report by the focus group team.

*Food store survey.* A regional survey was conducted of food stores of 3 types (supermarkets, small/medium grocery stores, and convenience stores) to determine availability and quality of 102 food items. The Delta NIRI FSS food basket was a representative list of food items that, if chosen, would supply a healthful diet with culturally appropriate food choices. Survey sampling and data collection methodology have been described in detail elsewhere.<sup>29</sup> Briefly, 225 stores (62 supermarket stores, 77 small/medium stores, and 86 convenience stores), drawn from a sampling frame of 557 stores stratified by county and store type, were surveyed to determine availability of 102 discrete food items. Supermarket stores were defined as large grocery stores with shopping carts and more than 1 checkout station; availability of all food sections to be surveyed on the FSS instrument; and extensive variety in produce and frozen food. Small/medium stores were classified by exclusion from the convenience and supermarket categories. They were smaller than supermarkets, but larger than convenience stores; had a limited number of the food sections to be surveyed with very limited variety, especially seasonal produce, and they were often locally owned. Food stores were surveyed by 2 pairs of trained surveyors. Food item lists were derived from the Thrifty Food Plan food lists,<sup>33</sup> the Authorized Food Retailers' Characteristics and Access Survey,<sup>34</sup> and food commonly consumed in the LMD region as determined from the Delta NIRI FOODS validation study and development of the Delta NIRI food frequency questionnaire.<sup>35</sup> The Delta NIRI core food basket was derived from the Delta NIRI FSS food basket and included 38 regionally important items. The items were divided into 5 broad food categories with subcategories based on the form of food. These categories were: (1) fruits and vegetables, subdivided by fresh, canned, and frozen; (2) breads and grains; (3) meat, fish, and poultry; (4) dairy; and (5) baking products, fats, and sweets. Availability was defined as the presence in food stores

of food items making up each food basket. Each item was recorded as available or not available. For the Delta NIRI core food basket, availability was calculated as the percentage of food basket items available in a store.

### Data Analysis

The frequency counts of the emerging themes were determined across focus groups (counties). Food store survey data were stored in a Microsoft Access database. SAS (version 9.1, SAS Institute, Inc., Cary, NC, 2002-2005) was used for FSS data management. A stratified sampling plan was used, with stores selected by store type within county. Five stores of each type were targeted from each county. Sample weights were constructed to account for differential probabilities of selection within county and store type. All available stores were sampled in counties with 5 or fewer supermarkets. A finite sample correction was made to account for large sampling fraction in some strata. All summary statistics (eg, means, medians, 25th and 75th percentiles) were weighted, and estimates were constructed using SUDAAN 9 (RTI International, Research Triangle Park, NC, 2009). Dot plots were constructed using Stata 10 (Stata, College Station, TX, 2007).

## RESULTS

A demographic profile of the food acquisition focus group participants is summarized in Table 2. Of the 81 participants, 44% were 18-44 years of age and 56% were over 45 years of age. The majority were female (95%) and African American (69%); 43% had a high school education, and 43% had more than a high school education.

The food acquisition perceptions of focus group participants are summarized in Table 3. Environmental and personal factors may motivate or interfere with food acquisition behavior change.

### Perceptions of Food Accessibility

Participants reported purchasing food from a large retailer as well as from small/medium grocery stores. Al-

**Table 2.** Demographic Profile of Participants in the Healthful Food Acquisition Groups (n = 81)

	Healthful Food Acquisition n (%)
<b>Age (y)</b>	
18-44	36 (44)
45+	45 (56)
<b>Sex</b>	
Male	4 (5)
Female	77 (95)
<b>Race</b>	
African American	56 (69)
Caucasian	22 (27)
Hispanic	2 (2)
Asian	1 (1)
<b>Education<sup>a</sup></b>	
< High school	6 (7)
High school	35 (43)
> High school	35 (43)
<b>State</b>	
Arkansas	23 (28)
Louisiana	32 (40)
Mississippi	26 (32)

Note: Percentages may not total 100 because of rounding.  
<sup>a</sup>Five individuals did not provide information on education level.

though most participants reported traveling 8-15 miles to the nearest acceptable retail outlet, some traveled approximately 60 miles. Use of personal cars for shopping was reported most often, but arranging to share a ride was also frequently reported. Most participants reported shopping for fruits and vegetables 2 times per week.

Participants seemed to prefer fresh fruits and vegetables over other forms. Many obtained fresh vegetables from home gardens rather than purchasing them from the grocery store. Concerns were raised as to the quality and availability of fresh fruits and vegetables in local markets. Participant quotes: "I just love fresh fruits and vegetables"; "My father has a garden"; "I have neighbors with gardens"; "I raise my own garden"; "They should sell better products. Fresher"; "Better fresh fruits and vegetables-better quality."

Desired changes in the shopping outlet indicated by participants were lower prices, better variety, better quality, and more fresh food items.

## Healthful Food Perceptions

Participants were asked, "What is your opinion of healthful food?" Participants stated eating 3 meals a day; eating a balanced diet from the food groups; eating fruits and vegetables; eating food items that are low in sugar, fat free, low in fat, or low calorie; consuming chicken, turkey, or skinless chicken; and using cooking methods such as baking, broiling, and grilling. Personal and family health motivated participants to purchase healthful food. Participant quotes: "For my health, I like vegetables for my health"; "My husband's stroke was a wake-up call."

Although personal preferences influenced food purchases, the majority of participants were influenced by family members. Participant quotes: "Taste for me, I buy vegetables because I like them"; "My husband is a vegetable eater . . . so I buy and prepare vegetables that I wouldn't ordinarily"; "My children. My boys, because my boys like to eat."

Participants associated healthful eating with higher food prices and stated that healthful food was not affordable. Participants reported that lower prices, risks/benefits of healthful versus unhealthy food choices, and food preparation would motivate them to purchase more healthful food. Participant quotes: "The bottom line is price. If you can't afford it, you're not going to buy it"; "Healthy food is very expensive, so it goes back with bringing the prices down"; "Money makes it hard, because when you go to the grocery store, prices shoot up on all the fruits and vegetables"; "What I'm saying is I'm on a budget and I have to get what I can get to make it last as long as it can. That means I can't really get what I should and ought to have. I buy like chicken, flour, and meal, something like that. And I can't get the fruits that I should have."

### Healthful Food Purchasing Motivators

Education on the risks of unhealthy eating and benefits of healthful food choices and food preparation would motivate participants to purchase more healthful food. Most suggested

**Table 3.** Food Acquisition Perceptions and Behaviors of Focus Group Participants

Question/Response	Number of Groups Making Responses (n)	Social Cognitive Theory Construct
<i>Where do people shop for groceries in your community?</i>		
Large grocery retailer	9	
Small/medium grocery store	9	
<i>How do people get to the grocery stores in your community?</i>		
Personal vehicles	9	
Friend/family	6	
Pay someone to transport	6	
<i>How far do you travel to get to the grocery stores?</i>		
Average distance 8-15 miles	6	
<i>Are there places in your community that you will not go to shop? Why?</i>		
Stores with high prices	7	
<i>What influenced your decision about purchasing healthful food including fruits or vegetables?</i>		
Personal and family health	7	Personal
<i>As you make shopping decisions, what's your opinion of fresh, frozen, and canned vegetables and fruits? Which do you prefer and why?</i>		
<i>What's your opinion of healthful food? Which do you prefer and why?</i>		
Prefer fresh	7	Personal
Acquire vegetables from home garden	7	Environmental
<i>If you could make changes in the grocery store where you shop, what changes would you make? Probe: variety, what do you mean? Lower prices, how?</i>		
Lower prices	9	Environmental
Better variety	8	Environmental
Better quality	8	Environmental
Fresh food items	8	Environmental
<i>What are some ideas that might get people to purchase more healthful food including fruits and vegetables while at the grocery store?</i>		
Lower prices	6	Environmental
Cooking demonstrations	6	Personal (knowledge/skills)
Education on the risk of unhealthful eating and benefits of healthful eating	9	Personal (knowledge/skills)
<i>We have talked about things that affect you purchasing healthful food including fruits and vegetables? What would it take for you to eat more healthful food including fruits or vegetables?</i>		
Teach new ways to prepare meals	9	Personal (knowledge/skills)
Providing healthful recipes and cookbooks	6	Environmental

that teaching food preparation skills and providing healthful recipes and cookbooks would provide motivation for consumption of more healthful food. Participant quotes: "You really have to be taught to eat it"; "Cook it another way"; "My biggest problem is figuring out what to fix for a meal"; "I want somebody to show me how to do it."

### Healthful Food Purchased

When asked about the types of healthful food and fruits and vege-

tables purchased, chicken, beef, pork, fish, whole-wheat bread, cereal, milk, and Jello were named, in addition to several fruits and vegetables (Table 4). Jello was perceived as a healthful food item in comparison to desserts such as cakes and pastries. This observation would suggest a substitution of Jello for cakes and pastries as dessert as a tradeoff, thus contributing to the perception that Jello is lower in sugar and calories and more healthful.

### Food Availability by Store Type

Data on availability of the core food basket items (38 items) by store type are illustrated in Figure 1. Small/medium stores had fewer of these items available than supermarkets, and more items than convenience stores. Most items in the core food basket were found in more than 94% of LMD supermarkets. On average, 25% of the stores had less than 95% (36 items) of the 38 items. Over 50% of the supermarkets stocked 100% of

**Table 4.** Healthful Food Acquisition Practices of Focus Group Participants

Food Group	Item	Group Frequency (n)
Fruit	Banana	5
	Peach	4
	Watermelon	4
	Grapes	4
Vegetables	Carrots	5
	Greens	5
	Potatoes	5
	Broccoli	4
	Cabbage	4
	Field/dried peas	4
	Tomatoes	4
	Chickens	7
Meat, Fish, Poultry	Pork	6
	Ground meat, beef	4
Dairy	Milk	6
Breads and Grains	Whole-wheat bread	4
	Cereal	4
	High-fiber cereals	3
Baking products, fats, and sweets	Gelatin dessert	4

the items. Approximately 48% of the core items, including some meats and most fresh produce, were stocked by fewer than 50% of the small/medium stores (Table 5). Only 32% of the food basket was available in convenience stores; these items were limited primarily to nonperishable items such as stick margarine, canned tuna, canned peaches, fresh and canned green beans, whole milk, eggs, dry spaghetti, rice, corn flakes, oatmeal, crackers, bread, enriched flour, and sugar.

Food items perceived as healthful and their availability by store type are presented in Figure 2. Vegetables included green beans, broccoli, greens, potatoes, and canned vegetables. Although 81%-93% of supermarkets had these vegetables, the food items were available in less than 20% of small/medium stores except for canned vegetables and in less than 4% of convenience stores. Bread was also perceived as healthful, however, whole-wheat bread was available in fewer than 85%, 23%, and 6% of supermarkets, small/medium stores, and convenience stores, respectively. Cereal and high-fiber cereals and oatmeal were perceived as healthful and were available in 97%-100% of supermarkets, 39%-75% of small/medium stores, and 18%-36% of convenience stores.

Whole milk, another food item believed to be healthful, was available in over 85% of supermarkets, small/medium, and convenience stores. Low-fat milk was available in 93%-100% of supermarkets and fewer than 50% of small/medium and convenience stores, and there was limited availability of skim milk.

## DISCUSSION

This study extends the understanding of the challenges to nutritional health faced by LMD residents. This study is one of the first to link qualitative data on food acquisition perceptions and behaviors with quantitative data on food availability in the region. Increasingly, researchers are turning to mixed-method techniques to provide expanded analysis and greater detail, providing new insight and confirming findings from each other.<sup>36,37</sup>

### Barriers to Purchasing Healthful Food

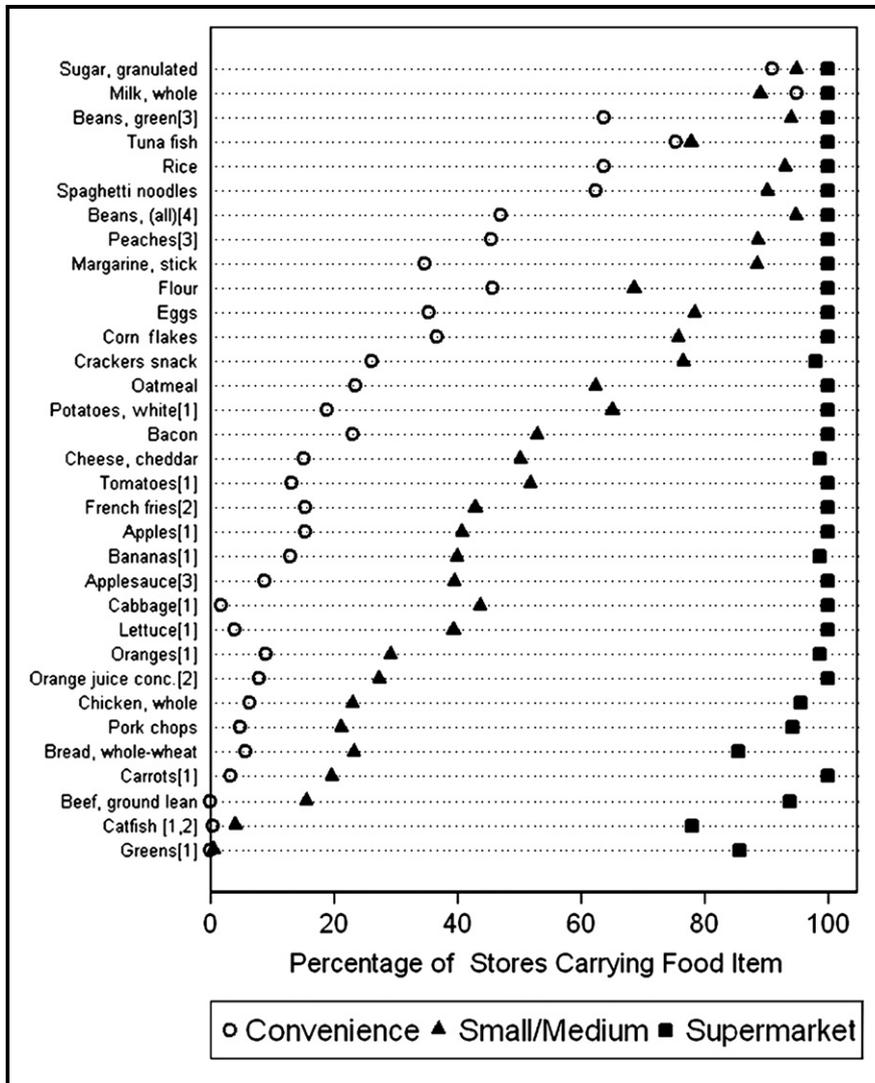
Focus group discussion with LMD residents identified factors that support or interfere with healthful food purchasing. The FGS findings support the theoretical tenets of the SCT. Additionally, knowledge gained from the FGS provides an understanding

of the complex personal and external determinants of behavior change. The study demonstrated that healthful food acquisition is influenced by individual and environmental factors.

*Environmental factors.* For some individuals, the local food environment is associated with meeting dietary recommendations.<sup>38</sup> Because population densities are low and stores are widely scattered in rural areas, distance to market is a significant barrier for low-income, elderly, and rural residents. Residents of the LMD have difficulty accessing fresh, nutritious food. Transportation was problematic for participants. Studies have shown that lack of transportation in rural areas is a barrier to food access and potentially to a healthful diet.<sup>39,40</sup>

*Personal factors.* Personal factors emerging from data analysis included individual or family health, preferences, and lack of food preparation skills. Health status, either for themselves or family members, was a strong motivator for purchasing healthful food. Consistent with other research, the findings demonstrated that the presence of certain health conditions influenced purchasing decisions, and the influence of personal and family preferences, including taste of food, influenced purchasing decisions.<sup>41,42</sup> Consequently, focus group participants purchased food based on family preferences and expressed a preference for fresh fruits and vegetables.

*Meaning of healthful eating.* Participants had some knowledge of the meaning of healthful eating. This finding is consistent with other research identifying perceptions of a healthful diet.<sup>43</sup> However, knowledge of healthful eating may not translate to healthful food acquisition or eating behavior. Similarly, participants had some misconceptions about healthful food. This finding may explain the listing of Jello as a healthful food. Although Jello provides little nutritional value, it can be a sweet treat to replace desserts for some individuals. Data from National Health and Nutrition Examination Survey (NHANES) III and NHANES 1999-2000<sup>44</sup> and FOODS 2000<sup>45</sup>



**Figure 1.** Availability of Delta Nutrition Intervention Research Initiative core food basket items by food store type. Note: Foods are ranked by overall availability. Numbers embedded in labels refer to type of product: [1] fresh, [2] frozen, [3] canned, and [4] dried.

indicated that fats and sweets are more available than fruits and vegetables in the LMD. An assessment of dietary quality in the LMD based on Healthy Eating Index scores indicated a lower overall diet quality, particularly concerning grains, vegetables, fruit, dairy products, meats, and dietary variety.<sup>3</sup> Inadequate food and nutrient intake of Delta residents was more pronounced in African Americans than Caucasians, in adults than in children, and in lower-income households.<sup>28</sup> This is a concern because of the chronic disease burden in this LMD population.<sup>24</sup> Residents of the LMD perceived knowledge of “healthful eating” contradicts the LMD’s high incidence of nutrition-related chronic diseases.

### Determinants of Food Acquisition Behaviors

Healthful eating behaviors may be influenced by biological determinants (hunger, appetite, taste); economic determinants (cost, income, availability); physical determinants (access, education, skills, time); social determinants (culture, family, peers, meal

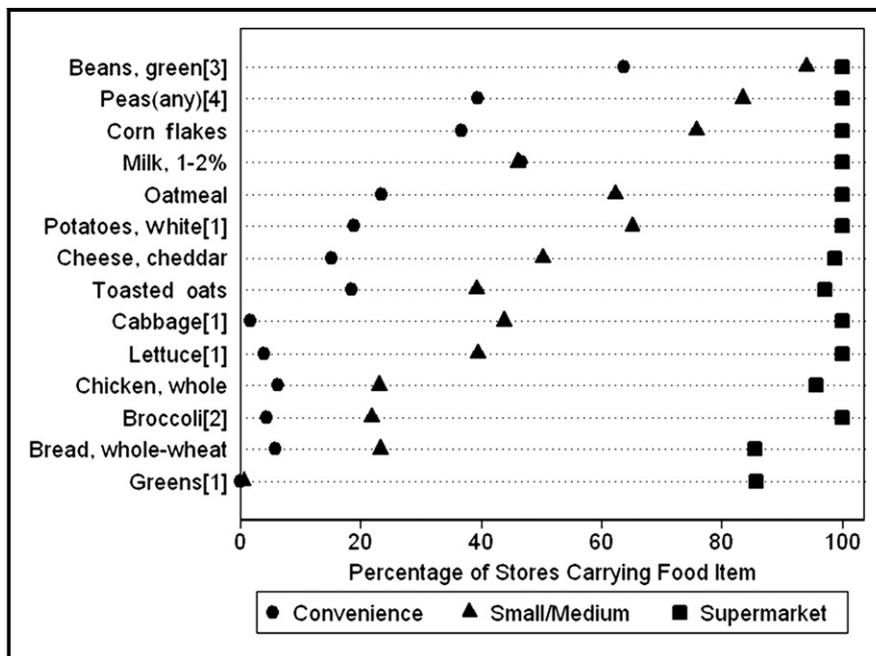
patterns); psychological determinants (mood, stress, guilt); and attitudes, beliefs, and knowledge about food.<sup>46</sup> Although individuals may have some knowledge of healthful food, unless there are sources of affordable, accessible healthful food it will be difficult to acquire those healthful food items to either initiate or maintain healthful eating. The research findings demonstrated that food availability, variety, quality, and affordability influenced purchasing behaviors. These barriers have an impact on the LMD residents’ ability to achieve a healthful diet. A previous study on fruit and vegetable access in low-income communities has also reported participants’ concerns that healthful food choices were not affordable within their communities.<sup>39</sup> The absence of quality and affordability of food for low-income residents prevents or diminishes their ability to choose food items that help maintain a healthful lifestyle.<sup>39,47</sup> Persons with low incomes and members of ethnic minority groups spend less money on food than their counterparts do, but a higher proportion of their income is spent on food.<sup>38,41,48</sup>

### Reconciling Food Purchasing Perceptions and Food Availability

Previous research has demonstrated that environmental factors, such as access and affordability, are only a small part of the problem surrounding low fruit and vegetable consumption, and greater recognition should be given to how the importance of motivation to eat fruit and vegetables influences consumption.<sup>49</sup> Limited time for food shopping, cooking, and family activities and transportation challenges are factors that must be captured in measures of physical and economic access and availability of food.<sup>50</sup>

**Table 5. Percentile Estimates of Delta NIRI Food Basket Items (38 items) Available by Store Type**

Store Type	25th Percentile	50th Percentile (median)	75th Percentile
Supermarket	95.3% (36.2 items)	100% (38 items)	100% (38 items)
Small/medium	35.3% (13.4 items)	47.6% (18.1 items)	62.6% (23.8 items)
Convenience	15.3% (5.8 items)	21.8% (8.3 items)	32.4% (12.3 items)



**Figure 2.** Foods perceived as healthy and their availability by store type. Note: Numbers embedded in labels refer to type of product: [1] fresh, [2] frozen, [3] canned, and [4] dried.

Limited availability and perceived costs of healthful food in the LMD influenced purchasing behaviors and ability to achieve a healthful diet. As a result, LMD residents are limited by the cost of food and availability and access to supermarkets. Food choices people make are influenced by food availability. Participants indicated that convincing families to eat healthful food can be achieved by changing personal and family behaviors related to meal planning, food purchasing, and food preparation. The average number of daily servings of green vegetables and breads and grains consumed by LMD residents was  $0.14 \pm 0.02$  and  $5.9 \pm 0.09$ , respectively.<sup>27</sup> Low consumption of these food items highlights the importance of changing behaviors and food environment.

### Limitations of the Research

The focus group sample was not randomly selected and only 1 group was conducted in each county, limiting generalizability. However, the sample design included participants from 9 counties representing the predominant ethnic groups in the LMD region and a range of ages and education levels. A limitation of focus group research was the somewhat subjective nature of qualitative data analysis.

However, an independent consultant skilled in focus group analysis reviewed data, transcripts, field notes, and summary reports prior to preparation of the final report by the focus group team. A trained facilitator limited focus group-related interactive problems such as 1 participant dominating others, normative discourse tendencies, within-group conflicts, and arguments. Another limitation common to focus group methodology was that discussion responses reflect the perceptions and opinions of the participants and that the responses of participants may have biased the responses of other participants. However, data analysis bias may have been minimized because participants responded to open-ended questions, which allowed the participants to give detailed reactions to questions. Further, the sampling frame for the FSS included the 9 counties in which focus groups were conducted.

### CONCLUSIONS

The LMD has reported challenges when it comes to availability, accessibility, and adequacy of health services and healthful food.<sup>23-29</sup> This article examined agreement between perceptions, behaviors, and ability to purchase healthful food in the LMD.

The findings show that changes in healthful food access and consumption will happen only through understanding and addressing the experiences, knowledge, and needs of the residents. Knowledge alone does not result in healthful eating behavior. Personal, external, and behavioral factors may affect the ability to make dietary changes. Sources of affordable and accessible food are needed to initiate and make healthful food choices. Physical access to food, as well as affordability, time to prepare food, and cultural traditions are important in determining whether people will purchase and consume more healthful food. Thus, greater attention must be focused on developing interventions that include strategies to increase knowledge of nutritious food, assist low-income adults in making healthful food acquisitions, and promote environmental and public policies to improve availability and accessibility of healthful food.

### IMPLICATIONS FOR RESEARCH AND PRACTICE

Development of nutrition interventions targeting food purchases is of limited value without changing availability within local stores in the LMD. Attitudes and perceptions of LMD residents should be incorporated into intervention development to improve food choices in conjunction with increasing the availability of healthful food in the LMD. Greater understanding and incorporation of attitudes and perceptions of LMD residents are critical for effectively increasing availability of healthful food. Availability and access to supermarkets that offer a variety of food at lower cost suggest that changes in the food environment are necessary to achieve a healthful, affordable diet. United States policies and programs aimed at improving access, availability, and diet quality should consider the social context of food preparation and purchasing and the residential environment.

Research is needed to obtain a broader understanding of food access issues in the LMD, including studies that identify the barriers and facilitators to healthful food choices. Research is needed to access the

cultural appropriateness of emerging and nontraditional approaches to improving availability and accessibility to lower-cost, nutritious food. For example, little research is available on the viability of communal gardens for this population. What types of food should be available at farmers' markets that would increase the likelihood of increased use by the target population? Little is known about the extent of influence of culture and class on acceptability and food choices among this population. Although it is known that there are regional differences in food habits, what are the common factors across all cultures that should be examined to develop a universal model promoting achievement of a healthful and nutritious diet? Supermarkets or other food sources that offer a variety of food at lower cost appear to be essential to achieve a healthful and affordable diet. The need for nutrition intervention is indicated for adults in the LMD. A multimodal, longitudinal approach is needed to address the many challenges that thwart healthful food choices. Most importantly, this approach must be taken in partnership with the community and involving a broad diversity of people.

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