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Lack of Easy Accessibility as a Potential Barrier to Adequate Fruit and Vegetable Consumption by Limited-Resource Individuals

Sandria L. Godwin and Fisseha Tegegne

Encouraging people to use their resources to purchase more fruits and vegetables is often at the top of the list of topics addressed by nutrition educators. Still, most populations are not consuming nearly enough fruits and vegetables according to a 2003 FAO/WHO Expert Report on Diet, Nutrition, and the Prevention of Chronic Diseases. This is particularly troubling given the surge of new research suggesting that fruits and vegetables can help prevent nutrient-deficiency disorders and also reduce the risk of cardiovascular diseases and cancer. Low-income individuals and households tend to spend less on and consume fewer fruits and vegetables than do their higher-income counterparts. A survey by the Economic Research Service (2004) shows that 19% of low-income households bought no fruits and vegetables from grocery stores over a two-week period, compared to only 10% of high-income households. A number of factors affect fruit and vegetable consumption, including accessibility, affordability, lack of motivation to eat more, cost, and specific preferences. Data gathered from 176 low-income individuals residing in Middle Tennessee showed that consumption of both fruits and vegetables by limited-resource individuals was well below the recommended intake. Thus it is of continuing interest to researchers to determine the reasons or potential reasons for this finding. The purpose of this study was to assess the availability of fruits and vegetables in stores which were easily accessible to the participants in the dietary-intake study. In-person surveys were conducted at fifty stores that were within a one-mile radius of five food banks to determine which fruits and vegetables were available in each and the quality of those that were present. These stores included any that was listed as a grocery store in a computer database, regardless of the size of the store. A large percentage of the stores had no fresh fruits or vegetables available. Most sold canned, while only a few had frozen fruits or vegetables. The fresh fruits that were most often available included apples, bananas, and lemons. Lettuce and cabbage were the most commonly available fresh vegetables. The variety of canned items was greater, with green beans being the mostly widely available. It is concluded that more fresh produce should be offered in stores that are in areas of easy accessibility to low-income neighborhoods. It is also recommended that a follow-up study be done to compare the prices of the items available, and whether increasing their presence in the local grocery stores leads to increased consumption.

Studies show that inadequate consumption of fruits and vegetables contributes to an increase in the risk of exposure to different kinds of diseases (Quan et al. 2000). The 2005 Dietary Guidelines for Americans (DGA) emphasize fruit and vegetable intake, with a recommendation of two cups of fruits (four servings) and two-and-one-half cups of vegetables (five servings) for a 2000 calorie diet (DHHS and USDA 2005). This is a significant increase over the 2000 DGA, which recommended two servings of fruits and three servings of vegetables as the minimum (USDA and DHHS 2000). The new guidelines also recommend consumption of vegetables from all five sub-groups (dark green, orange, legumes, starchy vegetables, and vegetables) on a weekly basis. The above recommendations suggest the importance of consuming fruits and vegetables to maintain a healthful diet. Despite this, consumption of fruits and vegetables is below recommended levels in the U.S. and other countries.

The relative purchase and consumption of fruits and vegetables is much lower for low-income groups with low education levels (Kreb-Smith and Kantor 2001; Quan et al. 2000; Giskes et al. 2002; Turrell et al. 2002; Johansson et al. 1999; Rogers et al. 1995). A study by the Economic Research Service of the USDA (Blisard, Stewart, and Jolliffe 2004) showed that low-income households spent significantly less on fruits and vegetables

Godwin is professor, Department of Family & Consumer Sciences, and Tegegne is associate professor, Institute of Agricultural and Environmental Research, Tennessee State University, Nashville.

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than did higher-income households. In contrast to 10% of high-income households, 19% of low-income households bought no fruit and vegetables in any given week (Blisand et al.; Quan et al. 2000). Another study focusing on the Mississippi Delta residents found that 20% of the residents had a lower intake of fruits and vegetables than residents in other regions (Champagne et al. 2004). This was also reflected in a previous study of low-income persons that we conducted where the mean intake of fruits and vegetables was considerably below the recommendations (Godwin, Speller-Henderson, and Tegegne 2004).

Proximity to supermarkets with easy access to nutritious foods has been noted as one of the key factors affecting consumption of fruits and vegetables (Marland et al. 2002a). Work by Tegegne et al. (2005) shows that use of store brands and discount coupons by stores will affect food-purchase decisions of low-income households. Lack of nutrition education among low-income households is also recognized to be an important factor.

Availability of outlets with stocks of fruits and vegetables at affordable prices in low-income areas remains an essential element for increasing consumption of fruits and vegetables by low-income households. Therefore, the purpose of this study was to ascertain whether a variety of fresh, canned, and frozen fruits and vegetables are available in the areas that are within relatively easy access to limited-resource individuals.

Methodology

Identification of Grocery Stores Surveyed

A previous dietary study (Godwin, Tegegne, and Speller-Henderson 2003) was conducted at Second Harvest Food Bank distribution sites in Nashville, TN. Five sites located in different sections of the city were selected for the present study. We identified stores listed as "grocery stores" that were within a one mile radius of each site using a web-based program (Excursia.com). This resulted in a total of 57 stores. Since some of the stores listed were not in operation, and a few managers would not let us survey their store, the research was completed in 50 "grocery stores."

Development of Survey Template and Data Collection

A preliminary investigative study was conducted in stores that would be in the final project. The researcher visited the store and made a list of all of the fruits and vegetables that were available, noting brands and forms. This allowed for the development of a comprehensive coded template that could be used as a checklist in the stores that were assessed for the project. Items that were noted, when applicable, included: whether the fruit/vegetable was available, brand names, form, quantity, size of container, quality of fresh produce, location within the store, and dates on packages.

Using the template that was developed, the researcher went in person to each of the stores, described the purpose of the project and what would be done to the clerk or manager, and received permission to conduct the in-depth investigation of the fruits and vegetables available in each store. Data was entered into SPSS-PC for analysis.

Results and Discussion

Table 1 shows the availability of fresh, canned, and frozen fruits and vegetables in the stores. Only 74%

Table 1. Percentage of Stores with Various Forms of Fruits and Vegetables Available (n=50).

Form of fruit/vegetable	Availability	
	N	%
Fresh	31	62
Canned	42	84
Frozen	18	36

of the stores surveyed had at least one fresh fruit or vegetable in the store. A smaller percentage (62%) had a canned fruit or vegetable. Although 90% of the stores had a frozen fruit or vegetable, it is important to note that it was most often orange juice.

The percentage of stores with different types of fresh fruits and vegetables present in the stores can be seen in Table 2. As expected, apples, bananas, lemons and oranges were the fresh fruits found most frequently. With the exception of lemons, this is in agreement with consumption data from our previous study, where these were the fruits most commonly eaten. It is probable that lemons were used in beverages in our consumption survey, but were not considered as something that needed to be reported on a dietary intake questionnaire.

Overall, fresh vegetables were found in fewer stores than were fruits, perhaps because they are more likely to be purchased to eat in-hand (see Table 2). The most frequently found vegetables were lettuce and cabbage. Tomatoes and potatoes were present in only 30% of the stores, although they were the most commonly consumed vegetables in our previous study. Perhaps these are items that are grown in gardens and were given to the individuals in the dietary study, or it is possible that the items were consumed somewhere other than the home.

As can be seen in Table 3, canned vegetables were more readily available than canned fruits. Only seven canned fruits were available in at least 20% of the stores, whereas 18 different vegetables were available in the same percentage of stores. The wide availability of fruit cocktail was reflected in the dietary study; however, the other fruits found in the stores were rarely consumed. Green beans were found in the majority of stores (62%). Of the remainder of the vegetables seen, we were surprised to see that asparagus, a high-cost vegetable, was found in 40% of the stores. It was not reported as an item that was consumed on any of the dietary

Table 2. Percentage of Stores Carrying Specific Fresh Fruits and Vegetables (n=50)[a].

Name of fruit	%	Name of vegetable	%
Apples	74	Lettuce	36
Bananas	44	Cabbage	34
Lemons	36	Cucumber	30
Oranges	34	Bell pepper	30
Tangerines	30	Potatoes	30
Grapes	28	Tomatoes	30
Grapefruit	28	Carrots	30
Pears	28	Cucumber	30
Plums	26	Onions	28
Cantaloupe	22	Sweet potatoes	28
		Turnip greens	26
		Celery	26
		Broccoli	22
		Squash	20

[a] Only those fruits and vegetables found in over 20% of the stores are listed in the table

Table 3. Percentage of Stores Carrying Specific Canned Fruits and Vegetables (n=50)[a].

Name of fruit	%	Name of vegetable	%
Fruit cocktail	58	Green beans	62
Peaches	44	Green peas	48
Pineapple	38	Carrots	44
Grapefruit	30	Corn	42
Mandarin oranges	28	Tomatoes	42
Apples	24	Mixed vegetables	40
Plums	24	Mushrooms	40
		Asparagus	40
		Greens	38
		Yams	36
		Sauerkraut	32
		Beets	30
		Lima beans	30
		Potatoes	28
		Squash	28
		Butterbeans	28
		Spinach	26
		Hominy	24

[a] Only those fruits and vegetables found in over 20% of the stores are listed in the table

Table 4. Percentage of Stores Carrying Specific Frozen Fruits and Vegetables (n=50)[a].

Name of fruit	%	Name of vegetable	%
Orange juice	90	Corn	28
Peaches	24	Broccoli	28
Strawberries	24	Green beans	26
Blackberries	22	Peas and carrots	22
		Squash	22

[a] Only those fruits and vegetables found in over 20% of the stores are listed in the table.

records in the previous study.

The percentage of stores with frozen fruits and vegetables can be seen in Table 4. Only four frozen fruits and five frozen vegetables were found in at least 20% of the stores. Orange juice was found in almost all of the stores (90%). It was also the most commonly consumed fruit in any form in our study. Although nutritionists typically recommend that fresh fruits be consumed, frozen foods can be a highly nutritious addition to the diet. However, a wider variety of frozen juices and other fruits and vegetables should be made available.

Few fruits and vegetables were found to be of poor quality or outdated. The most

frequent problem was bananas (14%), which ripen very quickly, and greens (10%). Other fruits that were deemed inedible were usually in bags (i.e. grapes and pears). Thus the majority of the fresh produce was deemed edible.

Although a variety of fruits and vegetables in various forms were found in many of the stores, it is still of concern that many stores had at most only one fruit or vegetable. It is important to note that only one of the stores surveyed that is within 1 mile of a food box distribution site is considered a major supermarket. The widest variety of items of different forms, sizes, and types were found there. Therefore it would be beneficial for a large supermarket to be accessible to all individuals.

A more in-depth study is needed to compare the cost of the foods in the stores in the areas that are highly populated by low-income households to food stores in other areas. If availability is not a limiting factor, then perhaps cost or lack of education regarding the importance of consuming fruits and vegetables is the issue.

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