Assessing the Nutrition Environments in the Southern Quadrant Area in Jackson, Mississippi

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ABSTRACT

The research assessed the availability, quality, and price of healthy and less healthy foods in grocery stores and convenience stores in a low wealth urban area in south Jackson. Using the Nutrition Environment Measurement Survey (NEMS), seven grocery stores and two corner stores were selected for evaluation of the area's nutrition environment. The sample was selected from a larger number of stores located in Hinds County, Jackson Metropolitan Area. Findings from the study showed that most stores sold healthier alternatives in beverages, such as low fat milk, fruit juice, and diet sodas. However, the healthier alternatives were generally costly. Less healthy options in meats with higher percentages of fat, frozen dinners, and whole milk were popular foods and available in a majority of stores. The study concludes that the need exists for improving the availability of healthier foods in low wealth communities.

Acknowledgements

Introduction

Grocery stores comprise a major part of a community's nutrition environment. They offer a variety of foods ranging from basic staples to fresh produce. Determining a community's nutrition environment is not an easy task. The array of food outlets vary significantly in the types, quality, and price of victuals. These variations may influence healthier or less healthy food consumption decisions (Wesley, Leggett & Manogin, 2014). Nutritionists, health professionals, researchers, and others interested in communities' nutrition environments can now evaluate them using the Nutrition Environment Measurement Survey (NEMS). NEMS provides a validated tool for measuring nutrition environments. The assessment can be conducted at any geographic scale – community, city or countywide, regional, or even larger geographies. Additionally, a variety of food outlets can be evaluated for nutrition offerings, including grocery stores, corner and convenience stores, and restaurants.

The NEMS tool for grocery and convenience stores typically evaluates a food outlet in eleven categories: milk, fresh fruits and vegetables, ground beef, hot dogs, frozen dinners, baked goods, beverages, whole grain bread, baked chips and cereal. The efficacy of the survey allows researchers to evaluate these

eleven measurements, revealing the availability or non availability of healthy and less healthy food items within various proximities of residential areas.

Evaluating Nutrition Environments

Honeycutt, Davis; Clawson and Glanz (2010) report that the NEMS measures are the only widely disseminated nutrition environment assessments that have been adopted and continuously utilized to measure the nutrition environments of a vast number of locations. Cavanaugh, Mallya, Brensinger, Tierney and Glanz (2013) employed the Nutrition Environment Measurement Survey for Corner Stores (NEMS-CS) to evaluate the nutrition environments in corner stores in Philadelphia. Targeting low wealth neighborhoods, the researchers examined food availability, quality, and price. Their findings opened possibilities for intervening improvements in food offerings.

Glanz, Sallis¸ Saelens and Frank (2007) conducted the NEMS study in four neighborhoods in the Atlanta metropolitan area with four neighborhoods defined as census tracts. Testing 15 food outlets in each of the four neighborhoods, the researchers concluded that the NEMS-S tool proved to have a "high degree of inter-rater and test–retest reliability" (p. 282). Liese, Weis, Pluto, Smith, and Lawson (2007) used an evaluation tool similar to NEMS in their study. The researchers used the instrument to evaluate the nutrition environments in rural areas of South Carolina. Their assessment also included amenities such as handicap parking, automatic doors, and curb features.

Drawing from research conducted in the mid 2000s, Glanz, Sallis, Saelens, and Frank (2005) posited that nutrition environments may factor into some of the disparities in nutrition and health outcomes among some racial/ethnic and socioeconomic groups. Indeed, Pluto, Smith, and Lawson (2007) observed that the largest number of supermarkets tend to be located in predominantly White areas while a high percentage of grocery stores are located in minority areas. Similarly, Morland, Wing, Roux, and Poole (2001) discovered that low wealth and minority communities may not have equal access to healthier food options available in larger supermarkets found in more affluent and White neighborhoods. The research conducted by Morland et al (2001) included counties in North Carolina and Maryland, selected suburbs of Minneapolis, Minnesota and Jackson, Mississippi.

The Nutrition Environment in the South Quadrant Area of Jackson, MS

Food security means having the physical and economic means to obtain adequate, safe, and nutritious foods (World Health Organization, 2015). The World Food Summit (2002) reaffirmed the right of all persons to have access to safe and nutritious food. Notwithstanding the growing awareness about food security, Feeding America (2015), found that the 2011-2013 national average of persons experiencing food insecurity totaled 14.6%. During the same study, the organization observed that eight states experienced higher food insecurity than the national average. Of the eight, Mississippi ranked second highest at 20.1%, topped only by Arkansas at 21.2%. The remaining states ranged from 16.0% to 18.0%. The Environmental Atlas provides a significant amount of data specific to communities' access and proximity to grocery stores. Data for 2010 showed that seniors, children, and a large number of households with no automobile living in Hinds County have low access to stores where they can purchase nutritious and affordable food (United States Department of Agriculture [USDA], 2015).

According to the Community Profile-City of Jackson-GIS (2015), 81.8 % of African Americans and 15.7% of Caucasians live within a five-mile radius of the nearest grocery store. Furthermore, 25.8% of these residents have a household base income of less than $15,000. The American Planning Association ([APA], 2007) noted that access to healthy foods in low wealth communities is an increasing concern. The availability of and access to adequate grocery stores that offer healthy food options in close proximity to where people live provides communities opportunities for choosing healthy foods. Conversely, the absence of such food outlets places communities at risk for living in a food desert. Food Desert, defined by USDA (n. d.)–is an area with limited access to fresh, healthy, and affordable food. These areas are predominantly comprised of lower income neighborhoods and communities whose accesses to these foods (super markets and/or grocery stores) remain limited.

The community food environment of Hinds County consists of 42 grocery stores, 3 supermarkets/club stores, 18 convenience stores without gas stations, and 131 convenience stores with gas stations (City-Data, 2015). These food outlets provide diverse options in food items, including those considered healthy. However, the APA (2007) noted that market changes, such as chain supermarkets mergers, can result in closure of viable grocery stores, reducing even further the availability of healthy food choices. The recent announcement about the closing of Kroger in the south quadrant area of Jackson illuminates such risks to food security. With little more than a courtesy explanation for the closure, Kroger's Community Affairs and Public Relations Manager issued a statement that the "hard decision" was made after an evaluation (WJTV Staff, 2015, para. 2). The Cincinnati, Ohio-based company explained that the closure was because the store had underperformed for several months (Ayres, 2015).

Using the Nutritional Environment Measurement Survey for Stores (NEMS-S) and the Nutritional Environment Measurement Survey for Corner Stores (NEMS-CS), a sample of seven grocery stores and two corner stores were evaluated on eleven nutritional measurements. The sample was selected from a larger group of stores evaluated within an area located in the south quadrant of the City of Jackson, Mississippi in Hinds County, one of five counties comprising the Jackson, Mississippi Metropolitan Statistical Area.

Sample and procedures

A random sample of nine grocery and corner stores located in the southern quadrant of Jackson were selected from a larger compiled list. Of the nine, seven were grocery stores and two were corner stores. Data for the study were collected in July and October 2014.

Measurement tool

The Nutrition Environment Measures Survey for Stores (NEMS-S) was adopted for use in grocery stores and convenience stores. NEMS-S is a validated observational measure of grocery, corner, and retail store nutrition environments (Glanz et al., 2007). The survey assessed the availability of healthy foods, quality of foods, and price of foods in stores. The inter-rater reliability and test-retest reliability were evaluated to affirm reliability of the adapted NEMS-S and confirm the quality of data collected for the evaluation (Glanz et al, 2007).

Statistical analysis

Means, standard deviations (SD), and ranges were used to summarize continuous variables (e.g. price). Frequency counts and percentages were used to summarize categorical variable (e.g. availability). To test for the differences in the mean prices of healthy vs. less-healthy items paired-t-tests were used. To test the differences in the NEMS-S and NEMS-CS summary scores by store characteristics, analysis of variance (ANOVA) models were used. All analyses were performed using IBM Statistics version 21.

Findings

NEMS-S measures were completed for 7 grocery stores and NEMS-CS measures were completed for 2 convenience stores. Kappa's for inter-rater reliability for availability of vegetables and fruits ranged from 0.703 (p = 0.001). The availability of the products observed had low values of 0.45 to 1.00 due to skewed data.

Ground beef, hotdogs, frozen dinner, and milk were the most popular items that were sold in the majority of the stores. The availability of healthy alternatives of these products were seldom available. The availability of the latter in a healthier option was significantly more expensive (-0.013/ lb., p = 0.013; -0.035/ package, p = 0.035; -0.035/ oz, p = 0.035; -0.013/ half gal, p = 0.01 respectively). Milk, soda, and juice were very prominently sold in all stores. Low fat milk, 100% fruit juice, and diet soda are the healthier alternatives that were commonly seen in most stores; nevertheless, they were slightly less available and more expensive. Low fat milk, 100% fruit juice and whole grain bread were the most costly. Thus, the healthier option for the respective category was tabulated to be the significantly more expensive (66.7%, p<0.031; 99% p<0.001; 88.9% p<0.04 respectively).

Table 1

Food Type and Availability

Type of Food (unit price)	Availability		Number of Varieties	Price	
	Healthy	**Less-Healthy**	**Healthy**	**Healthy**	**Less-Healthy**
	N(%)	N(%)	Mean (SD)	Mean (SD)	Mean (SD)
Meats and frozen meals					
Ground beef	5(55.6)*	9(100)*	0.56(0.53)	5.12(0.84)	4.25(0.49)
Hotdogs	7(77.8)*	9(100)*	0.78(0.44)	3.73(2.32)	3.51(2.22)
Frozen Dinner	7(77.8)*	9(100)*	0.78(0.44)	3.49(0.71)	3.63(0.933)
Beverages					
Milk	6(66.7)*	9(100)*	0.67(0.5)	2.56(0.97)*	2.14(0.89)*
Juice	9(100)	9(100)	1.0(0.0)	3.52(0.88)*	1.99(0.18)*
Calorie drink	7(77.8)	9(100)	1.0(0.0)	4.78(0.27)	4.78(0.27
Baked goods, snacks and cereal					
Bake goods	6(66.7)	9(100)	0.6(0.5)	3.12(0.96)	3.35(0.95)
Bread	8(88.9)	8(88.9)	0.89(0.33)	3.45(0.31)*	3.15(0.54)*
Chips	3(33.3)	9(100)	0.33(0.5)	3.20(0.14)	3.18(0.75)
Cereal	7(77.8)	9(100)	0.78(0.44)	3.75(0.84)	3.89(0.51)

*P = 0.05 for comparing less healthy to healthy

Table 2

Jackson grocery/corner stores' availability, price, and quality. **(N=9)**

Type of Food (unit price)	Availability N (%)	Number of Varieties Mean (SD)	Price Mean (SD)	Quality N(%)
Any Fruit				
Fruit: top 3 available	2(20)	1.5(0.85)		
Bananas (piece)	9(100)	-	0.47(.27)	7(86%)
Apples (piece)	9(100)	-	1.38(0.59)	7(86%)
Oranges	9(100)	-	0.93(0.59)	7(86%)
Any Vegetable				
Veg: top 3 available	2(20)	1.5(0.85)		
Tomatoes (lb.)	9(100)		1.61 (1.1)	7(100%)
Sweet Peppers (lb.)	9(100)	-	1.05 (0.9)	7(100%)
Cabbage	9(100)	-	0.54(0.35)	7(100%)
Canned & frozen		-		
fruits and vegetables				
Frozen vegetables	4(40)			
Canned fruits	7(70)			
Canned vegetables	6(60)	-	-	

*Two of the stores observed were corner stores that did not have fruits and vegetables.

According to the NEMS-S and NEMS-CS scoring, there are three primary evaluative dimensions: availability, price, and quality (information on scoring is available upon request). The maximum possible score is 54 points (availability + price + quality). The maximum number of possible points for availability is 30 points, price 18 points, and quality six points. The average availability percentage for the nine stores assessed was approximately 57% according to the NEMS-S and NEMS-CS scoring. Hence, the implication is that on average, of all grocery and convenience stores assessed; only 57% had the availability of a variety of healthier alternatives. The average price percentage for the nine stores assessed was 1.78%. The average percentage in the quality category for fresh fruits and vegetables was 93 percent. Thus, on average, of all grocery and convenience stores assessed in the area of south Jackson, 1.78% of the healthier alternatives were inexpensive; consequently, a majority (98.2%) of the stores in south Jackson sells healthier alternatives that are priced significantly higher.

Discussion

This research describes the availability, quality, and price of healthy and less-healthy food options in seven grocery stores and two corner stores in the south quadrant area in Jackson. Findings from the study suggest the need for greater improvement in healthier foods; particularly baked goods, bread, chips, 100% fruit juices, fruits, vegetables, and similar food items. The prices for healthier alternatives in milk, bread, juice, etc., must be competitive. Intervention is vital to improve the food environment in the south Jackson area specifically, and dietary choices among low- income urban populations generally.

Two limitations to the study are the small sample size and cross-sectional data collection. Because of the limited number of stores evaluated for nutritional food offerings, the findings cannot be adequately generalized to other communities, particularly those that are not urban, population–dense, or in concentrated poverty. Secondly, cross-sectional data collection is contingent upon food availability, quality, variety, and price. These assessed factors may vary due to turnover in store ownership turnover. Additionally, variations in prices may occur because of seasonal availability of some food items.

Regardless of the limitations, the contribution of this study adds significantly to the limited but growing literature on the nutrition environment in Mississippi, but especially within the south Jackson area. The study's strength includes the use of validated, observation measurement tools (NEMS-S and NEMS-CS), which were adopted and tested for grocery and corner stores focusing on healthier food alternatives beyond their availability. The research underscores the need to insure the public health goal of promoting healthy diets by making healthy and affordable foods available to all communities.

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