Research Brief

Impact on Dietary Choices after Discount Supermarket Opens in Low-Income Community

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ABSTRACT

Objective: To examine (1) the association of a new supermarket opening with dietary intake and perceptions of healthy food availability, and (2) associations of distance to the primary food store and mean prices of fruits, vegetables, and sugary beverages with levels of consumption of these foods and body mass index in a low-income, southeastern community.

Methods: The researchers used cross-sectional, self-administered questionnaire data and supermarket audit data collected in the supermarket community and comparison community before (2015) and after (2016) the supermarket opening. A difference-in-difference analysis employed propensity scores to compare pretest and posttest differences between communities.

Results: There were no significant differences between communities on dietary behaviors. There was a significant cross-sectional, inverse association between distance to the primary food store and fruit and vegetable consumption among all respondents in 2016.

Conclusions and Implications: The results suggest that adding a new discount supermarket is not necessarily associated with improvements in residents' fruit, vegetable, or sugary beverage consumption, or in their perceptions of the availability of healthy food in the neighborhood. However, distance to the store may be important.

Key Words: fruit, health promotion, obesity, policy, vegetables (*J Nutr Educ Behav*. 2018;■■:■■–■■.)

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INTRODUCTION

Elements of the community and consumer nutrition environment influence food choices and dietary behaviors.[1] In response to studies demonstrating the positive associations between geographic access to supermarkets and a healthier weight status, public–private partnerships have resulted in new supermarkets opening in municipalities across the US, with researchers examining whether a new supermarket will result in healthier dietary practices among residents of food deserts (low-income areas with limited healthy food access).[2-4] The majority of these studies occurred in large urban municipalities; some found no impact on dietary quality[2,4] and another found positive changes in overall dietary quality that were not linked to use of the new supermarket.[3] Replication of such studies is needed in more rural, southern US municipalities, where obesity and chronic diseases are highest in the state and nation.[5-7] Because the community food environment in rural areas is different compared with urban areas,[8] there is potential for a stronger impact on dietary intake from establishing a new supermarket in rural areas.

Foods and beverages purchased from supermarkets represent a majority of kilocalories consumed.[9] The type of supermarket where individuals shop is associated with purchases and consumption,[10-12] and some have found higher body mass index (BMI) among individuals who primarily shop at discount supermarkets.[13] However, little is known about how supermarket-related factors may be associated with more healthful purchases. Two potential influential factors are the comparative price of healthy vs unhealthy foods[11] and distance to the food store.[13] If healthy foods are less expensive relative to unhealthy foods,

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individuals may be more likely to purchase and consume healthier options. Distance to food stores can influence purchases in that individuals living farther from their supermarket of choice may shop for groceries less frequently and subsequently purchase more shelf-stable, nonperishable goods.[14]

The researchers analyzed data from baseline and a follow-up of cross-sectional samples in 2 low-income, eastern North Carolina communities (1 intervention and 1 comparison) to investigate (1) whether the introduction of a new supermarket was associated with subsequent changes in residents' diets and perceptions of the healthfulness of food available in their neighborhoods; and (2) whether (a) distance to the participants' primary food store and (b) mean price of fruits and vegetables and sugary beverages were associated with consumption of these foods and with BMI.

METHODS

Study Setting and Participants

In 2014, a discount supermarket opened a new location in an underserved, low-income area in Greenville, NC, the county seat of Pitt County. To examine the impact of a new supermarket on residents' diets, an impact evaluation with a comparison community was implemented. Kinston, the county seat of neighboring Lenoir County, was selected as a suitable comparison community. As noted in the authors' baseline article,[12] in Pitt County (estimated population 170,485), and in Lenoir County (estimated population 59,277), a high percentage of residents were obese or overweight compared with state and national data. Unlike urban areas, both Southern communities had limited public transportation opportunities, which further reduced underserved residents' transportation options to obtain groceries. Limited public transportation systems differentiated the settings of the current study from other studies in urban settings (with many public transportation options) where new supermarkets had opened.

Recruitment in Greenville and Kinston occurred within 2 of the lowest-income census blocks in each location (near the new discount supermarket in Greenville) and in community venues such as the public library and a community health center. Participants had to be aged >18 years and speak English. As an incentive, participants were offered a chance to win 1 of 8 $100 Walmart gift cards (4 in each location). The East Carolina University Institutional Review Board approved this study.

Baseline data were collected in Greenville (the new supermarket community) in April and May, 2015 (n = 178). The new supermarket opened July 1, 2015, and follow-up data were collected from October through November, 2016 (n = 94). In Kinston (the comparison community), baseline data were collected in August, 2015 (n = 172) and follow-up data were collected in October through November, 2016 (n = 93). No new supermarkets opened in Kinston during the study period. The study setting and methods were described in detail in a prior baseline article[12] and are detailed here subsequently.

In-Store Observations

The Bridging the Gap Food Store Observation Form (BTG-FSOF)[15] was used in a representative sample of grocery stores and supermarkets in the 2 study communities, determined based on commonly used chain supermarkets in eastern North Carolina (eg, Food Lion, Piggly Wiggly, Walmart). The BTG-FSOF includes an assessment of fruit, vegetable, and sugary beverage availability and price, 2 important elements of the consumer food environment. To assess how elements of the consumer food environment were associated with consumption and BMI, 2 trained observers completed the BTG-FSOF in 5 representative food stores within 5 miles of the new supermarket's location (in June, 2015) in Greenville and in 4 representative and comparable food stores (eg, of the same supermarket chains) (in September, 2015) in Kinston (the comparison community), and in the same stores in September through November, 2016. The BTG-FSOF sections related to fruits, vegetables, and sugary beverages were used as described previously.[12] Because availability did not vary appreciably among stores (eg, fruit and vegetable availability scores were 11 in 1 store and 12 in the remaining stores), for this analysis the researchers focused on the mean prices of fruits, vegetables (per pound), and sugary beverages (per unit). The mean price was used for 6 commonly purchased fruits and vegetables per pound (apples, bananas, grapes, carrots, tomatoes, and lettuce) and 3 types of sugary beverages per unit (soda [least expensive], soda [regular, nonsale price], and juice drink [< 50% fruit juice]).

Distance to Primary Food Shopping Venue

Participants' residential address and store location where they typically shopped were obtained during data collection; complete store addresses were found or verified using the ReferenceUSA business database.[16] Residential and food store addresses were batch geocoded with the Google Maps application programming interface through the BatchGeo website[17] and verified with Google Maps street listings and Google satellite imagery (Google LLC, Mountain View, CA). All addresses were geocoded to the highest level of accuracy possible, either to the rooftop (street address precision) or range-interpolated (interpolated between 2 precise points) levels. For both participant residence and store location, if data were missing or incomplete on specific variables that could not otherwise be determined, each missing data point was coded as missing. Distance from a participant's home address to the primary supermarket was calculated using the Google Distance Matrix application programming interface. Distances were calculated over a statewide street network to increase accuracy and reduce edge effects by accounting for customers' ability to traverse administrative (ie, county) boundaries.

Fruit, Vegetable, and Sugary Beverage Consumption, Perceived Healthful Food Access, and BMI

Daily fruit and vegetable consumption (in servings per day) was measured with the National Cancer Institute Fruit and Vegetable Screener.[18]