Research Brief

Cost of Children's Healthy vs Unhealthy Snacks Does Not Differ at Convenience Stores

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ABSTRACT

Objective: This study compared the prices of unhealthy (chips) and healthy (ready-to-eat fruit) snacks that students are likely to purchase from corner stores.

Methods: Snacks were purchased from 325 New Jersey corner stores; chip prices were compared with fruit prices overall and by store sales volume and block group characteristics.

Results: Prices did not differ significantly between chips and fruit in the overall sample in which both items were available (n = 104) (chips: \$0.46 ± \$0.15; fruit: \$0.49 ± \$0.19; $P = .48$) or by store or block group characteristics. Neither mean fruit prices nor mean chip prices differed by store sales volume or by neighborhood characteristics.

Conclusions and Implications: Promoting ready-to-eat fruits in corner stores to children as a price-neutral alternative to calorically dense snacks can be a viable strategy to improve the nutritional quality of snacks commonly purchased at corner stores.

Key Words: child, snacks, food costs, convenience stores (*J Nutr Educ Behav*. 2016;■:1-3.)

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INTRODUCTION

Small retail food stores tend to concentrate near schools,[1] providing students ready access to snacks on the way to and from school each day.[2] Although some corner stores may stock healthier options, these tend to be more expensive compared with their less nutritious counterparts.[3] Food prices contribute to students' eating behaviors, as adolescents, most of whom have a limited amount of spending money and consider price, among other factors, when choosing which foods to purchase and eat.[4,5] The purpose of this study was to compare corner store prices of an energy-dense, nutrient-poor snack students are likely to purchase (chips),[2] with prices for healthy, ready-to-eat snacks (fruit). The authors hypothesized that fruit would cost more than chips.

METHODS

Store audits were conducted in 2014 for a cross-sectional study that developed and validated a reduced audit instrument.[6] Details of that study are provided elsewhere.[6] Briefly, it was part of the New Jersey Child Health Study, and the sample of 325 New Jersey corner stores was powered for that project. The sampling frame consisted of small food stores listed in commercially available business lists (InfoUSA and Nielsen) for the metro areas of Camden, Newark, New Brunswick, and Trenton, NJ in 2013. Because the only data collected from participants related to store inventories, the study was granted exempt status by the Arizona State University Institutional Review Board.

Addresses of stores were geocoded using ArcGIS (Esri, Redlands, CA) to obtain Census block group codes. Stores were matched with their corresponding block group's characteristics including proportion of residents at least aged 25 years with at least a high school education, median income, proportion of households earning < 150% of the federal poverty level, race/ethnicity, proportion of female-headed households, proportion of households with residents under age 18 years, and proportion of residents at least aged 16 years who were unemployed. Block group characteristics were obtained from the American Community Survey Summary File Retrieval Tool.[7] Store sales volume was obtained from business files.

Data collectors completed the 325 audits in June, July, August, and December. After completing each audit, data collectors purchased the smallest bag of chips sold in the store and ready-to-eat fresh fruit, if available. In most stores the smallest bag of chips was 1 oz; in some cases, however, only larger sizes were available. Fresh fruit was considered ready-to-eat if it did not require peeling (eg, apple), if it could be peeled without a utensil (eg, orange), or if it was cut up and in a single-serve container (eg, cup of watermelon). Purchased fruits that qualified for this analysis included bananas, apples, oranges, pears, plums, peaches, nectarines, strawberries, and a mixed fruit cup. Data collectors recorded the name, size, and price of each

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Table 1. Mean Proportions of Education Level, Employment Status, Race/Ethnicity, Household Income, and Head of Household Status in Block Groups in Which Study Stores Were Located, and Mean Employee Count, Sales Volume, and Square Footage of Study Stores

Block Group Characteristics (n = 104)	Mean ± SD (%)
At least high school/General Education Degree education	70 ± 16
Unemployed	13 ± 6
White, non-Hispanic	5 ± 12
Black, non-Hispanic	54 ± 34
Hispanic/Latino	37±31
Household income < 150% of federal poverty level	45 ± 19
Female head of household with children	28 ± 12
Store characteristics (n = 100)	
Employees, n	2.8 ± 1.2
Sales volume, ($)	739,177 ± 268,067
Floor area, ft^2	1,272 ± 129

purchase they made. The current analysis included only stores from which a 1-oz bag of chips and a ready-to-eat fruit were purchased.

Means and SDs were used to summarize purchase prices, store sales volume, and block group characteristics. Paired *t* tests were conducted to compare fruit and chip prices overall, by store sales volume and block group characteristics, and by time of year (3 summer months vs December). One-way between-groups analysis of variance was conducted to analyze differences in chip and fruit price differences and to analyze fruit and chip prices separately according to store sales volume and block group characteristics. Chip and fruit prices were not normally distributed, and were log-transformed for analysis (SPSS version 23; IBM Corporation, Armonk, NY, 2015).

RESULTS

Table 1 presents characteristics of stores included in the sample and block groups where these stores were located. On average, 45% ± 19% of households in block groups where sampled stores were located earned <150% of the federal poverty level. Block groups were predominately non-Hispanic black and Hispanic, with an average unemployment rate of 13% ± 6%. Furthermore, 70% ± 16% of residents across all block groups had at least a high school education or General Education Diploma. The average sales volume of all stores was <$1 million. One-ounce bags of chips were purchased from 56% of stores, 54% of stores had ready-to-eat fruit, and 32% of stores had both. Mean price of all chips (n = 181) was $0.47 ± $0.16, compared with $0.52 ± $0.20 for all ready-to-eat fruit (n = 177) (Table 2). Prices did not differ between summer months and December. When comparing the mean price of chips with that of fruit only in stores where both items were available (n = 104), chips were $0.46 ± $0.15 and fruit was $0.49 ± $0.19 (Table 2, Figure). This difference was not significant. As shown in the figure, although mean fruit prices tended to be a few cents higher than mean chip prices across all subgroups, none of the differences were statistically significant, nor were any of the differences significant between the mean cost of fruit and chips. Neither the mean fruit prices nor the mean chip prices differed by store sales volume or neighborhood characteristics.

DISCUSSION

This study focused on 2 food items that students might be inclined to purchase as snacks from small stores often located near schools.[1,2] In the overall sample as well as in all subsamples, a student would spend approximately the same amount on either a ready-to-eat fruit or a 1-oz bag of chips.

This is good news for communities instituting healthy corner store programs to increase the availability of healthy foods in their neighborhoods. Small-store owners might be reluctant to lower prices on fruits and vegetables to increase sales, but in this sample, price reductions seemed unnecessary. Promoting ready-to-eat fruits to children may result in students choosing fruit over an unhealthy snack, and would be more viable for store owners than would lowering prices. Borradaile et al[2] found that on average, children purchased approximately 360 cal/trip to a corner store on the way to or from school, and that those purchases were primarily composed of chips, candy, and sugary beverages. A student who visited a corner store just 3 times/wk and exchanged an energy-dense, nutrient-poor snack for a fruit or vegetable snack could reduce his or her calorie consumption by approximately 300 cal/wk while adding vitamins, minerals, and fiber to his or her diet.

Healthy corner store initiatives targeting children for interventions to encourage them to choose healthy snacks over unhealthy ones have not always proven effective.[8,9] A change in societal norms concerning what constitutes a snack, a process that could require years of exposure, may be necessary for a change in children's snacking preferences.

Healthier foods and food patterns have been found to be more expensive overall compared with their less nutritious counterparts.[10] Almost half of the stores in this sample had no ready-to-eat fruits, and an alternative fruit or vegetable, such as a mango, was purchased. When these fruits and vegetables were included in analyses, healthy

Table 2. Price Means, Medians, and Interquartile Ranges of 1-oz Chips and Ready-to-Eat Fruit Purchased From Study Stores

Snack Purchases	Mean ± SD ($)	Median ($) (Interquartile Range)
All		
Chips (n = 181)	0.47 ± 0.16	0.50 (0.35–0.50)
Fruit (n = 177)	0.52 ± 0.20	0.50 (0.40–0.50)
Stores with both chips and fruit (n = 104)		
Chips	0.46 ± 0.15	0.50 (0.35–0.50)
Fruit	0.49 ± 0.19	0.50 (0.35–0.50)