

Disparate Advertising of Sugary Drinks: An Analysis of Beverages Promoted in Circulars from Grocery Stores in High- and Low-Income New York City Zip Codes

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Abstract

Background: The consumption of sugar-sweetened beverages (SSBs) has been associated with an increased risk of chronic disease including obesity, type 2 diabetes, and coronary heart disease. A correlation between low socioeconomic (SES) status and higher SSB intake has also been established.

Objective: The objective of this study was to analyze the calorie content and added sugar in beverages advertised in circulars of grocery stores in high- and low-income New York City zip codes.

Methods: Across a two-month period, we analyzed various nutritional characteristics of beverage products advertised on the front page of online circulars from grocery stores in 5 low- and 5 high-income New York City zip codes.

Results: Three-fourths of beverage products for sale in circulars from low-income zip codes were sugar-sweetened (74.4%) as compared with just over one-third advertised in those from high-income zip codes (35.7%).

Conclusion: High-calorie, sugary beverages are being marketed and priced to sell by grocery stores serving low SES populations with high SSB consumption patterns. Health education and promotion efforts that grocery stores can implement to contribute to chronic disease prevention are discussed.

Keywords: Sugar-sweetened beverages (SSBs); Calories; Circulars; Diabetes; New York City

Introduction

Numerous studies have shown a correlation between consumption of sugar-sweetened beverages (SSBs) and increased risk of such health conditions as metabolic syndrome, type 2 diabetes and obesity across various populations. A meta-analysis of data from eleven studies that included over 310,000 participants highlighted an association between higher SSB consumption and weight gain as well as development of type 2 diabetes and metabolic syndrome [1]. Among adult males, SSB consumption has been linked with increased risk of heart disease, type 2 diabetes, and adverse changes in inflammatory factors and lipids [2,3]. Health effects of SSBs among females have been shown as well [4,5]. Women who consumed more sugar-sweetened beverages were at increased risk for gaining weight and developing type 2 diabetes in research using data from the Nurse's Health Study [5]. In recent years, sugary sport drink consumption has tripled among adolescents [6], an age group where SSB intake has been shown to be a significant predictor of change in body fatness in early adulthood [7]. In younger children, an inverse association between milk and SSB intake has been identified [8]. Study findings also indicate that lower-income populations are more likely to purchase SSBs than those in higher-income brackets [9].

This study's objective was to compare the prevalence and various nutritional characteristics of beverages advertised in online circulars of grocery stores in high- and low-income New York City (NYC) zip codes. More specifically, added sugar and calorie content for these beverages were analyzed to determine possible differences that may contribute to disparate levels of nutrition-related chronic disease in low- versus high-income areas. Efforts that grocery stores can implement to address these disparities including increased - and primary placement of - sale promotions for more healthful beverage options, is discussed.

Materials and Methods

The study's methodology largely followed that used for a prior study discussed elsewhere [10]. Using 2010 Census data, we identified the 5 highest- and 5 lowest-income zip codes within NYC where grocery stores were located [11]. Only grocery stores that offered online circulars were eligible for selection. For each of these stores, we analyzed products advertised on the front page of their online circular every other week across a two-month period. Beverages were identified using the USDA National Nutrient Database [12].

Additional nutritional characteristics identified for each beverage included the following: 1) sugar-sweetened, 2) total calorie content, 3) total calories from sugar per serving, and 4) high- or low-calorie. Per the Centers for Disease Control and Prevention, sugar-sweetened beverages (SSBs) were identified by the presence of high-fructose corn syrup or sucrose on the label's list of ingredients and included full-calorie sodas, fruit drinks and punches, tea drinks, sport drinks, and energy drinks [13].

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Nutritional analyses for calories and sugar content were conducted using the manufacturer’s nutrition facts label. Total calories and calories from sugar were both calculated based on an 8 fluid ounce serving of each advertised beverage. Beverages were classified as low- or high-calorie using the New York City Food Standards for Beverage Vending Machines [14]. Beverages containing ≤ 25 calories per 8 ounces were classified as low-calorie, while those containing >25 calories per 8 ounces were considered high-calorie. Mean values for total calories and proportion of calories from sugar were calculated for both high- and low-income zip codes. T-tests were performed using Microsoft Excel to determine P values.

Results

Across a two-month period, we analyzed a total of 805 products advertised in 40 online grocery store circulars (circulars split evenly between low- and high-income zip codes). Of these products, 517 were identified in circulars from low-income zip codes (64.2%). Beverages consisted of 14.7% of these advertisements (N=118).

Table 1 summarizes the total number of beverages and proportion of sugar-sweetened, low- and high-calorie beverages advertised in online circulars of grocery stores in the 5 lowest- and 5 highest-income NYC zip codes where supermarkets were located. There were 90 advertisements for beverages in the low-income zip codes with over 75% categorized as high in calories (n=68). In comparison, of the 28 beverage-related advertisements in the high-income zip codes, 57.1% were identified as high-calorie drinks (n=16).

A significant difference was found for the number of calories per 8 fl. oz serving (P=0.02) where the low-income group’s advertised beverages were 27 kcals higher, on average, than the high-income group’s (82.9 versus 55.9 kcals, respectively). In the low-income zip codes, the contribution of calories from sugar in a single 8 fl. oz beverage almost doubled that found in their high-income counterparts (71.4% versus 36%, respectively) (P<0.001).

Finally, sugar-sweetened beverages (SSBs) accounted for almost three-fourths (74.4%) of the advertised beverages in the low-income zip codes (n=67). In comparison, SSBs in the high-income group accounted for little more than a third (35.7%) of the beverage-related advertisements (n=10).

Discussion

This study’s findings suggest a disproportionately high number of high-calorie and sugar-sweetened beverages advertised on the front page of grocery store circulars in low-income NYC zip codes. The low-income zip codes identified for this study are located in Brooklyn and the Bronx, NYC boroughs with disparately higher rates of obesity and diabetes than Manhattan which houses the study’s five high-income zip codes [15,16].

	Low-Income Zip Codes	High-Income Zip Codes
Total number of beverages (N)	90	28
Mean number of calories/8 fluid oz	82.9	55.9
Proportion (%) of calories derived from sugars in an 8 fl oz serving	71.4%	35.9%
Total number of sugar-sweetened beverages	74.4% (n=67)	35.7% (n=10)
Proportion (%) of non-caloric beverages (plain and seltzer water, diet sodas)	7.8% (n=7)	25% (n=7)
Proportion (%) of low-calorie beverages	24.4% (n=22)	42.9% (n=12)
Proportion (%) of high-calorie beverages	75.6% (n=68)	57.1% (n=16)

Table 1: Total Number and Proportion of Beverages in Online Grocery Store Circulars from Low- and High-Income Zip Codes in New York City.

Sugar-sweetened beverages are a major contributor of added sugar to the American diet [17], and differences in levels of SSB consumption have been found between socioeconomic groups [6]. In a 2012 NYC community health survey, almost 40% of Bronx residents and 27% of Brooklyn residents reported consuming one or more sugary drinks per day compared to just over one-fifth of residents in Manhattan (21.3%) [18]. A recent national study of SSB consumption patterns among adults and children noted similar findings: higher odds of heavy consumption of sugary drinks by adults was associated with low SES [6]. Among children, greater intake of total SSBs was also associated with SES [6]. Governmental and other leading health agencies recommend that adults and children decrease daily added sugar intake and consume fewer calories to lower the risk of weight-related chronic disease and metabolic conditions [13,19,20].

Limitations of this study include a cross-sectional design, a limited time frame of two months for data collection, and potential for variation in the circulars’ seasonal sale items. Although the ethnic representation in NYC is diverse, the study is also limited by a focus on this geographic location only. Replicating this study in other communities to assess socioeconomic differences in circular advertisements of SSBs is necessary in order to generalize these findings.

Despite these limitations, this study highlights important public health implications associated with marketing high-calories, sugary beverages priced to sell by grocery stores serving low socioeconomic status populations where SSB consumption patterns are shown to be high [6]. In low-income urban neighborhoods with disparately high rates of chronic disease and obesity, an opportunity exists for grocery stores to partner with public health professionals and proactively engage in chronic disease prevention and management. Increased sale promotions and prominent placement of low- and no-calorie beverages in weekly circulars can increase their accessibility and would encourage greater consumption of these products versus their more sugary counterparts. Complementary health education efforts can include increasing customers’ health literacy in identifying and purchasing these more healthful options.

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