RESEARCH
Original Research

Determinants of Sugar-Sweetened Beverage Consumption among Low-Income Children: Are There Differences by Race/Ethnicity, Age, and Sex?

Natasha Tasevska, MD, PhD; Derek DeLia, PhD; Cori Lorts, MPH, RD; Michael Yedidia, PhD; Punam Ohri-Vachaspati, PhD, RD

ARTICLE INFORMATION

Article history:
Submitted 12 October 2016
Accepted 13 March 2017

Keywords:
Sugar-sweetened beverages
Children
Low-income population
Lifestyle determinants
Household determinants

http://dx.doi.org/10.1016/j.jand.2017.03.013

ABSTRACT

Background Understanding determinants of high consumption of sugar-sweetened beverages (SSBs), a highly prevalent obesogenic behavior, will help build effective customized public health interventions.

Objective Our aim was to identify child and parent lifestyle and household demographic factors predictive of high SSB consumption frequency in children from low-income, ethnically diverse communities that may help inform public health interventions.

Design We used a cross-sectional telephone household survey.

Participants/setting Participants were 717 boys and 686 girls aged 3 to 18 years old from the New Jersey Childhood Obesity Study living in five low-income cities (Camden, New Brunswick, Newark, Trenton, and Vineland). The adult most knowledgeable about household food shopping completed a questionnaire over the telephone inquiring about their and their child's dietary and physical activity habits, and household-, parent-, and child-level demographics.

Main outcome measures Child's SSB consumption frequency was measured.

Statistical analysis performed Multivariate ordered logit models were designed to investigate a variety of variables hypothesized to affect the frequency of SSB consumption. Exploratory stratified analyses by race, sex, and age were also conducted.

Results Eight percent of our study participants never consumed SSBs, 45% consumed SSBs at least once per day, and 23% consumed twice or more per day. SSB consumption was higher among children 12 to 18 years vs 3 to 5 years ($P<0.0001$), of non-Hispanic black vs non-Hispanic white race/ethnicity ($P=0.010$), who were moderate fast food consumers vs never consumers ($P=0.003$), and those whose parents were high vs low SSB consumers ($P<0.0001$). Living in a non–English-speaking household ($P=0.030$), having a parent with a college or higher education vs less than high school ($P=0.003$), and having breakfast 6 to 7 days/wk vs never to 2 days/wk or less were associated with lower SSB consumption ($P=0.001$).

Conclusions We identified a number of household-, parent-, and child-level predictors of SSB consumption, which varied by race, sex, and age, useful for building customized interventions targeting certain behaviors in ethnically diverse, low-income children.

J Acad Nutr Diet. 2017;■:■-■.

SUGAR-SWEETENED BEVERAGES (SSBs), INCLUDING soda, fruit-flavored drinks, and sport drinks, are a major contributor to added sugars in children's diets and have been shown to be associated with obesity.[1-4] Approximately 17% of children ages 2 to 19 years were considered obese in 2011 to 2014.[5] This is problematic, as children who are obese are more likely to be obese as adults.[6]

The rates of obesity and SSB consumption affect certain populations more than others. The prevalence of obesity is higher in adolescents than in young children. While only 8.9% of children ages 2 to 5 years were considered obese in 2011 to 2014, 17.5% of 6- to 11-year-olds and 20.5% of 12- to 19-year-olds were found to be obese.[5] Non-Hispanic black children and Hispanic children ages 2 to 19 years have a higher prevalence of obesity, at 19.5% and 21.9%, respectively, compared to non-Hispanic white children (14.7%).[5] Non-Hispanic black and Hispanic children are also more likely to consume more total SSB than non-Hispanic white children.[7-10] Previous studies have found that older children and adolescents are more likely to consume SSBs than younger children.[11,12] A comparison of National Health and Nutrition Examination Survey data from cycles 1988 to 1994 to 1999 to

2004 showed the largest increases in SSB consumption was among children 6 to 11 years old. While no changes were observed among non-Hispanic white adolescents, there were significant increases in consumption among non-Hispanic blacks and Hispanics.[12]

Other factors associated with SSB consumption include sex, physical activity, sedentary behavior, school environment, parental SSB intake, and other dietary behaviors. Evidence shows that males are more likely to consume SSBs than females.[8,11,13] SSB consumption is usually negatively associated with physical activity and positively associated with sedentary behaviors, such as watching television.[9,11,14] The school environment, use of vending machines in particular, was found to be associated with a higher intake of SSBs.[7] Children whose parents drank SSBs were more likely to consume soft drinks regularly.[14] Consuming SSBs is also associated with other unhealthy eating behaviors, such as eating at fast-food restaurants, low vegetable consumption, and high consumption of unhealthy meats, french fries, and desserts.[8,9,13]

While non-Hispanic black and Hispanic children are at higher risk for obesity and have high consumption of SSBs, previous studies that have examined the determinants of SSBs have either not considered race/ethnicity[14] or had non-Hispanic white children as the majority of participants.[8,9,11,13] In addition, most studies that examined determinants of SSBs among children have focused only on middle and/or high school students.[7-9,13,14] Lastly, many studies have lacked household and socioeconomic factors,[7,8,13,14] which in one study were found to be significant determinants in SSB intake among children.[10] Importantly, no study to date has examined determinants in minority populations across all age groups of children with household socioeconomic factors, parental intake, as well as child behaviors in the same model. The purpose of our study is to examine the association of child and parent lifestyle and household demographic factors with the frequency of SSB consumption in children ages 3 to 18 years from low-income communities with high non-Hispanic black and Hispanic populations. These analyses will inform the design of tailored interventions to decrease levels of SSB intake in vulnerable, underserved population groups.

MATERIALS AND METHODS

We used data from the New Jersey Childhood Obesity Study, collected during 2009 and 2010 by a random-digit-dial household survey of 1,708 families living in five low-income cities in New Jersey (Camden, New Brunswick, Newark, Trenton, and Vineland). Only households with at least one 3- to 18-year-old child were included in the New Jersey Childhood Obesity Study; if a household had more than one child in the targeted age group, the surveyed child was randomly selected using a computer program. Households that were neither English- nor Spanish-speaking were not eligible to participate. The response rate for the survey was 49%. The study protocol was approved by the Institutional Review Board of Rutgers University and Arizona State University, and all participants provided verbal consent over the telephone.

The adult most knowledgeable about household food shopping completed a 36-minute-long interviewer-administered questionnaire over the telephone inquiring about their and their child's dietary and physical activity habits, and household-, parent-, and child-level demographics. In 94% of the cases, the respondent was the parent or the grandparent of the child included in the survey; consequently, respondents are referred to as parents in this paper. To assess the child's and parent's SSB consumption frequency, parents were asked "How often over the past month (ie, times per month, week, or day) did the child and you drink 1) regular carbonated soda or soft drinks that are sweetened, such as Coke [The Coca-Cola Company], Pepsi [PepsiCo, Inc], or 7-Up [Dr Pepper Snapple Group] (not including diet drinks) and 2) fruit-flavored drinks, such as lemonade, Sunny Delight [Sunny Delight Beverages Company], Kool-Aid [Kraft Foods], Gatorade [PepsiCo, Inc], or sweet iced tea (not including 100% fruit juice)." The frequency of consumption of these two types of beverages was combined to estimate the overall SSB consumption frequency used in the analysis. Other child's dietary habits assessed included frequency of fast-food consumption (times per month, week, or day) and breakfast consumption (number of days in a typical week) over the previous month. Information on child's screen time (watching television, playing video games, or using a computer) in hours per day, in a typical day during the school year, averaged over weekend and weekdays; and physical activity in days over the past week when the child was physically active (defined as activity that increased [his/her] heart rate and made [him/her] breath hard) for a total of at least 30 minutes per day; was also collected. The questionnaire also queried about child's age, sex, race and ethnicity, parent's highest grade or level of school completed, and the primary language spoken in the household. If responses to the question "What is the primary language spoken in your home?" were something other than English or Spanish, participants were asked to specify which language, and the response was marked as "other." Participants were asked whether they and/or their child were born outside of the United States, but not which country. The survey questionnaire was a composite of questions from other validated tools, including the Youth Risk Behavior Surveillance System (physical activity),[15] California Health Interview Study (screen time),[16] and Behavioral Risk Factor Surveillance System (diet, demographics).[17]

Of 1,708 participants who completed the survey, 1,403 had complete data on all variables included in the analysis. The analytical sample (n=1,403) included 717 boys and 686 girls.

Statistical Analysis

All analyses were conducted using STATA software.[18] Based on the literature, we examined a variety of independent variables hypothesized to affect the frequency of SSB consumption among children. These included the children's sex, age, race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, other), non–English-speaking households (yes, no), fast-food consumption (none [never], moderate [<2 times per week], high [≥2 times per week]), screen time (low [0 to <2 h/day], moderate [2 to <4 h/day], high [≥4 h/day]), physical activity (low [never or 1 day per week], moderate [2 to 5 days/wk], high [6 to 7 days/wk]), breakfast consumption (low [never to 2 day/wk], moderate [3 to 5 days/wk], high [6 to 7 days/wk]), parent's education (less than high school, high school, college education or higher), and parent's frequency