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American adults eligible for the Supplemental Nutritional Assistance Program consume more sugary beverages than ineligible adults

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ABSTRACT

Background. There is considerable debate about whether sugar-sweetened beverages (SSBs) should be allowable purchases with benefits from the Supplemental Nutrition Assistance Program (SNAP).

Purpose. To examine national patterns in adult consumption of SSBs by SNAP eligibility.

Methods. Cross-sectional analysis of 24-hour dietary recall data obtained from the National Health and Nutrition Examination Survey 2003–2010 (N = 17,198), analyzed in 2013.

Results. In 2003–2010, 65% of adults receiving SNAP consumed SSBs, averaging 307 cal daily, and 74 g of sugar. Compared to adults ineligible for SNAP, adults receiving SNAP consumed a higher percentage of SSBs (65% vs. 59%, $p < 0.001$), more calories from SSB per capita (210 kcal vs. 175 kcal, $p = 0.001$), and more daily calories from SSBs among drinkers (307 kcal vs. 278 kcal, $p = 0.008$). Overall, per capita consumption from SSBs was highest among adults receiving SNAP (210 kcal, 9% total daily intake), followed by adults eligible but not participating in SNAP (192 kcal, 8% total daily intake) — both of which had significantly higher SSB consumption than ineligible adults (175 kcal, 8% total daily intake) ($p < 0.05$).

Conclusion. Adults eligible for SNAP benefits consume more SSBs than ineligible adults.

Introduction

The Supplemental Nutrition Assistance Program (SNAP), formerly the Food Stamp Program (FSP), is the largest of the fifteen federal nutrition-assistance programs and aims to provide low-income households with resources to purchase food so as to minimize the likelihood that they will experience food insecurity. In 2012, SNAP costs totaled $75 billion for 46.6 million individuals — roughly 1 in 7 Americans (USDA, 2013b).

SNAP places few restrictions on allowable purchases. The current law defines eligible foods as "any food or food product for home consumption except alcoholic beverages, tobacco, and hot foods or hot food products ready for immediate consumption", which is based on the Food Stamp Act of, 1964 (Public Law 88–525). The question of whether SNAP should allow beneficiaries to use their benefits to purchase SSBs is hotly debated in political issue in the United States (Brownell and Ludwig, 2011) in large part due to the strong evidence-base linking consumption of sugar-sweetened beverages (SSBs) to the obesity epidemic (Malik et al., 2006), which currently affects one-third of U.S. adults and disproportionately impacts low income Americans (Flegal et al., 2010) along with the well documented characteristics of poorer environments which encourage unhealthy eating (e.g., high prevalence of convenience stores, targeted marketing of high calorie beverages).(An and Sturm, 2012; Grier and Kumanyika, 2008).

In the original Food Stamp Act of 1964, the House Agriculture Committee tried to prohibit soft drinks, among other items, but the Senate Agriculture Committee declined, saying that the restriction would cause "insurmountable administrative problems". More recently, in 2011, the State of New York requested a waiver to undertake a demonstration project restricting the purchase of SSBs in New York City which was denied by the U.S. Department of Agriculture (USDA) citing concerns such as operational challenges for retailers and confusion and stigma for clients (USDA, 2011). Other states have also requested permission to restrict the purchase of SSBs using SNAP benefits (Brownell and Ludwig, 2011). To date, these requests have all been unsuccessful (Brownell and Ludwig, 2011).

While the trends and patterns of SSB consumption (Bleich et al., 2009; Nielsen and Popkin, 2004) and SNAP's consistent success at reducing hunger and food insecurity in the U.S. (Nord and Golla, 2009) have been well described in the literature, less is known about the impact of the program on diet quality — in particular, patterns of SSB consumption by SNAP eligibility. In general, the association between SNAP and diet quality is inconclusive. Some research suggests that SNAP improves diet (Berger et al., 2001; Salmon et al., 2001; Shenkin, 2001; Shenkin and Baum, 2001), other studies suggest that it does not (J. D. Shenkin et al., 2001; Manning et al., 2001; Rustom et al., 2001; S. D. Shenkin et al., 2001; Schultz et al., 2001). SSBs account

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for 58% of all beverage purchases made by SNAP households (Andreyeva T et al., 2012), and diet quality is generally worse among SNAP recipients as compared to SNAP eligible nonparticipants (Leung et al., 2012). However, to our knowledge, no studies to date have focused on national patterns in SSB consumption by SNAP eligibility among all adults; available evidence focuses on overall diet among low-income Americans (Leung et al., 2012). The primary purpose of this study is to describe patterns in SSB consumption (2003–2010) among U.S. adults by SNAP eligibility status.

Research methods and procedures

Data and design

Data was obtained from the nationally representative continuous National Health and Nutrition Examination Survey (NHANES). The NHANES is a population-based survey designed to collect information on the health and nutrition of the U.S. population. Participants were selected based on a multi-stage, clustered, probability sampling strategy. Our analysis (conducted in 2013) combined the continuous NHANES data collection (2003–2010) to look at overall patterns during that time period. A complete description of data-collection procedures and analytic guidelines are available elsewhere (www.cdc.gov/nchs/nhanes.htm).

Study sample

The study sample consists of adults ages 20 and older with completed 24-hour dietary recalls. Survey respondents were excluded if they were pregnant or had diabetes at the time of data collection or if their dietary recall was incomplete or unreliable (as determined by the NHANES staff). The final analytic sample included 17,198 adults.

Measures

SNAP status

SNAP eligibility is determined by having a household income ≤130% of the federal poverty level (FPL) and $2000 in countable assets (USDA, 2013a). Since the NHANES does not provide sufficient information to measure net income and assets, we focused on gross income eligibility and self-reported SNAP status.

SNAP status was defined in three ways: 1) receiving SNAP; 2) eligible but not receiving SNAP; and 3) ineligible for SNAP. Individuals were considered to be receiving SNAP if they provided an affirmative response to the question, "In the last 12 months, did (you/you or any member of your household) receive Food Stamp benefits?" and if the household income was ≤130% of the poverty level. Adults were considered income eligible non-participants in the SNAP program if they provided a negative response to the question, "In the last 12 months, did (you/you or any member of your household) receive Food Stamp benefits?" and had a household income ≤130% of poverty. Adults were considered ineligible for the SNAP program if they lived in a household with an income >130% of poverty.

Sugar-sweetened beverages

Survey respondents reported all beverages consumed in a prior 24-hour period (midnight to midnight) and reported type, quantity and time of each consumption occasion. Following the dietary interview, all reported beverage items were systemically coded using the USDA Food and Nutrient Database. Caloric content and other nutrients derived from each consumed food or beverage item were calculated based on the quantity of beverages reported and the corresponding nutrient contents by the National Center for Health Statistics (NCHS). Our definition of SSBs included the following drinks: soda, sport drinks, fruit drinks and punches (non-carbonated beverages with added sugar), low-calorie drinks, sweetened tea, and other sweetened beverages which is consistent with the definition of SSBs commonly used in the literature (Bleich et al., 2009). In order to relate our results to dietary guidelines and inform intervention strategies, we used kilocalories (1 kcal = 4.2 kJ) and fluid ounces (1 oz = 28.35 g) as two primary measures to evaluate consumption patterns.

Body weight status

In the NHANES, body weight and height were measured using standard procedures in a mobile examination center. Healthy weight was defined as a body mass index (BMI) from 18.5 to 24.99 kg/m^2; overweight, BMI from 25 to 29.99 kg/m^2; and obese, BMI ≥ 30 kg/m^2.(WHO, 1988)

Other measures

Education was categorized into three mutually exclusive categories: 1) less than high school; 2) high school (or GED) and 3) more than high school. Country of birth was defined as being born in the United States versus elsewhere. Household food security was pre-defined in the NHANES data as full food security, marginal food security, and low/very low food security based on the U.S. Food Security Survey Module which consists of 18 questions (Bickel G et al., 2000). WIC status was determined by an affirmative answer to the question, "In the last 12 months, did your household receive benefits from the WIC program, that is, the Women, Infants and Children program?" Health insurance was defined as private, public (Medicare, Medicaid/CHIP, military health, VA coverage and other government insurance) and uninsured.

Analysis

All analyses were weighted to be representative of the general population and conducted using STATA, version 12 (StataCorp, L.P., College Station, TX) to account for the complex sampling structure. Multivariate linear and logistic regressions were used to adjust for potential differences in population characteristics across the SNAP eligibility categories, including race/ethnicity (non-Hispanic white, non-Hispanic black, and Mexican–American), sex, age, marital status (married, married before, living with a partner, never married), employment status (employed, not employed), education (less than high school, high school, more than high school), health insurance (public, private, not insured), WIC status, body weight (healthy weight, overweight, obese), household food security (full, marginal, low/very low), household size (1 to 3 persons, 4 or more), and country of birth (US born, born in another country). In particular, a logistic model was used for the binary outcome (percentage of SSB drinkers) and linear models were used for the continuous outcomes (calories from SSBs, grams of sugar from SSBs, and mean ounces of SSBs). As consumption patterns may vary depending on the day of the week, we also controlled for whether or not the surveyed day was a weekday or weekend. All tables and figures report predicted means based on the adjusted models.

We additionally conducted supplementary analyses to examine differences in SSB consumption by income among adults ineligible for SNAP, time trends in SSB consumption over the study period, and SSB consumption based on the amount of the monthly SNAP benefit. To examine adjusted differences in SSB consumption by income, we divided this group into two categories — 131% to 299% FPL and ≥300% FPL, based on the cut points in the data. To examine time trends, we stratified the SNAP status categories by adults who responded to the survey in 2003 to 2006 and adults who responded to the survey in 2007 to 2010. To examine the association between the amount of the monthly SNAP benefit and consumption of SSBs, we used NHANES 2005–2010, which includes information on the amount of SNAP benefits received, restricted to just those adults receiving SNAP (N = 1441). The maximum SNAP benefit is based on the size of the