Research Article

Need for Specific Sugar-Sweetened Beverage Lessons for Fourth- and Fifth-Graders

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ABSTRACT

Objective: Consumption of sugar-sweetened beverages (SSB) is linked to obesity. The authors hypothesized that school-based nutrition education would decrease SSB consumption.

Design: Self-selected interventional cohort with random selection for pre and post measurements.

Setting: Arizona Supplemental Nutrition Assistance Program–Education Program–eligible schools.

Participants: Randomly selected (9%) fourth- and fifth-grade classroom students.

Intervention: The University of Arizona Nutrition Network provided general nutrition education training and materials to teachers, to be delivered to their students. The University of Arizona Nutrition Network administered behavioral questionnaires to students in both fall and spring.

Main Outcome Measure(s): Change in SSB consumption.

Analyses: Descriptive statistics were computed for student demographics and beverage consumption on the day before testing. Paired *t* tests evaluated change in classroom averages. Linear regression assessed potential correlates of SSB consumption.

Results: Fall mean SSB consumption was 1.1 (± 0.2) times; mean milk and water intake were 1.6 (± 0.2) and 5.2 (± 0.7) times, respectively. Beverage consumption increased (3.2%) in springtime, with increased SSBs (14.4%) accounting for the majority ($P = .006$). Change in SSB consumption was negatively associated with baseline SSB and water consumption but positively associated with baseline milk fat ($P \leq .05$).

Conclusions and Implications: The results suggest the need for beverage-specific education to encourage children to consume more healthful beverages in warmer weather.

Key Words: Supplemental Nutrition Assistance Program (SNAP-Ed), nutrition education, sugar-sweetened beverage, school, adolescent (*J Nutr Educ Behav*. 2015;47:36-43.)

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INTRODUCTION

Childhood obesity remains a pressing public health concern in the US. Fifteen percent of US children aged 6–11 years are obese.[1] An additional 30% of children are at risk of becoming overweight or obese.[2] Obesity is associated with early onset of type 2 diabetes in youth[3] and comorbidities throughout the lifespan,[4] which have serious health implications for individuals, the medical and public health systems, and society.

There have been dramatic shifts in beverage consumption patterns in the US in the past 30–50 years. Sugar-sweetened beverages (SSB) have gained prominence in various forms including soft drinks, both carbonated and noncarbonated, fruit drinks (not 100% juice), vitamin and other sugared waters, and energy drinks. Although SSB consumption has declined slightly since its peak in 2000, consumption among youth is approximately 2 times what it was in the 1970s and SSB consumption triples between the ages of 2–6 and 13–18 years.[5] Limited data also suggest that unflavored milk intake among young children has declined whereas flavored (sugar-sweetened) milk and fruit juice have increased.[6] These trends are clinically relevant because of SSB consumption links to obesity through excess caloric intake,[7,8] as well its displacement of more nutritive foods in an individual's diet.[9] Emerging evidence also

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demonstrates associations between SSBs and adverse cardiometabolic profiles in children.[10,11] These types of outcomes imply that an individual's beverage consumption patterns early in life may have lasting effects throughout the lifespan.[6]

Emerging research in the US and other nations suggests that reducing SSB intake at school and at home may diminish excess weight gain among youth.[12] The largest percentage (36%) of added sugars in the American diet derives from soda, energy drinks, and sports drinks; thus, the US Dietary Guidelines for Americans recommend limiting one's intake of SSBs.[13] Multiple calls to action, particularly targeting low-income individuals, have been issued in the US and other nations to attempt to address the problem of excess SSB intake in youth (Child Nutrition and WIC Reauthorization Act of 2004[14]; World Health Organization 2010 resolution WHA63.14[15]), including reducing the availability of SSBs in schools with the intent of decreasing obesity.[16] However, little is known about the impact of nutrition education on overall fluid intake in youth.

The aim of this study was to evaluate change in beverage consumption patterns in fourth- and fifth-grade classrooms that qualified for the Supplemental Nutrition Assistance Program–Education Program (SNAP-Ed). It was hypothesized that general nutrition education would result in decreased SSB consumption in favor of milk and water consumption. Correlates of SSB consumption were explored.

METHODS

Study Design

This study used a self-selected intervention cohort with random selection for pre and post measurements. The researchers assessed change in beverage consumption patterns after periodic general nutrition education among fourth- and fifth-graders. The cohort was defined as SNAP-Ed–eligible elementary schools that partnered with the University of Arizona Nutrition Network (UANN) to provide nutrition education at the schools. The UANN uses the train-the-trainer model (TTT) model to provide age-appropriate general nutrition education to teachers, administrators, and staff,[13] as well as direct nutrition education to students by a professional nutrition educator. The study was limited to the partner schools in 5 of 7 counties served by the UANN that used the same delivery model, TTT, and logged nutrition education hours with the UANN according to the national SNAP-Ed reporting requirements for the Education and Administrative Reporting System (EARS). The 2 excluded counties either (1) employed direct nutrition education only or (2) had not yet obtained relevant tribal human subjects protection program approval. Other counties in the state, not served by the UANN, either did not receive SNAP-Ed services or received them from local health departments that used diverse delivery models.

The TTT model provided teachers, administrators, and staff with state health department–approved training, lessons, and materials. It guided them to integrate nutrition education into multiple school settings such as math, reading, art, music, science, and other lessons; classroom, cafeteria, and school-wide activities; signage, menus, and handouts; and classroom or public address system school-wide announcements. The TTT model was tailored according to the readiness of the school, teachers, and staff to maximize trainer implementation. Educational materials were derived from state health department–approved evidence-based curricula, individual lessons, presentations, handouts, and other supportive educational tools in alignment with the US Department of Agriculture (USDA) guidelines. The USDA guidelines and tip sheets, as well as the state-approved materials, included the recommendation that intake of SSBs should be limited,[13] but at the time of the study there was no approved SSB-specific curriculum or beverage-specific set of activities.

The frequency, intensity, and duration of programming varied from classroom to classroom and school to school based on the tailored approach. On average, new materials and lessons were provided to schools on a monthly basis after a minimum of 1–2 hours of initial training. The types of resources provided were gauged locally based on site readiness and the need for technical support after the initial training and included any or all of the resources or contact types listed in Table 1. Monthly attempts to increase engagement and advance services in schools that were in the initial stages of program implementation were made via e-mail or phone. In an end-of-year sub-study of 2 of the counties, 89% of educators confirmed that they had received resources from their UANN program representative at least once per month during the school year (unpublished data). Participating schools submitted hours dedicated to nutrition and nutrition-integrated physical activity monthly, in alignment with EARS topics. Topics tracked by EARS included: Fat Free and Low-Fat Milk or Equivalent (and alternative calcium sources); Fats and Oils; Fiber-Rich Foods; Food Shopping/Preparation; Fruits and Vegetables; Lean Meat and Beans; Limit Added Sugars or Caloric Sweeteners; MyPyramid/MyPlate–Healthy Eating Plan; Physical Activity Lesson/Demonstration; Promote Healthy Weight; Sodium and Potassium; Whole Grains; Food Safety; Other–Breast Feeding; Other–Folic Acid; Other–All content areas; Other–Hydration.

Once all participating classrooms were identified in the 5 counties from historical time logs, the UANN randomly selected 8% of fourth- and fifth-grade classrooms, with a minimum output of 2 classrooms per UANN county-level team forced into the randomization model. The final yield was 9% of UANN classrooms (n = 46 classrooms) (Figure 1). Teachers in selected classrooms were invited to participate in the administration of a brief survey to children in their classroom.

Survey Instrument and Proctoring

The Youth Nutrition and Physical Activity Survey combined validated questions from 2 age-appropriate surveys with good validity and reliability. Nutrition questions were adapted from the School Physical Activity and Nutrition survey, and