Consumption of Sports Drinks by Children and Adolescents

Healthy Eating Research
Building evidence to prevent childhood obesity

A Research Review, June 2012

Abstract

Children's and adolescents' consumption of sports drinks is increasing. Amidst a national obesity epidemic, many sports drinks sold in the United States contain high amounts of sugar, adding more calories to youths' diets. In limited quantities, sports drinks are recommended only for individuals engaged in prolonged vigorous physical activity for more than one hour. For most children and adolescents, consuming water before, during, and after physical activity provides the necessary hydration.

This research review examines the evidence about children's and adolescents' consumption of sports drinks and the related health implications. Parents, teachers, coaches, and children and adolescents need to know that sports drinks are not recommended for the vast majority of youths engaged in normal physical activity. Government agencies also need to monitor the effects of marketing sports drinks to children.

Introduction

Over the past three decades, U.S. children and adolescents have significantly increased their consumption of sugar-sweetened beverages (SSBs).[1] The per-capita caloric contribution of SSBs to children's and adolescents' diets increased from 204 calories per day in 1988–1994 to 224 calories per day in 1999–2004.[1] Adolescents now obtain 10 percent to 15 percent of their caloric intake from SSBs.[1] Consumption of SSBs is associated with excess weight gain, poor nutrition, displacement of healthful beverages, and a higher risk for obesity and diabetes.[2]

The term sugar-sweetened beverages is often associated with traditional carbonated beverages, such as sodas. However, this category of beverages also includes sports drinks or electrolyte drinks, sweetened tea, fruit-flavored drinks and punches, and other beverages that contain large amounts of added sugar.

Sports drinks were created in 1965 in the United States as dietary supplements for athletes in an effort to address certain sports-related physiological and nutritional issues.[3] These beverages were designed for athletes or individuals needing replenishment of water as well as carbohydrates and electrolytes lost or utilized during prolonged vigorous physical activity, including activities

performed in high temperatures and humidity. Although individual brands and products might vary, sports drinks typically contain nutrients such as water, electrolytes (primarily sodium and potassium), and carbohydrates.[4] Carbohydrate options found in a number of popular sports drinks include high fructose corn syrup, fructose, sucrose, sucrose syrup, brown rice syrup, cane juice, and maltodextrin.[5] Depending on the brand, some sports drinks contain as much as 19 grams of added sugar, 200 milligrams of sodium, and 80 calories per 8 ounces.[6]

While sports drinks were designed for athletes or individuals participating in prolonged vigorous physical activity, they are now commonly consumed by youths in

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the United States. Based on data from the 2010 National Youth Physical Activity and Nutrition Study, 16.1 percent of high school students drank one or more servings of a sports drink during the seven days before the survey, and 9.2 percent drank sports drinks two or more times per day during the same timeframe.[7] Adolescents who consume sports drinks more than once a day are more likely to be male, Black or Hispanic, eat at fast-food restaurants more than once a week, and be physically inactive.[8] One study examined why adolescents drank sports drinks. Adolescents' main reasons for drinking sports drinks included quenching their thirst, seeking a soda substitute, increasing their energy, and boosting their sports performance.[9] None identified the exercise-related rehydrating properties as the reason for their consumption.[9] Increasingly, sports drinks also are being consumed by non-athletes–those who simply like the taste of sports drinks or who are looking for a different kind of beverage.[10]

Summary of Methodology Used in Gathering Evidence

This research review summarizes the current literature on sports drinks trends, marketing of sports drinks to children and adolescents, and the health implications associated with sports drink consumption. Keyword searches were conducted in PubMed, Web of Science, Business Source Premier, and Google Scholar. Searches were carried out with a combination of terms and words in the title or text. Databases were searched with key terms such as: "sugar-sweetened beverages AND child health," "sports drinks AND health," "sports drinks AND physical activity," and "sports drinks AND marketing." Article titles and abstracts were examined, and relevant articles were retrieved. Additional articles were identified through searches of the references of the initial set of publications found through keyword searches. Position papers from organizations, such as the American College of Sports Medicine and the Academy of Nutrition and Dietetics also were reviewed. Additional electronic database searches were performed to identify research specific to dental health and hydration. Search limits were confined to the English language. Searches were not restricted by date or study design.

Key Research Results

- Sports drink consumption is increasing.
- Sports drink manufacturers are targeting children and adolescents.
- Sports drinks are marketed as a healthy alternative to soda.
- The benefits of sports drinks are appropriate only for athletes or individuals engaging in prolonged vigorous physical activity, and/or those activities performed in high temperatures and humidity.
- The average American child or adolescent does not engage in enough physical activity to warrant consumption of sports drinks.
- Water and a balanced diet are recommended and optimal for children and adolescents who do not participate in high-intensity physical activity lasting more than one hour.
- Sports drinks are a source of added sugars and contribute to excess energy intake.
- Consumption of sports drinks may increase risk for poor dental health.
- Sports drinks are a source of sodium and contribute to increasing sodium intakes among American youths.
- Sports drinks may displace necessary nutrients for growing youths.

Studies Backing Key Research Results

Sports drink consumption is increasing.

- Between 1985 and 2005, the overall availability of SSBs in the United States increased by 8.5 gallons per capita per year; 40 percent of this increase was due to sports drinks and fruit-flavored drinks.[11]
- While the number of people buying regular sodas fell by 16.5 million from 2003 to 2008, other non-alcoholic beverage segments, including sports drinks, grew during the same timeframe.[12]
- From 1989–2008, the percentage of American children ages 6 to 11 consuming sports drinks increased significantly, from 2 percent to 12 percent.[13] The amount of sports drinks consumed by these children also increased, from 255 milliliters per day to 289 milliliters per day during the same timeframe.[13]
- In 2006, sports drinks were the third-fastest growing beverage category in the United States.[6] In 2008, sports drinks sales were $7.5 billion, increasing in volume by 17 percent between 2004 and 2008.[14]

Sports drink manufacturers are targeting children and adolescents.

- Coca Cola developed a reduced-calorie, smaller-sized variety of Powerade sports drinks (Powerade Play) for younger children.[15] Powerade Play is advertised with the tagline, "The sports drink for the young athlete."[15]
- The re-branding of "Gatorade" as "G" in 2008 was meant to grab teenagers' attention, as they had moved away

from the brand thinking it was outdated.[14] Recently, Gatorade has been working with adolescents to test and promote new products, and in 2010 a "mobile locker room" featuring "G Series" products was marketed to high schools throughout the United States.[14]

- In 2010, Gatorade television ads were ranked among the top five most-advertised products seen by children and adolescents.[15] Powerade television ads were ranked twenty-sixth.[15]
- The sports drink industry has employed a number of social media strategies to target young consumers. Gatorade's "Mission Control," which launched in April 2009, represents an unusually extensive effort by a company to track social media.[16] "Mission Control" monitors popular social media elements, such as Facebook and Twitter, around the clock in order to monitor consumer behavior and to interact directly with potential consumers.[16] As of June 2011, Gatorade had more than 3 million Facebook fans and nearly 30,000 Twitter followers.[15] By comparison, Coca Cola's Powerade had approximately 110,000 Facebook fans and 10,000 Twitter followers.[15]

Sports drinks are marketed as a healthy alternative to soda.

- When sports drinks are the primary focus of ads, these ads often feature nutrition-related claims (e.g., vitamins, electrolytes) and hydration messages.[15] They also promote physical activity and mental benefits of consuming sports drinks.[15]
- Many parents are confused by the nutritional content of sports drinks. Even though the American Academy of Pediatrics recommends that most children and adolescents should not consume sports drinks, more than a quarter (27%) of parents believe that sports drinks are healthy for children, and 40 percent believe that Gatorade is healthy, according to an 2011 analysis by Yale University's Rudd Center for Food Policy & Obesity.[15]
- Since beverage manufacturers voluntarily phased out selling full-calorie soda in schools, they have promoted sports drinks as a healthier alternative, with some success.[6] According to the trade journal *Beverage Digest*, sports drinks increased their market share in schools from 14.6 percent in 2004 to 20 percent in the 2006–2007 school year, while the market share of sodas decreased from 39.9 percent to 29.8 percent in the same timeframe.[6]

The benefits of sports drinks are appropriate only for athletes or individuals engaging in prolonged vigorous physical activity, and/or those activities performed in high temperatures and humidity.

- The American College of Sports Medicine reports that the electrolytes and carbohydrates in sports drinks are beneficial for individuals who engage in prolonged vigorous physical activity, particularly in warm to hot temperatures.[17] Common examples of high-intensity physical activities include: football training during the summer months, marathon training and races, competitive soccer and tennis matches, and long cycling races.[17] Dehydration by 2 percent of body weight during extended periods of vigorous exercise in a warm to hot environment weakens stamina among athletes.[18, 19] Sports drinks have been shown to decrease fatigue and replace electrolytes lost in sweat under those circumstances.[17, 20–22]
- According to the American Academy of Pediatrics, children participating in vigorous exercise should drink water before, during, and after exercise.[23] If children are participating in prolonged vigorous physical activity in hot, humid conditions for more than one hour, small amounts of sports drinks may be appropriate.[23] However, for the typical child or adolescent engaging in routine physical activity for less than three hours in normal weather conditions, the use of sports drinks in place of water is unnecessary.[23]
- According to the Institute of Medicine Committee on Nutrition Standards for Foods in Schools, sports drinks should not be available in schools except when provided by the school for student athletes in sports programs involving vigorous physical activity more than one hour in duration.[24] The athletic coach should determine whether sports drinks should be available to athletes for the purposes of maintaining hydration during sports.[24]

The average American child or adolescent does not engage in enough physical activity to warrant consumption of sports drinks.

- According to a 2009 Centers for Disease Control and Prevention survey among students in grades 9 through 12, in the 50 U.S. states and the District of Columbia, only 18.4 percent of students participated in any kind of physical activity that increased their heart rate and made them breathe hard some of the time for at least 60 minutes per day on each of the seven days before the survey.[25]
- In a nationally representative sample, the mean length of physical education classes for students in grades 8 through 12 was 56.6 minutes.[26] While in

physical education classes, students spend between 10 percent and 21 percent of class time in vigorous physical activity, depending upon the method of measurement (i.e., heart rate monitors, observation, or accelerometer data).[27]

- A minority of youths participate in organized sports in schools. Only 33 percent of girls and 37 percent of boys participate in varsity sports.[26] Even fewer students, 16 percent of girls and 19 percent of boys, participate in intramural sports in secondary school.[26]

Water and a balanced diet are recommended and optimal for children and adolescents who do not participate in high-intensity physical activity lasting more than one hour.

- The 2010 *Dietary Guidelines for Americans* recommends consuming water and other fluids with few or no calories for adequate hydration.[28]
- The Academy of Nutrition and Dietetics (formerly the American Dietetic Association) recommends water as the best and most economical source of fluid for activity lasting less than an hour for adolescent athletes in organized sports.[29]
- A balanced diet may be enough to replace the water, carbohydrates, and electrolytes lost during exercise. Many of the electrolytes lost during exercise can be replaced with foods, such as soup, vegetable juice, and fruits and vegetables.[30, 31]
- Children and adolescents should be taught to drink water before, during, and after physical activity.[6] Although the amount of water children or adolescents need may increase based on the duration and intensity of the activity and the environmental conditions (e.g., heat, humidity, sun exposure), drinking water is sufficient as long as daily caloric and other nutrient needs are met.[6]

Sports drinks are a source of added sugars and contribute to excess energy intake.

- Sports drinks are a source of empty or nutrient-poor calories and are categorized as an SSB. Sports drinks contain 50 percent to 90 percent of the calories found in soda.[32] Full-calorie sports drinks contain three to five teaspoons of sugar per 8-ounce serving.[15]
- The carbohydrates in sports drinks can lead to excessive caloric intake, which can increase children's and adolescents' risk for overweight and obesity.[6]
- A significant amount of research indicates a positive association between added sugars from beverages and increased calorie consumption.[33] Serious and costly chronic diseases, such as type 2 diabetes and cardiovascular disease, as well as weight gain and obesity, are among the risks associated with excessive SSB consumption.[34–39]

Consumption of sports drinks may increase risk for poor dental health.

- Citric acid, which is often included in sports drinks, erodes tooth enamel.[6] Erosion of the enamel continues even after the pH has been neutralized.[6, 40]
- Saliva serves as a natural buffering agent to neutralize acids.[41] Athletes may compound dental erosion by consuming sports drinks when rates of saliva are decreased after exercise.[41]

Sports drinks are a source of sodium and contribute to increasing sodium intakes among American youths.

- Combined with the typical American youths' diet, which is already high in sodium, modest increases in sodium consumption from sports drinks may be harmful. Gatorade and Powerade contain between 35 milligrams to 200 milligrams of sodium per 8-ounce serving, depending on the product.[6]
- The Dietary Reference Intake for sodium is no more than 1,500 milligrams to 2,300 milligrams per day for children and adolescents (depending on age).[42]
- The 2007–2008 National Health and Nutrition Examination Survey (NHANES) data revealed that sodium intake among children and adolescents exceeds the level recommended in the 2010 *Dietary Guidelines for Americans*. In 2007–2008, the mean sodium intake for children ages 6 to 11 and adolescents ages 12 to 19 was 2,933 milligrams and 3,505 milligrams, respectively.[43] Sodium intake of males for all ages was higher than that of females.[43]

Sports drinks may displace necessary nutrients for growing youths.

- Many foods and beverages that contain added sugars, such as sports drinks, supply calories to the diet, but contain few or no essential nutrients and no dietary fiber.[28]
- Among children and adolescents, intake of SSBs has been shown to be negatively associated with intake of milk, as well as calcium, vitamin D, folate, and iron.[44, 45]

Future Research Needs

Sports drinks are a large and growing segment of the beverage industry targeting youths. While much research has been conducted on soda consumption and health effects in children and adolescents, comparatively little research has looked at the role of sports drinks in relation

to excess caloric intake, weight gain, and health effects, so more research in this area is warranted. Many states and school districts across the country have restricted the sale of soda during the school day; however, many policies allow the sale of sports drinks. Research is needed to monitor the trends related to these restrictions and to determine how many calories are being consumed through sports drinks during the school day. Anecdotal evidence suggests that some schools and youth sports teams receive sponsorship from sports drink companies. Research is needed to document these sponsorships and to examine the effects of these sponsorships on consumption of sports drinks and implications for obesity. Since sports drink marketing often targets youths from communities of color,[15] research on sponsorship for youth sports or sales of sports drinks in schools that have large numbers of racial and ethnic minorities is needed.

Conclusions

Sports drinks, along with sodas, energy drinks, fruit-flavored drinks, and other SSBs, account for 46 percent of added sugars in the American diet.[46] SSBs are the main source of added sugars in the diet of American children.[46] Eleven percent of overall energy intake in children ages 2 to 18 comes from SSBs.[47] Most children today consume four to six times more added sugars than the maximum recommended daily amount.[48] The American Heart Association recommends that most children and adolescent girls consume no more than 20 grams of added sugar per day, and adolescent boys consume no more than 33 grams of added sugars per day.[48]

Given the already elevated levels of added sugar in the American diet and its detrimental impact on health, the increased consumption of sports drinks in recent years is of growing concern for parents, health professionals, and public health advocates. Sports drinks contribute to this increased consumption of added sugar and excess calorie intake. They also add unnecessary sodium to children's and adolescents' diets, displace needed micronutrients, and may increase youths' risk for poor dental health. While sports drinks may be beneficial for athletes and individuals participating in prolonged vigorous physical activity in warm to high temperatures, for most children and adolescents, water is the recommended and optimal fluid for hydration. Parents, teachers, coaches, and children and adolescents need to understand the potential risks of consuming sports drinks. They also need to learn how to counteract marketing that leads youths to believe that consuming sports drinks will enhance athletic performance.

Policy Implications

- Fresh, safe, and free drinking water should be available at all times for children and adolescents, especially in schools and on athletic fields, recreational facilities, out-of-school time programs, and parks.
- Sports drinks should not be available or advertised throughout the school setting, and should not be available as options for purchase from school vending machines, school stores, the cafeteria, and other school facilities. Exceptions may apply for students participating in sports programs involving prolonged vigorous physical activity.
- School and community coaches, school nurses, physicians, dietitians, and out-of-school time staff and volunteers should help educate parents and youths about the need to consume water instead of sports drinks, except when participating in prolonged vigorous physical activity.
- Federal agencies should monitor the advertising and promotion of sports drinks to ensure that product health and nutrient claims are accurate and not misleading. These products should not be advertised directly to children and adolescents.
- The United States Department of Agriculture (USDA) should propose and finalize updated standards for foods and beverages sold outside the federal school meals program (through vending, à la carte, school stores, and fundraisers). Beverages for sale in elementary and middle schools should be limited to water, nonfat or low-fat (1 percent or less) milk or USDA-approved milk alternatives, and 100 percent fruit juice with no added sugar. In high school settings, USDA also might permit the sale of other low-calorie beverages.

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About Healthy Eating Research

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