American Journal of Health Promotion
2020, Vol. 34(5) 549-554

DOI: 10.1177/0890117120911885
journals.sagepub.com/home/ahp
SAGE

Correlates of Infrequent Plain Water Intake Among US High School Students: National Youth Risk Behavior Survey, 2017

Sohyun Park, PhD[1], Stephen Onufrak, PhD[1], Angie Cradock, ScD, MPE[2], Anisha Patel, MD, MSPH[3], Christina Hecht, PhD[4], Caitlin Merlo, MPH[5], and Heidi M. Blanck, PhD[1]

Abstract

Purpose: To examine factors associated with frequency of plain water (ie, tap, bottled, and unflavored sparkling water) intake among US high school students.

Design: Quantitative, cross-sectional study.

Setting: The 2017 national Youth Risk Behavior Survey data.

Subjects: US high school students with plain water intake data (N = 10 698).

Measures: The outcome was plain water intake. Exposure variables were demographics, academic grades, and behavioral characteristics.

Analysis: We used logistic regression to estimate adjusted odds ratios (aOR) and 95% confidence intervals (CIs) for factors associated with infrequent plain water intake (<3 vs ≥3 times/day).

Results: Overall, 48.7% of high school students reported drinking plain water <3 times/day. Factors associated with infrequent plain water intake were younger age (≤15 years; aOR = 1.20, CI = 1.05-1.37); earning mostly D/F grades (aOR = 1.37, CI = 1.07-1.77); consuming regular soda 1 to 6 times/week (aOR = 1.92, CI = 1.67-2.20) or ≥1 time/day (aOR = 3.23, CI = 2.65-3.94), sports drinks 1 to 6 times/week (aOR = 1.30, CI = 1.14-1.49), milk <2 glasses/day (aOR = 1.51, CI = 1.31-1.73), fruits <2 times/day (aOR = 1.92, CI = 1.66-2.22), and vegetables <3 times/day (aOR = 2.42, CI = 2.04-2.89); and being physically active ≥60 minutes/day on <5 days/week (aOR = 1.83, CI = 1.60-2.08). Students with obesity were less likely to have infrequent water intake (aOR = 0.63, CI = 0.53-0.74).

Conclusions: Infrequent plain water intake was associated with younger age, poor academic grades, poor dietary behaviors, and physical inactivity. These findings can inform intervention efforts to increase water intake to promote healthy lifestyles among adolescents.

Keywords

plain water, high school students, academic grades, behavioral characteristics

Purpose

Frequent intake of sugar-sweetened beverage (SSB) provides excess calories and added sugars and is linked to weight gain/obesity,[1] cardiovascular disease risk,[2] asthma,[3] dental caries,[4] poor academic achievement,[5] and low diet quality[6] in children. In contrast, drinking plain water (ie, tap, bottled, and unflavored sparkling water), especially when it is substituted for SSBs, may help with managing body weight and improve diet quality thereby reducing the risk for chronic conditions. Drinking water can also prevent dehydration, which is linked to poor cognitive function, constipation, and headache.[7] For example, a previous study reported that water intake was positively

[1] Division of Nutrition, Physical Activity and Obesity (DNPAO), National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), Centers for Disease Control and Prevention, Atlanta, GA, USA
[2] Prevention Research Center on Nutrition and Physical Activity, Harvard T.H. Chan School of Public Health, Boston, MA, USA
[3] Division of General Pediatrics at Stanford University, Stanford, CA, USA
[4] Division of Agriculture and Natural Resources, Nutrition Policy Institute, University of California, Berkeley, CA, USA
[5] Division of Population Health, NCCDPHP, CDC, Atlanta, GA, USA

Corresponding Author:
Sohyun Park, Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 4770 Buford Highway, NE Atlanta, GA 30341, USA.
Email: spark3@cdc.gov

associated with Healthy Eating Index-2010 total scores among US adolescents.[6]

Adolescents are the highest consumers of SSBs[8] and commonly have infrequent plain water intake.[9] According to the 2010 National Youth Physical Activity and Nutrition Study, almost 3 in 10 US high school students reported drinking plain water less than 1 time a day.[9] A recent study using 2011 to 2016 National Health and Nutrition Examination Survey data reported that caloric intake from SSBs was significantly higher among adolescents aged 12 to 19 years who did not drink plain water (288.4 kcal/day) than those who did (155.4 kcal/day).[10] While plain water can come from tap or bottle water, tap water is more environmentally responsive and less expensive than bottled water.

In order to develop and implement interventions to increase plain water intake among US adolescents, understanding the correlates associated with plain water intake is important. However, information on factors associated with plain water intake among US high school students is limited.[9] Thus, we examined associations of demographics, academic grades, and behavioral factors with frequency of plain water intake among a nationally representative sample of US high school students.

Methods

Sample

This cross-sectional study used data from the national 2017 Youth Risk Behavior Survey (YRBS). The YRBS is a school-based survey that monitors priority health-risk behaviors biennially among nationally representative samples of US high school students. Student participation in YRBS is anonymous and voluntary, and local parental permission procedures are followed to receive parental approval.[11] In 2017, the school response rate was 75%, and the student response rate was 81%, for an overall response rate of 60%.[12] More information on YRBS methodology is available elsewhere.[11] The Centers for Disease Control and Prevention's institutional review board approved the procedures for the national YRBS. For the current analysis, we included 10 698 US high school students with data on plain water intake.

Measures

The outcome variable was plain water intake, determined by the question, "During the past 7 days, how many times did you drink a bottle or glass of plain water? (Count tap, bottled, and unflavored sparkling water.)" Response options were: "I did not drink water during the past 7 days," "1 to 3 times during the past 7 days," "4 to 6 times during the past 7 days," "1 time/day," "2 times/day," "3 times/day," and "≥4 times/day." We categorized plain water intake as <1, 1 to 2, 3, or ≥4 times/day and defined infrequent water intake as <3 times/day on the basis of a previous study[9] because there is not a recommended amount of plain water intake.

Mutually exclusive response categories were created for each exposure variable. Demographic variables included age (≤15, 16, and ≥17 years), sex, and race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic/Latino, and non-Hispanic other/multi-race). For weight status, sex- and age-specific body mass index percentile was calculated from self-reported height and weight and classified as underweight/normal weight (<85th percentile), overweight (≥85th to <95th percentile), or obesity (≥95th percentile).[13] Self-reported academic grades during the past 12 months were categorized as mostly A's, mostly B's, mostly C's, and mostly D's/F's. Behavioral variables were intake of regular soda (none, 1-6 times/week, or ≥1 time/day), sports drinks (none, 1-6 times/week, or ≥1 time/day), milk (<2 or ≥2 glasses/day), fruits including 100% fruit juice (<2 or ≥2 times/day), and vegetables (<3 or ≥3 times/day), physically active ≥60 minutes/day (<5 or ≥5 days/week), and sleep on an average school night (<8 or ≥8 hours). Missing data regarding exposure variables ranged from 0.1% to 11% (weight status variable) and were omitted when the variables were used in any given test or model.

Analysis

For unadjusted analyses, we used χ^2 tests to examine differences in plain water intake across exposure categories (significant at $P < .05$). We used a multivariable logistic regression model to estimate adjusted odds ratios (aORs) and 95% confidence intervals (CIs) for factors associated with infrequent plain water intake (<3 times/day; reference: ≥3 times/day).[9,14] All variables were included in 1 model. Among 10 698 students with plain water intake data, the logistic regression model included 8718 students with complete data on all covariates. Students with complete data on all covariates were significantly more likely to be older (≥17 years) and non-Hispanic white students than those with incomplete data. There were no significant differences in complete data by sex. Statistical analyses were performed in SAS version 9.4 (Cary, North Carolina), using survey procedures to account for the complex sample design.

Results

Overall, 48.7% of students reported drinking plain water <3 times/day, and 24.6% drank plain water <1 time/day. Based on χ^2 tests, plain water intake was significantly associated with all characteristics except sex (Table 1). Based on the multivariable logistic regression model, factors significantly associated with infrequent plain water intake were age ≤15 years (aOR = 1.20, 95% CI = 1.05-1.37; vs age ≥17 years); earning mostly D/F grades (aOR = 1.37, 95% CI = 1.07-1.77; vs mostly A's), consuming regular soda 1 to 6 times/week (aOR = 1.92, 95% CI = 1.67-2.20) or ≥1 time/day (aOR = 3.23, 95% CI = 2.65-3.94; vs 0 times/day), sports drinks 1-6 times/week (aOR = 1.30, 95% CI = 1.14-1.49; vs 0 times/day), milk <2 glasses/day (aOR= 1.51, 95% CI = 1.31-1.73), fruits <2 times/day (aOR = 1.92, 95% CI = 1.66-2.22), and vegetables

Table 1. Characteristics of Respondents and Their Associations With Plain Water Intake[a] During the Past 7 Days Among US High School Students, National Youth Risk Behavior Survey, 2017.

		Plain Water Intake During the Past 7 Days				
Characteristic	All Respondents	<1 time/day	1-2 times/day	3 times/day	≥4 times/day	
	%[b]	% ± SE[b]	% ± SE[b]	% ± SE[b]	% ± SE[b]	*P* Value[c]
Total sample (N = 10 698)[d]	100	24.6 ± 0.9	24.1 ± 0.8	16.3 ± 0.5	34.9 ± 0.9	
Age (n = 10 630)						.04
≤15 years	36.4	25.7 ± 1.0	24.2 ± 1.1	16.4 ± 0.7	33.7 ± 1.3	
16 years	25.5	24.2 ± 1.1	24.7 ± 1.3	14.4 ± 0.9	36.7 ± 1.3	
≥17 years	38.1	23.7 ± 1.1	23.7 ± 1.1	17.7 ± 0.6	34.9 ± 1.1	
Sex (n = 10 608)						.96
Female	51.3	24.5 ± 1.1	24.4 ± 0.9	16.1 ± 0.8	35.0 ± 1.4	
Male	48.7	24.6 ± 1.1	24.0 ± 0.9	16.6 ± 0.7	34.8 ± 0.9	
Race/ethnicity (n = 10 494)						<.0001
White, non-Hispanic	55.8	22.2 ± 1.1	26.7 ± 1.0	16.9 ± 0.6	34.2 ± 1.2	
Black, non-Hispanic	11.8	32.4 ± 1.6	20.2 ± 1.3	14.3 ± 1.0	33.0 ± 1.9	
Hispanic or Latino	22.4	26.6 ± 1.4	21.0 ± 1.0	16.2 ± 0.9	36.2 ± 1.3	
Other/multi-race, non-Hispanic[e]	10.0	23.4 ± 1.6	23.4 ± 1.9	15.8 ± 1.7	37.4 ± 2.1	
Weight status[f] (n = 9500)						<.0001
Underweight/normal weight	69.4	24.1 ± 1.0	26.1 ± 1.0	17.5 ± 0.6	32.3 ± 1.2	
Overweight	15.7	25.4 ± 1.7	22.7 ± 1.5	14.2 ± 1.1	37.6 ± 1.5	
Obesity	14.9	22.4 ± 1.6	20.9 ± 1.2	14.7 ± 1.1	42.1 ± 1.8	
Self-reported academic grades during the past 12 months (n = 10 004)						<.0001
Mostly A's	39.0	19.3 ± 1.0	26.4 ± 1.2	17.9 ± 0.8	36.3 ± 1.3	
Mostly B's	38.4	25.0 ± 1.4	24.2 ± 1.0	16.3 ± 0.8	34.4 ± 1.3	
Mostly C's	17.6	29.8 ± 1.5	20.7 ± 1.3	15.1 ± 1.0	34.4 ± 1.4	
Mostly D's or F's	5.0	34.5 ± 2.6	22.9 ± 2.2	12.1 ± 1.4	30.5 ± 2.0	
Regular soda (n = 10 684)						<.0001
None	27.5	16.3 ± 1.3	18.7 ± 1.3	16.7 ± 1.3	48.3 ± 1.8	
1-6 times/week	53.0	27.4 ± 0.9	25.0 ± 0.9	17.2 ± 0.5	30.4 ± 0.8	
≥1 time/day	19.5	29.1 ± 1.6	29.4 ± 1.2	13.2 ± 0.2	28.3 ± 1.6	
Sports drinks (n = 10 676)						<.0001
None	47.8	22.9 ± 1.2	23.5 ± 0.9	16.2 ± 0.8	37.4 ± 1.4	
1-6 times/week	39.8	29.0 ± 1.0	24.0 ± 1.0	16.5 ± 0.7	30.5 ± 0.7	
≥1 time/day	12.4	17.2 ± 1.4	27.1 ± 1.3	16.0 ± 0.9	39.6 ± 1.9	
Milk (n = 10 671)						<.0001
<2 glasses/day	82.6	27.0 ± 1.0	24.6 ± 0.8	15.6 ± 0.5	32.8 ± 1.0	
≥2 glasses/day	17.4	13.5 ± 0.9	21.9 ± 1.1	19.9 ± 1.1	44.7 ± 1.7	
Fruits including 100% fruit juice (n = 10 644)						<.0001
<2 times/day	68.4	29.5 ± 1.1	26.1 ± 0.9	15.6 ± 0.5	28.8 ± 1.1	
≥2 times/day	31.6	14.1 ± 0.8	19.9 ± 0.8	18.0 ± 1.0	48.0 ± 0.9	
Vegetables (n = 10 632)						<.0001
<3 times/day	85.9	27.1 ± 1.0	25.5 ± 0.9	16.3 ± 0.5	31.1 ± 0.9	
≥3 times/day	14.1	9.9 ± 1.0	15.9 ± 1.2	16.8 ± 1.2	57.4 ± 1.6	
Physically active ≥60 minutes/day (n = 10 631)						<.0001
<5 days/week	52.4	29.5 ± 1.3	26.6 ± 0.8	15.2 ± 0.6	28.7 ± 1.2	
≥5 days/week	47.6	19.0 ± 0.9	21.4 ± 1.0	17.7 ± 0.7	41.9 ± 1.0	
Sleep on an average school night (n = 10 501)						.01
<8 hours	74.6	25.2 ± 0.9	24.7 ± 0.9	16.1 ± 0.6	34.0 ± 1.0	
≥8 hours	25.4	22.6 ± 1.4	22.9 ± 1.1	16.9 ± 0.8	37.6 ± 1.2	

Abbreviation: SE, standard error.

[a]The question asked was "During the past 7 days, how many times did you drink a bottle or glass of plain water? Count tap, bottled, and unflavored sparkling water."

[b]Because of rounding, weighted percentages may not add up to 100%.

[c]χ^2 tests were used for each variable to examine differences across categories.

[d]Unweighted sample size.

[e]Includes non-Hispanic American Indian or Alaska Native, Asian, Native Hawaiian or other Pacific Islander, or multi-race.

[f]Self-reported weight and height were used to calculate body mass index (BMI). Underweight/normal weight was defined as BMI <85th percentile for sex and age, overweight was defined as BMI ≥85th to <95th percentile, and obese was defined as BMI ≥95th percentile.

Table 2. Adjusted Odds Ratios for Variables Related to Infrequent Plain Water intake[a] (<3 times/day) During the Past 7 Days Among US High School Students, National Youth Risk Behavior Survey, 2017[b].

Characteristic	Plain Water Intake <3 Times/Day	
	Adjusted Odds Ratio	95% Confidence Interval
Age		
≤15 years	**1.20**[c]	**1.05-1.37**
16 years	1.09	0.95-1.24
≥17 years	Reference	
Sex		
Female	Reference	
Male	1.08	0.96-1.21
Race/ethnicity		
White, non-Hispanic	Reference	
Black, non-Hispanic	1.15	0.95-1.39
Hispanic or Latino	0.90	0.78-1.04
Other/multi-race, non-Hispanic[d]	0.92	0.78-1.10
Weight status[e]		
Underweight/ normal weight	Reference	
Overweight	0.89	0.75-1.06
Obesity	**0.63**[c]	**0.53-0.74**
Self-reported academic grades during the past 12 months		
Mostly A's	Reference	
Mostly B's	1.02	0.87-1.20
Mostly C's	1.06	0.87-1.29
Mostly D's or F's	**1.37**[c]	**1.07-1.77**
Regular soda		
None	Reference	
1-6 times/week	**1.92**[c]	**1.67-2.20**
≥1 time/day	**3.23**[c]	**2.65-3.94**
Sports drinks		
None	Reference	
1–6 times/week	**1.30**[c]	**1.14-1.49**
≥1 time/day	1.15	0.92-1.44
Milk		
<2 glasses/day	**1.51**[c]	**1.31-1.73**
≥2 glasses /day	Reference	
Fruits including 100% fruit juice		
<2 times/day	**1.92**[c]	**1.66-2.22**
≥2 times/day	Reference	
Vegetables		
<3 times/day	**2.42**[c]	**2.04-2.89**
≥3 times/day	Reference	
Physically active ≥60 minutes/day		
<5 days/week	**1.83**[c]	**1.60-2.08**
≥5 days/week	Reference	
Sleep on an average school night		
<8 hours	1.08	0.97-1.21
≥8 hours	Reference	

[a]The question asked was "During the past 7 days, how many times did you drink a bottle or glass of plain water? Count tap, bottled, and unflavored sparkling water."

[b]The outcome variable was plain water intake and exposure variables were demographic and behavioral characteristics. The logistic regression model included all variables of study and is based on a sample of 8718 students without missing data. Reference outcome category included students who drank plain water ≥3 times/day.

[c]Significant findings are bolded based on the 95% confidence intervals (ie, the confidence interval does not include 1).

[d]Includes non-Hispanic American Indian or Alaska Native, Asian, Native Hawaiian or other Pacific Islander, or multi-race.

[e]Self-reported weight and height were used to calculate body mass index (BMI). Underweight/normal weight was defined as BMI <85th percentile for sex and age; overweight was defined as BMI ≥85th to <95th percentile; and obese was defined as BMI ≥95th percentile.

<3 times/day (aOR = 2.42, 95% CI = 2.04-2.89); and being physically active ≥60 minutes/day on <5 days/week (aOR = 1.83, 95% CI = 1.60-2.08). Students with obesity had lower odds of infrequent plain water intake (aOR = 0.63, 95% CI = 0.53-0.74; vs underweight/normal weight students; Table 2).

Discussion

In our study, about half of students reported drinking a bottle or glass of plain water less than 3 times/day during the past 7 days. Furthermore, about 1 in 4 students drank plain water less than once a day. This is similar to a study from 2010, which showed that 54% of US high school students drank plain water <3 times/day.[9] We found that the odds of infrequent plain water intake were higher among students who were ≤15 years old, were physically inactive, had poor grades, and had poor dietary behaviors. Similar to our study findings, a previous study reported that younger age, poor dietary behaviors (eg, lower intake of milk, fruits, and vegetables and higher intake of SSBs and fast foods), and physical inactivity were associated with infrequent plain water intake among US high school students.[9]

Similar to a previous study,[9] we found that students with obesity had 37% lower odds for infrequent plain water intake as compared to underweight/normal weight students. It is possible that students with obesity might try to decrease energy intake from beverages by substituting plain water for SSBs. A previous study showed that students who were trying to lose weight were less likely consume SSBs than those who were not trying to do anything about their weight.[5]

In this study, students who reported earning mostly D's or F's had 37% higher odds for infrequent plain water intake compared to those who earned mostly A's. Although there is

limited information on associations between water intake and academic performance among US high school students, a previous study reported that the prevalence of infrequent plain water intake (<1 glass/day) was higher among middle school students who earned mostly D's or F's than those who earned mostly A's (46.4% vs 32.9%, respectively) in Florida.[14] Because dehydration is associated with decreased cognitive function and headache and rehydration could improve adverse effects of dehydration on cognitive performance,[7] drinking plain water may be a strategy to support better academic performance without adding calories to the diet.

This analysis includes a large, nationally representative sample with a relatively high response rate. However, this study is subject to limitations. First, associations are cross-sectional; thus, directionality or causality cannot be determined. Second, plain water intake is measured in frequency rather than volume. A previous study reported that plain water intake is moderately correlated ($r = .49$) between times per day as assessed by a frequency questionnaire and servings per day as assessed by multiple 24-hour dietary recalls, and the proportion of people consuming plain water daily was higher using a frequency questionnaire versus 24-hour dietary recall (70% for ≥1 time/day vs 59% for ≥1 serving/day) among US high school students.[15] Third, this analysis is limited to plain drinking water and does not assess overall water consumption; adolescents could also be receiving hydration from other foods and beverages. Finally, data are collected from adolescents who attended schools and thus are not representative of all adolescents.

In conclusion, this study showed that about 1 in 2 US high school students reported drinking a bottle or glass of plain water less than 3 times a day during the past 7 days, and 1 in 4 drank this amount less than once a day. Factors significantly associated with infrequent plain water intake were younger age; poor academic grades; higher intake of regular soda and sports drinks; lower intake of milk, fruits, and vegetables; and physical inactivity. However, students with obesity were less likely to have infrequent plain water intake. These findings suggest the need for actions to increase water intake among adolescents as a substitution for SSBs to better support healthy lifestyles. Identifying ways to increase plain water intake during adolescence and ensuring schools provide access to free drinking water throughout the school day might be key steps.

So What?

What is already known on this topic?

Adolescents are the highest consumers of sugar-sweetened beverages (SSBs). Substituting plain water for SSBs is one strategy to reduce SSB intake. Although infrequent plain water intake is common among adolescents, there is limited information on factors associated with infrequent plain water intake.

What does this article add?

Factors significantly associated with infrequent plain water intake were younger age (≤15 years; adjusted odds ratio [aOR] = 1.20; vs age ≥17 years), earning mostly D/F grades (aOR = 1.37; vs mostly A's), consuming regular soda >0 to <1 time/day (aOR = 1.92) or ≥1 time/day (aOR = 3.23; vs 0 times/day), sports drinks >0 to <1 time/day (aOR = 1.30; vs 0 times/day), milk <2 glasses/day (aOR = 1.51), fruits <2 times/day (aOR = 1.92), and vegetables <3 times/day (aOR = 2.42), and being physically active ≥60 minutes/day on <5 days/week (aOR = 1.83). Students with obesity were less likely to have infrequent plain water intake (aOR = 0.63; vs underweight/normal weight students).

What are the implications for health promotion practice or research?

These findings can inform efforts to increase plain water intake and decrease SSBs among adolescents to promote healthy lifestyles. Identifying ways to increase plain water intake to promote healthy lifestyles during adolescence may be key steps.

Authors' Note

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Sohyun Park, PhD https://orcid.org/0000-0002-8192-7048

References

1. de Ruyter JC, Olthof MR, Seidell JC, Katan MB. A trial of sugar-free or sugar-sweetened beverages and body weight in children. *N Engl J Med*. 2012;367(15):1397-1406.
2. Vos MB, Kaar JL, Welsh JA, et al. Added sugars and cardiovascular disease risk in children: A scientific statement from the American Heart Association. *Circulation*. 2017;135(19): e1017-e1034.
3. Park S, Blanck HM, Sherry B, Jones SE, Pan L. Regular-soda intake independent of weight status is associated with asthma among US high school students. *J Acad Nutr Diet*. 2013;113(1): 106-111.
4. Park S, Lin M, Onufrak S, Li R. Association of sugar-sweetened beverage intake during infancy with dental caries in 6-year-olds. *Clin Nutr Res*. 2015;4(1):9-17.

5. Park S, Sherry B, Foti K, Blanck HM. Self-reported academic grades and other correlates of sugar-sweetened soda intake among US adolescents. *J Acad Nutr Diet*. 2012;112(1): 125-131.
6. Leung CW, DiMatteo SG, Gosliner WA, Ritchie LD. Sugar-sweetened beverage and water intake in relation to diet quality in U.S. children. *Am J Prev Med*. 2018;54(3):394-402.
7. Popkin B, D'Anci K, Rosenberg I. Water, hydration, and health. *Nutr Rev*. 2010;68(8):439-458.
8. Rosinger A, Herrick K, Gahche J, Park S.Sugar-sweetened Beverage Consumption Among U.S. Youth, 2011-2014. *NCHS Data Brief*. 2017;(271):1-8.
9. Park S, Blanck HM, Sherry B, Brener N, O'Toole T. Factors associated with low water intake among US high school students-National Youth Physical Activity and Nutrition Study, 2010. *J Acad Nutr Diet*. 2012;112(9):1421-1427.
10. Rosinger AY, Bethancourt H, Francis LA. Association of caloric intake from sugar-sweetened beverages with water intake among US children and young adults in the 2011-2016 National Health and Nutrition Examination Survey Association of caloric intake from sugar-sweetened beverages with water intake among US children letters. *JAMA Pediatrics*. 2019;173(6):602-604.
11. Centers for Disease Control and Prevention, Brener ND, Kann L, Shanklin S, et al. Methodology of the Youth Risk Behavior Surveillance System—2013. *MMWR Recomm Rep*. 2013 1; 62(RR-1):1-20.
12. Kann L, McManus T, Harris WA, et al. Youth Risk Behavior Surveillance—United States, 2017. *MMWR Surveill Summ*. 2018;67(8):1-114.
13. Kuczmarski RJ, Ogden CL, Grummer-Strawn LM, et al. CDC growth charts: United States. *Adv Data*. 2000;8(314):1-27.
14. Park S, Sherry B, O'Toole T, Huang Y.Factors associated with low drinking water intake among adolescents: the Florida Youth Physical Activity and Nutrition Survey, 2007. *J Am Diet Assoc*. 2011;111(8):1211-1217.
15. O'Malley Olsen E, Eaton DK, Park S, Brener ND, Blanck HM. Comparing methods for assessing beverage intake among high school students. *Am J Health Behav*. Jan 2014;38(1):114-123.