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Factors Related to Water Filter Use for Drinking Tap Water at Home and Its Association With Consuming Plain Water and Sugar-Sweetened Beverages Among U.S. Adults

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Abstract

Objective: To examine factors associated with water filter use (WFU) for drinking tap water at home and its association with consuming plain water and sugar-sweetened beverages (SSBs).

Design: Quantitative, cross-sectional study.

Setting: The 2018 SummerStyles survey data.

Subjects: U.S. adults (≥18 years; N=4042).

Measures: Outcomes were intake of plain water (tap/bottled water) and SSBs. Exposure was WFU (yes, no, not drinking tap water at home). Covariates included sociodemographics, weight status, Census regions, and home ownership status.

Analysis: We used multivariable logistic regressions to estimate adjusted odds ratios (AOR) and 95% confidence interval (CI) for consuming tap water, bottled water, or total plain water >3 cups/day (vs. ≤3 cups) and SSBs ≥1 time/day (vs. <1 time) by WFU.

Results: Overall, 36% of adults reported using a filter for drinking tap water at home; 14% did not drink tap water at home. Hispanics had significantly higher odds of using a water filter (AOR=1.50, 95% CI=1.14–1.98) vs non-Hispanic White. Factors significantly associated

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Author Contributions

SP, SO, AC, CH, AP, and HB drafted survey questions. SP conducted data analyses and wrote the original draft of manuscript. All authors contributed to the conceptualization, review, and editing of this manuscript.

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with lower odds of WFU were lower education (AOR=.69, 95% CI=.55–.86 for ≤high school; AOR=.78, 95% CI=.64–.95 for some college, vs college graduate), not being married (AOR=.81, 95% CI=.66–.98, vs married/domestic partnership), and lower household income (AOR=.68, 95% CI=.68–.90 for <$35,000, vs ≥$100,000). Using a water filter was associated with higher odds of drinking >3 cups/day of tap water (AOR=1.33, 95% CI=1.13–1.56) and lower odds of SSBs ≥1 time/day (AOR=.76, 95% CI=.62–.92). Not drinking tap water at home was associated with higher odds of drinking >3 cups/day bottled water (AOR=3.46, 95% CI=2.70–4.44).

Conclusions: WFU was associated with higher tap water intake and lower SSB intake among U.S. adults. WFU was higher among Hispanics, but lower among those with lower education and income and not married adults. Although WFU was associated with healthful beverage habits, additional considerations for WFU may include source water quality, oral health, cost, and proper use.

Keywords

water filter; plain water; sugar-sweetened beverages; characteristics; sociodemographic

Purpose

Sugar-sweetened beverages (SSBs), such as regular soda, fruit drinks (not 100% fruit juice), sports drinks, energy drinks, flavored water with sugars, and coffee/tea beverages with added sugars,[1] are the leading sources of added sugars in the diet of American adults.[1] Frequent intake of SSBs (e.g., at least once per day) is associated with adverse health consequences in adults including obesity,[2–4] type 2 diabetes,[4–6] cardiovascular disease,[7,8] dental caries,[9,10] and asthma.[11]

In contrast, plain water intake (i.e., tap, bottled, and unflavored sparkling water without added sugars) may improve diet quality and help prevent chronic diseases when it is substituted for SSBs.[12–14] About 90% of the U.S. population receives drinking water from a public water system and that water is among the safest in the world[15]; however, there are documented instances of health violations in that may occur locally[16] and may differentially impact populations based on sociodemographic factors.[17] Based on 2011–2014 National Health and Nutrition Examination Survey (NHANES), only 55% of U.S. adults (≥20 years) reported consuming tap water on a given day.[18] Compared to those who drank water, calorie intake from SSBs were almost double among U.S. youth and young adults who did not drink water.[19] Furthermore, only 68% of U.S. adults perceived their local tap water is safe to drink, and mistrust of tap water safety was associated with lower plain water intake and higher SSB intake among U.S. Hispanic adults.[20]

Although most people may not need to filter their home tap water for safety reasons, some individuals may use water filters to improve their perception of safety, quality, or taste of tap water at their home.[21] For example, filter pitchers are point-of use water devices that may improve the taste of water and, depending on the grade of filter used, can reduce lead and other contaminants.[21] A previous study conducted among a small sample of adults (N = 546) living in a mid-sized city in northcentral West Virginia reported that 58% of adults used a water filter when drinking tap water.[22] Another study conducted in Québec,

Canada (N = 1014 citizens) reported that the association between tap water satisfaction and water intake profiles (e.g., tap water and/or bottled water) was mediated by the home water treatment strategies (e.g., water filter use such as a pitcher with filter, or cooling/refrigeration), knowledge about drinking water quality, and health risk perception.[23] If using a water filter improves the perception of home tap water safety, taste, or odor, this could be a strategy to increase tap water intake and decrease SSB intake in certain populations. However, water filter use has not received much attention in the public health literature and there is limited information on factors associated with water filter use at home among Americans.[22,24] Furthermore, the relationship between water filter use and beverage intake has not been examined using a national sample. In order to develop intervention strategies to increase plain water intake and reduce SSB intake among U.S. adults, we explored the prevalence of water filter use and factors associated with water filter use for drinking tap water at home and examined its association with consuming plain water and SSBs among U.S. adults.

Methods

Design

We conducted a cross-sectional study using data from the 2018 *SummerStyles* survey, which is an online survey of a panel sample of U.S. adults (≥18 years) led by Porter Novelli Public Services.[25] The survey is intended to measure a wide range of health-related attitudes, knowledge, behaviors, and conditions surrounding important public health issues. The *SummerStyles* survey has been used in previous studies.[20,26–30] The survey participants were selected from GfK's KnowledgePanel®, which is a large-scale online panel that is representative of the non-institutionalized U.S. population. The panel maintains about 55 000 panelists and is continuously replenished. Using probability-based sampling methods by address, panel members are randomly recruited by mail. A laptop or tablet and Internet access were provided to households if needed. This analysis was exempt from the Centers for Disease Control and Prevention (CDC) institutional review board because personal identifiers were not included in the data provided to the CDC.

Sample

The *SummerStyles* survey was sent to persons who participated in an initial wave (i.e., *SpringStyles* survey). Participants were not required to answer any of the questions and could leave the survey at any time. Respondents who did not answer at least half of the questions or completed the survey in ≤5 min were removed from the data as incomplete. In March–April 2018, the *SpringStyles* survey was distributed to a random sample of 10 904 panelists (≥18 years) and 6427 adults completed the survey, yielding a response rate of 58.9%. During June–July 2018, the *SummerStyles* survey was sent to 5584 adults who had responded to the *SpringStyles* survey. A total of 4088 adults completed the *SummerStyles* survey, yielding a response rate of 73.2%. Those who completed the survey received 5000 cash-equivalent reward points (value about $5). To match with U.S. Current Population Survey proportions, the data were weighted using the following 8 factors: age, sex, race/ethnicity, education, household income, household size, Census region, and metropolitan status. The initial sample was selected from individuals willing to be part of the larger

online panel; thus, study participants might not be representative of the entire U.S. adult population. Of the 4088 adults who completed the 2018 *SummerStyles* survey, 46 (1.1%) were excluded from current analysis because of missing data on outcomes (i.e., intake of plain water and SSBs) or main exposure variable (i.e., water filter use), leaving an analytic sample of 4042 adults.

Measures

The outcomes of interest were consumption of plain water (tap water, bottled water, and total plain water) and SSBs and survey questions were modified from previous studies.[20,27,31,32] Plain water intake was determined by the following 2 questions: (1) "On average, about how many cups of tap water do you drink each day? (8 oz. of water is equal to 1 cup.)"; and (2) "On average, about how many cups of bottled water do you drink each day? (8 oz. of water is equal to 1 cup. One standard 16 oz. bottle of water equals 2 cups.)." For each question, response choices were none, 1, 2–3, 4–5, 6–7, or ≥8 cups. To calculate total plain water intake, we summed the responses from intake of tap water and bottled water. Based on data distribution for tap water intake (approximately quartiles), 4 mutually exclusive categories (≤1, >1 to ≤ 3, >3 to ≤5, or >5 cups/day) were created for tap, bottled, and total plain water intake. For logistic regression models, each water intake variable was dichotomized into ≤3 and >3 cups/day based on a previous study.[33]

Since SSBs are not as frequently consumed daily like plain water, the frequency of SSB intake was determined by the following question: "During the past 7 days, how many times did you drink sodas, fruit drinks, sports or energy drinks, and other sugar-sweetened drinks? Do not include 100% fruit juice, diet drinks, or artificially sweetened low-calorie drinks." Response choices were none, 1–6 times/week, 1 time/day, 2 times/day, or ≥3 times/day. To calculate daily intake, 1–6 times/week was converted to .5 times/day (3.5 divided by 7), and ≥3 times/day was converted to 3 times/day. Based on previous studies,[27,34] 3 mutually exclusive categories (0, >0 to < 1, or ≥1 time/day) were created for SSB intake, and for the logistic regression model, SSB intake was dichotomized into <1 or ≥1 time/day.

The main exposure variable was water filter use determined by the following question: "Do you usually use a water filter for drinking tap water from your home, such as a Brita pitcher or PUR faucet water filter?" Response choices were Yes, No, or I do not drink tap water at home.

Covariates included sociodemographic characteristics, weight status, Census regions, and ownership status of living quarters. Sociodemographic variables were age (18–24, 25–44, 45–64, or ≥65 years), sex, race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic Other), education level (high school graduate or less, some college, and college graduate), marital status (married/domestic partnership or not married), and annual household income (<$35,000, $35,000–$74,999, $75,000–$99,999, or ≥$100,000). Not married comprised widowed, divorced, separated, or never married. Body mass index (BMI) was calculated using self-reported weight and height data, and weight status was grouped into underweight/healthy weight (BMI <25 kg/m^2), overweight (BMI 25–<30 kg/m^2), or obesity (BMI ≥30 kg/m^2).[35] Census region of residence was grouped into Northeast, Midwest, South, or West.[36] Ownership status of living quarters was

categorized as owned or rented. Only the weight status variable had missing data of 1.9% and respondents with missing weight status data were omitted when the variable was used in any given test or model.

Analysis

For unadjusted analyses, we used χ^2 tests to examine the bivariate associations between plain water intake, SSB intake, water filter use, and sociodemographic characteristics (significant at $P<.05$). To examine factors associated with water filter use, we used a multinomial logistic regression model to calculate adjusted odds ratios (AOR) and 95% confidence intervals (CI) for factors associated with water filter use (yes, no [a reference category], or did not drink tap water at home) including all variables in 1 model. To examine associations between water filter use and intake of plain water and SSBs, 4 separate multivariable logistic regression models were used to calculate AOR and 95% CI for the odds of consuming tap water >3 cups/day (reference: ≤3 cups/day), bottled water >3 cups/day (reference: ≤3 cups/day), total plain water >3 cups/day (reference: ≤3 cups/day), and SSBs ≥1 time/day (reference: <1 time/day). Each model controlled for age, sex, race/ethnicity, education, marital status, annual household income, weight status, Census region of residence, and ownership status of living quarters. Of those 4042 adults with plain water intake, SSB intake, and water filter use data, the logistic regression models included 3966 adults with complete data on weight status. Statistical analyses were conducted in SAS version 9.4 (Cary, North Carolina), using survey procedures to account for the sample design and weight variable.

Results

Overall, 34.1% of participants were aged 25–44 years old, 51.8% were female, 64.2% were non-Hispanic White, 40.1% had high school education or less, 62.1% were married or in domestic partnership, 33.5% had an annual household income of ≥$100,000, 33.4% had obesity, 37.8% were living in the South, and 70.5% owned their living quarters (Table 1). Furthermore, 36.0% of adults reported using a water filter for drinking tap water at home; 14.3% did not drink tap water at home. Based on bivariate analyses, using a water filter was significantly associated with age, sex, race/ethnicity, education level, marital status, annual household income, weight status, Census region of residence, and ownership status of living quarters (χ^2 tests, $P<.05$; Table 1). For example, the proportion of adults who reported using a water filter was highest among adults aged 25–44 years old, males, non-Hispanic others, adults with college graduate education, adults who were married or in a domestic partnership, adults with annual household income ≥$100,000, adults with underweight/healthy weight, those living in the West, and adults who owned their living quarters. The proportion of adults who reported not drinking tap water at home was highest among younger adults (18–24 years), females, non-Hispanic Black or Hispanic populations, adults with ≤ high school education, not married adults, adults with annual household income <$35,000, adults with obesity, and those who rented their living quarters.

Based on the multinomial logistic regression model for water filter usage (the reference category was not using a water filter) in Table 2, Hispanics had significantly higher odds

of using a water filter (AOR = 1.50, 95% CI = 1.14–1.98) vs non-Hispanic White. Factors significantly associated with lower odds of using a water filter were lower education (AOR = .69, 95% CI = .55–.86 for ≤high school; AOR = .78, 95% CI = .64–.95 for some college, vs college graduate), not being married (AOR = .81, 95% CI = .66–.98, vs married/domestic partnership), and lower household income (AOR = .68, 95% CI = .68–.90 for <$35,000, vs ≥$100,000). In the same model, odds of not drinking tap water at home were significantly higher among younger adults (AOR = 1.59, 95% CI = 1.14–2.23 for 25–44 years old; AOR = 1.38, 95% CI = 1.02–1.89 for 45–64 years old, vs ≥65 years old), females (AOR = 1.30, 95% CI = 1.02–1.64), non-Hispanic Black (AOR = 1.69, 95% CI = 1.18–2.42) or Hispanic (AOR = 1.99, 95% CI = 1.41–2.81, vs non-Hispanic White), those with lower education (AOR = 2.02, 95% CI = 1.44–2.83 for ≤high school; AOR = 1.93, 95% CI = 1.38–2.71 for some college, vs college graduate), and renters (AOR = 1.36, 95% CI = 1.02–1.80, vs homeowners) (Table 2).

Overall, 51.7% of adults drank total plain water >5 cups/day, and 24.7% adults reported drinking SSBs ≥1 time/day (Table 3). Based on bivariate analyses, using a water filter was significantly related to intake of more tap water, bottled water, total plain water, and less SSBs (χ^2 tests, $P < .05$). For example, among adults who reported using a water filter for drinking tap water at home, 35.9% drank tap water >5 cups/day, and 19.8% drank SSBs ≥1 time/day; whereas, among those who reported not using a water filter, 29.6% drank total plain water >5 cups/day and 26.0% drank SSBs ≥1 time/day (Table 3). Based on the multivariable logistic regression model, using a water filter was significantly associated with higher odds of drinking >3 cups/day of tap water (AOR = 1.33, 95% CI = 1.13–1.56) and lower odds of consuming SSBs ≥1 time/day (AOR = .76, 95% CI = .62–.92) (Table 4). Not drinking tap water at home was significantly associated with lower odds of drinking >3 cups/day of tap water (AOR = .39, 95% CI = .30–.51) and higher odds of drinking >3 cups/day bottled water (AOR = 3.46, 95% CI = 2.70–4.44) (Table 4). Using a water filter was not associated with total plain water intake after controlling for covariates.

Discussion

In our study, 36% of U.S. adults reported using a water filter for drinking tap water at home. Similar to our findings, a previous report showed that about 40% of Americans reported using a home water treatment unit.[21] Additionally, we found that factors significantly associated with using a water filter were race/ethnicity, education, marital status, and household income. For instance, odds of using a water filter were significantly higher among Hispanics but lower among adults with lower education, not married adults, and adults with lowest income category in our study. Upfront costs for water filtering systems vary widely from around $20 to thousands of dollars.[21,37] It is possible that those with lower household income may not be able to afford upfront or ongoing costs associated with water filtration. However, although upfront costs of water filtration may be a deterrent to some, over time filtration might be more affordable than continuously purchasing bottled water. Based on 2011–2014 NHANES data, while there were no differences in total plain water intake by race/Hispanic origin, non-Hispanic Black, and Hispanic adults were significantly less likely to drink tap water and more likely to drink bottled water compared to non-Hispanic White adults.[18] Additionally, SSB intake was higher among non-Hispanic Black and Hispanic

adults than non-Hispanic White adults.[34,38,39] Previous studies reported that adults with lower education, not married adults, and adults with lower household income consumed less plain water[18] and more SSBs[26,34,38,39] than their counterparts. There are limited studies on marital status and water filter use. As certain sociodemographic subgroups drink less water intake and more SSB intake, focused intervention efforts are needed to reduce differences in consumption of plain water and SSBs among U.S. adults. Although the use of water filtration may help alleviate concerns of water quality and appeal, intervention efforts should consider structural disparities related to race/ethnicity, household income, and food insecurity that might impact individuals to prioritize water filters over other necessary expenses. Furthermore, it is possible that recent drinking water crises (e.g., Flint, Michigan, Elk River in West Virginia) might have a disproportionately negative impacts on individuals of color or rural communities[40–42] and could result in avoidance of tap water regardless of whether they have a water filter at home.

A previous study conducted among a small sample of adults (N = 546) living in a mid-sized city in northcentral West Virginia showed somewhat different findings than our study.[22] This West Virginia study reported that 58% of adults used a water filter when drinking tap water; and using a water filter was significantly associated with age and household income, but not with education among adults.[22] For example, the odds of using a water filter significantly decreased as age increased; however, the odds of using a water filter significantly increased with higher household income.[22] This discrepancy in the higher prevalence of using a water filter could be partially due to differences in study sampling (a mid-sized city in West Virginia vs nationwide) and sample sizes. Additionally, it is possible that water filter use may be more widespread in West Virginia population because previous water crises can impact both actual and perceived water quality.[24,43]

A previous study reported that mistrust of tap water safety was significantly associated with lower plain water intake among non-White racial/ethnic adults and higher SSB intake among Hispanic adults in the U.S.[20] For instance, Hispanic adults who disagreed that their tap water is safe to drink had 2 times higher odds of drinking SSBs ≥1 time/day and 1.9 times higher odds of drinking plain water ≤1 time/day.[20] Moreover, a Canadian study reported that water intake profiles (i.e., Tap water only, Prefer tap water, Bottled water only, Prefer bottled water, and No preference) were significantly associated with study participants' satisfaction with taste, odor, and color of tap water (N = 1014); and the association between tap water satisfaction and water intake profiles was mediated by the home water treatment strategies (e.g., water filter use such as a pitcher with filter, or cooling/refrigeration), knowledge about drinking water quality, and health risk perception.[23] For example, Brita filter use was a significant mediating variable among tap water only and bottled water only consumers and proportion of the mediated effect ranged from 3.7% to 11.5%.[23] In our study, using a water filter for drinking tap water at home was associated with 33% higher odds of drinking more than 3 cups per day of tap water and 24% lower odds of drinking SSBs at least once per day compared to those who did not use a water filter among U.S. adults. Based on these findings, promoting use of water filtration may provide a focused strategy to increase tap water intake and decrease SSB intake among individuals, given that filtration devices can not only improve perceived tap water safety but may also help alleviate concerns of water quality and appeal.

In our study, 14% of U.S. adults (aged ≥18 years) reported not drinking tap water at home, and this was more prevalent among younger adults, females, non-Hispanic Black or Hispanic populations, adults with lower education level, not married adults, adults with lower household income, adults with obesity, and those who rented their living quarters. Previous studies using 2015–2016 NHANES data reported that, similar to our results, 16% of U.S. adults (aged ≥20 years) did not drink tap water,[44] while water in general (i.e., tap, bottled, flavored, carbonated, and enhanced/fortified water) was the most commonly consumed beverage among U.S. adults (aged ≥20 years), followed by coffee/tea drinks and SSBs (i.e., soft drinks, fruit drinks, and sports/energy drinks).[45] Drinking plain water instead of SSBs can reduce the risk of the adverse health consequences related to SSB intake.[12–14] Additionally, plain water as a beverage of choice may provide health benefits,[46] for example, reduction in dental caries where community water is fluoridated. It should be noted that some types of water filters remove fluoride from tap water.[47,48]

The strengths of our study include a large sample size and refined measurement of plain water intake (i.e., measuring tap water and bottled water separately). Despite these strengths, the present study has several limitations. First, the *SummerStyles* survey is a cross-sectional survey; thus, causation or the direction of the association cannot be determined. For example, we do not know if adults with water filters like their tap water better and therefore they drink more of it; or if adults who want to drink water might feel it is worthwhile to invest in water filter, whereas adults who do not want to drink water might not have concerns about tap water quality or taste. Further research might be needed to find out. Second, data are subject to recall or social desirability bias, because *SummerStyles* survey data are self-reported. Third, the study does not account for actual or perceived tap water quality or sources of water. Fourth, the survey may not capture other filters like a refrigerator filter or a filter that sits below the sink or filters the water of the home but not at the faucet. Additionally, the questions in the survey did not independently assess whether participants drink tap water or use a water filter. Fifth, although the data were weighted to match with U.S. Current Population Survey proportions, study findings might not be generalizable to the whole U.S. adult population, because the initial sample was selected from individuals willing to be part of the larger online panel. Nonetheless, the prevalence of not drinking tap water in our study population was very similar to that found in another study using nationally representative NHANES data.[44] Lastly, SSB intake was measured in frequency rather than volume of intake, so the amount of SSBs consumed cannot be determined.

In conclusion, 36% of U.S. adults reported using a water filter for drinking tap water at home, and water filter use was associated with higher tap water intake and lower SSB intake among U.S. adults. Yet, water filter use was higher among Hispanic adults, but lower among those with lower education and income, and adults who were not married. Additional considerations for water filter use may include source water quality, oral health, cost, and proper use. Nonetheless, our findings that water filter use was associated with healthful beverage habits can inform intervention efforts to increase tap water intake and reduce SSB intake among U.S. adults, especially populations at high-risk for diet attributable diseases. Furthermore, our study findings on factors associated with water filter use might inform public health and nutrition programs (e.g., Rethink Your Drink, SIPsmartER)[49–52] to encourage water intake among populations that may be hesitant to drink tap water.

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SO WHAT?

What Is Already Known on This Topic?

Plain water intake (i.e., tap, bottled, and unflavored sparkling water without added sugars) may improve diet quality and help prevent chronic diseases when it is substituted for SSBs. There is limited information on factors associated with water filter use at home among Americans.

What Does This Article Add?

Overall, 36% of adults reported using a filter for drinking tap water at home; 14% did not drink tap water at home. Odds of using a water filter were higher among Hispanics, but lower among those with lower education and income and not married adults. Using a water filter was significantly associated with higher odds of drinking >3 cups/day of tap water and lower odds of drinking SSBs ≥1 time/day. Not drinking tap water at home was significantly associated with higher odds of drinking >3 cups/day bottled water.

What Are the Implications for Health Promotion Practice or Research?

Although reported filter use was associated with healthful beverage habits, additional considerations for water filter use may include source water quality, oral health, cost, and proper use.

Table 1.

Characteristics of respondents and their bivariate associations with water filter use for drinking tap water at home among U.S. adults participating in the *SummerStyles* Survey, 2018.

		Water Filter Use for Drinking Tap Water at Home			
Characteristic	**All respondents %[a]**	**Yes % [a] ± SE**	**No % [a] ± SE**	**Do Not Drink Tap Water at Home % [a] ± SE**	***P* value[b]**
Total sample (N=4042)[c]	100	36.0 ± 0.9	49.7 ± 0.9	14.3 ± 0.7	
Age					.004
18–24 years	11.7	33.5 ± 3.7	47.5 ± 3.9	19.1 ± 3.2	
25–44 years	34.1	38.9 ± 1.5	45.9 ± 1.5	15.2 ± 1.2	
45–64 years	34.1	35.1 ± 1.3	51.0 ± 1.3	13.9 ± 1.0	
≥65 years	20.1	34.2 ± 1.7	55.4 ± 1.7	10.4 ± 1.1	
Sex					.006
Male	48.2	37.9 ± 1.3	49.8 ± 1.3	12.2 ± 0.9	
Female	51.8	34.2 ± 1.2	49.6 ± 1.3	16.1 ± 1.0	
Race/ethnicity					<.0001
White, non-Hispanic	64.2	36.1 ± 1.0	52.6 ± 1.0	11.3 ± 0.7	
Black, non-Hispanic	11.9	25.9 ± 2.5	51.8 ± 2.9	22.4 ± 2.6	
Hispanic	15.7	37.8 ± 2.7	40.1 ± 2.8	22.1 ± 2.4	
Other, non-Hispanic	8.2	46.9 ± 3.5	42.4 ± 3.5	10.7 ± 2.0	
Education level					<.0001
High school or less	40.1	29.4 ± 1.4	52.0 ± 1.6	18.6 ± 1.3	
Some college	28.3	34.2 ± 1.6	49.9 ± 1.7	16.0 ± 1.3	
College graduate	31.6	46.1 ± 1.4	46.7 ± 1.4	7.2 ± 0.8	
Marital status					<.0001
Married/domestic partnership	62.1	39.3 ± 1.0	48.8 ±1.1	11.8 ± 0.7	
Not married	37.9	30.6 ± 1.5	51.2 ± 1.7	18.2 ± 1.3	
Annual household income					<.0001
<$35,000	22.9	24.9 ± 1.8	56.0 ± 2.0	19.1 ± 1.7	
$35,000–$74,999	29.0	35.1 ± 1.6	48.1 ± 1.7	16.8 ± 1.4	
$75,000–$99,999	14.6	40.3 ± 2.2	47.3 ± 2.3	12.4 ± 1.5	
≥$100,000	33.5	42.6 ± 1.5	47.9 ± 1.5	9.5 ± 1.0	

Characteristic	All respondents%[a]	Water Filter Use for Drinking Tap Water at Home			P value[b]
		Yes %[a] ± SE	No %[a] ± SE	Do Not Drink Tap Water at Home %[a] ± SE	
Weight status[d] (n=3966)					.004
Underweight/healthy weight	33.7	39.0 ± 1.6	47.5 ± 1.7	13.4 ± 1.2	
Overweight	32.9	36.6 ± 1.5	51.2 ± 1.5	12.2 ± 1.1	
Obesity	33.4	32.5 ± 1.4	50.4 ± 1.5	17.1 ± 1.3	
Census region of residence					.003
Northeast	17.9	35.2 ± 2.0	49.0 ± 2.1	15.8 ± 1.7	
Midwest	20.9	32.7 ± 1.8	56.2 ± 1.9	11.1 ± 1.3	
South	37.8	35.7 ± 1.4	49.9 ± 1.5	14.5 ±1.1	
West	23.4	40.1 ± 1.9	44.3 ± 1.9	15.6 ± 1.5	
Ownership status of living quarters[e]					<.0001
Owned	70.5	38.1 ± 1.0	50.4 ± 1.0	11.5 ± 0.7	
Rented	29.5	31.0 ± 1.7	48.2 ± 1.8	20.8 ± 1.5	

SE: standard error.

[a]Weighted percent may not add up to 100% because of rounding.

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

[c]Unweighted sample size.

[d]Weight status was based on calculated body mass index (BMI) (kg/m^2): underweight/healthy weight, BMI<25; overweight, BMI 25–<30; obesity, BMI ≥30.

[e]Owned: owned or being bought by you or someone in your household; Rented: rented for cash or occupied without payment of cash rent.

Table 2.

Adjusted odds ratios and 95% confidence intervals for using a water filter for drinking tap water at home among U.S. adults participating in the SummerStyles Survey, 2018.[a]

	Used a Water Filter for Drinking Tap Water at Home	
Characteristic	***Yes* vs. *No* AOR (95% CI)**	***I don't drink tap water at home* vs. *No* AOR (95% CI)**
Age		
18–24 years	1.24 (.83, 1.86)	1.60 (.96, 2.68)
25–44 years	1.23 (.99, 1.52)	1.59 (1.14, 2.23)[b]
45–64 years	.99 (.81, 1.20)	1.38 (1.02, 1.89)[b]
≥65 years	Reference	Reference
Sex		
Male	Reference	Reference
Female	.96 (.82, 1.12)	1.30 (1.02, 1.64)[b]
Race/ethnicity		
White, non-Hispanic	Reference	Reference
Black, non-Hispanic	.81 (.60, 1.09)	1.69 (1.18, 2.42)[b]
Hispanic	1.50 (1.14, 1.98)[b]	1.99 (1.41, 2.81)[b]
Other, non-Hispanic	1.37 (.99, 1.89)	1.19 (.73, 1.95)
Education level		
High school or less	.69 (.55, .86)[b]	2.02 (1.44, 2.83)[b]
Some college	.78 (.64, .95)[b]	1.93 (1.38, 2.71)[b]
College graduate	Reference	Reference
Marital status		
Married/domestic partnership	Reference	Reference
Not married	.81 (.66, .98)[b]	1.17 (.91, 1.51)
Annual household income		
<$35,000	.68 (.51, .90)[b]	.91 (.62, 1.34)
$35,000–$74,999	.97 (.78, 1.20)	1.13 (.80, 1.60)

Characteristic	Used a Water Filter for Drinking Tap Water at Home	
	***Yes* vs. *No* AOR (95% CI)**	***I don't drink tap water at home* vs. *No* AOR (95% CI)**
$75,000–$99,999	1.06 (.84, 1.34)	1.01 (.68, 1.48)
≥$100,000	Reference	Reference
Weight status[c]		
Underweight/healthy weight	Reference	Reference
Overweight	.91 (.75, 1.11)	.85 (.62, 1.16)
Obesity	.89 (.73, 1.09)	1.10 (.82, 1.47)
Census region of residence		
Northeast	.96 (.77, 1.20)	1.19 (.86, 1.65)
Midwest	.82 (.67, 1.02)	.73 (.52, 1.03)
South	Reference	Reference
West	1.09 (.88, 1.36)	1.14 (.83, 1.55)
Ownership status of living quarters[d]		
Owned	Reference	Reference
Rented	.94 (.76, 1.16)	1.36 (1.02, 1.80)[b]

AOR: adjusted odds ratio; 95% CI: 95% confidence intervals.

[a]All variables listed in Table 2 were included in 1 multinomial logistic regression model. The reference category was not using water filter (unweighted n=3966).

[b]Considered statistically significant based on the 95% CI.

[c]Weight status was based on calculated body mass index (BMI) (kg/m^2): underweight/healthy weight, BMI<25; overweight, BMI 25–<30; obesity, BMI ≥30.

[d]Owned: owned or being bought by you or someone in your household; Rented: rented for cash or occupied without payment of cash rent.

Table 3.

Bivariate associations (unadjusted) of water filter use for drinking tap water at home with intake of tap water, bottled water, total plain water, and sugar-sweetened beverages (SSBs) among U.S. adults participating in the *SummerStyles* Survey, 2018 (unweighted N=4042).

		Water Filter Use for Drinking Tap Water at Home			
Beverage Intake	**All Respondents %[a]**	**Yes% [a] ± SE**	**No% [a] ± SE**	**Do Not Drink Tap Water at home% [a] ± SE**	**P value[b]**
Tap water					<.0001
≤1 cup/day	23.2	15.2 ± 1.1	20.3 ± 1.0	53.3 ± 2.6	
>1 to ≤3 cups/day	24.4	23.2 ± 1.3	27.4 ±1.1	16.9 ± 2.1	
>3 to ≤5 cups/day	22.4	25.7 ± 1.3	22.8 ±1.1	12.6 ± 1.8	
>5 cups/day	30.1	35.9 ± 1.4	29.6 ± 1.2	17.1 ± 2.0	
Bottled water					<.0001
≤1 cup/day	47.6	52.8 ± 1.5	51.5 ± 1.3	20.6 ± 2.1	
>1 to ≤3 cups/day	25.1	23.8 ± 1.3	26.0 ±1.1	25.1 ± 2.2	
>3 to ≤5 cups/day	12.6	11.0 ± 1.0	11.0 ± 0.8	22.5 ± 2.1	
>5 cups/day	14.7	12.4 ± 1.0	11.5 ± 0.8	31.7 ± 2.5	
Total plain water[c]					<.0001
≤1 cup/day	7.1	5.5 ± 0.7	7.2 ± 0.7	10.7 ± 1.5	
>1 to ≤3 cups/day	14.4	13.3 ± 1.0	15.8 ± 0.9	12.3 ± 1.8	
>3 to ≤5 cups/day	26.9	24.2 ± 1.3	28.8 ± 1.2	26.9 ± 2.3	
>5 cups/day	51.7	57.1 ± 1.5	48.3 ± 1.3	50.1 ± 2.6	
SSBs[d]					<.0001
0 times/day	35.6	39.1 ± 1.4	34.3 ± 1.2	31.4 ± 2.3	
>0 to <1 time/day	39.6	41.1 ± 1.5	39.7 ± 1.2	36.0 ± 2.5	
≥1 time/day	24.7	19.8 ± 1.2	26.0 ±1.1	32.6 ± 2.5	

SE: standard error; SSBs: sugar-sweetened beverages.

[a] Weighted percent may not add up to 100% because of rounding.

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

[c] Total plain water intake includes tap water and bottled water intake.

[d] Included sodas, fruit drinks, sports or energy drinks, and other sugar-sweetened drinks (excluding 100% fruit juice, diet drinks, or artificially sweetened low-calorie drinks).

Table 4.

Multivariable associations (adjusted) of water filter use for drinking tap water at home with intake of tap water, bottled water, and total plain drinking water (>3 cups/day) and daily intake of sugar-sweetened beverages (SSBs) among U.S. adults participating in the *SummerStyles* Survey, 2018 (unweighted n = 3966).

	Adjusted Odds Ratios (95% Confidence Intervals)[a]			
	Tap Water Intake >3 Cups/day[b]	**Bottled Water Intake >3 Cups/day[b]**	**Total Plain Water Intake >3 Cups/day[b]**	**SSB Intake ≥1 Time/day[c]**
Water filter use for drinking tap water at home				
Yes	1.33 (1.13, 1.56)[d]	1.10 (.90, 1.34)	1.20 (.99, 1.45)	.76 (.62, .92)[d]
No	Reference	Reference	Reference	Reference
Do not drink tap water at home	.39 (.30, .51)[d]	3.46 (2.70, 4.44)[d]	.88 (.67, 1.16)	1.26 (.97, 1.65)

[a] 4 separate multivariable logistic regression models were fitted for each beverage outcome, and each model controlled for age, sex, race/ethnicity, education, marital status, annual household income, weight status, Census regions of residence, and ownership status of living quarters.

[b] Total plain water intake includes tap water and bottled water intake. Each water intake variable was dichotomized into ≤3 and >3 cups/day.

[c] Included sodas, fruit drinks, sports or energy drinks, and other sugar-sweetened drinks (excluding 100% fruit juice, diet drinks, or artificially sweetened low-calorie drinks). SSB intake was dichotomized into <1 or ≥1 time/day.

[d] Considered statistically significant based on the 95% CI.