



HHS Public Access

Author manuscript

Am J Health Promot. Author manuscript; available in PMC 2019 July 01.

Published in final edited form as:

Am J Health Promot. 2018 July ; 32(6): 1365–1374. doi:10.1177/0890117116680472.

Physician Characteristics Associated With Sugar-Sweetened Beverage Counseling Practices

Brenna K. VanFrank, MD, MSPH^{1,2}, Sohyun Park, PhD², Jennifer L. Foltz, MD, MPH^{2,3}, Lisa C. McGuire, PhD², and Diane M. Harris, PhD²

¹Epidemic Intelligence Service, Office of Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention, Atlanta, GA, USA

²Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, GA, USA

³US Public Health Service Commissioned Corps, USA

Abstract

Purpose—Frequent sugar-sweetened beverage (SSB) consumption is associated with chronic disease. Although physician counseling can positively affect patient behavior, physicians' personal characteristics may influence counseling practices. We explored SSB-related topics physicians discuss when counseling overweight/obese patients and examined associations between physicians' SSB-related counseling practices and their personal and medical practice characteristics.

Design—Cross-sectional survey.

Setting—DocStyles survey, 2014.

Participants—A total of 1510 practicing US physicians.

Measures—Physician's SSB counseling on calories, added sugars, obesity/weight gain, health effects, consumption frequency, water substitution, and referral.

Analysis—Adjusted odds ratios (aORs) were calculated with multivariable logistic regression, adjusting for physician's personal and medical practice characteristics.

Results—Most physicians (98.5%) reported SSB-related counseling. The most reported topic was obesity/weight gain (81.4%); the least reported were added sugars (53.1%) and referral (35.0%). Physicians in adult-focused specialties had lower odds than pediatricians of counseling on several topics (aOR range: 0.26-0.64). Outpatient physicians had higher odds than inpatient physicians of counseling on consumption frequency and water substitution (aOR range:

Reprints and permission: sagepub.com/journalsPermissions.nav

Corresponding Author: Brenna K. VanFrank, Centers for Disease Control and Prevention, 4770 Buford Highway, Mail Stop F-77, Chamblee, GA, 30341, USA. bvanfrank@cdc.gov.

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.

1.60-2.01). Physicians consuming SSBs 1 time/day (15.7%) had lower odds than nonconsumers of counseling on most topics (aOR range: 0.58-0.68).

Conclusion—Most physicians reported SSB-related counseling; obesity/weight gain was discussed most frequently. Counseling opportunities remain in other topic areas. Opportunities also exist to strengthen SSB counseling practices in adult-focused specialties, inpatient settings, and among physicians who consume SSBs daily.

Keywords

sugar-sweetened beverage; physicians; counseling; obesity; clinical setting

Purpose

Frequent consumption of sugar-sweetened beverages (SSBs) has been associated with multiple adverse health effects including obesity,^{1,2} diabetes,³ cardiovascular disease,⁴ and dental disease.⁵ Sugar-sweetened beverages are defined by the Dietary Guidelines for Americans 2015-2020 as “liquids that are sweetened with various forms of added sugars ... [including] soda, fruitades, sports drinks, energy drinks, sweetened waters, and coffee and tea beverages with added sugars.”^{6(p95)} Approximately 64% of US youth and 51% of US adults reported drinking at least 1 SSB on a given day in 2009 to 2010.⁷ Several governmental and nongovernmental agencies recommend limiting SSB consumption in youth⁸⁻¹¹ and adults.^{6,12-14} Additionally, organizations including the Institute of Medicine, the American Heart Association (AHA), and the American Academy of Pediatrics have issued recommendations that clinicians advise patients to limit SSB intake and/or counsel on the health risks associated with the consumption of SSBs.^{8,12,14,15}

Physician's counseling regarding healthy lifestyle practices can positively affect patient engagement in health-related behaviors¹⁶⁻¹⁸ and can be considered an important component of comprehensive public health approaches to preventing and ameliorating chronic disease.¹⁹ Despite clinical guidelines recommending counseling and the potential benefits to patients, both providers and patients report counseling regarding SSBs does not always occur.²⁰⁻²² The reasons for this discrepancy are likely multifactorial, including many barriers to preventive counseling such as time, knowledge, and physician self-efficacy.²³⁻²⁵ Counseling practices may also be influenced by the characteristics of a physician's medical practice^{26,27} or personal health behaviors.²⁷⁻³⁰ However, limited information exists regarding factors related to physicians' SSB counseling practices. Additionally, although many physicians report counseling patients regarding SSBs,^{21,22,31} no study has investigated what information physicians are discussing with patients during this counseling.

The objectives of this exploratory study were as follows:

1. To investigate what topics physicians discuss with patients who are overweight or have obesity when providing SSB-related counseling.
2. To examine the association between physicians' personal and medical practice characteristics, including physician personal SSB intake, and their SSB-related counseling practices for patients who are overweight or have obesity.

Methods

Design

This cross-sectional study used data from DocStyles 2014, a web-based panel survey conducted by Porter Novelli in June 2014. The survey was designed to provide insights into physicians' attitudes and counseling behaviors regarding a variety of health issues pertaining to both children and adults.

Sample

The sample for this survey was randomly drawn from WorldOne's Global Medical Panel (www.worldone.com; World One has since been acquired by SERMO, a global market research company) which consists of 270 000 verified physicians and 1 million other medical professionals recruited from the United States via a double opt-in process. A total of 2512 family practice (FP) and internal medicine (IM) physicians, pediatricians, obstetrician/gynecologists (OB/GYNs), and nurse practitioners (NPs) were invited to participate in DocStyles to meet preset response quotas as determined by Porter Novelli (FP/IM = 1000, pediatrics = 250, OB/GYN = 250, NP = 250). Those responding to the invitation were further screened with the following inclusion criteria: (1) currently practices in the United States; (2) actively sees patients; (3) works in an individual, group, or hospital practice; and (4) has practiced medicine for at least 3 years. Of those invited to participate, 161 did not meet the inclusion criteria, 26 were excluded due to filled sample quotas, 132 were excluded due to incomplete surveys, and 433 did not respond or attempted to take the survey after it closed. Nurse practitioners (n = 250) were not asked to complete the subset of survey questions pertinent to this study, yielding a final analytic sample of 1510 physicians.

Response rates were calculated using a modified formula to take into account quota-based sampling by weighting quota-based exclusions as a factor of the overall sample pool rather than classifying them as standard incompletes. Response rates were found to be 81.2% for FP and IM physicians combined, 69.5% for pediatricians, and 76.4% for OB/GYNs. Response to the DocStyles survey was voluntary, and respondents were allowed to opt out of the survey any time during the completion of the survey. Each respondent was paid an honorarium of US\$35 to US\$73 for survey completion. This analysis was determined to be exempt from review by the Centers for Disease Control and Prevention (CDC) institutional review board because personal identifiers were not included in the data licensed to CDC.

Measures

Outcome variables were SSB counseling topics discussed by physicians with patients who were overweight or have obesity. Selection of counseling topics for investigation was based on evidence supporting behavior change as a means to improve health outcomes (SSB consumption frequency,^{32,33} substituting water for SSBs^{34,35}) as well as evidence supporting increasing SSB knowledge as a potential means to decrease SSB intake.³⁶ Physicians were asked “Which of the following do you discuss when you counsel your overweight and obese patients about their SSB intake? Select all that apply.” Response options were:

- Frequency of consumption

- The calorie content of SSBs
- The added sugar content of SSBs
- Suggest substituting water for SSBs
- Contributions to obesity and weight gain
- Contributions to adverse health effects such as diabetes
- I refer my patients to a dietician or nutrition services for counseling
- I do not counsel about SSBs.

Responses were categorized as “yes” or “no” for each SSB topic, and topics were grouped into 4 categories: nutritional content (calorie content, added sugars content), adverse health outcomes (contributions to obesity and weight gain, contributions to adverse health effects such as diabetes), behavior change (SSB consumption frequency, water substitution for SSBs), and referral to a dietician or nutrition services.

Exposure variables were physicians' personal and medical practice characteristics. Personal characteristics included were physicians' age (<45 or ≥45 years), sex, race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, non-Hispanic Asian, or non-Hispanic other/multiracial), and weight status (underweight/normal weight, overweight, obese, or missing). Age categories were based on prior studies³⁷ and the distribution of the sample; analysis with more detailed age categories did not change modeling results, therefore, categories were chosen to maintain consistency with prior literature. Physicians' weight status was classified according to body mass index (BMI) calculated from self-reported weight and height. Physicians were classified as underweight or normal weight if BMI was <25 kg/m², overweight if BMI was ≥25 to <30 kg/m², obese if BMI was ≥30 kg/m², or missing if weight and/or height was not reported.³⁸ Physicians were asked about their personal SSB intake in the week prior to the survey using 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 drinks.” Response options were none, 1 to 6 times per week, 1 time per day, 2 times per day, 3 times per day, and 4 or more times per day. For this analysis, frequency of SSB intake was classified as none, >0 to <1 time per day, or ≥1 time per day to identify both non-consumers and daily consumers of SSBs.

Medical practice characteristics indicated by respondents included medical specialty (pediatrics, FP, IM, or OB/GYN), primary work setting (inpatient, individual outpatient, or group outpatient), and teaching hospital affiliation (yes or no). Patient socioeconomic status was reported by physicians based on the financial status of the majority of their patient panel and was classified as low income if the physician selected “very poor to poor” or “poor to lower middle class,” medium income if the physician selected “lower middle class to middle class,” or high income if the physician selected “middle class to upper middle class” or “upper middle class to affluent.” Years of practice were found to be highly correlated with physicians' age ($r = .90$) and was, therefore, not included in the analysis.

Analysis

Statistical analyses were performed using SAS version 9.3 (SAS Institute Inc, Cary, North Carolina). χ^2 tests were used to assess crude associations between the reported use of each SSB counseling topic and personal and medical practice characteristics, with $P < .05$ as the criterion for statistical significance.

Multivariable logistic regression models were used to estimate the adjusted odds ratios (aORs) and 95% confidence intervals (CIs) for characteristics associated with SSB counseling topics. All exposure variables (ie, physicians' personal and medical practice characteristics) were included in 1 model for each SSB counseling topic.

Results

Physicians' personal and medical practice characteristics are shown in Table 1. A majority of respondents reported working in group outpatient practices (70.8%), and slightly more than half (56.2%) reported affiliation with a teaching hospital. Nearly 1 in 6 (15.7%) physicians reported consuming SSBs 1 time per day in the last week, whereas 48.2% reported not consuming SSBs in the last week.

A majority (98.5%) of physicians reported counseling patients who were overweight or had obesity on at least 1 topic related to SSBs (Table 1). The most commonly reported topic was the contribution of SSBs to obesity and weight gain (81.4%), and the least reported topics were the added sugars content of SSBs (53.1%) and referral to a dietician or nutrition services (35.0%); 63.8% to 72.3% of physicians reported counseling on behavior change topics (Table 2). Pediatricians had the highest percentage of counseling on any SSB topic, with 87.7% counseling on substituting water for SSBs. Internal medicine physicians had the lowest percentage of counseling on any nonreferral SSB topic, with 43.4% counseling on the added sugars content of SSBs. Obstetrician/gynecologists had the highest percentage of referral at 42.4%, and FP physicians had the lowest percentage of referral at 29.0%.

Results from adjusted analysis indicated that physicians did not differ significantly by age, sex, or physician weight status in their report of counseling on any SSB-related topic (Table 3). Some significant differences were noted among different race/ethnicity groups for counseling regarding added sugars content and water substitution (Table 3).

Physicians who reported consuming SSBs 1 time per day in the last week had significantly lower odds of counseling patients on all SSB counseling topics except SSB consumption frequency and referral (aOR range: 0.58-0.68; Table 3). Physician SSB intake >0 to <1 time per day was significantly associated with decreased odds of counseling about water substitution for SSBs (aOR: 0.71, 95% CI: 0.54-0.93).

Compared to pediatricians, OB/GYNs had lower odds of counseling on all SSB-related topics except for referral (aOR range: 0.26-0.60; Table 3). Family practice and IM physicians had lower odds than pediatricians of counseling on added sugars content and both behavior change topics (aOR range: 0.35-0.63). Likewise, IM physicians had lower odds of counseling on contributions of SSBs to adverse health effects such as diabetes (aOR: 0.64,

95% CI: 0.45-0.91). Obstetrician/ gynecologists had higher odds than pediatricians of referring patients for counseling on SSBs (aOR: 1.52, 95% CI: 1.05-2.20); differences for FP and IM physicians were not significant.

Compared to those working in inpatient practice, physicians working in group or individual outpatient practice had higher odds of counseling on both topics in the behavior change category (aOR range: 1.60-2.01). Additionally, physicians working in individual outpatient practice had higher odds of counseling on added sugars content than those working in inpatient practice (aOR: 1.71, 95% CI: 1.08-2.71).

Physician-reported patient socioeconomic status was generally not associated with SSB-related counseling topics. However, physicians whose patient panels were either low or medium income had a higher odds of counseling on water substitution for SSBs (aOR range: 1.32-1.56). Additionally, physicians whose patients were mostly low income had a higher odds of referring (aOR: 1.38, 95% CI: 1.02-1.87).

Discussion

Our study demonstrated that physician SSB-related counseling practices were associated with physicians' personal health behaviors, medical specialty, and practice setting. In adjusted analysis, physicians who consumed SSBs daily, practiced in adult-focused specialties, or worked in inpatient settings generally had decreased odds of discussing specific SSB-related counseling topics. Furthermore, discrepancies in physician counseling exist between specific SSB-related topic areas, with one-third of physicians in the study reporting not counseling on behavior change topics known to have positive patient impact.

Physicians' daily SSB intake was associated with significantly less counseling on all SSB-related topic areas except consumption frequency and referral. This is consistent with other studies that have demonstrated associations between physicians' personal behaviors and counseling practices in a range of areas including smoking,²⁹ physical activity,²⁷ and general preventive health measures.^{30,39} Physicians who engage in less healthy behaviors might have less concern regarding the behaviors^{29,40} or have a lack of confidence or concern for lack of efficacy in counseling patients in areas they struggle with themselves.^{28,30} Engaging physicians in interventions to improve their personal health behaviors may have potential to impact the health of patients. Future research could investigate the impact of physician-focused health behavior interventions on patient clinical care and outcomes.

Medical specialty was also associated with SSB-related counseling of patients who were overweight or had obesity, with providers in adult-focused specialties counseling significantly less than pediatricians in most topic areas. This association may be related to the difference in the content of clinical guidelines for the prevention and management of obesity in children versus adults. For children, obesity-related clinical guidelines specifically recommend clinicians counseling pediatric patients to limit SSB consumption and suggest SSB-related behavior changes.^{8,9} In contrast, obesity-related clinical guidelines for adults do not address SSB consumption or physician counseling on SSBs.^{41,42} Additionally, although SSB-related clinical guidelines for adults are limited to AHA's recommendations for

reducing cardiovascular disease risk,^{13,14} pediatric SSB-related clinical guidelines exist for general preventive counseling for all children.¹⁵ Stronger clinical guidance regarding SSB-related counseling for adults may be one strategy to improve counseling in this area.

Clinical guideline availability may also impact referral practices. The American College of Obstetricians and Gynecologists' guidelines for obesity in pregnancy recommend nutrition consultation be offered to patients.⁴³ Obstetrician/gynecologists in this study were more likely than pediatricians to refer patients who were overweight or had obesity to a dietician or nutrition services, despite being less likely to counsel on all other SSB-related topic areas.

Practice setting was related to physicians' SSB counseling practices, with inpatient providers less likely to report counseling on specific SSB-related topics than their outpatient counterparts. This may be due to physicians' perception that inpatient interventions are not effective in changing patient outcomes, that inpatient providers do not have sufficient time to implement effective counseling, or that patients do not want interventions while hospitalized.^{44,45} There is, however, some evidence that inpatient interventions can lead to positive change in patients' stages of readiness to change⁴⁶ and that patients are willing to initiate obesity-related counseling with inpatient providers.⁴⁷ Inpatient encounters, therefore, may be a prime opportunity for the initiation of counseling.

Although nearly all physicians in our study reported engaging patients who were overweight or had obesity in any SSB-related counseling, discrepancies remained in topic-specific counseling. Although only 19% of physicians reported not counseling on the contribution of SSB consumption to obesity and weight gain, 28% to 36% did not counsel on behavior change topics (SSB consumption frequency and water substitution). This suggests that patients may be receiving messages about the health impact of SSB consumption but less counseling on how to change their consumption behaviors.

Very few physicians (1.5%) in this study reported not counseling about SSBs. Although not directly comparable, prior studies have shown that 30% to 35% of physicians do not engage in any SSB-related counseling.^{21,22} The difference seen in any reported counseling between the present study and those prior is likely due to the manner in which physicians were asked about counseling. Our study asked physicians about specific SSB-related counseling topics rather than SSB counseling in general. Additionally, our study asked physicians about counseling practices for patients who were overweight or had obesity, whereas most other studies have investigated counseling practices for all patients. Although our study was able to investigate the factors associated with topic-specific counseling, the characteristics of respondents who reported not engaging in any SSB-related counseling could not be well described due to the small sample size of respondents who reported not counseling. Future studies could focus on why physicians counsel on some SSB-related topics but not others.

This study used a large, nationwide sample of providers from multiple specialties to examine specific SSB-related counseling topics, making it unique among studies focused on physician counseling. Nevertheless, the findings should be viewed in the context of several limitations. First, there is potential for sampling bias due to quota-based sampling methodology and the recruitment of respondents from an opt-in database. The sample should

not be considered as nationally representative of all US physicians. Second, counseling practices were self-reported and, therefore, subject to recall and social desirability bias. Third, directionality of the associations found in this study cannot be determined due to the study's cross-sectional nature. Finally, although only primary care physicians were sampled for this study, other health-care providers such as subspecialists, NPs, physician assistants, and other allied health professionals also have opportunities to counsel patients regarding healthy lifestyle practices. Future research could explore factors associated with the counseling practices of these providers.

Physicians' personal health behaviors, medical specialty, and practice setting are associated with the SSB-related counseling received by patients. Additionally, discrepancies in physician counseling exist between specific SSB-related counseling topics, with one-third of physicians reporting not counseling on behavior change topics known to have positive patient impact. This suggests opportunities to improve and strengthen not only the content of the SSB-related counseling patients are receiving but also counseling in inpatient settings, specialties focused on adult care, and among physicians who regularly consume SSBs.

Acknowledgments

The authors would like to acknowledge the contributions of Dr Gayathri Kumar and Dr Brook Belay in the development of the survey questions.

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

References

1. Te Morenga L, Mallard S, Mann J. Dietary sugars and body weight: systematic review and meta-analyses of randomised controlled trials and cohort studies. *BMJ*. 2012; 346:e7492. [PubMed: 23321486]
2. Ebbeling CB, Feldman HA, Chomitz VR, et al. A randomized trial of sugar-sweetened beverages and adolescent body weight. *N Engl J Med*. 2012; 367(15):1407–1416. [PubMed: 22998339]
3. Malik VS, Hu FB. Sweeteners and risk of obesity and type 2 diabetes: the role of sugar-sweetened beverages. *Curr Diab Rep*. 2012; 12(2):195–203.
4. Huang C, Huang J, Tian Y, Yang X, Gu D. Sugar sweetened beverages consumption and risk of coronary heart disease: a meta-analysis of prospective studies. *Atherosclerosis*. 2014; 234(1):11–16. [PubMed: 24583500]
5. Marshall TA, Levy SM, Broffitt B, et al. Dental caries and beverage consumption in young children. *Pediatrics*. 2003; 112(3 pt 1):e184–e191. [PubMed: 12949310]
6. U.S.Department of Health and Human Services and U.S.Department of Agriculture. 2015-2020 Dietary Guidelines for Americans. 8th2015. <http://health.gov/dietaryguidelines/2015/guidelines/>
7. Kit BK, Fakhouri TH, Park S, Nielsen SJ, Ogden CL. Trends in sugar-sweetened beverage consumption among youth and adults in the United States: 1999-2010. *Am J Clin Nutr*. 2013; 98(1): 180–188. [PubMed: 23676424]
8. Barlow SE. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics*. 2007; 120(suppl 4):S164–S192. [PubMed: 18055651]
9. Fitch, A., Fox, C., Bauerly, K., et al. Institute for Clinical Systems Improvement. Prevention and Management of Obesity for Children and Adolescents. 2013. https://www.icsi.org/guidelines_more/catalog_guidelines_and_more/catalog_guidelines/catalog_endocrine_guidelines/obesity_children/

10. Gidding SS, Dennison BA, Birch LL, et al. Dietary recommendations for children and adolescents: a guide for practitioners: consensus statement from the American Heart Association. *Circulation*. 2005; 112(13):2061–2075. [PubMed: 16186441]
11. World Health Organization. WHO Technical Report Series. Vol. 916. Geneva, Switzerland: World Health Organization; 2003. Diet, Nutrition, and the Prevention of Chronic Diseases: Report of a Joint WHO/FAO Expert Consultation.
12. Accelerating Progress in Obesity Prevention—Solving the Weight of the Nation. Washington DC: The National Academies Press; 2012. Institute of Medicine.
13. Gonzalez-Campoy J, St Jeor ST, Castorino K, et al. Clinical practice guidelines for healthy eating for the prevention and treatment of metabolic and endocrine disease in adults: cosponsored by the American Association of Clinical Endocrinologists/The American College of Endocrinology and The Obesity Society. *Endocr Pract*. 2013; 19(suppl 3):1–82. [PubMed: 24129260]
14. Eckel RH, Jakicic JM, Ard JD, et al. 2013 AHA/ACC guideline on lifestyle management to reduce cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2013; 129(25 suppl 2):S76–S99. [PubMed: 24222015]
15. Hagan, JF., Shaw, JS., Duncan, PM. Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents. 3rd. Elk Grove Village, IL: The American Academy of Pediatrics; 2008.
16. Doymaz S, Neuspiel DR. The influence of pediatric resident counseling on limiting sugar-sweetened drinks in children. *Clin Pediatr (Phila)*. 2009; 48(7):777–779. [PubMed: 19264717]
17. Bull FC, Jamrozik K. Advice on exercise from a family physician can help sedentary patients to become active. *Am J Prev Med*. 1998; 15(2):85–94. [PubMed: 9713663]
18. Loureiro ML, Nayga RM Jr. Obesity, weight loss, and physician's advice. *Soc Sci Med*. 2006; 62(10):2458–2468. [PubMed: 16376006]
19. Frieden TR. A framework for public health action: the health impact pyramid. *Am J Public Health*. 2010; 100(4):590–595. [PubMed: 20167880]
20. Park S, Sherry B, Blanck HM. Characteristics of parents receiving counseling from child's doctor to limit child's sugar drink consumption. *J Public Health (Oxf)*. 2012; 34(2):228–235. [PubMed: 21946263]
21. Bleich SN, Gudzone KA, Bennett WL, Cooper LA. Do physician beliefs about causes of obesity translate into actionable issues on which physicians counsel their patients? *Prev Med*. 2013; 56(5): 326–328. [PubMed: 23399006]
22. Klein JD, Sesselberg TS, Johnson MS, et al. Adoption of body mass index guidelines for screening and counseling in pediatric practice. *Pediatrics*. 2010; 125(2):265–272. [PubMed: 20083518]
23. Cabana MD, Rand CS, Powe NR, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA*. 1999; 282(15):1458–1465. [PubMed: 10535437]
24. Story MT, Neumark-Stzainer DR, Sherwood NE, et al. Management of child and adolescent obesity: attitudes, barriers, skills, and training needs among health care professionals. *Pediatrics*. 2002; 110(1):210–214. [PubMed: 12093997]
25. Jay M, Gillespie C, Ark T, et al. Do internists, pediatricians, and psychiatrists feel competent in obesity care?: using a needs assessment to drive curriculum design. *J Gen Intern Med*. 2008; 23(7): 1066–1070. [PubMed: 18612746]
26. Huang TT, Borowski LA, Liu B, et al. Pediatricians' and family physicians' weight-related care of children in the U.S. *Am J Prev Med*. 2011; 41(1):24–32. [PubMed: 21665060]
27. Abramson S, Stein J, Schaufele M, Frates E, Rogan S. Personal exercise habits and counseling practices of primary care physicians: a national survey. *Clin J Sport Med*. 2000; 10(1):40–48. [PubMed: 10695849]
28. Bleich SN, Bennett WL, Gudzone KA, Cooper LA. Impact of physician BMI on obesity care and beliefs. *Obesity (Silver Spring)*. 2012; 20(5):999–1005. [PubMed: 22262162]
29. Pipe A, Sorensen M, Reid R. Physician smoking status, attitudes toward smoking, and cessation advice to patients: an international survey. *Patient Educ Couns*. 2009; 74(1):118–123. [PubMed: 18774670]

30. Vickers KS, Kircher KJ, Smith MD, Petersen LR, Rasussen NH. Health behavior counseling in primary care: provider-reported rate and confidence. *Fam Med*. 2007; 39(10):730–735. [PubMed: 17987416]
31. Wethington HR, Sherry B, Polhamus B. Physician practices related to use of BMI-for-age and counseling for childhood obesity prevention: a cross-sectional study. *BMC Fam Pract*. 2011; 12:80. [PubMed: 21812987]
32. Chen L, Appel LJ, Loria C, et al. Reduction in consumption of sugar-sweetened beverages is associated with weight loss: the PREMIER trial. *Am J Clin Nutr*. 2009; 89(5):1299–1306. [PubMed: 19339405]
33. Chen L, Caballero B, Mitchell DC, et al. Reducing consumption of sugar-sweetened beverages is associated with reduced blood pressure: a prospective study among United States adults. *Circulation*. 2010; 121(22):2398–2406. [PubMed: 20497980]
34. Pan A, Malik VS, Hao T, Willett WC, Mozaffarian D, Hu FB. Changes in water and beverage intake and long-term weight changes: results from three prospective cohort studies. *Int J Obes (Lond)*. 2013; 37(10):1378–1385. [PubMed: 23318721]
35. Hernandez-Cordero S, Barquera S, Rodriguez-Ramirez S, et al. Substituting water for sugar-sweetened beverages reduces circulating triglycerides and the prevalence of metabolic syndrome in obese but not in overweight Mexican women in a randomized controlled trial. *J Nutr*. 2014; 144(11):1742–1752. [PubMed: 25332472]
36. Park S, Onufrak S, Sherry B, Blanck HM. The relationship between health-related knowledge and sugar-sweetened beverage intake among US adults. *J Acad Nutr Diet*. 2014; 114(7):1059–1066. [PubMed: 24360502]
37. Xiang N, Wethington H, Onufrak S, Belay B. Characteristics of US health care providers who counsel adolescents on sports and energy drink consumption. *Int J Pediatr*. 2014; 2014:987082. [PubMed: 24790611]
38. National Heart Lung and Blood Institute. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults—the evidence report. National Institutes of Health. *Obes Res*. 1998; 6(suppl 2):51S–209S. [PubMed: 9813653]
39. Frank E, Dresner Y, Shani M, Vinker S. The association between physicians' and patients' preventive health practices. *CMAJ*. 2013; 485(8):649–653.
40. Cornuz J, Ghali WA, Di Carlantonio D, Pecoud A, Paccaud F. Physicians' attitudes towards prevention: importance of intervention-specific barriers and physicians' health habits. *Fam Pract*. 2000; 17(6):535–540. [PubMed: 11120727]
41. Jensen MD, Ryan DH, Apovian CM, et al. 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. *Circulation*. 2013; 129(25 suppl 2):S102–S138. [PubMed: 24222017]
42. Fitch, A., Everling, L., Fox, C., et al. Institute for Clinical Systems Improvement. Prevention and Management of Obesity for Adults. 2013. https://www.icsi.org/guidelines__more/catalog_guidelines_and_more/catalog_guidelines/catalog_endocrine_guidelines/obesity__adults/
43. American College of Obstetricians and Gynecologists. ACOG Committee opinion no. 549: obesity in pregnancy. *Obstet Gynecol*. 2013; 121(1):213–217. [PubMed: 23262963]
44. Wachsberg KN, Creden A, Workman M, et al. Inpatient obesity intervention with postdischarge telephone follow-up: a randomized trial. *J Hosp Med*. 2014; 9(8):515–520. [PubMed: 24854049]
45. Targhetta R, Bernhard L, Sorokaty JM, Balmes JL, Nalpas B, Perney P. Intervention study to improve smoking cessation during hospitalization. *Public Health*. 2011; 125(7):457–463. [PubMed: 21729818]
46. Freyer-Adam J, Coder B, Baumeister SE, et al. Brief alcohol intervention for general hospital inpatients: a randomized controlled trial. *Drug Alcohol Depend*. 2008; 93(3):233–243. [PubMed: 18054445]
47. Bradford K, Kihlstrom M, Pointer I, Skinner AC, Slivka P, Perrin EM. Parental attitudes toward obesity and overweight screening and communication for hospitalized children. *Hosp Pediatr*. 2012; 2(3):126–132. [PubMed: 24319916]

SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Frequent sugar-sweetened beverage (SSB) consumption has been associated with multiple adverse health effects. Although physician counseling regarding healthy lifestyle practices can positively impact patient behavior, counseling practices may be influenced by physicians' personal and medical practice characteristics. Limited information exists regarding factors associated with physicians' SSB counseling practices and the content of SSB counseling.

What does this article add?

This study suggests that physicians' personal health behaviors, medical specialty, and practice setting are associated with the SSB-related counseling patients receive. Discrepancies exist between specific SSB-related counseling topics, with one-third of physicians not counseling on behavior change topics known to have positive patient impact.

What are the implications for health promotion practice or research?

Opportunities may exist to improve and strengthen the content of SSB-related patient counseling as well as counseling conducted in inpatient settings, in specialties focused on adult care, and among physicians who regularly consume SSBs.

Table 1Physicians' Personal and Medical Practice Characteristics. ^{a,b}

Physician Personal Characteristics	n (%)	Medical Practice Characteristics	n (%)
Age		Specialty	
<45 years	718 (47.6)	Pediatrics	252 (16.7)
45 years	792 (52.5)	Family practice	542 (35.9)
Sex		Internal medicine	466 (30.9)
Male	1029 (68.2)	OB/GYN	250 (16.6)
Female	481 (31.9)	Practice type	
Race/ethnicity		Inpatient	144 (9.5)
White, non-Hispanic	919 (60.9)	Individual outpatient	297 (19.7)
Black, non-Hispanic	39 (2.6)	Group outpatient	1069 (70.8)
Hispanic	68 (4.5)	Teaching hospital	
Asian, non-Hispanic	378 (25.0)	Yes	848 (56.2)
Other/multiracial, non-Hispanic	106 (7.0)	No	662 (43.8)
Weight status ^c		Patient socioeconomic status ^d	
Underweight/normal weight	680 (45.0)	Low income	259 (17.2)
Overweight	443 (29.3)	Medium income	569 (37.7)
Obese	138 (9.1)	High income	682 (45.2)
Missing	249 (16.5)		
SSB ^e intake		SSB counseling	
None	727 (48.2)	Any	1488 (98.5)
>0 and <1 time/day	546 (36.2)	None	22 (1.5)
1 time/day	237 (15.7)		

Abbreviation: OB/GYN, obstetrician/gynecologists.

^aDocStyles, 2014.^bN = 1510.^cBased on body mass index (BMI), underweight/normal weight indicates a BMI < 25 kg/m², overweight indicates a BMI 25 to <30 kg/m², and obese indicates a BMI ≥ 30 kg/m².^dPhysician-reported patient socioeconomic status of the majority of a physician's patient panel.^eSugar-sweetened beverages (SSBs) include soda, fruit drinks, sports or energy drinks, and other sugar-sweetened drinks but do not include 100% fruit juice, diet drinks, or artificially sweetened drinks.

Table 2
Physicians' Personal and Medical Practice Characteristics Associated With SSB^a Counseling Topics.^{b, c}

	Reported Counseling on Nutritional Content		Reported Counseling on Adverse Health Events		Reported Counseling on Behavior Change		Reported Referral for Counseling	
	Calorie Content, n (%)	Added Sugars Content, n (%)	Obesity and Weight Gain, n (%)	Health Effects (eg, Diabetes), n (%)	Consumption Frequency, n (%)	Water Substitution, n (%)	Dietician or Nutrition Services, n (%)	
Total (N = 1510)	951 (63.0)	801 (53.1)	1229 (81.4)	1032 (68.3)	964 (63.8)	1092 (72.3)	528 (35.0)	
Physician personal characteristics								
Age								
<45 years	436 (60.7)	342 (47.6)	574 (79.9)	479 (66.7)	444 (61.8)	505 (70.3)	256 (35.7)	
45 years	515 (65.0)	459 (58.0)	655 (82.7)	553 (69.8)	520 (65.7)	587 (74.1)	272 (34.3)	
Sex								
Male	642 (62.4)	559 (54.3)	837 (81.3)	703 (68.3)	653 (63.5)	739 (71.8)	360 (35.0)	
Female	309 (64.2)	242 (50.3)	392 (81.5)	329 (68.4)	311 (64.7)	353 (73.4)	168 (34.9)	
Race/ethnicity								
White, non-Hispanic	588 (64.0)	537 (58.4)	755 (82.2)	626 (68.2)	595 (64.7)	693 (75.4)	306 (33.3)	
Black, non-Hispanic	25 (64.1)	13 (33.3)	31 (79.5)	28 (71.8)	26 (66.7)	25 (64.1)	19 (48.7)	
Hispanic	49 (72.1)	34 (50.0)	56 (82.4)	44 (64.7)	43 (63.2)	52 (76.5)	19 (27.9)	
Asian, non-Hispanic	227 (60.1)	175 (46.3)	302 (79.9)	264 (69.8)	236 (62.4)	253 (66.9)	144 (38.1)	
Other/multiracial, non-Hispanic	62 (58.5)	42 (39.6)	85 (80.2)	70 (66.0)	64 (60.4)	69 (65.1)	40 (37.7)	
Weight status ^c								
Underweight/normal weight	431 (63.4)	361 (53.1)	558 (82.1)	463 (68.1)	430 (63.2)	495 (72.8)	245 (36.0)	
Overweight	282 (63.7)	255 (57.6)	355 (80.1)	314 (70.9)	277 (62.5)	329 (74.3)	152 (34.3)	
Obese	93 (67.4)	70 (50.7)	116 (84.1)	90 (65.2)	98 (71.0)	105 (76.1)	41 (29.7)	
Missing	145 (58.2)	115 (46.2)	200 (80.3)	165 (66.3)	159 (63.9)	163 (65.5)	90 (36.1)	
SSB ^a intake								
None	474 (65.2)	408 (56.1)	605 (83.2)	508 (69.9)	461 (63.4)	559 (76.9)	249 (34.3)	
>0 and < 1 time/day	345 (63.2)	291 (53.3)	444 (81.3)	381 (69.8)	361 (66.1)	381 (69.8)	192 (35.2)	
1 time/day	132 (55.7)	102 (43.0)	180 (76.0)	143 (60.3)	142 (59.9)	152 (64.1)	87 (36.7)	
Medical practice characteristics								
Specialty								

	Reported Counseling on Nutritional Content			Reported Counseling on Adverse Health Events			Reported Counseling on Behavior Change			Reported Referral for Counseling
	Calorie Content, n (%)	Added Sugars Content, n (%)	Obesity and Weight Gain, n (%)	Health Effects (eg, Diabetes), n (%)	Consumption Frequency, n (%)	Water Substitution, n (%)	Dietician or Nutrition Services, n (%)			
Pediatrics	166 (65.9)	170 (67.5)	217 (86.1)	184 (73.0)	194 (77.0)	221 (87.7)	86 (34.1)			
Family practice	363 (67.0)	312 (57.6)	450 (83.0)	397 (73.3)	368 (67.9)	393 (72.5)	157 (29.0)			
Internal medicine	284 (60.9)	202 (43.4)	368 (79.0)	298 (64.0)	256 (54.9)	310 (66.5)	179 (38.4)			
OB/GYN	138 (55.2)	117 (46.8)	194 (77.6)	153 (61.2)	146 (58.4)	168 (67.2)	106 (42.4)			
Practice type										
Inpatient	83 (57.6)	56 (38.9)	112 (77.8)	97 (67.4)	72 (50.0)	86 (59.7)	56 (38.9)			
Individual outpatient	201 (67.7)	171 (57.6)	246 (82.8)	219 (73.7)	194 (65.3)	217 (73.1)	97 (32.7)			
Group outpatient	667 (62.4)	574 (53.7)	871 (81.5)	716 (67.0)	698 (65.3)	789 (73.8)	375 (35.1)			
Teaching hospital										
Yes	521 (61.4)	436 (51.4)	689 (81.2)	571 (67.3)	540 (63.7)	613 (72.3)	322 (38.0)			
No	430 (65.0)	365 (55.1)	540 (81.6)	461 (69.6)	424 (64.1)	479 (72.3)	206 (31.1)			
Patient socioeconomic status ^e										
Low income	167 (64.5)	140 (54.1)	216 (83.4)	185 (71.4)	158 (61.0)	202 (78.0)	105 (40.5)			
Medium income	369 (64.9)	310 (54.5)	465 (81.7)	387 (68.0)	380 (66.8)	423 (74.3)	193 (33.9)			
High income	415 (60.9)	351 (51.5)	548 (80.4)	460 (67.5)	426 (62.5)	467 (68.5)	230 (33.7)			

Abbreviation: OB/GYN, obstetrician/gynecologists.

^aSugar-sweetened beverages (SSBs) include soda, fruit drinks, sports or energy drinks, and other sugar-sweetened drinks but do not include 100% fruit juice, diet drinks, or artificially sweetened drinks.

^bDocStyles, 2014.

^cBoldface indicates statistical significance based on χ^2 test for report of counseling for each topic ("yes" or "no"), $P < .05$.

^dBased on body mass index (BMI), underweight/normal weight indicates a BMI < 25 kg/m², overweight indicates a BMI 25 to <30 kg/m², and obese indicates a BMI ≥ 30 kg/m².

^ePhysician-reported patient socioeconomic status of the majority of a physician's patient panel.

Table 3

Adjusted Odds Ratios^a for SSB^b Counseling Topics With Physicians' Personal and Medical Practice Characteristics, *c,d,e*

	Reported Counseling on Nutritional Content		Reported Counseling on Adverse Health Events		Reported Counseling on Behavior Change			Reported Referral for Counseling
	Calorie Content, aOR (95% CI) ^f	Added Sugars Content, aOR (95% CI)	Obesity and Weight Gain, aOR (95% CI)	Health Effects (eg, Diabetes), aOR (95% CI)	Consumption Frequency, aOR (95% CI)	Water Substitution, aOR (95% CI)	Dietician or Nutrition Services, aOR (95% CI)	
Physician personal characteristics								
Age								
<45 years	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
45 years	1.10 (0.87-1.39)	1.22 (0.97-1.54)	1.14 (0.85-1.52)	1.12 (0.88-1.43)	1.07 (0.85-1.36)	0.97 (0.75-1.26)	1.04 (0.82-1.32)	
Sex								
Male	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female	1.09 (0.85-1.39)	0.82 (0.64-1.04)	0.94 (0.69-1.27)	1.00 (0.78-1.29)	0.98 (0.77-1.26)	0.95 (0.72-1.25)	0.94 (0.73-1.20)	
Race/ethnicity								
White, non-Hispanic	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black, non-Hispanic	1.07 (0.54-2.13)	0.42 (0.21-0.85)	0.92 (0.41-2.10)	1.33 (0.64-2.78)	1.12 (0.55-2.27)	0.65 (0.32-1.32)	1.84 (0.95-3.58)	
Hispanic	1.45 (0.83-2.53)	0.78 (0.47-1.29)	1.05 (0.54-2.03)	0.87 (0.51-1.47)	0.93 (0.55-1.57)	1.19 (0.65-2.17)	0.84 (0.48-1.46)	
Asian, non-Hispanic	0.90 (0.69-1.17)	0.70 (0.54-0.90)	0.92 (0.67-1.27)	1.19 (0.90-1.57)	1.00 (0.76-1.30)	0.72 (0.55-0.96)	1.21 (0.92-1.57)	
Other/multiracial, non-Hispanic	0.92 (0.60-1.42)	0.59 (0.38-0.91)	1.01 (0.60-1.71)	1.09 (0.70-1.71)	0.96 (0.62-1.49)	0.74 (0.47-1.16)	1.13 (0.73-1.75)	
Weight status ^g								
Underweight/normal weight	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Overweight	1.02 (0.79-1.33)	1.10 (0.85-1.43)	0.87 (0.63-1.20)	1.16 (0.88-1.53)	0.94 (0.72-1.23)	1.10 (0.82-1.47)	0.94 (0.72-1.22)	
Obese	1.10 (0.74-1.64)	0.77 (0.52-1.13)	1.06 (0.64-1.77)	0.83 (0.55-1.24)	1.35 (0.89-2.05)	1.08 (0.69-1.70)	0.78 (0.52-1.17)	
Missing	0.79 (0.58-1.08)	0.85 (0.62-1.16)	0.91 (0.62-1.33)	0.90 (0.66-1.24)	1.08 (0.79-1.49)	0.78 (0.56-1.08)	1.02 (0.75-1.40)	
SSB ^b intake								
None	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
>0 and <1 time/day	0.93 (0.73-1.18)	0.95 (0.75-1.21)	0.90 (0.67-1.22)	0.99 (0.77-1.27)	1.20 (0.94-1.55)	0.71 (0.54-0.93)	1.03 (0.81-1.31)	
1 time/day	0.68 (0.50-0.92)	0.63 (0.46-0.86)	0.67 (0.46-0.97)	0.64 (0.46-0.87)	0.96 (0.70-1.32)	0.58 (0.42-0.81)	1.12 (0.82-1.54)	
Medical practice characteristics								
Specialty								
Pediatrics	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

	Reported Counseling on Nutritional Content		Reported Counseling on Adverse Health Events		Reported Counseling on Behavior Change		Reported Referral for Counseling
	Calorie Content, aOR (95% CI) ^f	Added Sugars Content, aOR (95% CI)	Obesity and Weight Gain, aOR (95% CI)	Health Effects (eg, Diabetes), aOR (95% CI)	Consumption Frequency, aOR (95% CI)	Water Substitution, aOR (95% CI)	
Family practice	1.04 (0.75-1.44)	0.60 (0.43-0.84)	0.80 (0.52-1.24)	1.01 (0.72-1.44)	0.63 (0.44-0.89)	0.36 (0.23-0.55)	0.86 (0.62-1.21)
Internal medicine	0.90 (0.64-1.26)	0.41 (0.29-0.57)	0.66 (0.42-1.02)	0.64 (0.45-0.91)	0.39 (0.27-0.56)	0.35 (0.22-0.54)	1.20 (0.86-1.68)
OB/GYN	0.60 (0.41-0.87)	0.38 (0.26-0.55)	0.54 (0.34-0.87)	0.55 (0.37-0.81)	0.41 (0.28-0.61)	0.26 (0.17-0.42)	1.52 (1.05-2.20)
Practice type							
Inpatient	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Individual outpatient	1.46 (0.93-2.31)	1.71 (1.08-2.71)	1.30 (0.75-2.26)	1.18 (0.73-1.91)	1.72 (1.09-2.72)	2.01 (1.24-3.26)	0.90 (0.57-1.42)
Group outpatient	1.12 (0.76-1.65)	1.38 (0.93-2.06)	1.14 (0.71-1.81)	0.79 (0.53-1.19)	1.60 (1.09-2.36)	1.84 (1.22-2.76)	1.01 (0.69-1.50)
Teaching hospital							
Yes	1.00	1.00	1.00	1.00	1.00	1.00	1.00
No	1.07 (0.86-1.34)	1.10 (0.88-1.37)	0.98 (0.74-1.29)	1.04 (0.82-1.31)	0.92 (0.73-1.16)	0.99 (0.78-1.27)	0.80 (0.64-1.00)
Patient socioeconomic status ^h							
Low income	1.13 (0.83-1.53)	1.11 (0.82-1.50)	1.19 (0.81-1.74)	1.16 (0.84-1.60)	0.91 (0.67-1.23)	1.56 (1.10-2.21)	1.38 (1.02-1.87)
Medium income	1.15 (0.91-1.46)	1.12 (0.89-1.41)	1.07 (0.80-1.43)	1.01 (0.79-1.28)	1.21 (0.95-1.54)	1.32 (1.02-1.71)	1.03 (0.81-1.32)
High income	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Abbreviation: OB/GYN, obstetrician/gynecologists.

^aAll physician personal and medical practice characteristics were included in 1 model for each SSB counseling topic.

^bSugar-sweetened beverages (SSBs) include soda, fruit drinks, sports or energy drinks, and other sugar-sweetened drinks but do not include 100% fruit juice, diet drinks, or artificially sweetened drinks.

^cDocStyles, 2014.

^dN = 1510.

^eBoldface indicates statistical significance as 95% confidence interval does not include 1.

^fAdjusted odds ratio (aOR), 95% confidence intervals (CI).

^gBased on body mass index (BMI), underweight/normal weight indicates a BMI < 25 kg/m², overweight indicates a BMI 25 to <30 kg/m², and obese indicates a BMI ≥ 30 kg/m².

^hPhysician-reported patient socioeconomic status of the majority of a physician's patient panel.