Low-Calorie Sweetened Beverage Consumption Does Not Reduce Total Energy or Sugar Intake Among Children

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Objectives

To examine energy and macronutrient intake among children who report consuming low-calorie sweetened beverages (LCSB), sugar-sweetened beverages (SSB), or both LCSB + SB compared to water consumers

Introduction

- LCSBs are often used as an alternative to SSBs. There has been a reported increase in the consumption of LCSBs in children.
- Although LCSB provide an alternative to added sugars, their effects on overall diet and effectiveness as a tool for weight management remain unclear.
- The health effects of LCSB are particularly understudied in children.

Methods

- Dietary data were collected from children participating in three cycles of the National Health and Nutrition Examination Survey (NHANES) (2011-2016).
- Participants included children 2-17 years of age, who provided a single in-person dietary recall.
- Least squares mean and standard errors were determined using multivariable linear regression.
- Covariates included age, sex, race/ethnicity, family income, physical activity, and body-mass index (BMI) z-score.
- Pairwise comparisons were adjusted for using either Bonferroni-correction of Tukey-adjustment.
- P-values of <0.05 were considered statistically significant.

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Results

Table 1. Demographics of Children 2-17y Who Consume Predominantly Low-Calorie Sweetened Beverages (LCSBs), Sugary Beverages (SBs), or Both vs. Water , NHANES 2011-2016, N=7026. The superscript letters indicate significant differences between the groups.

	N	Beverage Grouping, Row %			
	All	Water	LCSB	SB	LCSB+SB
	n=7026	n=1077	n=345	n=4907	n=697
Age, years					
2-5	1866	20.3%	6.1%	67.3%	6.3%[a]
6-11	2469	13.1%	6.2%	68.3%	12.4%
11-17	2691	16.1%	5.3%	66.7%	11.9%[b]
Weight Status					
Underweight	208	*13.9%*	*7.7%*	72.2%	*6.2%*[a]
Normal	4336	17.3%	5.6%	67.5%	9.6%[a]
Overweight	1115	15.9%	6.8%	66.5%	10.8%
Obese	1367	12.7%	5.3%	66.9%	15.1%[b]
Sex					
Female	3420	17.6%	6.3%	65.0%[a]	11.0%
Male	3606	14.7%	5.3%	69.6%[b]	10.4%
Race/Ethnicity					
Non-Hispanic White (%)	1909	17.1%[a]	6.8%[a]	64.6%[a,c]	11.5%
Non-Hispanic Black (%)	1809	10.2%[b]	4.7%	74.9%[b]	10.3%
Hispanic (%)	2241	13.4%[a,b]	4.1%[b]	72.2%[b]	10.2%
Other Race (%)	1067	25.9%[c]	6.0%	60.2%[c]	7.9%
Family Income					
PIR[1]< 1.3	3154	13.7%	4.8%	72.1%[a]	9.4%
1.3 ≤ PIR < 3.50	2442	16.7%	5.0%[a]	66.1%[b]	12.2%
PIR ≥ 3.50	1430	18.2%	8.0%[b]	63.5%[b]	10.3%

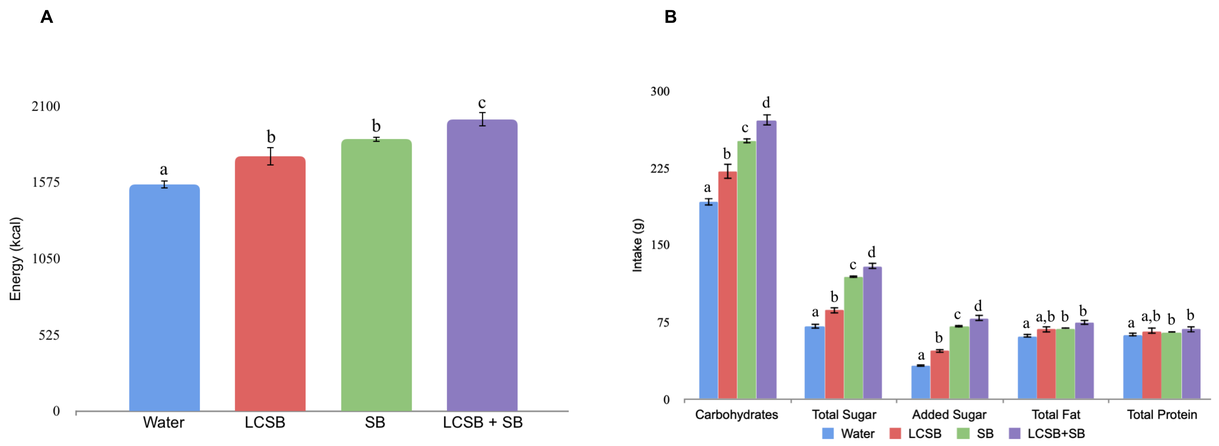

Figure 1. Associations between Water, LCSB, SB, and LCSB+SB consumers with (A) energy and (B) macronutrient intakes in US children. The superscript letters indicate significant differences between the groups.

Results (Continued)

- LCSB, SB, and LCSB+SB consumption was associated with higher energy, carbohydrate, total sugar, and added sugar intake compared to water consumption.
- The consumption of LCSB, SSB, and LCSB+SSB was associated with 196, 312, and 450 more total calories, respectively.
- In addition, LCSB, SSB, and LCSB+SSB consumers reported higher sugar intake compared to water, consuming 15, 39, and 46 more calories from added sugar, respectively.
- No differences in total energy intake between LCSB and SB consumers.
- Total fat and protein intakes were higher among SB and LCSB+SB consumers.
- Notably, LCSB+SSB consumers reported the highest energy, carbohydrate, and sugar intakes, even compared to SSB consumers.

Conclusions

- These findings challenge the utility of LCSB consumption as a strategy for weight management in children.
- The results of this analysis supported by experiments conducted with rodent models, which have shown that LCS consumption promotes increased energy intake.
- The findings of this analysis indicate that LCSB consumption is associated with increased energy, carbohydrate and sugar intake; and challenges the function of LCSB as a mechanism for decreasing sugar and energy intake.
- Therefore, water should continue to be recommended as the best alternative for SB consumption among children.

References

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