Associations between Low-Calorie Sweetened Beverage Consumption and Diet Quality in Youth

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INTRODUCTION

• Low-calorie sweetened beverages (LCSBs) are low-calorie/reduced sugar alternatives to sugar-sweetened beverages (SSBs).

• No studies to date have assessed the relationship between LCSB and diet quality in children

• Prior studies in adults report mixed findings

• Goals of this study were:

1) Investigate associations between LCSB consumption and diet quality in children and adolescents

2) Compare diet quality of LCSB consumers with that of water, sugar-sweetened beverage (SSB) consumers and combined consumers of LCSBs+SSBs.

METHODS

• N=10,257 youth (2-17 yrs) participating in The National Health and Nutrition Examination Survey (NHANES) 2007-2016.

• Using dietary data collected in NHANES, participants were grouped into four categories:
  o Water consumers (≥4oz water, <4oz LCSB and sweetened beverages (SBs)); n=1452
  o LCSB consumers (≥4oz LCSB, <4oz SSBs); n=504
  o SSB consumers (≥4oz SSB, <4oz LCSB); n= 7250
  o LCSB+SSB consumers (≥4oz each); n= 1051

• Healthy Eating Index (HEI-2015) was used to calculate total dietary quality and subcomponent scores.

• Models adjusted for sex, ethnicity, physical activity, and body mass index percentile covariates

RESULTS

• Diet quality of LCSB consumers lower than that of water consumers and similar to SSB+LCSB consumers (Figure 1, right)

  • In Adequacy subcategories (Table below in green),
    o LCSB consumers scored lower for ‘Whole Grains’ and ‘Total Vegetable Intake’ vs. Water
    o LCSB+SSB and SSB consumers scored similarly for most subcategories.

  • Among the Moderation subcategories (Table below in red)
    o LCSB consumers scored lower for added sugars vs. Water consumers (LCSB=7.7±0.1, Water=8.5±0.1).
    o LCSB+SSB and SSB consumers scored similarly, with significantly lower added sugar scores (reflecting higher intake) compared to water or LCSB consumers (SSB= 5.8±0.1, SSB+LCSB=5.5±0.2).

<table>
<thead>
<tr>
<th></th>
<th>Water</th>
<th>LCSB</th>
<th>SSB</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fruits</td>
<td>2.6 ± 0.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.5 ± 0.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.9 ± 0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.8 ± 0.1</td>
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<tr>
<td>Whole Fruits</td>
<td>2.9 ± 0.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.7 ± 0.2</td>
<td>2.5 ± 0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.4 ± 0.1&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Total Vegetables</td>
<td>2.4 ± 0.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.1 ± 0.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.1 ± 0.03&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.2 ± 0.1&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Greens &amp; Beans</td>
<td>1.2 ± 0.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.1 ± 0.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.0 ± 0.04&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.9 ± 0.1&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Whole Grains</td>
<td>3.8 ± 0.2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.9 ± 0.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.5 ± 0.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.4 ± 0.2&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Dairy</td>
<td>7.3 ± 0.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.2 ± 0.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>6.9 ± 0.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.1 ± 0.1</td>
</tr>
<tr>
<td>Total Protein</td>
<td>3.7 ± 0.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.8 ± 0.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.6 ± 0.03&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.5 ± 0.1</td>
</tr>
<tr>
<td>Seafood/Proteins</td>
<td>2.0 ± 0.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.7 ± 0.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.7 ± 0.04&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.6 ± 0.1&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Fatty Acids</td>
<td>3.9 ± 0.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.9 ± 0.2</td>
<td>4.0 ± 0.1</td>
<td>4.3 ± 0.2</td>
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</tbody>
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• Different superscripts indicate statistically different groups

CONCLUSIONS

• Consumption of LCSBs does not appear to improve diet quality compared to water
• Diet quality was similar across all sweetened beverage consumers and significantly lower than among water consumers.
• The worst HEI and subcomponent scores were observed in SSB and combined LCSB+SSB consumers.
• These findings reinforce recommendations that SSBs should be replaced with water rather than LCSBs.

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