ABSTRACT

Objectives: The purpose of this study was to identify the most commonly consumed morning food (MF) patterns in US children/adolescents (2–18 years-old) and compare intakes of 2015–2020 Dietary Guidelines’ nutrients of concern and whole grains and lower added sugar intake in US children.

METHODS: The analyses used data from the National Health and Nutrition Examination Survey 2011-2014. Cluster analysis was used to develop MF patterns of consumption in children/adolescents. The USDA food codes were used to identify all MF patterns and their associated intakes of 2015–2020 Dietary Guidelines’ nutrients of concern from various foods. Eight food groups were identified in children and adolescents. The patterns included: a) protein foods/breads/whole fruit/juice; b) milk; c) pancakes, waffles, French toast, eggs, and other egg products; d) milk/Higher-Sugar RTEC/Lower-Sugar RTEC; e) milk/Sweet Pastries; f) milk/Lower-Sugar RTEC; g) milk/Sweet Pastries and with eggs/protein foods/juice; h) milk/Higher-Sugar RTEC; i) milk/Lower-Sugar RTEC and lower-sugar (LS) RTEC; j) milk/lower-sugar RTEC and milk/Sweet Pastries. Children consuming a MF pattern of LS RTEC milk had greater whole grain intake vs. no MF (1.450 vs. 1.130 g/100 kcal; p < 0.001). Children consuming MF patterns that included eggs/protein foods/juice and milk/Sweet Pastries, children consuming a MF pattern of LS RTEC milk had greater whole grain intake vs. no MF (1.450 vs. 1.130 g/100 kcal; p < 0.001). Added sugar intake was significantly greater in milk/Sweet Pastries vs. no MF and significantly lower with LS RTEC milk vs. no MF. Children consuming milk/lower-sugar LS RTEC had higher calcium intake vs. no MF. Dietary fiber was higher in all clusters except eggs/protein foods/juice relative to those consuming no MF, ranging from 2.2 to 5.7 g/day more fiber when MF was consumed. Children not consuming MF patterns that included eggs/protein foods/juice and milk/Sweet Pastries, were linked to increased whole grains intake, except for MF patterns that included eggs/protein foods/juice and milk/Sweet Pastries.

RESULTS

In general, MF patterns were associated with significantly greater intake of 2015–2020 Dietary Guidelines’ nutrients of public health concern [i.e., calcium, potassium, vitamin D and dietary fiber].

Conclusions: MF patterns were linked to increased intakes of 2015–2020 Dietary Guidelines’ nutrients of public health concern. The MF patterns that included eggs/protein foods/juice and milk/Sweet Pastries, were linked to increased whole grain intake, except for MF patterns that included eggs/protein foods/juice and milk/Sweet Pastries.

SIGNIFICANCE & LIMITATIONS

Many grain food morning patterns, including all cereals and milk, can significantly contribute positive nutrients to the diet, and include dietary fiber, iron, magnesium, and B-vitamins (thiamin, riboflavin, niacin, and folate).

All dietary morning patterns must take into account 2015-2020 Dietary Guidelines’ nutrients recommendations to limit added sugar, sodium and saturated fats, while staying within caloric recommendations for age groups.

The current study is observational, and thus, cannot establish a causal link.

A large number of the current work stems from the use of NHANES, which is a large continuous survey that examines a nationally representative sample by highly-trained medical personnel. Additionally, numerous corrections were used to adjust the data in an attempt to remove potential confounding scenarios.

REFERENCES


Yanni Papaloukas
‘Nutritional Strategies, Nutrition Science Research, Paris, ON, Canada’

BACKGROUND

While the 2015–2020 Dietary Guidelines for Americans 2015 encourages several healthy dietary food patterns (1), at present, there are no nationally representative data on the association of different morning food patterns on nutrient intake and diet quality in children and adults. Recent studies show that certain grain food patterns were associated with greater 2015–2020 Dietary Guidelines’ nutrient intakes in both adults and children/adolescents (2). Additionally, certain grain food patterns were associated with lower intake of nutrients to focus, including saturated (S) and added sugars (3). Precious data show are dietary intake and weight of consuming breakfast, respectively breakfasters and non-breakfasters, and those who did not consume any morning foods.

PURPOSE

To identify the most commonly consumed morning food (MF) patterns in US children/adolescents (2–18 years-old) and compare intakes of 2015–2020 Dietary Guidelines’ nutrients of concern and whole grains and lower added sugar intake compared with children/adolescents who did not consume any morning foods.

METHODS

Subjects
- Data were obtained from What We Eat In America 2011.
- Participants included children and adolescents 2–18 years of age (n = 5,876) with reliable data 1-2 hour recall dietary data.

Description of Dataset
- A continuous survey conducted by the National Center for Health Statistics.

Analysis
- Cluster analysis was used to convert patterns of morning food consumption –cluster analysis is used to cluster food data sets to develop various patterns while trying to use as many different elements as possible.
- Dietary consumption was calculated using the USDA food codes.
- Dietary intake was calculated using food codes in the NHANES datasets.
- Energy intake was calculated using the USDA food codes.
- Food groups were identified in children and adolescents.
- The patterns included: a) protein foods/breads/whole fruit/juice; b) milk; c) pancakes, waffles, French toast, eggs, and other egg products; d) milk/Higher-Sugar RTEC/Lower-Sugar RTEC; e) milk/Sweet Pastries; f) milk/Lower-Sugar RTEC; g) milk/lower-sugar RTEC and milk/Sweet Pastries. Children consuming a MF pattern of LS RTEC milk had greater whole grain intake vs. no MF (1.130 vs. 0.890 g/100 kcal; p < 0.001).

RESULTS

Morning Food Patterns/Clusters In Children 2-18 Yrs. Old

<table>
<thead>
<tr>
<th>Morning Food Pattern</th>
<th>Mean</th>
<th>SE</th>
<th>Beta</th>
<th>SE</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein Foods/Breads/Whole Fruit/Juice</td>
<td>5.30</td>
<td>0.21</td>
<td>1.65</td>
<td>0.24</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>No Morning Foods</td>
<td>3.44</td>
<td>0.16</td>
<td>0.60</td>
<td>0.20</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Milk/Sweet Pastries</td>
<td>4.94</td>
<td>0.40</td>
<td>1.28</td>
<td>0.41</td>
<td>0.0041</td>
</tr>
<tr>
<td>Milk/Lower-Sugar RTEC</td>
<td>7.53</td>
<td>0.49</td>
<td>3.87</td>
<td>0.53</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Morning Food Patterns and Diet Quality, as measured by the 2015 Healthy Eating Index (HEI)

<table>
<thead>
<tr>
<th>Diet Quality (HEI) Score</th>
<th>1-18 yrs old</th>
<th>N=5,876</th>
<th>NHANES 2011-2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total fat intake, g</td>
<td>20.61</td>
<td>0.19</td>
<td>0.77</td>
</tr>
<tr>
<td>Protein intake, g</td>
<td>44.45</td>
<td>1.25</td>
<td>1.65</td>
</tr>
<tr>
<td>Added sugar intake, tsp eq</td>
<td>19.90</td>
<td>1.40</td>
<td>0.12</td>
</tr>
<tr>
<td>Total sugar intake, g</td>
<td>27.29</td>
<td>1.73</td>
<td>0.61</td>
</tr>
<tr>
<td>Calcium intake, mg</td>
<td>797.04</td>
<td>5.07</td>
<td>2.12</td>
</tr>
<tr>
<td>Potassium intake, mg</td>
<td>3,743.94</td>
<td>28.67</td>
<td>16.37</td>
</tr>
</tbody>
</table>
| Whole Grain Intake by Morning Food Pattern

CONCLUSIONS

In general, MF patterns were associated with significantly greater intake of 2015–2020 Dietary Guidelines’ nutrients of public health concern [i.e., calcium, potassium, vitamin D and dietary fiber].

- All three RTEC patterns were associated with increased intake of potassium, dietary fiber, calcium and vitamin D.

- Similarly, children who consumed the three RTEC patterns had greater daily whole grains intake vs. no MF.

- Consumption of most MF patterns in US children/adolescents is associated with greater whole grains intake.

- Cereals and grain foods may play a beneficial role in meeting whole grain recommendations since all MF patterns were linked to increased whole grain intake, except for MF patterns that included eggs/protein foods/juice and milk/Sweet Pastries.

- Only the LS RTEC milk morning pattern was linked to lower added sugar intake in comparison to no MF.

- Added sugar intake was significantly greater in milk/sweet pastries vs. no MF and significantly lower with LS RTEC milk vs. no MF.

- Children consuming milk/lower-sugar LS RTEC had higher calcium intake vs. no MF.

- Dietary fiber was higher in all clusters except eggs/protein foods/juice relative to those consuming no MF, ranging from 2.2 to 5.7 g/day more fiber when MF was consumed.

- Vitamin D (20-25) intake was higher in all MF patterns vs. no MF.

- Potassium intake was significantly greater in all MF patterns vs. no MF.

- Ready-to-cook and milk MF patterns, in addition to protein/breakfast/whole fruit/vegetables, were linked to better diet quality scores compared to no MF.