Are diet and physical activity associated with zBMI in 2-4-year olds in North Somerset and Gloucestershire: a cross-sectional study

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Introduction

• 22.1% of children starting primary school are overweight or obese

• Majority of 2-4-year olds in England take up government-funded early education

• Children’s Food Trust guidelines

• Guidelines of 180 minutes physical activity/day

• Little known about dietary intake/quality and physical activity (PA) levels in UK pre-schoolers
Methods

NAP SACC UK data

Sociodemographic Characteristics

Anthropometry
- Height and weight
- zBMI – UK 1990 and IOTF growth reference charts
Methods

Diet

- Child and Diet Evaluation Tool (CADET)
- **Diet intake**: Starchy foods; Fruit and vegetables; Non-dairy protein sources (meat, fish, and alternatives); Milk and dairy foods
- **Diet Quality**: Derived NAP SACC UK Nutrition Best Practice Standards score

Physical Activity

- ActiGraph GT1M accelerometers
- Count per minute (CPM); Sedentary Time; Light PA; Moderate-to-Vigorous PA; Active Time
Data Analysis

- Multilevel linear regression models with dietary intake, adherence to NAP SACC UK Nutrition Best Practice Standards score or physical activity and zBMI

- Multilevel logistic regression models with weight as a categorical outcome (healthy weight vs overweight/obese) – underweight children excluded

- All analyses adjusted for age, gender, ethnicity, parental education level and clustering

- Exploratory sub-group analyses examined PA levels by gender and by nursery vs non-nursery days

- Children excluded from dietary analyses who did not consume main meals, had breakfast only or did not consume any snacks (n=142)

- Children included in PA analyses with at least two valid days of data (≥8 hours/day) (n=114)
## Adherence to CFT Guidelines

### Main meals

<table>
<thead>
<tr>
<th>Activity</th>
<th>One meal (n=64)</th>
<th>Two meals (n=66)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not consuming sugary drinks</td>
<td>98.4%</td>
<td>98.5%</td>
</tr>
<tr>
<td>Not consuming processed potatoes</td>
<td>89.1%</td>
<td>89.4%</td>
</tr>
<tr>
<td>Two/Four types of fruits and vegetables</td>
<td>89.1%</td>
<td>77.3%</td>
</tr>
<tr>
<td>Portion of starchy food</td>
<td>85.9%</td>
<td>98.5%</td>
</tr>
<tr>
<td>Milk-based of fruit-based desserts</td>
<td>79.7%</td>
<td>90.9%</td>
</tr>
<tr>
<td>Not consuming processed meat and fish</td>
<td>62.5%</td>
<td>65.2%</td>
</tr>
<tr>
<td>Portion of protein</td>
<td>50.0%</td>
<td>60.6%</td>
</tr>
<tr>
<td>Portion of fruit and portion of vegetable</td>
<td>34.4%</td>
<td>69.7%</td>
</tr>
<tr>
<td>Three types of starchy food</td>
<td>n/a</td>
<td>48.5%</td>
</tr>
</tbody>
</table>

### Snacks

<table>
<thead>
<tr>
<th>Activity</th>
<th>One snack (n=74)</th>
<th>Two snacks (n=47)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not consuming sugary drink</td>
<td>100%</td>
<td>89.4%</td>
</tr>
<tr>
<td>Not consuming dried fruit</td>
<td>93.2%</td>
<td>95.7%</td>
</tr>
<tr>
<td>Portion of fruit or vegetable with snacks</td>
<td>n/a</td>
<td>91.5%</td>
</tr>
<tr>
<td>Not consuming high sugar or fat snack</td>
<td>74.3%</td>
<td>59.6%</td>
</tr>
<tr>
<td>At least one starchy snack/day</td>
<td>n/a</td>
<td>72.3%</td>
</tr>
</tbody>
</table>
Diet and zBMI

• Average portion of starchy foods (2.1), fruit and vegetables (5.2), non-dairy sources of protein (1.0) and milk and dairy foods (2.4) per day (n=142)

• Average NAP SACC UK Nutrition Best Practice Standards score for one main meal (5.9/8.0), two or more main meals (7.0/9.0), one snack (2.7/3.0) and two snacks (4.1/5.0)

• No associations between dietary intake or diet quality and zBMI

• No associations between dietary intake or diet quality and the odds of being overweight/obese
Physical Activity Levels

- 88.6% of the children did not meet the daily guidelines of ≥180 minutes (n=114)

- Mean minutes spent in sedentary (494.75), Light PA (121.32), Moderate-to-Vigorous PA (22.23) and Active Time (143.55) per day

- Children spent 10.51 more minutes in Active Time, 9.34 minutes in Light PA and 22.84 minutes in Sedentary Time on nursery days compared to non-nursery days

- Boys spent 2.37% and 2.12% more time in active time on nursery days and non-nursery days respectively
Physical Activity and zBMI

- For every 10 minutes spent in Light PA ($\beta = 0.08$, 95% CI = 0.01, 0.15) and Active Time ($\beta = 0.07$, 95% CI = 0.01, 0.12) there was a positive association with zBMI UK 1990.

- For every 10 minutes spent in Light PA ($\beta = 0.08$, 95% CI = 0.01, 0.15) and Active Time ($\beta = 0.06$, 95% CI = 0.01, 0.12) there was a positive association with zBMI IOTF.

- Children who spent a greater proportion of time in Active Time (OR = 1.13, 95% CI = 1.02, 1.25) and lower proportion of time sedentary (OR = 0.89, 95% CI = 0.80, 0.98) were more likely to be overweight/obese using UK 1990 charts (n=112).

- Children who spent a greater proportion of time in Light PA (OR = 1.20, 95% CI = 1.05, 1.37) and a lower proportion of time sedentary (OR = 0.87, 95% CI = 0.78, 0.97) were more likely to be overweight/obese using IOTF charts (n=109).
Summary

- Proportion of children meeting the dietary standards was <70% for fruits and vegetables and <75% for high sugar or fat snacks.
- Diet intake and quality were not associated with zBMI.
- 88.6% of the 114 participants did not meet current UK guidelines of ≥180 minutes PA/day.
- Time spent in Light PA and Active Time were positively associated with higher zBMI.
- The odds of being overweight/obese were higher in more active children and lower in more sedentary children.
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Thank you for listening!

Any Questions?