Efficacy of Water Preloading Before Main Meals as a Strategy for Weight Loss in Obese Primary Care Patients: RCT
Background

- Laboratory test studies
  - participants ingest less energy at meals after consuming 500ml of water 30 mins before the meal

- Test meal studies
  - consuming water before and during meals increases satiety
  - exact mechanism of the potential effect unclear

- Only one previous small RCT (Dennis et al. 2010)
  - intervention group lost approximately 2kg more than comparators
Research Question

To investigate the efficacy of water preloading before meals as a weight loss strategy for obese adults in primary care
Methods

- **Design**
  - 2 group RCT with participants allocated to
    - water preloading group
    - comparator group
  - Participants blinded to the purpose of the study

- **Population**
  - Adults with a raised BMI ($\geq 30$ kg/m$^2$) recorded within their primary care notes in the last 12 months
  - Exclusions
    - pregnant or breastfeeding or intending to become pregnant
    - currently or in the last 3 months taken part in a weight management programme
    - lost $>2$kg in the last three months
Outcomes and Assessments

- **Primary outcome**
  - Difference in weight change (objectively assessed) between the groups from baseline to 12 weeks FU

- **Secondary outcome**
  - % who lost 5% or more body weight at FU
Outcomes and Assessments

- Adherence to the intervention
  - 24 hour total urine collections
    - urine volume and osmolality
  
- Phone questionnaire
  - how often engaging in water preloading prior to each meal
Outcomes and Assessments

- Mechanistic enquiry
  - Beverage and Snack-2 Questionnaire (BSQ2)

- Phone questionnaire
  - feelings of fullness and satisfaction after their most recent main meal on a scale of 1-10
Consultation 1
(face to face, 30 mins)

- **Intervention group**
  - asked to consume 500ml of water (0.8 pints or 2 cups) 30 minutes prior to main meals each day
  - importance of water for health and weight management
  - reusable 500ml water bottles to aid measurement and promote adherence

- **Comparator group**
  - asked to imagine their stomach was full 30 minutes prior to main meals each day
Consultation 2  
(telephone, 10 mins)

- Review adherence to the intervention discussed in consultation 1

- For those reporting low adherence, we discussed barriers and means to overcome them to enhance adherence

Weekly text message reminders were sent during the 12 week intervention to both groups
Outcomes and Assessments

- 84 participants randomised
  - 41 to intervention
  - 43 to comparator
- 95% follow up for intervention group
- 88% follow up for comparator group
## Baseline Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Intervention n=41</th>
<th>Comparator n=43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age – mean (SD)</td>
<td>55.1 (10.5)</td>
<td>57.8 (9.8)</td>
</tr>
<tr>
<td>BMI – mean (SD)</td>
<td>34.1 (2.1)</td>
<td>34.0 (2.6)</td>
</tr>
<tr>
<td>Male n (%)</td>
<td>15 (36.6)</td>
<td>15 (34.9)</td>
</tr>
<tr>
<td>Ethnicity n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-white</td>
<td>6 (14.6)</td>
<td>12 (27.9)</td>
</tr>
</tbody>
</table>
### Primary outcome

<table>
<thead>
<tr>
<th></th>
<th>Mean weight change from baseline to follow up</th>
<th>Mean difference between groups at follow up (unadjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention (n=41)</td>
<td>Comparator (n=43)</td>
</tr>
<tr>
<td>Primary analysis – BOCF excluding self weights kg (95% CI)</td>
<td>-2.4 (-3.5 to -1.3)</td>
<td>-1.2 (-2.1 to -0.31)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-1.3 (-2.4 to -0.14)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p=0.028</td>
</tr>
</tbody>
</table>

Different methods of imputing missing data did not alter the result.
Secondary outcome

- 27% in intervention group and 5% in comparator group lost ≥ 5% body weight
Adherence

- **Urine analysis**
  - Intervention group drank significantly more than comparator

- **Self-reported preloading adherence**

<table>
<thead>
<tr>
<th>Self-reported frequency of preloading water before main meals</th>
<th>6 weeks</th>
<th>12 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all/once a day</td>
<td>-0.2 (1.4) n=8</td>
<td>-0.8 (1.8) n=9</td>
</tr>
<tr>
<td>Twice a day</td>
<td>-2.1 (1.8) n=9</td>
<td>-2.1 (2.8) n=11</td>
</tr>
<tr>
<td>Three times a day</td>
<td>-2.2 (2.4) n=20</td>
<td>-4.3 (4.0) n=16</td>
</tr>
</tbody>
</table>
Mechanistic enquiry

- **BSQ2 scores**
  - no difference in frequency of snacking between groups

- **Fullness and satiety scores**
  - no significant difference between groups
Conclusions

- Water preloading before main meals
  - leads to a moderate but significant weight loss
  - a simple message that could easily be disseminated by healthcare professionals and in public health campaigns

- Preliminary evidence
  - that water preloading may be effective
  - though the mechanism of action remains unknown
Acknowledgements

- This research was funded by
  - Scientific Foundation Board of the Royal College of General Practitioners (Grant number SFB 2013-28)
  - European Hydration Institute (EHI)

- HMP’s ACF post is funded by Health Education West Midlands and the Primary Care Research Trust

This presentation reflects only the authors’ views and EHI is not liable for any use that may be made of the information