Is the presence of sedentary behaviour or the absence of physical activity responsible for fat mass and appetite dysregulation? Preliminary results from the DAPHNE project.

MYERS, Anna <http://orcid.org/0000-0001-6432-8628>, FINLAYSON, G., BLUNDELL, J. and GIBBONS, C.

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Background

- It is well established that moderate-to-vigorous physical activity (MVPA) contributes to the prevention of non-communicable diseases. More recently, sedentary behaviour has been linked with deleterious health outcomes independent of the amount of MVPA performed.1, 2
- Sedentary behaviour has also been linked to unhealthy dietary intake but little is known about the association between objectively measured sedentary behaviour and appetite control.3

Aim

- The present study employed an innovative validated device for the objective measurement of sedentary and active behaviour to investigate whether measures of sedentary and active behaviours were associated with body composition or appetite dysregulation.

Methods

- 58 participants (13 males, 45 females) visited the Human Appetite Research Unit on two occasions (age 37.0 ± 13.8 years, BMI 28.6 ± 4.9 kg/m²).
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Visit 1:
- 24 hour PA profile
- Bed and morning activity
- Anthropometrics
- Blood pressure and gastric emptying
- Body weight and body composition
- PA and SB questionnaires
- Appetite questionnaires
- HR, BP and RHR
- Baseline and complete-FD
- HR and blood glucose
- SenseWear armband

Visit 2:
- 7 days measurement of free-living physical activity
- Measurement method
- Free-living PA
- Body composition
- Cardiovascular fitness
- Resting metabolic rate
- Appetite dysregulation

Table 1. Measurement methods.

<table>
<thead>
<tr>
<th>Measurement method</th>
<th>Free-living PA</th>
<th>Body composition</th>
<th>Cardiovascular fitness</th>
<th>Resting metabolic rate</th>
<th>Appetite dysregulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SenseWear mini</td>
<td>Bodpod</td>
<td>Indirect calorimetry</td>
<td>Indirect calorimetry</td>
<td>Three-Factor Eating Questionnaire; Binge Eating Scale</td>
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</tbody>
</table>

Results

- Sedentary behaviour was positively associated (r = 0.4 - 0.47, p <0.05) and MVPA negatively associated (r = -0.52 - -0.71, p <0.01) with multiple indices of adiposity.

- After controlling for MVPA the correlations between sedentary behaviour and adiposity were no longer significant, however when the correlations between MVPA and adiposity were adjusted for sedentary behaviour they remained significant.

- Higher levels of adiposity were associated with higher levels of TFEQ Disinhibition and Binge Eating. However there was no association between physical activity and sedentary behaviour with appetite dysregulation after controlling for adiposity.

Table 3. Correlation between indices of adiposity, active and sedentary behaviours and appetite dysregulation.

<table>
<thead>
<tr>
<th>Body mass</th>
<th>BMI</th>
<th>Fat mass</th>
<th>% fat mass</th>
<th>WC</th>
<th>SED1</th>
<th>MVPA1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disinhibition</td>
<td>0.51†</td>
<td>0.68†</td>
<td>0.65†</td>
<td>0.61†</td>
<td>-0.14</td>
<td>-0.12</td>
</tr>
<tr>
<td>Binge eating</td>
<td>0.45†</td>
<td>0.50†</td>
<td>0.53†</td>
<td>0.49†</td>
<td>0.52†</td>
<td>-0.18</td>
</tr>
<tr>
<td>n=58; data are Pearson correlations (r). † controlled for % fat mass (n=55). p&lt;0.01. Waist circumference (WC); SED (sedentary behaviour); energy expenditure (EE).</td>
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Conclusion

- The absence of MVPA may be more important than the presence of sedentary behaviour for the accumulation of body fat.
- Higher adiposity was associated with markers of appetite dysregulation (Disinhibition and Binge Eating).
- After controlling for adiposity, physical activity and sedentary behaviour were not associated with appetite dysregulation.
- Further research will investigate the relationships amongst physical activity, sedentary behaviour and appetite control using a robust methodological platform over a 14 week period.

References


Acknowledgements

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