Early years physical activity: from epidemiology to intervention

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Born in Bradford (BiB) birth cohort study was established in 2007 to shine the spotlight of research onto the health and wellbeing of children growing up in a multi-ethnic city with high levels of deprivation.
Between August 2008 and March 2009 all mothers recruited to the full BiB cohort were invited to take part in the BiB1000 sub-study:

- 1735 mothers recruited 2008-09
- Baseline, 6, 12, 18, 24 and 36 month data collection
- 1558 infants ≥1 follow-up 2008-13

BiB1000 publications:
- Bryant et al. Longitudinal and Life Course Studies 2013
- Fairley et al. BMC Obesity 2015
Measurement of PA in the Early Years

• Costa et al. Qualitative feasibility of using three accelerometers with 2-3-year-old children and both parents. *Res Q Exerc Sport*. 2013


• Bingham et al. Accelerometer data requirements for reliable estimations of habitual physical activity and sedentary time of children during the early years a worked example following a stepped approach. *J Sports Sci*. 2016

• Bingham et al. Reliability and Validity of the Early Years Physical Activity Questionnaire (EY-PAQ). *Sports* 2016
How active are Early years children?

<table>
<thead>
<tr>
<th>Average daily minutes in...</th>
<th>Accelerometer Mean ±SD, (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedentary</td>
<td>339.50 ± 79.35</td>
</tr>
<tr>
<td>Light PA</td>
<td>205.12 ± 40.30</td>
</tr>
<tr>
<td>Moderate-Vigorous PA</td>
<td>59.9 ± 20.26</td>
</tr>
<tr>
<td>Total PA</td>
<td>265.02 ± 54.74</td>
</tr>
<tr>
<td>wear time</td>
<td>604.52 ± 103.49</td>
</tr>
<tr>
<td>180 min every day guideline</td>
<td>60%</td>
</tr>
</tbody>
</table>

n = 237, age 2.93 ± 0.59 yrs

BHF manifesto: “91% of children aged 2-4 years do not meet the Chief Medical Officers’ physical activity guidelines for their age group.”
Correlates and determinants: a systematic review

• 130 studies ~ 40 different potential correlate/determinants

**CORRELATES**
1. Sex correlated with TPA, LPA and MVPA (boys more active than girls)
2. Time spent outdoors in play spaces positively correlated with TPA (not MVPA)
3. Attending preschool/childcare positively correlated with TPA and MVPA

**DETERMINANTS** (association over time: caution, small number of studies)
1. Boys had higher levels of Light PA compared to girls
2. Children whose mothers had depressive symptoms had lower TPA
3. Children whose parents spent longer playing with them had higher TPA

Ethnic differences in physical activity @ 2 year olds: BiB1000

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>White British</th>
<th>South Asian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total MVPA</td>
<td>18.8%</td>
<td>19.4%</td>
<td>18.1%</td>
</tr>
<tr>
<td>Home</td>
<td>70.9%</td>
<td>57.5%</td>
<td>67.7% *</td>
</tr>
<tr>
<td>Garden</td>
<td>13.9%</td>
<td>15.8%</td>
<td>13.5%</td>
</tr>
<tr>
<td>Sweating</td>
<td>2%</td>
<td>3.9%</td>
<td>2%</td>
</tr>
<tr>
<td>Walking</td>
<td>5.8%</td>
<td>11.6%</td>
<td>6% *</td>
</tr>
<tr>
<td>Park</td>
<td>3.7%</td>
<td>4.7%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Indoor play facility</td>
<td>3.7%</td>
<td>6.5%</td>
<td>6%</td>
</tr>
</tbody>
</table>

For both ethnic groups season was correlated with reported MVPA, with less MVPA for children whose mothers completed the questionnaire in the winter compared to summer.

For SA children, those whose mothers reported that the weather sometimes stopped their child from being active had children who had lower MVPA.
### Barriers and enablers to pre-schoolers PA 6 focus groups, 17 mothers

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Enablers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too busy</td>
<td>Someone else to help supervise</td>
</tr>
<tr>
<td>Mothers minimised journey’s taken</td>
<td>Activities available locally</td>
</tr>
<tr>
<td>difficult to leave house with child</td>
<td>Flexible timings</td>
</tr>
<tr>
<td>Unsafe neighbourhood</td>
<td></td>
</tr>
<tr>
<td>Can’t take child on their own</td>
<td></td>
</tr>
<tr>
<td>Weather/season</td>
<td></td>
</tr>
<tr>
<td>Public transport</td>
<td></td>
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</tbody>
</table>
Pre-Schoolers in the Playground

Play sessions are running here in the school playground for parents and their pre-school children. See Diane Lock in the community room for more information.

Mondays, Tuesdays, Wednesdays & Thursdays
9.00 – 9.30am
Tuesdays & Wednesdays
3.00 – 3.30pm

Funded by an NIHR Public Health Research Grant
(reference: 11/3001/16)
Setting
- Primary school playgrounds

Delivery
- Parental involvement workers
- Early years workers
- 2 hour face-to-face
- Manual
- Telephone support

Training
- Initiation phase (10 weeks)
- Maintenance phase (20 weeks)

Structure
- Structured & unstructured play
- Information to parents
- Take home play equipment
Motives for participation
* School familiarity
* Child will benefit, help child to be more active
* New way to engage with hard to reach families
* Parent & child meaningful activity, improved language and learning

Schools
- n = 10
- 6 South Asian
- 4 White
- Free School Meals = 48% (31 – 78%)
- English Additional Language = 57% (11.5 – 96.6%)

Children
- n = 164
- 2.8 ± 0.7 yrs
- 52% female
- 57% South Asian
- 37% White
- 6% Other

English Additional Language = 57% (11.5 – 96.6%)

Free School Meals = 48% (31 – 78%)
Results and what’s next for PiP?

- low attendance, high fidelity, acceptable and deliverable
- Revised intervention building on successful intervention elements and incorporating strategies to improve attendance will be evaluated in the Big Lottery Funded Better Start Bradford Programme

Barber et al. BMC Pilot and Feasibility Studies 2016; 2:12

Barber et al. Public Health Res 2015;3(5)
1. What do we know about childhood obesity, associated behaviours, our population, local context & environment

2. What behaviours to change, what are the barriers to change

3. How can we change them, what activities can we use?

4. Design material

5/6. Deliver and evaluate the intervention
Group sessions
Delivered in children’s centres
Using existing parenting facilitators

Taylor et al, 2013, Implementation Science
Results and what’s next for HAPPY?

- HAPPY was feasible and acceptable to participants who attended and those delivering it.

- Recruitment rate was low at 30% (n = 120), although in line with other trials, and study drop-out rates were acceptable.

- Most women who did not attend the first session failed to attend subsequent intervention sessions.

- A clear strategy to enhance attendance (particularly to the first session) has been planned and will be tested in the Better Start Bradford Programme.

- Currently seeking funding for a multi-site, national definitive trial.

McEachan et al. BMC Public Health 2016
Levels and determinants of TV viewing: BiB1000

Additional determinants included:

- Maternal stress
- Ethnicity
- Country of birth

Focus groups have identified barriers and facilitators to changing screen-viewing.
Active Imagination – intervention to reduce screen-time

Successful interventions were:
• health promotion cirricular or counselling
• < 7 months in duration
• ≥2 session

• Bolt on to existing language and communication interventions ‘imagination library’
• Bolt on to parenting programmes
• Early years workers training
Summary and things to consider

- Focus on active EVERYDAY
- Importance of parental involvement
- Weather and season are barriers to overcome
- Settings motive for participation are more focused on learning, social development than health
- Attendance to group based ‘health’ sessions can be poor, is there another way?