Systematic reviews of determinants of energy balance related behaviours in young children (0-6yrs): Evidence from quantitative and qualitative literature

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R Lakshman, V Paes, C O’Malley, K Hesketh, H Moore, S Griffin, E Van Sluijs, K Ong, C Summerbell
Aims

• What are the factors influencing behaviour?
• What are the characteristics of effective interventions?

Our reviews provide understanding of these factors to identify which are modifiable and can be targeted in a future intervention.

The link between behaviour and obesity already established.
Methods - search strategy

- Quantitative (Intervention and Observational) and Qualitative literature on factors influencing
  1) sugar sweetened beverage (SSB) intake
  2) obesogenic food (OF) intake
  3) fruit and vegetable intake
  4) physical activity and sedentary behaviours
- Common search strategy for all behaviours
- Eight electronic databases
- No language or period restrictions
Methods - inclusion & exclusion criteria

**Inclusion criteria**
- Intervention & prospective studies: Determinant → Behaviours
- Objectively & subjectively measured outcome
- Qualitative studies: barriers and facilitators
- Children aged 0-6yrs at baseline

**Exclusion criteria**
- Lab-based
- Clinical populations
- Weaning and bottle-feeding
- Descriptive table in unrelated study
- Behaviour → Obesity
- Cross-sectional studies (except SSB & OF intake)
### Methods - study selection

- 37,686 titles and abstracts screened
- 10% double-screened
- Details of full-text articles entered in an IN/OUT spread-sheet

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Full text articles</th>
<th>Quantitative</th>
<th>Qualitative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Intervention</td>
<td>Cohort</td>
<td>X-section</td>
</tr>
<tr>
<td>Qualitative: SSB and Obesogenic food intake</td>
<td>286</td>
<td>13</td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>Quantitative: Sugar sweetened beverage intake</td>
<td>286</td>
<td></td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>Quantitative: Obesogenic food intake</td>
<td>286</td>
<td>19</td>
<td>6</td>
<td>36</td>
</tr>
<tr>
<td>Fruit and vegetable intake</td>
<td>337</td>
<td>29</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>Physical activity and sedentary behaviour</td>
<td>164</td>
<td>16</td>
<td>6</td>
<td>-</td>
</tr>
</tbody>
</table>
Methods - data extraction & synthesis

- Included studies, detailed data extracted to spreadsheet
- Sample double reviewed by senior reviewer
- Quantitative data synthesised in harvest plots/tables
- Qualitative data, thematic analysis
- Pre-defined quality assessment criteria
- Level of determinant
  - Child
  - Parents & family
  - Childcare/Preschool
  - Community
  - Policy
Results

• Qualitative evidence: sugar sweetened beverage and obesogenic food intake
• Quantitative observational evidence: sugar sweetened beverage and obesogenic food intake
• Quantitative intervention evidence: sugar sweetened beverage intake
• Quantitative intervention evidence: obesogenic food intake
Qualitative evidence

- 20 studies: America (10) Europe (6) Australia (4)
- mainly 2004 onwards (18/20)
- Focus groups (16) Interviews (5) Ethnography (1)
- Parents (879) teachers (99) children (15) others (27)
- Main themes identified (number of studies)
  - **Child**: Preference (14)
  - **Parent**: Time & convenience (13) knowledge (13) cost/affordability (10) modelling (10) use of food as reward (10) health concerns (10)
  - **Environment**: Availability (10) advertising (10) school/childcare (10) family/peers (14) societal/cultural influence (5)
Themes- cost/affordability preference, advertising

It’s the money factor, you can’t just think, oh I’ll buy all that stuff because they might eat it..

I’ll stop buying something if they spit it out once because we don’t want the waste.

If juice is eliminated from diet- I think they’d throw a temper tantrum and I’d hear whining & crying.

We’ll just give it to her (fast food) if she is throwing a fit.

When [sweets are] obviously in the shops and advertising them and [the children] can see them, it makes it very hard to get away with them demanding...

We do tend to fall into the trap of, oh well it’s been advertised on TV and if that’s what they want then I’ll buy it.
Themes - Time & convenience

Oh he cooks sometimes but when it’s his turn he just thinks a takeaway is easier.

If you don’t have the time, then you start to feel guilty & you go and buy for the kids that new cereal the kid sees on TV.

It’s the convenience thing, usually it is between meals.., as we say we are on the go, so if we are going out for their activities.

..thinking, oh my goodness I’m going to mess that meal up, I’m going to go for the easy option.
Children do copy us... when your husband is having chocolate it’s not fair to expect your child to have banana

Parents can affect children when they are young... When they are older, friends are more important. My son often imitates his friends

As a parent you are responsible for your children’s lifestyle. We have to guide our children... Children don’t do what parents tell them to; they do what parents do

..like he wants what everyone else has...

My mother...she wants to see her chubby...she feeds her like she is stuffing a bag...
I’ve been eating too much [mother] and look I am fat. Do you want to look like me? No you will not be able to walk

Cause I was like that when I was little, I was overweight, picked on, and I don’t want to have her go through that

We try everything but often it is bribery...

Because she had eaten all her food, I said do you want ice-cream?

I told him if you behave well we will go to the convenience store to buy you a candy
Themes: knowledge, availability, society

A certain amount of juice is OK, 100% juice isn’t just sugar water

The health department says they need this much juice

We only offer water

I put the crisps in the cupboard where they cannot reach

I think it would be a good idea to install a water station....

Don’t like the taste (of water)...and some people suck on where the water comes out

The government should subsidise healthy food

It’s in our culture, children are allowed to have sweets several times a week, it’s not a big deal

I think society has a responsibility for our children’s lifestyles, since the politicians make the laws
Quantitative observational evidence

- SSB: 79 correlates, OF: 115 correlates

Positive associations in ≥3 studies:

- **Child**: ↑age, male, ↑obesogenic food intake (for SSB), ↑preference, ↑TV viewing

- **Parent**: ↓age, ↓income, ↓education, ↑family size, ↑BMI, ↑smoking, ↑early weaning, ↑obesogenic food/SSB intake (negative modelling)

- **Environment**: ↑availability
SSB : Interventions

- 13 studies : America (4) Europe (4) Australia (4) Asia (1)
- 2007 onwards
- Cluster RCT (7) RCT (1) Quasi-experimental (1) Uncontrolled (4)
- Main findings
  - 7 multi-level : 4++, 2+, 1/
  - 4 parent only: 2++, 2+
  - 2 parent plus: 1++, 1/
  - Only 1 UK study (parent plus social support): ++
  - No consistent relationship of effectiveness with setting (home, school, clinic), the determinant targeted, or use of theory (6 studies)
### SSB: Interventions (Harvest plot)

<table>
<thead>
<tr>
<th>Significant negative effect of intervention (- -)</th>
<th>Non-significant negative effect of intervention (-)</th>
<th>No effect of intervention (0)</th>
<th>Non-significant positive effect of intervention (+)</th>
<th>Significant positive effect of intervention (++)</th>
</tr>
</thead>
</table>

#### INTERVENTIONS TARGETING CHILD BEHAVIORAL DETERMINANTS

- School based policy and educational interventions, community based policy intervention, clinic and home based multi strategy intervention.
- **REP**
  - 1 2
  - 3 4 5
- **non-REP**
  - 6

#### INTERVENTIONS TARGETING MODIFIABLE PARENTAL DETERMINANTS

- School based policy or educational interventions; community based policy intervention; clinic and home based multi strategy intervention; Clinic or home based educational interventions; home or clinic based multi strategy interventions.
- **REP**
  - 1 2
  - 3 4 5
  - 7 8 9 10
- **non-REP**
  - 11 12 6 13

#### INTERVENTIONS TARGETING ENVIRONMENTAL DETERMINANTS

- School based policy or educational interventions; community based policy intervention; clinic based multi strategy interventions
- **REP**
  - 1 3
  - 4 5 14
- **non-REP**
  - 9 13
Obesogenic Foods: Interventions

- 19 studies: America (6) Europe (5) Australia (6) Asia (2)
- 2003 onwards
- We classified foods as: sweet (8) savoury (6) or obesogenic meals-not specified (15)

Main findings
- 12 multi-level, 5 ++
- 6 only parental determinants, 2 ++
- No consistent relationship of effectiveness with setting (home, school, clinic), the determinant targeted, or use of theory (11 studies)
Conclusions

- Research in this area recent, few UK studies
- Multi-level interventions show promise in changing obesogenic food and drink behaviours in young children
- Qualitative evidence indicates that future interventions should also target the barriers to behaviour change - affordability, convenience, modelling, education, preference, availability, advertising
- Long-term sustainability, impact on inequalities and potential for implementation in routine practice of interventions should be considered
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