Behavioral interventions to prevent childhood obesity: a systematic review and metaanalyses of randomized trials


CRD summary
The authors concluded that behavioural interventions to prevent paediatric obesity had small beneficial effects on target behaviours and no significant effect on body mass index. The review was generally well conducted, but a degree of caution may be required in interpreting the authors’ conclusions because the quality of the primary studies was low and there was unexplained inconsistency in the findings.

Authors' objectives
To assess the effectiveness of behavioural interventions to prevent childhood obesity.

Searching
MEDLINE, ERIC, EMBASE, CINAHL, PsycINFO, Dissertation Abstracts, Science Citation Index, Social Sciences Citation Index and Cochrane Central Register of Controlled Trials were searched from inception to February 2006. Search terms were described. The references of included studies and and reviews were handsearched. Experts in the field were consulted. The review was restricted to published studies.

Study selection
Randomised controlled trials (RCTs) of interventions aimed at changing lifestyle behaviours to prevent obesity were eligible for inclusion, provided participants were children and adolescents (aged two to 18 years). Eligible interventions could be simple or multimodal and could be delivered by a healthcare professional, community member or health authority in a home, school, clinic or community setting. Outcomes of interest were changes in diet (increase in healthy diet or decrease in unhealthy diet) or in physical activity (increased physical activity or decreased sedentary activity) or (secondarily) change in body mass index (BMI). These could be measured by self-report or by report of a family member, research or health care professional or other responsible adult (such as a teacher) or could be measured objectively (for example, using an accelerometer). RCTs were excluded if participants had eating disorders, if all were obese (as defined in the study), if most were adult or if the study targeted the consequences of obesity (such as cardiovascular risk factors).

The included studies varied widely with respect to participants, interventions, delivery methods and outcome measures. Some studies included a proportion of participants who were overweight. Interventions used in the studies included informational, cognitive, environmental and parental/social support components (defined in more detail in the review, with examples). All studies in the review included informational components. Less than half utilised environmental strategies. Most targeted more than one lifestyle behaviour.

Two reviewers independently selected studies for inclusion, with disagreements resolved by a third reviewer.

Assessment of study quality
The following aspects of study validity were assessed: allocation concealment; blinding of participants (to allocation and to study hypothesis), health care providers and/or data collectors; use of intention to treat analysis; and extent of losses to follow up. Two reviewers independently conducted the assessment.

Data extraction
For continuous outcomes, mean differences between the two groups in end-of-study outcomes (preferably) or changes from baseline were calculated, with 95% confidence intervals (CIs). Odds ratios (ORs) were calculated for dichotomous outcomes. Data were extracted at the longest duration of follow-up in which groups were still exposed to treatment or control conditions and for which there were not excessive losses to follow up (defined as over 20 per cent). Missing data were handled according to standard methods (Higgins 2005). Data were classified according to the components of the intervention and were extracted using a standardised form by two reviewers working independently. Additional
information was requested from study authors if necessary.

**Methods of synthesis**
Continuous data were pooled to calculate standardised mean differences (SMDs), with adjustment for small samples. Dichotomous data were pooled using the generic inverse variance method. Random-effects models were used. Heterogeneity was assessed using the $I^2$ statistic. Pre-planned subgroup analyses were conducted to investigate the effects of differences between the studies in quality, methodology and clinical characteristics. Statistical adjustments for multiple comparisons were not applied.

**Results of the review**
Thirty four RCTs were included in the review. The overall quality of the evidence was low. Four studies reported adequate allocation concealment. One study blinded participants or providers. Five studies blinded data collectors. Eleven studies used intention to treat analysis. Eleven had loss to follow up of over 20 per cent (range 0% to 38%).

Behavioural interventions versus controls:

Pooling of data showed that the interventions were associated with a small statistically significant increase in physical activity (SMD 0.12, 95% CI: 0.04, 0.20; 18 RCTs, 22 comparisons, n=9,891), with moderate heterogeneity ($I^2=63\%$) that was not explained by subgroup analyses.

Behavioural interventions were associated with a small statistically significant decrease in sedentary activity (SMD -0.29, 95% CI: -0.35, -0.22; 10 RCTs, 14 comparisons, n=3,003) and decrease in unhealthy diet (SMD -0.15, 95% CI: -0.22, -0.08; 19 RCTs, 23 comparisons, n=9,578), with moderate heterogeneity for the analysis of decrease in unhealthy diet ($I^2=34\%$).

No statistically significant difference between the groups was reported for increases in healthy dietary behaviour (12 RCTs, 14 comparisons, n=5,468), with considerable heterogeneity ($I^2=83\%$) that was not explained by subgroup analyses. Behavioural interventions had no statistically significant effect on BMI (34 RCTs, 43 comparisons, n=32,003).

In subgroup analyses, RCTs with interventions of over six-months duration and with post-intervention (as opposed to in-treatment) outcomes had slightly larger effects. Detailed results of subgroup analyses were reported in the review.

**Authors’ conclusions**
Behavioural interventions to prevent paediatric obesity had small beneficial effects on target behaviours and no significant effect on BMI.

**CRD commentary**
The objectives and inclusion criteria of the review were clear and relevant sources were searched for studies. As the review was restricted to published studies it may be subject to publication bias; there did not appear to be a formal assessment for this bias. It was unclear whether the search was restricted by language. Relevant criteria were used to assess validity and steps were taken to minimise the risk of error and bias by having more than one reviewer undertake study selection, validity assessment and data extraction. Appropriate methods were used to combine the studies statistically and assess and investigate for heterogeneity. Potential sources of heterogeneity and various other types of bias were well addressed in the text. As noted by the authors, the overall quality of the evidence was poor and there was persistent heterogeneity in the analyses. The review was generally well conducted, but a degree of caution may be required in interpreting the authors’ conclusions because the quality of the primary studies was low and there was unexplained inconsistency in the findings.

**Implications of the review for practice and research**
Practice: The authors did not state any implications for practice.

Research: The authors stated that there was a need for studies of promising long-term interventions for prevention of childhood obesity, with detailed definition and measurement of target behaviours, extended follow-up and improved reporting of details of interventions. They suggested that systematic reviews in this area should be structured to permit comparison of intervention types across studies, in line with the present review.
Funding
The Endocrine Society.

Bibliographic details

PubMedID
18782880

DOI
10.1210/jc.2006-2411

Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Body Mass Index; Child; Child Behavior; Child, Preschool; Data Interpretation, Statistical; Feeding Behavior; Humans; Life Style; Motor Activity; Obesity /prevention & control; Quality Control; Randomized Controlled Trials as Topic /standards /statistics & numerical data; Research Design

AccessionNumber
12009101884

Date bibliographic record published
31/03/2009

Date abstract record published
01/07/2009

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.