Which type of sedentary behaviour intervention is more effective at reducing body mass index in children? A meta-analytic review
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CRD summary
This review concluded that interventions to reduce sedentary behaviour were effective in reducing body mass index in children. A comprehensive intervention targeting multiple sedentary activities could prevent obesity in children. Given the small effects, and limitations in the review methods and generalisability, these conclusions seem overstated and may not be reliable.

Authors' objectives
To assess the effects of single- and multi-component sedentary behaviour interventions on body mass index in children.

Searching
MEDLINE, PsycINFO, and Web of Science were searched in July, 2012, for English-language publications. Search terms were reported. Google Scholar was used to search the Internet. Relevant journal issues, and reference lists of relevant reviews and included articles were manually searched for further studies.

Study selection
Eligible studies were randomised controlled trials (RCTs) comparing the effects of a sedentary behaviour intervention versus control on body mass index in children (aged 18 years or younger). Eligible comparators included non-obesity prevention information, such as fire-drill training; usual care; or assessment only. Trials were excluded if the interventions were not specifically designed to limit the time spent in sedentary behaviour, or if they did not report the unadjusted means and standard deviations for body mass index of groups before and after intervention.

In the included trials, the mean age of participants ranged from four to 15 years, and they were recruited from general, overweight or obese populations. Where reported, most participants were Caucasian. Most controls were no treatment; the others were advice, education, counselling or usual care (care visits and follow-up appointments with a paediatrician or sub-specialist). The interventions were based in clinics, at school, at home, or combinations of these; they lasted from one to 208 weeks. The content of, structure of, and behaviours targeted by, the interventions varied.

The authors did not state how many reviewers were involved in study selection.

Assessment of study quality
Trial quality was assessed by two reviewers independently, using the Quality Assessment Tool for Quantitative Studies. This covered selection bias, study design, confounders, blinding, data collection methods, and withdrawals and drop-outs. Ratings for these were used to provide an overall rating for each trial (strong, moderate or weak).

Any discrepancies were resolved by consensus.

Data extraction
Body mass index data were extracted to calculate standardised mean differences ($d$) and 95% confidence intervals. These effect sizes were then transformed to Hedge's $g$ before meta-analysis, to correct for small-study bias.

The data were extracted independently by two reviewers; any discrepancies were resolved by consensus.

Methods of synthesis
Effect sizes and 95% confidence intervals were pooled using random-effects models. Statistical heterogeneity was assessed using Cochran’s $Q$ and $I^2$.

Stratified analyses were performed according to the behaviour targeted by the intervention. The relationships between predefined moderators were explored using bivariate correlation analyses. Publication bias was assessed using Egger's test, funnel plots, and the trim-and-fill method.
Results of the review
Twenty-five trials were included in the review (7,429 participants; range 10 to 1,323). The quality of 10 trials was strong; 11 trials were moderate; and four trials were weak.

Compared with controls, a very small reduction in body mass index was observed in the intervention groups (g -0.07, 95% CI -0.14 to -0.01; 25 RCTs; I²=25%); this difference was of borderline statistical significance. No statistically significant differences between groups were observed when the analyses were stratified by whether interventions targeted sedentary behaviour alone or in combination with physical activity, diet or both.

Egger's test showed small-study effects (p=0.037), meaning that small trials may have produced large effect sizes. A funnel plot and the trim-and-fill method did not show any evidence of publication bias. Further results were reported.

Authors' conclusions
Interventions to reduce sedentary behaviour were effective in reducing body mass index in children. A comprehensive intervention targeting multiple sedentary activities could prevent obesity in children.

CRD commentary
The review question and inclusion criteria were clearly defined and reproducible. Relevant data sources were searched, but the restriction to English-language publications means that relevant trials may have been missed. Data extraction and quality assessment were carried out by two people, but it was unclear whether this was the case for study selection, so reviewer error and bias cannot be ruled out.

Suitable quality assessment criteria were employed and a full breakdown of the results was provided. There was some clinical and methodological variation across the individual trials, but the statistical methods of synthesis seemed appropriate and the statistical heterogeneity was not significant. The authors acknowledged that the population characteristics were poorly reported and that the trials were mainly conducted in developed countries; limiting the ability to generalise the findings. It should also be noted that the content of the interventions and their delivery methods varied widely.

Given the small effects, and limitations in the review methods and generalisability, the authors' conclusions seem overstated and may not be reliable.

Implications of the review for practice and research
Practice: The authors stated that the difference in body mass index was not clinically significant, but it could be at a population level for non-obese children. They stated that clinical health practitioners could consider focusing on limiting sedentary behaviour to reduce body mass index in paediatric patients.

Research: The authors did not state any implications for research.

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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.