School-based obesity prevention programs: a meta-analysis of randomized controlled trials

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CRD summary
The authors concluded that their review of randomised controlled trials, since 2006, supported the effectiveness of school-based obesity prevention programmes, for children, which lasted more than one year and included parental support. The authors’ conclusions reflect the evidence presented, but the poor quality of the trials, and limited information on variation between them, should be considered.

Authors’ objectives
To evaluate the effectiveness of school-based obesity prevention programmes.

Searching
Nine databases, including MEDLINE, PsycINFO and Cochrane Central Register of Controlled Trials (CENTRAL), were searched for articles, with abstracts in English, from 2006 to January 2012; search terms were reported. Relevant reviews and meta-analyses were examined for additional studies.

Study selection
Randomised controlled trials (RCTs) of school-based obesity prevention programmes, aimed at children aged five to 18 years, were eligible for inclusion. The outcome of interest was body mass index (BMI). Control groups had to receive no intervention. Trials that only included obese children, and those of interventions for eating disorders or other medical conditions, were excluded.

Trials were conducted in various countries, over different continents, with one study conducted in England. The intervention programmes had various components to alter lifestyle, such as increasing intake of healthy foods, decreasing consumption of unhealthy foods, and increasing physical activity. They used multiple strategies, with informative, behavioural, environmental, or cognitive components. Just over half the trials used parental support.

Two reviewers independently selected trials for inclusion.

Assessment of study quality
Two reviewers independently assessed the quality of the trials. Criteria covered allocation concealment; blinding of patients, health care providers, and data collectors; use of intention-to-treat analysis; and loss to follow-up.

Data extraction
Two reviewers independently extracted data on the mean change in BMI, with standard deviations or standard errors. Disagreements were resolved by recourse to a third reviewer. Trial authors were contacted for missing data.

Methods of synthesis
The data from individual trials were combined, using fixed-effect and random-effects models, to create standardised mean differences with 95% confidence intervals. The random-effects meta-analysis was reported where there was significant statistical heterogeneity.

Meta regression was conducted to analyse the effects of the comprehensiveness of the intervention, parental involvement, and duration of the intervention. Sensitivity analyses were conducted by removing trials with drop-out rates over 20%; and those that did not perform cluster randomisation by school. Publication bias was assessed using fail-safe N and a funnel plot.

Results of the review
Thirty-two trials (52,109 participants) were included in the review. Two trials reported adequate allocation concealment, two reported participant or provider blinding, five reported blinding of data collectors, and seven had loss to follow-up of less than 20%.
School-based obesity prevention programmes statistically significantly reduced BMI (SMD -0.076, 95% CI -0.123 to -0.028; 32 RCTs). Trials that only included pre-adolescent children reported statistically significant reductions in BMI with the intervention (SMD -0.104, 95% CI -0.195 to -0.01; 18 RCTs), but those only including adolescents (10 RCTs) reported no significant differences. There was no significant difference in effectiveness between the pre-adolescent and adolescent trials.

Meta-regression found a significant hierarchy of effect size from comprehensive programmes, over one year long, with parental support (-0.151, 95% CI -0.334 to 0.031; six RCTs) to non-comprehensive programmes, of less than one year, with no parental support (-0.019, 95% CI -0.044 to 0.006; 16 RCTs), but most of the effect sizes were not significant. The results of the sensitivity analyses were similar to the overall results (details were reported). There was no evidence of publication bias.

Authors’ conclusions
This review of RCTs since 2006 supported the effectiveness of school-based obesity prevention programmes, for children, which lasted more than one year and included parental support.

CRD commentary
The review question was clear, with defined inclusion and exclusion criteria. Several relevant sources were searched. No efforts were made to locate unpublished data; it was unclear whether language restrictions were applied. Formal assessment found no evidence of publication bias. Trial quality was assessed, using appropriate criteria, and the results were reported in full. In general, the trials were at a high risk of bias.

Appropriate methods were used to reduce reviewer error and bias throughout the review. It was unclear whether the methods of analysis were appropriate, given the lack of reporting of the trial details and lack of reporting of the methods of analysis and results of statistical heterogeneity. Analyses were conducted to account for differences between trials, but without the statistical heterogeneity results it was unclear whether this was eradicated.

The authors’ conclusions reflect the evidence presented, but the poor quality of the trials, and limited information on variation between them, should be borne in mind.

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

Research: The authors stated that further research was required to develop and test school-based interventions to reduce BMI in teenagers. These trials should clearly identify the theoretical model guiding the intervention; and compare various weight reduction programmes and other school-based health interventions that might result in weight loss.

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