

Effectiveness of school-based nutrition education interventions to prevent and reduce excessive weight gain in children and adolescents: a systematic review

Silveira JA, Taddei JA, Guerra PH, Nobre MR

CRD summary

The authors concluded that school-based interventions were effective in reducing the rates of overweight and obesity, and increasing fruit and vegetable consumption. This was a well-conducted review and the evidence reflects the authors' conclusions. However, interpretation should bear in mind that the most direct measure (body mass index) did not indicate significant changes.

Authors' objectives

To examine the effectiveness of school-based nutrition education interventions to prevent and reduce obesity in children and adolescents.

Searching

Fourteen databases, which included PubMed, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), CINAHL, LILAC and PsycINFO, were searched up to May 2010 for publications in any language. Search terms were reported. Reference lists of five relevant systematic reviews were searched manually.

Study selection

Randomised controlled trials (RCTs) that assessed the effectiveness of school-based behavioural lifestyle change interventions compared to no intervention in children aged five to 18 years were eligible for inclusion. Behavioural interventions were required to have been recommended by health professionals or school teachers. Eligible trials were required to report absolute or standardised measures of body mass index (BMI), skin folds, circumferences and percentage of body fat or lean mass, or dietary outcomes (measured using food recall or food frequency questionnaire). Trials of children with eating disorders, dyslipidaemia, mental or physical disabilities, diabetes and anaemia were excluded from the review. Trials that assessed after-school interventions, studies that used drugs or food supplements as components of interventions and data from articles that addressed impacts of different follow-up periods were excluded.

Two included trials were conducted in developing countries, the others were conducted in USA, Europe and New Zealand. Only trials that assessed nutrition education-only interventions were included in the review; intervention components included classroom activities, parental involvement, school nutrition policy, school food service, educational games, social marketing and environmental changes, individual counselling and use of the Internet. Most trials included one or two components.

Two reviewers independently screened studies for inclusion. Discrepancies were resolved through referral to a senior reviewer.

Assessment of study quality

Two reviewers independently assessed trials using a modified version of the Quality Assessment Tool for Quantitative Studies. Criteria included selection bias, study design, confounders, blinding, data collection method, withdrawals and drop-outs, intervention integrity and analysis. Each criterion was rated as strong, moderate or weak and each trial was given an overall rating of A (high quality), B (moderate quality) or C (low quality).

Data extraction

One reviewer extracted or calculated within and between pre- and post-assessment group differences to estimate effect sizes.

Methods of synthesis

Due to heterogeneity, effect sizes could not be pooled. Data were presented as a narrative synthesis grouped by trial quality.

Results of the review

Twenty-four RCTs were included in the review. The total population was unclear, but trials included fewer than 99 children/adolescents to more than 2,000. Nine trials were high quality (level A), nine were moderate quality (level B) and six were low quality (level C). Seven trials analysed data on an intention-to-treat (ITT) basis. Interventions lasted between one month and more than 12 months.

Quality level A: One RCT reported a significant change in BMI between intervention and control groups ($p < 0.01$). Four RCTs showed a significant reduction in the prevalence of overweight in intervention compared to control groups (odds ratio (OR) 0.68, 95% CI 0.46 to 1.00, OR 0.614, 95% CI 0.465 to 0.788, OR 0.65, 95% CI 0.54 to 0.79 and 0.69, 95% CI 0.48 to 0.98). Two trials reported a significant increase in mean fruit consumption. One trial reported a statistically significant increase in mean vegetable or fruit and vegetable consumption and one RCT reported no significant change in mean consumption of fruit and vegetable. Another trial showed no significant differences in vegetable or fruit and vegetable consumption.

Quality level B: Six trials showed an increase in fruit consumption (servings or grams per day) in the intervention compared to control groups. Four trials showed significant increase in vegetable consumption (grams or servings per day). Six RCTs showed increased fruit and vegetable consumption and two trials found no differences in consumption.

Quality level C: None of the three RCTs that assessed BMI showed a significant post-intervention change. One of three trials showed a significant increase in post-intervention fruit consumption compared to

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controls ($p=0.042$). No significant changes were reported in vegetable consumption (three RCTs) or fruit and vegetable consumption (two RCTs).

Authors' conclusions

Evidence from RCTs show that school-based interventions were effective in reduced rates of overweight and obesity, and increased fruit and vegetable consumption.

CRD commentary

The review question and supporting inclusion criteria were clearly stated. A comprehensive literature search was undertaken without restrictions, which reduced potential for language and publication biases. Publication bias was not assessed formally. Appropriate criteria were used to assess trial quality and most trials were moderate to high quality. Study selection and quality assessment were undertaken in duplicate, but only one reviewer performed the data extraction and so reviewer error and bias could not be ruled out. Given the heterogeneity among trials, the decision not to pool trial data appeared appropriate.

The evidence reflects the authors' conclusions on rates of overweight and obesity, and fruit and vegetable consumption, but the most direct measure (BMI) did not indicate significant changes and the authors' conclusions should be interpreted with this in mind.

Implications of the review for practice and research

Practice: The authors stated that the most effective intervention components included duration of longer than one year, introduction into regular activities of the school, parental involvement, introduction of nutrition education into the regular curriculum and provision of fruits and vegetables.

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

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