Effectiveness of interventions in the prevention of childhood obesity
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CRD summary
This systematic review assessed the effects of family, school and community interventions for the prevention of childhood obesity. Despite the lack of reported methodology and uncertain quality of the included studies, the authors’ cautious conclusion, that nutritional education and promotion of physical activity together with behaviour modification, decrease in sedentary activities and the collaboration of the family may be important in preventing childhood obesity, seems reasonable.

Authors' objectives
To determine the efficacy of family-, school- and community-based interventions for the prevention of childhood obesity.

Searching
MEDLINE was searched from January 1993 to December 2003; the search terms were reported. A number of specialist journals and secondary journals were also checked for relevant papers. Articles written in English, Spanish, Portuguese or Italian were considered for inclusion.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) and non-randomised intervention studies observed for a minimum of 12 weeks were eligible for inclusion. All of the included studies were RCTs. Within the majority of school-based interventions, the school or class was the unit of randomisation. The length of follow-up varied across studies and ranged from 3 months to 3 years. The sample sizes ranged from 52 to 4,019.

Specific interventions included in the review
Studies of prevention interventions on ponderal status (weight) were eligible for inclusion. The interventions included nutritional education, behaviour modification, promotion of physical activity, parental participation, modification of school meals, or a combination of these interventions.

Participants included in the review
Studies of populations aged between 0 and 18 years old were eligible for inclusion. Four studies were aimed at high-risk populations, racial U.S. groups (American Indians, African-Americans, and Hispanic and Afro-American children). Where reported, the age of the included participants ranged from 4 to 13 years. The majority of the studies were conducted in the USA, with one each in the UK, Germany and Thailand.

Outcomes assessed in the review
Studies of effects of ponderal status were eligible for inclusion. The most common outcomes in the review included body mass index (BMI), measurements of skin-folds and percentage body fat mass. Changes in abdominal fat distribution were measured as a waist measurement or waist-to-hip ratio. Definitions for overweight or obesity varied between the studies. Absolute and percentage changes relative to baseline values were used.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that the quality of the included papers was systematically assessed.
Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Intervention type (school, community), intervention components (nutritional education, behaviour modification, parental involvement, physical activity and school-food intervention), duration of the intervention, outcomes evaluated and age were extracted. Studies were evaluated for adjustment for confounding variables (age, gender, initial value of variable, and maturation stage). The interventions were described as being effective or not; estimates were not provided.

Methods of synthesis
How were the studies combined?
The studies were synthesised narratively, grouped by intervention component(s).

How were differences between studies investigated?
Differences between some of the studies were described in the text.

Results of the review
Fourteen studies (n=10,593) were included in the review: 12 school-based studies (n=10,476) and 2 community-based studies (n=117).

Nine studies used nutritional education with physical activity interventions. Three studies found a significant effect of the intervention on the prevention of childhood obesity: one (n=297) was in both boys and girls (changes in triceps skin fold and fat mass percentage of obese children) and two (n=1,376) were in girls alone (prevalence, incidence and remission of obesity, and changes in BMI adjusted by maturity stage and age). One of these studies also included a lifestyle modification programme lasting 2 school years. Six studies found no statistically significant effect of the intervention on measures of obesity. Four studies used an intervention that included physical activity without additional nutritional education. One study found no statistically significant effect of the intervention on the prevention of weight gain. One short-term (3 months) pilot community study (n=52) looking at the effect of after school dance classes in Afro-American adolescent girls found a reduction in sedentary behaviour (time spent watching television), but no effect on BMI or waist measurement. Another study (n=1,109) found a significant reduction in BMI after 2 school years with activity programmes run by specialists compared with controls, but only in boys. This study also included parental involvement and an attempt to increase the consumption of low fat foods in the school canteen. One study of Asian children (4.5 years old) looking at the effect of aerobic exercise conducted three times a week for a period of 7 months found a greater decrease in skin-fold measurement from baseline in the exercise group than in the control group (from 12.2% to 8.8% and 11.7% to 9.7%, respectively). In addition, girls in the exercise group had a lower likelihood of having an increasing BMI slope than girls in the control group.

Seven studies included interventions with parental participation. No comparisons were made between the same interventions with or without parental intervention. Three studies found a significant effect of intervention with parental participation on the prevention of childhood obesity. Four studies found no statistically significant effect of intervention with parental involvement compared with the control.

Five studies involved an intervention with schools’ dining facilities. One study (n=1,109) found a significant reduction in BMI in boys; this study included parental participation and an intervention to increase greater activity amongst the participants. No statistically significant between-group differences were found in the other studies. One 3-month pilot study looked at the reduction of sedentary activities (n=52), i.e. the reduction in the number of hours watching television, videos and video games. Collaboration of the parents was also sought. A significantly lower increase in sedentary behaviour was found at the 8-month follow-up, but there was no change in physical activity or fat consumption.

Authors’ conclusions
Nutritional education and promotion of physical activity, together with behaviour modifications, decrease in sedentary
activities and the collaboration of the family, may be important factors in the prevention of childhood obesity.

**CRD commentary**
The research question was supported by broad inclusion criteria in terms of the interventions and population. A large electronic database and several relevant journals were searched for papers published in English, Italian, Spanish or Portuguese. However, grey literature does not appear to have been sought and the authors made no attempt to evaluate publication bias. Lack of reporting on the review process means that the likelihood of error or bias being introduced could not be assessed. In addition, the quality of the included trials was not assessed.

A narrative synthesis was appropriate given differences between the studies in terms of the intervention, duration of follow-up and outcome data. Estimates for study outcomes were not provided, which made it difficult to verify claims to the effectiveness of studies. Lack of reported methodology and uncertain quality of the included studies limits interpretation of the results; however, the authors’ cautious conclusion seems reasonable.

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

Research: The authors stated the need for well-designed studies that examine a range of interventions and assess cost benefits. Studies should use more rigorous and reproducible methodology with more clearly defined objectives.

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