Combined home and school obesity prevention interventions for children: what behavior change strategies and intervention characteristics are associated with effectiveness?

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CRD summary
The authors concluded that seven studies supported the effectiveness of obesity prevention, in multiple settings, and that providing information on behaviour-to-health links, prompting practice, and planning social support were more common in effective interventions. The authors' conclusions were tentative and they suggested that their results should be interpreted with caution, which seems appropriate.

Authors' objectives
To determine whether obesity prevention, targeting nutrition and physical activity in children, delivered at home and in school or the community, was effective.

Searching
A search of PubMed, Web of Science, The Cochrane Library, PsycINFO, and Dissertation Abstracts was conducted to identify studies published in English between 1998 and March 2010 (search terms were provided). Reference lists of relevant publications were screened.

Study selection
Prospective studies, of any duration, that evaluated a community-based or school-based obesity prevention programme for children (aged one to 18 years) were eligible for inclusion, if they involved parents or caregivers and compared the programme with a concurrent control. The interventions had to include a nutrition or activity component and a behaviour-change component, to increase physical activity, decrease sedentary activity, change nutrition intake or change weight status. The intervention had to be sufficiently described to allow its content to be coded. Studies had to assess at least one objectively measured outcome or a self-reported subjective outcome, using a validated tool, at baseline and after the intervention. Secondary outcomes included determinants of children's behaviour, such as parental knowledge; parent and child interactions, such as feeding practices; environmental measures; and predictors of behaviour change.

All the included studies involved preschool or primary school children; some only included girls and some only included African Americans; most were conducted in the USA. Group sessions were conducted in school, after-school care, childcare centres, kindergarten or a summer day camp. Home components were usually homework for children to complete with parents or fact sheets for the family. Parent and home components were of varying intensity. Programmes lasted from five to 20 weeks. Some interventions followed theoretical models, such as social learning theory, or ecological models. The most commonly used techniques were prompting intention formation, providing instruction on how to perform a behaviour, self-monitoring, and modelling or demonstrating the behaviour. Outcomes were evaluated at the end of the intervention; only four studies had longer follow-up.

The authors did not report how many reviewers selected studies.

Assessment of study quality
Study quality was assessed, using the Effective Public Health Practice Project quality assessment tool, with eight criteria covering selection bias; study design and allocation bias; confounders; blinding; data collection methods; withdrawals and dropouts; intervention integrity; and analysis. Each criterion was rated as weak, moderate or strong. Study quality was judged to be strong if at least four key criteria were rated strong and none was weak; moderate if less than four criteria were rated strong and one criterion was weak; and weak if at least two criteria were rated weak.

Quality assessment was undertaken independently by two reviewers, with any disagreements resolved by discussion.

Data extraction
Intervention content (including nutrition, activity and behaviour change) and the strength of the theoretical basis of the
interventions was coded using definitions developed for the review, based on guidelines and published taxonomies. The results were extracted as they were presented in the studies, including means and standard deviations, odds ratios, frequency data and significance levels.

Two reviewers independently extracted the data and coded the interventions.

**Methods of synthesis**

A narrative synthesis was conducted due to variety in reported outcomes. A study was classified as effective if there was a significant difference between the intervention and control for an objectively measured outcome, or significant differences in two self-reported outcomes, due to the potential for bias in self-reported measures. The frequency of intervention effectiveness was assessed according to study characteristics and intervention content, with the numbers of effective and ineffective interventions reported.

**Results of the review**

Fifteen studies were included; 12 were randomised controlled trials (two were cluster randomised and four were pilot trials), two were quasi-experimental studies, and one was a controlled clinical trial. Some studies reported the number of children, while others reported the number of daycare centres or families. The quality of four studies was rated as strong, eight studies were moderate, and three were weak. Studies scored most poorly on criteria for selection bias and withdrawals and dropouts.

Seven studies had interventions that were coded as effective, after the intervention or at follow-up, and they were judged to be of moderate to strong quality. Significant effects were found for objective outcomes including reductions in body mass index (three of eight studies) and blood pressure (one study), and for self-reported outcomes, such as increased consumption of fruit and vegetables (four of nine studies), reduction in fat (four of seven studies) and total energy intake (two of five studies). Significant improvements were observed in physical activity (three of nine studies) and television viewing (two of three studies).

Eight studies were coded as ineffective, with three rated as weak and the other five as moderate quality. The ineffective components were reported in tables, as were the effective and ineffective determinants of behaviours.

The effective studies had a median of 10 behaviour-change techniques (eight in school and seven at home), compared with 6.5 in ineffective studies (5.5 in school or the community and 4.5 at home). Providing general information on behaviour-to-health links was more common in effective studies (six out of seven) than in ineffective studies (one out of eight). Prompting of practice of behaviour, and planning for social support or social changes were used in six of the seven effective studies.

**Authors’ conclusions**

The authors concluded that seven studies supported the effectiveness of obesity prevention, in multiple settings, in changing children’s behaviour. Providing information on behaviour-to-health links, prompting practice, and planning social support were more common in effective interventions.

**CRD commentary**

The review aim and inclusion criteria were clear. A number of sources were searched and efforts were made to find unpublished studies minimising the potential for publication bias. Only studies in English were included, risking language bias. Steps were made to minimise bias and errors in data extraction and quality assessment, but were not reported for study selection, leaving the potential for error and bias. Appropriate criteria were used to assess study quality; most studies were of moderate to strong quality. Some study details were provided, but the comparators were not described and the results were only given for outcomes with statistically significant results. The quality assessment results were not fully reported. There was variation in the study populations, interventions and outcomes and a narrative synthesis was appropriate.

Just over half the included studies were judged to be ineffective; the authors stated that it was not possible to assess if these interventions were ineffective or the studies were not large enough to detect differences. The authors recommended interpreting these findings with caution. The interventions were generally short, and were conducted in young children. It was unclear whether the findings were generalisable to older children. The authors recommended
some elements of the interventions that were associated with effectiveness, but insufficient evidence was presented to support these recommendations.

The authors’ conclusions were tentative and they suggested interpreting the findings with caution, which seems appropriate.

**Implications of the review for practice and research**

*Practice:* The authors stated that their research could inform the development of public health obesity prevention strategies. Family involvement in combined-setting interventions was recommended.

*Research:* The authors stated that future research should establish whether the techniques used and the effectiveness of combined-setting interventions differed by the demographic characteristics of the children and whether delivery to parents or to children was more effective. They also recommend that the design and quality of studies should be improved.

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