**A meta-analytic review of obesity prevention programs for children and adolescents: the skinny on interventions that work**

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**CRD summary**
This review assessed the effectiveness of obesity prevention programmes and examined features associated with effectiveness. The authors concluded that the overall effectiveness of such programmes is low. This conclusion reflects the results of the review but, in the absence of full reporting of review methodology and a formal assessment of validity, it is difficult to determine its reliability.

**Authors' objectives**
To evaluate obesity prevention programmes for children and adolescents, and to assess the characteristics of those interventions associated with larger effects.

**Searching**
PsycINFO, MEDLINE, CINAHL, and Dissertation Abstracts International were searched from 1980 to 2005; the search terms were reported. Tables of contents for relevant journals were searched for the same period, references of narrative reviews and identified articles were checked, and experts were contacted in order to identify unpublished trials.

**Study selection**

- **Study designs of evaluations included in the review**
  Controlled trials were eligible for inclusion in the review.

- **Specific interventions included in the review**
  Both primary obesity prevention programmes and other interventions that were expected to reduce weight gain or risk of obesity, such as physical activity programmes, eating disorder prevention programmes and psycho-educational interventions, were eligible for inclusion. Studies that only compared active interventions and studies described as obesity treatment programmes were excluded from the review. The majority of the included studies examined school-based interventions. The duration of the included interventions ranged from 3 to 280 hours, delivered over 3 to 140 weeks.

- **Participants included in the review**
  Studies that targeted children and adolescents were eligible for inclusion. Under the definition of adolescence used, studies with a mean participant age up to 22 years were eligible for inclusion. Studies of participants with an average body mass index (BMI) above 25 (overweight) or 30 (obese) were eligible for inclusion if the aim of the programmes was the prevention of further weight gain. Some studies focused on selected populations, including those with elevated BMI or at higher risk; other studies were not selective. Most of the included studies focused on both males and females. The proportion of participants who were Black or Hispanic ranged from 0 to 100%. The mean or median age of the participants ranged from 1.8 to 21.3 years.

- **Outcomes assessed in the review**
  Studies that reported proxy measures of body fat were eligible for inclusion. The majority of the included studies reported BMI, although some reported skinfold thickness.

- **How were decisions on the relevance of primary studies made?**
  Two reviewers assessed the studies for relevance following independent searches by three reviewers.
Assessment of study quality
The authors did not state how any validity assessment was performed. Randomisation of the studies (programmes) was assessed, but the authors did not state that they further assessed validity.

Data extraction
Two reviewers coded data on moderator variables, with inter-rater agreement assessed on a randomly selected sample of 30%. However, the authors did not state how the results data were extracted for the review, or how many reviewers performed the data extraction.

Data were extracted on differences in the change in BMI or other proxy measure of body fat, and effect sizes were calculated as the correlation coefficient (r). Where data were missing, effect sizes were imputed using full information likelihood estimation.

Methods of synthesis
How were the studies combined?
The studies were combined in a random-effects meta-analysis.

How were differences between studies investigated?
Statistical heterogeneity between the studies was assessed using the Q statistic. Reasons for heterogeneity were a focus of the review and were discussed extensively, with univariate and multivariate models used to explore these factors. Correlations between potential moderator variables were tabulated.

Results of the review
Forty-six studies of 61 obesity prevention programmes were included (n=23,172). There was random assignment of participation in 51 programmes.

Thirteen interventions evaluated in 14 trials showed a statistically significant effect of the intervention. The mean effect size was small (r=0.04), but was significantly higher than zero (p=0.01). The range of effect sizes was -0.24 to 0.50. There was statistically significant heterogeneity between the studies (p<0.001).

Univariate analysis.
An extensive investigation of potential factors moderating the effect size for interventions was reported. This suggested that interventions were more effective in trials enrolling children over 11 years and adolescents (r=0.07, p<0.05) than in those enrolling pre-adolescents (r=0.03, p=0.07), and that effect sizes were also larger in trials with female participants (r=0.13, p<0.01) than in those conducted with mixed or male populations (r=0.02, p=0.06). Interventions with a shorter duration (less than 16 weeks) also appeared to be more effective (r=0.06, p<0.01), as were interventions solely focused on weight change (r=0.09, p<0.001). Trials with self-selecting recruitment also showed larger effect sizes (r=0.14, p<0.001) than population-based interventions, for which effect sizes did not differ from zero (r=0.02, p=0.10).

Multivariate analysis.
Variables found to be significant predictors of effect size were entered into a multivariate model. Only age and self-selected recruitment were found to be statistically significant in the multivariate model.

Authors' conclusions
Most interventions did not produce the hypothesised weight gain prevention effects. The overall intervention effect was, on average, small.

CRD commentary
The review question and the inclusion criteria were clear, if broad. The authors searched a number of relevant databases.
and made reasonable attempts to identify unpublished studies. This reduces the likelihood that some relevant studies were excluded from the review. The authors reported using appropriate methods to minimise bias and error when selecting studies for the review, but not when extracting the data. Although a key criterion of validity was examined and used subsequently to inform the synthesis of data, the authors did not report carrying out a formal assessment of study validity.

The use of meta-analysis to statistically combine the results of trials with a wide range of interventions and populations could be problematic. However, the subsequent extensive analyses of factors which might account for the differences between the results of the studies was appropriate and formed the major focus of the review. The authors' conclusions reflect the results of the review but, in the absence of a full assessment of study validity, it is difficult to assess the likelihood that these conclusions are reliable.

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

Practice: The authors did not state any implications for practice.

Research: The authors stated that future trials should follow up promising findings with improved methodology (randomisation, blinded outcome assessment, direct measures of body fat and attempts to minimise attrition), in particular the use of long-term follow-up post-intervention.

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