

Identifying effective behavioural models and behaviour change strategies underpinning preschool- and school-based obesity prevention interventions aimed at 4-6-year-olds: a systematic review

Nixon CA, Moore HJ, Douthwaite W, Gibson EL, Vogele C, Kreichauf S, Wildgruber A, Manios Y, Summerbell CD, ToyBox-study Group

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CRD summary

The most effective pre-school- and school-based interventions to prevent obesity in children aged four to six years were based on social cognitive theory or social learning theory, combined high parental involvement with interactive school-based learning, targeted physical activity and dietary change, and had long-term follow-up. These conclusions should be interpreted with caution.

Authors' objectives

To evaluate the efficacy of pre-school- and school-based obesity prevention for children aged four to six years, and to identify the effective behavioural models and strategies for behaviour change.

Searching

MEDLINE, EMBASE, CINAHL, PsycINFO, and The Cochrane Library were searched for publications from April 1995 to April 2010, in English or German; search terms were reported. Systematic reviews and key reviews were handsearched.

Study selection

Primary studies of interventions to prevent obesity, with controlled assignment of children aged between four and 6.9 years, in a pre-school or school, were eligible for inclusion if they reported before and after measurements for the same children, and had a follow-up of at least six months. Randomised controlled trials (RCTs); non-RCTs, with random allocation; double-blind and single-blind studies; intervention and evaluation studies; and matched population studies were eligible. Relevant interventions modified diet patterns; foods and drinks; food preparation (cooking methods); dietary constituents; physical activity and inactivity; energy intake; energy density in the diet; and energy expenditure. It was not necessary for the intervention to be based on behavioural theory. Studies had to report at least one of the following outcomes: markers of weight gain; overweight; obesity; markers of body composition; or markers of distribution of fat.

The authors aimed to focus on European studies, but half the studies were conducted in America, Asia, or Australasia. A quarter of the studies did not provide full data, but they were included in the review. Various psychological models were used - the most common being Bandura's social cognitive theory (SCT) or social learning theory (SLT). Some studies used more than one theory or model and a quarter had no theoretical basis, but all studies used behaviour-change strategies. All the interventions increased physical activity; three quarters increased healthy eating; and a quarter reduced sedentary behaviour. Parental involvement was categorised as: low (consent only); medium (completed health questionnaires); or high (parents exposed to intervention). Interventions lasted from two to three weeks up to six years. Outcomes were assessed at intervention end in all studies, during the intervention in a quarter of studies, and one to seven years from baseline in 42% of studies. All studies measured anthropometric outcomes; most (83%) measured physical activity, sedentary behaviour or both; three quarters measured dietary behaviour; and 58% measured health awareness. Where reported, the mean age of the children was 4.1 to 6.9 years at baseline.

Three reviewers performed the selection in duplicate, with disagreements resolved by a fourth reviewer.

Assessment of study quality

Methodological quality was assessed using the Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies, which assessed selection bias; study design; confounders; blinding; data collection methods; analyses; and withdrawals and dropouts. Studies were rated as: strong (no weak ratings); moderate (one weak rating); or weak (two or more weak ratings). The authors added three further criteria for intervention integrity: theoretical model reported; intervention details sufficient for replication; and evaluation of the intervention process.

Two independent reviewers performed the quality assessment, with disagreements resolved by discussion.

Data extraction

Significant and non-significant differences between intervention and control groups were extracted, with probability values. The authors did not report how many reviewers extracted the data.

Methods of synthesis

A narrative review was performed because adequate information, in an appropriate format, at identical time points, was not available.

Results of the review

Twelve studies were identified; five were cluster RCTs and four were non-cluster RCTs. Participant numbers were not reported. For quality, four studies were rated strong, five were moderate, and three were weak. For intervention integrity, eight were strong and four were moderate.

Weight status: Four of 12 studies reported significant favourable weight status changes in the intervention group. All four studies had high or medium parental involvement; two used multiple behavioural models and two used a single model. All four studies had significant favourable changes in physical activity, dietary behaviour, or both.

Physical activity and diet: Seven of 12 studies reported significant favourable changes in physical activity, dietary behaviour, or both with the intervention; six had high parental involvement and one had medium parental involvement. In six of the seven studies the interventions were based on behavioural models. Only two of the five studies reporting no significant changes had high parental involvement; the remaining three studies had medium or low levels; these studies also reported no significant changes in weight status. Eleven studies addressed physical activity and five reported significant increases for interventions versus controls. Nine studies addressed dietary behaviour and six reported significant improvements for interventions versus controls.

Attitude and knowledge: Four of six studies reported significant behaviour changes, such as parents' and children's health knowledge, parents' attitude to health, parental support, and role modelling. Parental involvement in the interventions was high or medium in three studies and low in the fourth, but delivery was by older peer children. Two used behavioural models and two did not, but used similar elements.

The intervention strategies in the five studies with significant results for two or more of the outcomes considered were summarised. The most successful behavioural model was the SCT/SLT.

Authors' conclusions

Interventions that were based on SCT/SLT, that combined high levels of parental involvement with interactive school-based learning, that targeted physical activity and dietary change, and that had long-term follow-up, were most effective.

CRD commentary

The review addressed a well-defined question for study design, interventions, and relevant outcomes, but participants were less clear. Relevant databases were searched, but only studies published in English or German were included and the search for unpublished studies was not extensive; some relevant studies might have been missed. Publication bias was not assessed. Study quality was assessed using suitable criteria. Study selection and quality assessment were carried out with efforts to reduce error and bias, but these were not reported for data extraction. The full intervention details were reported, but the control details, whether or not participants were obese, the number of study participants, and their weight status at baseline, were not reported. The study details were unclear in several cases. A narrative synthesis was provided due to study variations.

The included studies were of moderate quality. The authors recognised that their conclusions should be interpreted with caution since the data were mostly provided by parents and carers, and were open to positive reporting bias.

Implications of the review for practice and research

Practice: The authors suggested that teachers, parents and older children could be role models in changing young children's perceptions of healthy living.

Research: The authors recommended that further research should focus on changing the physical environment, addressing policy and community approaches, and targeting population subgroups, as highlighted by the Foresight report. Research should assess interventions informed by children's views and address the value systems and social or cultural factors that drive human behaviour.

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