Do interventions to limit sedentary behaviours change behaviour and reduce childhood obesity: a critical review of the literature

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CRD summary
The authors concluded that interventions with an emphasis on decreasing sedentary behaviours are effective in reducing sedentary behaviours and controlling weight in children and adolescents. In view of the differences between the studies and the use of multi-component interventions, a more cautious conclusion may be appropriate.

Authors' objectives
To evaluate the effects of interventions to reduce sedentary behaviours (SB) on behaviour and weight in children and adolescents.

Searching
MEDLINE, PsycINFO, HealthSTAR, the Cochrane Database of Systematic Reviews and CINAHL were searched from inception to February 2005 using the reported search terms. In addition, the reference lists in reviews and relevant studies were screened and experts in the field were contacted for missing studies.

Study selection
Study designs of evaluations included in the review
Controlled studies were eligible for inclusion in the review. Observational studies and cross-sectional studies were excluded.

Specific interventions included in the review
Studies that evaluated interventions to reduce SB in natural settings were eligible for inclusion. Multilevel interventions that included a reduction in SB component were included. Sedentary behaviour was defined as recreational screen time and did not include educational activities such as homework or reading. Some of the included studies were clinic-based (e.g., speciality clinics and primary care); others were population-based and included pre-school, elementary school and middle school settings. The studies used a variety of interventions (details were reported) and some had active control interventions. The duration of the interventions ranged from 20 minutes to 4 years.

Participants included in the review
Studies of children and adolescents were eligible for inclusion in the review. Some of the included studies were in children at risk or obese children; other studies targeted all children regardless of baseline weight. Studies targeted children aged from pre-school to middle school.

Outcomes assessed in the review
Studies that assessed measures of SB or weight were eligible for inclusion. In most studies, SB measurements were based on self-report questionnaires. Weight measures included body mass index (BMI), BMI z-scores, changes in the percentage of overweight participants, body fat and triceps skin-fold measurements. The outcomes were measured post-intervention in most of the included studies.

How were decisions on the relevance of primary studies made?
Two reviewers independently selected the studies. A third author resolved any disagreements on inclusion.

Assessment of study quality
Two reviewers independently assessed validity using the following criteria: use of randomisation; randomisation described and adequate; level of blinding; allocation concealment; completeness of follow-up; use of intention-to-treat analysis; baseline similarity of the treatment groups; equal treatment of groups; appropriate biometric measures assessed; and self-reporting of SB.
Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. For each study, means and standard deviations of SB and BMI were presented for each treatment group, together with the mean difference and 95% confidence interval (CI).

Methods of synthesis
How were the studies combined?
Differences between the studies precluded meta-analysis. The studies were grouped by setting and age group targeted, and combined in a narrative. A funnel plot was used to assess publication bias.

How were differences between studies investigated?
Differences between the studies were described in the text and tables.

Results of the review
Twelve studies were included: 11 randomised controlled trials (RCTs; n=2,790) and one non-randomised controlled study (n=16 schools). The sample size in the RCTs ranged from 10 to 1,295.

Eleven studies randomised participants either individually or by school; most concealed allocation. Studies generally analysed data on an intention-to-treat basis where there were complete data. Follow-up was reported for between 61% and 98.5% of participants. Some studies had small sample sizes. Blinding was not used in any of the studies.

SB.
One study in a speciality setting reported that the intervention was associated with a significant reduction in SB compared with the control. Two studies set in primary care reported no significant difference in SB between the intervention and control. Three of four school-based studies reported that the intervention was associated with a significant reduction in SB compared with the control; the fourth reported no significant difference between treatments.

Changes in BMI.
Three studies in speciality settings reported no significant difference in change in BMI between the intervention and control. One study set in primary care reported that the intervention was associated with a significant reduction in BMI compared with the control. Three school-based studies reported no significant difference in the change in BMI between treatments.

The funnel plot showed no evidence of publication bias.

Authors' conclusions
Interventions with an emphasis on reducing SB are effective in reducing SB and controlling weight in children and adolescents.

CRD commentary
The review addressed a clear question that was defined in terms of the participants, intervention, outcomes and study design. Several relevant sources were searched but no attempts to minimise publication or language bias were reported. Publication bias was assessed and no evidence of it was found. Methods were used to minimise reviewer error and bias at the study selection and validity assessment stages, but it was not clear whether similar steps were taken in the data extraction. Validity was assessed using specified criteria and the results of this assessment. In view of the differences between the studies, a narrative synthesis with studies grouped by setting and age group was appropriate. The results from individual studies were described rather than the evidence being synthesised, and study quality was not taken into account when reporting the results from individual studies. The control interventions varied, many studies used multi-component interventions and many studies used an active control, and this made it difficult to assess the effects of interventions to reduce SB. In view of the differences between the studies and the use of multi-component interventions, a more cautious conclusion may be more appropriate.
Implications of the review for practice and research

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

Research: The authors stated that further research is required to evaluate brief office interventions and community-based interventions. There is also a need to develop reliable and valid SB measures that can be used for very young children, and a need to determine which behaviours are replacing SB and whether there are changes in eating habits associated with the interventions.

Funding
Health Resources and Services Administration, National Research Service Award #T32 HP-10030-07.

Bibliographic details

PubMedID
17212797

DOI
10.1111/j.1467-789X.2006.00259.x

Indexing Status
Subject indexing assigned by NLM

MeSH
Child; Child Behavior; Clinical Trials as Topic; Exercise /physiology; Female; Health Promotion /methods; Humans; Life Style; Male; Obesity /epidemiology /prevention & control; Risk Factors

AccessionNumber
12007000090

Date bibliographic record published
07/02/2008

Date abstract record published
01/09/2008

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.