Systematic review of school-based interventions that focus on changing dietary intake and physical activity levels to prevent childhood obesity: an update to the obesity guidance produced by the National Institute for Health and Clinical Excellence

Brown T, Summerbell C

CRD summary
Combined diet and physical activity school-based interventions were concluded to be potentially useful in preventing children becoming overweight in the long term. The conclusions from this review were tentative and may not be reliable due to methodological weaknesses in the review.

Authors' objectives
To review the effectiveness of school-based interventions that focus on changing dietary intake and physical activity levels to prevent childhood obesity.

Searching
MEDLINE and EMBASE were searched from January 2006 to September 2007 to update searches previously carried out for NICE obesity guidance (see Other Publications of Related Interest). Search terms were not reported. Studies included in the earlier report were evaluated against the inclusion criteria for this review. References lists of new papers were checked for other relevant publications. No language restrictions were applied.

Study selection
Randomised controlled trials (RCTs) and non-randomised controlled trials of lifestyle interventions set in schools and that lasting at least 12 weeks were eligible for this review. Comparators could be usual care or another active intervention. Participants were aged between five and 18 years and were not recruited on the basis of weight. Studies were required to report a weight outcome as change or absolute values. A lifestyle intervention was defined as including healthy eating, increase in physical activity, reduction in sedentary behaviours, behaviour therapy, social support and education for diet and activity behaviours.

Most included studies used combined diet and physical activity interventions; some focused on physical activity alone and a small number on diet alone. Most trials were conducted in US schools. Smaller numbers were set in UK, Australia and Germany. A further 14 trials took place in 14 different European and non-European countries. Participant age ranged from four to 18 years. Mean baseline body mass index (BMI) ranged from 15.5 to 27.6 kg/m² (where reported). Settings included primary and secondary schools; one study was set in a pre-school environment. Most studies had a follow-up of less than one year; longer follow up periods included two to five years.

Two independent reviewers assessed studies for inclusion and resolved disagreements by discussion.

Assessment of study quality
No formal validity assessment was reported.

Data extraction
Interventions were grouped as diet, physical activity or diet plus physical activity. Change in BMI or other weight outcome was extracted for each study, as were potential confounders and process indicators. Where absolute weight or BMI values were reported, change was calculated by subtracting values at baseline from values at follow-up.

Data extraction was performed by one reviewer.

Methods of synthesis
It appeared that a narrative synthesis that grouped studies by intervention type and then according to significant or non-significant benefits of the intervention was adopted.
Results of the review
A total of 38 studies were included in this review (n=unclear): 23 studies from the previous study and an additional 15 studies.

There was insufficient evidence to assess the effectiveness of dietary interventions versus control (three studies, n=989). School-based physical activity interventions were reported to be significantly more effective than a control intervention in five (n=approximately 1,103) out of 15 studies (n=approximately 6,609) according to mean BMI change. Two of the five studies with significant results reported significant differences for girls but not for boys (n=391).

Overall the effects were inconsistent and short term.

Diet and physical activity interventions were compared with a control in 20 studies, of which nine reported significant improvements in mean BMI for the intervention groups. Overall effectiveness of these combined interventions was equivocal.

Process evaluations were either not reported or reported poorly in the included studies.

Authors' conclusions
Overall the findings were inconsistent, but suggested that combined diet and physical activity school-based interventions may prevent children becoming overweight in the long term. Physical activity interventions, particularly in girls in primary schools, may help prevent these children from becoming overweight in the short term.

CRD commentary
This review addressed a broad but defined question with searches of some appropriate databases. Publication bias may not have been reduced as there was no evidence of searching for unpublished or grey literature. Study selection was performed by two reviewers. Data extraction was carried out by only one reviewer, which made it difficult to rule out the possibility of reviewer error or bias. With a relatively large pool of studies, it was difficult to interpret the overall reliability of the results and conclusions in the absence of a formal assessment of validity. The synthesis itself appeared to rely heavily on a vote-counting approach, which may not distinguish between more and less reliable sources of evidence (such as grouping studies by design or sample size). As the authors acknowledged, there appeared to be considerable heterogeneity within the included studies and meta-analysis may not have been appropriate. The conclusions were tentative and may not be reliable due to methodological weaknesses in the review.

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

Research: The authors stated that there was a need for research that viewed behaviour change within the context of an obesogenic environment and the co-dependency of success of prevention interventions on a paradigm shift in thinking.

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