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Children and physical activity: a systematic review of barriers and facilitators

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Source	London: University of London, Institute of Education, Social Science Research Unit, EPPI-Centre
Series	EPPI Report
Year published	2003
Pages	137
CRD summary	This review included studies evaluating the effectiveness of interventions to promote physical activity in children aged 4 to 10 years. The authors found that a variety of interventions have been shown to be effective in one or more studies, but the number of evaluations was too small to allow any firm conclusions. These cautious conclusions appear reliable.
Record status	This record is a structured abstract written by CRD reviewers. The original has met a set of quality criteria. Since September 1996 abstracts have been sent to authors for comment. Additional factual information is incorporated into the record. Noted as [A:.....].
Authors' objectives	To examine the barriers to, and facilitators of physical activity amongst children aged 4 to 10 years. This abstract focuses on the effectiveness of interventions to promote physical activity amongst children.
Specific interventions included in the review	Studies that assessed an intervention aimed at promoting physical activity 'beyond the physical education (PE) lesson' were eligible for inclusion. The included studies aimed to influence physical activity directly, or change children's sedentary behaviour, in particular their television watching habits. The studies assessed multifaceted interventions that included: child and parental education on the problems of excessive TV watching and provision of a TV time manager; and classroom-based education on healthy eating, limited TV viewing time and physical activity promotion, either with or without smoking prevention education. The intensity of the interventions ranged from 15 to 20 minutes for 4 weeks, to 2 hours weekly for 5 years. The duration of follow-up ranged from less than 6 months to 3 years.
Participants included in the review	Studies of children aged 4 to 10 years were eligible for inclusion.
Outcomes assessed in the review	Studies that reported changes in physical activity levels or children's motivation to be physically active were eligible for inclusion. Studies that reported the prevalence or incidence of participation in physical activity, or were limited to physiological outcomes, were excluded.
Study designs of evaluations included in the review	Studies that included a comparison or control group were eligible for inclusion. Linked process evaluations were also eligible for inclusion.
What sources were searched to identify primary studies?	MEDLINE, EMBASE, CINAHL, ERIC, the Social Sciences Citation Index, PsycINFO, BiblioMap, PrevRev (an internal EPPI-Centre database), DARE and HealthPromis from inception to November 2001, and the Cochrane Library (2001, Issue 4) were searched for studies published in English; the search terms were reported. The journals of Education and Health (1983 to 2002) and Health Education Quarterly/Health Education and Behaviour (1981 to 2002) were handsearched. In addition, bibliographies of relevant studies were checked and experts and authors in the field were contacted.

Validity Assessment	The quality of the studies was assessed according to the following: the reporting of the number of participants recruited to each study group; clear definition of the aims of the intervention; description of the study design and content of the intervention; use of random allocation; and the reporting of losses to follow-up or attrition in each group. Two reviewers independently assessed study quality.
How were decisions on the relevance of primary studies made?	Two reviewers independently assessed studies for inclusion.
How were the data extracted from primary studies?	Two independent reviewers extracted the data. The results were extracted as reported in the studies.
Number of studies included in the review	Twenty-one studies met the general inclusion criteria. However, only 5 studies (3 cluster randomised trials, 1 non-randomised cluster trial and 1 pilot randomised controlled trial) met the methodological criteria and were used in the main synthesis. The number of participants was not reported.
How were the studies combined?	Each individual study was described in detail and a brief narrative synthesis was provided.
How were differences between studies investigated?	Differences between the studies were discussed in the text according to the intervention (content and duration) and study quality.
Results of the review	<p>All 5 studies reported the impact of the intervention for all outcomes, had equivalent study groups at baseline, and reported post intervention data for all individuals or groups. Four studies reported pre-intervention data for all individuals or groups, while the fifth was included due to the use of an intention-to-treat analysis.</p> <p>All 5 studies were found to be effective in modifying one or more behavioural or motivational physical activity outcomes, but the results were varied. Two studies reported positive effects on knowledge but not physical activity, whereas another 2 studies reported positive effects for participation in physical activity but not for reducing TV viewing or video or video game use. The fifth study reported a positive effect on TV viewing or video or video game use, but not physical activity.</p>
Was any cost information reported?	No.
Authors' conclusions	Education and the provision of equipment for monitoring TV or video-game use; engaging parents in supporting and encouraging their children's physical activity and providing opportunities for family participation; and multi-component, multi-site interventions using a combination of education in the classroom, improvements in school PE, and home-based activities have all been demonstrated to be effective in one or more studies. However, given the small number of evaluations found the conclusions about effectiveness can only be tentative.
CRD commentary	<p>The review question was broad, but had been defined in terms of the interventions, participants, outcomes and study designs. Several sources were searched for relevant studies, and efforts were made to locate unpublished studies. However, restricting the review to studies published in English means that other relevant studies might have been missed and language bias introduced into the review. Efforts were made to reduce reviewer bias and errors in the study selection, quality assessment and data extraction processes. A narrative synthesis of the studies was appropriate given the differences between the studies, which were discussed in the text.</p> <p>Details of the included studies were tabulated, but no effect sizes or significance tests were presented. This makes it impossible for the reader to judge the size of any purported beneficial intervention effects. Overall, the authors' conclusions were tentative, which was appropriate given the paucity of the evidence base, the range of interventions and outcome measures assessed, and the fact that all the included studies were based in the USA, making their generalisability to the UK setting uncertain.</p>
What are the implications of the review?	Practice: The authors reiterated those interventions that had some positive effect in one or more study, namely child and/or parental education in school or primary care settings, the provision of equipment for monitoring home TV, video and video-game use, and healthy eating and physical activity interventions. Involving parents in interventions appears to be effective in increasing children's participation in, and their knowledge of physical activity. Also recommended were interventions that encourage children to select their own fitness activities based on their own preferences; provide

	<p>opportunities to participate in brief simplified activities in school break times; build upon the physical and mental health or social aspects of participating in physical activity; promote acceptance among children of diverse shapes and types of bodies, or help children deal with peer ridicule and encourage peer sporting performance.</p> <p>Research: The authors recommended using individuals, families, schools and geographical areas of Local Education Authorities as units of allocation for outcome evaluations, and that outcome evaluations should include integral process evaluations. They stated that the reporting of studies needs to be more complete, with key aspects of methodology and results reported in a detailed and consistent manner, as basic data are often missing. Studies examining children's views need to engage children in a way that respects them as research participants.</p>
Subject index terms status	Subject indexing assigned by CRD
Subject index terms	Child; Exercise; Health-Behavior; Physical-Fitness
Review funding body	Department of Health.
Accession number	12003008500
Database entry date	31 May 2006
Language published in	English
Address for correspondence	EPPI-Centre, Social Science Research Unit, Institute of Education, University of London, 18 Woburn Square, London WC1H 0NR, UK.
Web address of original research:	http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=245

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