After-school program impact on physical activity and fitness. A meta-analysis
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CRD summary
The authors concluded that limited evidence suggested after-school programmes can improve physical activity and other health-related aspects; further research was required. Given the unclear quality of the included studies and the potential for bias in the review process, the reliability of the authors' conclusions is unclear.

Authors' objectives
To evaluate the effectiveness of after-school programmes in increasing physical activity.

Searching
PubMed, ScienceDirect and EBSCO were searched from 1980 to February 2008 for articles published in English. References of included articles and relevant reviews were handsearched.

Study selection
Randomised controlled trials (RCT) or quasi-experimental studies of after-school programmes that promoted physical activity either solely or as part of a broader intervention in children aged 18 years or less carried out in a school setting were eligible for inclusion. Inclusion criteria for outcomes were measures of physical activity or physical fitness. For the purposes of the review, quasi-experimental studies were defined as using pre- and post-test measures with no control group.

Included studies were of moderate to vigorous physical activity with a contact time that ranged from 42 minutes a week to 400 minutes a week and with a programme duration that ranged from nine weeks to 96 weeks. Four studies also included a dietary component. Where stated, participants in the included studies ranged in age from five to 15 years. Three studies included only African-American girls. Some studies included only overweight children or those from low-income situations. Outcomes reported in the included studies were categorised into six domains: physical activity; physical fitness (cardiovascular fitness, skeletal health or muscular strength); body composition (such as body mass index, percentage body fat, fat mass), blood lipids, psychosocial measures (exercise, weight and mental health) and sedentary activities (television, computer and game use).

The authors stated neither how the studies were selected for the review nor how many reviewers performed the study selection.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Means and standard deviations or standard errors were extracted for each outcome onto standardised data extraction forms; these were used to calculate effect sizes using Hedge's g.

The authors did not state how many reviewers performed the data extraction.

Methods of synthesis
Pooled effect sizes were calculated using a random-effects inverse-variance model. Morris and DeShon's method for combining effect sizes from studies with different designs was used. Heterogeneity was estimated using the I² statistic. Sensitivity analyses were conducted excluding each study in turn.

Results of the review
Thirteen studies of 11 interventions were included for review (n=3,591): nine RCTs (n=3,087); two non-randomised controlled pre-test/post-test designs (n=374); and two uncontrolled pre-test/post-test designs (n=134).
After-school physical activity programmes had a moderate effect on increasing physical activity in children (effect size 0.44, 95% CI 0.28 to 0.60; six studies, n=604); there was evidence of moderate statistical heterogeneity (43%).

There was evidence of a small but significant effect on physical fitness (effect size 0.16, 95% CI 0.01 to 0.30; six studies, n=3,015), body composition (effect size 0.07, 95% CI 0.03 to 0.12; 10 studies, n=3,174) and blood lipids (effect size 0.20, 95% CI 0.06 to 0.33; three studies, n=1,811). Statistical heterogeneity was high for the outcome of physical fitness (86%) and lipids (87%) and low for body composition (15%).

After-school exercise programmes did not significantly impact on psychosocial measures of physical activity, weight concerns or general mental health. Nor did they significantly impact on sedentary activity.

**Authors’ conclusions**
The limited evidence suggested that after-school programmes can improve physical activity and other health-related aspects; further research was required.

**CRD commentary**
The review addressed a clear question with well-defined inclusion criteria. Three relevant databases were searched. However, the search was restricted by publication status and language, so the possibility of language and publication biases could not be ruled out. It was unclear whether appropriate steps were taken in the review process to minimise reviewer error and bias. A validity assessment did not appear to have been carried out, therefore, it was not possible to determine the quality of the included studies. In light of the high levels of clinical heterogeneity between studies, further investigation of heterogeneity may have been warranted. Given the unclear quality of the included studies and the potential for bias in the review process, the reliability of the authors’ conclusions is unclear.

**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 was required with greater attention to the underlying theoretical rationale that measured physical activity outside of the intervention, randomisation at school level and that had greater follow-up.

**Funding**
None.

**Bibliographic details**

**PubMedID**
19362799

**DOI**
10.1016/j.amepre.2009.01.033

**Original Paper URL**
http://www.ajpm-online.net/article/S0749-3797(09)00147-0/abstract

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adolescent; Body Composition; Child; Exercise /physiology; Female; Health Behavior; Health Promotion; Humans; Lipids /blood; Male; Physical Fitness; Schools; United States
AccessionNumber
12009105804

Date bibliographic record published
02/09/2009

Date abstract record published
04/11/2009

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.