Can preschool improve child health outcomes? A systematic review

D’Onise K, Lynch JW, Sawyer MG, McDermott RA

CRD summary
The review found generally null effects of preschool interventions in four-year-old children across a range of health outcomes. There was some evidence for obesity reduction, greater social competence, improved mental health and crime prevention. The authors’ conclusions are appropriately cautious and reflect the limited evidence base, but additional high-quality research is needed to adequately answer the research question.

Authors' objectives
To assess the health effects of centre-based preschool programmes on four-year-old children beyond preschool years to adulthood.

Searching
MEDLINE, EMBASE, ERIC, PsycINFO, Sociological Abstracts, Head Start, The Cochrane Library and Campbell Collaboration Social, Psychological, Educational and Criminological Trials Register were searched for relevant studies published in English from 1980 to December 2008; search terms were reported. Reference lists of retrieved studies and the journal Child Development from 1980 to July 2008 were searched. Conference abstracts were excluded.

Study selection
Studies were eligible if the preschool programme was centre-based and compared with a control group. Studies were required to include healthy four-year-old children and report on health outcomes from at least the year subsequent to the intervention in children aged under 18 years. Health was defined as the presence or absence of disease, disease risk factors, health behaviours and indicators of well being.

In the included studies, programmes offered a wide range of services that included health, nutrition and social services and educational and parenting programmes in various combinations and intensities. Control groups had either no treatment (mostly in older studies) or other alternate programmes. Participant ages ranged from zero to nine years. Follow-up age ranged from five to 21 years (most commonly five to six years). Seventy-six per cent of participants were sampled from populations considered at risk of school failure; the others were sampled from general populations without specific criteria. Health outcomes were physical, social or mental health outcomes.

The authors did not state how many reviewers selected studies for inclusion in the review.

Assessment of study quality
Studies were appraised for quality (risk of bias) using the Effective Public Health Practice Project (EPHPP) critical appraisal tool. Criteria included assessment of potential selection bias, study design, potential for residual confounding, blinding of researchers and participants, data collection methods and withdrawals/drop-outs. Studies were classified as high potential risk of bias (lower quality), moderate potential risk of bias or low potential risk of bias.

The authors did not state how many reviewers undertook validity assessment.

Data extraction
Relative risks (RRs) and absolute risk differences (ARDs), with 95% confidence intervals (CIs), for dichotomous data and Cohen’s d effect estimates with 95% CIs for continuous data were calculated or extracted from the studies. Where data were not in a suitable format, results were presented as reported in the study. Where data were not available, the authors of the study were contacted for further information.

The authors did not state how many reviewers extracted data.
Methods of synthesis
The studies were synthesised in narrative format.

Results of the review
Thirty-seven studies were included in the review. Where sample size was reported, studies ranged from 55 to 22,782 participants. Six studies were randomised controlled trials (RCTs), 12 were quasi-experimental studies, 17 were cohort studies, one study used a regression discontinuity design and one study used an instrumental variable approach. Eight studies were of higher quality, 15 were of moderate quality and 14 had lower quality.

A significant reduction in obesity at ages eight to 10 years was found between Head Start preschool programmes compared to control (two studies). There was no evidence of an association between other outcomes and improved home environment. There was no evidence of an association between enhanced health service access for preschool participants and health outcomes such as health service use, immunisation, physical illness and general health, but there was a trend towards reduced mortality in children aged five to nine years (two studies).

Social competence was significantly improved with experimental programs rather than centre-based programmes (effect sizes, where reported, ranged from 0.25 to 0.46; six out of 12 studies of overall preschool programmes). There was no evidence of benefits for self concept or self esteem.

Five of 16 studies reported a reduction in externalising problems with preschool programmes compared to control. One study found greater adverse effects on externalising problems for children in preschool programmes from the first year of life. There was no evidence of effects on internalising problems and alcohol or drug use in adolescence. Three of four studies found a reduced risk of crime for preschool participants.

Authors’ conclusions
There were generally null effects of preschool interventions across a range of health outcomes. There was some evidence for obesity reduction, greater social competence, improved mental health and crime prevention.

CRD commentary
The review addressed a clear research question. The broad inclusion criteria appeared appropriate. A wide range of electronic databases and a relevant journal were searched using appropriate search terms. Efforts were made to find unpublished studies by searches of relevant trial registers. Most studies were conducted in USA and the search was restricted to studies published in English, so language bias could not be ruled out. The authors did not report their methods for study selection, quality assessment and data extraction, so reviewer bias and error could not be ruled out. An appropriate tool was used to assess the included studies for quality; most studies were of moderate or low quality and few were randomised. Physical outcomes were often measured from parental or self report, which may have introduced additional bias. The intervention, control groups and assessed outcomes varied widely. Studies were appropriately synthesised in narrative format.

The authors’ conclusions are appropriately cautious and reflect the limited evidence base. Additional high-quality research is needed to adequately answer the research question.

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

Research: The authors stated that more research was required with better study designs, interventions undertaken in different populations in different countries and measurement of standardised robust health outcomes arising from the interventions.

Funding
National Health and Medical Research Council of Australia; National Heart Foundation.
Bibliographic details
D’Onise K, Lynch JW, Sawyer MG, McDermott RA. Can preschool improve child health outcomes? A systematic review. Social Science and Medicine 2010; 70(9): 1423-1440

PubMedID
20199834

DOI
10.1016/j.socscimed.2009.12.037

Original Paper URL
http://dx.doi.org/10.1016/j.socscimed.2009.12.037

Indexing Status
Subject indexing assigned by NLM

MeSH
Child Development; Child, Preschool; Health Status; Humans; Schools, Nursery

AccessionNumber
12010003002

Date bibliographic record published
22/09/2010

Date abstract record published
13/04/2011

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.