Early intervention for preschool-age children with ADHD: a literature review
McGoey K E, Eckert T L, DuPaul G J

Authors' objectives
To assess the existing interventions for pre-school-age children with attention-deficit hyperactivity disorder (ADHD).

Searching
ERIC, PsycLIT, MEDLINE and Dissertation Abstracts were searched from 1967 to 2000; the search terms were listed. The authors also checked the references of all studies identified by the searches and of literature reviews in the area, so as to identify further potentially relevant studies. An annotated bibliography addressing issues and interventions relating to ADHD was also reviewed and several journals were handsearched: Behaviour Modification, Exceptional Children, Journal of the American Academy of Child and Adolescent Psychiatry, Journal of Behavior Therapy and Experimental Psychiatry, Journal of Consulting and Clinical Psychology, Journal of Emotional and Behavioural Disorders, and Journal of Early Intervention. The authors did not report whether any language restrictions were applied.

Study selection
Study designs of evaluations included in the review
No inclusion criteria were stated in relation to the study design. All study designs were eligible for inclusion provided that the methods and results were discussed in the article. The designs of the included studies were unclear.

Specific interventions included in the review
Studies in which an intervention was implemented to address a problem behaviour associated with ADHD were eligible for inclusion. The specific interventions were:

- psychotropic medication (dextroamphetamine, methylphenidate, or lithium),
- school-based behaviour management interventions (contingent adult positive attention, self-instruction training, positive reinforcement, time-out or daily self-monitoring report card),
- parent-education programmes (child-management training program, parent-training intervention, parent-child interaction training or follow-up), and
- multi-component treatment approaches (medication, symbolic modelling and parent training).

Participants included in the review
Studies that assessed pre-school children (3 years 0 months to 5 years 11 months) who were not normally attending a kindergarten programme, and who had been diagnosed as being at risk for or having ADHD, were eligible for inclusion. Studies that assessed participants who had been diagnosed as having mental retardation or neuro-developmental disorders were excluded.

Outcomes assessed in the review
No inclusion criteria were stated in relation to the outcomes. The outcomes assessed were behaviour and interaction ratings. The authors did not report how these were assessed in the primary studies.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.
Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Data were extracted on the participants, setting, intervention and outcomes.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative discussion grouped according to the type of intervention (pharmacological, parent-training, behaviour management, or multi-component treatment approaches).

How were differences between studies investigated?
Differences between the studies were discussed in relation to the different interventions and inclusion criteria.

Results of the review
Twenty-eight studies involving more than 774 children, 175 parents and 46 families were included. All of the studies were uncontrolled (the specific study designs were not reported).

Psychotropic medication (14 studies).
The results suggested that methylphenidate could improve compliance, on-task behaviours and activity levels in pre-school-age children with ADHD. The effects were observed with both low doses (0.3 mg/kg) and higher doses (1.4 mg/kg). However, although independent observations of child behaviour indicated improvements at low doses, parent and teacher ratings of the child's behaviour were not affected. Only at higher doses were significant changes in parent interactions shown. Side-effects appeared to increase with higher doses of methylphenidate. These included decreased social interaction, loss of appetite and dysphoric mood. Only one study assessed the use of dextroamphetamine. The results of this study showed the children demonstrated improvements in on-task and appropriate play behaviours, but no teacher-reported effects were observed. The results of a study assessing the effectiveness of lithium showed that lithium was associated with increased problem behaviours and significant medication side-effects.

Parent-training interventions (9 studies).
The results of the studies showed that parent-training interventions improved parent-child interactions assessed under analogue conditions. The treatment effects included increases in child compliance, use of appropriate parental commands, knowledge of appropriate parenting techniques, and positive parental statements. In addition, some preliminary evidence suggested that once parenting patterns were established, positive effects in the behaviour of the children could be observed in settings other than the home, and over a long time.

Behaviour management interventions (4 studies).
The results of the studies were inconsistent and inconclusive. One study of cognitive-behavioural training appeared to be developmentally inappropriate for pre-school-age children. A further study of self-instruction training that initially reported positive results could not be replicated.

Multi-component treatment approaches (1 study).
One study examined the effectiveness of a multiple intervention that comprised medication, symbolic modelling and parent training. The results showed that the combination of medication, symbolic modelling and parent training was more effective than medication and symbolic modelling, or medication alone, in improving compliance.

Authors' conclusions
Most empirical studies indicated that stimulant medication, parent training and classroom behaviour management were effective in reducing symptoms of ADHD in young children. However, there were relatively few studies that examined treatment outcomes for pre-school-age children with ADHD.
CRD commentary
The review question was only partially defined in terms of the interventions and participants that were to be included in the review. No criteria were stated for either the study design or the outcomes of interest. A number of sources were searched for potentially relevant studies, including journals. The review methods were not reported and, therefore, it is not known whether any measures were taken to reduce bias and errors. Furthermore, it appears that the quality of the studies was not assessed, thus it is impossible to examine how study quality might have impacted upon the results. Some data from the primary studies were presented in tabular format, with further information given in the text. The narrative synthesis was appropriate given the differences in interventions and participant groups between the studies. Overall, given the methodological weakness in the evidence base reviewed, the authors' conclusions should be viewed tentatively.

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

Research: The authors stated that future investigations should use larger samples sizes, inclusion criteria consistent with those advocated by the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (American Psychiatric Association, 1994), and data on the treatment integrity and acceptability of the interventions. They should also endeavour to examine the child's behaviour through functional analysis, given the developmental age of many pre-school children. Furthermore, investigations should be conducted across the pre-school and home environments, with outcome data supplied from both settings.

Bibliographic details

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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.