Protecting children from environmental tobacco smoke (ETS) exposure: a critical review

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CRD summary
This review assessed interventions aimed at reducing residential environmental tobacco smoke (ETS) exposure in youths. The authors concluded that interventions can reduce children's exposure to ETS. The lack of a quality assessment, the unknown validity of methods used to assess outcomes, and the inconsistent results among studies mean that the conclusions may not be reliable.

Authors' objectives
To assess interventions aimed at reducing residential environmental tobacco smoke (ETS) exposure in youths.

Searching
PsycINFO and MEDLINE were searched for published studies; the keywords were stated. Reference lists were also checked.

Study selection
Study designs of evaluations included in the review
The inclusion criteria were not specified in terms of study design.

Specific interventions included in the review
Studies of ETS interventions for children that targeted family or household members were eligible for inclusion. Prenatal interventions and public restrictions or legal interventions were excluded. The interventions in the included studies were most often conducted in a paediatrician's office or other health care facility; these interventions tended to be brief one-off sessions and some included the provision of printed material, personalised letters with feedback, or a follow-up phone call. The other interventions were based in the home; these varied from one to seven sessions, with session lasting up to 45 minutes. The included studies targeted parental smoking cessation exclusively, or were aimed at altering smoking behaviour to reduce children's exposure to ETS.

Participants included in the review
Family or household members of children from birth to adolescence were eligible for inclusion. Most of the participants in the included studies were women who were parents and current smokers. The children were aged 2 weeks to 17 years and were asthmatic or healthy.

Outcomes assessed in the review
The inclusion criteria were not specified in terms of outcomes. The primary outcomes in the review were ETS exposure and smoking cessation. Most of the studies used self-report measures to assess the outcomes. The most common outcome assessed was the number of cigarettes exposed per day. Some studies also measured children's urinary cotinine or air nicotine levels.

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
For each study, effect sizes (Ess; Cohen's d) were calculated either directly or using the data presented in reports. Where more than one outcome measure was reported, the ESs were calculated for ETS exposure or smoking cessation. Where studies used more than one measure to assess the main outcome, an average ES was calculated.

**Methods of synthesis**

How were the studies combined?
The studies were grouped by study design and a narrative synthesis was undertaken. Each study was described in the text and additional descriptive information was tabulated. The mean ES was calculated for RCTs and CCTs.

How were differences between studies investigated?
The results were also discussed according to the type of intervention (physician versus home-based), the theoretical framework underlying the intervention, the type of participant (asthmatic versus healthy) and the amount of the intervention.

**Results of the review**

Twelve randomised controlled trials (RCTs), 5 non-randomised controlled trials (CCTs), one observational study and one multiple baseline study were included. The numbers of participants in the RCTs and CCTs were reported as children, families and unspecified units.

RCTs: 8 of the 12 RCTs found that the intervention had significant effects on ETS exposure, while the remaining four found no significant difference between interventions in ETS exposure. The mean ES (d) was 0.38.

CCTs: one of the 5 CCTs found that the intervention had a significant effect on ETS exposure. The mean ES (d) was 0.10.

One observational study found that the intervention was associated with a significant reduction in the number of cigarettes children were exposed to per day.

One multiple baseline study found self-reported reductions in ETS after the intervention.

**Authors' conclusions**

Interventions can reduce children's exposure to ETS. The results were most promising for studies of a higher quality design, interventions of greater intensity and duration, and interventions based on behavioural-change theory.

**CRD commentary**

The review question was clear in terms of the intervention, outcomes and participants, but was not explicitly defined in terms of the outcomes or study design. Limiting the search to published studies listed in only two databases might have resulted in the omission of other relevant studies, and raises the possibility of publication bias. It was unclear whether any language limitations had been applied. The methods used to select the studies and extract the data were not described, hence any efforts made to reduce errors and bias cannot be judged. The validity of the included studies was not formally assessed or adequately addressed.

Some relevant data were tabulated, while additional information was provided in the text of the review. The studies were appropriately grouped by study design and combined in a narrative. The studies were also grouped by characteristics of the intervention and participants. These do not appear to have been pre-specified, and the varied methodological rigour prohibits the drawing of conclusions about the relative effectiveness of intervention components. The authors discussed some of the limitations of the review, such as the lack of standardised measures for ETS exposure, studies creating their own questionnaires, and participant reactivity biasing responses. This casts doubt upon the validity of the methods used to assess the outcomes. However, the authors offered no explanation for negative findings from some studies, and they did not assess study quality or discuss the influence of the sometimes
high drop-out rates on the results. The review findings may not be reliable and should be interpreted with caution.

**Implications of the review for practice and research**

Practice: The authors specified elements to be incorporated into a model for ETS interventions. More specifically, the target should be ETS reduction rather than cessation exclusively (e.g. outdoor smoking); a stepped-care approach, including initial advice and follow-up, should be taken; and intervention components should include shaping and reinforcement.

Research: The authors stated that future research should be directed at improving the effectiveness of physician-based interventions, and that interventions should be based on theory. They stated that interventions aimed at reducing smoking in women after delivery should include a weight loss and maintenance component, stress management and relaxation techniques, assertiveness and social skills, and nicotine replacement treatment. Future research could use delivery of interventions to groups, motivational interviewing, use both ETS reduction and cessation as outcomes, and could target ETS interventions at children. The authors also stated that a standardised definition of ETS exposure should be developed.

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