Parental smoking cessation to protect young children: a systematic review and meta-analysis

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CRD summary
This review concluded that interventions aimed at increasing parental smoking cessation to benefit children increased parental and maternal quit rates. The main limitations of the review were the poor quality of some of the included studies and the significant heterogeneity between study results. In view of these limitations, the conclusions should be interpreted with some caution.

Authors' objectives
To assess the effects of interventions that encouraged parental smoking cessation to protect young children.

Searching
MEDLINE, PsycINFO, Web of Science and The Cochrane Library were searched for articles in English, to the end of March 2011; search terms were reported. The reference lists of all retrieved review papers were checked for additional relevant studies.

Study selection
Randomised controlled trials (RCTs), quasi-randomised controlled trials and controlled trials of smoking cessation interventions for parents of children (aged zero to six years) were eligible for inclusion. Trials that included children older than six years were included if they also included children six years old or less. The children could be healthy, asthmatic or visiting hospitals or paediatric clinics. Any type of smoking cessation intervention aimed at reduction or cessation of parental smoking to benefit children, or child tobacco smoke exposure reduction, was eligible for inclusion. Studies had to assess smoking quit rates with a minimum follow-up period of one month from the start of the intervention.

The included trials were conducted in the United States, China, Norway, Scotland, Finland, Italy and Australia. Interventions included self-help materials, face-to-face counselling, telephone counselling, cessation medications and biochemical feedback; most studies included more than one component. The number of sessions ranged from one to 16, where reported. Ten studies enrolled healthy children, five enrolled asthmatic children and three enrolled children visiting hospitals or paediatric clinics. Children’s ages ranged from newborn to 17 years, where stated. In eight studies the control group received some type of intervention; either usual care or a specific intervention related to smoking, cessation or risk to children from smoking. In four studies the control group did not receive any information on smoking cessation or risk to children from smoking. Six studies did not report what the control group received.

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

Assessment of study quality
Two reviewers independently assessed the quality of the included trials. The following criteria were assessed: study design; randomisation concealment; blinding of observers; biochemical validation of quit rates; drop-outs; and fidelity to treatment.

Data extraction
Two reviewers independently extracted data on quit rates; differences were resolved by discussion. Where quit rates were reported for different follow-up times, the longest follow-up period was used. Risk ratios (RRs) and risk differences, with 95% confidence intervals (CIs), were calculated.

Methods of synthesis
Quit rates and risk ratios were pooled using the DerSimonian and Laird random-effects model. Subgroup analyses were performed according to the following variables: maternal versus paternal quit rates; child age at recruitment; child cohort (healthy, asthmatic, hospital or clinic visit); intervention setting; provider; use of smoking cessation medication; number of sessions; use of theory in developing the intervention; primary research objective; length of maximum
follow-up; provision of smoking cessation or smoking-related intervention to the control group; study design; blinding of observers; and proportion of drop-outs.

Heterogeneity was assessed using Χ² and Ι². Publication bias was assessed by visual assessment of funnel plot asymmetry.

Results of the review
Eighteen trials were included in the review (9,773 participants, range 42 to 2,901); 15 RCTs, two quasi-randomised controlled trials and one controlled trial. The length of follow-up ranged from one month to eight years, but was either six months or one year in most trials. Randomisation concealment was reported in nine trials, blinding of observers was reported in eight trials and biochemical validation of outcome data was reported in five trials. The proportion of patients followed-up ranged from 61 to 97%; 13 trials had over 80% follow-up. Few trials reported whether participants received the full intervention.

There was a modest statistically significant increase in parental quit rates associated with the intervention (RR 1.34, 95% CI: 1.05 to 1.71; 18 trials). However, there was evidence of significant heterogeneity (Ι²=60%). The risk difference of 0.04 (CI: 0.01 to 0.07) indicates an additional 4% quit rate in the intervention group compared with the control group. Again, there was evidence of significant heterogeneity (Ι²=82%).

The separate results for maternal quit rates indicated a modest improvement, but this was not statistically significant (RR 1.44, 95% CI: 0.99 to 2.09; 12 trials). There seems to be no improvement in paternal quit rates (RR 0.95, 95% CI: 0.71 to 1.29; two trials).

Subgroup analyses suggested that the interventions were beneficial in the following subgroups: parents whose children were four years old and over (RR 1.57, CI: 1.14 to 2.16; 11 trials); interventions that included use of smoking cessation medication (RR 3.13, 95% CI: 1.19 to 8.21; two trials); interventions whose primary purpose was cessation (RR 1.69, 95% CI: 1.2 to 2.4; five trials); and interventions with 81 to 100% follow-up (RR 1.64, 95% CI: 1.12 to 2.42; 13 trials).

There was no evidence of significant publication bias; the funnel plot was reasonably symmetrical.

Authors' conclusions
Interventions aimed at increasing parental smoking cessation to benefit children increased parental and maternal quit rates, and could help protect vulnerable children from harm due to tobacco smoke exposure. However, most parents did not quit, so additional strategies to protect children were needed.

CRD commentary
The review question and inclusion criteria were clear, but many studies included children up to the age of 17 years, rather than just young children (aged zero to six years) which was the focus of the review. The search strategy was adequate with limited attempts to identify unpublished trials; there was no evidence of significant publication bias in the assessment of funnel plot asymmetry. Data extraction and quality assessment procedures were undertaken in duplicate, which reduced the potential for reviewer bias and error. However, it was unclear whether similar measures were taken when undertaking study selection.

The quality of the included trials was assessed using appropriate criteria; results were presented and also used in subgroup analyses. The poor quality of some of the included studies was a limitation of the review; in particular few studies used biochemical validation of outcome data. Adequate study details were presented. There was significant heterogeneity between trial results, so presentation of the overall pooled results may not have been appropriate. The number of participants included in the analyses was considerably lower than the total number of participants in the included studies; the reason for this was unclear. Subgroup analyses were undertaken to investigate the heterogeneity, however some subgroup analyses were based on small numbers of studies and participants.

This was a good quality systematic review and the authors used appropriate methods to reduce the potential for bias. The main limitations of the review were the poor quality of some of the included studies and the significant heterogeneity between study results. In view of these limitations, the conclusions should be interpreted with some caution.
Implications of the review for practice and research

Practice: The authors stated that policy makers should recommend effective interventions that counsel parents to quit for the benefit of their children, and recommend training of clinicians in this area.

Research: The authors stated that further research was required to develop more effective programs for getting parents to stop smoking, to isolate components that best maximised the motivating function of child welfare, and to identify effective interventions for the protection of children from tobacco smoke exposure if parents were not ready or able to quit. This may be enhanced by phased development of interventions, beginning with in-depth qualitative research with parents and including intervention piloting.

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