Family-Based Interventions in Preventing Children and Adolescents from Using Tobacco: A Systematic Review and Meta-Analysis

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ABSTRACT

BACKGROUND: Tobacco is the main preventable cause of death and disease worldwide. Adolescent smoking is increasing in many countries with poorer countries following the earlier experiences of affluent countries. Preventing adolescents from starting smoking is crucial to decreasing tobacco-related illness.

OBJECTIVE: To assess effectiveness of family-based interventions alone and combined with school-based interventions to prevent children and adolescents from initiating tobacco use.

DATA SOURCES: Fourteen bibliographic databases and the Internet, journals hand-searched, and experts consulted.

STUDY ELIGIBILITY CRITERIA, PARTICIPANTS, AND INTERVENTIONS: Randomized controlled trials (RCTs) with children or adolescents and families, interventions to prevent starting tobacco use, and follow-up ≥6 months.

STUDY APPRAISAL/SYNTHESIS METHODS: Abstracts/titles independently assessed and data independently entered by 2 authors. Risk of bias was assessed with the Cochrane Risk-of-Bias tool.

RESULTS: Twenty-seven RCTs were included. Nine trials of never-smokers compared with a control provided data for meta-analysis. Family intervention trials had significantly fewer students who started smoking. Meta-analysis of 2 RCTs of combined family and school interventions compared with school only, showed additional significant benefit. The common feature of effective high-intensity interventions was encouraging authoritative parenting.

LIMITATIONS: Only 14 RCTs provided data for meta-analysis (approximately a third of participants). Of the 13 RCTs that did not provide data for meta-analysis 8 compared a family intervention with no intervention and 1 reported significant effects, and 5 compared a family combined with school intervention with a school intervention only and none reported additional significant effects.

CONCLUSIONS AND IMPLICATIONS OF KEY FINDINGS: There is moderate-quality evidence that family-based interventions prevent children and adolescents from starting to smoke.

KEYWORDS: adolescent; adolescent behavior; child; family; health promotion; parent-child relations; parents; primary prevention; tobacco use

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WHAT THIS SYSTEMATIC REVIEW ADDS

- Nine trials of family interventions to prevent ever-smoking adolescents reported that significantly fewer started smoking.
- Two trials of combined family and school interventions compared with school-only showed additional significant benefit.
- The common feature of the effective high-intensity interventions was encouraging authoritative parenting.

HOW TO USE THIS SYSTEMATIC REVIEW

- Pediatricians could encourage schools to adopt high-intensity programs suited to families who need help.
- Examples are school family resource centers and family workshops.
- Improving parenting/nurturing skills include instruction on setting limits, talking about substance use, helping children improve social skills, and helping children resist unwanted peer influences.

THE MAIN PREVENTABLE cause of death and disease worldwide is tobacco.[1] Adult smoking begins in adolescence: 89% of US adult smokers who began regular tobacco use started by the age of 18 years.[2] Despite continued antitobacco strategies such as banning advertisements and prosecuting businesses that sell tobacco to

minors, tobacco use among youth remains commonplace. In 2014 it was estimated that 24.6% of US high school students had used a tobacco product and 12.7% were currently using 2 or more tobacco products.[3] Data from the National Health and Nutrition Examination survey for 2003 to 2010 showed that 53.3% of children 6 to 19 years of age with asthma were exposed to environmental tobacco smoke, and it was associated with missing school, more health care visits, and activity limitation for non-Hispanic white children and sleep disturbance for non-Hispanic white and Mexican children.[4]

It is important to prevent children and adolescents from ever trying tobacco because even just trying results in a 50% continuation. Youth who smoke are also likely to drink and use drugs such as cannabis, and intervening to prevent smoking uptake during adolescence is critical to slowing or halting the trend toward increased tobacco-related illness. The challenge of adolescent smoking is increasing in less developed countries and trends toward earlier initiation in countries such as India places these countries on the same path that the more developed countries have followed.[5] Important influences on adolescent smoking are the individual (sex, concerns with body weight, and attitudes to smoking); parental influences (parental smoking, the number of smokers in the family, and parental permissiveness); and peer influences (the number of peer-group members and friends who smoke, and the academic expectations of this group),[6] ethnic group,[7] affluence,[8] and education (parental tertiary education is associated with lower rates of smoking).[9] Thus, preventive interventions need to focus on personal characteristics, and the influences of family, peers, and advertising. The way parents respond can be a significant determinant of adolescent smoking.[10,11] The children of parents who had never smoked are less likely to smoke. In a study of 2981 12th-graders in 20 school districts in Washington state 18.6% smoked if no parent smoked and 31.8% smoked if a parent smoked. If no parent smoked and an older sibling smoked the odds ratio that the 12th-grader would smoke was 1.85 (95% confidence interval [CI], 1.06–3.21; $P = .029$) and if a parent smoked 1.49 (95% CI, 1.01–2.18; $P = .040$).[2] Parental advice not to smoke or explicit disapproval of smoking can be effective in young teens[12–14] and in unmarried pregnant teenagers.[15] A permissive parenting style and home policy increase the likelihood of experimentation, whereas authoritative parenting (combining demanding and responsive management of children's behavior) correlates with the lowest rate of starting smoking.[7,16] The influence of friends and peers has also been shown to be associated with smoking behavior[13,17] and smoking uptake is negatively related to perceived social competence and parental monitoring.

A key issue is to identify which interventions are effective in preventing starting smoking. A Cochrane systematic review of school-based programs found interventions with never-smokers followed up for more than a year resulted in 12% fewer adolescents starting to smoke.[18] Cost-effectiveness modeling estimates that school programs provide savings of US $2000 to US $20,000 per quality-adjusted life-year because of averted smoking.[19] The national Clinical Effort Against Second-Hand Smoke Exposure (CEASE) study of 952 parents who were current smokers reported that 54.3% reported smoke-free home policies but were less likely to report smoke-free home policies if they were heavier smokers, black, living with smokers, or attending with a sick child. Only 19.9% reported being asked and 17.1% advised by a pediatrician about home smoke-free policies.[20] Pediatricians need to emphasize that strict smoke-free policies are necessary because having smoke free-areas, closed doors, or air filters are not effective.[21] A systematic review of mentoring to prevent adolescent tobacco use identified only 4 randomized controlled trials (RCTs), of which only 1 reported that peer mentoring was associated with reduced smoking (odds ratio = 0.78; 95% CI, 0.64–0.96).[22] Because many schools already provide prevention programs, it is important to review the effects of family-based programs provided on their own and together with school-based programs. Health promotion programs usually vary in intensity, duration, and implementation fidelity to the protocol, and it is important to identify which dose relationship of interventions are effective.

The purpose of this systematic review[23] was to assess the effectiveness of family interventions alone and combined with school-based interventions to prevent children and adolescents from initiating tobacco use.

METHODS

This review followed a published protocol.[23]

LITERATURE SEARCH

MedLine (Fig. 1), EMBASE, PsycINFO, CINAHL, Web of Science, ERIC, the Cochrane Tobacco Addiction Group Specialized Register, and the Cochrane Central Register of Controlled Trials were searched from inception to March 2014. Conference proceedings, organization Web sites, and article reference lists were searched. A further search update was conducted in MedLine on November 1, 2015, which revealed no new RCTs. The RCTs included in the review were entered in the PubMed single citation matcher on November 1, 2015 and no new RCTs were identified by following up the "related studies" citations. There were no restrictions on date or language.

INCLUSION CRITERIA

We included RCTs and cluster RCTs (C-RCTs), with a duration of a minimum 6-month follow-up (which is standard in smoking prevention studies); family-based intervention alone, or in combination with a school-based intervention; and children (aged 5–12 years) and adolescents (aged 13–18 years) and family members. The search strategy chosen also located studies that followed these children beyond age 18 years. For each study we determined whether during the study the participants received any cointerventions such as the standard health or tobacco education curriculum taught in the school, or interventions that occurred in their community, and whether the control