A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations

Skara S, Sussman S

CRD summary
This review assessed the long-term effects of psychosocial programmes in preventing smoking and other drug abuse among adolescents. The authors concluded that there is weak evidence that social influences programmes can prevent or reduce substance use for up to 15 years. The authors' conclusions took account of the quality of the included studies and are likely to be reliable.

Authors' objectives
To assess the long-term (more than 2 years) effectiveness of psychosocial programmes in preventing smoking and other drug abuse among adolescents.

Searching
MEDLINE (from 1966), HeathSTAR (from 1975) and PsycINFO (from 1887) were searched to October 2002 for studies published in English; the search terms were stated. The reference lists in identified studies, previous reviews and meta-analyses were checked, as were the websites of the U.S. Department of Health and Human Services and the Centers for Disease Control and Prevention. First authors of identified papers were contacted for updated information and details of unpublished studies and research in progress.

Study selection
Study designs of evaluations included in the review
Studies of at least a quasi-experimental design comparing an intervention with a control group were eligible for inclusion. The unit of assignment in the included studies was schools, classrooms, Boys and Girls Clubs of America, communities, school districts and individuals. About half of the included studies used some type of matching or blocking to minimise baseline non equivalence.

Specific interventions included in the review
Studies using at least one school-based or community-based intervention were eligible for inclusion. All but one of the included studies used a school-based programme.

All studies included programmes addressing social influences to smoke and the development of skills to resist these pressures. Other programme elements included life skills training, factual information, public commitment and a community component. The programmes were delivered by a variety of personnel such as classroom teachers, research staff, health educators and peer leaders. The number of regular sessions varied widely (range: 5 to 384; median and mode 10), as did the length of the programme (range: 2 weeks to 8 years). Some programmes included booster sessions, which ranged from one session over 2 days to 15 sessions over 2 years.

Participants included in the review
Studies of adolescents who were aged less than 21 years at baseline were eligible for inclusion. Most of the included studies recruited 7th grade students, aged 12 to 13 years. Over the duration of the studies, the students ranged in age from 8 to 28 years. Generally, about half of the sample were female and most of the studies were conducted in predominantly white populations.

Outcomes assessed in the review
Studies that assessed the incidence or prevalence of tobacco use after at least 2 years for adolescents aged 12 to 15 years and 16 to 19 years were eligible for inclusion. The review also assessed the use of other drugs such as alcohol and marijuana. The included studies evaluated drug use using self-report questionnaires of lifetime or recent use and/or biochemical validation, or the bogus pipeline method. The duration of follow-up ranged from 24 months to 15 years.
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
Studies were assessed for: study design; unit of assignment and unit of analysis; the methods used to assess the outcomes; whether the analysis adjusted for the number of outcomes measured; adequacy of reporting of characteristics of the study; the methods used to select the study sample; attrition rates; an exploration of differential attrition rates between treatment groups and according to risk status; baseline comparability among the treatment groups; adjustment for potential confounding factors; and implementation fidelity. Two reviewers independently assessed validity and reached consensus.

Data extraction
Two reviewers independently extracted the data and reached consensus. Data were extracted on the methods used to conduct the study, the characteristics of the participants and programmes, recruitment of the sample, retention, description of the analysis and results. Where necessary, additional information was sought from authors or other relevant publications. The review did not include results from post hoc analyses.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative with accompanying tables.

How were differences between studies investigated?
Differences between the studies were discussed with respect to study characteristics such as study methodology and validity.

Results of the review
Twenty-five studies were included: 11 experimental studies and 14 quasi-experimental studies. The sample sizes at baseline ranged from 161 to 8,388 (mean 3,445 students). The sample sizes at the last follow-up ranged from 91 to 7,864 (mean 2,235 students).

Methodological limitations of the studies included: low percentage of retention in some studies (where reported, mean 64%, range: 18 to 94); lack of a reported exploration of possible differential rates of attrition between treatment groups; lack of an evaluation of programme fidelity; different units used for treatment assignment and analysis; lack of a description of how the data were dichotomised or scored; lack of an adjustment for multiple outcome measures; lack of reporting of the psychometric adequacy of methods used to assess the outcomes; and inadequate reporting of the type and amount of training of people delivering the programme.

Most studies (about 75%) did test or control for baseline imbalance in potential confounding variables.

Tobacco: 15 of the 25 studies found that programmes had a significant positive effect on at least one smoking outcome (such as ever, monthly, weekly or daily smoking), compared with control, among students who were nonsmokers at baseline. Eleven of 17 studies reporting the difference between treatments in the percentage of adolescents smoking found programmes had a significant positive effect in comparison with the control. The reductions in baseline nonsmokers who started smoking ranged from 9 to 14.2% (mean 11.4) for treatment compared with control among 5 studies presenting these data.

Eight of the 14 studies that appeared to use booster sessions found that reductions were maintained until the end of follow-up. Thirteen of the 18 studies that showed an initial positive effect found the effect was maintained to the end of follow-up.

Other drug use: 6 of 9 studies found that the programmes had a significant positive effect on other drug use. Compared with the control, the reductions with programmes ranged from 6.9 to 11.7% for weekly alcohol use (3 studies) and was
5.7% for marijuana use (1 study). Five of the 7 studies that appeared to use booster sessions found that the reductions were maintained until the end of follow-up. Six of the 8 studies that showed an initial positive effect found the effect was maintained to the end of follow-up.

**Authors' conclusions**
There was experimental evidence that social influence programmes can prevent or reduce substance use for up to 15 years after the end of the programme. The authors also concluded that, in view of the inconsistent results among the studies and the variation in internal and external validity, the evidence is weak.

**CRD commentary**
The review question was clear in terms of the study design, intervention, participants and outcomes. Several relevant sources were searched, the search terms were stated, and attempts were made to locate unpublished studies. There were no attempts to minimise language bias. The methods used to select the studies were not described, so it is not known whether any efforts were made to reduce errors and bias. Methods were used to minimise bias in the data extraction and validity assessment processes. Validity was assessed and discussed in detail. The narrative synthesis appeared appropriate given the differences among studies and the methodological problems. The authors' conclusion took account of the quality of the included studies and the general conclusions are likely to be reliable.

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

Research: The authors stated that higher quality research is required and made recommendations for future research.

Studies should: be based on detailed conceptual models that are used to design and analyse the study; be adequately-powered well-controlled randomised controlled trials, or quasi-experimental studies that define the target population and use feasible methods for allocating treatment groups; use longitudinal designs with or without cross-sectional studies to assess long-term outcomes and maintenance effects at the transition from junior to high school; endeavour to achieve high response rates and minimise selective attrition, and use appropriate statistical methods to deal with differential attrition; evaluate outcomes using multiple measures; include strategies to evaluate and maintain the fidelity of programmes; assess qualitative data and develop instruments to measure such data; analyse data using methods for measuring change across multiple time periods and assess the influence of programme characteristics on outcomes; use standardised descriptors of interventions and evaluation; and report all categories of substance abuse and not just selected significant findings.

In addition, research should identify, further validate and develop instruments for assessing potential moderating or mediating variables; research should explore methods of dealing with non equivalence at baseline, testing for confounding variables, differential attrition and the proper unit of analysis; and researchers should consider the influence of ethnicity on programme effectiveness.

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