A meta-analytic review of school-based prevention for cannabis use

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CRD summary
The authors appeared to conclude that school-based prevention programmes reduced youth cannabis use, especially programmes that used mixed models, had longer duration and were facilitated by non-teachers who used interactive methods. In view of limitations in the review, which included poor reporting of study characteristics, heterogeneity between studies and extensive data manipulation, these conclusions should be interpreted with caution.

Authors' objectives
To evaluate the effectiveness of school-based prevention programmes for reducing cannabis use in 12 to 19 year olds.

Searching
PsycINFO, PubMed, EMBASE, ERIC, Education, Health Sciences, Sociological Abstracts and BHI: British Humanities Index (CSA Illumina) were searched from 1999 to 2007 for peer-reviewed articles in English. The authors stated that they searched for health sciences abstracts, but the source of the abstracts was unclear. Search terms were reported. Books, previous reviews and meta-analyses and reference lists of articles retrieved were checked for articles published since 1999.

Study selection
Controlled experimental or quasi-experimental studies of school-based cannabis prevention programmes in 12 to 19 year-olds were eligible for inclusion. Studies were required to include self-reported cannabis use as an outcome and to not combine cannabis prevention with other types of prevention programmes. Controls could receive an alternative form of the prevention programme or no programme.

Units of analysis in the included studies was students, classes or schools. Some studies used a social-influence prevention model (using motivational strategies). Others used mixed methods (such as targeting self-esteem, providing information and including social influence models). Programmes were delivered by teachers and non-teachers (health professionals, police, programme specialists) who used either interactive or didactic methods. Nearly all studies reported post-test follow-up. Duration of follow-up was not reported. Most studies were set in North America.

The authors did not state how many reviewers performed study selection.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
For each study, the standardised mean difference between treatment groups (Cohen's effect size, d), along with 95% confidence intervals (CIs), were calculated from mean and standard deviations or (if necessary) from F statistics. Where studies reported no significant effects, an effect size of 0.00 and one-tailed $p$ value of $p=0.5$ was assigned in accordance with published methods. If a study reported multiple measures of cannabis use at different time points, a single effect size was calculated from the median effect size of all measures or from the last reported follow-up where there were multiple delayed post-tests. A study-developed binary coding tool was used to categorise clinical and methodological study characteristics (such as social learning versus mixed model, fewer versus more than 15 sessions, teacher versus non-teacher facilitation and interactive versus didactic delivery).

Two reviewers independently extracted data. Disagreements were resolved by discussion. Primary study authors were contacted for more information where required.

Methods of synthesis
Studies were combined, pooling all sampling units, to calculate a mean effect size using a fixed-effect model. Statistical
heterogeneity was calculated using the q statistic. Publication bias was assessed by calculating a fail-safe number. Subgroup analysis was used to investigate the impact of study characteristics categorised by the study-developed coding tool. For investigations of heterogeneity, the Hedges procedure was used to weight mean effect sizes. Sensitivity analyses were conducted to examine the effects of assigning an effect size of 0.00 to some studies and the effects of removing one study at a time and excluding one outlier study.

Results of the review
Fifteen studies were included (15,571 sampling units, range 11 to 4,276).

School-based programmes reduced cannabis use more than control conditions, with a moderate effect size (0.58, 95% CI 0.55 to 0.62; 15 studies) and statistically significant heterogeneity (p<0.05).

Subgroup analyses (14 or 15 studies for each comparison) showed that a significantly greater benefit was associated with mixed prevention models (p<0.0001), at least 15 sessions (p<0.00001), delivery by a non-teacher (p=0.01), an interactive approach (p<0.00001), participant age at least 14 years (p<0.00001) and reported assessment of programme fidelity (p=0.00001). There was significant statistical heterogeneity (p<0.05) in one or both subgroups in all these analyses.

No evidence of publication bias was found.

Authors’ conclusions
The authors appeared to conclude that school-based prevention programmes reduced youth cannabis use, especially programmes that used mixed models, were of longer duration and were facilitated by non-teachers in an interactive manner.

CRD commentary
The objectives and inclusion criteria of the review were clear. Inclusion criteria were not fully adhered to (restriction to studies that reported statistics that permitted calculation of effect sizes). Relevant sources were searched for studies. The restriction to peer-reviewed articles in English meant that some studies may have been missed. Appropriate methods were used to assess potential publication bias. Steps were taken to minimise the risk of reviewer bias and error by having more than one reviewer independently extract data, but it was unclear whether this also applied to study selection and it appeared that study validity was not assessed.

No information was reported about the design, quality or findings of individual studies (such as study design, unit of analysis, programme components, control intervention, outcome measures, follow-up rates, estimates of effect). This poor reporting, combined with extensive data manipulation within the review, made it impossible to assess the reliability of the review findings. The apparent pooling of group and individual data was not statistically sound and the findings of subgroup analyses appear questionable. Study characteristics were dichotomised into two subgroups with unknown potential for clinical differences within each subgroup. All subgroup analyses had significant (though unquantified) statistical heterogeneity. As the authors noted, there were few studies, statistical data were poorly reported in the primary studies and self-report data may not have been reliable.

Limitations in the review, which included failure to assess study quality, poor reporting of study characteristics, heterogeneity between studies and extensive data manipulation, the authors’ conclusions should be interpreted with caution.

Implications of the review for practice and research
Practice: The authors stated that school-based cannabis prevention programmes should include peer interaction, be delivered by facilitators skilled and confident in this type of delivery and be of fairly long duration (such as 15 weeks or more). Teachers who delivered programmes should have adequate training and motivation. Programme developers should ensure that content was suitable for younger adolescents.

Research: The authors stated that further research was needed to identify which programme elements were most effective. Studies should report sufficient statistical information to facilitate meta-analysis, report demographic
information about participants and describe the programme in detail, including training given to programme facilitators.

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