School-based prevention for illicit drugs' use: a systematic review

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Reference

• This review was published in the Cochrane Library (Issue 2 – 2005):

School-based prevention for illicit drugs' use

Authors:
Background

• School is an appropriate setting for illicit drugs use prevention programs
  – 4 out of 5 drug users begin before adulthood
  – a large number of young persons can be reached
  – schools can adopt and enforce a broad spectrum of educational policies
Methods

Literature search

• The search strategy was elaborated according to the Cochrane Collaboration method
  – Specific search strategies were used for each database
  – No language restrictions were adopted

• The following sources were searched
  – Cochrane Central Register of Controlled Trials (1st update 2004)
  – Cochrane Database of Systematic Reviews (1st update 2004)
  – Cochrane Drug and Alcohol Review Group Register (1st update 2004)
Methods

Inclusion criteria

All RCTs and Controlled Prospective Studies (CPSs) evaluating any intervention program versus a control condition
  - usual curricular activities
  - another school-based drug prevention program and designed to prevent substance use in a school setting
were considered
Methods

Data collection and evaluation

• Review articles, and all the included studies were scanned to identify other significant studies
• Research teams, and 18 authors of the included and excluded studies were contacted to discover unpublished researches/results
• The search strategy identified **9657 reports**
  – **7441** reports were excluded based on titles
  – **2216** abstracts were evaluated by two reviewers
  – **1538** reports were excluded based on abstracts
  – **678** full reports were obtained
  – **613** reports were excluded (374 for methodological reasons, 128 were reviews, 76 were community programs, 35 were alcohol focused programs)
Methods

Data extraction

- 678 studies were independently assessed by two reviewers
- **65 reports** met the inclusion criteria (40 RCTs)
  - 24 (21 RCTs) of them were excluded for methodological reasons
- **41 reports** were included (29 RCTs)
  - Data were independently extracted by two reviewers using a standardized checklist
- Disagreements were settled by a third reviewer
- 14 authors were contacted in order to provide supplementary analysis data
- Only **15 RCTs** provided data useful for meta-analysis
Methods

**program classification**

- The interventions and control arms of the studies were classified as:
  - **skills focused**, aimed to enhance students' abilities in generic, refusal, and safety skills
  - **affective focused**, aimed to modify inner qualities (personality traits such as self-esteem and self-efficacy, and motivational aspects such as the intention to use drugs)
  - **knowledge focused programs**, aimed to enhance knowledge of and the effects, and consequences of drug use
  - **usual curricula**
Methods

Program classification

The interventions were also classified according to

• type of teaching:
  – **interactive programs**: participants were actively involved in the activities
  – **passive programs**

• people involved in program administration:
  – **teachers**
  – **external educators**
  – **peers**
Methods

Outcomes

• The following outcomes were considered
  – drug knowledge
  – drug attitudes
  – acquirement of personal skills
  – peers/adults drug use
  – intention to use drugs
  – use of drugs
Methods

Quality assessment

• The quality of the studies included was assessed by two reviewers

• according to the CDAG's check list studies were grouped in 3 classes:
  – A: low risk of bias (scores 9-11)
  – B: moderate risk of bias (scores 6-8)
  – C: high risk of bias (scores 0-5)

• Disagreements were settled by a third reviewer
Methods

Statistical analysis

• Data were analysed with RevMan software

• A standardized effect size was calculated for each study, in function of its outcome

• Wherever possible, summary relative risks and 95% confidence intervals were calculated with a random effects model; for continuous outcomes measured in different ways a standardized mean difference (SMD) between groups was calculated

• When two or more studies were included in the meta-analysis, a test of heterogeneity was applied

• The effect of the low quality studies on the overall results was determined by a sensitivity analysis, with inclusion or exclusion the class C studies (no differences emerged)
Included studies

- 29 studies (41 reports) were included
- 14 did not present data useful for the inclusion in the meta-analyses
- 18 studies were of 6 and 7th grade students
- in 18 studies the evaluation was based on post-test assessment; 13 provided data at 1 year follow-up
- all but one were conducted in the USA. Only 1 RCT was conducted in the UK
- Most studies evaluated skills focused programs (n=25); affective programs were assessed by 6 studies, and 6 included a knowledge focused arm
- interactive techniques were used in 27 studies. Administrators were external educators in 20 studies, teachers in 10, peer leaders in 4, and others (policemen) in 2
# Results

**Skills versus usual curricula**

**drugs use**

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>Treatment n/N</th>
<th>Control n/N</th>
<th>RR (random) 95% CI</th>
<th>Weight %</th>
<th>RR (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ringwall 1991</td>
<td>65/685</td>
<td>77/585</td>
<td>52.56</td>
<td>0.72</td>
<td>0.53, 0.98</td>
</tr>
<tr>
<td>Snow 1992</td>
<td>63/575</td>
<td>63/526</td>
<td>47.44</td>
<td>0.91</td>
<td>0.66, 1.27</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>1260</td>
<td>1111</td>
<td>100.00</td>
<td>0.81</td>
<td>0.64, 1.02</td>
</tr>
</tbody>
</table>

Total events: 128 (Treatment), 140 (Control)
Test for heterogeneity: Chi² = 1.06, df = 1 (P = 0.30), I² = 6.0%
Test for overall effect: Z = 1.80 (P = 0.07)
Results

Skills versus usual curricula

hard drugs use

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>Treatment n/N</th>
<th>Control n/N</th>
<th>RR (random) 95% CI</th>
<th>Weight %</th>
<th>RR (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sussman 2002</td>
<td>9/200</td>
<td>15/176</td>
<td>61.43</td>
<td>61.43</td>
<td>0.53 [0.24, 1.18]</td>
</tr>
<tr>
<td>Furr-Holden 2004</td>
<td>5/192</td>
<td>13/178</td>
<td>38.57</td>
<td>38.57</td>
<td>0.36 [0.13, 0.98]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>392</td>
<td>354</td>
<td></td>
<td>100.00</td>
<td>0.45 [0.24, 0.85]</td>
</tr>
</tbody>
</table>

Total events: 14 (Treatment), 28 (Control)
Test for heterogeneity: Chi² = 0.36, df = 1 (P = 0.55), I² = 0%
Test for overall effect: Z = 2.47 (P = 0.01)
# Results

## Skills versus usual curricula

### marijuana use

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>Treatment</th>
<th>Control</th>
<th>RR (random) 95% CI</th>
<th>Weight</th>
<th>RR (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sussman 2002</td>
<td>46/199</td>
<td>44/172</td>
<td></td>
<td>10.09</td>
<td>0.90 [0.63, 1.29]</td>
</tr>
<tr>
<td>Botvin 1990</td>
<td>147/1128</td>
<td>160/1142</td>
<td></td>
<td>28.69</td>
<td>0.93 [0.76, 1.15]</td>
</tr>
<tr>
<td>Ellickson 2003</td>
<td>332/2353</td>
<td>293/1723</td>
<td></td>
<td>55.38</td>
<td>0.76 [0.66, 0.88]</td>
</tr>
<tr>
<td>Furr-Holden 2004</td>
<td>25/192</td>
<td>34/178</td>
<td></td>
<td>5.85</td>
<td>0.68 [0.42, 1.10]</td>
</tr>
</tbody>
</table>

Total (95% CI)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Control</th>
<th>Weight</th>
<th>RR (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>4072</td>
<td>3215</td>
<td>100.00</td>
<td>0.82 [0.73, 0.92]</td>
</tr>
</tbody>
</table>

Total events: 550 (Treatment), 531 (Control)

Test for heterogeneity: Chi² = 3.15, df = 3 (P = 0.37), I² = 4.8%
Test for overall effect: Z = 3.43 (P = 0.0006)
Results

Skills versus usual curricula

marijuana use (without C class study)

Review: School-based prevention for illicit drugs' use.
Comparison: 02 skills vs usual curricula
Outcome: 09 marijuana use (only A-B quality class studies)

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>Treatment n/N</th>
<th>Control n/N</th>
<th>RR (fixed)</th>
<th>Weight %</th>
<th>RR (fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botvin 1990</td>
<td>147/1128</td>
<td>160/1142</td>
<td>29.22</td>
<td>0.93</td>
<td>0.93 [0.76, 1.15]</td>
</tr>
<tr>
<td>Ellickson 2003</td>
<td>332/2553</td>
<td>293/1723</td>
<td>64.29</td>
<td>0.76</td>
<td>0.76 [0.66, 0.88]</td>
</tr>
<tr>
<td>Furr-Holden 2004</td>
<td>25/192</td>
<td>34/178</td>
<td>6.48</td>
<td>0.68</td>
<td>0.68 [0.42, 1.10]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>3873</td>
<td>3043</td>
<td>100.00</td>
<td>0.81</td>
<td>0.81 [0.72, 0.91]</td>
</tr>
</tbody>
</table>

Total events: 504 (Treatment), 487 (Control)
Test for heterogeneity: Chi² = 2.60, df = 2 (P = 0.25), I² = 28.7%
Test for overall effect: Z = 3.64 (P = 0.0003)
## Results

### Skills versus usual curricula
decision making skills

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>Treatment N</th>
<th>Treatment Mean (SD)</th>
<th>Control N</th>
<th>Control Mean (SD)</th>
<th>SMD (random) 95% CI</th>
<th>Weight %</th>
<th>SMD (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snow 1992</td>
<td>631</td>
<td>35.29 (7.02)</td>
<td>528</td>
<td>30.65 (5.35)</td>
<td>0.90 (0.77, 1.02)</td>
<td>64.01</td>
<td></td>
</tr>
<tr>
<td>Hurry 1997</td>
<td>65</td>
<td>51.10 (2.40)</td>
<td>55</td>
<td>3.60 (2.90)</td>
<td>35.99 (0.20, 0.93)</td>
<td>95.96</td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>646</td>
<td></td>
<td>583</td>
<td></td>
<td>100.00 (0.46, 1.09)</td>
<td>0.78</td>
<td></td>
</tr>
</tbody>
</table>

Test for heterogeneity: Chi² = 2.84, df = 1 (P = 0.09), I² = 64.6%
Test for overall effect: Z = 4.67 (P < 0.000001)
# Results

**Affective versus usual curricula**

**drug knowledge**

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>N</th>
<th>Treatment Mean (SD)</th>
<th>Control Mean (SD)</th>
<th>SMD (random) 95% CI</th>
<th>Weight %</th>
<th>SMD (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corbin 1993</td>
<td>22</td>
<td>18.23 (1.19)</td>
<td>12.63 (4.57)</td>
<td>-1.70 (0.38, 2.43)</td>
<td>71.71</td>
<td></td>
</tr>
<tr>
<td>Jones 1995</td>
<td>14</td>
<td>18.14 (1.41)</td>
<td>12.50 (3.42)</td>
<td>2.34 (1.18, 3.49)</td>
<td>28.29</td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>36</td>
<td>27</td>
<td></td>
<td>1.30 (0.50, 2.00)</td>
<td>100.00</td>
<td>1.88 (1.27, 2.50)</td>
</tr>
</tbody>
</table>

Test for heterogeneity: $CH^2 = 0.83, df = 1 (P = 0.36), I^2 = 0$
Test for overall effect: $Z = 6.00 (P < 0.00001)$
## Results

**Affective versus usual curricula decision making skills**

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>Treatment N</th>
<th>Mean (SD)</th>
<th>Control N</th>
<th>Mean (SD)</th>
<th>SMD (random) 95% CI</th>
<th>Weight %</th>
<th>SMD (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corbin 1993</td>
<td>22</td>
<td>6.18 (1.14)</td>
<td>19</td>
<td>6.26 (1.73)</td>
<td>![Green Arrow]</td>
<td>67.72</td>
<td>1.31 (0.62, 1.99)</td>
</tr>
<tr>
<td>Jones 1995</td>
<td>14</td>
<td>7.29 (1.44)</td>
<td>8</td>
<td>5.12 (1.46)</td>
<td>![Green Arrow]</td>
<td>32.27</td>
<td>1.44 (0.45, 2.43)</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>36</td>
<td></td>
<td>27</td>
<td></td>
<td>![Green Arrow]</td>
<td>100.00</td>
<td>1.35 (0.79, 1.91)</td>
</tr>
</tbody>
</table>

- **Test for heterogeneity:** $\chi^2 = 0.05$, df = 1 ($P = 0.82$), $P = 0$
- **Test for overall effect:** $Z = 4.71$ ($P < 0.00001$)

<table>
<thead>
<tr>
<th></th>
<th>Favours control</th>
<th>Favours treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Results

### Knowledge versus usual curricula
drug knowledge

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>N</th>
<th>Treatment Mean (SD)</th>
<th>Control Mean (SD)</th>
<th>SMD (random) 95% CI</th>
<th>Weight %</th>
<th>SMD (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortin 1993</td>
<td>16</td>
<td>17.06 (2.86)</td>
<td>19.63 (4.57)</td>
<td>1.11 [0.39, 1.83]</td>
<td>27.76</td>
<td>1.11 [0.39, 1.83]</td>
</tr>
<tr>
<td>Jones 1995</td>
<td>12</td>
<td>17.00 (2.52)</td>
<td>12.50 (3.42)</td>
<td>1.48 [0.45, 2.52]</td>
<td>16.87</td>
<td>1.48 [0.45, 2.52]</td>
</tr>
<tr>
<td>Sigelman 2003</td>
<td>86</td>
<td>0.91 (0.11)</td>
<td>0.81 (0.11)</td>
<td>0.62 [0.31, 0.94]</td>
<td>85.37</td>
<td>0.62 [0.31, 0.94]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>114</td>
<td>17.00 (2.52)</td>
<td>12.81 (4.57)</td>
<td>1.10 [0.42, 1.79]</td>
<td>100.00</td>
<td>1.10 [0.42, 1.79]</td>
</tr>
</tbody>
</table>

Test for heterogeneity: Chi² = 3.55, df = 2 (P = 0.17), I² = 43.6%
Test for overall effect: Z = 3.66 (P = 0.0002)
Results

Knowledge versus usual curricula

decision making skills

the result is the same for assertiveness
Results

*Interactive vs passive techniques*

- Only three studies provided data suitable for meta-analysis: results were not statistically significant for drug knowledge, decision making skills, self-esteem, self-efficacy, and marijuana use.

- However, interactive techniques were more effective in reducing hard drug use in the study by Sussman (RR=0.43; CI95%: 0.19-0.99)
Results

The role of peers

- When administered by peers as opposed to teachers, programs were significantly more effective with regard to marijuana use, knowledge and attitudes towards this drug at post test.
- Marijuana attitudes at 1 year follow-up become lower in the teacher-led group.
- When compared with external educators, the effect of peers was evident for drug knowledge (WMD=-3.42; CI95%: -6.81, -0.03), but not significant for the other outcomes.
Conclusions

• **Skills focused programs** have a positive effect on both mediating variables and final outcomes, compared to usual curricula

• The meta-analysis on drug and marijuana use showed a 20% lower use in the intervention groups at the post test, and a 55% lower use of hard drugs

• This results persist even years after the intervention, with most of the RCTs included having a satisfactory methodological quality (mainly quality score=B)
Conclusions

• **knowledge focused programs** improve mediating variables (especially drug knowledge) compared with usual curricula, but are not more effective than skills based programs

• when final outcomes are considered (drug use), their effects are comparable to the usual curricula and the other two types of programs

• **affective-focused programs** improve decision making skills and drug knowledge compared to usual curricula and knowledge-focused interventions, but no evidence of effectiveness is shown for use of drugs
Conclusions

• the number needed to treat (NNT) is 33 for marijuana use

• Since the prevalence of marijuana use in the post-test of the control arm of the RCTs included in this comparison was 16.5%, 5 out of 33 students (16.5% of 33) will use this drug. Of this, 1 would be prevented by the intervention, which corresponds to the 20% of the new initiators
Limitations

• The findings have some limitations
  – none of the RCTs satisfied all the quality criteria of the review
  – most results were outcomes at post test and few data were from long-term follow-ups
  – many studies did not present effect measures but only statistical indicators (f, p...) so it was impossible to combine them in the meta-analysis
  – measure of effects were very heterogeneous
  – the control for heterogeneity was not always satisfactory
  – only six studies were designed to take account of the cluster effect
  – all but one of the 29 RCTs included were conducted in the USA
Recommendations

• programs which develop individual social skills should be chosen when planning community interventions against drug use

• long term effects should be investigated

• well designed (high quality studies), long term follow-up, randomised trials are needed, especially in countries other than the USA