Effects of an Advocacy Intervention to Reduce Smoking Among Teenagers

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Objectives: To test whether high school students’ participation in advocacy activities related to the advertising, availability, and use of tobacco in their communities would prevent or reduce their own tobacco use.

Design: Ten continuation high schools in northern California, randomly assigned to a semester-long program in which students either carried out advocacy activities to counter environmental-level smoking influences in their communities (treatment) or learned about drug and alcohol abuse prevention (control).

Participants: Eleventh and 12th grade high school students; 5 (advocacy) treatment and 5 control schools over 4 semesters from 2000 through 2002.

Main Outcome Measures: Self-reported smoking defined as nonsmokers (those who had never smoked tobacco or those who were former smokers), light smokers (those who smoked <1 pack per week), or regular smokers (those who smoked ≥1 pack per week), and confirmed by carbon monoxide level readings. The following 3 constructs related to social cognitive theory—perceived incentive value, perceived self-efficacy, and outcome expectancies—were assessed.

Results: There was a significant net change from baseline to the end of the semester (after the intervention) between treatment and control schools for students who were regular smokers, but not for students who were nonsmokers or light smokers. Regular smoking decreased 3.8% in treatment schools and increased 1.5% in control schools (P<.001). Regular smoking continued to decrease at 6 months after the intervention in treatment schools, with a total change in prevalence from 25.1% to 20.3%. Involvement in community-advocacy activities and the 3 social constructs—perceived incentive value, perceived self-efficacy, and outcome expectancies—also showed significant net changes between treatment and control schools (all P values <.01).

Conclusion: Student engagement in community-advocacy activities that addressed environmental influences of cigarette smoking resulted in significant decreases in regular smoking.


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powerful social influences that may trigger cigarette smoking (eg, advertising or peer smoking) and provide them with coping skills to resist these influences. The results of these interventions showed that social influence resistance training could reduce the incidence of cigarette smoking relative to control conditions, but their effects tended to be modest and short lived.

The lack of sustained effects of the social influence resistance training model may stem, in part, from the fact that adolescents who participated in the smoking prevention efforts were seldom involved in the intervention’s development and implementation process. Furthermore, a growing body of literature suggests that individuals can only be successful if health behavior change is embedded in the social context. Thus, to achieve more durable change, it may be important for an intervention to focus on the environmental influences of smoking. Also, it may be important for adolescents to help shape the development of environmental-level antismoking activities and to publicly advocate for their implementation. Such advocacy interventions afford adolescents the opportunity to articulate their own interests and play an active role in how an intervention addresses these interests. In addition, advocacy combines proven social influence program components that restructure perceived norms of tobacco use and examines environmental influences to smoke with community advocacy and empowerment training.

It was within this context that we designed a randomized trial to test whether high school student participation in advocacy activities related to the advertising, availability, and use of tobacco in their communities would prevent or reduce their own tobacco use. We conducted the trial in continuation high schools because of the high cigarette smoking rates of their students. We designed a new advocacy curriculum in which students carried out activities to counter environmental-level smoking influences in their schools and communities (advocacy or “treatment” group) and tested it against an existing curriculum in which students learned about drug and alcohol abuse prevention (control group). We hypothesized that students in the treatment high schools would experience a significantly greater decrease in cigarette smoking than students in the control high schools, and that the reduction in smoking would be maintained for 6 months following the intervention. We also hypothesized that students in the treatment vs the control high schools would experience more positive change in 3 social cognitive constructs that may predict successful involvement in advocacy activities.

STUDY DESIGN

Ten continuation high schools in the San Francisco–San Jose area of northern California were randomly assigned to either the advocacy (treatment) or the drug and alcohol abuse prevention (control) intervention (Figure). The high schools were randomized by the toss of a coin, with every high school having an equal chance of receiving the treatment or control curriculum. The high schools ranged in size from 97 to 300 students. All 11th and 12th grade students were eligible to participate. Both interventions were 1 semester long and were repeated across 4 semesters from 2000 through 2002. During the second semester, the intervention was provided to only 6 continuation high schools (3 treatment and 3 control) because of the emergency sick leave of 2 main staff members. Only 1 class was offered each semester at each school.

STUDENT RECRUITMENT

Twenty-five students were recruited on a voluntary basis from each continuation high school during the first week of each semester. The initial class size of 25 allowed for attrition and provided a class size that lent itself well to intervention activities. Students were recruited during classes or at lunchtime by study staff who explained that the students would be assigned to 1 of the 2 interventions. A total of 375 students were recruited for the advocacy (treatment) intervention and 438 for the drug and alcohol abuse prevention intervention. Of these, 367 and 431, respectively, attended 1 or more of the intervention classes (Figure).

The classes were taught once per week during regular school hours for 60 to 90 minutes by the staff of the Stanford Prevention Research Center, Stanford, Calif. Students earned up to 5 high school credits, based on the number of classes they attended and their level of involvement. Both treatment and control interventions emphasized group participation and small group activities. No tests or homework were required. Active parent and student consents were obtained following a procedure approved by the Stanford University School of Medicine’s institutional review board.

ADVOCACY (TREATMENT) INTERVENTION

We defined advocacy as individual and group activities to affect change by writing and/or speaking in support of an issue outside of one’s immediate group. We based the advocacy curriculum on social learning and the empowerment theory and designed it to (1) modify proximal social influences on cigarette smoking, for example, perceived norms and values about smoking; (2) build awareness of distal environmental influences on smoking, for example, tobacco advertising; and (3) engage youth in devising strategies to modify environmental influences on cigarette smoking. The curriculum was provided in the following 3 phases.

Phase 1 dispelled misconceptions about cigarette smoking and raised students’ awareness about environmental influ-
encees on smoking in their schools and communities. Students learned about strategies used by tobacco companies to promote cigarette smoking among teenagers. Discussions were initiated about tobacco and its role in society to help teenagers clarify their beliefs and knowledge about tobacco use. Classroom and community-based sessions engaged students in activities to assess advertising, availability, and access to tobacco in their community.

Phase 2 involved a daylong youth advocacy institute for students from all treatment groups. The youth advocacy institute agenda was designed to foster team building and to provide students with the opportunity to develop advocacy skills, practice persuasive communication, present the results of their community assessments of tobacco, and choose an advocacy project that would be carried out during the remainder of the semester.

Phase 3 assisted teenagers in developing, implementing, and evaluating their community-advocacy projects. All of the community-advocacy activities involved researching a tobacco-related issue (eg, conducting surveys and analyzing data), developing educational materials (eg, handouts about tobacco promotion to minors or descriptions of smoking laws for store owners), talking with people in power (eg, school administrators, store owners, physicians, or city council members), and evaluating progress. Students selected community-advocacy projects such as those listed below to:

- Form a task force of school administrators, teachers, and students to enforce smoking bans on campus;
- Reduce the amount of tobacco advertisements and promotions in stores that teenagers and children frequent;
- Increase store compliance with laws and ordinances that limit tobacco advertisements on exterior windows;
- Reduce cigarette sales to minors by local stores;
- Eliminate magazines with cigarette advertising from medical and dental offices;
- Convince city council members to decline campaign contributions from tobacco companies.

CONTROL INTERVENTION

We tested the new smoking advocacy intervention against an existing substance abuse prevention intervention that was not specific to tobacco. The control intervention was a modified version of Toward No Drug Abuse, a curriculum developed for continuation high school students.23,24 The curriculum focuses on health motivation, social skills, and decision making regarding drug and alcohol use. Sessions covered topics such as types of illegal substances and their physiological properties, and the effects on health, family, and community. Videotapes, audiotapes, role-playing, open discussions, and outside speakers (eg, drug rehabilitation counselors or former drug users) reinforced the material.

DATA COLLECTION

Data were collected via a survey administered at 3 time points: baseline, after the intervention (at the end of the semester), and at a 6-month follow-up assessment (6 months after the end of the semester). Questions were developed for a fifth grade or sixth grade students (as assessed by standardized question25 that asked, “How much do you smoke now?” Students were classified as nonsmokers, light or experimental smokers, or regular smokers based on the following response options:

- Nonsmokers (those who had never smoked tobacco or former tobacco smokers):
  - “I’ve never smoked cigarettes.”
  - “I used to smoke but now I don’t.”

- Light or experimental smokers (those who smoked <1 pack per week):
  - “I’ve only tried a few puffs.”
  - “A few cigarettes or less a month.”
  - “Less than a pack a week.”

- Regular smokers (those who smoked ≥1 pack per week):
  - “About a pack a week.”
  - “About half a pack a day.”
  - “A pack a day or more.”

BIOCHEMICAL VALIDATION OF SMOKING

Self-reported smoking was confirmed at baseline and after the intervention by a handheld breath carbon monoxide monitor into which students exhaled 3 times (Bedfont Scientific Ltd, Kent, England). This allowed us to identify students whose carbon monoxide level readings were consistent with being a regular smoker (≥10 ppm of carbon monoxide), but who had reported being a nonsmoker or light smoker. Two students were reclassified at baseline and 4 were reclassified after the intervention.

PROCESS OUTCOME VARIABLES

We assessed change in 3 constructs related to social cognitive theory22,26,27 that have been found to predict engagement in advocacy activities,28-30 Each question used a 5-point scale. These were not asked during the 6-month follow-up telephone survey because of their length. Each is described below with the results of tests for internal consistency, based on baseline values (Cronbach’s α).31 We also assessed the number of community-advocacy activities in which teenagers were involved.

Perceived Incentive Value: The extent to which students considered a tobacco-free environment to be important; 8 items (Cronbach α=0.93).

Perceived Self-efficacy: Perceptions of ability to perform specific advocacy actions; 8 items (Cronbach α=0.89).

Outcome Expectancies: Perceptions of the likelihood that particular advocacy activities would result in changes in a student’s surrounding environment; 9 items (Cronbach α=0.87).

Community Advocacy: Number of tobacco-related advocacy activities in which teenagers were involved during the preceding 5 months. Eight types of activities plus 1 open-ended question for additional activities were listed that pertained to the types of activities that we intended the intervention students to be involved with (eg, conducting background research, making presentations to school administrators or community store owners, surveying school or community members about a tobacco issue, or working with the media, police, or schools on a tobacco-related issue (Cronbach α=0.83).
Overall, in both the treatment and control schools, approximately 35% of the students were classified as nonsmokers, 40% as light or experimental smokers, and 25% as regular smokers (Table 1). Students were ethnically diverse; approximately 40% were Latino (primarily Mexican American), 20% white, 15% mixed ethnicity, 12% Asian or Pacific Islander, and 5% African American. More than half of the students lived in a single-parent home and about 30% of the students had fathers who had completed less than a high school education. There were only slight differences in baseline smoking and/or sociodemographic characteristics between the treatment and control high schools.

**EFFECTS OF THE TREATMENT INTERVENTION**

There was a significant net change from baseline to the end of the semester (after the intervention) between treatment and control high schools for students who were regular smokers, but not for students who were nonsmokers or light smokers (Table 2). Regular smoking decreased 3.8% in treatment high schools and increased 1.5% in control high schools, with a significant net change of 5.3%. The largest net change was for the lightest category of regular smoking (students who smoked about 1 pack per week). Rates of nonsmoking increased about 3.5% for both treatment and control high schools. The significant net changes in regular smoking were consistent across the 5 treatment high schools.

There were also significant net changes between treatment and control schools favoring treatment for the 3 social cognitive constructs—perceived incentive value for creating a tobacco-free environment, perceived self-efficacy to perform advocacy activities, and outcome expectancies that advocacy activities would result in changes in students’ environments. Furthermore, there was a significant net change in involvement in community-advocacy activities. For example, the mean number of community-advocacy activities that students were involved in during the 5 preceding months increased from 0.9 to 4.0 in the treatment high schools and remained unchanged at 1.0 in the control high schools. Mean outcomes increased from 2.9 to 3.2 in the treatment high schools indicating that students felt “we might” accomplish the advocacy activities to “we probably can.” All measures related to the 3 social constructs remained unchanged in the control high schools.

**EFFECTS AT THE 6-MONTH FOLLOW-UP ASSESSMENT**

The significant net change in regular smoking for the treatment vs control high schools was maintained at the 6-month follow-up assessment. Regular smoking decreased an additional 1.0% in treatment high schools at the 6-month follow-up assessment (Table 3). Rates of regular smoking in the treatment high schools were 25.1% at baseline, 21.3% after the intervention, and 20.3% at the 6-month follow-up assessment. In contrast, rates of regular smoking rates in the control high schools were similar across all 3 time points. When examined at the
Table 2. Changes in Smoking and Advocacy-Related Constructs From Baseline to After the Intervention*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Advocacy (Treatment) Intervention Group (n = 5 Schools)</th>
<th>Control Intervention Group (n = 5 Schools)</th>
<th>Net Change (Treatment − Control Groups)†</th>
<th>Net Change P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>After the Intervention</td>
<td>Change</td>
<td>Baseline</td>
</tr>
<tr>
<td>Current smoking status, %‡</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>38.3 (7.2)</td>
<td>41.9 (6.7)</td>
<td>3.6 (3.4)</td>
<td>32.6 (5.0)</td>
</tr>
<tr>
<td>Light smokers</td>
<td>36.6 (2.4)</td>
<td>36.8 (3.2)</td>
<td>0.2 (5.0)</td>
<td>42.2 (3.9)</td>
</tr>
<tr>
<td>Regular smokers</td>
<td>25.1 (7.3)</td>
<td>21.3 (7.5)</td>
<td>−3.8 (1.7)</td>
<td>25.2 (5.5)</td>
</tr>
<tr>
<td>Social cognitive constructs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived incentive value (x; range, 1-8)</td>
<td>2.8 (0.2)</td>
<td>3.2 (0.3)</td>
<td>0.4 (0.1)</td>
<td>2.7 (0.2)</td>
</tr>
<tr>
<td>Perceived self-efficacy (x; range, 1-8)</td>
<td>3.3 (0.1)</td>
<td>3.5 (0.1)</td>
<td>0.2 (0.1)</td>
<td>3.0 (0.1)</td>
</tr>
<tr>
<td>Outcome expectancies (x; range, 1-9)</td>
<td>2.9 (0.1)</td>
<td>3.2 (0.1)</td>
<td>0.3 (0.1)</td>
<td>2.7 (0.1)</td>
</tr>
<tr>
<td>Community advocacy (‡No. of activities in last 5 mo)</td>
<td>0.9 (0.4)</td>
<td>4.0 (0.4)</td>
<td>3.1 (0.7)</td>
<td>1.0 (0.4)</td>
</tr>
</tbody>
</table>

*Data are given as the number (SD) for advocacy (treatment) or control groups unless otherwise indicated.
†Two-tailed, 2-sample t tests were used to test the net change difference between the advocacy (treatment) intervention group (ie, schools that received the advocacy-based curriculum) and the control intervention group (ie, schools that received the drug and alcohol abuse prevention curriculum).
‡Students were classified as nonsmokers (those who never smoked tobacco or those who were former tobacco smokers), light or experimental smokers (those who smoked <1 pack per week), or regular smokers (those who smoked ≥1 pack per week).

Table 3. Changes in Smoking From After the Intervention to the 6-Month Follow-up Assessment*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Advocacy (Treatment) Intervention Group (n = 5 Schools)</th>
<th>Control Intervention Group (n = 5 Schools)</th>
<th>Net Change (Treatment − Control Groups)†</th>
<th>Net Change P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>After the Intervention</td>
<td>At the 6-mo Follow-up Assessment</td>
<td>Change</td>
<td>After the Intervention</td>
</tr>
<tr>
<td>Current smoking status, No. (%)‡</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>41.9 (6.7)</td>
<td>44.6 (8.3)</td>
<td>2.7 (4.4)</td>
<td>36.0 (1.9)</td>
</tr>
<tr>
<td>Light smokers</td>
<td>36.8 (3.2)</td>
<td>35.1 (7.4)</td>
<td>−1.7 (7.8)</td>
<td>37.3 (3.4)</td>
</tr>
<tr>
<td>Regular smokers</td>
<td>21.3 (7.5)</td>
<td>20.3 (5.7)</td>
<td>−1.0 (4.5)</td>
<td>26.7 (4.8)</td>
</tr>
</tbody>
</table>

*Data are given as the number (SD) for advocacy (treatment) or control groups unless otherwise indicated.
†Two-tailed, 2-sample t tests were used to test the net change difference between the advocacy (treatment) intervention group (ie, schools that received the advocacy-based curriculum) and the control intervention group (ie, schools that received the drug and alcohol abuse prevention curriculum).

Our results indicate that an advocacy curriculum, designed to engage high school students in activities related to the advertising, availability, and use of tobacco in their communities, was more effective in achieving reductions in regular smoking than the control curriculum in which students learned about drug and alcohol abuse prevention. Furthermore, students in the treatment high schools showed significantly more positive changes in constructs related to social cognitive theory that may lie in the causal pathway to smoking. These changes were achieved in continuation high schools in which students have exceptionally high rates of cigarette smoking.

We did not show a significant decrease in light smokers in treatment high schools compared with control high schools. This may be because of our definition of cigarette smokers. Our definition of light smokers included the following 3 response options: “I’ve only tried a few puffs”; “[I smoke] a few cigarettes or less a month”; or “[I smoke] less than a pack a week.” These 3 options all involved low levels of smoking. It is possible that students who were light or experimental smokers did not feel the need to quit because they felt that the community-advocacy activities were more directly applicable to regular smokers.

The significant decrease in regular smoking is both surprising and encouraging. Our advocacy curriculum focused on changing social and environmental influences on smoking by actively engaging students in observing and evaluating information, formulating antitobacco messages, and engaging in strategies to reduce pro-smoking cues in their communities. This type of intervention may be especially important for teenagers who have high cigarette smoking rates because it takes a less direct route to behavioral change by focusing more on tobacco industry marketing strategies and community action than on personal behavior.
Most tobacco smoking prevention and cessation interventions for adolescents have found little or no sustained effects on smoking behavior. Since behavior change is embedded in the social context, interventions that involve adolescents in advocacy about social and environmental factors that influence smoking may be an effective strategy for smoking prevention and/or cessation programs. We randomized 10 continuation high schools in northern California to receive an advocacy curriculum in which students carried out activities to counter environmental influences on cigarette smoking in their communities (treatment) or a curriculum in which students learned about drug and alcohol abuse prevention (control). Compared with control high schools, students in treatment high schools showed significant net changes from baseline to the end of the semester (after the intervention) for regular smoking (ie, those who smoked ≥1 pack per week), involvement in community-advocacy activities, and 3 constructs related to social cognitive theory—perceived incentive value, perceived self-efficacy, and outcome expectancies. These smoking effects were maintained at the 6-month, postintervention, follow-up assessment.

COMPARISON WITH PAST STUDY RESULTS

Several past studies have used an advocacy model to address youth involvement in community activities related to cigarette smoking prevention and/or cessation.28,29,33 However, none, to our knowledge, have used a randomized study design or shown that community-advocacy activities positively influence individual smoking behavior. Altman et al28 examined factors that influence youth participation in heart disease prevention activities among 2609 ninth graders in California and found that constructs drawn from social cognitive theory, including those examined in this study, were positively associated with participation in community activities promoting heart health. Smoking behavior was not evaluated. Winkleby et al33 used an advocacy model to address smoking and other drugs in regular high school students and showed significant changes in constructs related to smoking behavior but not individual smoking.

STUDY STRENGTHS

There are a number of strengths to our study. First, the study was a randomized trial in which 10 northern California continuation high schools were randomized to 1 of 2 conditions. Second, the community-advocacy curriculum (treatment) was tested against a highly regarded existing drug and alcohol abuse curriculum (control) that has been shown to be effective in changing alcohol and other drug use at the individual level.30,34 Third, we achieved an unusually high retention rate among continuation high school students who often have poor attendance because of the multiple challenges they face in their daily lives.30 Fourth, we placed an emphasis on fidelity to the implementation of the curriculum because our intervention involved numerous high schools and teachers. We assessed whether the lessons were covered according to our study protocol by sending an outside observer to evaluate 1 lesson at each of the 10 participating continuation high schools. Visits were unannounced to the teachers and students. Visits were made during the fourth lesson (“Introduction to Environmental Influences” for the treatment schools and “Chemical Dependency” for the control schools). Results showed that the teachers covered 80% (treatment high schools) and 78% (control high schools) of the required material, that the sessions were taught as written, and that the students completed the required activities.

STUDY LIMITATIONS

There are also several limitations to our study. Students were a volunteer sample of teenagers from 10 continuation high schools in the San Francisco–San Jose area of northern California. Results are, therefore, not necessarily generalizable to other teenagers in these participating high schools, teenagers in other continuation high schools, or teenagers in regular high schools. The smoking rates for our volunteer sample were, however, similar to rates for teenagers in the treatment and control continuation high schools who did not participate in our intervention. At the conclusion of our study, we estimated smoking rates among all students in 9 of the 10 treatment and control continuation high schools by conducting a survey on various days of the week over a 2-week period (total of 906 students). Regular smoking rates, according to our definition, were similar between our volunteer study sample and the nonvolunteer students (25% vs 23%, respectively). Nonsmoking and light or experimental smoking rates were somewhat different; nonsmoking rates were 35% vs 47% for the volunteer vs nonvolunteer students, and light or experimental smoking rates were 40% vs 30%.

RECOMMENDATIONS

Our findings indicate that student engagement in community-advocacy activities that addressed environmental influences related to cigarette smoking resulted in significant decreases in regular smoking that were maintained and decreased further at the 6-month follow-up assessment after the intervention. The changes in personal cigarette smoking behavior were accompanied by significant increases in involvement in community-advocacy activities and 3 constructs related to social cognitive theory (ie, perceived incentive value, perceived self-efficacy, and outcome expectancies). These changes occurred among students in an age group when cigarette smoking usually shows large increases.5 Furthermore, these changes occurred among continuation high school students who have exceptionally high levels of cigarette smoking.5 The success of our intervention suggests that activities that focus on involving students in advocacy about social and environmental factors that influence smoking may be an effective strategy for smoking prevention and/or cessation programs.
Accepted for publication August 22, 2003.

This study was supported in part by grant RO1 DA12530 from the National Institute on Drug Abuse, National Institutes of Health, Bethesda, Md (Dr Winkleby).

We thank Helena Kraemer, PhD, for biostatistical advice, and the following northern California high schools for their kind support in helping make the intervention a success: Alta Vista High School, Mountain View; Bridgepoint High School, Newark; Broadway High School, San Jose; Calaveras Hills High School, Milpitas; Central High School, Morgan Hill; Mount Madonna High School, Gilroy; New Valley High School, Santa Clara; Phoenix High School, San Jose; Robertson High School, Fremont; and Thornton High School, Daly City.

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