Project EX — A teen smoking cessation initial study in Wuhan, China

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Abstract

The increasing smoking prevalence in China indicates a need for effective smoking cessation programs, yet, to our knowledge, no studies have evaluated the effects of smoking cessation programs among Chinese adolescents. A group of 46 10th-grade-level cigarette smokers from two schools in Wuhan, China, were provided with Project EX, an eight-session school-based clinic smoking cessation program developed in the United States. Efforts of translation of the Project EX curriculum, verification of translation, curriculum modification, and cultural adaptation were made to adapt the curriculum to the local culture. The 46 smokers represented 71% of all the self-reported 30-day smokers among 622 10th graders at these two schools. Only one student dropped out from the clinic program. Four-month follow-up data indicated a 10.5% 30-day quit rate and a 14.3% 7-day quit rate. The students who did not quit smoking reported a 16% reduction in daily cigarette consumption at posttest and a 33% reduction at 4-month follow-up. Use of a 2 1/2-week prebaseline-to-baseline clinic assessment indicated a clinic cohort nonassisted quit rate of 3%. These data provided evidence that Project EX can be adapted in another country, such as China; can be very well received; and can lead to promising results on cessation.

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1. Introduction

Smoking prevalence is high among Chinese adolescents, and a growing trend among adolescents was detected (Chen et al., 2001; Hu et al., 1990; Li et al., 1998, 1999; Sun & Ling, 1997; Unger et al., 2001; Zhu et al., 1992). Surveys in the 1990s, especially after 1995, indicated that 28–40% of boys and 3–5% of girls in various parts of China had tried cigarette smoking (Li et al., 1998, 1999; Sun & Ling, 1997). A survey conducted in 1996 in 17 cities/provinces in China indicated that about 20–22% of middle-school students and 37% of high-school students ever smoked cigarettes (Tian et al., 1997). Most adolescent tobacco users are likely to continue using tobacco into adulthood (Flay, 1993; Sussman et al., 2001). They are at risk for physical consequences of tobacco use, some of which begin their course in adolescence (Dwyer et al., 1988). Effective smoking cessation programs for adolescents in China are needed to stop the habit before addiction and physical consequences accumulate.

Previous research on tobacco use cessation programming among teenagers is sparse. Sussman (2002) conducted an exhaustive review of 66 tobacco use cessation programs that included teenagers as participants. Detailed information from any intervention—targeted or population—that provided an assessment of quitting among older teens and young adults was included.

For those intervention studies that included a control-group comparison, the mean quit rate across the control groups was approximately 7% (with an overall baseline smoking mean estimated at 7 cigarettes per day). The mean quit rate at follow-up (a mode of 6 months postintervention) among the program conditions was 12%. Thus, on average, programming led to almost a doubling of the quit rate. Programs were grouped by different theories of behavior change. A comparison of intervention theories revealed that the motivation enhancement (19%) and contingency-based reinforcement (16%) programs showed higher recruitment and quit rates than the overall intervention cessation mean. Programs that involve manipulation of intrinsic or extrinsic motivation appear to be the most effective at changing behavior (e.g., see Miller & Rollnick, 1991).

The conclusions of the review are consistent with the composition of Project EX (Sussman, Dent, & Lichtman, 2001). Project EX is an eight-session teen school-based clinic tobacco use cessation program that involves the inclusion of enjoyable, motivating activities (games, talk show, and alternative medicine-type) to enhance quit rates among youth. This clinic program was tested in a three-group experimental design in southern California in 1998. The conditions included clinic only, clinic plus a school-as-community component, and standard care control. Eighteen schools were assigned to the three conditions using a randomized block design. Three hundred and thirty-five smokers participated in the study, making this the largest controlled teen smoking cessation field trial conducted to date. Seventeen percent of the smokers enrolled in the clinics reported having quit smoking for at least the last 30 days at a 3-month follow-up (5 months after the program quit day), compared to only 8% of the control condition smokers over the same time period. The two program conditions did not differ in results. The Project EX clinic component appears to be an effective means of tobacco use cessation among teens.
While the results of Project EX are promising, it is not clear whether or not program results would replicate in another culture, where motivations for smoking and quitting may be different from those in the United States. The purposes of the present pilot test were to attempt to replicate Project EX in China and provide information for developing smoking cessation programs for Chinese adolescent smokers. These efforts were completed in Wuhan, China, where cigarette smoking by adolescents has received an increasing amount of attention as a public health issue in recent years (Warren et al., 2000). Data collected in Wuhan, China, indicated that lifetime smoking prevalence was 47% for boys and 18% for girls who were attending Grades 7 through 9 (Unger et al., 2001). The peak age of smoking onset of Chinese adolescents in China ranged from 11 to 14 years (Chen et al., 2001). However, 39% of the respondents reported that they have never received any education about substance use at school. There is a need for intervention programs on smoking cessation for adolescents in China. No clinic-setting teen smoking cessation program for Chinese adolescents in China could be found in English language literature. A challenge of implementing Project EX is that a different language is spoken among those who experience a very different lifestyle from those who received Project EX previously. An indication of potential program effects in Wuhan would also suggest cross-cultural effectiveness and wide applicability of Project EX and would encourage an additional large-scale testing of this project.

2. Methods

2.1. Participants and recruitment

Participants were 46 10th graders in Wuhan, China, who attended either a regular high school (51%) or a vocational school (49%). Wuhan is the largest city in central China, with a population of 7.3 million and an area of 8467 km². Located on the Yangtze River, Wuhan is an economic, cultural, and political center of China. According to officers at the Education Committee of Wuhan, in urban Wuhan, approximately 50% of middle-school students matriculate to academic high schools. The majority of the remainder goes on to vocational schools.

The mean age of the study participants was 16.2 (S.D. = 0.4) years, with a range from 16 to 17 years. Among the participants, three were girls. All participants were of Han ethnicity. This is a pilot study of an ongoing prevention trial among Chinese adolescents in Wuhan, China, which has been approved by the Institutional Review Board of the University of Southern California and the Public Health Bureau of Wuhan, China.

The 46 participants were recruited from a school-based screening assessment conducted in June 2000, 2 1/2 weeks prior to administration of the baseline clinic assessment. The self-report questionnaire was completed by 622 10th-grade students (42% boys) from two urban Wuhan schools: one regular high school (50.5%) and one vocational school (49.5%). Within each school, six classes were randomly selected. The two schools selected were a convenience sample, situated near the Centers for Disease Control and Prevention of Wuhan
and were willing to participate in the pilot test. During the classroom assessment, teachers were not present; participants were assured that only their identification (ID) numbers were on the questionnaire, and they were informed that their responses would remain confidential. Only the research team would know of their smoking status.

In the school-based screening assessment, past 30-day smoking behavior was measured by the item “Recall the past 30 days (1 month). How many days did you smoke?” Response options were “0 days,” “1–2 days,” “3–5 days,” “6–9 days,” “10–14 days,” “15–24 days,” “25+ days,” and “I don’t know.” Sixty-eight students (5% girls) reported that they smoked one or more days in the past 30 days.

The IDs of these students were linked with their names by two program facilitators. At both schools, directly after the assessment, one program facilitator contacted student smokers in person on the school campus and brought them together in small private groups. The program facilitator provided a brief 5-minute presentation regarding the availability of a tobacco use quit clinic over the next few weeks and explained the length of the cessation program, frequency of the clinic, and the availability of incentives for attendance.

Students contacted were asked to sign a student consent form indicating their willingness to participate in a tobacco education class that was being offered at the school. Those students who agreed to participate on the student consent form were given parent consent forms and were asked to take signed parent consent forms with them to the first clinic session. Students’ parents were informed about the availability of the class but not about their child’s smoking status.

A total of 2 1/2 weeks passed between the initial assessment with the announcement about the availability of the quit clinic and the first clinic session at the time a baseline survey was completed. This time period permitted a means of estimating naturally occurring cessation among youth from the same clinic cohort that were provided only information about the availability of a cessation program. A total of 2 of the 68 participants originally screened reported having quit during this period. Thus, naturally occurring quitting was estimated at 3%. The 2 participants who reported quitting smoking desired to attend the clinic. Therefore, while 48 participants attended the clinic, baseline data were analyzed only on those 46 participants who were still cigarette smokers at the pretest. It was assumed that the other 20 who did not attend the clinic continued smoking.

2.2. Curriculum

2.2.1. Contents of curriculum

The Project EX curriculum involves eight sessions delivered over a 6-week period. Session 1 imparts the ground rules for the clinic and discusses reasons for using and quitting tobacco. Session 2 discusses how tobacco use can cause, rather than relieve stress. Session 3 discusses the harmful substances in tobacco and how it can injure one’s body. Session 4 mentions the first step of breaking an addiction by making a commitment to quit, and youth discuss means of quitting. Session 5 discusses more about nicotine and addiction and strategies of managing withdrawal symptoms. Psychological coping includes self-forgiveness and avoiding false expectations regarding how quitting will and will not affect one’s life. Session 6 involves learning maintenance strategies, including avoiding weight gain and practicing “yoga
activity” to maintain a sense of balance. Session 7 involves learning more maintenance strategies, including assertiveness training and anger management. Session 8 involves learning means to avoid relapse and mentions how topics covered in the tobacco cessation clinic could be applicable to other substances (Sussman et al., 2001).

2.2.2. Translation
The original version of the curriculum was obtained from the Project EX team at the University of Southern California (USC). It was translated to Chinese (Mandarin) by two certified translators, who were employed by USC. Back-translation was not conducted. Instead, two bilingual researchers at USC verified the translation by reading both the English and Chinese versions. The translated version was pilot-tested session by session in focus groups at the Centers for Disease Control and Prevention of Wuhan in China before program implementation to verify that the version to be utilized was both clearly understood and culturally appropriate.

2.2.3. Cultural adaptation
Six changes were made in the curriculum to adapt it to Wuhan culture: (1) The original curriculum targets “tobacco” use. Inasmuch as Chinese adolescents seldom use smokeless tobacco, pipes, or cigars, the word “tobacco” was changed to “cigarette” in the Chinese version. (2) Because chewing tobacco is not popular among Chinese adolescents, the information on chewing tobacco was removed. (3) Changes were made regarding the incentives (extrinsic motivators) provided. When Project EX was implemented in the United States, students were told that they would obtain credit from their teacher for participating in the program. In Wuhan, the incentives were monetary (120 RMB Yuan in total—about US$14.5). Participants were told that they would receive money for transportation reimbursement and compensation for their attendance at program sessions. (4) All names of characters in the talk shows (see Sussman et al., 2001) were changed from American to Chinese names. (5) In Session 1, “Orientation,” the original curriculum provides one suggestion, “Save money. Over US$900 per year is spent on smoking one pack per day.”, for a question, “What are some reasons for quitting?” The monetary amount was changed to 3650 Yuan (US$440), which indicates what the cost is in Wuhan. (6) Finally, in Session 3, “Health Dangers of Tobacco Use,” there is a question list for a game in the original curriculum, pertaining to second-hand smoke and policies. Questions and multiple-choice responses were changed to reflect policies in Wuhan. For example, one question asks “In which of the following places is it legal to smoke in the United States? (‘Airline flight,’ ‘Interstate bus,’ ‘New York City taxi cab,’ and ‘None of the above’).” This item was replaced with “In which of the following places is it legal to smoke in Wuhan? (‘Airline flight,’ ‘Bus,’ ‘Hotel,’ and ‘None of the above’).” Details on the contents of the U.S. version of the curriculum are found in Sussman et al.

2.3. Implementation of the program
Two weeks prior to implementation, one health educator from the Centers for Disease Control and Prevention of Wuhan was trained in Project EX by the first author of this
manuscript (who had been trained on implementation in English by the original Project EX
development team at USC). She delivered the program in a 50-seat classroom at the center
over a 5-week period. The other health educator served as an observer and assistant.

For the first 3 weeks of the clinic delivery, two clinic sessions were delivered each week. The health educator delivered the program to participants from the vocational school on Tuesday and Friday mornings, and to participants from the regular high school on Sunday and Wednesday mornings. One clinic session was delivered each week over the subsequent 2 weeks. Paper-and-pencil pretest and posttest questionnaires were administered in the begin-
ing of the first and end of the last sessions. A follow-up assessment was conducted
approximately 4 months after the last session of the clinic. Saliva samples were collected in
the beginning of each session and at the follow-up, utilizing a pipeline protocol (described in
Sussman et al., 1995).

2.4. Measures

2.4.1. Process measures

Receptivity to the program was measured by two types of measures (Sussman et al., 2001). Eight items assessed program quality across sessions. These items asked “How helpful was
the class for quitting smoking?”, “How interesting was the class?”, “How much did you like
the class?”, “How informative was the class?”, “How well organized was the class?”, “How
much did you learn in the class?”, “How enthusiastic was the health educator?”, and “How
well informed was the health educator?” Clinic participants were asked to rate these items on
a scale of 1 (worst) to 10 (best). Level of receptivity of the specific program sessions was
measured by asking participants to rate each session (which was described by the activities
included in the session) on a scale of how good the session was, from 1 (worst) to 10 (best) in
the posttest.

2.4.2. Smoking behavior

The past 30-day quit rate was measured by an open-ended question “How many times
have you used cigarettes in the last month (30 days)? (0 to 100+ times)” in the three
assessments (pretest, posttest, and follow-up). The past 7-day quit rate was measured by using
an open-ended question “How many cigarettes have you smoked in the last 7 days?” in all
three clinic assessments (see Stacy et al., 1990). To identify daily cigarette use, an open-ended
question “How many cigarettes do you smoke in an average day?” was asked in the three
assessments. Percentage reduction of daily cigarette use was measured by dividing the change
of daily cigarette use on a measure at posttest or follow-up compared with the same measure
assessed at baseline, and multiplying the result by 100.

3. Results

Forty-six 10th-grade smokers attended the first clinic session and completed the pretest
questionnaire. At the baseline, the participants reported smoking a mean of 5.7 cigarettes per
day. Forty-five of the 46 participants attended at least six of the clinic sessions and completed the immediate posttest questionnaire (98% of the initial participants). All 45 of these participants also completed the follow-up questionnaire—a mean of 4.6 months after the posttest (S.D. = 0.9 month).

The eight process ratings (e.g., helpful, interesting, liked) were highly intercorrelated (coefficient alpha=.85). These eight process adjectives were averaged to compose an index; the mean score on this index was 8.10 (S.D. = 1.07). All eight individual clinical sessions were rated as high in quality (all session rating means > 7.4).

We validated self-report of cigarette smoking using NicoMeter strip. A saliva sample (about 5 ml) was collected using a protocol developed and used for the Project SMART (Graham et al., 1990). The cotinine levels of the saliva samples were assessed using the NicoMeter strip, an immunoassay-based analytical technique (Serex, 2000). An overreporting of quitting was observed in 4.5% of the sample, based on the results of biochemical validation. Adjusting our results downward for this bias, then, at the 4-month follow-up, 10.5% adjusted 30-day abstinence and 14.3% adjusted past-week abstinence are reported (Table 1). This is 3.5−4.8 times the quit rate achieved prior to the beginning of the clinic. Inasmuch as the same bias is likely to have occurred among those reporting naturally occurring quitting, the same apparent benefit of attending the clinic would be achieved.

Although not all of the participants quit smoking, those who did not quit did decrease their cigarette consumption. Mean daily cigarette consumption among the nonquitters was 4.8 cigarettes per day at the posttest and 3.8 cigarettes per day at the follow-up test; percentage reduction of daily use was approximately 16% at posttest and 33% at follow-up.

4. Discussion

This study provides evidence that Project EX, an adolescent smoking cessation program developed for use in the United States, also may be effective among adolescents in China. Of 68 smokers identified in a school-based survey (representing 11% of the 622 students surveyed at the schools), 48 (71%) volunteered to participate in the program. This indicates that interest in smoking cessation programs among adolescent smokers in China is high. This participation rate is especially impressive because the smoking cessation program was conducted outside of school hours at a different location.

<table>
<thead>
<tr>
<th>Time</th>
<th>Past 30 days Smokers (%)</th>
<th>Past 7 days Smokers (%)</th>
<th>Quit rate (%) Past 30-days</th>
<th>Quit rate (%) Past 7-days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>100</td>
<td>93</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Posttest</td>
<td>96</td>
<td>87</td>
<td>3.8</td>
<td>12.4</td>
</tr>
<tr>
<td>Follow-up</td>
<td>88</td>
<td>84</td>
<td>10.5</td>
<td>14.3</td>
</tr>
</tbody>
</table>

In calculating quit rate (%), missing data was counted as still smoking; quit rate was adjusted by 95.5% for overreporting of quitting.
Of the 48 students who participated in the program, 2 already had quit smoking by the time the classes began, and 1 dropped out after the first session. The remaining 96% of the students attended most of the classes and completed both the immediate posttest and the 4-month follow-up. These results show much higher recruitment rates, much lower dropout rates, and much higher follow-up rates than in studies conducted in the United States (Sussman et al., 2001).

Using the naturally occurring quit rate among participants selected for the clinic of 3%, by follow-up, the 30-day quit rate and 7-day quit rate were about 3.5–4.8 times as high after exposure to Project EX. The previous, U.S. trial of Project EX achieved a program quit rate that doubled that obtained in the control condition. This indicates that participation in the program was useful in helping adolescent smokers quit smoking. However, larger studies should be done before generalizing the findings to all Chinese adolescents.

The results of this study indicate that it is feasible to implement smoking cessation programs among Chinese adolescents, that Chinese adolescent smokers are receptive to cessation programs such as Project EX, and that this program is effective in increasing short-term smoking cessation rates. These results suggest an optimistic future for use of Project EX in China. Of course, there are several limitations to this study. For example, as it was conducted as a pilot study, the sample is small, and there was no random assignment to a control and program group. Generalizing the findings to all Chinese Adolescents is limited. In addition, the quit rate established was measured over a relatively brief period, from a small sample, and it is subject to error because we did not reach the 20 students who did not attend the clinic. Still, the sample size was larger than 18 of the 66 studies reviewed by Sussman (2002). These results indicate that a larger trial should be conducted in Wuhan China, because the pilot findings are promising. Project EX is showing an ability to be adaptable in different countries, with few modifications.

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