Soz Praeventivmed 1989; 34: 24–29

Prevention of Tobacco Use Among Adolescents in Public Schools in San Diego County, U.S.A.

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Introduction

Data from the most recent U.S.A. national survey [1] on the pattern of drug use among American adolescents indicate that cigarette use among high school students is declining. Between 1977 and 1986 the prevalence of daily smoking decreased from 29.0% to 18.4%. Currently 30% of high school seniors report having smoked cigarettes in the past month and 67.6% report having tried cigarettes at least once in their lifetimes. Thirty-day prevalence estimates vary by a number of demographic and social factors including gender, region of the U.S. and population density. National monthly use rates of males were found to be 27.9% versus 30.6% for females. Monthly use rates are highest in the Northeastern portion of the U.S. (35.2%) and lowest in the South (26.1%). Rural regions have a slightly higher rate of use (31.0%) than suburban (28.0%) and urban (30.8%) areas.

Just as cigarette smoking among adolescents has been decreasing, the use of chewing tobacco and snuff (both referred to as smokeless tobacco) has been increasing. Currently some 20 to 30 million Americans use some form of smokeless tobacco [2]. A recent study by Schaefer, et al. [3] showed that 12% of high school students regularly used smokeless tobacco; a study conducted in Massachusetts found 12% of high school boys to be users [4], while a Nebraska study showed only 7% of students in grades 7–12 to be regular users [5]. Other prevalence estimates vary from 10.4% [2] to as high as 31.0%[6] for students of approximately the same age.

Smokeless tobacco use among high school students has been shown to be a predominantly male phenomena. In a recent study among high school students in Arkansas, fully 36.7% of males versus only 2.2% of females were shown to be current users of smokeless tobacco [7]. Though rates of smokeless tobacco use are typically highest in the Southeastern and rural regions of the United States, substantial use rates are found outside these areas as well, with one recent study of Colorado high school students showing 10% of urban and 13% of rural subjects to be users [8].

Data from students at younger age levels show that weekly use among males in fourth grade varies from 2.8% to as high as 9.4%. The percentages among females at this grade level are substantially lower, ranging from 0.0% to 2.0% [9].

Generally, ethnic minorities are at reduced risk for assuming the practice of smokeless tobacco use, with the possible exception of American Indians [10]. Hispanics have also been shown in some locations to be at increased risk for smokeless tobacco use [9]. Blacks and Asians, however, are shown in most areas to be at substantially lower risk of use [9, 11].

Just as progress has been made in recent efforts for preventing cigarette smoking, the tobacco industry in the United States and other Western countries has rapidly maneuvered to increase the marketing of smokeless tobacco. Their efforts have been successful, as it now appears that American youth are switching from cigarette smoking to smokeless tobacco use. Project S.H.O.U.T. is one of several new studies in the United States designed to counteract this trend by using successful psychosocial intervention techniques adapted from previous smoking prevention programs in the United States, Canada, Germany and elsewhere.

Methods

Recruitment of Schools

All elementary (Kindergarten to 6th-grade), middle (6th through 8th-grade), and junior high (7th through 9th-grade) public schools within a one-half hours's drive from the Project S.H.O.U.T. headquarters were sent recruitment letters for the pilot year intervention program. Because resources were limited at this stage of the project, the pilot sample was restricted to the first eleven schools that agreed to participate. Each school that agreed was asked to provide two 7th-grade (12- and 13-year olds) classes in which the program could be conducted. Two schools were very small and provided only one class. Following recruitment, the eleven schools were randomly assigned to either the intervention or control condition. The intervention group consisted of 6 schools (10 classrooms) and the control group of 5 schools (10 classrooms). Parents of the students in the selected classrooms were sent con-

sent forms requesting their permission for their child's participation in Project S.H.O.U.T.

Intervention Leaders

Project S.H.O.U.T. utilizes volunteer college undergraduate group leaders to work in the 7th-grade public school classrooms. Classes were led by pairs of undergraduates. Group leader training consisted of six, one and one-half hour sessions. The following materials/procedures were reviewed in the training sessions:

a. Questionnaire administration and saliva sampling.
b. The health consequences of tobacco use.
c. Advertising of tobacco products.
d. Five methods of resisting peer pressure.
e. Working with small groups.
f. Simulations of classroom experiences.
g. Intervention materials.

Content of S.H.O.U.T. classes

The first class session of the S.H.O.U.T. intervention consisted of a program orientation and baseline measurements. The students were informed that throughout the program they could earn raffle tickets for participating in group discussions and role playing activities, for completing homework assignments, and for good behavior.

Class session #2 began by presenting samples of cigarettes and smokeless tobacco for the students to look at, touch and smell. Students viewed a 20-minute videotape which explored smokeless tobacco, cigarettes, health effects, and peer pressure. A discussion followed.

Class session #3 began with a worksheet on why people start to use tobacco and where tobacco use occurs. Discussion also focused on the advantages of being tobacco free. Group leaders then demonstrated five methods of refusing tobacco offers: ignoring, arguing, getting mad, broken record, and point/counterpoint. The broken record method of refusing tobacco offers consists of repeating verbatim the same refusal to repeated offers of tobacco. For example, repeating the response "No thank you, I don't smoke" to both the first and second offer of tobacco would be classified as a broken record refusal, while saying "No thank you, I don't smoke" to the first offer followed by saying "No thank you, I said I don't want any" to the second offer would not. The point/counterpoint method consists of refusing a tobacco offer (point) while giving a reason for not accepting the offer (counter-point). An example of this technique would be a response such as, "No (point), smoking can cause cancer" (counter-point). Students practiced the various methods through role-playing, with particular emphasis on the broken record and point/counterpoint methods, the two most appropriate refusal methods.

In class session #4, group leaders worked with individual groups on developing and practicing skits about resisting peer pressure to use tobacco. Suggestions were given regarding dialogue, delivery, technique, facial expressions, body language, etc.

In the class session #5, groups presented their skits to the class. Group leaders videotaped most of the skits and judged which of the skits best demonstrated refusing an offer of tobacco. Following the skit presentations, group leaders collected all previously earned raffle tickets from the students for the lottery drawing. Prizes consisted of hats, notebooks, movie passes, pizzas, ice cream, albums, passes for video arcades, passes for skateboard rentals, etc. All prizes were donated by community businesses. In addition to the lottery prizes, all students received small prizes of anti-tobacco buttons, iron-on transfers of the S.H.O.U.T. logo, and bookmarks.

In part two of the program, which consisted of three "booster" sessions, students reviewed previous curricula, especially the point/counterpoint method of resisting peer pressure; discussed addiction to and cessation of tobacco use; and were given the opportunity to publicly announce their intentions to use or not use tobacco. Students then submitted to a final saliva sampling and prevalence survey.

The Lottery

A third condition was added to our pilot program when the Investigators wanted to compare the effects of skills training education (Intervention), no education (Control) and no skills training, but reinforcement for non-use of tobacco (Lottery). We devised an incentive system whereby students could, upon verification with a breath exam, win prizes for being non-users of tobacco [12]. Over a six week period, three surprise visits were made to each classroom. Each 7th-grade student was balloted as to whether or not he had used tobacco in the previous week.

Three students per class who reported "no" were asked to volunteer to validate their self-report of non-use by submitting to a visual mouth exam and a breath exam utilizing an Ecolyzer 2000™, carbon monoxide monitor. Upon validation, students were immediately rewarded with a nominal prize as reinforcement for non-tobacco use behavior. Prizes included duffle bags, posters, folders, pens, and sports equipment. The class that demonstrated the greatest reduction in tobacco use during the lottery program received a prize for the group to share. Mid-year and year-end prevalence surveys were administered to assess possible effects of the incentive condition.

Measures

Survey administration and saliva sample collection were completed in the eleven intervention and control schools for baseline measures in October, 1987. A total of 512 surveys and 405 saliva samples were collected. The majority of the parents that did not give their child permission to participate in Project S.H.O.U.T. did so because of the saliva sample collection. Thus, the teachers decided that all children would

participate in the project, including completing the survey, but only those who received permission would provide a sample of saliva.

Project S.H.O.U.T. administered questionnaires to the students to determine the number of tobacco users in the participating schools. However, because tobacco use among adolescents is generally perceived as a socially undesirable behavior, some students may be inclined to misrepresent their true smoking behavior on a self-report survey. Students may choose to underreport their tobacco use out of embarrassment or desire to please, or, on the other hand, may overreport it to appear older or uncooperative [13]. In order to improve the validity of the students' self-reported tobacco use, therefore, Project S.H.O.U.T. collected saliva samples, immediately prior to the survey administration, and informed the students that each sample could be analyzed for tobacco by-products. The effectiveness of this procedure is based on the assumption that students will be more truthful regarding their tobacco use habits if they believe that the researchers have an accurate method of objectively measuring that behavior [13]. Project S.H.O.U.T. analyzed the saliva samples for cotinine, a metabolite of nicotine, which can be found in body fluids and is almost exclusively related to tobacco exposure. In Fall 1987, there was 91.9% agreement between the classification of tobacco users obtained from salivary cotinine analysis and self-report, and 94.8% agreement in the Spring.

Mid-year surveys were administered in February, 1988 to all students in the control, lottery, and intervention schools. A total of 255 intervention, 229 control, and 214 intervention students were surveyed. Saliva samples were not collected because of logistical problems.

Surveys and saliva samples were collected for the posttesting in April, 1988. A total 251 lottery, 286 control and 215 intervention students were tested.

Measures of Social Skills

Few researchers have measured the effectiveness of a skills training intervention with an assessment of behavioral skills. Most programs rely on comparing prevalence of self-reported tobacco use between intervention and control conditions. Researchers at the Oregon Research Institute [14] used audiotapes to record scenarios of children being offered cigarettes. Students were asked to listen to the tape recordings and respond aloud to the offers of tobacco. The students' responses were recorded on another tape recorder and were content-analyzed by the research staff. Project S.H.O.U.T. replicated this study with some modifications. We added scripts for smokeless tobacco and emphasized forceful individual pressure, group pressure and repeated offers of the tobacco. Twenty scripts were developed by Project S.H.O.U.T. staff and reviewed by 6 volunteer students for social validity. The edited scripts were sent to a local high school drama department for rehearsal and subsequent recording. Script dialogue, sound effects, instructions and pauses were then edited together.

Four schools from the program, two intervention and two control, were contacted and asked to participate in the assessment. Approximately 78 students participated in the refusal skills assessment.

Tab. 1. Mean percent of students who used tobacco in the past week.

Condition	Number of schools	Pretest	Midyear	Posttest
Control	5	3.5	5.6	8.2
Intervention	6	7.3	8.6	7.3
Lottery	5		6.2	4.8

Results

Main study assessment

Table 1 and Figure 1 show the prevalence of regular tobacco users in the control, lottery and intervention schools. A regular tobacco user was defined as someone who used either smokeless tobacco or cigarettes in the past week. The baseline prevalence of regular users in the intervention and control schools was 7.3% and 3.5%, respectively. By posttest the proportion of regular users increased to 8.2% in the control schools but remained constant at 7.3% in the intervention schools.

Group leader assessment

Group leaders were rated by outside observers on seven categories: being prepared, maintaining class control, keeping students attention, encouraging participation, communication, relating to students, and working well as a team. It was found that highly rated group leaders had more of an effect in reducing tobacco use than poorly rated facilitators. Table 2 shows that working well in a team, relating well to

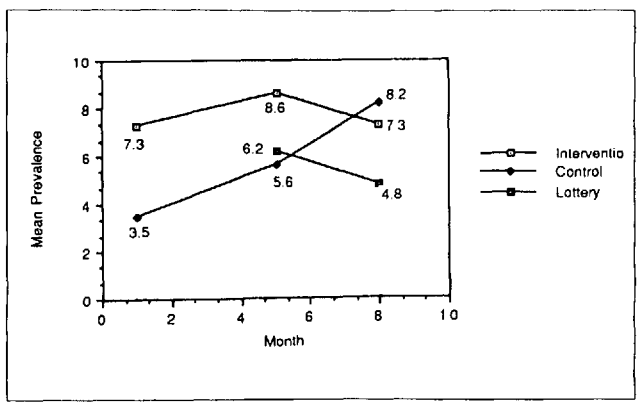

Fig. 1. Prevalence of tobacco use in past week.

Tab. 2. Correlation between peer leader ratings and proportional change in tobacco use in past week by rating category.

Category	Overall Tobacco Correlations	Sig*	Cigarette Correlation	Sig*	Smokeless Correlation	Sig*
Peer leader was well prepared	-.80	.03	-.56	.12	-.73	.05
Peer leader maintained class control	-.54	.13	-.16	.40	-.66	.08
Peer leader kept students attention	-.62	.09	-.10	.42	-.69	.06
Peer leader encouraged participation	-.68	.07	-.64	.09	-.55	.13
Peer leader communicated well	-.62	.09	-.52	.15	-.53	.14
Peer leader related well to students	-.74	.05	-.93	.00	-.51	.15
Peer leader worked well in a team	-.93	.00	-.77	.04	-.72	.05
Average of all categories	-.78	.03	-.52	.14	-.72	.05

* one-tailed

students and being well prepared were significantly correlated to proportional change in generic tobacco use in the past week ($p < .05$).

Lottery condition assessment

It was found that the baseline past-week prevalence of tobacco users in the five lottery schools was 6.2%. At the end of the lottery program, the prevalence of students that had used tobacco in the past week had decreased to 4.8% (Table 1 and Figure 1).

Evaluation of refusal skills

Students listened to audiotaped scenarios where they were offered cigarettes or smokeless tobacco. Students were to respond to the 20 offers as if they were actually present in the situation, but were instructed to refuse the offers. Their responses were recorded and scored for content.

The number of offers used in the analyses was reduced by eliminating items with poor frequency distributions in the response categories (point/counterpoint, argue, etc.) and items which did not include clear offers of tobacco. The final assessment included 14 situations, 7 with cigarettes and 7 with smokeless tobacco.

Based on the refusal methods introduced in the intervention, a three point scale was developed to rate the quality of each response. A response which consisted of a broken-record refusal or a point-counterpoint response were scored with a three, as they were considered to be the most appropriate and effective. Responses which consisted of only a simple direct refusal (e.g. "No thanks") or only a reason (e.g. "Smoking can cause cancer") but not both, were scored with a two, and responses which contained arguing, getting mad, ignoring, or supportive (e.g. "You go ahead") statements, regardless of whether or not they also contained other appropriate refusal statements, were scored with a one. An average quality rating was then obtained for each student by averaging these individual response ratings across the situations. The differences in the quality of responses between the intervention and control students are presented in Table 3. When scores were averaged across all of the situations, it was found that the intervention students scored higher, indicating higher quality responses, than the control students. The intervention students also gave significantly higher quality responses than the control students to offers of cigarettes, but not to offers of smokeless tobacco.

Tab. 3. Means and standard deviations of response ratings by type of offer.

	Condition				
	Intervention		Control		
Situation	M	SD	M	SD	Significance
Cigarettes	2.20	0.32	2.01	0.29	***
Smokeless Tobacco	2.24	0.38	2.11	0.34	NS
Total	2.22	0.30	1.96	0.26	***

*** $p < .01$

NS = not significant

Discussion

The results indicate the difference between the intervention and control schools from pre- to post-test did not reach the level of statistical significance. There are several possible explanations. First, it is possible that the intervention did not have a detectable effect given the small number of schools that participated as well as the small number of students within those schools, both of which contributed to increasing the standard error of the prevalence of tobacco use. Second, students at this age are actively experimenting with tobacco at accelerating rates, as apparent in the use trends among control students. Therefore, the differences between intervention and control students could be expected to further increase should additional follow-up measures be taken. Third, there is a high mobility rate among students in San Diego. Perhaps as much as 15% to 20% of the students transferred to new schools within the six month period. With such a high turnover rate, it is difficult to assess the actual number of tobacco users among the initial group of students unless individual names would have been collected. Names were not collected because several students were afraid to give honest answers for fear of getting in trouble with parents or teachers.

As Project S.H.O.U.T. was finishing a randomized trial of its general program, only tentative conclusions could be drawn. While there was a lack of significant results, the trends in tobacco use prevalence seemed to

indicate that the skills training arrested an acceleration of tobacco use among our intervention students, especially between the Christmas holiday and Spring posttests in the intervention schools. Therefore, perhaps we successfully countered a trend of increasing tobacco use which we could not actually get under control until the class had finished a few months of the training. That the intervention was effective was also supported by the apparent improvement in refusal skills observed among the intervention students. We were especially encouraged, however, by the apparent effectiveness of our lottery condition. This indicated that perhaps simply asking students not to use tobacco and backing this up with subsequent testing of whether they were using tobacco (while reinforcing them for non-use) may have been sufficient to deter usage. This would be somewhat contradictory with current thinking in the tobacco use literature, which holds that students turn to tobacco (or drug) use simply because they don't know how to sucessfully and appropriately resist negative pressure to use the substance. The success of our lottery condition would indicate that perhaps they do actually have the skills but need to be reinforced for using them. Others might perhaps argue that the use of "external" reinforcements might prove counterproductive over the years, and that such a strategy, underestimates the human capacity of the adolescents. To this we would counter that such reinforcement strategies need only be effective for a few years of high vulnerability to have a major health promotion impact. Students of this age (and all people for that matter) are largely products of their social environment, with all of the inherent pleasant and aversive consequences of behavior. Through the use of pleasant consequences, we are simply trying to emulate the success of effective parents, teachers and others who place highest priority on the health and well-being of their children.

Through our main phase intervention, we will be working in twelve intervention and twelve control schools, combining both the lottery condition and the social skills training for all intervention students. We hope that our work in this area will give us a clear understanding of how to prevent all forms of tobacco use, which other cultures may adapt should they soon be faced with the problem of smokeless tobacco as we are in the United States. Moreover, we hope that we will also be able to adapt these measures to the prevention of alcohol and drug abuse among this vulnerable population group.

Summary

Project S.H.O.U.T. (which stands for "Students Helping Others Understand Tobacco") is a tobacco-use prevention project funded by the United States National Cancer Institute for preventing the use of cigarettes and smokeless tobacco (snuff and chewing tobacco) in public schools in San Diego County, California. Based on principles of behavior modification, Project S.H.O.U.T. teaches students how to anticipate and overcome negative peer pressure to use tobacco and reinforces them for having done so. Preliminary results indicate that the prevalence of tobacco use among students receiving peer pressure resistance skills training was somewhat but not statistically significantly lower than the control group after one year of intervention. In addition, students in a third lottery condition, who were reinforced for simply not using tobacco, showed lower prevalence rates compared to controls. Additional support for the efficacy of the intervention program was provided by the refusal skills assessment test, which indicated that students exposed to the intervention were able to refuse tobacco offers more effectively than the control students. Our results indicate that tobacco use prevention experts should do more than provide decision-making and behavioral skills for resisting tobacco use, but should also reinforce the non-use of tobacco.

Résumé

Prévention de la consommation de tabac chez des adolescents dans les écoles publiques du comté de San Diego, USA

Le projet S.H.O.U.T. («Students Helping Others Understand Tobacco») est un projet financé par l'Institut américain de recherche sur le cancer (United States National Cancer Institute) qui s'intéresse à la prévention, en milieu scolaire, de la consommation de tabac, sous forme de cigarettes mais aussi de tabac à priser et à mâcher. Ce projet se fonde sur l'apprentissage de comportements nouveaux: l'intervention consiste à apprendre aux enfants à anticiper et résister aux offres de tabac puis à les conforter dans cette attitude de résistance aux pressions du groupe social. Les résultats préliminaires montrent que, si l'on compare les enfants ayant subi cet entraînement à un groupe témoin, la prévalence de la consommation de tabac est, après une année, inférieure, mais pas statistiquement différente, pour ces premiers. De plus, les élèves d'un troisième groupe qui étaient simplement récompensés s'ils prouvaient leur abstinence, présentent une prévalence inférieure à celle du groupe témoin.

Par ailleurs, tous les élèves ont subi un test qui mesure les capacités à refuser. Manifestement, les élèves du groupe d'intervention savent refuser de manière bien plus habile et donc plus efficace que ceux du groupe contrôle.

Nos résultats indiquent donc qu'il est possible, grâce à de tels programmes d'intervention, de modifier le comportement des enfants et, ainsi, de les amener à restreindre leur consommation de tabac.

Zusammenfassung

Prävention von Tabakgenuss bei Jugendlichen in öffentlichen Schulen San Diegos, USA

Das Projekt S.H.O.U.T. (Abkürzung für «Students Helping Others Understand Tobacco») ist eine Initiative zur Raucherprävention, die vom US-amerikanischen Krebsforschungsinstitut (National Cancer Institute) gefördert wird und die den Einstieg in das Rauchen von Zigaretten und andere Formen des Tabakgenusses (Schnupftabak und Kautabak) in öffentlichen Schulen des Bezirks San Diego, Kalifornien, verhindern soll. Gestützt auf die Grundsätze der Verhaltensmodifikation vermittelt das Projekt S.H.O.U.T. Schülern, wie sie einen sozialen Druck von Gleichaltrigen, der negative Folgen haben würde, erkennen, ihm ausweichen und wie sie ihre Widerstandshaltung stabilisieren können. Erste Ergebnisse lassen erkennen, dass nach einem Jahr der Intervention die Prävalenz des Tabakgenusses bei Schülern, die eine Unterweisung in Techniken des Widerstands gegen den sozialen Druck von Gleichaltrigen erhalten haben, etwas, aber nicht statistisch signifikant, niedriger als in der Kontrollgruppe war. Die Prävalenzrate (verstanden als Tabakgenuss in der vergangenen Woche) blieb in den Interventionsschulen stabil bei 7,3%. Die Prävalenzrate in den Kontrollschulen stieg von 3,5 auf 8,2%. Ausserdem waren die Prävalenzraten von Schülern, die in ihrem Verhalten, auf den Genuss von Tabak einfach zu verzichten, bestätigt worden waren, niedriger als in den Kontrollgruppen. Diese Ergebnisse zeigen, dass Präventionsexperten sich nicht einfach mit der Vermittlung von Techniken der Entscheidung und des Verhaltens in bezug auf Tabakkonsum zufrieden geben und auch die Ablehnung jedes Tabakkonsums verstärken sollten. Die Wirksamkeit des Interventionsprogramms konnte ebenfalls durch einen Test zur Entwicklung von Ablehnungsverhalten erhöht werden, der erkennen liess, dass Schüler, die unmittelbar von der Intervention angesprochen wurden, erfolgreicher Aufforderungen zum Tabak-

konsum ablehnen konnten als die Schüler in der Kontrollgruppe. Unsere Befunde zeigen auch, dass sowohl gegen Zigarettenrauchen als auch die «rauchfreien» Formen des Tabakgenusses in einem Programm erfolgreich angegangen werden kann.

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Acknowledgements:

This work is supported by Grant 1-RO1-CA44921-01 from the National Cancer Institute.

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