

# Evaluation of a Tobacco Prevention Curriculum for Elementary School Children

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## Abstract

This study evaluates the effectiveness of a tobacco education curriculum in increasing knowledge about tobacco, attitudes toward tobacco use, and intentions to use tobacco among elementary school children. A two-stage cluster sample was used to select a representative sample of 97 schools. Forty-nine schools were in the evaluation group and 48 schools were in the comparison group. One thousand seven hundred and forty-six third grade students participated in the study. The results indicate a significant increase in knowledge and attitude in posttest scores but no significant difference in intentions posttest scores. Most students never tried cigarettes, smokeless tobacco, or cigars (95%, 98%, and 98%, respectively). There were no significant differences between the evaluation and comparison groups for use of any tobacco products ( $p > .05$ ). Boys were almost twice as likely to have tried cigarettes ( $p < .05$ , OR 1.78) and almost three times as likely to have tried cigars ( $p < .05$ , OR 2.52) than girls.

Almost one-half (48%) of fifth graders who have tried cigarettes reported they first did so in the third grade (Kann, Kinchen, Williams, et. al, 1998). Smoking has now reached epidemic proportion among children and according to the WHO "nicotine addiction" is a pediatric disease (DHHS, 2003; WHO, 2001). Early tobacco use is associated with heavier use in adulthood (National Cancer Institute, 2001; American Academy of Pediatrics, 2001). In addition, nicotine addiction in adolescence is as severe as that in adults, and they have as difficult a time in quitting (Elders, Perry, Eriksen, Giovino, 1994). Elementary-aged children who try cigarettes are more likely to smoke as adults than those who try it at older ages (DHHS, 2003; DHHS, 2001; National Cancer Institute, 2001).

Risk behaviors learned and established in childhood, such as smoking, contribute to cancers and heart disease later in life (DHHS, 2003). Smoking is believed to be part of a cluster of behavioral and psychological problems that emerge as early as elementary school (Coogan, Adams, Geller, Brooks, Miller, & Koh, 1998). Children and adolescents who smoke are more likely to have low self-esteem, have poor school performance, use illicit drugs and alcohol, be sexually active, and engage in fights (CDC, 2001; Coogan, et al. 1998). In addition, children and adolescents who smoke tend to underestimate the addictive effects of tobacco. Seventy-five percent of high school smokers who thought they would quit after five years were still smoking seven to nine years later (National Council on Alcoholism and Drug Dependence, 2001). Thus, tobacco education and prevention programs should begin in elementary school.

There is a paucity of studies on tobacco use among elementary school children and the effectiveness of tobacco awareness programs targeted towards them. To date, most major studies have focused on adolescents (DHHS, 2003; National Cancer Institute, 2001; Ganey, Young, & Wood, 1998). This study evaluated the effectiveness of the *Eglin Long-Horn of Nightshade County* tobacco prevention curriculum among third graders in Florida. A certified health education specialist, who also is an author and illustrator of children's books, developed the curriculum.

This curriculum is an illustrated children's book that centers on tobacco use and its consequences. The story explores the chemical make up of tobacco; the physiologic, cosmetic, and social consequences of using tobacco; the immediate and long-term health consequences of use; tobacco advertising; and secondhand smoke. The curriculum has a strong emphasis in language arts, science, health education, math, social studies, and character building. The

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## Introduction

According to the World Health Organization (WHO), approximately five million people die yearly from tobacco-related illnesses (World Health Organization, 2003). In the United States, tobacco contributes to one in every five deaths each year (U.S. Department of Health and Human Services [DHHS], 2003). Experimentation with tobacco begins at an early age. Nationally, approximately 80% of first time tobacco use occurs by age 18 (National Cancer Institute, 2001) and 22% of students have smoked a whole cigarette by age 13 (Centers for Disease Control and Prevention [CDC], 2002).

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curriculum meets all the criteria for the Florida Tobacco Pilot Program and the Florida Department of Education Sunshine State Standards. There are nine chapters with accompanying worksheets and activities. A teachers' guide on how to implement the curriculum is included.

The goals of this study were to: (1) assess knowledge of tobacco products and consequences of use; (2) assess attitudes towards not using tobacco products; (3) assess intentions toward using tobacco products; (4) assess elementary teachers' reactions to the curriculum; and (5) encourage commitments toward not using tobacco products.

### Methods and Procedures

#### Participants

This study used a two-stage cluster sample design to select a representative sample. The first stage consisted of 737 schools within the five regions of the state that agreed to participate. At the second stage, each school was assigned a random number within their counties in the region. Ninety-seven elementary schools within the five regions were randomly selected to participate in the program. The schools were then randomly divided into the evaluation group (which received the curriculum) or the comparison group (which did not receive the curriculum). The teachers in the comparison group were advised to not teach their students about alcohol, tobacco, or other drugs before and during the study. The curriculum was made available to the teachers and students in the comparison groups at the end of the study. One thousand seven hundred and forty-six third grade students from the five regions in Florida had parental permission to participate in the study. The Institutional Review Board at the researchers' institution as well as the Institutional Review Board of the respective school boards approved the study.

#### Instrumentation

This curriculum was pilot tested with six elementary schools and 24 classes within those schools. The results indicated that the *Eglin* curriculum significantly improved students' knowledge, attitudes, and intention towards using tobacco products. Teachers also responded positively to the curriculum and would recommend its use. The results of the pilot test are published elsewhere (Chen & Lindsey, 2001). A 15-item instrument was used to assess students' pre- and post-assessment knowledge of tobacco. A 27-item instrument also was used to assess students' pre- and post-assessment attitudes and intent towards tobacco use. It also contained demographic information. The response formats for the items on the student surveys were dichotomous (e.g., True/False) and trichotomous (e.g., Yes/No/Maybe). Cronbach's alpha was used to assess internal consistency of the instruments. Cronbach's alpha ranged from .64 for the knowledge test, 0.66 for the attitude towards smoking, and 0.94 for the intent to smoke. Students in the evaluation group also completed a 12-item instrument to evaluate how the curriculum affected

their knowledge, attitudes, and intentions towards tobacco use.

Teachers for the evaluation group were mailed a 30-item instrument (including two open-ended questions) to assess the effectiveness and utility of the curriculum. The teachers' instrument used dichotomous items and items on a five-point Likert scale. The teachers' instrument was written at an eighth grade reading level and was designed to take approximately 15 minutes to complete. Participating teachers and the safe and drug free school coordinators in the pilot study assessed the face validity and reading level of all instruments (Chen & Lindsey, 2001). Revisions were made accordingly.

#### Procedures

Third grade teachers implemented the *Eglin* curriculum during regular school hours. Teachers attended a two and one-half hour training session on how to implement the curriculum and use the materials. The teachers read the questions on the assessment instruments and students followed along on their own copies. Students completed the pre-assessment instruments a few days before the curriculum was implemented. The curriculum was implemented over two to four weeks. Students then completed the posttest assessment instruments. The post-assessment instruments were completed a day or two after the curriculum was completed. The teachers' assessment instrument was mailed to them during the last week of the curriculum. The instrument was returned in a self-addressed stamped envelope.

#### Data Analysis

Statistical analyses were performed with JMP Statistical Discover Software (release 5.1, 2002 SAS Institute, Cary, NC). Chi-square, odds ratio (OR), t-test, and analysis of covariance (ANCOVA) were used to evaluate differences between the evaluation and comparison groups. The pretest was used as the covariate in the ANCOVA. Significance was set at  $p < 0.05$ .

### Results

#### Demographics

One thousand seven hundred and eighty-four third grade students from the five regions in Florida were randomly selected for the study but only 1,746 received parental permission to participate in the study. Forty-nine schools (958 students) were used to evaluate the *Eglin Long-Horn of Nightshade County* curriculum and 48 schools (788 students) were used for comparison. The average age was 8.75 years. Fifty-one percent were girls and 49% were boys. Ninety-three percent of the students came from the three largest U.S. ethnic groups—whites, blacks, and nonwhite Hispanics (61%, 19%, and 13%, respectively). The remaining students identified themselves as American Indian, Asian, and Pacific Islander (4%, 2%, and 1%, respectively)

Table 1

*Pretest, Posttest, and Adjusted Posttest Means*

Variable	Pretest	Posttest	
		Obtained	Adjusted Posttest
<b>Knowledge</b>			
Evaluation (n=951)	6.35±0.08	10.57±0.10*	10.61±0.08*
Comparison (n=772)	6.64±0.09	7.19±0.10	7.14±0.10
<b>Attitude</b>			
Evaluation (n=954)	18.17±0.06	18.74±0.07*	18.74±0.07*
Comparison (n=788)	18.21±0.06	18.16±0.08	18.15±0.08
<b>Intentions</b>			
Evaluation (n=954)	19.52±0.06	19.58±0.06	19.58±0.05
Comparison (n=788)	19.53±0.06	19.49±0.07	19.49±0.06

\* $p < .0001$ .**Knowledge About Tobacco**

The maximum score that could be achieved on the knowledge scale was 15. Although the comparison group had a significantly higher score ( $6.64 \pm 2.3$ ) than the evaluation group ( $6.35 \pm 2.5$ ) on mean pretest score ( $t = -2.47, p = 0.01$ ), the mean difference was small; however, the evaluation group scored significantly higher ( $10.57 \pm 2.3$ ) than the comparison group ( $7.19 \pm 2.7$ ) on mean posttest score ( $t = 25.88, p < 0.0001$ ). The adjusted post-assessment mean using ANCOVA was still scored significantly higher ( $10.61, SEM 0.08$ ) than the comparison ( $7.14, SEM 0.10$ ) on the mean posttest score ( $p < 0.0001$ ). (Refer to Table 1.)

**Attitude Towards Tobacco**

The maximum score that could be achieved on the attitude scale was 20. There was no significant difference between the evaluation group ( $18.17 \pm 0.06$ ) and the comparison group ( $18.21 \pm 0.06$ ) in mean pretest score ( $t = -0.43, p = 0.66$ ). There was a small but significant difference between the evaluation group ( $18.74 \pm 0.07$ ) and the comparison group ( $18.16 \pm 0.08$ ) in mean posttest scores ( $t = 5.14, p < 0.0001$ ). ANCOVA also found a small but significant difference between the evaluation group ( $18.74, SEM 0.07$ ) and the comparison group ( $18.15, SEM 0.08$ ) in mean posttest score ( $p < 0.0001$ ).

**Intentions Towards Tobacco**

The maximum score that could be achieved on the intention scale was 20. There was no significant difference between the evaluation group ( $19.52 \pm 0.05$ ) and the comparison group ( $19.53 \pm 0.06$ ) on mean pretest scores ( $t = -0.297, p = 0.76$ ). There also was no significant difference

between the evaluation group ( $19.58 \pm 0.06$ ) and the comparison group ( $19.49 \pm 0.07$ ) in mean posttest score ( $t = .961, p = 0.33$ ). ANCOVA did not find a difference between the evaluation group ( $19.58 SEM 0.05$ ) and the comparison group ( $19.49 SEM 0.06$ ) in mean posttest score ( $p > .05$ ).

**Tobacco Behavior**

Most students never tried cigarettes, smokeless tobacco, or cigars (95%, 98%, and 98% respectively). There were no significant differences between the evaluation and comparison groups for any of the tobacco products ( $p > .05$ ). Of those who tried tobacco products, boys were almost twice as likely to have tried cigarettes ( $p < .05, OR 1.78$ ) and almost three times as likely to have tried cigars ( $p < .05, OR 2.52$ ) than girls. There was no significant gender difference in smokeless tobacco use. At the end of the program intervention, 97% of the students in the evaluation groups made a personal commitment to not smoke, chew, or dip tobacco.

**Student Evaluation of Eglin Long-Horn of Nightshade County Curriculum**

The *Eglin Long-Horn of Nightshade County* curriculum was well received and rated highly by the students. Students were asked to respond "yes," "no," or "not sure" to items on the student evaluation. On average, students responded "yes" 93% of the time, ranging from 80% to 98% (Table 2).

**Teacher Evaluation of Eglin Long-Horn of Nightshade County Curriculum**

The teacher's evaluation instrument assessed whether the curriculum met the teachers' needs, its ease of use, its general components, and the tobacco prevention

Table 2

*Student Evaluation of Eglin Long-Horn of Nightshade County Program (n=853)*

	"Yes" Responses	
	n	%
Has <i>Eglin</i> helped you understand that tobacco cause many diseases?	832	98
Do you want to be proud and healthy like <i>Eglin</i> for choosing to be not use tobacco?	836	98
Do you think the <i>Eglin</i> story and activities have given you good reasons to never smoke, chew, or dip tobacco?	824	97
After reading <i>Eglin</i> , can you tell other people what you have learned about tobacco?	816	96
Do you think that smoking and chewing tobacco are unhealthy habits?	820	96
After reading <i>Eglin</i> , will you try to stay away from secondhand smoke?	818	96
Did you learn from <i>Eglin</i> that secondhand smoke could make you sick if you breathe it?	799	94
Do you think other 3 <sup>rd</sup> graders would like their teachers to read <i>Eglin</i> to them?	797	94
Has <i>Eglin</i> given you some reasons to ask someone you love to stop smoking, chewing, or dipping tobacco?	793	93
Did <i>Eglin</i> help change the way you feel about not smoking and chewing tobacco?	761	89
Did <i>Eglin</i> help you understand that using tobacco can affect the way people think about you?	728	85
Has <i>Eglin</i> taught you how to resist peer pressure?	678	80

components. The assessment used a 5-point Likert scale, with 5 being the most favorable response. The curriculum was well received and rated highly by the teachers. Most teachers (97%) rated the curriculum between good and excellent. All teachers (100%) believed the program strengthened the attitudes of their students concerning the harmful effects of using tobacco. Most teachers (95%) would recommend that their district use the program in all elementary schools. In addition, most (97%) reported the book presented them with many teaching options (Table 3).

#### Discussion

Preventing tobacco use is a concern for health professionals and educators. In 1994, the CDC recommended that tobacco education programs begin in elementary school and continue through grade 12, with intensive focus on grades six through eight (CDC, 1994). Research has shown that elementary-aged children have very limited understanding and factual knowledge about the health consequences of tobacco use (Chin, Schonfield, O'Hare,

Showalter, & Cretchetti, 1998). The results from this study indicated that quality health education curricula such as *Eglin Long-Horn of Nightshade County* program can positively impact children's knowledge and attitudes towards tobacco use. In addition, the curriculum shows that tobacco education can have an impact as early as the third grade.

As expected, there was a low prevalence of tobacco use among these third graders; however, the fact that some had already experimented with tobacco reinforces the importance of implementing age-appropriate tobacco awareness and prevention programs such as *Eglin* in elementary schools. Boys were significantly more likely to try cigarettes and cigars than girls. This indicates the possible need for gender-specific tobacco prevention programs. Teachers and students responded very positively to the program and gave it a high evaluation. These positive responses also suggest that this was an appropriate curriculum for the target group.

The study has several limitations. The responses were subjective and self-reported. It is possible that other assessment methods would have yielded different results. The study also does not provide any long-term follow up of

Table 3

*Teacher Evaluation Results (n = 39)*

Sections		% of Strongly Agree/Agree
<b>General Components</b>		
Material free of racial and gender bias		100
Subject is covered adequately		100
Program objectives are met		100
I like this material		97
Information is accurate		97
Material is of high quality		97
Material captures and holds interests and attention of students		97
Material stimulates useful discussion		97
Students respond spontaneously to material		92
Material is clear and concise		92
I like the format		92
Program meets needs not met in present health curriculum		90
Material is easy to use		90
Material is appropriate for grade level		77
Vocabulary is suitable for grade level		74
<b>Tobacco Prevention</b>		
Material contains factual information on health risks of tobacco		100
Material stresses unhealthful effects of using tobacco		100
Material promotes healthy, safe, and responsible attitudes and behaviors		100
Material teaches positive decision making and critical thinking skills		95
Information is presented in manner that children understand		92
Material teaches refusal skills.		90
Material discusses ways to resist peer pressure to use tobacco		90
Material stresses that its against the law for minors to use tobacco		90
<b>Final Questions</b>		
<i>Eglin</i> strengthened students attitudes about tobacco	"Yes" responses	100
Overall rating of program	"Good to Excellent"	97
Presented you with many teaching options	"Yes" responses	97
Recommend book in all elementary schools	"Yes" responses	95
Did <i>Eglin</i> reach any high risk youth?	"Yes" responses	69

students. The long-term effects of tobacco education programs for elementary-aged children in preventing future tobacco use are debatable; however, smoking is part of a cluster of behavioral and psychological problems that emerges in late childhood and early adolescence (Elders, Perry, Eriksen, & Giovino, 1994; Heyman, 1997). One study

also suggests that tobacco prevention programs should specifically target grades three through five (Sarvela, Monge, Shannon, & Nawrot, 1999). Thus, it is good public health practice to introduce the foundations of a healthy lifestyle, including preventing tobacco use, as early as possible.

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