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Student Pharmacists Provide Tobacco Use Prevention Education to Elementary School Children: A Pilot Experience


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Abstract

Background and purpose: The purpose of this article is to describe a service learning experience involving tobacco prevention education and to measure the education's effect on the learners' knowledge of tobacco products.

Educational activity and setting: Student pharmacists planned and presented a 40-minute tobacco prevention education program using the Tar Wars curriculum to fourth and fifth grade students at three suburban elementary schools in Western Massachusetts. Mean scores on a five-question assessment given to school age children before and after the presentation were compared. A total of 206 elementary school students in ten classrooms participated.

Findings: The average survey score increased from 1.87 on the pre-survey to 3.72 out of a maximum of five on the post-survey (P<0.01).

Discussion and summary: Student pharmacists provided tobacco prevention education to three suburban elementary schools. The children demonstrated an increase in short-term knowledge regarding tobacco use. Tobacco prevention is a unique co-curricular opportunity for student pharmacists to get involved in their community.
Keywords: Tar Wars, student pharmacist, tobacco education, public health

**Background and purpose**

The 2013 Center for the Advancement of Pharmacy Education (CAPE) Outcomes\(^1\) include specific mention of health and wellness (Outcome 2.3), population-based care (Outcome 2.4), and educator (Outcome 3.2) as critical to the development of practice-ready pharmacists. Additionally, the Accreditation Council for Pharmacy Education (ACPE) 2016 Standards\(^2\) require pharmacy programs to provide and assess co-curricular experiences that advance the professional development of student pharmacists. This article describes such an activity at the Western New England College of Pharmacy.

Tobacco use is the leading cause of preventable morbidity and mortality in the US.\(^3\)\(^-\)\(^5\) It is responsible for approximately 480,000 deaths each year and causes tobacco-related chronic disease in an estimated 8,600,000 people.\(^4\) In 2014, approximately 16.8% of adults in the U.S. were smokers.\(^3\) One of the Healthy People 2020 campaign objectives is to reduce this percentage to less than 12%.\(^6\) Although this objective focuses on adults who smoke, approximately 90% of these individuals began smoking before 18 years of age.\(^4\) According to the 2014 National Youth Tobacco Survey, 7.7% of middle school and 24.6% of high school students reported use of one or more tobacco products in the previous 30 days.\(^7\) It is estimated that every day, 3,800 youths smoke their first cigarette and 1,000 of these become daily smokers.\(^7\)

The causes of the current tobacco use epidemic are complex. Factors that influence youth to begin smoking include glamorization of smoking, mass marketing, and social influences including peer pressure.\(^7\) Prevention is integral to ending this epidemic. Healthy People 2020 outlines a comprehensive strategic plan to reduce tobacco use with objectives aimed at reducing tobacco prevalence, health system changes to promote smoking cessation, and social and environmental changes that discourage tobacco use.\(^6\) The Centers for Disease Control's (CDC) Best Practices for Comprehensive Tobacco Control Programs-2014 provides an evidenced-based guide for states to establish comprehensive tobacco control programs.\(^8\) It promotes an approach that combines educational, clinical, regulatory, economic, and social strategies as research has demonstrated that a multicomponent effort is most effective. It specifically states that community programs and school policies and intervention should be part of the comprehensive effort and combined with mass-media education campaigns.
In contrast to community-based programs, several national anti-smoking campaigns have been evaluated in the literature. The impact of the national mass-media “truth” anti-smoking campaign on national smoking rates among 50,000 students in the eighth, tenth, and twelfth grades from 1997-2002 found a 7% decline in smoking rates in the sample population and attributed 22% of the decline to the anti-smoking campaign.\textsuperscript{9} Due to the cost, such mass-media campaigns are usually undertaken only by large organizations or governmental bodies, whereas school-based tobacco prevention education programs may exist on a smaller scale such as at the state, county, or school district level.

The CDC does not promote a specific tobacco prevention curriculum, though several programs are available.\textsuperscript{8} Tar Wars, a program owned and operated by the American Academy of Family Physicians that was developed in 1988, has frequently been cited in the literature.\textsuperscript{10-16} This structured curriculum is available for free and does not require specific training for the presenter. It has been shown to improve students’ knowledge regarding tobacco use, though no long-term studies evaluating its effects on tobacco use behaviors have been published.\textsuperscript{13,14} Since its inception, the Tar Wars program has reached more than 10 million children. The desired audience for the program is fourth and fifth grade students who may be starting to feel the pressure from those around them to try tobacco products. It is ideal to provide this education to elementary school students as waiting until middle or high school may be too late. The goal of the program is to provide education on the harmful effects of tobacco through class discussion, hands on activities, and small group work. This report will document the planning, implementation, and evaluation of this educational intervention. Specific objectives of the Tar Wars program are in Table 1.\textsuperscript{16}

In addition to not promoting a specific curriculum, the CDC does not specify who should provide tobacco prevention education. Within elementary schools, the education is often provided by teachers or a school nurse.\textsuperscript{10} Although school nurses possess adequate knowledge of the negative health effects of tobacco, they may not have time in their daily schedule to educate large portions of the student body. A possible solution is to incorporate volunteers from outside the school, such as healthcare professionals or students studying health-related fields. Pharmacists are considered to be one of the most trusted health professionals and are readily accessible within the community.\textsuperscript{17} The pharmacist's role in providing smoking cessation activities is well documented.\textsuperscript{18-22} The ability of student pharmacists to provide education has been documented in the literature; some of the published topics include: proper antibiotic
usage, asthma, vaccines, over-the-counter medication selection, and bone density screenings.\textsuperscript{23-27} Student pharmacists receive tobacco cessation education within the didactic portion of the pharmacy curriculum in addition to knowledge and skills gained during experiential hours. Given pharmacists knowledge of tobacco use and smoking cessation and their role in patient education for prevention and treatment of other diseases, it is reasonable to suggest that pharmacists and student pharmacists would be a viable resource for providing tobacco prevention education. While several reports describe the role of nursing students in providing tobacco prevention education, to date, there is no published description of pharmacists or student pharmacists providing youth-directed tobacco prevention education.\textsuperscript{12,15,28} The purpose of this project was to explore the feasibility of student pharmacists providing tobacco prevention education using the Tar Wars curriculum at local elementary schools. This article describes the first-year experience of the pilot project.

**Educational activity and setting**

In 2014, students at Western New England University College of Pharmacy sought to establish a relationship with a local area school district to provide the Tar Wars Program. A faculty member who was board-certified in ambulatory care was identified as the project advisor due to potential interest. The role of the faculty project advisor was to serve as a liaison between the college and the local school district, and to aid with training and troubleshoot any challenges during the presentation. Emails were sent to three local school districts to solicit interest in the program. One area school district with three elementary schools responded. Prior to determining the schedule, the faculty project advisor and student leaders met with the principals of the participating schools. During this meeting, there was extensive discussion of the needs within the individual schools and the specific activities that could address these needs. Concerns were raised about the timing of the presentations, training of the students, and any financial commitment required by the individual schools. The program content, as well as space and time requirements were reviewed with the schools’ administration. Coordinating a schedule with the elementary schools required three to four months of communication.

Students within the professional doctor of pharmacy (PharmD) curriculum were recruited through student organizations and encouraged to volunteer for this unique community service opportunity. A Tar Wars Committee made up of approximately 10 student pharmacists was charged with preparing the
materials such as model cigarettes, tar, magazine ads, and drafting questions to ask the elementary students during the presentation. Students were advised to follow guidance from the Tar Wars website. Speaker training consisted of providing each presenter with a copy of the Tar Wars program guide and a demonstration by advisor. Students would then teach back each activity to the faculty advisor to ensure consistency. The Tar Wars curriculum was modified slightly, from 45 minutes to 40 minutes, to allow time for survey completion. A list of the planned activities is provided in Table 2. Of note, activity five was customized to incorporate a large fake cigarette that allowed each of the elementary students to pull out a note card highlighting the ingredient and the other uses for that specific ingredient. This was done to allow for greater class participation and to achieve a collective response from the group as each ingredient was read aloud.

Student pharmacist presenters worked in groups of two or three. Each group met for 15 to 20 minutes before the presentation to discuss the flow of the program and divide up the leadership roles of each activity. Additionally, presenters met before the presentation to determine who would lead each section and what specific questions would be asked. Each group of presenters were then assigned to a room of 20 to 30 students to provide the tobacco prevention education. This was essential to smooth delivery of the program as each activity has several components that need to be explained in detail. For example, during the straw breathing exercise, students must be advised not to participate if they have asthma or other breathing related conditions and instead could assist the facilitators with keeping time while watching their classmates. During the student presentations, the faculty advisor circulated through the classrooms to ensure the program was running smoothly and was available to aid if necessary. After delivery of all programs, teachers and principals were contacted to provide feedback and suggestions for improving the program.

A survey containing five questions to assess knowledge based on the Tar Wars learning objectives (Figure 1) was developed. This survey was developed in consultation with elementary educators to ensure language was appropriate for school age children. The survey was administered to students immediately before and after the presentation. Students were not allowed to discuss the survey with each other during the administration time. To preserve student confidentiality, neither individual nor school identifiers were collected. Both the Institutional Review Board at the college and the superintendent of the
school district approved the survey. The mean score pre- and post-survey were compared using a paired Student's t-test. A p-value < 0.05 was considered significant. Statistical analysis was performed using SPSSv19.

Findings

Approximately 15 student pharmacists provided tobacco prevention education to a total of 206 elementary students in 10 classrooms across three suburban schools over two days. Presentations were given to three to four classes at a time and utilized two to three presenters in each classroom. The faculty coordinator circulated between classrooms every four to five minutes to ensure the material was delivered appropriately and in a timely manner. Additionally, the teachers from the elementary school remained in the classroom to assist if needed. Pre- and post-surveys were received from 100% and 96% of the students, respectively. The average survey score increased from 1.87 on the pre-survey to 3.72 on the post survey (p<0.01). Positive feedback in the form of emails from individual teachers and the principals was received from all schools along with requests for the program to return the following year. Emails and letters of praise were forwarded from the point of contact within the school district to the coordinator within the college of pharmacy. All schools requested more information on electronic cigarettes and vaping.

Discussion

Providing tobacco prevention education to youth presents a unique opportunity for student pharmacists to become involved in their community and to extend the reach of limited resources currently available to school systems. It also provides an opportunity for a school of pharmacy to meet the Center for the Advancement of Pharmacy Education (CAPE) Guidelines' outcomes for health and wellness (Outcome 2.3), population-based care (Outcome 2.4), and educator (Outcome 3.2). This project demonstrates a successful implementation of one tobacco prevention education program at three suburban elementary schools in central Massachusetts. The elementary school students demonstrated an increase in knowledge regarding tobacco use as evidenced by a statistically significant increase in mean survey score after the education.

This report compares favorably to similar implementations carried out by nursing students. Miller and colleagues used the Tar Wars curriculum to teach a sixth-grade class. No baseline evaluation of knowledge was given but students achieved a mean of 95% on a knowledge assessment following the
presentation. Bassi et al\textsuperscript{15} also used the Tar Wars curriculum to provide education to ninety-six fourth and fifth grade students. Pretest and posttest measurements were performed however the pretest results were not reported making comparison to the current work difficult.

There were several challenges to note for others who wish to duplicate this endeavor. First was the coordination of the timing of this experience. Advisors should carefully account for both time to plan and to deliver the education involving multiple professional years of student pharmacists with varying class schedules. Another challenge was scheduling the programs during the winter months when snow delays were a possibility. While this activity did not take place in a healthcare setting, the student pharmacists were challenged to work together to achieve a common goal and act as a member of a healthcare team.

There are limitations to this project. The sample population represented one suburban school district and no student demographics were collected. Comparisons between schools could not be performed. Due to the one-day education provided, we were unable to reassess the students later during the school year for knowledge retention. Effects on long-term knowledge retention and especially tobacco avoidance would be ideal. The survey that we administered was identical before and after the education, therefore the correct responses could have been due to practice effect. Additionally, the survey was not previously validated in school age children and we did not collect formal feedback from the schools. Due to lack of control group, there is no way to know if students who did not receive this program would also be able to have a similar rate of correct response if given the survey a second time.

The authors recognize that changes to the program may be warranted and have already begun developing a modified program based on feedback from the schools and on the limitations mentioned above. This includes expanding the program to include more schools and adding information regarding electronic cigarettes and vaping. Future opportunities for research include perceptions of the elementary school teachers, administrators, and Tar Wars presenters, and collection of long-term retention data.

**Summary**

Student pharmacists are a viable resource to provide tobacco prevention education to local elementary school children using the Tar Wars curriculum. The children demonstrated an increase in
short-term knowledge regarding tobacco. Tobacco prevention is a unique opportunity for students to get involved in their community.

Acknowledgments

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Disclosure statement

Authors do not have any financial conflicts of interest to disclose.

References


Fig 1. Pre and Post Survey

Table 1 Presentation Objectives

<table>
<thead>
<tr>
<th>Objective #</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To increase the students’ knowledge of the short-term effects of tobacco use</td>
</tr>
</tbody>
</table>
To demonstrate how smoking decreases lung volume

To illustrate the cost of tobacco use

To identify and understand the reasons why people use tobacco products

To increase students’ knowledge of how tobacco advertising attempts to influence them and how to think critically about tobacco advertising, as well as to heighten students’ awareness of the tobacco industry’s marketing strategies

Table 2. Description of Activities

<table>
<thead>
<tr>
<th>Activity #</th>
<th>Activity Title</th>
<th>Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre-Survey</td>
<td>Survey was administered to obtain baseline information of knowledge prior to activity</td>
</tr>
<tr>
<td>2</td>
<td>Financial Impact of Tobacco Use</td>
<td>Presentation leaders enlisted class participation to estimate the daily, monthly, yearly, lifetime costs of tobacco to the user and encouraged the students to come up with alternate ways to spend the money</td>
</tr>
<tr>
<td>3</td>
<td>Straw Breathing Exercise</td>
<td>Students utilized straws for 60 seconds to simulate what breathing with emphysema and/or restricted lung disease would feel like.</td>
</tr>
<tr>
<td>4</td>
<td>E-cigarettes</td>
<td>Discussion lead by presenters about e-cigarettes, commercials, costs, and appeal to the younger generation</td>
</tr>
<tr>
<td>5</td>
<td>What’s in a Cigarette?</td>
<td>Presenters provided 10-15 index cards with ingredients to students and each student read the ingredient to the class along with other uses such as acetone for nail polish</td>
</tr>
<tr>
<td>6</td>
<td>Reasons that People Use Tobacco</td>
<td>Discussion and group work during which time magazine ads were passed out amongst the class and discussion was conducted individually to encourage</td>
</tr>
</tbody>
</table>
students to understand the meaning and intent behind the advertising materials.

7 Secondhand Smoke
Presenter lead discussion on the dangers of secondhand smoke. Students were encourage to share stories and ask the presenters any questions.

8 Post-Survey
Survey was re-administered to assess changes in knowledge after the presentation

This survey will help you understand how much you know about smoking, and how much you are going to learn!

1. How much does ONE pack of cigarettes usually cost in Massachusetts?
   A. $4
   B. $7
   C. $10
   D. $15

2. Approximately how many ingredients are used to make cigarettes?
   A. 10
   B. 50
   C. 300
   D. 600

3. Cigarettes have some crazy ingredients. Circle the letter or letters of the following you think are used:
   A. Acetone (used in nail polish remover)
   B. Arsenic (used in rat poison)
   C. Lead (found in batteries)
   D. Tar (used to pave roads)
   E. None of these

4. What can be a reason that teenagers choose to smoke?
   A. To look "cool" and "tough"
   B. To fit in with older friends
   C. Peer pressure
   D. All of these are reasons
   E. None of these reasons

5. Since I'm not the one smoking a cigarette, smoke from other people can't hurt me.
   A. True
   B. False