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Teaching Tobacco Cessation to Large Student Cohorts through Train-the-Trainees and Problem Based Learning Strategies

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ABSTRACT

Background: Smoking is a leading cause of preventable deaths worldwide. Graduates of medical schools receive limited training on tobacco cessation and are ill-equipped to treat tobacco dependence. In this paper, we describe and present evidence from an educational intervention based on a train-the-trainers model and problem-based learning strategy aimed to educate a large number of first-year medical students on tobacco-related issues.

Methods: A survey assessing students’ knowledge, attitudes and beliefs was conducted before and after educational intervention. Tobacco experts from the faculty staff, who are trained problem-based learning tutors, served as facilitators in the problem-based learning setting with 1000 medical students.

Results: Significant changes in knowledge and beliefs were observed. Items such as need for further training in cessation, importance, and effectiveness of brief advice showed significant variations after the educational intervention.

Discussion: Educational intervention based on a train-the-trainers and problem-based learning approaches are feasible and effective to educate a large cohort of first-year medical students in tobacco issues. Further research is needed to find out whether this intervention improves overall patient care management.

Keywords: Medical education, problem-based learning, tobacco cessation, train-the-trainers

Background

Smoking is a leading cause of preventable deaths worldwide. Since the ratification of the World Health Organization (WHO) Framework Convention on Tobacco Control[1] in 2004, Uruguay has quickly undertaken combat of the tobacco epidemic. By March 1st, 2006, Uruguay had become the first smoke-free country in the Americas. Two years later, a national comprehensive tobacco control law was approved, which reaffirmed existing measures of smoke-free places and added others such as complete bans of advertising, promotion, sponsorship of tobacco products except at the point of sale, and higher taxation of cigarettes. This law also required healthcare institutions to deliver adequate treatment and support to smokers who are willing to quit, a service that was not widely available until recently. Thus, Uruguay has become a leading country in tobacco control, having fulfilled most of the provisions of the WHO treaty.

Tobacco control measures have wide political support in Uruguay, and in fact past President Dr. Tabaré Vazquez, a leader in this health policy, is a practicing oncologist and former professor of the Oncology Department of the public Faculty of Medicine.

How to cite this article: Llambi L, Barros M, Parodi C, Cora M, Garces G. Teaching tobacco cessation to large student cohorts through train-the-trainers and problem based learning strategies. Educ Health 2016;29:89-94.
In this context, national smoking prevalence dropped from 32.7% to 24.9% between the years 2006 and 2009.\[^2,3\] Implementation of smoke-free policies is believed to increase smokers’ willingness to quit\[^4,6\] and available data show that 75% of smokers in Uruguay are considering quitting. However, among smokers who visited a healthcare provider in the past year, only 54.5% reported receiving any kind of smoking cessation advice.\[^3\]

Uruguay is a small country of 3.2 million people, located on the Atlantic Ocean between Argentina and Brazil. Uruguayan physicians’ educational curricula regarding tobacco cessation issues was minimal until recently, and previous studies suggest that most graduates of medical schools here and worldwide receive limited training, and are ill-equipped to treat tobacco dependence.\[^7,11\]

In 2009, tobacco cessation training was formally introduced into the educational curriculum of the public medical school, so as to bridge the gap between patients’ demands and scarce professional training on this subject. The train-the-trainer (TT) model has been increasingly used in the education of students of the healthcare professions as well as clinicians.\[^12,13\] In this approach, an expert trains faculty members and subsequently these teachers return to their setting and then train their students. Problem-based learning (PBL) is a student-centered instructional strategy in which students work in small groups to learn collaboratively, discuss and solve a problem.\[^14,17\]

Knowledge-attitude-behavior (KAP) surveys provide essential information to help plan, implement and evaluate educational programs as well as advocacy, communication and social mobilization.\[^18\] KAP survey data show what respondents know about tobacco use in this case, how the health system responded to the problem, what they think about smokers and tobacco control measures and what they actually do about it. KAP surveys can identify cultural beliefs, knowledge gaps or behavioral patterns that may pose a barrier to education or health policy.

The purpose of our paper is to describe the design and evaluation of an educational intervention based on the TT model and problem-based learning strategy aimed to train a large number of first-year medical students on tobacco-related issues.

**Methods**

**Educational intervention**

We conducted a prospective, quasi-experimental study. Medical Education department teachers together with tobacco experts, who were part of the faculty, designed the problem-based learning case, its learning objectives, self-assessment and feedback forms. Experts belong to the Internal Medicine department of the University Hospital and have been in charge of the tobacco-cessation clinic of the hospital for more than a decade. It was an interdisciplinary team of three physicians, a psychologist and a social worker, who are also faculty teachers. They were trained in tobacco control issues abroad and in continuous medical education courses developed by the National Cancer Agency. This case was part of a series of six problem-based learning cases in the first-year of the curriculum.

Tobacco experts held a 3-hour workshop with tutors, who subsequently acted as problem-based learning facilitators with the first-year medical students. Topics included in the 3-hour workshop were: Epidemiology of tobacco use; tobacco-related diseases; effects of passive smoking; principles of nicotine addiction; healthcare providers’ role modeling; and principles of clinical intervention for cessation, especially brief advice and tobacco control policies.

The PBL case was discussed by students in weekly 2-hour sessions over a period of two weeks, in groups of 20 students. The PBL process followed its essential steps: Presentation of the situation; reviewing the scenario and generating hypothesis; identifying problems and learning needs; performing information-seeking; solving the problem by applying new learning; and reflecting and assessing on the content and process of learning.\[^14,16,17\] Though initially this methodology was applied in ideal group sizes of seven students at McMaster University, Ontario, Canada, it has later been used in larger groups.\[^19\]

**Outcome measures**

To measure educational impact, we used the Global Health Professions Students Survey; WHO-Center for Disease Prevention (GHPSS).\[^20,21\] It consists of 23 multiple-choice or yes/no questions that assess students prevalence of tobacco use, second-hand smoke exposure, knowledge, personal practices, attitudes and beliefs regarding smoking and smoking cessation. Attitudinal questions assessed students’ beliefs about physicians’ role in influencing quitting. According to the GHPSS, anyone who had smoked at least one cigarette in the past month was considered as “smoker”.

The questionnaire was given to students by their tutors before and after the educational intervention. It was anonymous, voluntary, self-administered and took approximately 20 to 30 minutes to complete. Effectiveness of the intervention was measured comparing percentages of correct answers between baseline and follow-up answers to the GHPSS. Approval of the institutional board of the Medical Education department of the Faculty of Medicine was obtained. Students willing to participate signed a written informed consent form, with confidentiality of subject data ensured.
Statistical analysis

Descriptive statistics were used. Answers were compared using Chi-square and Fisher’s exact test. P values < 0.05 were considered statistically significant. SPSS version 17 was used.

Results

The questionnaire was distributed to 1030 students enrolled in the course, with 910 receiving it and 120 not receiving the test because tutors did not hand them out. Of the 910 students, 624 (68.6%) completed the pre-intervention questionnaire and 577 of these completed the post-intervention version (92.4% of baseline respondents, and 63% of the enrolled students). Basic demographics, tobacco experimentation rates, smoking status and willingness to quit at baseline and follow-up are shown in Table 1. These variables did not significantly vary between pre and post surveys, except for agreement with advertising bans.

Response rates exploring knowledge, attitudes and beliefs at pre and post-intervention surveys are presented in Table 2. Significant changes were observed in baseline and follow-up scores. Core questions about brief advice, its effectiveness and timing showed better performance of the students in the post-test survey. Answers regarding tobacco advertising, promotion and sponsorship in post-test revealed better comprehension about these issues after the intervention. The perceived need for training rose significantly as well as the awareness that doctors must systematically provide information about smoking and cessation. However, some items did not vary after the educational activity. Knowledge of the fact that doctors who smoke are less likely to encourage their patients to quit and perception of role model did not increase after the training. Agreement with complete smoking bans in enclosed places did not significantly vary.

Response rates were analyzed by gender and smoking status. No association between gender and smoking status was found at a bivariate level. Significant differences in some answers regarding knowledge and beliefs were found related to smoker or non-smoker conditions. Smokers were less likely to acknowledge physicians as role models or brief advice effectiveness. Students’ positive answers to core questions by smoking status are shown in Table 3. Regarding gender, female students reported higher scores regarding acceptance of indoor smoking bans [Table 4]. Other variables did not vary significantly by gender at baseline or follow-up.

Discussion

We found a high prevalence of tobacco use among medical students (27.8%), which is, in fact, higher than that in our national general adult population of 24.9%, but similar to medical students smoking prevalence in other countries.

It is well-known that most smokers experiment and begin smoking at pre-teen and teen years; in fact, the Youth Tobacco Survey conducted in Uruguay in 2010 showed an average age of experimentation at age 13.3 years. In spite of the fact that the national smoke-free policy started when the students of our study were teenagers, strong anti-tobacco comprehensive legislation was enacted in 2009. This could explain why the prevalence of tobacco use in medical students is still high in this study. In the youth survey, smoking prevalence among high school students between 13 and 18 years was 18.3% in 2010, so we have reason to believe smoking prevalence among university students will drop in the near future. In the present study, we found that smoking status negatively impacted students’ knowledge and beliefs about the effectiveness of brief advice to quit smoking, role model concept and acceptance of smoke-free policy.
The fact that knowledge about brief advice was significantly lower among students who smoke is worrying, since it seems that tobacco use negatively influences the future health professions workforce to deliver effective anti-tobacco counseling.

Current evidence shows that brief advice should be properly delivered to all smokers by healthcare providers irrespective of whether they want to stop smoking or not, since it appears likely to advise patients to quit.

Furthermore, increasing awareness of physicians’ roles in informing and advising patients is critical, because in spite of six decades of research linking tobacco use to increased morbidity and mortality, many smokers remain unassisted by healthcare systems.

Other studies have assessed the impact of different strategies to address tobacco education in medical students. Leong et al. and Leone et al. carried out intensive four-hour workshops combined with patient counseling at clerkship sites. Both studies showed significant knowledge gain in pharmacotherapy for the treatment of the addiction and use of smoking cessation techniques as well as improvement in confidence in helping patients quit.

Our educational intervention did not modify awareness of physician role models or lack of recognition of smoking status as a barrier in doctors’ performance. Similarly, Leone et al. found that attitudinal aspects like frustration with unwilling patients or attitudes toward tobacco advertising did not vary after receiving the educational intervention. Furthermore, no changes were noticed regarding smoke-free policies acceptance other than advertising bans in our study. A possible explanation of this observation may be that acceptance rates were already high at the time of the baseline survey. We did find significantly higher acceptance of smoke-free policy among women in this cohort.


to work by triggering a quit attempt. Advice can be strengthened if it can be linked to an existing smoking-related medical condition, or to protecting children and young people from exposure to second-hand smoke.

The educational intervention was effective in increasing knowledge about brief advice, motivation to receive training, and awareness of the physician’s role in informing and counseling smokers. Enhancing motivation to receive further training is particularly important since lack of skills is a central barrier to provide proper counseling, according to several studies. Furthermore, increasing awareness of physicians’ roles in informing and advising patients is critical, because in spite of six decades of research linking tobacco use to increased morbidity and mortality, many smokers remain unassisted by healthcare systems.

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study. Some media campaigns in Uruguay have women as primary audiences and may have impacted this observation. Although knowledge about tobacco-issues could be easily modified by different educational activities, our study suggests that attitudinal aspects and beliefs need to be addressed through other strategies, probably involving observation and emulation of effective role models in a clinical setting.

There are several study limitations. As in many educational intervention studies, practical and ethical issues mandated that the study be performed using a pre-post design within which students served as their own controls. Additionally, the survey was not answered by one-third of the total number of enrolled students, since it was not compulsory. Finally, pre and post-intervention assessment could not be matched by participant due to anonymity. This means that the results should be taken conditionally. Lack of longer-term monitoring of the outcomes prevents us from knowing whether changes were sustained, if they decreased or otherwise were enhanced by other educational interventions related to the topic. On the other hand, one of the study strengths was the ability to reach a large cohort of students, using strategies which enhance students’ development of independent learning and communication skills, responsibility for their own learning, and critical thinking, in spite of a large number of students and few teachers trained in the subject matter at the beginning of the educational experience.

**Conclusion**

Overall, educational interventions based on train-the-trainers and problem-based learning approaches are feasible and effective in training a large number of first-year medical students in tobacco issues. Some attitudes and beliefs were not significantly modified through this intervention and need to be addressed in other settings. The KAP model was found useful in detecting beliefs and barriers, and will help tailor future educational interventions according to these findings. Further research is needed to determine whether this intervention improves patient care management.

**Acknowledgements**

Authors wish to acknowledge medical students Class of 2009 of the Facultad de Medicina, Universidad de la Republica and their tutors.

**Financial support and sponsorship**

The study received a grant from the National Tobacco Control Program, Ministry of Health.

**Conflicts of interest**

There are no conflicts of interest.

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