

Educating Masters of Public Health Students on Tobacco Control and Prevention: An Integrated Curriculum Approach

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Abstract

Objectives: Comprehensive training in the area of tobacco control and prevention has not been available to public health students receiving professional degrees. This study describes findings of a project designed to develop and evaluate an integrated approach to the education of Masters of Public Health (MPH) students at the University of Iowa about tobacco control and prevention. **Methods:** A review of tobacco use, control and prevention content in public health courses was conducted. A plan to integrate new content into six required core courses in the MPH curriculum was developed and implemented. Students' knowledge of tobacco control and prevention was assessed using a pre/post-test evaluation developed by the MPH program core course instructors. The pre-test was administered to a cohort of incoming MPH students in order to assess their current tobacco knowledge. A post-test was administered to this same cohort directly prior to graduation but following the completion of all core courses. The pre- and post-tests results were analyzed to determine the effectiveness of the integrative approach to student learning. **Results:** Integration of tobacco use, control and prevention content and assessment of student knowledge were successfully accomplished in all six core courses in the MPH curriculum. Student knowledge ($n=37$) increased significantly ($p<.05$) from pre-test to post-test as measured on 14 items that performed well or moderately on three criteria. **Conclusions:** Findings indicate that tobacco content can be included and, more importantly, integrated into each of the core areas of public health as defined by the Council on Education for Public Health. Integration of tobacco content in all core courses improved MPH student knowledge of tobacco control and prevention. Constructing effective measures of student knowledge in this domain is challenging.

Key words: Smoking Prevention and Control, Graduate Public Health Education, Integrated Curriculum Approach, Evaluation

Introduction

In the United States, there is a need to provide education to medical, public health, and allied health students regarding tobacco prevention and control. Although a number of education programs cover tobacco control and prevention, attention to the number one public health problem by most health sciences academic institutions has been minimal.¹

Surveys conducted in both nursing and medical schools indicate a wide variation of information and time spent on tobacco education.²⁻⁵ Most of the training focused on cancer risk and the health consequences but do not require tobacco education. Medical schools do not require clinical training in smoking cessation techniques.⁵ Programs offering tobacco training vary from several minutes to as many as 12 hours of instruction, with most providing one hour or less. Thirty-one percent of medical schools surveyed averaged less than one hour per year of instruction regarding smoking cessation techniques during four years of medical school. Only a few medical schools surveyed reported providing three or more hours of clinical smoking cessation instruction in the third (14.7%) and fourth (4.9%) years.^{1,6}

Comprehensive training in the area of tobacco control and prevention has not been readily available to public health students receiving professional degrees. To address the topic of tobacco control with Master of Public Health students at the University of Iowa, an integrative approach by providing tobacco education throughout the core curriculum for Master of Public Health (MPH) students was developed. This approach focused on providing tobacco education in each of the six core courses that all MPH students are required to take at this university to achieve their degree. These six core disciplines included Biostatistics, Epidemiology, Environmental Health, Health Management and Policy, Health Promotion and Disease Prevention, and Public Health Practice. Each department in the College of Public Health is responsible for at least one core course. Course materials were developed to teach basic concepts of public health practice using tobacco as an example to illustrate the utility of a specific practice skill.

Methods

In fall 2003, all public health courses at the University of Iowa were reviewed to determine if and

to what extent they addressed the use, prevention and control of tobacco. Specific attention was given to the six required core courses of the MPH Program. The review of courses was conducted at three levels by: 1) interviewing each department head; 2) interviewing individual course instructors; and 3) examining syllabi for each course. Results of this review indicated that tobacco use, control and prevention was being addressed specifically in only one course and briefly mentioned in two. Thus, an integrated approach to providing tobacco education in each of the six core courses (Biostatistics, Epidemiology, Public Health Practice, Environmental Health, Health Management and Policy, and Health Promotion/ Disease Prevention) was developed and implemented. MPH student knowledge regarding tobacco was assessed prior to and following content integration.

Development and Implementation of Tobacco Content

Through a series of meetings, departmental instructors of the core courses developed discipline-specific tobacco material for their respective core course. Following a review of the literature in each core discipline, a content outline of information to be delivered to students was constructed. The primary instructional strategy was to incorporate tobacco use, control and prevention content to illustrate concepts currently being taught. For example, in biostatistics the data used to calculate mean, medians, and variance was from a recent statewide tobacco survey conducted by the state health department. Results were discussed in light of health implications for society. In epidemiology, the same survey data was used to compute tobacco use prevalence and to discuss the comparison of the state's smoking rates with those of other states. In health care management, tobacco policies were used to discuss how health policies were created, implemented and enforced. Each instructor was compensated monetarily for time and effort to modify class examples to include tobacco use, control or prevention information.

Evaluation of Students' Knowledge

A pre/post-test was developed by the core course instructors. Each instructor based their set of questions on the information to be presented in their respective classes over the semester. Topics included tobacco knowledge, attitudes regarding tobacco control policy, tobacco-related morbidity and mortality, tobacco use prevalence, and smoking cessation counseling. The instructors contributed equal numbers of items that were then combined to develop the initial test. The pre-test was administered to the cohort of all new, incoming MPH students at

the start of each core class in fall 2003. This cohort was followed through all six core classes until graduation. A post-test was administered to the same MPH cohort directly prior to graduation but following the completion of all core courses. Since several core courses are taught by different faculty across semesters, an additional section was added to the post-test to ascertain course instructor. Both pre-test and post-test surveys were administered in paper form.

Properties of the Knowledge Instrument

The instrument consisted of 22 multi-choice questions with either four or five choices from which the student could select the correct response. Item analysis was used to examine the psychometric properties of the knowledge instrument. Three specific item analyses were performed, including difficulty analysis, discrimination analysis, and distractor analysis. Table 1 provides a summary of the item analysis, which includes each item's difficulty index, point-biserial correlation coefficient, distractor analysis, and overall performance rating. Items judged as performing well or moderately met either all or two of the following criteria: (1) moderate in difficulty (i.e., difficulty index of .20 to .80); (2) point-biserial $>.20$; and, (3) included plausible and attractive distractors. The results of the original set of 22 questions indicated poor overall internal consistency based on average inter-item correlation, with a Cronbach's Alpha of only .222. When the eight items that performed poorly were removed, the Cronbach's Alpha increased to a moderate level of .400. A total of 14 questions were used in the analysis to determine pre/post-test score differences.

Results

Sample

Forty five MPH students completed the pre-test, and were contacted to complete the post-test. Three of the 45 students had withdrawn from the MPH program before they were contacted for the post-test, three had changed degree programs, and two students had not given enough information (name) to be contacted for the post-test. All 37 possible MPH students were contacted by email and or mail multiple times. Completed post-tests were obtained from 27 of the 37 students (response rate=73.0%). This remaining sample (n=27) was used for all pre- and post-test analyses. The average time between pre-test and post-test was two years. A total of 20 out of 27 students (74.1%) were female. The mean age for this cohort was 32.3 and ranged from 24 to 58 years old.

Integration of Tobacco Course Materials into Core Course

All instructors that were teaching core requirements to the MPH program were interviewed to determine difficulties in their teaching the new integrated tobacco materials. All were able to achieve integration of tobacco materials, yet this did require additional effort to replace current handouts and PowerPoint slides. An audit of the course activities following implementation indicate that tobacco content was integrated into all six core courses.

Changes in Knowledge by MPH Students

A pre-test/post-test comparison was obtained using a paired t-test of student scores among the 14 questions that performed moderately or well (please see table one). Results indicated that students answered questions correctly at a significantly higher level at post-test (mean 6.3, SD 2.1) compared to pre-test (mean 6.0, SD 2.1) ($p<.05$). In the pre-test, scores ranged from a minimum of five (22.7%) correct to a maximum of 13 (59.1%) correct. In the post-test scores ranged from a minimum of six (27.3%) correct to a maximum of 16 (72.7%) correct. Further analysis of the scores by gender and Public Health specialty area was not conducted due to small sample sizes.

Additional analysis investigating pre/post test scores was conducted using only test items that performed well on all three factors. Five items in the pre/post-test that were judged as having performed well included: (a) knowledge of high school smoking rate (i.e., Item 8); (b) knowledge of effectiveness of excise tax (i.e., Item 12); (c) knowledge of effective tobacco control strategies (i.e., Item 13); (d) knowledge of deaths from secondhand smoke (i.e., Item 18); and (e) knowledge of productivity losses from smoking (i.e., Item 21 (see table two). In the analyses, items were considered only as dichotomous variables (i.e., incorrect=0, correct=1), and the overall knowledge scale was computed as the sum of the five knowledge items. Results of univariate analyses on the five high-performance items at baseline and post-instruction indicated a significant change in the students' knowledge ($p<.05$).

Discussion

This study described findings of a project that was designed to develop and evaluate an integrated approach to the education of Masters of Public Health students about tobacco use, control and prevention. One outcome of our study was that tobacco content could be included and, more

importantly, integrated into each of the core areas of public health as defined by the Council on Education for Public Health. The second outcome of this project was to determine if an integrated approach could increase the knowledge level of students regarding tobacco prevention and control. Both of these outcomes should be replicable in other schools that offer MPH degrees, as integration of tobacco content principally builds on the current curriculum structure of a program. The integration of tobacco content must be a commitment of the school to address the leading risk factor of premature death in developed countries

This project demonstrated that critical tobacco use, control and prevention information can be integrated into the educational program of Masters of Public Health students, and that students can master this information. The efforts of The University of Iowa College of Public Health to provide tobacco education to all MPH students taking core classes represent successes and challenges that should be addressed by future curriculum development initiatives in this area. The success is that without disrupting or restructuring the curriculum, tobacco information can be incorporated into individual courses. This system-wide approach to providing information on the number one health-related concern in the US today can be accomplished. The challenge is to sustain this activity as new instructors inherit these courses and may not continue to update and provide the tobacco information.

One key question for future work is to determine whether increased knowledge in the area of tobacco control may or may not relate to MPH students' becoming better public health professionals. Although this question is yet to be answered, there is also a concurrent need for program developers to continually monitor trends and information that the new public health practitioner will need to master in order to meet the demands of working in the profession in the next five to ten years.

The findings of our study also highlight specific academic issues that should be addressed as this and other MPH educational programs targeting tobacco control and prevention are further developed. First, our findings from the item analysis of the knowledge instrument reflect the difficulty in constructing valid evaluation tools. Our analysis indicated that less than one-quarter of the items developed by faculty to evaluate the program were judged as performing well, in that they were moderate in difficulty, distinguished reasonably well between high and low scorers, and possessed plausible distractors.

Consequently, performance related to only one aspect of the new integrated curriculum, knowledge of effectiveness of excise tax, was found to improve significantly. Second, this study points to the need for further research assessing the impact of an integrated curriculum on students' public health practice during and after completion of the MPH program.

Kirkpatrick¹⁰ described a four-level model for training evaluation that has been used in several fields and disciplines, and this model could be useful to future efforts aimed at developing and evaluating the impact of tobacco control and prevention curricula. Kirkpatrick's model specifies four levels of outcomes that should be included in the assessment of various types of educational and training programs. These four levels include: (a) Level 1—students' reactions to the program (i.e., satisfaction); (b) Level 2—knowledge outcomes associated with the program; (c) Level 3—transfer of learning (i.e., changes in behavior or practice); and, (d) Level 4—results (i.e., impact on distal outcomes such as community health). In the case of institutions attempting to develop integrated curricula focusing on tobacco control, the latter outcomes draw attention to the need for documentation of whether training programs result in community-level impacts, such as increased adoption of evidence-based practices by communities and the creation of multi-component initiatives that attempt to promote community-level norms, attitudes, and behaviors against tobacco use by changing socio-political and physical environments. The real evaluation will be on this integrated approach to influence public health practice.

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Table 1. Item Analysis Summary Difficulty Index, Point-Biserial Correlation Coefficient, Distractor Analysis, and Overall Performance of Knowledge Assessment Items

Item	Difficulty Index	Point-Biserial Coefficient	Distractor Analysis X ² Value	Overall Performance
1. Which of the following determinants of health is/are associated with smoking behaviors	.87	.11	2.10	Performed poorly
2. The public health system tool, Mobilizing for Action through Planning and Partnerships (MAPP), has as a primary goal the formation of an action committee to direct community interventions to reduce smoking	.22	.26	3.18	Performed moderately
3. The Master Settlement Agreement (MSA) required that the states' Attorney Generals use those proceeds to develop new and more effective smoking cessation programs in the United States	.43	.15	.09	Performed poorly
4. In the United States, what percentage of cases of lung cancer among smokers can be attributed to smoking	.70	.19	2.78	Performed poorly
5. Annually, the greatest number of deaths in the United States is attributed to	.97	.21	.87	Performed moderately
6. According to the National Center for Health Statistics, in 2001 the prevalence rate of current cigarette smoking (smoking some days or everyday during the past 30 days and smoking at least 100 cigarettes in a lifetime) by persons 18 years of age and older in the United States was closest to	.68	.21	1.13	Performed moderately
7. Smoking is considered a confounding variable for which of the following correlations	.43	.19	2.61	Performed poorly
8. According to the 2001 CDC Youth Risk Behavior Surveillance Summary, the prevalence rate of current smoking (cigarette use in the past 30 days) among high school students in the United States was closest to	.32	.42**	6.37*	Performed well
9. According to the 2001 Iowa Behavioral Risk Factor Surveillance System, the prevalence rate of current smoking (smoking some days or everyday during the past 30 days and smoking at least 100 cigarettes in a lifetime) among adult Iowans was closest to	.62	.24	3.15	Performed moderately

Item	Difficulty Index	Point-Biserial Coefficient	Distractor Analysis X ² Value	Overall Performance
10. According to the 2002 IDPH Youth Tobacco Survey Report, the prevalence rate of current smoking (cigarette use in the past 30 days) among high school students in Iowa was closest to	.35	.26	4.68	Performed moderately
11. According to the 2002 IDPH Youth Tobacco Survey Report, the prevalence rate of current smoking (cigarette use in the past 30 days) among middle school students in Iowa was	.32	-.11	2.05	Performed poorly
12. What do experts agree is the most effective tobacco control strategy	.41	.38	6.57*	Performed well
13. Which of the following has been demonstrated to be an ineffective mean of tobacco control	.46	.22	7.71*	Performed well
14. As a counselor, in which "stage of change" would you provide information to a client on reasons for quitting	.08	.32	8.28**	Performed moderately
15. The Surgeon General (2000) reports that nearly 70% of American smokers make at least one outpatient visit each year. Approximately what percentage of smokers received cessation advice from their health care providers	.22	.46**	4.52	Performed moderately
16. The average annual mortality-related productivity losses attributable to smoking for adults and infants in the United States is	.14	.26	1.01	Performed poorly
17. What is the most remarkable factor that weakened the tobacco industry as an interest group and their influence on health policy and health care delivery	.49	.29	2.20	Performed moderately
18. There are approximately 440,000 annual smoking-attributable cancer deaths. Of those, how many deaths are attributed to exposure from secondhand smoke	.41	.45**	9.35**	Performed well
19. Which one of the following statements is FALSE	.27	.33**	5.06	Performed moderately
20. Which one of the following is a FALSE statement concerning Environmental Tobacco Smoke (ETS)	.78	.14	.46	Performed poorly
21. Which of the following class of hazards is in tobacco smoke	.54	.34**	6.36**	Performed well
22. What adverse health effects in young children are known to be associated with exposure to environmental tobacco smoke	.16	-.01	1.24	Performed poorly

* p < .10. ** p < .05.

Table 2. Repeated Measures Analysis of Covariance Comparing Baseline and Post-test Knowledge Outcomes

Knowledge Outcome Variables	Means		Univ. F	Means Different, p < .05
	Baseline	Post-test		
Overall Knowledge	1.63	1.85	.93	
Knowledge of High School Smoking Rate	.38	.50	.78	
Knowledge of Effectiveness of Excise Tax	.39	.65	8.50*	Baseline<Post-test
Knowledge of Effective Tobacco Control Strategies	.44	.41	.09	
Knowledge of Deaths from Secondhand Smoke	.44	.33	.98	
Knowledge of Productivity Losses from Smoking	.52	.67	1.93	

* p<.01