

The Need for Tobacco Education: Studies of Collegiate Dental Hygiene Patients and Faculty

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Abstract: The need for inclusion of comprehensive tobacco control education/training for health care providers continues to be stressed in publications addressing cessation services. The dental appointment presents an excellent opportunity to provide tobacco interventions to basically healthy people on regular intervals. The purpose of this study was twofold: 1) to assess the need (stage of change and concomitant need for tobacco cessation intervention) of dental hygiene patients at a Midwest dental hygiene clinic, and 2) to assess and compare the level of tobacco intervention education currently being offered by dental hygiene educators in a Midwestern state. Patients (n=426) of a collegiate dental health clinic completed a survey that assessed the level and type of tobacco cessation intervention patients might require. A statewide sample of dental hygiene faculty (n=97) were surveyed to determine the attitudes, perceived barriers, and current practices in tobacco education offered in their programs. Of patients who currently smoked (34.5 percent), 24.7 percent indicated being in the Action stage of change; 14.2 percent were in Preparation; 22.2 percent were in Contemplation; and 29 percent were in Precontemplation. Although faculty indicated tobacco education was very important (5.03 on 1-6 scale), they felt only moderately confident delivering tobacco education (3.18 on a 1-5 scale). Only 16 percent to 35 percent of faculty reported that their curriculum included brief motivational interviewing, pharmacotherapies, or setting-up a private practice tobacco control program. The results strongly suggest the need for a comprehensive, competency-based tobacco curriculum to enhance and expand existing dental hygiene programs.

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The comprehensive effort to control tobacco use and nicotine addiction has made significant strides forward since the 1964 Surgeon General's Report on Tobacco and Health was released. In 1965, approximately 42 percent of the population eighteen years and older smoked.¹ Almost forty years later, data indicate that approximately 22.5 percent of the U.S. population smoke,² and the level of teen smoking has dropped to 28.8 percent.³ Unfortunately, smoking continues to be the number one preventable cause of death in the United States, with an estimated approximately 430,000 or 18.1 percent of deaths annually in America due to smoking-related heart disease, cancer, and stroke.⁴ With approximately 27,700 new cases of oral cancer diagnosed in 2005 resulting in approximately 7,320 deaths,⁵ and with 70 percent of oral cancers associated with smoking,⁶ the need for a comprehensive cessation intervention for every tobacco user is compelling. Smoking contributes to an increase of prevalence and severity of periodontitis,⁷ an increase of pocket depths, marginal bone and attachment loss,^{8,9} de-

creased healing following periodontal therapy,¹⁰ and an increase of tooth loss.¹¹ This chronic, relapsing disease impacts heavily on all forms of periodontal care as a result of a compromised host response.¹²

Approximately 70 percent of smokers report that they visit a health care provider at least one time a year.¹³ These visits could provide an opportunity for a personalized tobacco cessation intervention. Although there has been incremental improvement in health care providers offering tobacco interventions,^{14,15} the level and type of intervention continue to vary widely. Studies have reported that the percentage of medical practitioners who identify tobacco use among their patients varies widely (18 percent to 71 percent, with 20 percent the most often cited figure), and the number of clinicians who advise their patients to quit is less. Even fewer medical providers (e.g., MD, DO) indicate that they go on to discuss quit strategies, prescribe pharmacotherapies, or offer referrals, and they seldom provide follow-up or relapse prevention,¹⁵⁻¹⁹ even though these activities are part of the 5As (Ask, Advise, Assess, Assist,

Arrange) tobacco cessation intervention guidelines recommended by the U.S. Public Health Service.²⁰

Surveys of practicing dentists revealed approximately 50 percent ask their patients if they use tobacco, up to 65 percent advise patients who smoke to quit, but fewer than 20 percent assist patients in their quit attempt.²¹⁻²⁷ Dental hygienists regularly ask patients about their tobacco use less than 25 percent of the time and regularly advise smokers to quit between 35 and 60 percent of the time during a normal dental cleaning.^{22,25} Dental hygienists also cite lack of training and confidence as barriers to consistent, evidence-based tobacco interventions.^{21,28} Conversely, studies of medical professionals trained in tobacco cessation find that they report providing significantly more interventions than those who were not trained.²⁹

The U.S. Public Health Service's gold standard, *Treating Tobacco Use and Dependence: Clinical Guideline*,²⁰ reported a strong relationship between clinician-based tobacco interventions and successful quitting by patients. An estimated 5 to 7 percent of smokers successfully quit on their own. However, when a clinician offers a brief cessation intervention combined with pharmacotherapies, approximately 30 percent of patients who want to stop smoking are able to quit successfully.²⁰ The evidence shows that health care providers can have a profound impact on the long-term success of patients trying to quit.

The goal of Healthy People 2010 Objective 3.10 is to "Increase the proportion of physicians and dentists who counsel their at-risk (tobacco using) patients about tobacco use cessation, physical activity, and cancer screening." Specifically, Objective 3.10c established the goal of increasing cessation interventions provided by dental professionals from 59 percent, reported in 1997, to 85 percent by the year 2010.³⁰ Two primary educational avenues exist to accomplish this goal: training of current providers through continuing education, and training of future providers in the postsecondary educational setting.

In recent surveys, medical schools report that health effects of tobacco use are included in didactic course material. However, a limited number of educators incorporate the health effects of tobacco into the clinical setting by teaching and assessing tobacco-intervention competencies.³¹ Tobacco cessation and prevention in dental and dental hygiene schools have increased in recent years; but, unfortunately, it still lacks integration throughout the curriculum or assessment of students' clinical competency.^{32,33} The

following have been identified as gaps in tobacco education: lack of integration of knowledge into practice; failure to provide students with enhanced intervention skills (e.g., motivational interviewing, pharmacotherapy strategies, relapse prevention); lack of smokeless tobacco intervention strategies; and minimal inclusion of cultural issues in tobacco cessation and prevention.³⁴ Furthermore, just as in private practice, the common barriers cited by educators to explain why they do not train students in tobacco/drug abuse are lack of faculty time, lack of student interest, lack of teaching materials, and lack of faculty expertise or training.^{32,35} When health care students receive both didactic instruction and the opportunity to practice their skills, they consistently demonstrate an increase in knowledge and they gain confidence in providing tobacco cessation interventions.^{36,37} Tobacco education results in a greater number of dental and dental hygiene graduates now in private practice reporting a higher number of tobacco interventions in private practice.³⁸ In addition, patients of trained practitioners have reported receiving more cessation interventions than patients of practitioners not trained in tobacco education.³⁹

The dilemma is evident. As dental health care providers, we have an opportunity to provide a potentially life-saving intervention, but often lack the necessary knowledge, training, and experience to provide a personalized tobacco cessation intervention. For over twenty years, associations, researchers, and educators have been calling for competencies in tobacco cessation and prevention to be included in normal patient care and integrated into dental, dental hygiene, and medical education.⁴⁰⁻⁴³

To pursue the goal of competency in tobacco interventions, numerous panels and health care organizations have advocated for tobacco control to be diffused throughout the curriculum, with faculty receiving adequate training to raise their level of self-efficacy in providing role modeling, feedback, and competencies in the clinical setting. The Association of Teachers of Preventive Medicine and the Health Resources and Service Administration convened a task force to establish a set of core competencies to guide health care educators. Tobacco cessation is listed as an example in prevention counseling in undergraduate education in basic disease prevention and health promotion.⁴⁴ The Healthy People Curriculum Task Force, convened by the Association of Academic Health Centers, the Association of Teachers of Preventive Medicine, and the American Dental Education Association,^{45,46} developed the *Clinical*

Prevention and Population Health Curriculum Framework in 2003. The aim was to advocate a comprehensive, evidence-based curriculum designed to assist educators to reach the Healthy People 2010 goals of increasing prevention content of clinical education—including health care providers increasing their tobacco interventions.

The American Dental Education Association (ADEA) has established basic core competencies for dental and dental hygiene education. The second core competency for entry into the dental hygiene profession is health promotion and disease prevention.⁴⁷ Although tobacco cessation and prevention are not stated explicitly in the competencies, the hygienist should be able to “have a general knowledge of wellness, health determinants, . . . emphasize both prevention of disease and effective health care delivery” (p. 746). However, in the ADEA Policy Statements 2004, Section V. Health Promotion and Disease Prevention explicitly states that institutional and individual members are to discourage the use of tobacco, maintain tobacco-free environments, and provide training on tobacco cessation.⁴⁸ The Commission on Dental Accreditation, American Dental Association (ADA), Accreditation Standards for Dental Hygiene Education Programs (1998) states specifically in the Patient Care Competencies that “graduates must be competent in providing the dental hygiene process of care which includes . . . risk assessment (i.e., tobacco, systemic, caries)” (p. 21).⁴⁹ The Accreditation Standards also list competencies in pharmacology, oral pathology, and periodontology—all of which directly relate to a comprehensive tobacco cessation intervention. In addition, the ADA now lists tobacco cessation counseling under Section II 3.3.3.2, Provision of Clinical Dental Hygiene Services in the technical report, the National Board Dental Hygiene Examination’s examination specifications.⁵⁰

Given the disease burden of tobacco use and government and professional recommendations, a competency-based tobacco control curriculum should be an essential component of dental hygiene programs nationwide. Our study addresses the readiness for dental hygiene programs to integrate comprehensive tobacco control education in their curricula. The study assessed patients’ requirements for tobacco use intervention and evaluated dental hygiene faculty members’ attitudes and behaviors regarding tobacco control education. Two theoretical approaches guided these studies. The Transtheoretical Model⁵¹ (Stages

of Change) guided the development of our study of patient need, and the Theory of Planned Behavior⁵² guided our survey of faculty members’ attitudes toward tobacco control education. Our goal for the dental hygiene faculty survey was to provide an assessment of the readiness for a comprehensive tobacco education program to be integrated into the curriculum so that student hygienists can be prepared to meet the needs of their patients.

The Transtheoretical Model, also known as the Stages of Change model, proposes a process by which individuals change maladaptive health behaviors such as smoking.⁵¹ The Transtheoretical Model is comprised of five stages, or processes, through which individuals progress as they attempt to discontinue an unhealthy behavior. With regard to smoking or tobacco use cessation, the first stage, Precontemplation, refers to the period in which a smoker is not thinking about quitting smoking, at least not within the next six months. The second stage, Contemplation, occurs when a smoker begins to seriously consider quitting smoking within the next six months. The third stage, Preparation, describes smokers who are ready to quit smoking within the next month or smokers who have failed when they tried to quit previously. The fourth stage, Action, refers to the time period (zero to six months) when smokers make behavioral changes and stop smoking. The last stage, Maintenance, begins six months after the start of the action stage and refers to the time that the ex-smoker maintains his or her ex-smoker status. Most smokers who have quit by progressing through these stages of change admit to having started smoking again, or relapsing, and have subsequently proceeded through the stages of change for a second time, sometimes multiple times.⁵³⁻⁵⁵ Thus, although ex-smokers have reached the maintenance stage, they may still relapse to an earlier stage.

The use of the Transtheoretical Model for understanding smoking cessation has been widely researched and supported.⁵⁴⁻⁵⁶ Some research has found that using the Stages of Change as an indicator of smoking status instead of a distinct smoker/non-smoker categorization system provided a better description of the actual behaviors of smokers who were trying to quit.^{54,55} Specifically, smokers in the Precontemplation stage were less likely to engage in activities such as consciousness-raising and finding help for quitting smoking in relationships than were smokers in the Contemplation and Preparation stages. Likewise, individuals in the Preparation stage were more likely to engage in activities that help them to

quit smoking than were smokers in the Precontemplation and Contemplation stages. Other research has reported that the most successful aids that help smokers quit smoking differ depending on the stage of change in which the smoker is classified.⁵⁶ Our study measured dental hygiene patients' stage of change in smoking cessation to ascertain the level and types of tobacco cessation interventions needed.

The Theory of Planned Behavior⁵² (TPB) is a well-established intention model that has proven successful in predicting and explaining behavior across a wide variety of domains.^{57,58} According to the theory, intention is determined by 1) the individual's attitude toward the behavior, 2) the subjective norm, i.e., perceived social pressure to perform or not to perform the behavior, and 3) perceived behavioral control, i.e., perceptions of the personal and situational impediments to perform the behavior. Thus, using TPB, intention to implement a standard-of-care tobacco curriculum in dental hygiene programs is a function of the decision maker's (dental hygiene faculty's) attitude toward tobacco control education, perception that relevant others value this behavior, perceptions that barriers to implementing this curriculum are minimized or overcome, and belief that one has the self-efficacy (capacity and confidence) to implement the curriculum.⁵⁹ Our survey of dental hygiene faculty was developed to measure these components of the TPB, which allowed us to accurately determine the relative strengths and weaknesses of factors impinging on their intention to integrate competency-based, comprehensive tobacco control into their curriculum.

Method

Patient data came from surveys collected from clients of a university-based dental hygiene clinic during the course of three semesters when the clinic was open. This survey was a brief assessment of the patient's tobacco-use status based on the Stages of Change model. Dental hygiene faculty data came from a statewide study of dental hygiene educators in community colleges that offered a dental hygiene program. These data were the baseline surveys collected as part of a three-year study of faculty and student adoption of a comprehensive tobacco control curriculum.

Participants

The participants in the patient survey were 426 individuals who visited a university-based dental hygiene program between fall 2003 and fall 2004 and completed the smoking screening survey. Thirteen patients did not complete questions about demographic data, but of those who did, 210 were women and 203 were men; 275 were students at the university (most were seniors and graduate students, 31 percent and 25 percent, respectively); sixty-five were university employees; and the majority were white (292; 71 percent), followed by African American (44; 11 percent).

The participants in the dental hygiene faculty survey were ninety-seven full-time, part-time, and adjunct faculty or instructors at all twelve community college dental hygiene programs in the state of Illinois. The number of faculty per program ranged from four to sixteen. There were fifty-three part-time and forty-one full-time (three did not report) faculty members; fourteen (14 percent) were program directors and twelve (12.4 percent) were dentists. The majority were white (90.7 percent) and female (88.7 percent).

Measures and Procedures

The patient survey was a brief assessment of the patient's tobacco use history as well as demographic characteristics. For smoking status, participants were categorized as "nonsmoker" if they had never tried cigarette smoking or they had smoked less than 100 cigarettes; "smoker" if they had smoked more than 100 cigarettes and stated that they currently smoked; and "ex-smoker" if they had smoked more than 100 cigarettes but report that they currently do not smoke. If they were a smoker, their stage of change for quitting was assessed with an item modeled from DiClemente et al.'s brief assessment.⁶² The question asked, "Are you seriously thinking of quitting?" If they answered, "Yes, right now," they were classified as "Action." If they answered, "Yes, within the next 30 days," they were classified as "Preparation." If they answered, "Yes, within the next 6 months," they were classified as "Contemplation," and if they answered, "No, no plans to quit," they were classified as "Precontemplation." Ex-smokers who had quit less than six months ago were classified as "Maintenance." A second question asked what types of assistance, if any, the respondent desired for help in quitting smoking. Response options

were a) “help, I’m ready to quit now,” b) “information, I’m planning to quit in the next 30 days,” c) “information, I’m planning to quit in the next 6 months,” d) “information, but I’m not planning to quit,” or e) “nothing, thanks.” This question was used by the student dental hygienist who reviewed the survey to determine what type of tobacco intervention packet to give the respondent, but it also served as a validation question for the stage of change measure. Demographic questions assessed the patient’s gender, race/ethnicity, and status as a student, employee, or community member.

The patient survey was pilot-tested and administered to every patient on his or her first visit to the dental hygiene clinic during the fall 2003, spring 2004, and fall 2004 semesters. The survey was completed in a waiting room area and returned to the receptionist who first gave the survey to the attending dental hygiene student. After the student hygienist and supervising faculty member reviewed the survey, it was delivered to the research team.

The dental hygiene faculty survey was developed to measure the primary constructs of the theory of planned behavior (TPB).⁵² This theory incorporates the concepts of a) attitudes toward the behavior change, b) perceived subjective norms (belief that influential others support the behavior change), c) self-confidence (self-efficacy) in changing behavior, and d) perceived external barriers to behavior change. The focus of the behavior change was integration of a comprehensive tobacco curriculum (developed and supplied by the research team) into the dental hygiene program. In TPB, it is recognized that the social and situational factors that affect behavior change are idiosyncratic for each context; therefore, measures of these specific elements must also be idiosyncratic. The influential others that dental hygiene educators look to in considering behavior change and the concerns that stand in the way of freely adopting desired new behaviors must be determined in the context of the study.

To determine the types of social influences and external barriers that may affect the decision to adopt and integrate a tobacco curriculum, a focus group was conducted using a sample of dental hygiene educators attending a state conference. The focus group revealed that dental hygiene faculty tend to rely on their program directors, accreditation standards (communicated by accreditation visitors), textbooks, and other dental hygienists when making decisions about curriculum changes. The most common barriers in-

cluded lack of personal training on tobacco education, lack of adequate pedagogical resources, and, most importantly, lack of time in the curriculum to add new a new topic, such as tobacco education.

On the basis of these findings, survey questions were developed to assess the social factors and external barriers that might influence the level and type of tobacco cessation instruction offered. The literature on tobacco curricula in health care programs and in tobacco control more generally (e.g., resources from the Center for Disease Control’s *Surveillance and Evaluation Data Resources for Comprehensive Tobacco Control Programs*⁶⁰) was examined to develop a pool of items for the attitude and behavior portions of the survey. The entire set of items was reviewed by the research team, who included experts in dental hygiene, health education, and psychology. Cognitive interviews⁶¹ were conducted with faculty members of university-based dental hygiene programs. Cognitive interviews use a “think aloud” method to obtain a comprehensive understanding of how survey participants mentally comprehend every aspect of the survey, including the instructions, meaning of the scale anchors, and meaning of the questions or items. The revised survey was edited in accordance with the results of these interviews.

“Attitudes Toward Tobacco Education” were measured with twenty-one Likert-type items rated on a scale of 1 (not at all important) to 6 (very important) (the intermediate scale anchors were not labeled). A six-point scale was used to avoid a midpoint. Sample items were: “Covering pharmacological approaches to tobacco cessation in a dental hygiene curriculum is . . .,” “Teaching students how to assess patients’ tobacco use is . . .,” and “Expanding the coverage of tobacco-related education for dental hygiene students to up to 7-8 hours in the curriculum is . . .” The internal consistency reliability of this scale and all subsequent scales are reported in Table 1.

“Subjective Norms” were measured by two sets of items. The first five items measured the extent to which participants believed various other types of people (identified in the focus group as influential to dental hygiene faculty) would approve of the faculty member increasing time spent on tobacco education (accreditation visitors, program directors, other dental hygiene programs, employers of students, and other professional colleagues). A sample item was: “Increasing the time spent on tobacco education will impress accreditation visitors.” Responses to each

Table 1. Means, SDs, internal consistencies, and intercorrelations among the TPB variables (n=97)

Variable	Mean	SD	a	b	c	d
a. Attitudes	5.03	0.82	(.96)			
b. Subjective norms (wt)	14.97	3.47	.48**	(.79)		
c. Self-efficacy	3.18	0.73	.34**	.32**	(.87)	
d. Control external barriers	3.27	0.66	.36**	.39**	.39**	(.77)

Note: Cronbach alphas are presented in the diagonal.
*p<0.05; **p<0.01

item were recorded on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). The second set of items asked respondents to rate the extent to which they were motivated to comply with each of the social sources listed above, and responses were recorded on a five-point scale ranging from 1 (very weak) to 5 (very strong) (no intermediate anchors). A sample item was “The extent to which I am motivated to comply with accreditation visitors is. . . .” As recommended by Ajzen,⁵² the resulting subjective norm scale was computed by multiplying each social source approval item by its corresponding motivation-to-comply item (which served as a weight).

“Self-Efficacy for Adopting Tobacco Curriculum” was measured with six item stems that assessed respondents’ confidence in dealing with issues related to tobacco education. Sample items included: “With regard to teaching tobacco-related pathology (e.g., periodontal disease, leukoplakia, oral cancer, etc.), I feel . . .” and “With regard to overcoming dental hygiene students’ resistance to engaging in tobacco control activities, I feel. . . .” Responses were recorded on a scale that ranged from 1 (not at all confident) to 5 (very confident) (no intermediate anchors). The six items were averaged to create a composite self-efficacy scale.

“Perceptions of External Barriers” was measured with five statements that assessed participants’ perceived ability to control various barriers that may impede adopting and integrating a comprehensive tobacco curriculum. Sample statements were “I am able to find the time to increase the amount of attention I spend on tobacco education in my classrooms” and “I have good resources that I can use to teach all aspects of tobacco education.” Responses were recorded on a 5-point scale with the following anchors: 1 (strongly disagree), 2 (disagree), 3 (neither agree nor disagree), 4 (agree), and 5 (strongly agree). These items were averaged to create a composite external

barriers scale (note that high scores indicate the ability to control external barriers).

The behavioral section of the survey measured the extent to which respondents covered various topics related to tobacco education in their curriculum. Separate items addressed didactic and clinic classes respectively. For the didactic questions, respondents indicated whether the topic was covered in the curriculum (yes, no, or not sure), who covered the topic (the respondent, someone else, or both), and how much time was spent on the topic if the respondent covered it (five minutes to sixty minutes or more). There were thirteen topics covered in the didactic portion of the behavioral survey; for example, “The historical, social, and economic factors associated with tobacco use and the tobacco industry,” “The nature of nicotine dependency,” and “Brief motivational interviewing.” For the clinic portion of the survey, respondents indicated whether they assessed students’ ability to perform seven tobacco-related intervention skills in clinic (yes, no), whether it was done formally with a rating scale or not, and how often the competency was assessed (1=never to 5=always). Sample competencies included “Assessing stages of change among tobacco-using clients,” “Discussing tobacco cessation/prevention strategies with clients,” and “Providing cessation resources and follow-up.” Finally, the demographic section of the survey assessed information about the respondent’s gender, race/ethnicity, professional credentials, position tenure, and other characteristics and whether they have provided tobacco intervention in their own clinical practice.

The dental hygiene faculty survey was administered to faculty members during meetings at their institutions between fall 2003 and spring 2004. Completed surveys were collected by a member of the research team. Additional surveys with postage-paid return envelopes were left for faculty members who did not attend the meeting, or they were mailed to

the program director to distribute to their faculty members.

Results

The purpose of this study was twofold: 1) to assess the need for smoking cessation intervention among patients of a collegiate dental hygiene clinic in a Midwestern university, and 2) to assess and compare the level of tobacco intervention education currently being offered in dental hygiene programs in that same Midwestern state. Findings from the patient survey are presented first to assess patients' stage of change for tobacco cessation and concomitant need for tobacco intervention. Results from the dental hygiene faculty survey provide an assessment of the readiness for a comprehensive tobacco education program to be integrated into the curriculum so that student hygienists can be prepared to meet the needs of their patients.

Patient Survey

Smoking status was determined for 420 of the 426 respondents of the patient survey. Of these, 51.2 percent were classified as nonsmokers, 14.3 percent were classified as ex-smokers, and 34.5 percent were classified as current smokers. There were no significant differences in smoking status by gender [c^2 (df=2)=3.04, ns], or by classification as a university student (n=283) or other (n=128) (c^2 (df=2)=.93, ns). There was an insufficient number of university employees to include in this analysis (n=9). The smoking status of whites (n=285) vs. African Americans (n=43) revealed a significant difference (c^2 (df=2)=11.05, $p<.01$). There was insufficient sample size of other race/ethnicities, which ranged from 1 to 19. Examination of the unstandardized residuals indicated that African Americans were more likely to be nonsmokers than expected by chance and less likely to be ex-smokers or current smokers than expected by chance. Twenty-one percent of African Americans were smokers compared to 37 percent of whites.

Of those who completed the Stages of Change measure (n=162), 29.0 percent were classified as Precontemplation, 22.2 percent as Contemplation, 14.2 percent as Preparation, 24.7 percent as Action, and 9.9 percent as Maintenance. By comparison, of the 172 smokers or ex-smokers who completed the question ascertaining what type of smoking cessa-

tion help they would like to have, only 9.3 percent indicated wanting help to quit now, 5.8 percent wanted information because they were planning to quit in the next thirty days, 14.5 percent wanted help for quitting in the next six months, 4.1 percent wanted information but were planning to quit, and 66.3 percent wanted nothing.

There were no significant differences in stage of change by gender [c^2 (df=4)=3.75, ns]; student vs. other status (c^2 (df=4)=5.10, ns); or white vs. African American race [c^2 (df=4)=0.48, ns; note, however, that the cell sizes for the African Americans across the five stages were too small for a reliable analysis].

Dental Hygiene Faculty Survey

Scale scores for each of the TPB components of the faculty survey (attitudes, subjective norms-weighted, self-efficacy, and control over external barriers) were computed by averaging the items corresponding to the component. Table 1 presents the means, standard deviations, intercorrelations, and internal consistencies for these components. Each of the TPB components demonstrated acceptable internal reliability (assessed by Cronbach's alpha). Respondents had very positive attitudes toward tobacco control education in the dental hygiene curriculum. The mean for the entire scale was 5.03 on a six-point scale indicating strong agreement with each of the items. Of the twenty-one attitudinal items, respondents felt that facilitating students' understanding of the connection between tobacco use and periodontal disease and lesions ($M=5.65$) and teaching students how to relate oral pathology/periodontal disease to clients' tobacco use ($M=5.64$) were the most important. Conversely, having a tobacco resource person or coordinator on the faculty who can assist other faculty with developing their tobacco-related lectures/lesson plans ($M=4.43$) and expanding the coverage of tobacco-related education for dental hygiene students to up to seven to eight hours in the curriculum ($M=4.58$) were rated as slightly less important (although still above the midpoint of the scale).

The weighted subjective norm scale had a theoretical range from 1 to 25, and the overall mean was 14.94, indicating relatively moderate social influences on decisions to integrate tobacco education in the dental hygiene curriculum. Self-efficacy for the ability to teach tobacco education and perceived control over external barriers to teaching tobacco education were rated as moderately positive (means were

Table 2. Coverage of tobacco curriculum topics in didactic courses by respondent and by program

Topic	Percent of Respondents Who State the Topic Is Taught	Percent of Respondents Who Cover the Topic	Average Time Spent by Those Covering the Topic (in minutes)
a. The historical, social, and economic factors associated with tobacco use and the tobacco industry.	26.49	9.3	35.0
b. A review of general diseases related to tobacco use.	67.84	25.8	27.0
c. A review of oral tobacco-related diseases.	71.61	27.8	33.7
d. The nature of nicotine dependency.	41.16	11.3	20.5
e. Understanding tobacco cessation strategies.	34.68	11.3	33.4
f. Understanding tobacco prevention strategies.	26.93	7.2	33.6
g. Public Health Service's 5As and 5Rs for conducting tobacco cessation counseling.	29.01	11.3	25.0
h. Stages of change.	20.80	6.2	18.4
i. Brief motivational interviewing.	16.08	8.2	12.9
j. FDA-approved pharmacotherapies to assist cessation attempts.	35.01	2.1	20.0
l. How to develop a comprehensive tobacco intervention program in a clinical setting.	19.84	22.2	35.0
m. Strategies for how to become involved in community-based tobacco control.	16.59	30.0	16.0
n. Addressing dental hygiene students' own use of tobacco.	47.07	54.1	16.8

3.30 and 3.22, respectively on 5-point scales). Respondents felt least confident in helping students overcome employers' (e.g., dentists) concerns about implementing tobacco control education in the dental practice ($M=2.86$) and tended to disagree that they had good resources that they could use to teach all aspects of tobacco education ($M=2.74$). These four TPB variables were moderately intercorrelated, indicating that those with the most positive attitudes toward tobacco education also felt that social influences were somewhat important in their decision to adopt tobacco education, confident in teaching tobacco education, and able to overcome external barriers such as finding the time and convincing students of the importance of tobacco education for dental hygienists.

Respondents were asked to indicate whether various tobacco education topics were taught in didactic courses and whether tobacco intervention competencies were assessed in clinic. These data were analyzed to assess the extent of integration of tobacco-related topics in each program's curriculum. Table 2 reports the average percent of faculty in each program who reported that each of thirteen topics was covered in their curriculum. Higher percentages indicated greater agreement among the faculty that

the topic was covered, and thus was likely to be well integrated into the program. Conversely, low percentages meant only a few faculty members, if any, believed the topic was covered and therefore suggests that the topic was not well integrated. Table 2 also reports the percentage of respondents who covered the topic and, for those, the average amount of time spent on the topic in a semester. Topics that appeared to be the most integrated were reviewing general diseases related to tobacco use and reviewing oral tobacco-related diseases. About one-fourth of the respondents indicated that they cover these topics in their courses, and they spend approximately one-half hour on each topic. Over half of the faculty indicated that they address their students' own use of tobacco, but only spend about sixteen minutes in the entire semester doing so. Topics for which there was little consensus that it was covered in the curriculum or which very few respondents covered included a) understanding tobacco prevention strategies; b) 5As and 5Rs (Relevance, Risks, Rewards, Roadblocks, Repetition—interventions used to further help people quit);²⁰ c) stages of change; d) brief motivational interviewing; e) developing a comprehensive tobacco intervention program in a clinical setting; and f) strat-

egies for becoming involved in community-based tobacco control.

Table 3 reports the percentage of faculty who stated that various tobacco intervention competencies were evaluated in clinical courses. More than 75 percent of respondents indicated that two of the competencies were assessed: the students' ability to assess whether patients use tobacco, and the students' ability to associate head and neck exam findings to tobacco use. Slightly over 50 percent of the respondents also indicated that the students' ability to discuss tobacco cessation/prevention strategies with clients was assessed. However, the majority of faculty indicated that only assessing patient use of tobacco was done formally (and this majority was only about 52 percent). Nonetheless, if respondents indicated that a particular competency was assessed, it was done so fairly frequently (see Table 3).

Discussion

The results of this needs assessment revealed two basic findings: 1) a strong need for tobacco cessation intervention exists for patients of a teaching dental hygiene clinic; and 2) the majority of dental hygiene faculty in this study have not fully integrated tobacco control education into their programs despite strong, positive attitudes toward tobacco education.

Important Findings from the Patient Survey

The dental hygiene patient survey revealed that the rate of smoking is higher than the national aver-

age for adult smokers² and higher than the rate of smoking for students at the university where this study was conducted. A random sample of students (n=1024) was surveyed during spring 2004 (at the same university and during the same time frame that the patient survey was conducted); it indicated that 23.4 percent were current smokers, 11.8 percent were ex-smokers, and 54.7 percent were nonsmokers. It is possible that smokers are more likely than the general public to need and thus obtain dental hygiene services due to their increased oral health problems.⁸⁻¹² Thus, the dental/dental hygiene visit represents an excellent opportunity to deliver tobacco cessation and prevention interventions.

The patient survey also revealed that whereas 71 percent of those in a "stage of change" indicated a desire for or having thoughts about quitting smoking now or in the future, 66 percent did not want any help or information about quitting smoking. These findings indicate that patients are not likely to ask for smoking cessation services and that health care providers, such as dental hygienists, may need to initiate discussions about such services.

Important Findings from the Faculty Survey

The intent of the dental hygiene faculty survey was to examine the current state of attitudes and practices with regard to integrating comprehensive tobacco education in dental hygiene curricula. According to the theory of planned behavior,⁵² attitudes, social influences, and control over internal and external barriers must be strong for individuals to form an intention to engage in behavior change, such as

Table 3. Assessment of tobacco intervention competencies in clinic courses

Skill	Percent of Respondents Who Indicate Competency Is Assessed in Clinic	Average Frequency of Assessment of Competency* (n's=18-61)	Percent of Respondents Who Indicate Competency Is Assessed Formally
a. Assessing whether the patient uses tobacco.	79.06	4.07	51.5
b. Associating head and neck exam findings to tobacco use, if relevant.	77.61	4.57	47.4
c. Assessing stages of change among tobacco-using clients.	35.03	4.26	17.5
d. Discussing tobacco cessation/prevention strategies with clients.	54.27	3.78	10.3
e. Following the 5As and 5Rs for conducting tobacco cessation counseling.	16.03	3.67	5.2
f. Using brief motivational interviewing.	28.07	3.88	4.1
g. Providing cessation resources and follow-up.	23.72	3.58	5.2

*Assessed on a scale from 1 (never) to 5 (always)

increasing attention to tobacco education in the curriculum. Our study showed attitudes toward tobacco education were indeed quite strong, but social influences, self-efficacy to teach tobacco education, and perception of control over external barriers to teaching tobacco education were only moderate. Moreover, an analysis of the tobacco education components currently practiced by the respondents revealed that, except for covering general and oral-specific diseases related to tobacco use, the majority of faculty respondents did not cover other tobacco-related issues in their didactic courses.

Despite faculty members' strong beliefs about the importance of tobacco cessation training, very few tobacco-intervention competencies were formally assessed in clinic. Whereas nearly 80 percent of faculty respondents reported that the students' ability to evaluate patients' tobacco use is assessed, only 51 percent reported that this competency was assessed formally. In a previous study, 16 percent of the faculty reported that student competency was assessed when following the 5As and 5Rs for conducting tobacco cessation counseling.²⁰ The 16 percent of faculty who reported that students were assessed to competency indicated that the 5As and 5Rs assessment was done relatively frequently: 3.88 (1=never to 5=always). However, when all participating faculty were asked if this same competency was formally assessed, only 5.2 percent were aware of the formal assessment. These findings may reflect the possibility that some programs have a faculty member who is very motivated and interested in tobacco control (a tobacco champion) and who has integrated various aspects of tobacco control into his or her courses and/or clinical instruction. Unfortunately, the results suggest that tobacco control has not been well integrated into the overall curriculum, including both didactic and clinic courses and among the majority of faculty members in a particular program.

These results corroborate previous research examining the extent of tobacco cessation education offered in medical and dental schools. For the most part, the effects of tobacco are presented in didactic course material but often do not include motivational interviewing, pharmacotherapies, or effective follow-up. Dental hygiene students' competence in tobacco cessation counseling with actual patients is rarely evaluated.³¹⁻³⁴ As in other research, the dental hygiene faculty reported as "very important" the need to prepare students to identify tobacco use by their patients, evaluate the oral and general health effects, and ad-

vice patients to quit. Because students must be clinically competent in assessing oral pathology and disease identification, it is not surprising that faculty would report these topic areas as being very important. Based on the results of this study, the need to expand the level of didactic and actual practice to treat a complicated chemical dependency, such as nicotine addiction, is clear. In this study, faculty reported feeling less prepared to incorporate stages of change, motivational interviewing, and pharmacotherapies. The suggestion that pharmacotherapies, motivational interviewing, and the stages of change should be added to the curriculum has been viewed by some faculty with skepticism. The curriculum is already overpacked, and many faculty do not believe they are adequately prepared to offer this instruction since they may never have provided a tobacco intervention using these strategies themselves.

Fortunately, institutional support for the inclusion of competency-based tobacco cessation continues to expand, and now includes the American Dental Education Association (ADEA) 2004 Policy Statements and Core Competencies,^{47,48} the American Dental Association (ADA) Commission on Dental Accreditation, and Accreditation Standards for Dental Hygiene Education Programs, 1998.⁴⁹ Notably, the ADA has recently included questions about tobacco and tobacco cessation in the National Board Dental Hygiene Examination.⁵⁰ With such a substantial mandate, there appears to be a pressing need for an evidence- and competency-based tobacco control curriculum intended to assist dental hygiene educators in overcoming many of the reported barriers of lack of time and materials.

Limitations

The generalizability of our findings regarding patient need for tobacco cessation intervention is limited to those patients, mostly college students, who patronize a university-based dental hygiene clinic. This rural, Midwestern dental hygiene clinic in our study reported seeing a higher number of adult patients who smoked (34.5 percent) as compared to the national average of adults who smoke (22.5 percent). This could possibly reflect the geographic location of the clinic and/or the fact that tobacco-using patients have a greater need for dental cleanings due to stain, deposits, malodor, or loose teeth (periodontitis).

Our findings regarding dental hygiene faculty's readiness to integrate tobacco education in their curriculum is generalizable to the state of Illinois; however, there is no reason to believe that DH faculty in other community college settings in the United States are not similarly situated. However, only one of the twelve dental hygiene programs in the study was directly affiliated with a dental school, thus possibly limiting their ability to practice integrated tobacco cessation with the whole dental team.

Conclusion

Healthy youth and adults visit their dental care provider on a regular basis. In this current needs assessment study, over one-third of the patients reported using tobacco, thus demonstrating a strong need for clinicians to be prepared to offer appropriate tobacco interventions. Although many patients indicated an intention to quit using tobacco, most in this study did not want assistance in quitting, indicating that dental hygienists may need to be proactive and consistent in their approach to providing assistance in cessation attempts.

Health care educators have a unique opportunity to shape and guide future generations of dental health care providers. The barriers to providing comprehensive, competency-based tobacco control education are possible to overcome. A comprehensive, easy-to-use tobacco control curriculum that would bring the student from theory to competency may bring this very important health promotion/disease prevention intervention closer to becoming a part of normal patient care.

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