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Oral Cancer Prevention and Early Detection: Using the PRECEDE-PROCEED Framework to Guide the Training of Health Professional Students

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Abstract

Background.—Teaching cancer prevention and detection is important in health professional education. It is desirable to select a comprehensive framework for teaching oral cancer (OC) prevention and detection skills.

Methods.—The PRECEDE-PROCEED model was used to design a randomized pretest and posttest study of the OC prevention and detection skills of dental students (n=104). OC knowledge, opinions, and competencies were evaluated.

Results.—Second year students in the intervention group were more competent than those in the control group.

Conclusions.—The novel use of PRECEDE-PROCEED sets a precedent for designing a standardized OC curriculum for a wide range of health professional disciplines.

Training health professional students in the prevention and early detection of disease is an important component of predoctoral education. However, uniform incorporation of prevention and detection content into curricula of health professional schools has not yet occurred.¹ In response to this challenge, developmental Objectives 1 through 7 of Healthy People 2010 is to increase the number of health professional schools that include core competencies in health promotion and disease prevention.² A 4-component Clinical Prevention and Population Health Framework was subsequently developed by the

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Healthy People Curriculum Task Force. Within this framework is a call for training health professional students in screening and counseling skills.¹

A comprehensive disease prevention and detection curriculum for health professional schools should include training in oral cancer prevention and early detection. With a 5-year relative survival rate of 59%, oral cancer is a significant public health concern in the United States. It is anticipated that there will be approximately 30,000 new cases and 7400 deaths in the United States in 2006 attributable to cancers of the oral cavity and pharynx.³ The major risk factor is tobacco use, which accounts for over 75% of oral cancers. Thus, Healthy People 2010 includes 3 objectives to detect oral cancer earlier and to increase the percentage of dentists and physicians who counsel tobacco using patients and encourage nonusers to abstain from starting tobacco use.² Additionally, the American Cancer Society recommends conducting an oral cancer examination during regular periodic health examinations for individuals aged 20 years and older.⁴

Despite these national recommendations, studies of dental and medical school curricula confirm insufficient coverage of oral cancer prevention and early detection.⁵⁻⁷ Dental and medical students have reported receiving inadequate training in head and neck examination and tobacco cessation counseling.⁸⁻¹³ Additionally, few dental or medical schools formally evaluate competency in head and neck examination and tobacco cessation counseling, and no state board of dental or medical examiners requires applicants to demonstrate their proficiency in these areas. Only 1 state requires continuing dental education in these areas.¹⁴

Oral cancer prevention and early detection can be integrated into the curricula of health professional schools using a comprehensive planning framework. One methodology that is commonly used to design, implement, and evaluate interventions that influence health-related behaviors is the PRECEDE-PROCEED model developed by Green, and Kreuter.¹⁵ Components of the model are derived from epidemiology; social, behavioral, and educational sciences; and health administration.

Purpose

The PRECEDE-PROCEED model was used to develop, implement, and evaluate a randomized pretest and posttest study to compare traditional lecture instruction with a problem-based learning (PBL) approach for training dental students in oral cancer prevention and early detection skills. Dental students were chosen as the study population of interest, although this model may be adapted to design oral cancer prevention and detection curricula for other health professions disciplines.

MATERIALS AND METHODS

The PRECEDE-PROCEED model consists of 8 phases: (1) Social Assessment and Situational Analysis, (2) Epidemiological Assessment, (3) Educational and Ecological Assessment, (4) Intervention Alignment, (5) Implementation, (6) Process Evaluation, (7) Impact Evaluation, and (8) Outcome Evaluation. A diagram of the application of PRECEDE-PROCEED to this study is given in Figure 1.

An assessment of the social environment was provided by preliminary studies of dental and medical students in 1 university setting in 2002. Based on the preliminary studies, Phase 2 evaluated the dental school's curriculum for oral cancer prevention and early detection content. A detailed listing of the curriculum is given in Table 1. In Phase 3, discussion sessions were held with dental faculty members to obtain faculty input regarding ways to improve dental students' oral cancer prevention and detection skills.

In Phases 4 and 5, 1st- and 2nd-year dental students (n = 104) were randomly assigned to either the intervention or control group using a computer-generated random numbers sequence. Students in the control group received usual instruction in oral cancer prevention and detection as determined by the dental curriculum. Those in the intervention group received faculty-facilitated, standardized, patient-based training in addition to the existing curriculum. During this training, groups of students observed dental faculty members demonstrate proper head and neck examination techniques and how to counsel a standardized patient about tobacco use cessation.

All students were measured at baseline and at a 6-month posttest on their oral cancer and tobacco cessation knowledge, opinions and behaviors, and their competency in head and neck examination and tobacco cessation counseling. Knowledge, opinions, and behaviors were measured using a modified version of a self-administered questionnaire designed for physicians and dentists,¹⁶⁻¹⁸ and competency was measured with an Objective Structured Clinical Examination (OSCE). Since the mid-1970s, the OSCE has been used to observe and document medical students' clinical skills in a standardized context.¹⁹ The OSCE used for this study portrayed the standardized patient as a current smoker at risk for oral cancer and was pilot-tested with 4th-year dental students (n=8) in August 2005.

The university's human subjects institutional review board approved this randomized 2-group pretest and posttest study in July 2005. The dental school was designated as the initial study site. Written informed consent was obtained from all student participants, with students and investigators each receiving a copy of the signed consent form.

RESULTS

Phases 6 through 8 comprise the evaluative component of the PRECEDE-PROCEED model. Results of the social assessment indicated that although dental and medical students improved in oral cancer prevention and detection skills as they progressed through school, a greater emphasis should be placed on these issues in the curricula. Similarly, whereas students favored increased training in tobacco cessation education, the majority felt inadequately trained in and uncomfortable providing tobacco cessation counseling and advice to patients.⁹⁻¹¹

Following the intervention, change in questionnaire responses and OSCE scores were compared from pretest to posttest between the intervention and control groups. Second-year students in the intervention group received higher OSCE scores than those in the control group. There were no group differences for 1st-year students. Additional study results have been described elsewhere.²⁰

DISCUSSION

Although oral cancer is a significant public health concern, educational research on the oral cancer prevention and early detection skills of health professional students is scarce. This study demonstrated that the PRECEDE-PROCEED theoretical model can be applied as a comprehensive methodology for designing, implementing, and evaluating an oral cancer prevention and early detection intervention. The improved OSCE scores of 2nd-year students indicated that the combination of traditional lecture and PBL can improve students' oral cancer prevention and detection skills. The skills of 2nd-year students in the intervention group may have been reinforced by observing faculty members demonstrate the head and neck examination and tobacco cessation counseling techniques. The lack of effect for 1st-year students could be attributed to a more limited baseline knowledge and set of skills.

Eva²¹ acknowledged that research on PBL interventions can be effective when appropriate outcome measures are selected within an optimal research design such as the randomized pretest and posttest design used in this study. Using the PRECEDE-PROCEED model to design an oral cancer prevention and early detection training program is an innovative approach because the model is commonly used to direct interventions for patients, not providers. Additionally, the systematic process of identifying multiple components necessary for achieving the desired outcome allows this methodology to be applied in any health professional discipline or field.

One important aspect of curricular change is that of engaging faculty acceptance and support. Barriers to implementation can be avoided by encouraging faculty participation from the outset. As described in this study, discussion sessions with faculty can yield suggestions for improvement in the existing curriculum content. At the time of this assessment, the dental curriculum was undergoing a major revision, and faculty members were quite supportive of developing an improved oral cancer prevention and detection curriculum. Suggestions from the faculty included having additional instruction for students in proper methods of examination and tobacco cessation counseling and formally evaluating student competency after the 2 preclinical years of school. Sachdeva²² commented that curricular reform and adaptation are more effective when faculty provide expertise toward the development and implementation of new teaching strategies.

Health professional schools have a responsibility to train competent and confident future providers. By assessing the oral cancer prevention and early detection training of health professional students within a theory-based model, educators can apply a scientifically sound approach toward understanding the factors related to students' examination and counseling skills. Oral cancer prevention and early detection needs to be an integral component of cancer education, and the PRECEDE-PROCEED model can be used to effectively design a standardized curricular model for the health professions disciplines.

Acknowledgments

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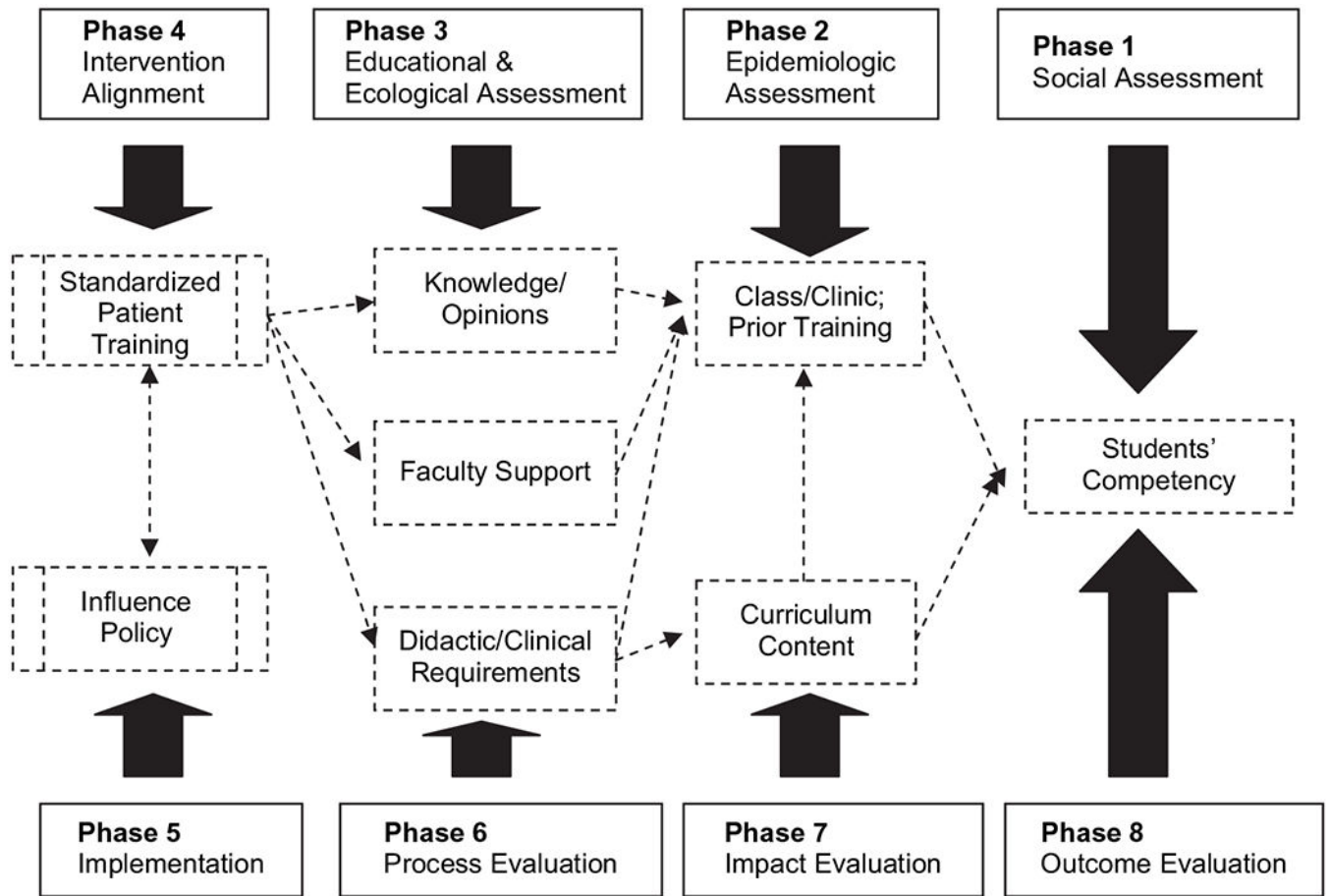


Figure 1. PRECEDE-PROCEED application for designing oral cancer prevention and early detection training for health professional students. Solid boxes and arrows: PRECEDE-PROCEED phases. Dashed boxes and arrows: PRECEDE-PROCEED model application to training health professional students in oral cancer prevention and early detection.

Table 1.**Oral Cancer Prevention and Detection Content at a US Dental School**

Course	Semester	Topics Covered
1st Year	Summer	Introduction to oral pathology and oral cancer
Nutrition	Fall	The role of fruit and vegetable consumption in the progression of oral cancers
Preventive Dentistry	Fall	Oral cancer epidemiology and tobacco cessation training
Preventive Periodontics	Fall	Review of medical and dental histories including tobacco and alcohol use assessment; components of an extraoral and intraoral examination
Advanced Biochemistry	Spring	The molecular basis of oral cancer
2nd Year		
Oral Medicine	Spring	The types, epidemiology, and location of oral cancers
3rd Year		
Oral Pathology I and II	Fall/Spring	The pathology of oral cancer
Junior Periodontics Clinics	Summer/Fall/Spring	Review medical and dental histories, and conduct intraoral and extraoral examination with patients
4th Year		
Clinical Diagnostic Conference	Summer	Establish clinical differential diagnosis for pathologic lesions including various types of oral cancers
Senior Periodontics Clinics	Summer/Fall/Spring	Review medical and dental histories, and conduct intraoral and extraoral examination with patients