Oral Cancer Knowledge and Opinions Among Maryland Nurse Practitioners

Piya Siriphant, DDS, MPH, PhD; Thomas F. Drury, PhD; Alice M. Horowitz, PhD; Ruth M. Harris, PhD, RN, CRNP

Abstract

Objectives: *As part of a Maryland statewide oral cancer needs assessment, a census of adult and family practice nurse practitioners was conducted to determine their knowledge of oral cancer risk factors, diagnostic procedures and related opinions.* ***Methods:*** *Information was obtained through a pretested, 40-item, self-administered mail questionnaire of 389 nurse practitioners. A second complete mailing was sent three weeks after the initial mailing; two postal card reminders were mailed at 10 and 17 days after the second mailing, which yielded a response rate of 56 percent.* ***Results:*** *Most nurse practitioners identified the use of tobacco, alcohol, and prior oral cancer lesions as real risk factors. But only 35 percent identified exposure to the sun as a risk for lip cancer. Respondents were not overly knowledgeable about the early signs of oral cancer, most common forms, or sites for oral cancer. Only 19 percent believed their knowledge of oral cancer was current. Nurse practitioners who reported having a continuing education course on oral cancer within the past two to five years were 3.1 times more likely to have a high score on knowledge of risk factors and 2.9 times more likely to have a high score on knowledge of both risk factors and of diagnostic procedures than were those who had never had a continuing education course.* ***Conclusions:*** *The reported knowledge of oral cancer, in conjunction with opinions about level of knowledge and training, point to a need for systematic educational updates in oral cancer prevention and early detection. [J Public Health Dent 2001;61(3):138-44]*

Key Words: oral cancer, nurse practitioners, knowledge, risk factors, diagnostic procedures.

Since the early 1970s, nearly 30,000 Americans have been diagnosed annually with oral cancer, representing about 3 percent of the approximately 1 million new cases of all cancers diagnosed each year (1). This estimate includes cancers of the lips, tongue, floor of the mouth, palate, gingiva and alveolar mucosa, buccal mucosa, and oropharynx. Although the five-year survival rate for early detected and localized oral cancers is almost 80 percent, the average five-year survival rate of all oral cancers in the United States over the past 20 years has been only 52 to 54 percent (1,2). This discrepancy is because most oral cancers are detected at later stages, characterized by regional or distant metastasis. Oral cancer accounts for approximately 8,000 deaths per year in the United States (1-4). The American Cancer Society has estimated that in 1999, the number of deaths and age-adjusted death rate for oral cancer exceeded those due to other well-known types of cancer, such as melanoma of the skin and cervical cancer (5). Although mortality due to oral cancer decreased slightly between 1970 and 1990, there have been no significant changes in either the incidence or the survival rate of oral cancers over the same period (2). In the absence of pertinent data, there is no satisfactory explanation for these inconsistent trends.

In the United States, the incidence rate of oral cancer for the state of Maryland ranks 14th among the states; however, Maryland's oral cancer mortality rate ranks seventh among the states overall and ranks sixth for black males. Data from the Maryland Cancer Registry show that between 1992 and 1994, the age-adjusted incidence rates in all regions of Maryland except the Eastern Shore have decreased moderately. However, in the Eastern Shore region, the oral cancer mortality rates have dramatically increased from 9.9 per 100,000 population in 1992 to 14.8 per 100,000 in 1994. Oral cancer incidence rates clearly differ by gender: 14.8 per 100,000 males and 6.3 per 100,000 females. In addition, black males have a higher incidence rate of oral cancer than do their white counterparts. The incidence rates among black females and white females are similar. The incidence rate among black males also is on the increase, while among white males and females the rates of new cases of oral cancer generally have been stable (6).

Because oral cancer is a public health problem that needs to be addressed, Healthy People 2010 devoted three objectives to oral cancer: to reduce the oral and pharyngeal cancer death rate; to increase the proportion of oral and pharyngeal cancers detected at the earliest stage; and to increase the proportion of adults who, in the past 12 months, report having had an examination to detect oral and pharyngeal cancer (7). Despite the fact that major risk factors for oral cancer are well recognized and that preventive

Send correspondence and reprint requests to Dr. Horowitz, National Institute of Dental and Craniofacial Research, National Institutes of Health, Building 45, Room 3AN-44B, 45 Center Drive MSC 6401, Bethesda, MD 20892-6401. E-mail: alice.horowitz@nih.gov. Dr. Siriphant is lecturer, Faculty of Dentistry, Thammasat University, Thailand. At the time of the study he was a doctoral student in the Department of Health Behavior and Health Education, School of Public Health, University of North Carolina at Chapel Hill. Dr. Drury is a statistician with the National Institute of Dental and Craniofacial Research, National Institutes of Health, Bethesda. Dr. Harris is professor and chair of the Department of Adult Health Nursing, School of Nursing, University of Maryland, Baltimore. Manuscript received: 5/30/00; returned to authors for revision: 10/31/00; accepted for publication: 12/27/00.

measures are available, considerable gaps remain among both the general public and various health practitioners in the utilization of such knowledge and preventive practices.

The American Cancer Society recommends an annual oral cancer examination for persons aged 40 years or older (8). Nonetheless, in 1996 only 28 percent of Maryland adults and 33 percent of those aged 40 years or older reported having an oral cancer examination during the 12 months preceding their interview (9). Knowledge of risk factors for oral cancer is meager in the general adult population and much less than satisfactory among many health care providers in Maryland (9-12). Recent studies of Maryland dentists suggest that their knowledge and practices concerning risk factors for and early detection of oral cancers is disappointing (13,14). In 1996, 28 percent of Maryland adults did not visit a dentist or receive oral health care during the past 12 months. About 24 percent of adults had not seen a physician during this same period (9). Because many people do not have access to a dentist or dental hygienist, other providers need to assist in providing oral cancer examinations.

In this context, nurse practitioners are one of the most likely groups of health professionals to get involved in this effort because they are likely to have extensive contact with high-risk populations. For this reason, and as part of a systematic statewide oral cancer needs assessment, adult and family practice nurse practitioners in Maryland were surveyed.

The objectives of this study were threefold: (1) to determine knowledge of oral cancer risk factors and diagnostic procedures of adult and family practice nurse practitioners in Maryland; (2) to describe associations between background characteristics of nurse practitioners and their knowledge of oral cancer risk factors and diagnostic procedures; and (3) to explore relations between their levels of oral cancer knowledge and their opinions about the currency of their oral cancer knowledge, the adequacy of their oral cancer training, and their interest in and preferences for future oral cancer continuing education.

Methods

To achieve these objectives, information obtained through the 1998 Maryland Oral Cancer Survey of Nurse Practitioners (MDOCSNP) was analyzed. The 1998 MDOCSNP was a mail survey of all active adult and family nurse practitioners in Maryland at the time of the survey.

In March 1998, a pretested, 40-item, self-administered questionnaire (12) was sent to all 793 adult and family practice nurse practitioners registered in Maryland. Two weeks after this initial mailing, a first postal card reminder was sent. A second complete mailing was dispatched three weeks after the initial complete mailing. Finally, two additional postal card reminders were sent at 10 and 17 days after the second complete mailing. Data collection was completed in April 1998. These follow-up procedures yielded usable responses from 389 nurse practitioners, representing a response rate of 56 percent. These 389 nurse practitioners constitute the study group for the present research study.

The study group provided answers to a 40-item questionnaire that was grouped into three main sections. One section obtained information on age, sex, educational experiences (including recentness of oral cancer continuing education), and access to computers. It also solicited information on the characteristics of respondents' current work settings, including type of practice and characteristics of patients. Another section queried knowledge of oral cancer risk factors and oral cancer diagnostic procedures. A final section covered opinions on the adequacy of their current knowledge of oral cancer, perceived competence of various health professions to perform oral cancer examinations, and perceived roles and responsibilities of nurse practitioners in oral cancer prevention.

The present study only analyzed responses to seven questions about real risks and seven questions about nonrisks, as well as nine questions about signs and symptoms of oral cancer and the basics of oral cancer examination procedures. The 14 items on oral cancer risks were used to develop an overall index of current knowledge of oral cancer risk factors, which ranged from 0 to 14. The nine questions about signs and symptoms of oral cancer and basic oral cancer screening methods were used to develop an index of current knowledge of oral cancer diagnostic procedures, which ranged from 0 to 9. The combined scores from these two knowledge indices were summarized in an overall index of oral cancer knowledge, which ranged from 0 to 23. The scores for knowledge of oral cancer risks and knowledge of oral cancer diagnostic procedures were each grouped into three approximately equal categories of low, medium, or high level of knowledge. The three-category indices of knowledge of risks and of diagnostic procedures also were used to form a typology of patterns of oral cancer knowledge. This typology facilitated the identification of nurse practitioners who had consistently high scores on both indices.

The analysis initially described the characteristics of the study group, the current knowledge of risk factors, the current knowledge of diagnostic procedures, and patterns of oral cancer knowledge. Logistic regression was used to determine the likelihood of receiving a high score on three indices of oral cancer knowledge for each of 11 background characteristics of nurse practitioners. The three indices were knowledge of oral cancer risks, knowledge of oral cancer diagnostic procedures, and knowledge of both risks and diagnostic procedures. Lastly, logistic regression was used to determine the likelihood of having favorable beliefs about the currency of respondents' oral cancer knowledge, the adequacy of their oral cancer training, and interest in oral cancer continuing education among nurse practitioners with low and medium levels of oral cancer knowledge compared to those with high levels.

All analyses were carried out with unweighted data using SAS Version 6.0 and SUDAAN Version 7.0 statistical programs. Both stratified contingency table and logistic regression modeling were used in the data analyses. A .05 level of significance was used in evaluating all statistical results.

Results

Characteristics of the Study Group. Nearly all (97%) respondents were female. Only a small percentage (6%) were aged 24–30 years, 27 percent were aged 31–40 years, 43 percent were aged 41–50 years, and 22 percent were older than 50 years of age. Fifty-eight percent had graduated from their nurse practitioner program be-

tween 1990 and 1998, 25 percent graduated between 1980 and 1989, and 16 percent graduated before 1980. Eighty-three percent had a master's degree.

Almost half (46%) were in primary care practices and 20 percent worked in specialty practices. Nearly three-quarters of respondents (74%) reported that the initial visit for a new nonemergency patient was scheduled with the nurse practitioner rather than the physician. Eighteen percent of respondents confirmed that all of their adult patients had some type of health insurance (including Medicaid and Medicare) and 61 percent reported that more than 90 percent of their patients were covered by some type of health insurance.

With regard to educational experiences, 77 percent had never had a continuing education course on oral cancer since graduation. Furthermore, only 6 percent of the respondents had taken a continuing education course on oral cancer within the past five years, and none had done so during the past year.

Current Knowledge of Risk Factors. With regard to real risk factors, almost all respondents correctly identified the use of tobacco products (99%), prior oral cancer lesions (97%), and the use of alcohol (90%) as oral cancer risk factors. Nearly three quarters (71%) distinguished older age as a risk factor. However, 42 percent recognized low consumption of fruits and vegetables as a risk factor. Thirty-five percent identified sun exposure as a risk for lip cancer and 24 percent recognized that most oral cancers are diagnosed among persons aged 60 years or older (Figure 1).

With regard to nonrisk factors, fewer than half could correctly identify that familial clustering of cancer (49%), a poorly fitting denture (30%), poor oral hygiene (26%), and a family history of cancer (15%) were not oral cancer risk factors. In addition, only slightly more than half could correctly pinpoint that spicy foods (58%), hot beverages and foods (56%), and obesity (51%) were nonrisk factors (Figure 1).

Correct answers reflecting current knowledge of oral cancer risk factors were widely distributed, ranging from a low score of 0 to a high score of 13 (out of a maximum score of 14), with an average score of 6.9. When the distribution of nurse practitioners was classified into three categories reflecting their overall level of knowledge of oral cancer risks, 31 percent were categorized as having a low level of such knowledge; 34 percent, a medium level of knowledge; and 35 percent, a high level of knowledge of oral cancer risk factors (Table 1).

Current Knowledge of Diagnostic Procedures. With regard to their knowledge of oral cancer diagnostic procedures, about 78 percent of respondents could identify the procedures for examining the tongue (Figure 2). Seventy-two percent knew that signs of a lymph node are most characteristic of oral cancer metastasis. Sixty-five percent knew that in the early stage of oral cancer the patient is asymptomatic, and 58 percent knew the most commonly diagnosed stage of oral cancer. About half (49%) correctly knew the early signs of oral cancer, 42 percent knew the most common form of oral cancer, nearly 24 percent knew the two most common sites of oral cancer besides the lips, 22 percent knew the most common area of the tongue for oral cancer, and only 6 percent knew the most common conditions associated with oral cancer (Figure 2).

Overall, correct answers on knowledge of oral cancer diagnostic procedures ranged from 0 to 8 (out of a maximum score of 9), with an average score of 4.1. The effort to produce a crude ranking of nurse practitioners by their overall level of knowledge of

FIGURE 1
Percentage of Nurse Practitioners Providing Correct Responses to Questions about Real Risks and Nonrisks of Oral Cancer

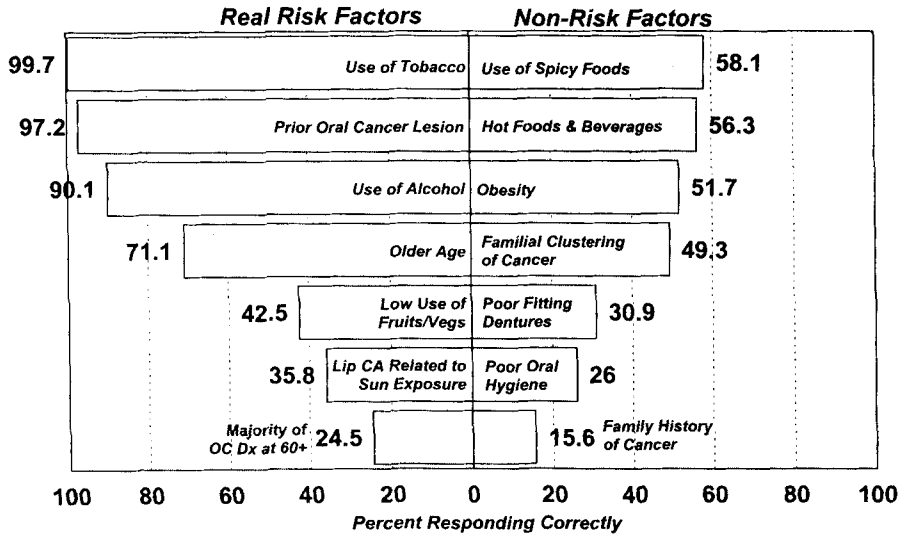
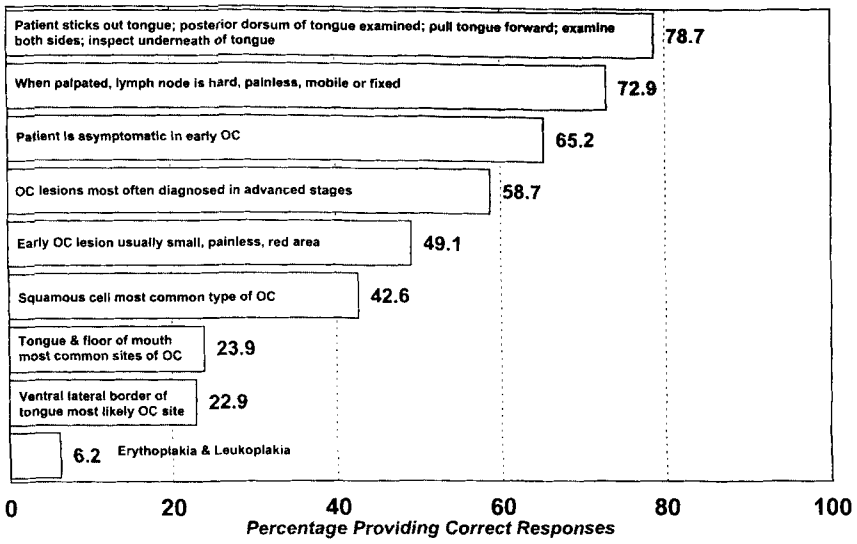


TABLE 1
Percent Distribution of Nurse Practitioners by Patterns of Levels of Knowledge of Oral Cancer Risk Factors and Diagnostic Procedures

Score for Knowledge Index of Oral Cancer Diagnostic Procedures	Score for Knowledge Index of Oral Cancer Risk Factors: % of All Nurse Practitioners			
	Low (0–5)	Medium (6–8)	High (9–13)	Total
Low (0–3)	17.2	11.6	6.9	35.7
Medium (4–5)	9.5	14.4	14.4	38.3
High (6–8)	4.1	8.2	13.6	25.9
Total	30.9	34.1	34.9	100.0

FIGURE 2
Percentage of Nurse Practitioners Providing Correct Responses to Selected Items on Knowledge of Oral Cancer Diagnostic Procedures



oral cancer diagnostic procedures identified almost 36 percent with a low level of knowledge in this domain (0–3 correct items), 38 percent with a medium level of knowledge (4–5 correct items), and 26 percent with a high level of knowledge (6–8 correct items) of oral cancer diagnostic procedures (Table 1).

Patterns of Oral Cancer Knowledge. To evaluate interrelationships between nurse practitioners' knowledge of oral cancer diagnostic procedures and their knowledge of oral cancer risk factors, a typology of nurse practitioners was developed by cross-classifying low, medium, and high levels of knowledge on each index (Table 1). This analysis revealed that 45 percent of the nurse practitioners received a consistent score on both aspects of oral cancer knowledge and that these nurse practitioners were about equally likely to have received low (17%), medium (14%), or high (14%) scores on each index. Among the 55 percent of respondents with inconsistent knowledge rankings, 33 percent had better knowledge of oral cancer risk factors than they had of oral cancer diagnostic procedures, while 22 percent had better knowledge of oral cancer diagnostic procedures than they did of pertinent risk factors. This analysis also revealed that only 14 percent of nurse practitioners had received a high score on each of the aspects of oral cancer knowledge that were studied.

Background Characteristics and Knowledge of Oral Cancer. To assess associations between various background characteristics of nurse practitioners and their knowledge of oral cancer, three aspects of their knowledge levels were examined using logistic regression analyses: (1) the likelihood of getting a high score for their knowledge of oral cancer risk factors, (2) the likelihood of getting a high score for their knowledge of oral cancer diagnostic procedures, and (3) the likelihood of getting a high score both for their knowledge of oral cancer risk factors and for their knowledge of pertinent diagnostic procedures. Eleven different respondent characteristics were examined in relation to these three levels of oral cancer knowledge variables: age of practitioner, type of practice, typical ages of patients, patient health insurance coverage, first contact with health staff, time of graduation, interval since last oral cancer continuing education course, entry-level degree, highest degree earned, year highest degree earned, and number of professional association memberships. Only one characteristic—the interval since the last continuing education course on oral cancer—was systematically and consistently associated with the likelihood of having a high level of oral cancer knowledge on any of the knowledge variables studied.

The interval since the last continuing education course on oral cancer was significantly associated with oral cancer knowledge levels of nurse practitioners (Table 2). Nurse practi-

TABLE 2
Associations Between Interval Since Last Oral Cancer Continuing Education Course and High Score on Three Indices of Oral Cancer Knowledge Among Nurse Practitioners

Interval Since Last Oral Cancer Continuing EducationCourse*	Odds of Getting High Score					
	Risk Factors		Diagnostic Procedures		Risk Factors & Diag. Proc.	
	Odds Ratio	95% CI†	Odds Ratio	95% CI	Odds Ratio	95% CI
Within past 2–5 years	3.1‡	1.3, 7.3	2.2	0.9, 5.3	2.9¶	1.1, 8.1
Not yet (new graduate)	2.9‡	1.3, 6.5	2.7‡	1.2, 6.1	3.6‡	1.4, 8.8
Never	1.0	—	1.0	—	1.0	—

*No practitioner had participated in an oral cancer continuing education course either "within the past 12 months" or "more than 5 years ago."
†Confidence interval.
‡$P \leq .01$.
¶$P \leq .05$.

TABLE 3
Associations Between Levels of Oral Cancer Knowledge and Strongly Agreeing or Agreeing with Statements about Currency of Oral Cancer Knowledge and Adequacy of Oral Cancer Training Among Nurse Practitioners

Type and Level of Oral Cancer Knowlege	Odds of Strongly Agreeing or Agreeing with the Following Statements									
	My Knowledge of Oral Cancer Training Is Current		My Oral Cancer Training was Adequate to							
			Examine Patients for Oral Cancer		Palpate Patients for Oral Cancer		Provide Tobacco Cessation Education		Provide Alcohol Cessation Education	
	OR*	95% CI†	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Risk factors										
Low	3.2‡	1.6, 6.5	2.8¶	1.7, 4.7	0.6	0.1, 3.1	1.8§	1.1, 3.3	1.4	0.9, 2.3
Medium	1.5	0.8, 2.6	1.9‡	1.4, 3.0	1.3	0.3, 4.8	1.6	1.0, 2.8	1.5	0.9, 2.4
High	1.0	—	1.0	—	1.0	—	1.0	—	1.0	—
Diagnostic procedures										
Low	9.4¶	3.9, 22.7	4.5¶	2.6, 7.9	1.4	0.2, 7.7	2.4‡	1.3, 4.3	2.0‡	1.2, 3.4
Medium	1.7	1.0, 3.0	2.1‡	1.2, 3.5	1.6	0.3, 8.2	1.5	0.8, 2.8	1.0	0.6, 1.7
High	1.0	—	1.0	—	1.0	—	1.0	—	1.0	—
Risk factors and diagnostic procedures										
Low	7.7¶	3.4, 17.4	3.6¶	2.1, 6.0	0.9	0.2, 4.4	2.2‡	1.3, 3.9	2.0‡	1.2, 3.4
Medium	1.9§	1.1, 3.5	1.6	1.0, 2.7	1.5	0.3, 6.3	1.8	1.0, 3.1	1.0	0.6, 1.7
High	1.0	—	1.0	—	1.0	—	1.0	—	1.0	—

*OR=odds ratio. (Note: All ORs have been reflected; in general, ORs should be read as "so many times less likely to strongly agree or agree; the two ORs <1.0 should be read as "so many times more likely to strongly agree or agree.")
†CI=confidence interval.
‡$P \leq .01$.
¶$P \leq .001$.
§$P \leq .05$.
Source: MDOCSNP, 1998.

tioners who reported taking a continuing education course on oral cancer within the past two to five years were 3.1 times more likely to have a high score on knowledge of risk factors, and 2.9 times more likely to have a high score both on knowledge of risk factors and diagnostic procedures than were those who had never taken a continuing education course. Also, compared to those who had never attended a continuing education course on oral cancer, new nurse practitioner graduates were, respectively, 2.9, 2.7, and 3.6 times more likely to have high scores on knowledge of oral cancer risk factors, diagnostic procedures, or both of these domains. However, there was no difference between new graduates and those who had a continuing education course within the past two to five years.

Levels of Oral Cancer Knowledge and Related Opinions. A final set of analyses explored potential associations between levels of oral cancer knowledge and nurse practitioners' opinions about the currency of their oral cancer knowledge, the adequacy of their oral cancer training, and their interest in and preferences for continuing education courses about oral cancer. Each of these opinions was analyzed separately, as well as in relationship to their knowledge of oral cancer risk factors, diagnostic procedures, or their combination.

About one out of five nurse practitioners (19%) thought their knowledge of oral cancer was current, and 48 percent believed their training to provide oral cancer exams for patients was adequate. Almost all respondents either agreed or strongly agreed that nurse practitioners should be trained to provide education on alcohol (91%) and tobacco (97%) cessation. Overall, 77 percent had never had a continuing education course on oral cancer, but 75 percent were interested in some type of future oral cancer education courses.

Compared to nurse practitioners with high oral cancer knowledge scores, those with low scores on the risk factors, diagnostic procedures, and combined knowledge indices were, respectively, 3.2, 9.4, and 7.7 times less likely to agree that their knowledge was current. In addition, those with low scores on these same three indices also were, respectively, 2.8, 4.5, and 3.6 times less likely to report that their training to examine patients for oral cancer was adequate. Those with low and high levels of oral cancer knowledge held similar opinions about the adequacy of their training for palpating a patient's lymph nodes. However, they differed somewhat in their opinions about the adequacy of their training to provide tobacco or alcohol cessation education (Table 3).

Discussion

Because this study is the first survey of oral cancer knowledge among adult and family practice nurse practitioners, a number of weaknesses need to be considered in interpreting the study findings. Admittedly, response rates to mail surveys of various health professionals tend to be somewhat

low (15). The response rate may have been higher if a complete questionnaire package had been sent at each mailing instead of sending postcards. In any case, given the actual response rate to the 1998 MDOCSNP, generalizability of this study's findings to all Maryland adult and family practice nurse practitioners is not appropriate. It is probably fair to surmise that if there is bias associated with the low response rate, it probably consists of respondents having more favorable oral cancer knowledge and opinions than may actually be the case in the target population. The implication of this possible response bias is that information gaps may be larger than they appear and interest in future continuing education in the entire target population may be lower than the findings would suggest.

It has been recommended that an oral cancer examination be comprehensively integrated with other routine cancer examinations because the prevalence of oral cancer is low and individuals more frequently receive medical care than they do dental care (16). Past efforts of oral health care professionals have been insufficient to reduce the incidence and mortality of this deadly disease. Thus, concerted efforts among all health professionals are encouraged.

An oral cancer examination can be completed within a few minutes, the procedure is simple, and the examination process does not require any additional medical equipment (16,17). Thus, integrating an oral cancer examination into the physical examination of patients is not likely to be a burden on either health care providers or patients. The routine oral examination by health care providers other than dentists and dental hygienists will considerably increase the likelihood of achieving the oral cancer examination levels among the target population as stated in the Healthy People 2010 objectives (7). Nurse practitioners are one of the highest priority health professional groups for increased involvement in oral cancer examinations because they are focused on health promotion and disease prevention and typically are found in organized, community-based, cancer-screening programs. Furthermore, nurse practitioners, especially adult and family practice groups, are likely to have more contact with high-risk population groups than are other health care professionals.

As part of the strategy to implement the Healthy People 2010 objectives, adult and family practice nurse practitioners should receive the necessary technical and educational support to perform an oral cancer examination. Results from this study show that there is a need for educational interventions to improve knowledge of oral cancer among Maryland adult and family practice nurse practitioners. Moreover, this need is pervasive across various backgrounds of adult and family practice nurse practitioners. The positive association between recency of an oral cancer continuing education course and a high level of oral cancer knowledge suggests that such interventions would be effective in improving the level of oral cancer knowledge among Maryland adult and family practice nurse practitioners. The fact that a high level of oral cancer knowledge is positively associated with favorable opinions about the currency of oral cancer knowledge and the adequacy of oral cancer training also suggests that such educational programs would increase their sense of efficacy in the area of the oral cancer examination. The proposed continuing education program should include, but not be restricted to, knowledge of oral cancer risk factors and diagnostic procedures, tobacco and alcohol cessation education, and an oral cancer examination procedure. The fact that a large majority of respondents showed interest in future oral cancer education courses would seem to indicate that such courses would be well received.

Schools of nursing also might review their curriculum on oral cancer examinations. Nearly two-thirds of the nurse practitioners thought that their education program inadequately addressed the oral cancer examination. In addition, half of the respondents judged their nurse practitioner educational program to be insufficient with regard to oral cancer examinations. Current oral cancer knowledge on risk factors and diagnostic procedures should be reviewed, updated, and integrated into the current cancer education curriculum. Furthermore, there is a need to assess efficiency and the possibility of an integrated cancer education course for various health professionals to enhance cooperation and coordination among them. The dental profession, especially those in dental public health, could work with nurse practitioners to foster prevention and early detection of oral and pharyngeal cancers.

The two national credentialing bodies for nurse practitioners, i.e., the American Academy of Nurse Practitioners and the American Nurse's Association, might consider putting a greater emphasis on oral cancer as part of the examination for certifying and recertifying nurse practitioners. This requirement would help direct attention to the prevention and early detection of oral cancer.

Finally, consistent with other studies (9-13), most nurse practitioners (88%) agreed that their patients' knowledge of oral cancer risk factors was insufficient. Almost the same percentage (86%) judged their patients' knowledge of oral cancer signs and symptoms to be inadequate. In addition to greater emphasis on education courses and curriculum for nurse practitioners, there is a need to educate the public to request oral cancer examinations along with oral cancer education. Because health care providers, including nurse practitioners, have a strong influence on individuals' health behavior decisions, they should be encouraged to provide the public with more information about oral cancer.

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