

SURVEY OF U.S. DENTISTS' KNOWLEDGE AND OPINIONS ABOUT ORAL PHARYNGEAL CANCER

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ABSTRACT

Background. Oral pharyngeal cancer constitutes the most life-threatening of all dental and craniofacial conditions. The U.S. five-year survival rate of 52 percent for these cancers is one of the lowest and has not changed in decades.

Methods. The authors mailed a pretested survey to 7,000 randomly selected general dentists. They obtained information on 3,200 dentists' levels of knowledge about oral pharyngeal cancer risks and diagnostic procedures for providing an oral cancer examination, as well as about related opinions and interest in continuing education, or CE, courses on the topic. The authors carried out analyses using unweighted data; they used both bivariate and logistic analytical techniques and evaluated at a significance level of $P \leq .01$.

Results. Based on responses to 14 questions, the average knowledge of oral cancer risks score was 8.4. About one-half of dentists surveyed knew the two most common sites of intraoral cancer and that most oral cancers are diagnosed at a late stage.

Conclusions. The reported knowledge of these dentists regarding oral cancer suggests that they are not as knowledgeable as they could be about cancer prevention and early detection and that they recognize these deficiencies. Most of the dentists were interested in oral cancer CE.

Clinical Implications. Dentists need to know where in the mouth to look and what types of lesions to look for to provide a comprehensive oral cancer examination.

It is estimated that nearly 30,000 new cases of oral pharyngeal cancer will be diagnosed in the United States during 2000.¹ That means that more than three of these neoplasms will be diagnosed every hour throughout the year. Further, it is estimated that approximately 8,000 people will die in 2000 as a result of oral pharyngeal cancer—about one person every hour throughout the year.¹

The vast majority of oral pharyngeal cancer is attributed to the use of tobacco products that are smoked or chewed, with cigarettes being the major culprit.² The combined use of tobacco and alcohol significantly increases one's risk of developing this cancer.³ Eating fruits and vegetables provides protection against oral cancer⁴ as does using lip balm with sunscreen and wearing hats to prevent lip cancers.

Oral pharyngeal cancer, which affects the lips, tongue, pharynx and oral cavity, comprises about 3 percent of all cancers diagnosed in the United States. This cancer occurs in men twice as frequently as in women.⁵ The average age at diagnosis is 63 years, and this cancer most often is diagnosed at late stages. The five-year survival rate is approximately 52 percent, a fact that has remained unchanged for decades.⁵

While the American Cancer Society recommends an annual oral cancer examination for people 40 years of age and older,⁶ a 1992 survey found that only 15 percent of U.S. adults 18 years of age or older had ever had an oral cancer examination.⁷ Moreover, only 7 percent of the respondents 40 years of age or older had received an oral cancer examination during the past year. Na-

TABLE 1

SELECTED CHARACTERISTICS OF GENERAL PRACTICE DENTISTS (N = 3,200).

BACKGROUND CHARACTERISTICS	PERCENTAGE*
SEX	
Male	86
Female	14
TIME OF GRADUATION	
Before 1970	22
1970 to 1979	28
1980 to 1989	33
1990 to 1995	17
TYPE OF PRACTICE	
Solo	68
Partnership	12
Employee/Contractor	14
Other	6
INTERVAL SINCE LAST ORAL CANCER CONTINUING EDUCATION COURSE	
Within the Past 12 Months	13
One to Four Years	42
Five or More Years	26
Never Taken a Course	18

* Some groups of percentages do not equal 100 due to rounding.

tional surveys also have shown that the U.S. adult population is ill-informed about the risk factors of developing this cancer, as well as its signs and symptoms.^{7,8}

We created the National Oral Cancer Survey of Dentists and conducted a national pilot survey before this study. It suggested that dentists' knowledge about oral pharyngeal cancers might not be as current as they believed.⁹ A regional pilot survey of dentists and physicians in Maryland had similar findings.¹⁰

Our objectives for this current study were as follows:

- to determine general practice dentists' knowledge of oral

cancer risks and diagnostic procedures for oral pharyngeal cancer;

- to describe relationships between dentists' background characteristics and their knowledge about oral cancer;

- to explore associations between dentists' levels of oral cancer knowledge and their opinions about how current their oral cancer knowledge was;

- to describe dentists' interest in future continuing education, or CE, courses and preferred approaches to CE.

METHODS

We purchased a list of 7,000 randomly selected general prac-

tioners (ADA and non-ADA members) in the United States from the ADA. We mailed a pretested, 34-item questionnaire; cover letter; and self-addressed, stamped return envelope to each of these dentists in July 1995 and asked them to return the questionnaires within two weeks.

At three weeks, we mailed a reminder postcard to all 7,000 dentists; six weeks after the initial mailing, we sent a second complete mailing to all nonrespondents.

We received 3,200 usable questionnaires, which represented a response rate of 50 percent of the 6,400 sampled dentists who were eligible for the

survey. We also received 600 questionnaires from ineligible dentists.

In evaluating potential bias due to the low response rate, we were not able to determine the background characteristics of the nonrespondents in this national study. The study group, however, was comparable with the ADA's statistics for U.S. general practice dentists according to sex, year of graduation and type of practice.

Moreover, we conducted a pilot survey to prepare for the national survey, and we obtained demographic data on a random 10 percent sample of the nonrespondents. We found no differences between their backgrounds and those of respondents to the pilot survey.⁹

Of the 3,200 dentists studied, 86 percent were men (Table 1). Sixty-eight percent owned solo practices, while 12 and 14 percent, respectively, practiced in partnerships or were employees/contractors. Fifty percent of the respondents were graduated from 1980 to 1995.

From the survey sample, we assessed dentists' responses to 14 questions regarding their knowledge of oral cancer risk factors; seven questions addressed real risk factors—those supported by research—and seven items address non-risk factors—those not supported by research. We analyzed nine other questions to ascertain dentists' knowledge of oral cancer diagnostic procedures. We also obtained information on selected opinions regarding dentists' oral cancer education and training.

We gave each correct response to the 14 items regarding risk factors for oral cancer a score of "1." Then we added up

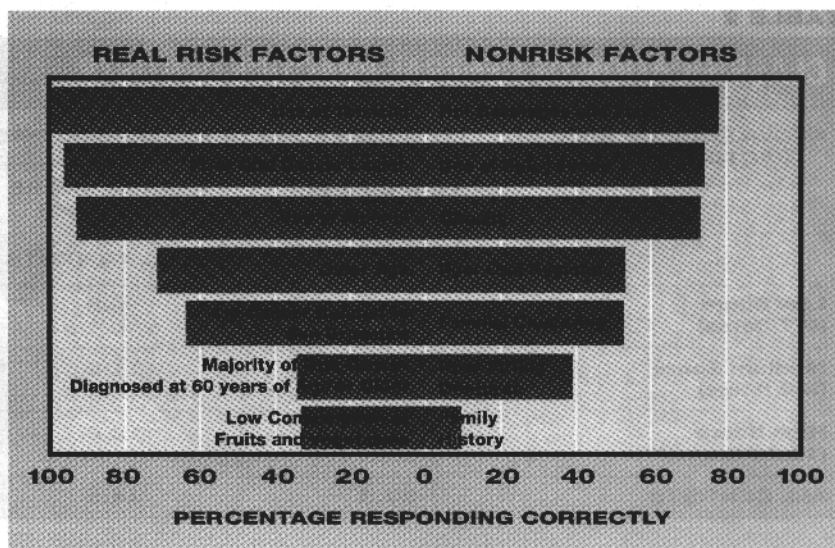


Figure 1. Knowledge of oral pharyngeal cancer real risk and nonrisk factors among general practice dentists.

the items' scores to yield the index of knowledge of oral cancer risk factors—a number ranging from 0 to 14. Based on the number of correct responses, we classified dentists into one of three categories: low score (0-7 items), medium score (8-9 items) or high score (10-13 items).

We also gave correct responses to each of the nine questions on oral cancer diagnostic procedures a score of "1" and then added up the scores to yield a numeric index of level of knowledge of diagnostic procedures. Here, we also classified dentists into one of three categories depending on the number of correct responses: low score (0-4 items), medium score (5-6 items) or high score (7-9 items). We used the low, medium and high score categories of these two indexes to develop a typology of general practice dentists' knowledge of oral cancer based on their combined classification in the two indexes.

To measure their opinions, we provided dentists with five precoded response categories:

"strongly agree," "agree," "disagree," "strongly disagree" and "don't know" (an off-scale response category). For purposes of this study, we collapsed strongly agree and agree responses to identify any agreement with an item. In some cases, however, the percentage of dentists who responded strongly agree also is reported.

Because of the low response rate, we made no effort to develop estimates for the target population. We carried out all analyses using unweighted data. In the analyses, we determined the extent to which dentists responded correctly to the indicated items on oral cancer risks and diagnostic procedures. We then examined the overall effect of selected background and practice characteristics on the likelihood of getting a high score on the three indexes: oral cancer risks, diagnostic procedures, and risks and diagnostic procedures combined.

Next, we explored the relationship between the dentists' levels of oral cancer knowledge and their opinions about how

TABLE 2

CLASSIFICATION OF GENERAL PRACTICE DENTISTS.

KNOWLEDGE OF RISK FACTOR SCORE	KNOWLEDGE OF DIAGNOSTIC PROCEDURES			ALL DENTISTS
	LOW SCORE (0-4 ITEMS)	MEDIUM SCORE (5-6 ITEMS)	HIGH SCORE (7-9 ITEMS)	
PERCENTAGE OF ALL DENTISTS				
Low Score (0-7 Items)	16.1	9.8	6.5	32.4
Medium Score (8-9 Items)	12.0	11.2	9.1	32.4
High Score (10-13 Items)	9.2	13.6	12.4	35.2
ALL DENTISTS	37.3	34.6	28.0	100.0

current their oral cancer knowledge was.

Finally, we determined dentists' interests in and preferences about approaches to oral cancer CE courses. We employed both bivariate and logistic analytical techniques using the statistical software packages Statistical Analysis System (Version 6, SAS Institute) and SUDAAN (Release 7.0, Research Triangle Institute). We evaluate all statistical results using a significance level of $P \leq .01$.

RESULTS

Knowledge of risk factors.

Regarding real risk factors, nearly all dentists correctly identified patients' tobacco use (99.7 percent), having a prior oral cancer lesion (96.4 percent) and alcohol use (92.7 percent) as risk factors for oral pharyngeal cancer. Seventy percent identified older age as a risk factor, and 64 percent recognized that lip cancer is related to sun exposure. In contrast, only about one-third of the dentists recognized that oral cancers most often are diagnosed in patients 60 years of age or older and that low consumption of

fruits and vegetables is a risk factor (Figure 1).

With regard to nonrisk factors, about three-fourths of the dentists knew that hot beverages and foods, as well as spicy foods, are not risk factors for oral cancers. About 70 percent

Seventy-six percent of the dentists knew that a patient who has early oral cancer usually is asymptomatic.

knew that obesity is not a risk factor. Only about 50 percent knew that poor oral hygiene and familial clustering of cancer are not risk factors for oral cancer. Less than 40 percent knew that poor-fitting dentures are not a risk factor for oral pharyngeal cancer, and only 8 percent recognized that a family history of cancer is not in itself a risk factor for oral cancer.

The overall 14-item index of dentists' levels of knowledge of oral cancer risks ranged from zero to 13. On average, dentists got eight of the knowledge of

oral cancer risk items correct. A total of 32.4 percent of the dentists responded correctly to seven or fewer risk items, and 32.4 percent got eight to nine items correct (Table 2).

Knowledge of diagnostic procedures. With regard to items asking about knowledge of oral cancer diagnostic procedures, 83 percent of dentists knew that squamous cell carcinoma is the most common type of cancer, 81 percent identified all of the procedures for examining the tongue for oral cancers, and 80 percent recognized that an early oral cancer lesion usually is a small, painless red area (Figure 2). Seventy-six percent of the dentists knew that a patient who has early oral cancer usually is asymptomatic. Seventy-one percent knew that the ventral lateral border is the most common area of the tongue to develop oral cancer. Sixty-nine percent knew the signs of a lymph node most characteristic of oral cancer metastasis. Fifty-four percent knew the tongue and floor of the mouth are the two most common sites of intraoral cancer, and 51 percent knew that most oral cancers are diag-

nosed in an advanced stage. Out of a list of five common soft-tissue changes, dentists were asked to rank in order of importance the two conditions most likely to be associated with oral cancer. Thirty-seven percent knew that erythroplakia and leukoplakia—in that order—are the two lesions most likely to be associated with oral cancer. Another 40 percent identified both lesions but in the wrong order; 8 percent got one or the other correct; 15 percent either got neither response correct or chose “don’t know.”

The overall nine-item index of the dentists’ level of knowledge of oral cancer diagnostic procedures ranged from zero to nine. On average, dentists got six of these items correct. Thirty-seven percent got four or fewer items correct, 35 percent got five to six items correct, and 28 percent got seven to nine items correct.

Patterns of knowledge of oral cancer risks and diagnostic procedures. To determine patterns of knowledge of oral cancer risks and diagnostic procedures, we cross-classified dentists on each of these two indexes (Table 2). Nearly 40 percent of the dentists had consistent levels of oral cancer knowledge on both indexes; about 16 percent had a consistently low score, about 11 percent had a consistently medium score, and about 12 percent had a consistently high score. Among the approximately 60 percent of dentists with inconsistent levels of knowledge of oral cancer risk factors and diagnostic procedures, 35 percent had better knowledge of risk factors than diagnostic procedures. For 25 percent, however, the opposite was the case.

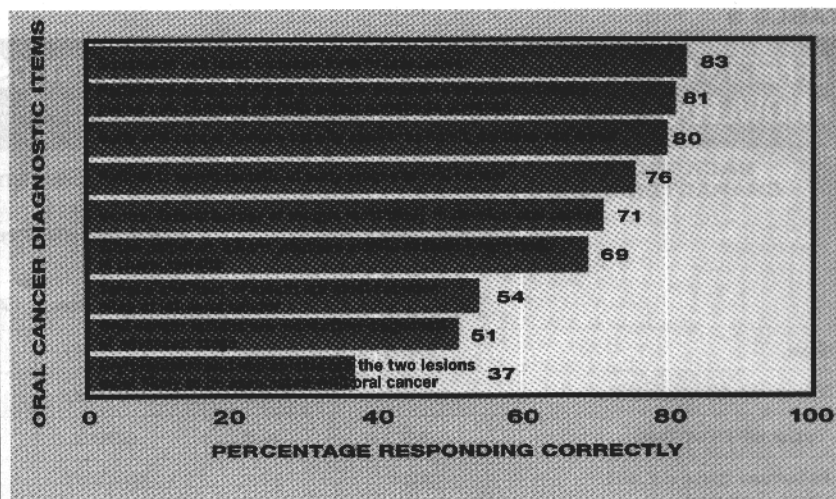


Figure 2. Percentage of general practice dentists who provided correct responses to selected items about knowledge of oral cancer diagnostic procedures.

Background characteristics and knowledge of oral cancer. To assess the overall effects of background characteristics on dentists’ levels of knowledge about risk factors for oral cancers and diagnostic procedures related to an oral cancer examination, we performed bivariate and multivariate logistic regression analyses. We analyzed four background characteristics—sex, type of practice, year of dental school graduation and the interval since their last oral cancer CE course—to determine their overall and net effects on the likelihood of getting a high knowledge score with regard to risk factors, diagnostic procedures and both aspects of oral cancer knowledge combined.

Throughout these analyses, male dentists in solo practice who were graduated before 1970 and had taken an oral cancer CE course within the past year defined the reference population(s). The *P* values for the unadjusted and adjusted effects of each background characteristic on the likelihood of getting a high score on knowl-

edge risk factors, diagnostic procedures, and risk and diagnostic procedures combined are shown in Table 3.

Overall, women were 1.3 to 1.6 times more likely than men to receive a high score on each knowledge index, but these bivariate findings were explained by other factors, particularly time of graduation. With regard to type of practice, dentists who were employees or contractors were more likely overall than those in solo or partnership practices to receive a high score on the index of knowledge of oral cancer risks and diagnostic procedures combined (Table 4).

Recency of graduation had a consistent effect on the likelihood of getting a high score on each knowledge index. Compared with dentists who were graduated before 1970, each of the three younger graduate cohorts were increasingly more likely to get a high score on each knowledge index (Table 4).

With regard to the effects of recent participation in an oral cancer CE course, dentists who had never taken an oral cancer

TABLE 3

EFFECTS OF SELECTED BACKGROUND CHARACTERISTICS ON GENERAL DENTISTS' KNOWLEDGE OF ORAL CANCER.

BACKGROUND CHARACTERISTICS	HIGH SCORE ON INDEX OF KNOWLEDGE OF ORAL CANCER (P VALUE)					
	Risk Factors		Diagnostic Procedures		Risk Factors and Diagnostic Procedures	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Sex	.005	NS*	.00000	NS	.0002	NS
Time of Graduation	.00000	.0000	.00000	.00000	.00000	.00000
Type of Practice	.002	NS	.0002	NS	.00000	.013
Interval Since Last Oral Cancer Continuing Education Course	NS	NS	.00000	.00000	NS	NS

* NS: Not Significant.

CE course were two times less likely to get a high score both on knowledge of oral cancer diagnostic procedures and on knowledge of risks and diagnostic procedures than were dentists who had taken an oral cancer CE course within the past 12 months. Those who had taken a CE course five or more years ago were 1.6 times less likely to get a high score on knowledge of diagnostic procedures, and those who had been to one in the past one to four years were 1.4 times less likely to get a high score on knowledge of oral cancer diagnostic procedures.

Knowledge-related opinions. Sixty-eight percent of dentists reported that their knowledge of oral cancer was current, but only 4 percent strongly agreed that this was the case. With regard to interest in future oral cancer CE courses, 82 percent expressed interest. Overall, the three most popular first and second choices about preferred approaches to CE were lectures (57 percent), clinical demonstrations (42 percent), and audiovisual slides

and tapes (37 percent). A few dentists selected computer-based (6.3 percent) or satellite communication (7.5) programs as their first or second choices.

Levels of oral cancer knowledge and opinions

The three most popular first and second choices about preferred approaches to continuing education were lectures, clinical demonstrations, and audiovisual slides and tapes.

about currency of knowledge. Additional analyses explored potential associations among levels of knowledge of oral cancer risk factors, diagnostic procedures and the combination of the two, as well as dentists' opinions about how current their oral cancer knowledge was. The overall knowledge index

used a low, medium and high categorization of dentists based on the number of correct responses to the 23 oral cancer knowledge items—14 items about knowledge of oral cancer risks and nine items about knowledge of oral cancer diagnostic procedures. The results showed that compared with dentists with high oral cancer knowledge scores, those with low and medium scores on risk factors, diagnostic procedures and the combined overall index were less likely to agree that their knowledge was current.

DISCUSSION

We need to address the low response rate because of the potential nonresponse bias and possible impact on the generalizability of the study findings. The response rate of 50 percent was the same as that of the pilot study conducted during the survey instrument's developmental stage.⁹ This response rate is not unlike that of other recent mail surveys of health practitioners.¹¹ We did not develop weighted estimates

TABLE 4

LIKELIHOOD OF GENERAL PRACTICE DENTISTS GETTING A HIGH SCORE ON ORAL CANCER KNOWLEDGE INDEXES.

BACKGROUND CHARACTERISTICS	INDEX OF KNOWLEDGE OF ORAL CANCER								
	Risks			Diagnostic Procedures			Risks and Diagnostic Procedures Combined		
	Adjusted Odds Ratio	95% Confidence Interval	P Value	Adjusted Odds Ratio	95% Confidence Interval	P Value	Adjusted Odds Ratio	95% Confidence Interval	P Value
Sex									
Male	1.0*	—	—	1.0*	—	—	1.0*	—	—
Female	1.03	0.8-1.3	.8	1.1	0.9-1.4	—	1.1	0.8-1.4	.5
Type of Practice									
Solo	1.0*	—	—	1.0*	—	—	1.0*	—	—
Partnership	1.01	0.8-1.3	.9	1.2	0.9-1.5	.07	1.3	1.0-1.7	.05
Employee/Contractor	1.2	0.9-1.5	.14	1.1	0.9-1.4	.5	1.5	1.1-1.9	.009
Other	1.3	0.9-1.9	.13	1.3	0.9-1.9	.13	1.5	0.9-2.3	.06
Time of Graduation									
Before 1970	1.0*	—	—	1.0*	—	—	1.0*	—	—
1970 to 1979	1.7	1.3-2.1	.00001	2.0	1.6-2.5	.00000	2.1	1.5-3.0	.00003
1980 to 1989	1.9	1.5-2.4	.00000	2.9	2.3-3.7	.00000	2.8	2.0-4.0	.00000
1990 to 1995	2.6	2.0-3.5	.00000	3.5	2.6-4.7	.00000	3.5	2.3-5.2	.00000
Interval Since Last Oral Cancer Continuing Education Course									
Within Last 12 Months	1.0	—	—	1.0*	—	—	1.0*	—	—
One to Four Years	0.96	0.8-1.2	.7	0.7 [†]	0.6-0.9	.004	0.9	0.6-1.2	.4
Five or More Years	1.09	0.8-1.4	.5	0.6 [‡]	0.4-0.7	.00001	0.8	0.6-1.1	.2
Never	0.8	0.8-1.02	.07	0.5 [§]	0.4-0.6	.00000	0.6 [‡]	0.4-0.9	.005

* Reference cells.

† The reflected odds ratio was 1.4.

‡ The reflected odds ratio was 1.6.

§ The reflected odds ratio was 2.0.

because the low response rate made it technically impossible to generalize the results to the target population of U.S. general dentists. Thus, the results are based on the unweighted data

from the 3,200 dentists who participated in the survey. Because survey respondents are likely to have greater knowledge of and interest in the topic than nonrespondents, the results may por-

tray a scenario that is better than it really is. That is, the findings may reflect somewhat higher levels of knowledge about oral cancer, as well as higher levels of interest in oral

cancer CE courses among the responding dentists than is the case among all general practice dentists.

While it is encouraging that the large majority of dentists identified most real risk factors for oral pharyngeal cancer (Figure 1), it is less impressive that only one-third of the respondents knew that oral cancers most often are diagnosed in late stages (Figure 2). Dentists tended to incorrectly report that poor oral hygiene and familial clustering of cancer are risk factors, and 25 percent reported incorrectly that hot beverages and hot and spicy foods are risk factors for oral cancers. Thus, there is a relatively high level of misinformation among this group. Considering that the respondents of this survey likely are more interested in and more knowledgeable about oral pharyngeal cancer than nonrespondent general dentists, we prudently suggest that oral cancer CE courses should be offered that include oral pharyngeal cancer risk factors.

Dentists' knowledge about oral cancer diagnostic procedures also presented some troubling deficiencies. Only 54 percent of the dentists knew the two most common sites of oral cancer: the ventral lateral border of the tongue and the floor of the mouth. Further, 36 percent knew that erythroplakia and leukoplakia, in that order, are the two lesions most likely to be associated with these cancers. Until recently, it was believed and taught that the white lesions known as leukoplakia were the primary lesions for which to look. Today, red lesions or red and white mixed lesions are considered to be the ones most likely associ-



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ated with oral cancers. This point must be highlighted because if dentists do not know what to look for or where to look when they perform oral cancer examinations—and dentists maintain they do provide such examinations¹²—then they may not find or recognize suspicious

Only 54 percent of the dentists knew the two most common sites of oral cancer: the ventral lateral border of the tongue and the floor of the mouth.

lesions. Although two-thirds of the dentists believed that their knowledge of oral cancer was current, only 4 percent strongly agreed with this statement, suggesting a less-than-confident opinion.

Compared with other types of courses offered, there are relatively few CE courses on the prevention and early detection of oral pharyngeal cancer. Yet, more than 80 percent of dentists responded that they had taken such a CE course. The results of this study show that having taken an oral cancer CE course

had little effect on their overall level of knowledge. This finding may reflect that such courses did not emphasize risk factors and diagnostic factors concerning oral cancer; it also may reflect an overestimation on the part of respondents of having taken an oral cancer CE course.

The correlation between the recency of graduation and dentists' levels of knowledge of both risk factors and diagnostic procedures for oral pharyngeal cancer suggests that dental schools currently provide reasonable coverage of the topic. It is clear, however, that CE courses are needed to help earlier graduates update their knowledge about oral cancer risk factors and diagnostic skills, and annual refresher courses have been recommended.¹³

These concepts have been strongly recommended by the Centers for Disease Control and Prevention, the National Institute of Dental and Craniofacial Research and the American Dental Association.^{14,15}

CONCLUSIONS

Having appropriate knowledge and information about the risk factors and diagnostic procedures for oral pharyngeal cancer are prerequisites for dentists providing the appropriate information for their patients,

as well as comprehensive oral cancer examinations. The results of this survey suggest that dentists are not as knowledgeable as they could be about oral cancer prevention and early detection, and that they recognize these deficiencies. Further, most of the dentists surveyed indicated an interest in taking oral cancer CE courses. At a minimum, such courses should include appropriate and current information on risk factors for these cancers, as well as what to look for and where to look when providing a comprehensive oral cancer examination. The need for knowledgeable, well-trained dentists is crucial in the prevention and early detection of oral pharyngeal cancers. ■

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