

Maryland Dentists' Knowledge of Oral Cancer Risk Factors and Diagnostic Procedures

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A questionnaire was mailed to 800 Maryland general practice dentists to assess their knowledge of risk factors and diagnostic procedures for oral cancer. Two indices were created based on 14 questions on knowledge of oral cancer risk factors and 9 questions on oral cancer diagnostic procedures. Data were analyzed statistically and evaluated with an alpha level of 0.05. Nearly all respondents identified use of tobacco, prior oral cancer lesions, and use of alcohol as risk factors. However, only 36% correctly identified that poor-fitting dentures are not a risk factor and 58% that poor oral hygiene is not a risk factor. Nearly 87% knew how to examine the tongue and surrounding areas, and 32% identified erythroplakia and leukoplakia as conditions associated with oral cancer. Appropriate knowledge about risk factors and diagnostic procedures is essential for dentists to counsel their patients and perform appropriate oral cancer examinations.

Oral cancers include tumors of the lip, tongue, floor of the mouth, palate, and other sites of the mouth and pharynx (Ries et al., 1999; Silverman, 1998). The risk for oral cancer increases with age; the median age of diagnosis is 64. About 95% of oral cancers occur in persons 40 years of age or older (Ries et al., 1999; Silverman, 1998). Only 35% of these cancers are diagnosed in localized stages (Ries et al., 1999; Swango, 1996). Detection of oral cavity and pharynx cancers in late stages is tied to a lack of improvement in the 5-year relative survival rate during the past 30 years (Izquierdo & Rozier, 1996; Ries et al., 1999; Swango, 1996).

Primary prevention of oral cancers includes reducing exposure to risk factors such as tobacco, alcohol, and DNA viruses for intraoral lesions and reducing exposure to sunlight for lesions of the lip (Blot et al., 1988; Horowitz, Goodman, Yellowitz, & Nourjah, 1996; Izquierdo & Rozier, 1996; Silverman, 1998). In addition, increased consumption of fruit and vegetables is a protective measure (Potter, Chavez, Chen, Ferro-Luzzi, & Hirohata, 1997). A secondary preventive measure is the detection of lesions in early stages by a noninvasive visual and tactile examination of the head and neck region (Hall, Melrose, & Abrams, 1980; Horowitz et al., 1996; Silverman, 1998). Dentists and dental hygienists are key players in the early detection of these cancers when they are asymptomatic and small (Mashberg & Samit, 1995). With early detection, mor-

bidity and mortality from these cancers would be reduced, as has been observed with cervical cancer (Beral, Hermon, Muñoz, & Devesa, 1994; Izquierdo & Rozier, 1996).

The preventive measures outlined previously are addressed by several objectives throughout different chapters in *Healthy People 2010* (U.S. Department of Health and Human Services, 2000). Specific objectives in the oral health and cancer sections are (a) to increase the proportion of detected oropharyngeal cancer lesions that are diagnosed at Stage 1 (localized stage); (b) to increase the proportion of adults who, in the past 12 months, report having had an examination to detect oral and pharyngeal cancer; and (c) to reduce the number of deaths due to cancer of the oral cavity and pharynx to no more than 9 per 100,000 among men aged 45 through 74 and to no more than 3 per 100,000 among women aged 45 through 74.

Because Maryland ranks among the top 10 states in the United States with a high mortality rate from cancer of the oral cavity and pharynx (Carpenter, Yellowitz, & Goodman, 1993; Ries et al., 1999), a statewide needs assessment using the PRECEDE-PROCEED, a comprehensive model for planning (Green & Kreuter, 1999) is underway as part of a Maryland initiative in oral cancer prevention and early detection. The Maryland initiative includes an assessment of the public and health care providers (dentists, dental hygienists, nurse practitioners, and family physicians) regarding their knowledge, opinions, and practices on oral cancer prevention and early detection. The objectives of the assessment of general practice dentists in Maryland were as follows: (a) to determine their knowledge of oral cancer risks, (b) to determine dentists' knowledge of diagnostic procedures for oral cancer, and (c) to describe relations between dentists' background characteristics and their knowledge of oral cancer. In addition, general practice dentists' interest in future continuing education courses and preferred methods for continuing education were queried.

BACKGROUND

Annually, 30,000 new cases of oral cancers are diagnosed, and one American dies every hour from these cancers (Ries et al., 1999). Although oral cancers represent 3% of the overall cancer burden in the United States (Ries et al., 1999; Wingo et al., 1999), advanced

oral cancers and their treatment cause chronic pain, nutritional impairment, and facial disfigurement that cannot be covered by clothing.

Squamous cell carcinomas account for 90% of all oral cancers, followed by adenocarcinomas and Kaposi's sarcomas (Silverman, 1998). Squamous cell carcinomas occur in all sites of the oral cavity, including tongue, lips, floor of the mouth, soft palate, and tonsils. Adenocarcinomas occur mainly in the salivary glands; Kaposi's sarcomas mainly occur in the palate (Blot, McLaughlin, Devesa, & Fraumeni, 1996). Of all the anatomic sites, the tongue and floor of the mouth account for most of these cancers (Silverman, 1998).

The major risk factors for oral cancers in the United States include use of tobacco and alcohol products, a diet low in fruit and vegetables, and not using protection against the sun in the case of lip cancer (Horowitz et al., 1996; Silverman, 1998). Results from two national studies (Horowitz & Nourjah, 1996; Horowitz, Nourjah, & Gift, 1995) suggest that U.S. adults are ill-informed about signs of and risk factors for oral cancers. Furthermore, one of the studies showed that only 15% of adults had ever had an oral cancer examination annually and only 7% had an examination in the past year, as recommended by the American Cancer Society (Horowitz & Nourjah, 1996). In addition, a national survey of general dentists in the United States found deficiencies in dentists' knowledge of signs and symptoms of oral cancers and in their assessment of patients' present and past use of tobacco and alcohol (Yellowitz, Horowitz, Drury, & Goodman, 2000).

Compared to major cancers, such as lung, breast, prostate and colon and/or rectum, oral cancers have one of the lowest 5-year survival rates. The 5-year survival rate for advanced oral cancer lesions is 19%, compared to 78% for localized lesions. The lowest survival rates occur among Black males (Ries et al., 1999). Early detection is the main factor for a better prognosis. Generally, oral cancers are curable when diagnosed and treated in localized stages. Practitioners' knowledge of the early signs and symptoms of oral cancer is important for diagnoses and appropriate referral. To accurately detect a lesion in the early stages, general practitioners must be familiar with where to look and what to see in the oral cavity. Their assessments of patients' risk factors in conjunction with a thorough oral cancer examination are vital for early detection of oral cancers.

METHOD

During the summer of 1995, a pretested, 34-item questionnaire was mailed to a simple random sample of 1,000 general practice Maryland dentists selected from an American Dental Association (ADA) mailing list. The general practitioners' list comprised both ADA and non-ADA members. The first mailing consisted of a cover letter, questionnaire, and stamped and addressed return envelope. Three weeks after the initial mailing, a reminder postcard was sent to those who had not responded. A third mailing (cover letter, questionnaire, and envelope) was sent 6 weeks after the initial mailing. A total of 508 usable questionnaires were returned from 937 eligible respondents, yielding a response rate of 54%.

Knowledge of oral cancer risks was assessed from (a) 14 questions, 7 on oral cancer real risks and 7 on nonrisks for these cancers; (b) 9 questions on oral cancer diagnostic procedures; and (c) items describing selected aspects of the respondents' backgrounds. The questions on knowledge of oral cancer risk factors and diagnostic procedures were used to develop two indices in the form of summed scores. Each correct response received a score of 1. The number of correct responses to the 14 questions on knowledge of oral cancer risks was summed for each dentist. A similar score was created for the nine questions on knowledge of oral cancer diagnostic procedures. Each of these summated scores was grouped into three categories designating a low, medium, or high score, based on the number of correct responses. The two indices of knowledge of risk and knowledge of diagnostic procedures were then cross-tabulated to develop a typology of general practice dentists' knowledge of oral cancer.

Unweighted data were analyzed using SAS and SUDAAN software. An alpha level of 0.05 was used in evaluating the statistical significance of overall effects and differences tested by pairwise comparisons. In addition to the usual cross-tabulations, logistic analyses focused initially on the likelihood of getting a high score for the indexes of knowledge of oral cancer risks and knowledge of oral cancer diagnostic procedures independently of each other. Then, the analysis focused on the likelihood of getting a high score on both indices. In these analyses, gender, time of graduation, type of practice, and interval since the last oral cancer continuing education course (OC CE) were included as independent variables.

TABLE 1
Selected Characteristics of General Practice Dentists

<i>Background Characteristic</i>	<i>Percentage</i>
All dentists	100
Gender	
Male	81
Female	19
Time of graduation	
Pre-1970	23
1970-1979	28
1980-1989	34
1990-1995	15
Type of practice	
Solo	60
Partner	17
Salaried and/or contractor	19
All other	4
Interval since last OC CE course	
Within past 12 months	14
1 to 4 years	40
5 or more years	29
Never	18

NOTE: Some percentages do not add up to 100% due to rounding. OC CE = oral cancer continuing education course.

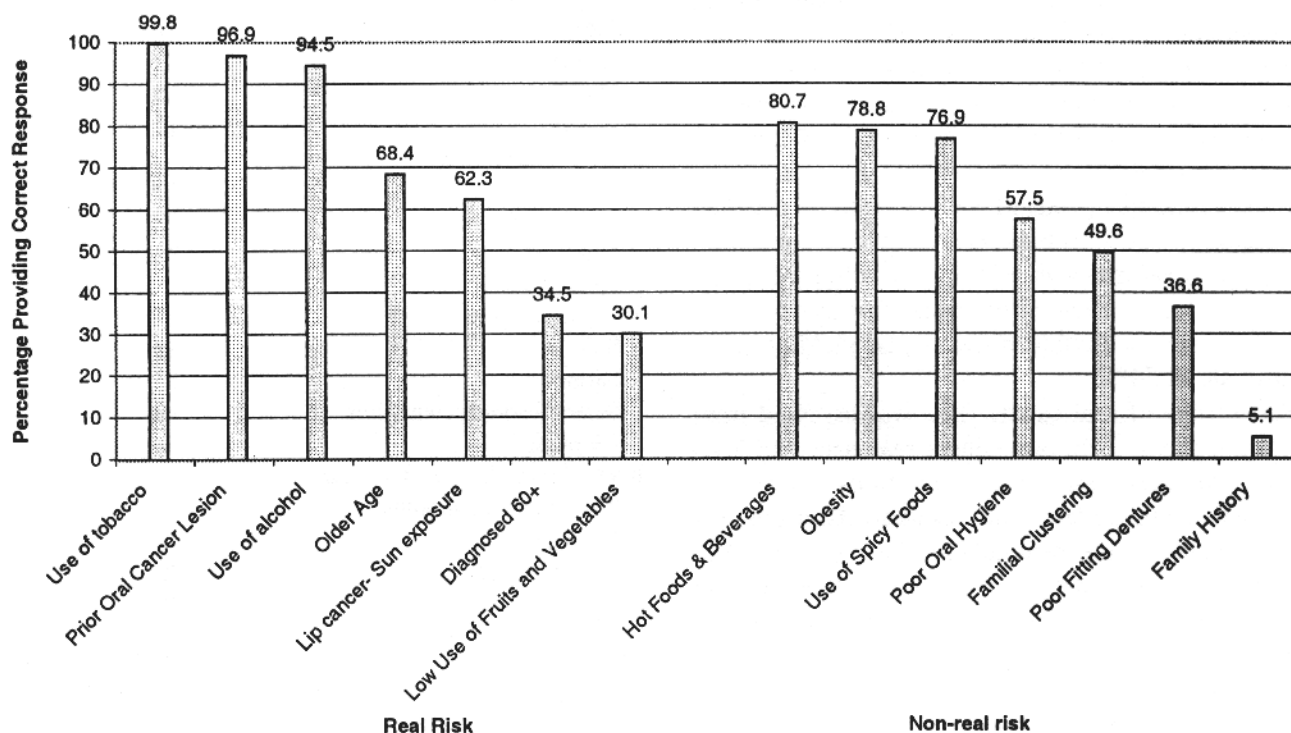
RESULTS

About four out of five (81%) of the general practice dentists who responded to the survey were males; the remaining fifth were females (see Table 1). Nearly half (49%) of the respondents graduated after 1980. The majority (60%) of respondents were in solo practice, 17% had a partner, 19% were in a salaried position, and 4% indicated other types of practice arrangements. Although 14% had an OC CE in the last 12 months, 18% had never attended one.

Knowledge of Risk Factors for Oral Cancer

Concerning real oral cancer risk factors, virtually all respondents identified use of tobacco as a risk factor, and about 95% correctly identified a prior oral cancer lesion and use of alcohol as risk factors. In contrast, only 68% identified older age as a risk factor, and fewer still (35%) indicated that the majority of oral cancers are diagnosed in patients 60 years of age or older. Only one third recognized the protective effect of consumption of fruits and vegetables (see Figure 1).

FIGURE 1
Response to Selected Items on Knowledge of Oral Cancer Risk Factors, Maryland, 1995



Concerning oral cancer nonrisk factors, slightly more than 75% knew that hot beverages, use of spicy foods, and obesity are not oral cancer risk factors. Just more than a third correctly indicated that poor-fitting dentures are not a risk factor, and 58% knew that poor oral hygiene is not a risk factor. A small number (5%) recognized that a family history of cancer is not, in itself, an oral cancer risk factor.

Knowledge of Diagnostic Procedures

More than 80% of the respondents knew how to examine the tongue and surrounding areas for signs of oral cancer, that the most common type of oral cancer is squamous cell carcinoma, and that early oral cancer lesions are small and painless. Furthermore, 70% knew that a patient is asymptomatic when he or she has an early oral cancer lesion and that the ventral lateral border of the tongue is the most common area for oral cancer. Approximately half knew that oral cancer lesions are often diagnosed in advanced stages, and 32% identified erythroplakia and leukoplakia (in that order) as

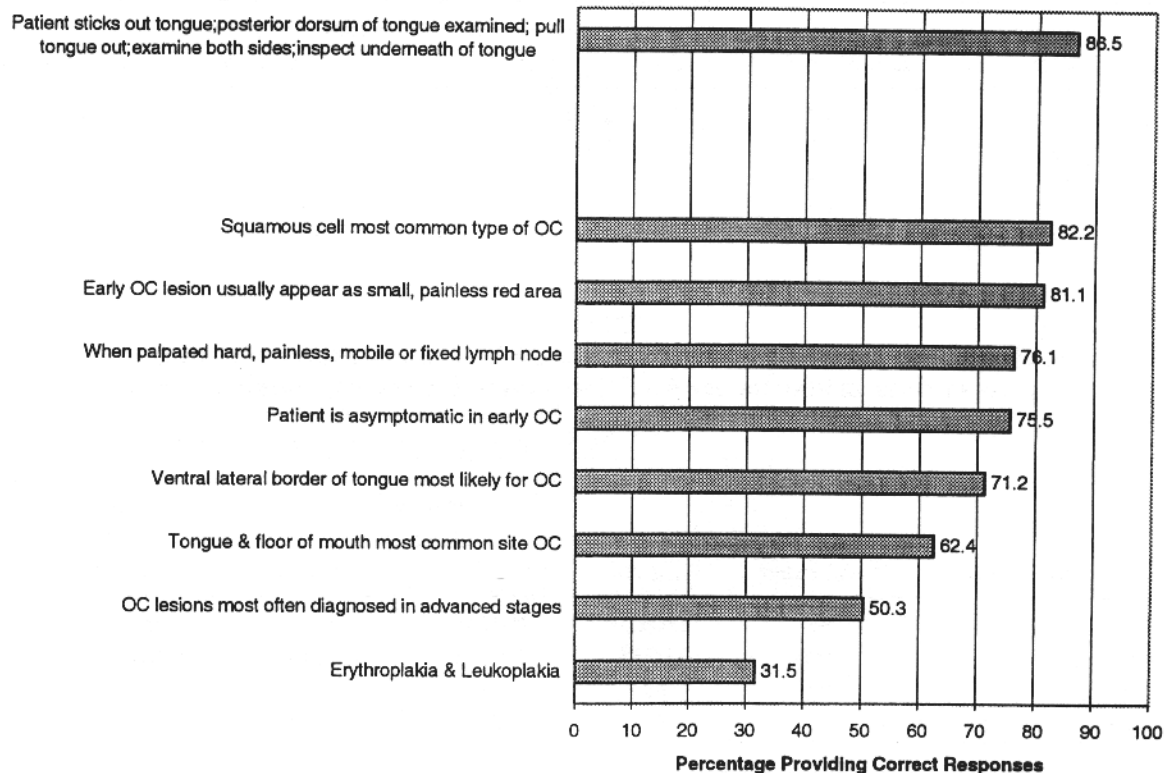
the two most common conditions associated with oral cancer (see Figure 2).

Patterns of Knowledge of Oral Cancer Risks and Diagnostic Procedures

The actual distribution of scores for knowledge of oral cancer risk factors ranged from 0 to 13. The low-score category included dentists with zero to seven correct items, the medium score category had eight to nine correct items, and the high score category had 10 to 13 correct items (see Table 2). Relative to one another, nearly 30% of dentists received a low score, 35% received a medium score, and 35% received a high score.

The actual distribution of scores for knowledge of diagnostic procedures ranged from zero to nine. The low score included dentists with zero to five correct items, the medium score included those with six to seven correct items, and the high score included practitioners with eight to nine correct items (see Table 2). Nearly 35% of dentists received a low score; 44% received a medium score, and 20% received a high score.

FIGURE 2
 Percentage of General Practice Dentists Providing Correct Responses to Selected Items on Knowledge of Oral Cancer Diagnostic Procedures, Maryland, 1995



Only 9% of dentists received a high score in both knowledge of oral cancer risk factors and knowledge of oral cancer diagnostic procedures (see Table 2), whereas 14% scored low in both of these dimensions of oral cancer knowledge.

Background Characteristics and Oral Cancer Knowledge

Time of graduation was the only background characteristic consistently associated with the likelihood of receiving a high score for (a) knowledge of oral cancer risk factors, (b) diagnostic procedures, and (c) both types of oral cancer knowledge combined (see Table 3). On the three indexes of oral cancer knowledge, dentists who graduated between 1990 and 1995 were, respectively, 1.8, 2.2, and 3.9 times more likely to have received a high score than were their counterparts who graduated prior to 1970. The interval since the last oral cancer continuing education course had a significant effect on knowledge of oral cancer diagnostic procedures in that dentists who had taken a course in the past 12 months were more abreast of diagnostic procedures

for oral cancer than those who did not attend a course in the past 12 months.

OPINIONS AND PREFERENCES

Of general practice dentists, 78% agreed that their knowledge of oral cancer was current, but only 5% strongly agreed with this statement. The vast majority (81%) of respondents were interested in OC CE. The top two preferred formats were lectures and clinical demonstrations (see Figure 3).

Discussion

Because of the low response rate, no effort was made to develop estimates for the target population. A similar response rate was obtained from the national study of general practice dentists (Horowitz, Drury, Goodman, & Yellowitz, 2000). In addition, other recent mail surveys of health practitioners have resulted in low response rates (Asch, 1997). On the assumption that respondents to this survey may represent dentists with more interest in or concern with oral cancer than

TABLE 2
Percentage Distribution of General Practice Dentists by Patterns of Knowledge of Oral Cancer Risk Factors and Diagnostic Procedures, Maryland, 1995

Knowledge of Risk Factors	Knowledge of Diagnostic Procedures			All Dentists
	Low Score (0-5)	Medium Score (6-7)	High Score (8-9)	
Low score (0-7)	14.1	11.0	4.8	29.9
Medium score (8-9)	11.9	16.9	6.4	35.1
High score (10-13)	9.6	16.3	9	34.9
All dentists	35.5	44.2	20.3	100

TABLE 3
Unadjusted and Adjusted Effects of Selected Background Characteristics on Three Aspects of General Practice Dentists' Oral Cancer Knowledge, Maryland, 1995

Background Characteristic	High Score on Index of Knowledge of Oral Cancer					
	Risk Factor		Diagnostic Procedure		Risk Factor and Diagnostic Procedure	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Gender	<i>ns</i>	0.022	0.0136	<i>ns</i>	<i>ns</i>	<i>ns</i>
Time of graduation	0.038	0.0037	0.0018	0.0014	0.0102	0.0121
Type of practice	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>
Interval since last OC CE course	<i>ns</i>	<i>ns</i>	0.0206	0.0448	<i>ns</i>	<i>ns</i>

NOTE: *ns* = $p > .05$. OC CE = oral cancer continuing education course.

nonrespondents, it is conceivable that if there is bias due to the low response rate, it is probably in the direction that the reported levels of oral cancer knowledge and expressed interest in OC CE may be higher in the study group than in the actual target population.

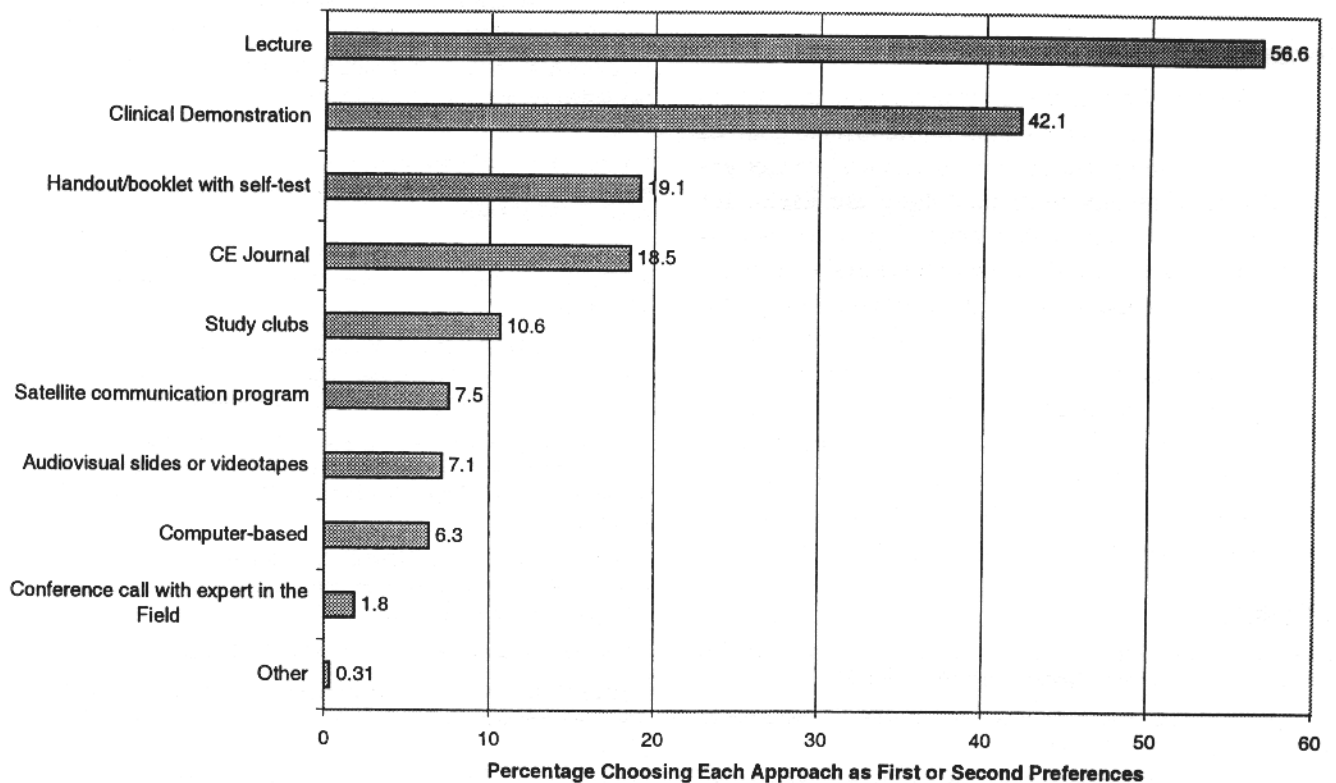
A strategically important factor in reducing morbidity and mortality associated with oral cancers is early detection (Silverman, 1998). Dentists and other oral health professionals are key players in the early detection of these cancers. Data from a survey of Maryland adults showed that 21% of the respondents had heard about the examination and approximately 28% of respondents reported ever having an oral cancer examination (Horowitz, Moon, Goodman, & Yellowitz, 1998). At the same time, only 20% of all respondents had the oral examination in the past year (Horowitz et al., 1998). Most serious, less than 25% of individuals fitting a higher risk profile (Black racial background, less than a high school education, edentulous, and a user of tobacco products) reported ever having had an oral cancer examination (Horowitz et al., 1998).

To appropriately identify individuals at high risk for these cancers and counsel them, dentists must be famil-

iar with oral cancer risk factors. Respondents to the survey were aware of the major risk factors for oral cancer (tobacco and alcohol use). Although two thirds were aware that age is a risk factor, only one third indicated that the majority of oral cancers are typically diagnosed among those 60 years of age or older. Dentists need to be alert to the fact that age is a risk factor, especially considering the aging of the United States population. The aging of the baby boomers compounded by a continuing increase in life expectancy will result in an unprecedented proportion of individuals older than 65 years of age (Pamuk, Makuc, Heclak, Reubem, & Lochner, 1998).

Dentists can and should educate patients, especially those at high risk, to look for unusual lesions and suspicious changes in the oral cavity. To educate their patients, dentists must first be knowledgeable of what to look for and where to look in the oral cavity. A telephone survey conducted in Maryland found that 39% of the public did not know an early sign for oral cancer (Horowitz et al., 1998). Regarding knowledge of oral cancer risk factors, only 36% of Maryland adults identified exposure to sun as a risk factor for lip cancer. Even

FIGURE 3
General Practice Dentists' Preferred Educational Approaches for Oral Cancer Continuing Education, Maryland, 1995



more alarming, only 13% knew that regular use of alcohol was a risk factor for these cancers (Horowitz et al., 1998). A similar dearth of knowledge about oral cancer risk factors was reported in a survey among Maryland veterans (Canto et al., 1998).

Early detection also is tied to dentists' knowledge of diagnostic procedures. This study found that those dentists with higher levels of knowledge provided more favorable opinions about performing an oral cancer examination. More than 75% were aware of how to examine the tongue, early signs of oral cancer, and the most common histological type of oral cancer. Fewer dentists were aware that the ventral lateral border of the tongue and floor of the mouth are the most common sites. Careful examination of these areas is extremely important to detect small lesions; therefore, dentists must know where to look carefully in the oral cavity. An early oral cancer lesion appears as a red (erythroplakia) and/or a white lesion (leukoplakia). Only one third knew that erythroplakia and leukoplakia are, respectively, the first and second most common conditions associated with oral cancers. Identification of erythroplakia

also requires a more careful examination. Leukoplakias (prevalence in population not known) occur frequently and until recently were considered the most suspicious premalignant lesions. Based on recent studies, it has been confirmed that speckled leukoplakia or erythroleukoplakia (mix of white and red lesions) carry the greatest risk for developing a cancerous lesion (Silverman, 1998; Waldron & Shafer, 1975).

Knowledge of diagnostic procedures was associated with recentness of both graduation from dental school and participation in an oral cancer continuing education course. It is encouraging that the percentage of respondents interested in oral cancer continuing education courses was very high.

Results from the study provide both challenges and opportunities to disseminate prevailing and pertinent information on oral cancer prevention and early detection. To further encourage general dental practitioners to attend courses in the topic of oral cancer, a requirement could be set by the state of Maryland for a minimum of continuing education hours in the topic of oral cancer for licensure and relicensure. Furthermore, the

findings presented are important to consider for the design and content of continuing education courses for general practice dentists in the state of Maryland.

Conclusion

Knowledge about risk factors and diagnostic procedures for oral cancer is essential for dentists to counsel their patients and perform appropriate oral cancer examinations. Findings from this study are useful for identifying those areas that general practice dentist need to reinforce to provide a complete oral cancer examination. Also, the preferred types of continuing education courses were lectures and/or clinical demonstrations, important facts to consider in the design of continuing education courses. This study represents one component of the statewide needs assessment of health care providers and the public to develop and implement health promotion activities toward prevention and early detection of oral and pharyngeal cancers.

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