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Oral Cancer Prevention and Early Detection: Knowledge, Practices, and Opinions of Oral Health Care Providers in New York State

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Abstract

Background—The purpose of this study was to assess the knowledge, practices, and opinions of dentists and dental hygienists in New York State regarding oral cancer prevention and early detection.

Method—We sent questionnaires to a stratified random sample of dentists and dental hygienists selected from a list of licensed oral health care providers in New York State. We analyzed responses to the questionnaires, and we derived descriptive statistics.

Results—The effective response rate was 55% and 65% among dentists and dental hygienists, respectively. About 85% of dentists and 78% of dental hygienists reported providing annual oral cancer examination to their patients aged 40 and above. Although a majority assessed tobacco use, fewer practitioners assessed alcohol use. Both dentists and dental hygienists lacked knowledge in some aspects of risk factors, signs, and symptoms of oral cancer. However, dentists had significantly higher knowledge scores than dental hygienists.

Conclusion—Dentists and dental hygienists in New York State are knowledgeable about oral cancer, but there are gaps in the knowledge of certain risk factors and in the oral cancer examination technique.

Although oral cancer is rare and attracts little attention, it is more common than Hodgkin's disease or carcinoma of the brain, liver, bone, thyroid gland, stomach, ovaries, or cancer of the cervix. It ranks 12th among all cancers.¹ Oral and pharyngeal cancers account for approximately 3% of all cancers, with about 28,260 new cases being diagnosed every year.² The financial cost to treat and rehabilitate patients with this devastating disease is estimated to be about 2 billion dollars.³

New York ranks fourth among all states in the United States for the number of new cases and deaths due to oral and pharyngeal cancer.⁴ According to the New York State Cancer Registry,⁵ an annual average of 1977 oral and pharyngeal cancer cases were reported for the period 1997–2001. The incidence rate for males and females was 15.4 and 6.4 per 100,000, respectively. Mortality rate for males was found to be almost 3 times that of females (4.1 vs. 1.5 per 100,000).⁵

Although these cancers are easily detectable, the proportion of oral and pharyngeal cancers diagnosed in early stage ranges from a low of 26% among Black males to a high of 48% among White females.⁵ Both patient and clinician factors play a role in this delayed diagnosis.⁶

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Previous national and local studies have reported that a very low percentage of Americans have had an oral cancer examination in the past year.^{7,8} The knowledge of oral cancer risk factors has been reported to be a predictor for having had or being aware of the existence of an oral cancer examination.⁹

One of the objectives of Healthy People 2010 is to increase the percentage of oral and pharyngeal cancers (stage I, localized) detected at the earliest stage to 50%.¹⁰ Previous surveys have revealed that 70% to 81% of dentists have reported conducting an oral cancer examination for all their patients, 40 years and older, at their initial appointment,^{11,12} whereas a lower percentage of dental hygienists (66%) have reported doing so.¹³ Some investigators have claimed that the benefits of early cancer detection are compelling enough that dental professionals need to make every effort to screen all patients at risk.^{14,15} The American Cancer Society recommends that for individuals undergoing periodic health examinations, a cancer-related checkup should include health counseling and depending on the person's age, might include examination for cancer of the oral cavity.¹⁶

Dentists and dental hygienists can play a crucial role in the early detection and prevention of oral and pharyngeal cancer. The purpose of this study was to assess the knowledge, practices, and opinions of dentists and dental hygienists among a random sample of practicing dentists and dental hygienists in New York State regarding oral cancer prevention and early detection.

METHOD

We randomly selected a stratified sample of dentists ($n = 1025$) and dental hygienists ($n = 1025$) from the lists of licensed dental practitioners in New York State. For calculating the sample size, we used nQuery Advisor software.¹⁷ We obtained a final sample of 904 dentists and 963 dental hygienists after eliminating all ineligible providers (those deceased, retired, no longer in active practice, or those who had moved out of the state). We assessed the representativeness of the sample by comparing the characteristics of those who were selected with the national dental workforce profiles.¹⁸

We designed questionnaires to assess the knowledge, practices, and opinions regarding oral cancer prevention and early detection. The items included in the questionnaires assessed the knowledge of signs, symptoms, and risk factors for oral cancer; assessment of risky behavior; and clinical practice technique of oral cancer examination. In addition, we gathered opinions and information about oral cancer education received while in the schools of dentistry and dental hygiene as well as demographic information. The questionnaires included previously validated items as well as items specifically designed for this survey.^{19,20} This study received approval from the institutional review boards of the New York State Department of Health and New York University.

We performed the analyses using SPSS software.²¹ We analyzed responses to the questionnaires by calculating frequencies for categorical data and means for continuous data. We assessed knowledge and practice patterns by giving a score of 1 point to each correct response and then summing the scores. There were 29 items on the survey that assessed knowledge and 26 items that assessed practice patterns. We categorized the final scores into 3 groups: high, medium, and low. We assumed those items with missing responses to be not knowing the correct answer and scored as such. We calculated confidence intervals (95%) to compare the proportions between dentists and dental hygienists and to assess the difference in mean scores.

RESULTS

Table 1 summarizes the characteristics of the study sample. A total of 499 (55%) dentists and 630 (65%) dental hygienists responded to the surveys. More than 80% of dentists and about 65% of dental hygienists we surveyed were above 40 years of age. More than 88% of the respondents were White. The racial composition of the sample of dental practitioners in New York State who responded to this survey was similar to the national dental workforce.¹⁸ We found no significant differences in demographic characteristics between respondents and nonrespondents, which suggested that the sample was representative of the New York State licensed oral health care providers. Almost 72% of dental hygienists reported being the first provider to screen new patients in their practice. More than 25% in both groups did not have any educational material about oral cancer in their practice.

Knowledge

Overall, we found that this group of dentists and dental hygienists were knowledgeable about oral cancer risk factors and signs and symptoms. However, there were some notable discrepancies and differences in their knowledge. More than two thirds of dentists knew that the lymph nodes typically present in patients with oral cancer are hard, painless, and either mobile or fixed. On the other hand, almost half of dental hygienists were not aware of this. Although about 55% in both groups were aware that older age is a risk factor, only one third of dentists and less than one fifth of dental hygienists knew that most oral cancers are diagnosed in persons 60 years and older. Less than 60% in both groups were aware of the relationship between sun exposure and lip cancer.

Regarding risk factors, a very high percentage in both groups was aware that tobacco (90%) and alcohol (> 80%) are risk factors for oral cancer. However, only about 25% of dentists and 30% of dental hygienists were aware that low consumption of fruits and vegetables is a risk factor. There were also some differences between dentists and dental hygienists in their awareness of certain culture-specific risk factors such as betel quid chewing (a folded edible leaf packed with ground areca nut, tobacco, white lime, and assorted spices) and Gutka consumption (a sweet flavorful tobacco product). Dentists were more aware of betel quid chewing (52%), whereas only 28% of dental hygienists were aware of it. Only 16% of dentists and 11% of dental hygienists were aware of Gutka use as a risk factor for oral cancer.

We computed knowledge scores using 29 knowledge items (mean scores of dentists = 17.3; 95% CI, 16.8–17.8; mean scores of dental hygienists = 14.9; 95% CI, 14.5–15.3). Approximately 39% of dentists and 18% of hygienists had a score higher than 20 out of a maximum score of 29. A majority of dentists and dental hygienists had scores in the range of 10 to 19. Dentists were significantly more knowledgeable about oral cancer risk factors and signs and symptoms than dental hygienists.

Practices

Table 2 provides responses to questions about the practices of dentists and dental hygienists regarding oral cancer prevention and early detection. Approximately 85% and 78% of dentists and dental hygienists, respectively, reported currently providing oral cancer examinations to more than 80% of their patients aged 40 and above. The reasons most often reported by dentists for not providing oral cancer examinations were that oral cancer examination was not a necessary procedure and that they were not reimbursed for performing it. In addition, dental hygienists thought that it was not within the scope of their practice and that it took too much time. More than 90% agreed that palpating of lymph nodes of head and neck is an essential step for oral cancer examination. The assessment of tobacco and alcohol history was similar in both groups, with alcohol assessment being lower in both groups (Figure 1).

There was no significant difference in the practice pattern scores between dentists and dental hygienists (Table 2). We found that dental hygienists promoted tobacco cessation activities significantly more than dentists.

Opinions

A large proportion of dentists (72%) agreed that their knowledge about oral cancer was current. On the contrary, less than half of dental hygienists agreed that their knowledge was current. Interestingly, about 68% of dentists thought that oral cancer examination should be a separate reimbursable procedure. Figure 2 shows the opinions of the respondents regarding their oral cancer prevention training and education as well as their patients' knowledge about oral cancer risk factors and signs and symptoms.

Finally, more than 75% of dentists reported taking an oral cancer continuing education course in the last 5 years. However, only 50% of dental hygienists reported taking a course in the past 5 years. As a result of taking a continuing education course, 34% of dentists and 51% of dental hygienists reported making changes in their practice of oral cancer prevention. Regarding the different modes of educational approaches, both groups preferred lectures, clinical demonstration courses, and audiovisual slides.

DISCUSSION

A comprehensive oral cancer examination and risk assessment are measures that may lead to early detection and prevention of oral cancer. Many experts agree that the key is not necessarily identifying oral cancer but identifying tissue that is not normal and taking appropriate action.¹⁵ Kerr and Cruz²² provided an overview of current dental office preventive practices and diagnostic techniques for the early detection of oral cancer and precancerous conditions. An oral cancer examination could take as little as 90 seconds to perform.^{23,24} Overall, we found that this group of dentists and dental hygienists were knowledgeable about oral cancer risk factors and about signs and symptoms. However, dental hygienists lag behind dentists in their knowledge base in some aspects. Both groups need to improve their awareness about the risk for oral cancer posed by the consumption of known carcinogens such as betel quid and Gutka. This is especially important due to the large influx of people to New York State from Asian countries such as India, Pakistan, Bangladesh, and the Philippines where habits like betel quid and Gutka chewing are practiced.²⁵ As has been shown in previous studies, although a large proportion of both groups identified tobacco and alcohol as risk factors, few of them assessed their patients for alcohol use.^{12,19,26,27}

This study highlights the need for education and training activities with regard to the causes and prevention of oral cancer among all oral health care providers. As in previous studies,^{11,20,28,29} a large proportion (more than 90%) wrongly identified family history of cancer as a risk factor. Previous studies^{30,31} have compared the knowledge and practice of different groups of health care providers regarding oral cancer and related issues. These studies have suggested that the knowledge levels of the groups investigated were generally good. Nevertheless, as we found in this study, there were discrepancies related to risk factor knowledge and clinical examination technique. A recent survey of senior dental students from 7 US dental schools showed a perceived lack of knowledge and skills in oral cancer examination.³² This could conceivably translate as a subsequent deficiency in incorporating optimal oral cancer control procedures in their practice.³² Barker et al.³³ found significant changes in knowledge and perceived competency with respect to oral and pharyngeal cancer after a multi-component educational intervention was targeted at health care professionals.

Since 2001, New York State has mandated that all dentists take 2 hours of coursework and training, on a 1-time basis, regarding the chemical and related effects of tobacco products and

the recognition, diagnosis, and treatment of the oral health effects.³⁴ Because a large proportion of dental hygienists in this study reported being the first provider to screen new patients in their practice, educational activities directed toward dental hygienists should be explored in the future. This would help in enhancing their knowledge and thus help in resolving the existing gaps in the knowledge and practices of oral cancer prevention between dentists and dental hygienists.

This study has several limitations. Although the characteristics of the respondents were comparable to the national workforce profile, the results may not fully reflect the knowledge, practices, and opinions of all dentists and dental hygienists. Further, it was not possible to determine whether the respondents were or are practicing as they reported in the survey.

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Figure 1.
Percent of dentists and dental hygienists assessing history of cancer and tobacco and alcohol use.

Figure 2. Opinions of dentists and dental hygienists (percent agreeing or strongly agreeing) regarding their oral cancer prevention training and education and their patients' knowledge of oral cancer.

TABLE 1

Characteristics of Dentists and Dental Hygienists (%) Who Responded to the Survey

Characteristics	% Dentists (N = 499)	% Dental Hygienists (N = 630)
Age, y		
20–39 years	19.0	36.0
40–59 years	61.0	58.0
60 years and older	20.0	6.0
Gender		
Male	87.0	1.0
Female	13.0	99.0
Ethnicity/racial group		
White	88.6	93.5
African American	1.7	1.9
Hispanic	2.3	2.4
Native American	0.0	0.0
Asian/Pacific Islander/ other	7.5	2.2
Types of practice		
Solo practice	59.8	63.0
Specialty practice	4.1	11.5
Public health/government	2.5	1.9
Partner	17.0	—
Employee	9.4	—
Independent contractor	4.3	—
Other	2.9	3.4
Year of graduation		
Range	1939–2001	1951–2001
Median	1978	1982

TABLE 2

Practices of Dentists and Dental Hygienists Regarding Oral Cancer Examination and Tobacco Cessation and Alcohol Reduction*

Practices	Dentists		Dental Hygienists	
	%	95% CI	%	95% CI
1. Currently providing annual oral cancer examination [†]	84.9	81.6–88.2	78.4	75.1–81.7
2. Examine tongue appropriately [‡]	90.0	87.3–92.7	91	88.6–93.3
3. Assisting tobacco cessation activities [‡]	19.1	15.4–22.8	29.6	25.7–33.5 [§]
4. Assisting alcohol reduction/cessation activities [‡]	9.2	6.5–11.9	6.9	4.9–8.9
5. Practice scores, mean				
(a) High (18–26)	11.6	7.3–15.9	11.3	7.8–14.8
(b) Medium (9–17)	10.8		4.0	
(c) Low (0–8)	62.3		61.9	
6. Conducted oral cancer examination at initial visit, mean	26.9		34.1	
18–39y				
40+ y	82.0	78.7–84.7	76.0	72.8–79.2
7. Conducted oral cancer examination at recall visit, mean	85.0	82.1–87.8	79.0	76.0–82.0
18–39 y				
40+ y	77.0	73.4–80.0	72.0	68.8–75.2
8. Identified suspicious lesion (and took biopsy in the case of dentists)	80.0	76.7–83.2	76.0	73.0–79.0
Mean no. of patients/y	11.6	9.1–14.1 [§]	4.1	3.6–4.6
9. Referred for further evaluation				
Mean no. of patients/y	4.5	4.0–5.0 [§]	3.0	2.7–3.4

* CI indicates confidence interval.

[†] In the past 6 months or for more than 6 months.

[‡] Based on item asking if the practitioners examined tongue by asking patients to stick out their tongue, examine using tongue blade, and inspect both sides as well as underside of tongue.

[§] Statistically significant difference between groups.