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North Carolina Dental Hygienists' Assessment of Patients' Tobacco and Alcohol Use

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Purpose. North Carolina is the 11th most populous state and ranks 14th among all states in the age-adjusted mortality rate for oral and pharyngeal cancer (OPC). This study assessed North Carolina dental hygienists' knowledge of tobacco and alcohol use as OPC risk factors, assessment practices of tobacco and alcohol use in patient medical histories, and opinions regarding tobacco and alcohol cessation education. Characteristics of dental hygienists who screen for tobacco and alcohol use in medical histories were also analyzed.

Methods. A 40-item survey was mailed to a simple random sample of 1,223 dental hygienists from a registry of 4,076 licensed in North Carolina. Data were included from 651 completed surveys, giving an effective response rate of 57%.

Results. Most respondents correctly identified tobacco and alcohol use as risk factors for OPC. A majority assessed patients' tobacco and alcohol use. Less than 10% assessed no tobacco factors, while nearly 42% assessed no alcohol factors. A number of background and practice characteristics were found to be positively associated with tobacco and alcohol screening in patient medical histories. A majority agreed or strongly agreed that dental hygienists should be trained to provide tobacco and alcohol cessation education to their patients; however, few felt trained to provide such education.

Conclusion. Improvements in knowledge regarding tobacco and alcohol use as OPC risk factors are needed. Future interventions might include educational programs for currently practicing dental hygienists and increased tobacco and alcohol cessation education in the professional entry-level dental hygiene curricula.

Keywords: Tobacco, tobacco use cessation, alcohol, dental hygienist, professional education, medical history, oral cancer

Introduction

Oral and pharyngeal cancer (OPC) is the 12th most common type of cancer in the world and accounts for approximately 3% of all cancers in the United States.^{1,2} The most common form is squamous cell carcinoma, which accounts for 96% of all oral carcinomas.³ Etiological factors include tobacco use, alcohol consumption, a diet poor in fresh fruits and vegetables, infective agents, immune deficiency, and exposure to sunlight (lip cancer).⁴ The two major risk factors, the use of tobacco

and excessive alcohol consumption, combined are estimated to account for 75% of all cases in the United States.⁵ Patterns and risks associated with tobacco and alcohol use have also been shown to account for nearly all of the observed racial differences in incidence and mortality rates.⁶

The age-adjusted (world standard) incidence rate for OPC was 8.1 per 100,000 population from 1995 to 1999, but it varied greatly according to race and sex.⁷ In 2002, estimations of OPC were 28,900 new cases and 7,400 deaths in the United States.⁸ North Carolina is the 11th most populous state and ranks 14th among all states in age-adjusted mortality rate for OPC.^{8,9}

Preventable oral diseases compromise the health status of many Americans. Oral health care providers have the opportunity to become more involved in preventing or reducing the occurrence of these diseases. Dental hygienists, in particular, can serve as valuable resources for promotion of sustained oral health through prevention and early detection of oral cancer. The following research provides information about dental hygienists' assessment of tobacco and alcohol use in patient medical histories and is intended to help in the design of interventions to improve overall oral cancer control.

Review of the Literature

Many factors have been related to the development of OPC. Accepted modifiable behavioral risk factors for this disease include tobacco use, excessive alcohol consumption, over-exposure to the sun (for lip cancer), and a diet low in fruits and vegetables. In addition, a recent association of human papillomavirus with oral cancer has been established.¹⁰ Some factors that have been erroneously associated with increasing oral cancer risk include hot foods and beverages, spicy foods, obesity, poor oral hygiene, poor fitting dentures, familial clustering, and family history.¹¹

The strongest risk factor for oral cancer is the use of inhaled or smokeless tobacco and chewing substitutes that usually contain tobacco, such as pan masala or betel nut quid (common in some Middle and Far Eastern countries).¹² Risk associated with cigarette use, in particular, grows with increased consumption, and studies have shown that, for both men and women, increased tobacco use tends to increase oral cancer risk.¹³⁻¹⁶ Tobacco smoking was found to be the leading risk factor for all of the cancers analyzed in one study, with both current and former use seen as harmful.¹³ Another study concluded that a decrease in very high levels of cigarette and cigar smoking is key to overall oral cancer prevention.¹⁴

The results of a study involving 100 cases and 47,773 controls indicated tobacco chewing as a strong risk factor for erythroplakia.¹⁵ Chewers who swallowed the tobacco fluid and chewers who kept the chewing tobacco in their mouths overnight both had higher risks for erythroplakia than chewers who did not swallow or orally store tobacco fluid. A dose-responsive relationship for the frequency of chewing tobacco with the risk of erythroplakia was seen. This study also indicated alcohol use as a strong risk factor for erythroplakia, showing a dose-responsive relationship for the frequency and duration of alcohol use with the risk of erythroplakia.¹⁵

Alcohol Consumption

Excessive alcohol use has been associated with oral cancer as a risk factor, and studies have shown that alcohol consumption may be involved in a multiplicative interaction with smoking.¹⁶ Alcohol may possibly act as a solvent, allowing the carcinogens from tobacco to penetrate into the tissues, or it may act as a catalyst in metabolically activating tobacco carcinogens. Another possible mechanism is that alcohol lessens the protective effect of fruits and vegetables by decreasing the nutrient intake or absorption.¹⁷

There is indication that the relative risk for OPC in heavy consumers of both products exceeds the risks for abstainers up to 37-fold.¹⁷ A study involving 195 female cases and 1,113 controls showed that an elevated consumption of both alcohol and tobacco produced an approximately 15-fold increased risk in OPC cases.¹⁶ The study also indicated that oral cancer

is associated with alcohol drinking in those who never smoke and with tobacco smoking in non-drinkers.¹⁶ Another study emphasized the findings of this study when former drinkers participating in the research showed a significant steady decline in oral cancer risk.¹⁴

A study involving 1,207 patients hospitalized for alcoholism found increased risk for oral, pharyngeal, esophageal, laryngeal, and lung cancer among alcoholics.¹⁸ Most notable increases were observed for cancer of the hypopharynx, the mesopharynx (without appreciable differences between the tonsil and the anterior pillar), the floor of the mouth, and the base of the tongue. The results of this study support the hypothesis of a carcinogenic effect of alcohol involving direct contact with oral and pharyngeal mucosa.¹⁸

Public Perception and Awareness of Oral Cancer Risk Factors

Public awareness about the risk factors and methods of early detection of oral cancer is very low.¹⁹ Being aware of the risk factors, early signs and symptoms, and common oral lesions can help both patients and health care providers detect lesions at their earliest stage. The fact that habits such as smoking and alcohol drinking cause oral cancer is well recognized in the medical community, but those who have the disease may not be as well informed. Ideally, patients should be informed, their risk factors modified, and the implemented changes reinforced by repetition and psychological support. Even if patients cannot reverse their habits, reductions may decrease their overall risk.²⁰

A study involving three focus groups of male alcohol drinkers and tobacco smokers over the age of 44 set out to examine their perceptions and understanding of oral cancer.²¹ There was common agreement among the participants on issues of general health. Fitness, diet, and lifestyle were regarded as important to both physical and psychological health, as was age. Smoking, alcohol drinking, and obesity all had unhealthy connotations. There was agreement on the inadvisability of smoking (about half of the participants smoked), although drinking was better tolerated. There was consensus on how little should be smoked, but no consensus on how much alcohol was safe.²¹

When the group discussions turned to diseases that might affect the mouth or throat, only thrush, foot and mouth disease, and colds were mentioned. Awareness of oral cancer was related to level of education, with more educated participants being better informed about the causes of oral cancer. Most of the men had not come across information regarding oral cancer and indicated that they would probably not seek advice about prevention unless they had personal experience of the disease.²¹

Role of the Dental Hygienist

Primary prevention through the avoidance or limitation of tobacco and alcohol use is the key to lowering the incidence of OPC. The elimination of all tobacco use is the single most important way to reduce the likelihood of the disease. Dental hygienists, in particular, are in a position to inform their patients and to make the public aware of the risk factors, signs, and ramifications of oral cancer.

Purpose and Objectives of the Study

Due to high OPC incidence and mortality rates in North Carolina, dental hygienists were surveyed about their knowledge of tobacco and alcohol use as OPC risk factors, assessment practices of tobacco and alcohol use in patient medical histories, and opinions regarding tobacco and alcohol cessation education. Information gathered from the study was projected to help obtain a good understanding of existing practices in dental offices across the state and to aid in the development of initiatives for promoting oral cancer prevention and early detection. This article will review North Carolina dental hygienists' knowledge of tobacco and alcohol use as risk factors for oral cancer, assessment practices of tobacco and alcohol use in patient medical histories, and opinions regarding the adequacy of their tobacco and alcohol cessation education abilities. Characteristics of dental hygienists who screen for tobacco and alcohol use in medical histories will also be discussed.

Methods and Materials

To address the aims of this study, data from the "North Carolina State Survey of Dental Hygienists: Oral Cancer" was analyzed. The survey was developed in part using the "Maryland Oral Cancer Survey of Dental Hygienists."¹¹ A list of names and addresses of all licensed dental hygienists in North Carolina (n = 4,076) was obtained from the North Carolina State Board of Dental Examiners. In November 2002, a piloted 40-item survey questionnaire, cover letter, and business reply envelope were mailed to a simple random sample of 1,223 North Carolina dental hygienists.

The chosen sample size represented approximately 30% of dental hygienists licensed in North Carolina at the time, and it was presumed to be large enough to provide accurate generalizations to the target population. Distribution of the randomly selected sample was as follows for each of the six geographic Health Service Areas of the state: 1. Western - 16.4%, 2. Piedmont - 18.3%, 3. Southern Piedmont - 22.2%, 4. Capitol - 17.7%, 5. Cardinal - 14.1%, and 6. Eastern - 11.4%. Inclusion criteria required respondents to be licensed to practice dental hygiene in North Carolina and to currently be providing clinical, educational, and/or referral services.

Two weeks after the initial mailing, a reminder/thank you postcard was sent to each dental hygienist and, approximately six weeks after the initial mailing, a second complete mailing was sent to all non-respondents with a revised letter stating the importance of the survey. Five respondents, randomly selected from a drawing, received a \$25 gift certificate to a gourmet food store/mail order business as an incentive for participating in the study. Approval for this voluntary confidential survey was obtained from the Committee on Research Involving Human Subjects of the University of North Carolina School of Dentistry.

A total of 651 usable surveys were received, which represented an effective response rate of 57% of the 1,223 sampled dental hygienists who were eligible for the study. Descriptive analyses of the unweighted data were computed by calculating measures of central tendency and variation for the continuous variables and frequency tables for the categorical data. Bivariate and logistic regression modeling was performed with Statistical Analysis System (SAS) Software [Version 8.2, Cary, NC]. Analyses were evaluated using a standard alpha level $P < 0.05$. Odds ratios and 95% confidence intervals were calculated to make comparisons of categorical variables within the sample group.

Results

Response Frequency and Sample Characteristics

Descriptive characteristics of the survey respondents are illustrated in Table I. Of the total respondents to the survey, 99% were female. Most of the respondents were between 31 and 50 years of age (65%). Graduation year from an entry-level dental hygiene program was almost evenly dispersed among the following year categories: 1995 to 2002 (30%), 1985 to 1994 (27%), and 1975 to 1984 (29%). The most frequently earned degree awarded upon graduation from an entry-level dental hygiene program was specified as an associate degree (88%), which was also most frequently reported as the highest degree ever obtained (72%). Nearly 60% of the respondents obtain continuing education through a professional organization. Of those respondents, a majority (58%) indicated being a member of one of two dental hygiene national organizations, the American Dental Hygienists' Association (ADHA) or the National Dental Hygienists' Association. The majority of the respondents indicated a general practice as their primary practice setting (83%). Distribution of the survey respondents across the six Health Service Areas in North Carolina closely resembled that of the randomly selected sample of practitioners in those areas.

Table I. Descriptive characteristics of dental hygienist survey respondents

Characteristics	Number	Percent
All respondents	651	100.0
Gender		
Female	625	99.7
Male	2	0.3
Age (years)		
<24	28	4.4
24-30	110	17.4
31-40	195	30.8
41-50	218	34.4
51-59	74	11.7
60-64	9	1.4
65+	0	0.0
Graduation year from entry-level dental hygiene program		
1995-2002	187	30.0
1985-1994	173	27.3
1975-1984	181	28.6
pre-1975	92	14.5
Degree awarded upon graduation from entry-level program		
Certificate in Dental Hygiene	45	7.1
Associate Degree in Dental Hygiene	510	87.5
Baccalaureate Degree in Dental Hygiene	79	12.5
Highest degree earned		
AA/AAS	413	72.2
BS/BA	135	23.6
Masters	16	2.8
Doctorate	2	0.3
Other	6	1.0
Membership of those who obtain CE through professional organizations		
American Dental Hygienists' Association	197	52.4
National Dental Hygienists' Association	22	5.9
American Public Health Association	8	2.1
American Association of Public Health Dentistry	5	1.3
American Dental Education Association	12	3.2
International Association for Dental Research	14	18.4
Other	69	21.1
Practice setting		
General practice	542	83.3
Specialty practice	39	6.0
Public health/government	21	3.2
Hospital	4	0.6
Other	33	5.1
North Carolina Health Service Area		
I – Western	107	16.4
II – Piedmont	129	19.8
III – Southern Piedmont	124	19.0
IV – Capital	125	19.2
V – Cardinal	95	14.6
VI – Eastern	70	10.8

Source: North Carolina State Survey of Dental Hygienists: Oral Cancer

Knowledge of Tobacco and Alcohol Use as Risk Factors for Oral Cancer

Most respondents correctly identified a history of tobacco (99.8%) and alcohol (86.5%) use as risk factors for disease. However, very few of the respondents knew that smokeless tobacco risk is less than that of cigarette use (15.3%). Smokeless tobacco lesions were thought to resolve with discontinued use by 41.8% of the respondents.

Assessment of Tobacco and Alcohol Use in Medical Histories

Table II demonstrates the percentage of dental hygienists assessing factors of tobacco and alcohol use in patient medical histories - past use, present use, and type and amount used. A high percentage of dental hygienists indicated that they assessed patients' present tobacco use (92%), but only 77% and 80% assessed patients' past tobacco use and type and amount used, respectively. A majority of the respondents reported assessment of patients' present alcohol use (55%) and only 41% and 31% assessed patients' past alcohol use and type and amount used, respectively. A majority of the respondents (67%) indicated that they evaluated all three factors of tobacco use in patient medical histories (past use, present use, and

type and amount used). However, only a small percentage reported evaluating all three factors of alcohol use (23%). Although fewer than 10% of the respondents reported assessing no tobacco factors, nearly 42% indicated that they did not assess any of the alcohol use factors when reviewing patient medical histories. As shown in Table III, more than half of the dental hygiene respondents specified that they evaluated present use of both tobacco and alcohol in patient medical histories (54%), but only 39% and 29% of the respondents indicated evaluating tobacco and alcohol past use and type and amount used, respectively. In addition, more dental hygienists screened for past tobacco use and present alcohol use (47%) than did dental hygienists who screened for past alcohol use and present tobacco use (40%).

Table II. Dental hygienists' assessment of tobacco and alcohol use

	Tobacco	Alcohol
Assess past use	76.5%	40.6%
Assess present use	91.5%	55.4%
Assess type and amount used	79.3%	30.5%
Assess none of the above	7.8%	41.2%

Table III. Overall patterns of tobacco and alcohol screening in medical histories (percentage of dental hygienists who assess each item)

	Tobacco Past Use	Tobacco Present Use	Tobacco Type/amount Used
Alcohol Past Use	39.0%	39.7%	35.1%
Alcohol Present Use	46.8%	54.4%	47.1%
Alcohol Type/amount Used	26.9%	30.3%	29.5%

Bivariate Associations with Tobacco and Alcohol Risk Assessment

The extent to which dental hygienists assessed factors of alcohol and tobacco use (past use, present use, and type and amount used) in patient medical histories was calculated in relation to selected background and practice characteristics. Bivariate associations with tobacco and alcohol use screening are demonstrated in Table IV, along with corresponding *P* values. Eleven background characteristics were used: primary practice setting, age, year of graduation, entry-level dental hygiene degree received, typical volume of patients seen, majority age group of patients seen, belief that oral cancer knowledge is current, professional organization membership (ADHA members and non-members), continuing education gained through a professional organization (yes/no), interval since last continuing education course, and North Carolina Health Service Area of professional practice.

Table IV. Bivariate associations on three indices of the completeness of dental hygienists' screenings for tobacco and alcohol use in medical histories

	All 3 Tobacco Items	All 3 Alcohol Items	All 6 Tobacco & Alcohol Items
Practice Setting			
General practice	64.9 **	20.9 **	19.8 **
Other	78.4	34.7	34.7
Age (years)			
≤ age 40	67.2	24.8	23.9
> age 40	66.9	21.2	20.0
Year of graduation			
1985-2002	68.7	24.4	23.6
before 1985	64.9	21.5	20.2
Entry level Dental Hygiene degree received			
Certificate	71.8	20.5	21.0
Associate	66.9	23.0	21.7
Baccalaureate	66.7	25.7	25.7
Volume of patients typically seen			
< 32 patients per week	68.4	28.3 *	27.3 *
≥ 32 patients per week	66.1	19.7	18.7
Majority age of patients seen (years)			
< age 65	66.5	21.9	20.7
≥ age 65	62.8	17.9	16.9
Belief that oral cancer knowledge is current			
High	72.8 **	31.9 ****	30.4 ****
Low	60.5	13.4	12.8
Membership			
American Dental Hygiene Association	73.4 *	28.6 *	27.9 *
Other	64.1	18.5	19.5
Obtain continuing education through professional organization			
Yes	73.3 ****	26.6 *	25.6 *
No	58.5	18.5	17.4
Interval since last oral cancer continuing education course			
Within the past year	74.8 **	32.1 *	31.6 *
During the past 2-5 years	70.6	23.5	22.5
More than 5 years ago	58.5	17.4	15.4
Never	50.8	12.3	10.7
Not attended (recent grad)	64.7	17.6	17.6
Don't know	54.6	18.2	18.2
North Carolina Health Service Area			
I - Western	67.3 *	16.7 *	16.8 *
II - Piedmont	60.3	18.1	15.8
III - Southern Piedmont	77.3	35.4	33.6
IV - Capital	57.0	28.9	22.1
V - Cardinal	68.1	19.8	19.8
VI - Eastern	75.0	25.0	25.4

* $P < 0.05$
 ** $P < 0.01$
 **** $P < 0.0001$

Regarding complete assessment of all three tobacco items, six background characteristics were found to be positively associated: continuing education gained through a professional organization ($P < 0.0001$), primary practice setting ($P < 0.01$), belief that oral cancer knowledge is current ($P < 0.01$), interval since last continuing education course ($P < 0.01$), North Carolina Health Service Area ($P < 0.01$), and ADHA membership ($P < 0.05$). Regarding complete assessment of all three alcohol items, seven background characteristics were found to be positively associated: continuing education gained through a professional organization ($P < 0.05$), primary practice setting ($P < 0.01$), belief that oral cancer knowledge is current ($P < 0.0001$), interval since last continuing education course ($P < 0.05$), North Carolina Health Service Area ($P < 0.05$), ADHA membership ($P < 0.05$), and typical volume of patients seen ($P < 0.05$). Regarding complete assessment of all six tobacco and alcohol items, the same background characteristics and significance levels associated with complete assessment of all three alcohol items were found to be positively associated in this case as well.

Multivariate Model of Factors Significantly Associated with Tobacco and Alcohol Risk Assessment

Table V provides a multivariate model of factors associated with tobacco and alcohol risk assessment using patient medical histories. Regarding the completeness of dental hygienists screening for tobacco and alcohol use in medical histories, only three background characteristics remained in the model and were found to be positively associated: dental hygienists' age (Wald $P = 0.0291$), belief that their oral cancer knowledge is current (Wald $P < 0.0001$), and North Carolina Health Service Area of practice (Wald $P = 0.0072$).

Table V. Multivariate model of factors significantly associated with the completeness of dental hygienists' screening for tobacco and alcohol use in medical histories

Effect	Odds Ratio	95% Confidence Interval	Wald P Value
Age (years)			
≤ age 40	1.0	Reference	0.0291
> age 40	1.7	1.1 – 2.7	
Belief that oral cancer knowledge is current			
Low	1.0	Reference	<0.0001
High	3.7	2.3 – 6.0	
North Carolina Health Service Area			
VI - Eastern	1.0	Reference	0.0072
V - Cardinal	0.5	0.2 – 1.2	
IV - Capital	0.8	0.4 – 1.8	
III - Southern Piedmont	1.6	0.7 – 3.4	
II - Piedmont	0.5	0.2 – 1.1	
I - Western	0.5	0.2 – 1.2	

Opinions Regarding Adequacy of Tobacco and Alcohol Cessation Education

A majority of the respondents either agreed or strongly agreed that dental hygienists should be trained to provide tobacco and alcohol cessation education to their patients (81% and 63%, respectively). However, only a few of the respondents felt adequately trained to provide such education (36% and 16%, respectively).

Discussion

The response rate for this study was similar to the 60% response rate achieved in the "Maryland Oral Cancer Survey of Dental Hygienists."¹¹ The response rate obtained for this survey is, nonetheless, consistent with other surveys mailed to health practitioners.²³ Therefore, although the small sample size limits generalizations beyond the target population, the information gathered from the study can be very beneficial toward the development of initiatives for promoting oral cancer prevention and early detection in North Carolina. In addition, due to the random selection of dental hygienists in North Carolina, a representative sample of providers from each of the six Health Service Area was obtained. This allowed determination of relative regional assessment of the need to advocate interventions within specific practice areas in the state.

Although non-response bias can still be present, even with a suitable response rate,²⁴ we will acknowledge the likely effect of incomplete capture of data from all respondents. Namely, information gathered from this study most likely under-represents dental hygienists' lack of knowledge regarding OPC risk factors. It has been found that non-responders to postal questionnaire surveys are different from responders in relation to their overall well-being and behavior.²⁵⁻²⁹ In this study, dental hygienists responding to the survey may have a higher level of oral cancer knowledge, a higher interest in oral cancer control and continuing education, better patient assessment practices, and more positive feelings about their training and patient education skills than those who failed to return completed surveys. Those not responding to the survey may have little knowledge and, therefore, are discouraged from submitting their responses; they may have very little interest in oral cancer control in their state, either because they have had inadequate OPC training or are not aware of the increasing threat of this disease in North Carolina; or they may not think their input is valuable and, therefore, do not desire to participate in professional activities or continuing education courses that could improve their awareness of oral cancer.

A relatively high percentage of dental hygienists correctly identified having a history of tobacco use as a true risk factor for OPC, and this knowledge was exhibited in their response regarding their conduct of tobacco use screening. However, only a small percentage of the respondents knew that smokeless tobacco risk is less than that of cigarette use and that lesions caused by smokeless tobacco typically resolve with discontinued use. This finding is similar to that reported among Maryland dental hygienists, where 98% correctly identified tobacco as a risk factor, and 79%, 94%, and 79% assessed past and present use, and type and amount of tobacco used.¹¹ In addition, only 10% of Maryland dental hygienists knew that cigarette use is a greater risk factor than use of smokeless tobacco for oral cancer, and 33% knew that smokeless tobacco lesions usually diminish when use of the product is discontinued.¹¹ Although a high percentage of dental hygienists

correctly identified a history of alcohol use as a real risk factor for disease, a smaller percentage of dental hygienists assessed all three factors of alcohol use than did those who assessed all three elements of tobacco use. Again, this finding is very similar to assessment practices found among Maryland dental hygienists.¹¹

A number of background and practice characteristics were found to be positively associated with tobacco and alcohol screening in patient medical histories. Most significantly associated were the belief that oral cancer knowledge is current and obtaining continuing education through a professional organization, with high belief in their oral cancer knowledge being current subsequently found significant in the multivariate model. This finding suggests that oral cancer continuing education courses may contribute to better tobacco and alcohol risk assessment practices, or that having confidence in one's oral cancer knowledge lends to increased participation in oral cancer prevention efforts. Members of ADHA were significantly more likely to completely screen for all aspects of tobacco and alcohol use in medical histories than those who were not members. In addition, respondents who indicated they had received continuing education credit through a professional organization were significantly more likely to screen for all aspects of tobacco and alcohol risk.

Most interesting was the finding that dental hygienists who had either attended an oral cancer continuing education course within the past five years or who had never attended a continuing education course because they were recent graduates were significantly more likely to assess all aspects of tobacco and alcohol use, further establishing that continuing education increases awareness, motivates practitioners, and results in improved practices. It was interesting to note that dental hygienists who treated a typical patient volume of 32 or more patients per week were significantly less likely to screen for all three alcohol factors or all six tobacco and alcohol factors combined than were those who saw fewer patients. This finding is very discouraging as it suggests that most dental hygienists simply do not have time to adequately assess their patients for oral cancer risk factors. However, it at least provides some suggestion of where to begin our efforts to decrease the burden of oral cancer in this state.

Several suggestions could be made to assist in this prevention endeavor. The first suggestion would be to encourage dental offices across the state to allow more appointment time for dental hygienists to assess new patients and to determine if these patients participate in certain behaviors that might increase their predisposition to oral cancer. Secondly, dental offices might be encouraged to implement tobacco and alcohol cessation education in their office via one-on-one consultations with the dental hygiene professional. In addition, educational videos in the dental office might be a tool to increase the dissemination of information to all patients in the practice. In this way, dental hygienists would be communicating to patients that they care about their oral and general health and, in turn, patients might begin to ask more questions about oral cancer and methods to prevent disease.

Significant differences were evident across the six Health Service Areas in North Carolina with regards to medical history assessment of tobacco and alcohol use as OPC risk factors. Providers in the Southern Piedmont region were notably more likely to completely assess patients for all factors of tobacco and alcohol use in medical histories than were providers in other regions. This finding suggests that it might be beneficial to examine the specific reason why dental hygienists practicing in the Southern Piedmont region tend to have better patient assessment practices. This examination might include looking at regional community college dental hygiene program curricula, public programs available, and/or patient awareness of oral cancer in this region.

Regarding opinions relating to tobacco and alcohol cessation education, a majority of the respondents felt that dental hygienists should be trained to provide tobacco and alcohol cessation education to their patients. However, only a few felt adequately trained to provide such education. This finding is consistent with that found in Maryland, where only 32% of dental hygienists felt they were adequately trained to provide tobacco cessation services and only 13% for alcohol cessation.¹¹

The information revealed by this survey provides only a brief synopsis of the status of North Carolina dental hygienists' knowledge of tobacco and alcohol use as risk factors for OPC, their assessment practices of tobacco and alcohol use in patient medical histories, and their opinions regarding the adequacy of their training as it relates to tobacco and alcohol cessation patient education. However, it does offer a rationale for implementing oral cancer education programs that include tobacco and alcohol use assessment and cessation training in both the dental hygiene curricula as well as for continuing education courses for existing providers.

Conclusion

In beginning to implement oral cancer education initiatives, it is important to target areas where OPC has increasing incidence. This study explored potential professional practice deficits that may have indirectly contributed to the high incidence of OPC in North Carolina.⁹ Dental hygienists nationally have been called upon to increase their tobacco use knowledge and their efforts toward preventing adolescent tobacco use onset and assisting adults in cessation efforts. Acknowledging and addressing deficiencies in assessment practices for tobacco and alcohol control may be the first step in facilitating oral cancer control. Future interventions might include educational programs for currently practicing hygienists and increased tobacco and alcohol cessation education in dental hygiene curricula. All health care providers must participate in risk reduction and early detection efforts. North Carolina dental hygienists have an excellent opportunity to assist in this worthwhile endeavor and to serve as effective resources for oral health promotion.

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Notes

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