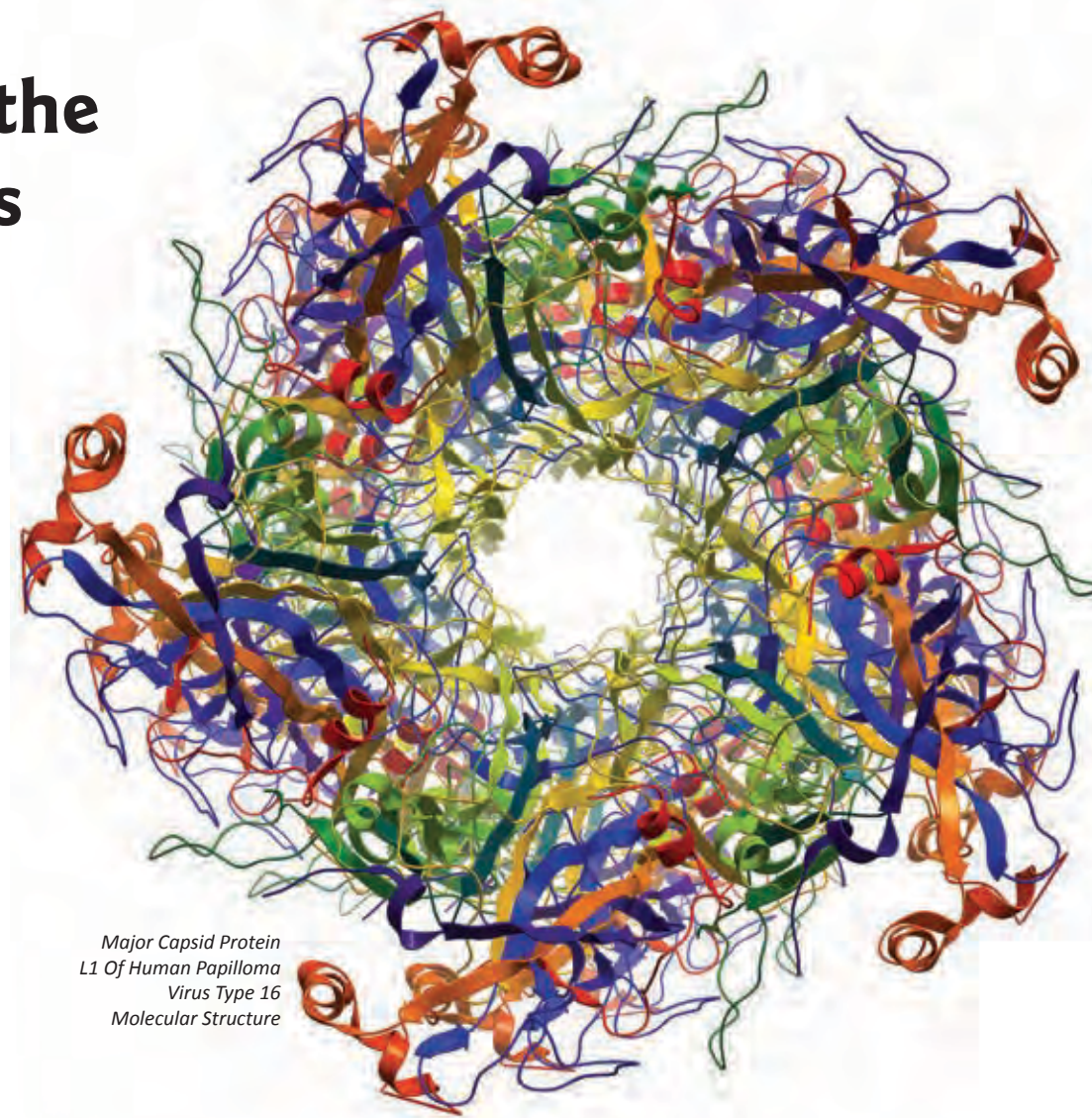


Knowledge Assessment of the Dental Community in Texas on the Role of Human Papilloma Virus in Oropharyngeal Cancer

INTRODUCTION

Oropharyngeal cancer (OPC) is the sixth most common cancer in the world (1,2). Individuals who are diagnosed with such cancers have an approximate 60% five year survival rate (3). Historically OPC has been associated with the chronic and excessive use of tobacco and alcohol. More recently, it has been shown that Human Papilloma Virus (HPV) is associated with OPC, particularly in the posterior oropharynx, which includes the base of the tongue. The prevalence of HPV-related posterior OPC has been increasing over time, rising from 16% in 1984 to 72% in 2004. Current data indicates that the prevalence has increased to 90% and represents the fastest growing group of OPCs among Americans under 50 years of age (1,4-9).

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ABSTRACT

Objectives: The epidemiology of oral cancer is changing. From 1988 to 2004, there has been a dramatic increase in Human Papilloma virus (HPV) positive oropharyngeal squamous cell carcinoma (OPC) in the U.S. At the same time there have been decreasing rates of OPC associated with the traditional risk factors of smoking and alcohol consumption. The epidemiology of oral cancer is changing. As the epidemiology changes, it is important that the dental community recognize these factors. The goal of this study was to assess the baseline level of knowledge about HPV and OPC within the Texas dental community.

Methods: Practicing dentists and dental hygienists from Texas dental professional networks and dental students from the three Texas schools of dentistry were recruited to participate in the study. Participants were requested to access and complete a 7-item online survey. To ensure anonymity, a third party practice facilitator or department administrator disseminated the survey link to participants.

Results: Of the 457 surveys completed, 100% of respondents reported conducting oral soft tissue examinations at least annually. However, only 73% included the oropharynx in their exam. Less than 50% of dental professionals selected the correct location of the greatest increase in oral cancer incidence during the last 10 years. Less than 30% of each of the groups answered correctly in indicating the age group with the most rapidly increasing incidence of oral cancer. Approximately 40% of all groups indicated that a biopsy from the posterior oropharynx should be tested for HPV.

Conclusion: Survey results across Texas dentists, dental hygienists, and Texas dental students demonstrated a lack of knowledge of the changing profile of oral cancer regarding HPV-associated OPC. This aim of this initial phase was to determine the baseline level of knowledge surrounding the risks associated with oropharyngeal cancer in the survey population. Our goal is to utilize these findings to develop educational interventions that will be disseminated throughout the dental community in Texas to improve diagnosis of these devastating cancers.

KEY WORDS

Detection, HPV, oropharyngeal cancer, prevention

THE AUTHORS



Stephanie D. Rowan, RN, MSN
Senior Clinical Research Nurse,
Department of Comprehensive Dentistry,
Division of Research, University of Texas
Health Science Center San Antonio.
Correspondence: 7703 Floyd Curl Dr Mail
Code 7719 San Antonio, TX 78229-3900;
Ph# 210-450-0739 or 210-567-4973, Fax:
210-562-9374; rowans@uthscsa.edu.



Shirley L. Hu, MPH
Department of Comprehensive Dentistry,
Division of Research, University of Texas
Health Science Center San Antonio, San
Antonio, Texas

Jacob S. Brotzman, BS
Department of Comprehensive Dentistry,
Division of Research, University of Texas
Health Science Center San Antonio, San
Antonio, Texas



Spencer W. Redding, DDS, MEd
Professor and Chairman, Department of
Comprehensive Dentistry, University of
Texas Health Science Center San Antonio,
San Antonio, Texas



K. Vendrell Rankin, DDS
Professor and Associate Chair, Department
of Public Health Sciences, Baylor College
of Dentistry—Texas A&M Health Science
Center, Dallas, Texas



Nadarajah Vigneswaran, BDS, DMD
DrMedDent, Department of Diagnostic
Sciences, University of Texas, School of
Dentistry Houston, Houston, Texas

HPV-associated OPC is recognized as a sexually transmitted disease (10). The increased prevalence of HPV-related OPC appears to reflect a change in sexual behaviors. Decreased age of sexual debut and increased number of sexual partners, particularly, with oral sex, has resulted in an increase in oral HPV infection and subsequently, an increase in HPV-positive OPC (10,11).

HPV-positive OPCs may be difficult to detect clinically, as they develop within cryptic epithelium of the palatine tonsils and lingual tonsil at the base of the tongue, both components of Waldeyer's Ring. Many posteriorly located OPCs may be misdiagnosed as a sore throat. Demographic measures such as age, race, and gender, have now been identified as contemporary risks for developing HPV-positive OPC (12,13). Across the U.S, men are more likely to develop HPV-positive OPC than women, and whites are more likely than blacks or Hispanics to develop the disease (8). Additionally, the age range at highest risk for acquiring HPV-positive OPC is 40-60 years of age, which is approximately 10 years younger than with OPC associated with the traditional risk factors of smoking and drinking (13). As compared to patients with non-HPV OPC, patients with HPV-positive OPC tend to be diagnosed at a more advanced stage, but paradoxically respond better to therapy with a 2-fold increase in the 5-year survival rate (10,14). Therefore it is important to know the HPV status of oropharyngeal tumors. It is now considered standard protocol to test biopsy specimens from the posterior oropharynx for HPV.

Table 1. Characteristics of Survey Respondents

| Dental Professionals | (n = 125) |
|---------------------------------|-----------|
| Dentist (n=51): | |
| Individual Dentist | 63% (32) |
| Group Dentist | 19% (10) |
| Dental Educator | 18% (9) |
| Dental Hygienist (n=74): | |
| Individual Dental Hygienist | 50% (37) |
| Group Dental Hygienist | 24% (18) |
| Dental Hygiene Educator | 26% (19) |
| Texas Dental School Students | (n = 332) |
| By Year | |
| Freshmen | 60% (198) |
| Seniors | 40% (134) |

In 2000, Horowitz and Yellowitz surveyed dental professionals about diagnostic procedures and risks associated with OPC development (15,16). Of the 3,200 dentists surveyed, an average of only 8 of the 14 questions pertaining to OPC were answered correctly (16). The authors concluded that these results indicated a need for systematic educational updates in oral cancer prevention and detection (15). The goal of this study is to determine the current baseline knowledge level of the role of HPV and OPC in Texas dentists, hygienists, and dental student populations.

METHODS

To evaluate the level of current knowledge of the role of HPV in OPC, the study team developed a 7-item survey, utilizing the most current

epidemiologic data on HPV-related OPCs. The survey was constructed to focus on oral and oropharyngeal cancer risk factors and soft tissue assessment practices. Specifically, HPV was not listed as a primary focus to minimize selection bias. The survey was pilot tested among a sample of dental faculty to assess readability, wording of questions, flow, and time considerations. Minor modifications were made based on feedback. The final survey took less than 5 minutes to complete.

Practicing dentists of the South Texas Oral Health Oral Health Network (STOHN), from San Antonio, Laredo, and Abilene, and attendees at the Texas Dental Hygienists' Association 2014 annual meeting participated. These community providers represent a wide variety of practice types and patient populations from across Texas.

Table 2. Oral Cancer Survey Questions

| Question | Answer Options |
|---|---|
| How often are you performing oral soft tissue examinations? | Every visit Every 6 months Annually |
| Which of the following structures are evaluated during your oral soft tissue screening? <i>**May provide more than one value</i> | Buccal Mucosa Labial Mucosa Floor of Mouth Tongue, Lateral Border Hard Palate Soft Palate Posterior Oropharynx incl. Tonsils |
| A history of sexually transmitted disease can be a risk for oral cancer. | Disagree Slightly Disagree Neutral Somewhat Agree Strongly Agree |
| Over the last ten years, in which oral location has the incidence of oral cancer increased the most? | Hard palate Dorsal Tongue Floor of Mouth Soft Palate Labial Mucosa Buccal Mucosa Posterior Oropharynx incl. Tonsils |
| Over the last ten years, which age group has shown the greatest increase in incidence of oral cancer? | < 20 years of age 20 - 40 years of age 40 - 60 years of age 60 - 80 years of age > 80 years of age |
| Over the last ten years, which of the following groups has shown the greatest increase in incidence of oral cancer? | Black Females White Females White Males Black Males |
| From which of the following locations should a biopsy for oral cancer be tested for a sexually transmitted disease? | Buccal Mucosa Labial Mucosa Floor of Mouth Tongue, Lateral Border Hard Palate Soft Palate Posterior Oropharynx incl. Tonsils This is Unnecessary |

Additionally, freshman and senior dental students from the three Texas schools of dentistry participated in the study, including the University of Texas Health Science Center at San Antonio, the University of Texas Health Science Center at Houston, and Texas A&M University Baylor College of Dentistry in Dallas. First and fourth year dental classes were chosen to evaluate changes in knowledge over the course of dental school. The breakdown of the survey respondents is listed in Table 1.

To ensure anonymity of all participants, a third party network facilitator, department administrator, or student class representative disseminated the Institutional Review Board (IRB) approved survey link or a paper copy of the survey. All data was processed with RedCap, an electronic data capture system (www.project-redcap.org/). Descriptive statistics were calculated for the findings.

A total of 488 surveys were submitted by participants. Of these surveys, 457 complete data sets were used in the analysis. The overall response rate was 57%. The response rate for community dental clinicians was 49% for dentists and 37% for dental hygienists. Based on the class size at the respective schools, the dental student survey combined response rate for all three schools was 45% for seniors and 63% for freshmen. The survey of practitioners included an additional item to determine if practitioners had recent exposure to current literature or continuing education on HPV and OPC, using the surrogate of oral soft tissue screening continuing education courses. Fifty-nine percent of dentists and

seventy-two percent of dental hygiene respondents had completed one to four continuing education courses in the last five years which focused on oral soft tissue screening. Currently, across all three schools of dentistry, initial freshman dental curricula do not include oral pathology or an oral medicine component. However, both topics are covered by the senior year.

RESULTS

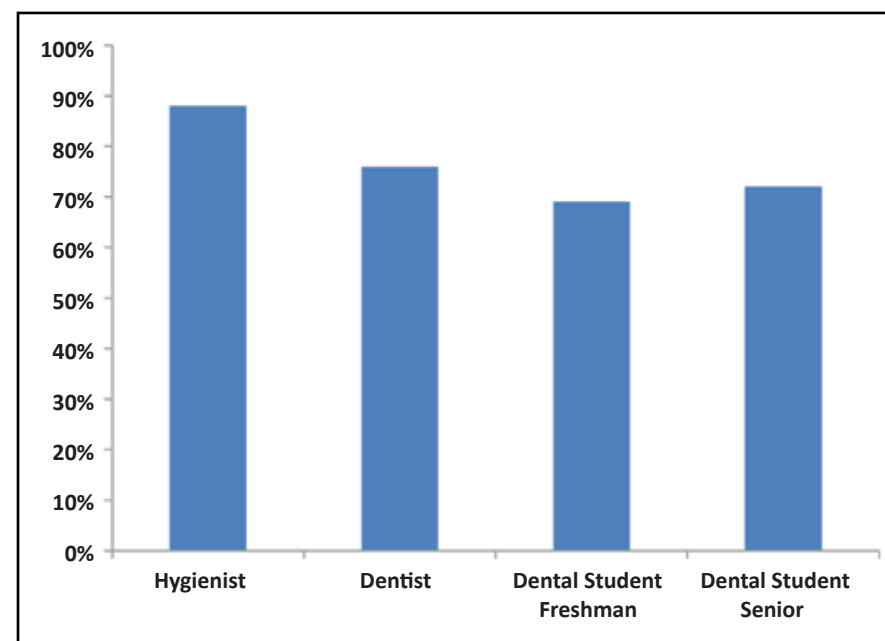
The 7 questions on the survey are listed in Table 2.

Question 1. All respondents reported completing soft tissue assessments at least annually, with 38% of those more frequently at six-month intervals (Question 1).

Question 2. The seven possible anatomical sites included in oral examination sites included buccal mucosa, labial mucosa, floor of mouth, lateral border of the tongue, hard palate, soft palate, and posterior oropharynx including tonsils. Participants were permitted to choose more than one option. Approximately 90% of respondents indicated that their examination included the buccal mucosa, labial mucosa, floor of mouth, lateral border of the tongue, hard palate, and soft palate. However, only 73% included the posterior oropharynx including tonsils in a routine oral cancer screening. Analysis by subgroups revealed that 88% of dentists and dental hygienists included examination of the posterior oropharynx and tonsils, 76% of senior dental students and 69% of freshmen dental students (Figure 1).

Question 3. All respondents were

Figure 1. Oral Soft Tissue Assessment Includes Posterior Oropharynx/Tonsils



knowledgeable that a sexually transmitted disease can be a risk for oral cancer (Figure 2).

Question 4. With the exception of freshmen dental students, approximately 50% of all respondents correctly identified the posterior oropharynx as the location where oral cancer has significantly increased over the last ten years. Only 24% of freshmen were able to correctly identify this site (Figure 3).

Question 5. Over 50% of all respondent groups indicated that the incidence of oral cancer had increased significantly in the 20-40 year old age group over the last ten years. An increased incidence in the 40-60 year old age group was identified by 30% of respondents. The results were similar across all respondent groups (Figure 4).

Question 6. Less than 46% of all respondents indicated that the group with the greatest increase in incidence of oral cancer over the last ten years is white males (Figure 5).

Question 7. A total of 42% of all respondents indicated that a biopsy from the posterior oropharynx should be tested for a sexually transmitted disease. The range for practitioners and senior dental students was 28-42% while only 16% of freshman dental students indicated the same (Figure 6).

There is a current disconnect in the dental community with regard to the role of HPV infection in OPC. It is estimated that by 2030, half of head and neck cancers will be HPV-positive and by 2020 the projected OPC incidence in men will surpass cervical cancer rates in women (17). In 2010, Healthy People 2020 included as an Oral Health Objective to increase the proportion of adults who received an oral and pharyngeal cancer screening from a dentist or dental hygienist

Figure 2. Sexually Transmitted Disease History as Risk for Oral Cancer

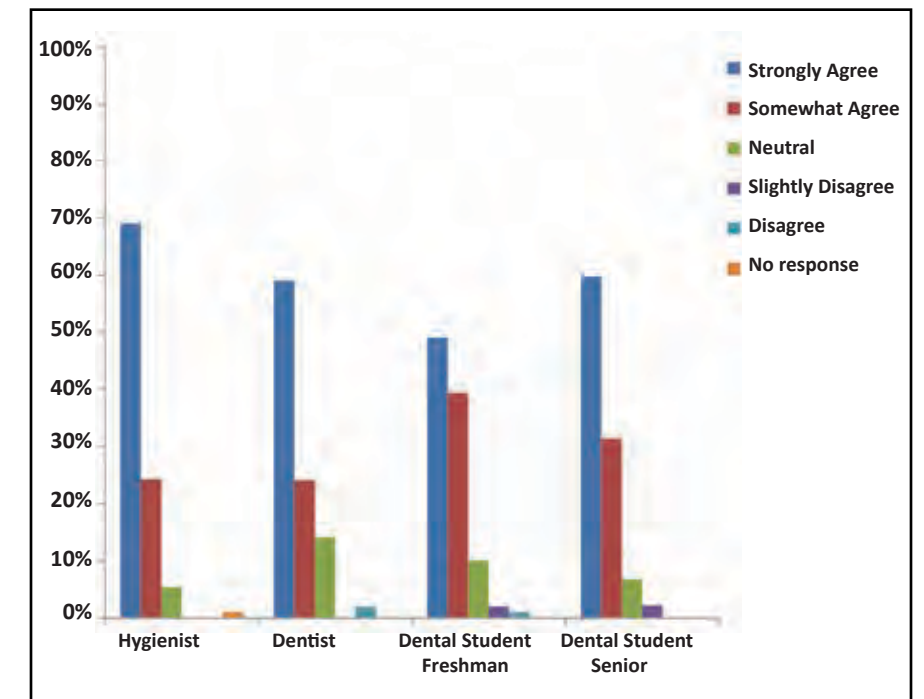


Figure 3. Greatest Location Increase of Oral Cancer in Last 10 Years: Posterior Oropharynx including Tonsils

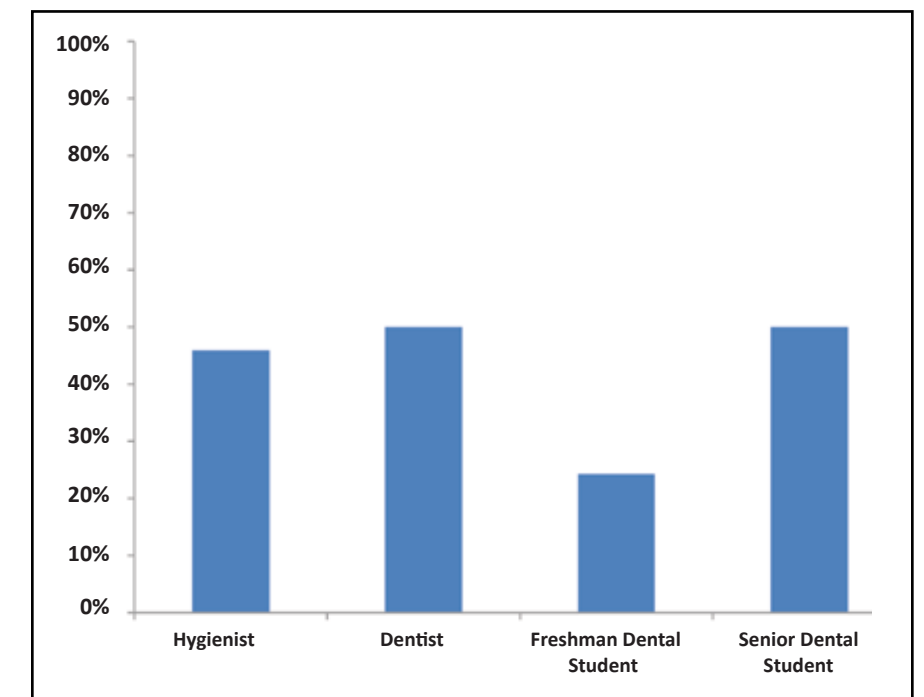


Figure 4. Age Group to Have Shown the Greatest Increase in Oral Cancer Over the Last 10 Years

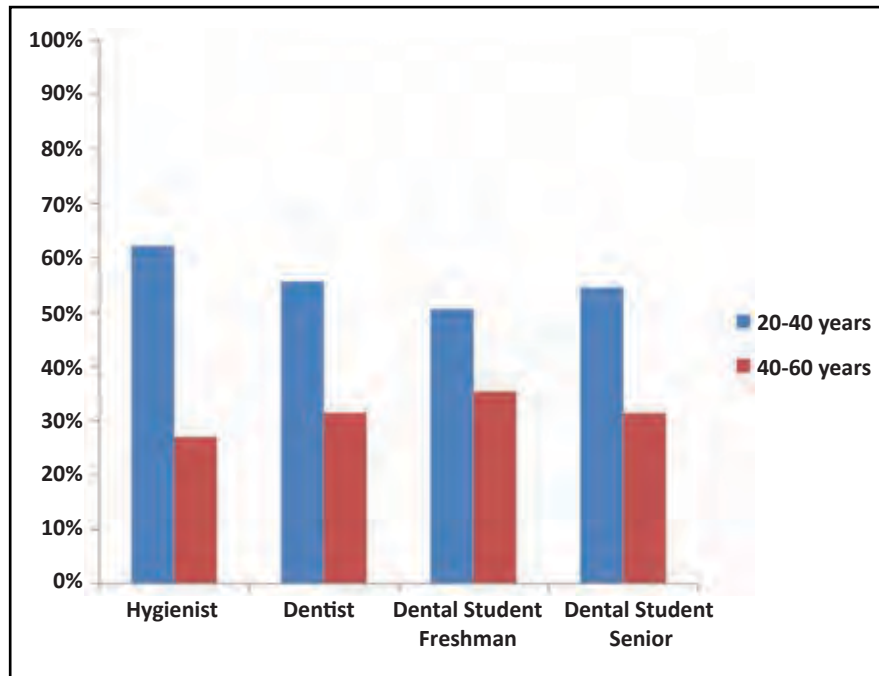
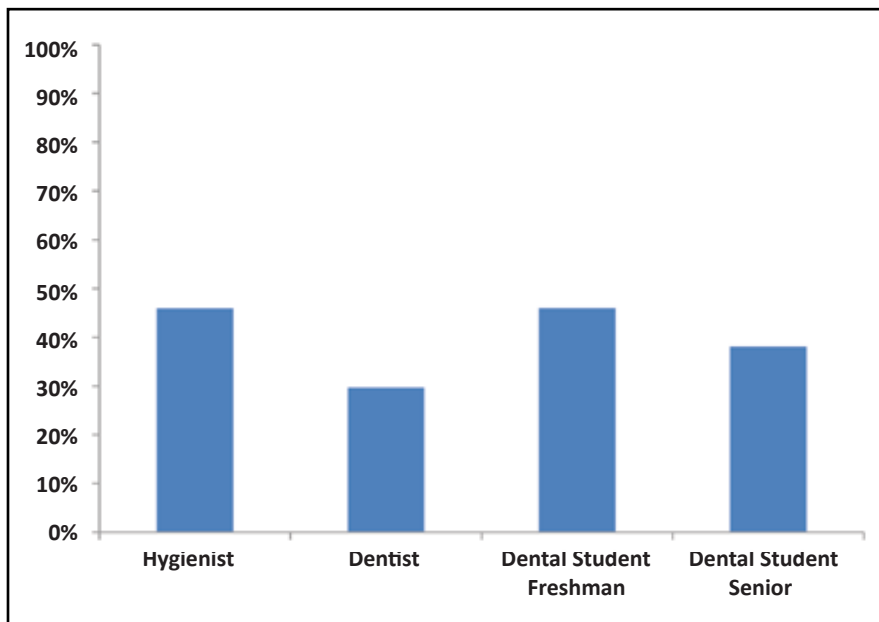
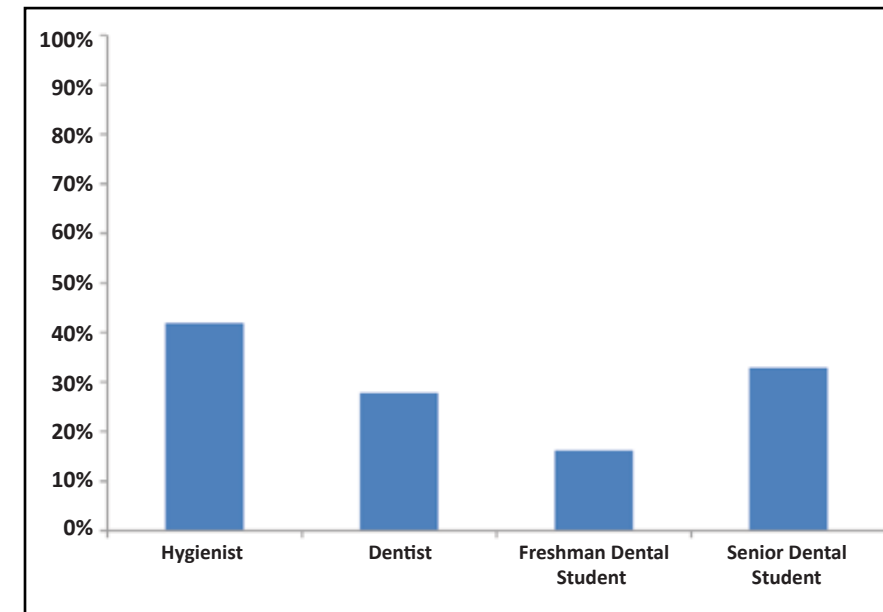


Figure 5. Group with Greatest Increase of Oral Cancer during Past 10 Years: White Males



each year (18). In 2013, Bosch et al., called for a universal response to HPV infection (19). However, Daley et al., reported that dental professionals are not discussing HPV with their patients due to liability concerns, discomfort discussing sexually transmitted infections, and current lack of professional guidelines for recommending HPV vaccine as a primary prevention measure for OPC (20,21). In our survey, we determined that there are currently misconceptions about the role of HPV and oropharyngeal cancer in the dental profession in Texas. Even though there were some differences among the four groups surveyed (dentists, hygienists, freshman dental students, and senior dental students), all groups had common misconceptions regarding HPV and OPC. Less than 50% of all respondent groups were aware of the oral location of the most rapidly increasing incidence in oral cancer over the last 10 years. Most respondent groups indicated the incorrect age range for the greatest increase in oral cancer incidence over the last 10 years. Most respondent groups were unable to identify white males as the group with the largest increase in oral cancer. Less than 42% of group respondents indicated the importance of submitting biopsies from the posterior oropharynx for HPV testing. Current educational experience of the respondents did not appear to alter the results of the survey items. The majority of dentists and hygienists reported taking continuing education courses covering soft tissue pathology during the last 5 years. Senior dental students scored only slightly higher than freshman dental students

Figure 6. Location where Biopsies Should be Tested for HPV—Posterior Oropharynx



on several questions, and actually scored lower on Question 6 (increase incidence of OPC in white males). As one of the most frequently visited health care providers, dental professionals have the opportunity to examine the oral and oropharyngeal soft tissue for lesions or other signs of cancer (16). It is essential that dentists and dental hygienists be knowledgeable about HPV infection and its role in oropharyngeal cancer. The results of this survey indicate that there is a clear need for development and dissemination of education on HPV and OPC.

CONCLUSION

Despite the evidence of the growing epidemic of HPV-related OPC, we identified substantial lack of knowledge among Texas dental providers and dental students on the role of HPV infection and oropharyngeal cancer. HPV-related OPC is often difficult to detect clinically and knowledge of risk factors and epidemiology is critical to promote early diagnosis and increased survival. It is clear that

educational interventions are required to close the knowledge gap in the rapidly changing landscape of oral cancer. Plans are currently under development to address the areas of deficiency.

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Knowledge Assessment *continued*

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EDWARD P. "JOE" WALLER, JR., D.D.S., J.D.
ATTORNEY AT LAW

BRIN & BRIN, P.C.
6223 IH 10 West
SAN ANTONIO, TEXAS 78201
(210) 341-9711
FAX (210) 341-1854
jwaller@brinandbrin.com

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