

## RESEARCH ARTICLE

# Knowledge and Opinions Regarding Oral Cancer among Yemeni Dental Students

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### Abstract

**Background:** Oral cancer presents with high mortality rates, and the likelihood of survival is remarkably superior when detected early. Health care providers, particularly dentists, play a critical role in early detection of oral cancers and should be knowledgeable and skillful in oral cancer diagnosis. **Purpose:** The aim of the present study was to assess the current knowledge of future Yemeni dentists and their opinions on oral cancer. **Materials and Methods:** A pretested self-administered questionnaire was distributed to fourth and fifth year dental students. Questions relating to knowledge of oral cancer, risk factors, and opinions on oral cancer prevention and practices were posed. **Results:** The response rate was 80%. The vast majority of students identified smoking and smokeless tobacco as the major risk factors for oral cancer. Most of the students (92.6%) knew that squamous cell carcinoma is the most common form of oral cancer, and 85.3% were aware that tongue and floor of the mouth are the most likely sites. While the majority showed willingness to advise their patients on risk factors, only 40% felt adequately trained to provide such advice. More than 85% of students admitted that they need further information regarding oral cancer. As expected, students of the final year appeared slightly more knowledgeable regarding risk factors and clinical features of the disease. **Conclusions:** The findings of the present study suggest that there is a need to reinforce the undergraduate dental curriculum with regards to oral cancer education, particularly in its prevention and early detection.

**Keywords:** Oral cancer - dental students - knowledge - opinions - Yemen

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### Introduction

Oral cancer is a major health problem and represents approximately 4% of all cancers worldwide (Ferlay et al., 2010). More than 500,000 patients are estimated to have oral cancer globally with approximately 389,000 new cases per annum (Kazmi et al., 2011). Incidence rates are much higher in developing regions like south east Asia, where they account for up to 50% of all malignant tumors (Argawal et al., 2012; Siegel et al., 2012; Ghani et al., 2013).

More than 90% of malignant tumors of the oral cavity, oropharynx, and pharynx are squamous cell carcinoma developed from premalignant lesions such as leukoplakia and erythroplakia (Dumitrescu et al., 2014). The etiology of oral cancer is multi-factorial, but the most important risks factors are: tobacco smoking and chewing, excess alcohol consumption, betel quid chewing, sun exposure in the case of lip cancer, human papilloma Virus (HPV)

infection, immunodeficiencies, diet and nutrition and socio-economic status (Lohavanichbutr et al., 2009; Lin et al., 2011; Halawany et al., 2013; Tadbir et al., 2013; Al-attas et al., 2014). The above- mentioned risk habits are very common in Yemen except, betel quid chewing and alcohol consumption (Alaizari and Al-Maweri, 2014). Moreover, Qat chewing and smokeless tobacco use (locally known as shammah) are highly prevalent, and have been linked with occurrence of oral cancer in Yemen (Scheifele et al., 2007; Alaizari and Al-Maweri, 2014).

Oral cancer has been reported to have one of the lowest 5-year survival rates of all cancers, probably because most lesions are not diagnosed in the early stages (Byakodi et al., 2012; Goyal et al., 2013). The delay in presentation and/or referral is more or less evenly distributed between patients and doctors and is partly due to the unawareness of oral cancer among the public and professionals and partly due to barriers in the health care system that may prevent patients from seeking dental and medical care

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(Dumitrescu et al., 2014). Therefore, the challenge is to advance the diagnosis to an earlier stage which then would result in less morbidity and better prognosis.

Researchers in oral cancer agree that the early diagnosis of oral carcinoma greatly increases the probability of cure and survival rate with minimum impairment and deformity (Joseph et al., 2002; Uti et al., 2006). It is therefore pertinent that dental practitioners possess good knowledge of the signs and symptoms of malignant and premalignant lesions for early and effective diagnosis. Ensuring that future dental practitioners are knowledgeable about malignant and premalignant lesions will improve the efficacy of screening and management of these lesions (Uti et al., 2006; Seleh et al., 2014).

Several studies in the USA, UK, Europe ; Kuwait, Iran and Nigeria (Cannick et al., 2005; Uti et al., 2006; Carter and Ogden, 2007; Boroumand et al., 2008; Dumitrescu et al., 2014; Honarmand et al., 2014; Joseph et al., 2014) have investigated the undergraduate dental students awareness of oral cancer and premalignant lesions. These studies showed the need to improve the knowledge on preventing and detecting oral cancer. To date, there has been no published data regarding oral cancer knowledge and practices among dental students in Yemen. In view of paucity of data, the aims of this study were to assess the knowledge of Yemeni dental students regarding oral cancer risk factors, diagnostic signs and examination procedures, and also to assess their opinions regarding the usefulness and effectiveness of current teaching methods related to the prevention and detection of oral cancer.

## Materials and Methods

A cross-sectional, questionnaire-based survey of undergraduate dental students at the faculty of dentistry, Sana'a University, Yemen was undertaken. All clinical dental students (fourth and fifth year dental students), enrolled during the 2013-2014 academic year, were eligible to participate. Participation was voluntary, and participants were informed that they could withdraw at any time and that their responses would be anonymous and treated confidentially. Upon entry, all participants signed a declaration of informed consent. The study was conducted in full accordance with the declared ethical principles of the World Medical Association Declaration

of Helsinki (2002).

The self-administered questionnaire was adapted from previously validated items that have been applied in similar studies (Carter and Ogden, 2007; Boroumand et al., 2008; Al Dubai et al., 2012; Saleh et al., 2014), with modifications to suit the local population, especially in the area of risk factors associated with the disease. Before distributing the questionnaire, a pilot study was performed on a random sample of students (n=20), and the questionnaire was modified according to the feedback obtained.

The questionnaire comprised of 32 close-ended items divided into several sections. The first section included demographic variables of the responding students such as age, gender and year of study. The second section focused on the risk factors and clinical signs of oral cancer. The third section assessed oral cancer screening/oral mucosal examination habits, opinions on sufficiency of individual knowledge on oral cancer detection and prevention as well as the desire for further information/training. The questionnaire was delivered during routine lectures to all students; it required 10 minutes to complete.

The data management and statistical analysis were performed using the statistical software SPSS version 20.0. Frequencies and percentages were obtained for categorical data, and Chi-square test was used to determine the association between variables. P value<0.05 was considered significant.

## Results

A total of 163 students participated in the study for a response rate of 80%. The respondents were 122 (74.8%) female and 41 (25.2 %) male students with a mean age of 23.20±1.35 years (range=22-32 years). Around 58.9% of the respondents were in the final academic year (fifth year) and 41.1% were in the fourth year.

Regarding knowledge on risk factors of oral cancer, the vast majority of students correctly identified smoking (98.2%), smokeless tobacco (99.4%), sun exposure in case of lip cancer (90.8%) and alcohol consumption (88.3%). However, only around 60% of the students identified older age and HPV as risk factors. A positive correlation (p<0.05) was found between the knowledge regarding certain risk factors items and the academic year (Table 1).

**Table 1. Knowledge of the Risk Factors among Students According to the Academic year (Yes answer)**

Variable	4 <sup>th</sup> year students N (%)	5 <sup>th</sup> year students N (%)	Total N (%)	P- Value
Smoking	94 (97.9%)	66 (98.5%)	160 (98.2%)	NS
Smokeless tobacco use	95 (99.0%)	67 (100.0%)	162 (99.4%)	NS
Alcohol consumption	80 (83.3%)	64 (95.5%)	144 (88.3%)	0.037
Viral factors	54 (56.2%)	45 (67.2%)	99 (60.7%)	NS
Sun exposure	84 (87.5%)	64 (95.5%)	148 (90.8%)	NS
Prior oral cancer	64 (66.7%)	54 (80.6%)	118 (72.4)	0.005
Older age	51 (53.1%)	47 (70.1%)	98 (60.1%)	NS
Immunosuppression	61 (63.5%)	52 (77.6%)	113 (69.3%)	NS
Low consumption of fruits and vegetables	21 (21.9%)	23 (34.3%)	44 (27.0%)	NS
Family history of cancer	43 (44.8%)	48 (71.6%)	91 (55.8%)	0.001
Poor oral hygiene	29 (30.2%)	27 (40.3%)	56 (34.4%)	0.014
Obesity	15 (15.6%)	21 (31.3%)	36 (22.1%)	NS

NS: Not significant

With reference to the diagnostic knowledge, the majority (92.6%) knew that squamous carcinoma is the most common form of oral cancer and 85.3% knew that tongue and floor of the mouth are the most likely sites of oral cancer. However, only 70.6% of the students were aware that oral cancer is most often diagnosed at an advanced stage. No statistical correlation was noted according to academic year ( $p>0.5$ ).

With regards to clinical signs associated with oral cancer, ulceration (93.3%) was the most frequent change identified, followed by erythroleukoplakia (92.0%), white patch (81.6%) and red patch (79.8%). Fifth year students showed better knowledge pertaining clinical signs of oral cancer as compared to fourth year students but the differences were not statistically significant, except with the identification of erythroleukoplakia ( $p<0.05$ ; Table 2).

Practices and opinions of dental students regarding oral cancer screening and prevention are illustrated in Table 3. About 94.5% of the respondents routinely recorded their patients' tobacco and alcohol consumption habits during history taking, and 95.7% reported that they would advise their patients on risk factors for oral cancer in the future with no significant differences according to the academic year. Three quarters of the students (76.1%) reported performing routine oral examination during routine visits, and 60.1% had the opportunity to examine patients with oral lesions.

Of the students, only 41.7% of felt adequately trained to provide tobacco cessation education. Furthermore, around 72.4% of students felt they did not have sufficient

**Table 2. Clinical Signs of oral cancer according to the Academic Year N (%)**

	4 <sup>th</sup> year Students	5 <sup>th</sup> year Students	Total	P
Ulceration	87 (90.6%)	65 (97.0%)	152 (93.3%)	NS
Red patch	72 (75.0%)	58 (86.6%)	130 (79.8%)	NS
White patch	74 (77.1%)	59 (88.1%)	133 (81.6%)	NS
Speckled lump	84 (87.5%)	66 (98.5%)	150 (92.0%)	0.03
Bleeding	65 (67.7%)	47 (70.1%)	112 (68.7%)	NS
	37 (38.5%)	27 (40.3%)	64 (39.3%)	NS

NS: Not significant

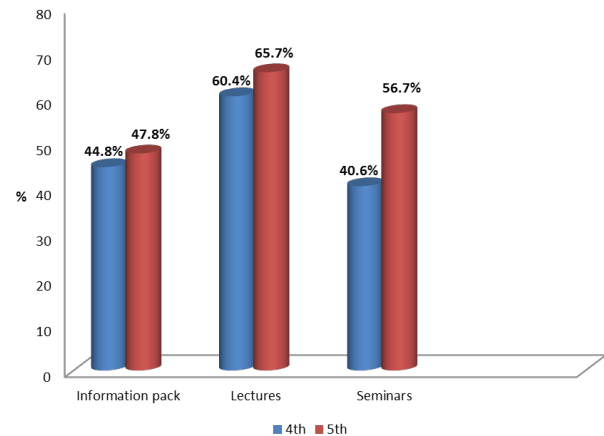
**Table 3. Practices and Opinions of the Students Regarding Oral Cancer Screening (Yes Answers)**

	4 <sup>th</sup> year students N (%)	5 <sup>th</sup> year students N (%)	Total N (%)
<b>Practices:</b>			
I always ask my patients if they use tobacco	93 (96.9%)	61 (91.0%)	154 (94.5%)
I will advise my patients about OC risk factors	90 (93.8%)	66 (98.5%)	156 (95.7%)
I examine patients' oral mucosa routinely	73 (76.0%)	51 (76.1%)	124 (76.1%)
I always screen the oral mucosa of high risk patients group	22 (84.6%)	14 (63.6%)	36 (75.0%)
I had had the opportunity to examine patients with oral lesions	52 (54.2%)	46 (68.7%)	98 (60.1%)
<b>Opinions:</b>			
I feel adequately trained to provide tobacco cessation education	45 (46.9%)	23 (34.3%)	68 (41.7%)
I have sufficient knowledge about prevention and detection of OC *	19 (19.8%)	26 (38.8%)	45 (27.6%)
knowledge level about clinical appearance of oral cancer:*			
a. Very well informed	1 (1.0%)	8 (11.9%)	9 (5.5%)
b. Well informed	5 (5.2%)	0 (0.0%)	5 (3.1%)
c. Adequately informed	38 (39.6%)	26 (38.8%)	64 (39.3%)
d. Poorly informed	52 (54.2%)	33 (49.3%)	85 (52.1%)
I would you like more information oral cancer	82 (85.4%)	58 (86.6%)	140 (85.9%)

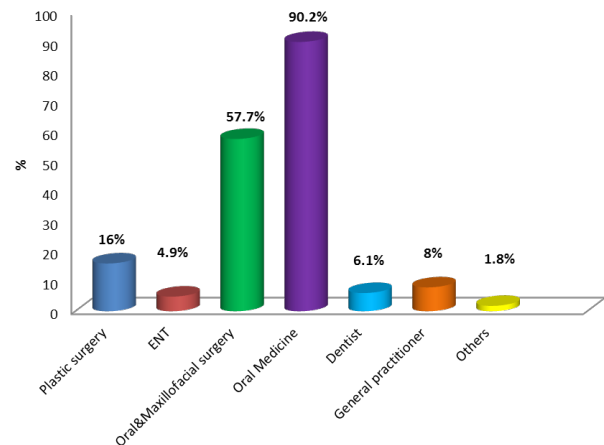
\*Chi-square test; \* $p<0.05$ ; OC=oral cancer

knowledge regarding prevention and detection of oral cancer, and 86% of students wanted further information on prevention and early detection of oral cancer (Table 3), with lectures and an information pack being the most popular forms of further information (Figure 1).

Majority of the students selected Oral Medicine and Oral and Maxillofacial Surgery as the point of referral for a patient with a suspected oral cancer (Figure 2).



**Figure 1. Source of Information Requested by Students According to the Academic Year**



**Figure 2. Point of Referral Selected by Dental Students**

## Discussion

Oral cancer is arguably the most significant condition that can be diagnosed by a dentist. Besides, early detection is believed to be the best way of decreasing the mortality and morbidity rate of the disorder (Uti et al., 2006; Ariyawardana and Ekanayake, 2008). Hence, this study was conducted to assess oral cancer awareness amongst undergraduate dental students of the faculty of Dentistry of Sana'a University, Yemen.

The results of the present study show that dental students at Sana'a University are generally knowledgeable regarding clinical signs, risk factors and diagnostic concepts of oral cancer. However, similar to previous studies (Cannick et al., 2005; Uti et al., 2006; Carter and Ogden, 2007; Boroumand et al., 2008; Honarmand et al., 2014; Joseph et al., 2014; Dumitrescu et al., 2014; Kujan et al., 2014), there is a gap and variability in their knowledge.

Although the vast majority of students identified tobacco and alcohol as the main risk factors, similar to previous studies done in the USA, UK, Kuwait, Iran, and Saudi Arabia (Cannick et al., 2005; Carter and Ogden, 2007; Boroumand et al., 2008; Kujan et al., 2014; Honarmand et al., 2014; Joseph et al., 2014), a considerable proportion of students were not aware that, HPV, low consumption of fruits, prior oral cancer lesions, obesity, and other lifestyle factors are also potential risk factors. Most of oral cancer cases occur in patients 45 years or older, with most patients at the time of diagnosis being at their sixties (Decusearaet et al., 2011). To our surprise, only 60% of students indicated older age as a potential risk factor for development of oral malignancy, a percentage lower than that reported in similar studies elsewhere (Boroumand et al., 2008; Decusearaet et al., 2011; Joseph et al., 2014; Kujan et al., 2014; Saleh et al., 2014). These results highlight the need to revise the current curriculum with emphasis on oral cancer risk factors. As expected, final year dental students showed better knowledge regarding some items of risk factors, probably due to curricular factors making them more exposed to topics related to oral cancer, which is in accordance with previous reports (Ogden and Mahboobi, 2001; Dumitrescu et al., 2014).

Students' knowledge of oral cancer diagnosis was found relatively better when compared to the knowledge of risk factors. The vast majority (92%) identified squamous cell carcinoma as the most common type of oral cancer, and over 85% identified tongue and floor of the mouth as the most common sites of oral cancer. These findings are consistent with previous studies among dental students elsewhere (Carter and Ogden, 2007; Boroumand et al., 2008; Kazmi et al., 2011; Joseph et al., 2014; Kujan et al., 2014). Slightly more than two thirds of the students knew that oral cancers are most often diagnosed in the advanced stage in contrast to only 55% in most of the other surveys (Boroumand et al., 2008; Dumitrescu et al., 2014). Early recognition of the most common clinical presentations of oral cancer is of utmost importance in the diagnosis of oral cancer. In the present study majority of students correctly identified ulceration, red (erythroplakia) and white (leukoplakia) patches as the most common clinical

presentations of oral cancer. However, leukoplakia was identified by a higher percentage of students (81.6%) in comparison to erythroplakia (79%). Although both lesions have malignant potential, erythroplakia has a greater chance to progress to oral cancer (Scully and Porter, 2000). In addition, it has been reported that on histopathological assessment over half of erythroplakias were invasive carcinoma, and 40% showed carcinoma in situ (Reichart and Philipsen, 2005). The significance of leukoplakia, erythroplakia and erythroleukoplakia needs to be emphasized in future teaching of both medical and dental students.

As oral cancer/precancer can be prevented by controlling risk factors such as use of tobacco and consumption of alcohol, it is necessary that dentists educate their patients on the importance of quitting these behaviors. It is encouraging that majority of students (95.7%) in our study indicated a willingness to deliver advice to their patients in the future regarding risk factors of oral cancer. This percentage is higher than that reported in similar studies in Nigeria and Iran (Uti et al., 2006; Ogden and Mahboobi, 2011). However, in line with other studies (Uti et al., 2006; Decusearaet et al., 2011; Halawany et al., 2013; Dumitrescu et al., 2014; Kujan et al., 2014) dental students in Yemen reported being unprepared to offer tobacco cessation assistance, as more than half of the students (58.3%) felt inadequately trained to provide tobacco cessation education to their patients. This alarming finding can be attributed to the lack of adequate education and limited training of dental students on tobacco and alcohol cessation practices. Davis and colleagues in 2010 suggested that dental schools provide only "basic Knowledge -curricula that rarely incorporate effective, behaviorally- based components affecting long-term change", and emphasized the importance of and need for new strategies regarding tobacco preventive activities (Davis et al., 2010). Primary prevention of oral cancers involves reducing exposure to etiological factors like tobacco and alcohol. Preventive activities such as risk reduction counseling and oral health education have been shown to be effective in reducing the incidence of oral cancer (Uti et al., 2006). Moreover, patients have been found to be receptive to dentists' advice on such matters (Miller et al., 2006). Hence dental students and health care workers have an important role in the prevention of oral malignancies by educating their patients at each contact.

Oral visual screening can reduce mortality in high risk individuals and has the potential to prevent at least 37,000 oral cancer deaths worldwide (Joseph et al., 2014). Oral cancer detection during a nonsymptom-driven examination is associated with a lower stage at diagnosis (Holmes et al., 2003). It is heartening that more than three fourth of our students reported performing routine oral examination during routine visits indicating that they feel responsible, and want to be actively involved in oral cancer prevention through early detection. This result is in line with similar studies done in Iran, UK, Kuwait and Malaysia (Carter and Ogden, 2007; Boroumand et al., 2008; Ogden and Mahboobi, 2011; Joseph et al., 2014; Saleh et al., 2014). Moreover, over half of the students had the opportunity to examine patients with oral cancer.



This finding was almost similar to the reports from UK, Saudi, and Iran (Carter and Ogden, 2007; Boroumand et al., 2008; Ogden and Mahboobi, 2011; Kujan et al., 2014) but more than the results of a study in Nigeria (Uti et al., 2006). As expected a direct relationship between examining a patient with oral cancer and increasing academic year, which can be explained by the fact that students in the higher clinical years (fifth year) have more clinical sessions than those in lower years. This finding is also in accordance with previous reports (Boroumand et al., 2008; Ogden and Mahboobi, 2011).

Routine and repetitive teaching of certain procedures in both didactic and clinical courses leads students to perform these procedures in their clinical practice (Cannick et al., 2005). Therefore, the teaching of oral soft tissue examination should be emphasized throughout the undergraduate curriculum in order to ensure that such examinations become routine. A recent comparative study of instructional methods by Clark et al., reported that utilizing both video and interactive practice improved the clinical technique, didactic knowledge, and confidence in oral cancer examination (Clark et al., 2014).

In line with other studies (Carter and Ogden, 2007; Boroumand et al., 2008; Ogden and Mahboobi, 2011), only a few students either felt very well or well informed regarding clinical appearance of oral cancer, and around 72.4% of students felt they did not have sufficient knowledge regarding prevention and early detection of oral cancer. This is consistent with previous studies of dental and medical students where confidence about oral cancer knowledge was attributed to a lack of training (Carter and Ogden, 2007; Dumitrescu et al., 2014). Emphasis on hands-on training for oral cancer examinations is critical for improving dental students' skills and confidence in this area. In the present study, more than 85% of students admitted that they need further information regarding oral cancer, which is very similar to the results of previous studies from UK and Iran (Carter and Ogden, 2007; Boroumand et al., 2008; Ogden and Mahboobi, 2011). The most wanted types of information reported by our students were lectures and seminars. A similar finding has been reported by Ogden and Mahboobi, (2011) in their study among Iranian dental students. By contrast, information package was the most preferred form for knowledge transmission reported among dental students in the UK (Carter, Ogden, 2007).

Oral Medicine and Oral and Maxillofacial surgery were the most commonly selected proposed points of referral for patients with a suspected oral cancer, which confirmed results of previous studies from Iran, UK and Kuwait (Carter and Ogden, 2007; Ogden and Mahboobi, 2011; Joseph et al., 2014). The world 'Oral' in the options could have steered the respondents toward choosing Oral Medicine and Oral Maxillofacial surgery as the preferred points of referral. Such bias may have been reduced if this question was left open to the respondents rather than presented as a closed question.

This study demonstrated a need for an improved and more organized syllabus with greater emphasis on a thorough clinical examination. Emerging risk factors like HPV and life style related factors in oral cancer should

be taught during the third year and should be included in medical history forms used in the clinic (fourth and fifth years). Preventive measures such as risk behavior modification and tobacco use prevention and control education should be incorporated in the dental curriculum. Also, proper referral guidelines for suspicious lesions should be taught during the clinical years.

It has been reported that all observational studies such as cross-sectional surveys are prone to limitations and bias (Lu, 2009). This study has some limitations that should be taken in consideration. One possible limitation is the likelihood of selection bias given that dental students who chose to participate in the survey may be more keenly interested or concerned with oral cancer than those who did not participate. Therefore, the results are likely not generalizable to non-respondents. Additionally, a general limiting characteristic of self-reporting surveys is the probability of socially acceptable responding (Boroumand et al., 2008), and therefore the results may not necessary fully reflect students' real knowledge and daily professional practice. Nonetheless, despite these limitations, the study provides some important information about Yemeni dental students' knowledge, opinions and practices regarding oral cancer. Such information should help identify areas that need reinforcement or greater emphasis in the dental curriculum.

In conclusion, although Yemeni dental students showed a reasonable level of knowledge regarding oral cancer, educators and policymakers need to place greater emphasis on oral cancer education and training in dental schools. This study revealed an urgent need for a more structured teaching program, with more focus on the early signs and symptoms of oral cancer and precancerous lesions. Moreover, there is a need to reinforce the current undergraduate dental curriculum in regards to oral cancer education particularly in prevention and early detection.

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