



Oral cancer knowledge and awareness of dentists in Northern Cyprus: A survey study

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Abstract

Oral and oropharyngeal cancers have been recognized as a major global health problem and are the sixth most common cancers in the world, with increasing rates of incidence and mortality. Dentists have an important role and responsibility in the early diagnosis of oral cancer. This study aimed to assess knowledge, awareness, and attitudes regarding oral cancer among dentists in North Cyprus. This study was conducted via a questionnaire that was distributed to the dentists in different provinces of Northern Cyprus. The questionnaire comprised 19 main items about the demographic information, dentist's oral cancer knowledge, attitude, opinions, and practices. The study consisted of 120 dentists and an overall response rate of 81.6% (98) was achieved. Nearly, all respondents were knowledgeable about tobacco use (98%) and previous oral cancer history (98%). The percentage of correct answers to questions concerning knowledge about risk factors of oral cancer ranged from 4.1% (family history of cancer) to 98%. Two-thirds of the participants pointed out correctly that the tongue and floor of the mouth are the most affected sites for oral cancers and leukoplakia and erythroplakia are two lesions most commonly correlated with oral cancer. However, 47% of participants were able to identify squamous cell carcinoma as the most frequent form of oral cancer. In conclusion, dental faculty curriculums and continuing education programs should aim at managing oral cancer need to address not only increase the knowledge and awareness about oral cancers but also include the clinical cases and practices.

Keywords: awareness, knowledge, oral cancer, dentist, North Cyprus

1. Introduction

One of the worst diseases known as cancer has made a huge impact on public health, economies, and social aspects all over the world. Cancer is the abnormal growth and differentiation of cells and can arise from any organ or body structure. It is usually detected at a late stage or maybe incidentally diagnosed during routine laboratory tests or radiographic imaging performed for different reasons (1).

Oral and oropharyngeal cancers have been recognized as a major global health problem and are the sixth most common cancers in the world, with increasing rates of incidence and mortality (2). The geographic differences in the prevalence of lip and oral cavity cancers have been reported and it turns out to be a highly frequent incidence in Southern Asia as well as the Pacific Islands (3).

Many factors may play a role in the etiology of oral cancers however primary risk factors undoubtedly include smoking and alcohol consumption in patients over the age of 45 years (4). Other important risk factors are immunodeficiency, diet, and nutrition, socio-economic status, exposure to the sun, infection with human papillomavirus (HPV), and chronic trauma of the oral mucosa. Furthermore, potentially malignant

disorders (PMDs) such as erythroplakia, non-homogeneous leukoplakia, erosive lichen planus, oral submucous fibrosis, and actinic keratosis, are known to harbor the development of oral cancers (5).

The most common initial site for oral cancer is the tongue in European, North American, and Asian countries, accounting for approximately 40-50% of all oral malignancies. Buccal mucosa in addition to gingiva is the second common location due to the betel nut and/or smokeless tobacco use among Asian populations and followed by the lip, floor of the mouth, hard and soft palate, and tonsils (6). Overall 90% of oral cancers are squamous epithelium in origin which results in oral squamous cell carcinomas (7).

Although the oral cavity is an easily identifiable area, early detection is not always possible due to the absence of pain, in the beginning, lack of the patient's awareness and dentist's knowledge, and more than half of the oral cancers are diagnosed in an advanced stage. The recognition and the early detection of oral cancer can lead to decreasing mortality and reducing morbidity related to the treatment (8). Patients with possible oral lesions or with potentially malignant disorders are

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often assessed first by general dental practitioners. However, the main reason for the lack of accurate and early diagnosis of oral cancers is an insufficient level of awareness. Dental practitioners must perform a thorough oral cancer examination as part of their clinical practice and should be aware of the early clinical signs and symptoms occurring with malignancy (9). This study is an attempt to determine the knowledge, attitude, and practices of dentists for the prevention and early diagnosis of oral cancers in the Turkish population of Cyprus.

2. Materials and Methods

2.1. Study design

This study was conducted via a questionnaire that was distributed to the general dental practitioners (%39.8) and specialist dentists (%60.2) in different provinces of Northern Cyprus. The questionnaire and methodology for this study was approved by the Human Research Ethics committee of the Near East University (IRB approval number: YDU/89-1313).

2.2. Study Questionnaire

The questionnaire was designed and translated to the Turkish language following similar previous studies about oral cancer knowledge (9-13). All the dentists, who were registered Chamber of Turkish Cypriot Dentists, were invited to participate in the study. Altogether 120 dentists received the questionnaire. 98 out of 120 dentists accepted to participate in the study and two researchers (MM, MF) were personally surveyed in their offices or work station. The questionnaire comprised 19 main items and several lower ones. The first section included information about the participant's demographic information such as gender, age, number of years since graduation, nationality, working site, and level of education.

The next section contained 15 main questions and their sub-questions, about the dentist's oral cancer knowledge, attitude, opinions, and practices. Nine general knowledge questions were about the oral cancer risk factors, potentially malignant disorders, most common forms of oral cancer, most frequent age of diagnosis, most common sites of oral cancer, symptoms of both early, late stage of oral cancer, and the features of oral cancer metastases. The next three questions included the most commonly mentioned and reported symptoms by a patient with early stage of oral cancer, the characteristic features of the lymph node invasion, and related aspects of the medical history of oral cancer patients. Finally, in the last part, questions were associated with the attendance at oral cancer continuing education courses, and regarding their attitude and behavior about oral cancer patients.

All data entered into Microsoft Excel (Microsoft Corporation, Redmont, WA, USA), and then transferred into the SPSS program (version 22.0; IBM Corp., Armonk, NY, USA). A Chi-square test was used to compare descriptive statistics. Significance was assessed at $p < 0.05$ level.

3. Results

This cross-sectional study analyses the answers given by

participating dentists in North Cyprus regarding early detection of oral cancer. The study consisted of 120 dentists and an overall response rate of 81.6% (98) was achieved. Among 98 dentists aged between 23 and 70 years, there were 49 (50%) female dentists and 49 (50%) male dentists. 60.2% percent of the participants were general dentists, while the remaining (39.8%) were specialists (Table 1).

Table 1. Demographic characteristics of participants

Variables	No. (%)
Gender	
Male	49 (50%)
Female	49 (50%)
Level of education	
Dental practitioners	59 (60.2%)
Specialist dentist	39 (39.8%)

To explore participant's knowledge, all dentists were asked about risk factors for oral cancers including tobacco use, alcohol use, previous history of oral cancer, family history of cancer, prolonged sunlight exposure, viral infections, bad oral hygiene, poorly fitting dentures, head and neck radiotherapy, chronic infection, being over 60 years of age, constant consumption of hot food and beverages, obesity, low consumption of fruit and vegetables and frequent consumption of spicy food. Nearly, all respondents were knowledgeable about tobacco use (98%) and previous oral cancer history (98%). The percentage of correct answers to questions concerning knowledge about risk factors of oral cancer ranged from 4.1% to 98% as shown in (Fig. 1). An item with the lowest percentage (4.1%) included knowing that a family history of cancer is not a risk factor for oral cancers. Only 37.8% and 59.2% of the participant correctly identified the low consumption of fruit and vegetables and older age as a risk factor respectively. However, 16.3% and 19.4% of the respondents, respectively, recognized bad oral hygiene and poorly fitting dentures as non-risk factors (Fig. 1).

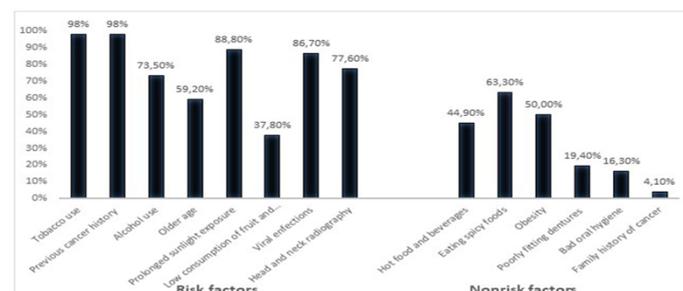


Fig 1. Knowledge about oral cancer risk factors of participants

67.4% of dentists pointed out correctly that the tongue and floor of the mouth are the most affected sites for oral cancers. However, approximately 47% of participants were able to identify squamous cell carcinoma as the most frequent form of oral cancer. When the participants were asked about two lesions most possible to be correlated with oral cancer, 69.4% of the respondent correctly recognized the leukoplakia and erythroplakia (Table 2).

Table 2. Distribution of the answers regarding clinical features of oral cancer

Variables		Percent
What is the most common type of oral cancer?	Squamous Cell Carcinoma	46.9%
	Lymphoma	7.1%
	Basal Cell Carcinoma	10.2%
	Adenocarcinoma	6.1%
	Kaposi Sarcoma	5.1%
	Do not know	24.5%
What is the most common site affected by the oral cancer excluding lip?	Tongue and floor of the mouth	67.4%
	Buccal mucosa	11.2%
	Soft palate	9.2%
	Gingiva	4.1%
	Tonsils	1%
	Do not know/Not sure	7.1%
What is the most age group affected by the oral cancer?	Under 18 years	0%
	Between 18 and 39 years	9.2%
	Between 40 and 59 years	39.8%
	Above 60 years	32.7%
	Do not know/Not sure	18.3%
What is the clinical properties of a prior oral cancer lesion?	Small, painful, white area	8.2%
	Small, painless, white area	44.9%
	Small, painful, red area	11.2%
	Small, painless, red area	27.6%
	Do not know/Not sure	8.2%
What is the most frequent clinical stage in which oral cancer is diagnosed?	Premalign	25.5%
	Initial/Local	35.7%
	Advanced/Metastasis	16.2%
	Do not know/Not sure	22.4%
Which symptoms most commonly expressed in early oral cancer?	Pain	7.1%
	Ulceration	49%
	Swelling	6.1%
	None/Asymptomatic	33.7%
	Do not know/Not sure	4.1%
Where is the most common site of distant metastasis of oral cancer?	Bone	24.1%
	Skin	22.9%
	Lung	42.2%
	Liver	10.8%
Which of the following two conditions are commonly related to the development of oral cancer?	Erythroplakia/Morbus Bowen	5.9%
	Leukoplakia/Erythroplakia	69.4%
	Blue Nevus/Leukoplakia	20%
	Morbus Bowen/Blue Nevus	4.7%
Lip cancers;	are related to sun exposure	59.2%
	are increasing each year	9.2%
	have a worse prognosis than most oral cancers	6.1%
	affect upper lip more frequently than the lower lip	5.1%
	have not been related to any form of tobacco use	2%
	Do not know/Not sure	18.4%
Which of the following findings in the neck lymph nodes indicate that oral cancer has metastasized?	Hard/Painful/Mobile	17.3%
	Hard/Painless/Fixed	50%
	Soft/Painful/Mobile	3.1%
	Soft/Painless/Fixed	8.2%
	Do not know/Not sure	21.4%

When the dentists were asked “Which of the following do you assess while taking a medical history of oral cancer patients?”, more than %90 of them responded that they evaluate “present use of tobacco, history of cancer, previous use of tobacco, patient’s family history of cancer” (Table 3). Dental congresses were found to be the main source of oral cancer knowledge with 62.1 percent, followed by the textbooks (47.4%) (Table 4).

Table 3. Patient’s health history assessment by the dentist

	Yes	No
Patient’s current use of tobacco	94.9%	5.1%
Patient’s current use of alcohol	81.6%	18.4%
Patient’s history of cancer	95.8%	4.2%
Patient’s previous use of tobacco	91.8%	8.2%
Patient’s previous use of alcohol	72.4%	27.6%
Patient’s family history of cancer	92.8%	7.2%
Type&amount of alcohol used	71.4%	28.6%
Type&amount of tobacco	86.7%	13.3%
Diet type	69.4%	30.6%
Sun exposure	82.7%	17.3%

Table 5. Attitude towards oral cancer of the participants

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
I have a piece of updated knowledge about oral cancer	11.2%	26.5%	28.6%	23.5%	10.2%
Oral cancer examinations for those 40 years of age and older should be provided annually	55.1%	38.8%	5.1%	1%	0%
Oral cancer examinations for adults 18-39 years of age should be provided annually	34.7%	41.8%	14.3%	8.2%	1%
I am comfortable referring patients with suspicious oral lesions to specialists	87.8%	10.2%	2%	0%	0%
My patients are sufficiently informed on risk factors for oral cancer	1%	9.2%	25.5%	27.6%	36.7%
My patients sufficiently know the signs and symptoms of oral cancer	1%	9.2%	25.5%	27.6%	36.7%
Dentists are adequately trained to examine patients for oral cancer	20.4%	32.7%	28.6%	12.2%	6.1%
Doctors are adequately trained to examine patients for oral cancer	18.4%	33.7%	34.7%	10.1%	3.1%
Early detection improves 5-year survival rates from oral cancers	58.2%	29.6%	11.2%	1%	0%
Lesions associated with chewing tobacco resolve after tobacco cessation	7.1%	15.3%	48%	13.3%	16.3%
I routinely perform lymph node palpation in addition to oral cavity examination	17.3%	34.7%	16.3%	12.2%	19.4%
I perform biopsy from my patients with suspicious oral lesions	25.5%	33.7%	12.2%	6.2%	22.4%
I am adequately trained to perform an oral cancer examination	21.4%	26.5%	27.6%	12.2%	12.2%
I am adequately trained to perform patient’s lymph node palpation	26.5%	37.8%	19.4%	8.1%	8.2%
I advise my patients with suspicious oral lesions	71.4%	27.6%	1%	0%	0%
Dentists need further training to perform an oral cancer examination	69.4%	24.5%	3.1%	1%	2%
I am sure, I can diagnose oral cancer from the clinical appearances	12.2%	28.6%	41.8%	6.2%	11.2%
The dentist should inform their patients of their findings	78.6%	19.4%	2%	0%	0%

Table 4. Source/sources of oral cancer knowledge

	Yes	No
Educational courses	12.6%	87.4%
Scientific journals	42.1%	57.9%
Textbook	47.4%	52.6%
Dental congresses	62.1%	37.9%

Table 5 presents the breakdown of the participants’ answers to the questions about the attitudes towards oral cancer. While 37.7% of dentists strongly agreed/agreed that their knowledge about oral cancer is up to date, 93.9% reported they need further education. Only 10.2% of the respondents declared that their patients are sufficiently informed on risk factors for oral cancer and know the signs and symptoms of oral cancer. Answers regarding their role in diagnostic procedures showed that 59.2% of dentists either strongly agreed or agreed that they perform biopsy from the suspicious oral lesions.

The 98 participants who participated in the questionnaire were grouped according to the number of correct answers which is shown in Fig. 2. According to the table, the level of the participants who answered between 0-9 is determined as low level and there is 1 dentist in this situation, the level of the participants who answered between 10-18 is determined as intermediate level and there are 74 dentists in this range, the level of the participants who answered between 19-27 is determined as high level and there are 23 dentists in this range.

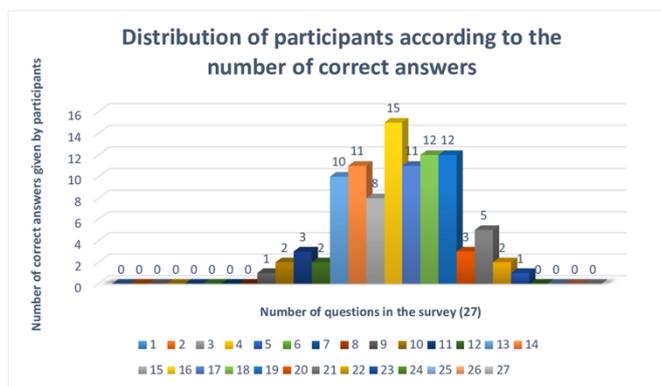


Fig 2. Distribution of participants according to the number of correct answers

The percentage calculation of the participants grouped as low, intermediate and high level is shown in Fig. 3. It was determined that 1.02 percent of the respondents were low level, 75.51 percent were intermediate level and 23.47 percent were high level.

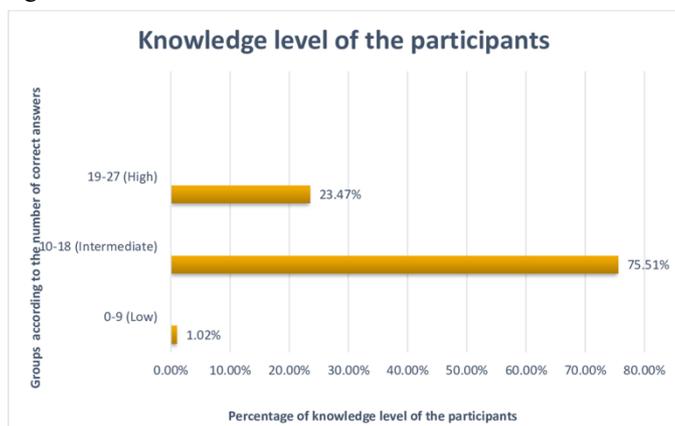


Fig 3. Knowledge level of the participants

4. Discussion

Dentists' awareness about symptoms, risk factors, and attitudes have a significant impact on the early detection of oral cancers to reduce high morbidity and mortality rates and improves the quality of life of the patient. Thus, measuring and understanding the dental practitioners' knowledge is of utmost importance. It would also help in developing postgraduate educational strategies. Many studies have documented the oral cancer awareness and knowledge level in a variety of participant groups from different countries (9-15). To the best of our knowledge, this is the first study that providing an overview of the current status of knowledge and skills regarding oral cancer among practicing dentists in North

Cyprus.

In this study, a majority of the dentists rightly identified tobacco (98%) and alcohol (73.5%) use as the major risk factors for oral cancer. In a recent research, dentists identified tobacco (98.8%) and alcohol (95.3%) misuse as the major risk factors for oral cancer (13). Colella et al. similarly observed that 94.1% of dentists indicated tobacco usage, 79.2% of dentists indicated alcohol usage, and 89.5% of dentists indicated prior oral cancer lesion as risk factors (16). These findings are also consistent with the report on Kuwait (17), India (18) and Yemen (19).

In a study conducted by Negri et al reported that smoking, alcohol, and low β -carotene intake were responsible for 85-88% of oropharyngeal cancers in both genders in Northern Italy (20). Similar to this study Rodriguez et al showed that a combination of tobacco, alcohol, and low vegetable consumption were responsible for 85% of the oral and pharyngeal cancers in young adults (21). Frequent intake of fresh vegetables and fruits was inversely related to oral cancer risk. Also, Sánchez et al reported that the high intake of fruit and vegetables has a protective effect and reduced the risk of this neoplasm among current smokers and heavy alcohol drinkers (22). According to the results of our study, most dentists knew prolonged sunlight exposure, head-neck radiotherapy and previous oral cancer lesions as the main risk factors; on the other hand, low intake of fruit and vegetables was the least likely to associate with oral cancer in previous studies (11,12,15). Consistent with the literature, this research found that the low consumption of fruit and vegetables is the least known risk factor and most of the respondents were unaware of this link.

Second lower awareness level was determined in older age which is the strongest risk factor as well as tobacco and alcohol consumption. Nearly two-fifths of the present study participants could not identify older age as a risk factor. This finding is following the Keser and Pekiner, Kebabcioğlu and Pekiner, and Decuseara et al. (10, 13, 23) Moreover, participants exhibited relatively better knowledge of oral cancer risk factors than non-risk factors. Family history of cancer (95.9%), bad oral hygiene (83.7%), and poorly fitting dentures (80.6%) were established as risk factors for oral cancer by a large number of dentists. Although tooth decay, bad oral hygiene, and ill-fitting dentures are not in themselves a relevant risk factor for oral cancer, there is no consensus about this issue in the literature. Despite adjustments for major known risk factors (tobacco and alcohol consumption), Moraes et al. found a statistically significant relationship between the extent and severity of chronic periodontitis and oral cancer (24). However, Meurman in a review study concluded that although specific bacterial, yeast, and viral infections associated with oral cancer and infectious agents associated both within the tumor cells and inflammation, the mechanism is not clear and the literature results are controversial (25). In

another review study, Colonia-Garcia et al reported that currently, the available evidence is limited and inadequate to derive definite conclusions about the role of the periodontal disease in oral cancer (26).

Two most common site of oral cancer was correctly identified as 'tongue and floor of the mouth' by 67.4% of the dentists. However, another diagnostic item, 'squamous cell carcinoma (SCC) is the most common type of oral cancer', which showed a low level of knowledge, was determined by only 46.9% of the respondents. In a study conducted with dentists in the Democratic Republic of Congo, it was known with a very low percentage that squamous cell carcinoma is the most common type of oral cancer, similar to ours (27). Similarly in Kuwait (17), Yemen (19), Iran (28), and Turkey (13) the majority of the dentists knew that floor of the mouth and tongue are at greatest risk of cancer development. The biological behavior of oral cavity cancer relies on the size, site, patient age, stage, and rate of growth as well as the tumor type among which site and tumor type are extremely important. The ventral surface of the tongue with the floor of the mouth (also known as coffin's corner) which is the common site of oral cancer development may easily be missed by cursory inspection (29). However, SCC in this region may be very aggressive and tend to invade and metastasize even if at an early stage (30, 31). Especially in young patients, tongue SCC has a worse prognosis and a high rate of metastasis (32,33).

Oral erythroplakia and leukoplakia are the most common oral potentially malignant disorders (OPMDs) in the oral cavity and are considered to have a high risk of malignant transformation. In a study of dentists attending the FDI World Dental Congress held in Istanbul, approximately two-thirds (64.1%) of dentists identified erythroplakia and leukoplakia as the lesions most likely to be precancerous, and approximately two-thirds (64.7%) of dentists considered that squamous cell carcinoma is the most common form of oral cancer (13). A study conducted by Shafer and Waldron (34) reported that 51% erythroplakia biopsy specimens were invasive carcinoma, 40 %were carcinoma in situ or severe epithelial dysplasia and 9% were mild or moderate epithelial dysplasia. In another study from Brazil, Pires et al retrospectively analyzed 684 OPMDs (leukoplakia, speckled leukoplakia, and actinic cheilitis) and found that more than half of these lesions showed a various degree of epithelial dysplasia (35). Although leukoplakia (white patches) is more common OPMD, erythroplakia (red patches) is more serious (36).

More than two-thirds of the participants of this study were familiar with leukoplakia and erythroplakias commonly related lesions for the development of oral cancer. However, only 26.7% of the dentists correctly identified the clinical properties of a prior oral cancer lesion as small, painless, and red areas while 44.9% of them select small, painless, and white areas. In India, most of the dentists (82%) considered white lesions as the most common seen oral cancer lesion and only 9.6% of

dentists considered red erosions as the most common seen oral cancer lesion. In another study, Clovis et al. (23) observed that the appearance of early oral cancer lesions (small, painless, red lesions, in that order) was correctly identified by large numbers of respondents (77%) (13). Although most dentists know about what to look at theoretically, they do not know the clinical appearances of these lesions. Since early lesions of oral cancer are small, painless, and erythematous, most of the respondents failed to recognize the clinical appearances of oral cancer in North Cyprus.

The percentage of dentists who strongly agreed to inform patients with suspicious lesions were 79.5% and 64.3% of them strongly agreed to be adequately trained to be able to perform patient's lymph node palpation. In a similar study, Pekiner and Kebabçioğlu stated that only 61.2% of the participating dentists informed their patients about suspected oral lesions (13). In other study, 12% of dentists referred patients with suspicious lesions to a specialist; 68% of them inform their patients on alcohol and tobacco usage as oral cancer risk factors and 37% of the dentists routinely palpated their patients' lymph nodes (18). In Yemen, 68.3 and 94.1% of dentists indicated that they are comfortable palpating lymph nodes in neck region and referring suspicious oral lesions to specialists, respectively (19).

Early detection of oral cancers increases the survival rate, and most of the participants (87.8%) are consistent with this finding. However, only 37.7% (strongly agree/agree) thought that their knowledge is current about oral cancer. Cervical lymph node palpation is an important part of the oral cancer examination. In this study, 52% of the physicians stated that they would routinely perform lymph node palpation in addition to oral cavity examination and 64.3% of them received sufficient training to palpate lymph nodes. In a study from Turkey, Keser and Pekiner (13) investigated oral cancer awareness among the undergraduate dental students, reported four-fifth of the students believed that they are not adequately trained to perform an oral cancer examination while 64.7% of them disagree or uncertain about adequate training to perform lymph node examination. A recent study conducted by Ozdemir-Ozenen et al. emphasized the importance of reorganization of the dental curriculum and courses for improving their skills, awareness, and knowledge of dental students about risk factors and early signs of oral cancers to prevent carcinogenesis and increase the survival rate (37).

The limitation of this survey study only reflects the theoretical knowledge of the participating physicians. In this study, the authors have some doubts about whether the theoretical knowledge of physicians increases the ability to recognize the lesion clinically.

In conclusion, dental faculty curriculums and continuing education programs should aim at managing oral cancer need to address not only increase the knowledge and awareness about oral cancers but also include the clinical cases and

practices such as performing the oral cancer examination, lymph node palpation, early characteristics of the potentially malignant disorders.

Ethical Statement

The questionnaire and methodology for this study was approved by the Human Research Ethics committee of the Near East University (IRB approval number: YDU/89-1313).

Conflict of interest

The authors declared no conflict of interest.

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Authors' contributions

Concept: K.O., S.A., Design: S.A., Data Collection or Processing: M.M.G., M.F., Analysis or Interpretation: M.M.G., M.F., Literature Search: S.A., M.M.G. Writing: S.A., M.M.G.

Ethical Statement

Approval was obtained from Near East University Scientific Research Ethics Committee, the study started. The ethics committee decision date is 25/03/2021 and the number of ethical committee decisions is 2021/89.

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