EVALUATION OF AWARENESS, KNOWLEDGE, ATTITUDE AND SCREENING OF ORAL CANCER AMONG DENTAL PRACTITIONERS AND DENTAL STUDENTS- AN ONLINE QUESTIONNAIRE BASED CROSS-SECTIONAL STUDY

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Abstract:

Background: Oral cancer is a silent invasive disease with poor prognosis and more than 60 % of these cases were diagnosed in later stages. Early diagnosis of the malignancy greatly increased survival rates as the mouth is easily accessible for self or clinical examination. Lack of awareness among dental practitioners and health care providers is the most significant factor in delaying diagnosis and treatment of oral cancer.

Aim & Objective: 1) To assess the level of knowledge and awareness regarding oral cancer, its clinical presentation and associated risk factors among dental practitioners and dental students. 2) To explore dentists' attitude regarding their role in screening, detection and prevention of oral cancer.

Material & Methods: A cross sectional online survey was conducted on 300 dental practitioners and dental students, who are working and studying in recognized dental institutes and dental clinics receptively in the area around tri-city. A validated questionnaire survey comprised of 29 questions regarding a basic knowledge and awareness, and attitude and screening of oral cancer was distributed randomly among the participants. The Performa was distributed through electronic media and all the participants filled the questionnaire Performa. Performa was based on the demographic data and to raise the awareness, knowledge, attitude and screening of oral cancer among dental practitioners and dental students. All the data were collected, tabulated and analysed using SPSS software 20.

Results: A total of 300 dental practitioners and dental students were approached, of which 273 participated in the study. The response rate of the study was 91%. Among the various risk factors for causing oral cancer, the use of alcohol was identified as a major risk factor by 267 (97.8%) dentists. The high-risk age group for oral cancer was identified in between 40-60 years by 246 (90.1%) dentists. Two hundred and forty-four (89.4%) dentists strongly agreed that patients should be referred to specialists if they suspected oral cancer in any lesion. Majority 97.8% of the dentists routinely practiced complete oral cavity examination on all patients who attended their practice.

Conclusion: It can be concluded that though the mean knowledge and awareness, attitude, practice and screening about oral cancer among specialized dentists was good but there is a need to improve the knowledge and practices of risk factors for oral cancer among general dental practitioners by either collaborative approach by various specialties or by arranging continuous educational programs for them.

Keywords: Oral cancer, oral cancer awareness, Poor oral hygiene, screening, Risk factors, Dental professionals

Introduction:

Oral cancer is a silent invasive disease, usually presented as a persistent painless ulcer on the side of tongue, lip, floor of the mouth, gingiva, cheek lining or palate. It represents as an intra oral red lesion without any disturbing symptoms. In India, oral cancer is among the top three types of cancers and approximately 90-95% cancer affecting the oral cavity are squamous cell carcinoma with known high-risk factors, identifiable clinical features and affective treatment for early lesions may remain undetected in the early stages because of the dentist's attitude and knowledge.^{1,2} These signs are usually neglected by the patient and also sometimes unnoticed by the dentists. However, it needs an instant definite diagnosis. Different behavioral risk factors contribute to the development of oral cancer. Severe alcoholism tobacco like cigarettes, smokeless tobacco, betel nut chewing and human papilloma virus (HPV), are the most common risk factors for oral cancer.^{3,4} In addition, ultraviolet radiations, iron deficiency anemia, candida infections, immunosuppression and deletion and mutation of tumor suppressor genes are some of the other causes of oral cancer.⁵

Prognosis of oral cancer depends on the several factors such as age, general health of patient, the type and location of the oral cancer and response of the cancer to the treatment.⁶ However, one of the factors that dental practitioners play an important role in diagnosing the staging of oral cancer for the patient. Majority of the oral cancer was detected at late stages (III & IV) and early diagnosis and treatment is important to increase patient survival ability and to delay its prognosis.⁷ On the other hand, patients diagnosed with oral cancer in its late stages there will be more chances of lower survival rate and poor prognosis. Furthermore, they will go through a difficult phase with radiotherapy and surgical intervention such as surgeries of reconstruction and rehabilitation of their oral cavity and face. This would eventually result in major impact on the patient's quality of life (QoL). Patients with oral cancer have been noted to present to the

clinician at much advanced stages when they may develop features such as ulceration, pain, oral bleeds, swelling, growth and neck lumps whereas oral cancer in its early stage tends to remain asymptomatic. Reduction of delay in diagnosis may reduce morbidity and may decrease the mortality rate, stressing the paramount importance that should be assigned for early detection of oral cancer.

Oral cancers were the seventh most commonly occurring cancer and, in terms of mortality, the ninth deadliest by cancer site in the world as stated by World Cancer Report 2014.⁸ It accounts for 2.1 % of all cancers. The incidence rate of oral cancer varies widely in different countries suggested by differences in the distribution of the etiological factors. Although, developed countries showed reduction in the incidence of lip and oral cancer, there is high incidence of new cases in low to middle income countries such as India, south and south east Asia,⁹ which is linked to known life style risk factors particularly the use of tobacco products.

The international agency for research on cancer has predicted on oral cancer that India's incidence of cancer will increase from 1million in 2012 to more than 1.7 million in 2035. This indicate that the death rate because of cancer will also increase from 680000 to 1-2 million in the same period.¹⁰ According to the statics most of the oral cancer cases occur between the age of 50- 70 years, but it could also affect children as early as 10 years. incidence of oral cancer increases by age.¹¹ The commonest age is fifth decade of life. In India men are 2-4 times more effective than woman, due to the changes in the behavioral and life style patterns. A study states that the use of tobacco in the form of smoking has 5.19 times higher risk or pre- cancerous lesion on palate when compared to that of tobacco chewing. The states like Uttar Pradesh, Jharkhand and Bihar in India witness more risk of oral cancer.¹⁰

WHO "Global Oral Health Programmes", approach for controlling oral cancer includes two

approaches. First approach is prevention through reduction of the exposure to risk factors. The second approach, is early detection of patients with suspicious oral lesion through screening programmes.¹² The early detection of patients with oral cancer depends on patient's awareness and perception about their health, and on the ability of dental practitioners to examine and screen their patients. Dental professionals have a crucial role in early detection of oral cancer via screening of high-risk individuals. It is expected that dentists, on top of having an extensive understanding of the etiology of oral and clinical aspects of cancer, feel able to make a prompt diagnosis of this condition. Nevertheless, some studies have suggested that these professionals are not able to adequately detect oral cancer in its early stages due to their ineffective attitudes and lack of knowledge.¹³ As any other health professional, dentist are healthcare providers who need further post graduate training and continuous and educational courses to be competent in diagnosing oral diseases, treating and preventing various oral health conditions. Lack of awareness and knowledge regarding the risk factors, signs and symptoms of oral cancer among the Indian masses may pose a great challenge for the clinicians as well as dental professionals to control the growing burden of oral cancer on the society.

Several studies in the USA, Canada, Europe and Saudi Arabia have assessed dentists' knowledge, opinions and practices regarding oral cancer. These studies showed the need to improve the knowledge on preventing and detecting oral cancer.¹⁴⁻¹⁸ Hence, the present online cross-sectional survey aimed to assess the assess and explore the level of knowledge and awareness regarding oral cancer, its clinical presentation and associated risk factors as well as attitude regarding their role in screening, detection and prevention of oral cancer among dental practitioners and dental students.

Materials and Methods

The online cross-sectional questionnaire-based study was conducted over a period of 3 months

from January 2021 to March 2021, among the dental practitioners, specialized dentists, interns and post graduate students. The purpose of the study was discussed and explained to the participants and verbal informed consent was obtained before the commencement of the study. The sample was obtained by simple random sampling, conducted among 300 dental practitioners and dental students, evenly distributed the questionnaire survey in between the participants.

Inclusion Criteria

1. Participants those who were willing to participate as volunteer
2. Both male and female dental practitioners and dental students
3. General Dental Practitioners, Specialized Dentist, Interns and Post Graduate students.
4. Age group was 25-50 years.

Development of the Questionnaire design

A self-administered two-part questionnaire consists of 29 questions was administered to dental professionals. The questionnaire was framed based upon the previous research in the literature conducted by Brzak et al,¹⁹ Villa et al²⁰ and Carter and Ogden²¹ designed in English, which was validated, and modifications were then made accordingly before the final questionnaire was administered.

The first part consisting of questions on demographic analysis related to age, gender clinical or teaching experience and educational qualification. The second part of the questionnaire consists of 29 questions based upon the knowledge about oral cancer, its clinical presentation (anatomical site, signs and symptoms), identification of risk factors and pre-disposing factors and knowledge and delivery of advice on risk factors for oral cancer, chance to investigate the patients with premature oral lesions, identification of clinical signs, referral to health care provider, their viewpoint on adequacy of knowledge regarding diagnosis, treatment, prevention and its consequences, and the wish for further improving their knowledge on oral cancer.

The attitude questions include significance of knowledge needed for oral cancer examinations and its perceived utility and practice questions include methods of oral cancer examination, management of suspicious lesions, identifying the use of tobacco and alcohol in patients' medical history. The questionnaire took 10 min to complete. All questionnaire were assessed for completion, and incomplete questionnaires were discarded. The Performa was distributed through electronic media and all the participants filled the questionnaire Performa. Performa was based on the demographic data and to raise the awareness, knowledge, attitude and screening of oral cancer among dental practitioners and dental students. All data were analyzed by using the Statistical Package for Social Sciences (SPSS) software, for windows, version 20. Descriptive statistics have been generated in terms of percentages.

Results

Sociodemographic Characteristics of dental practitioners and dental students

Distribution of sociodemographic characteristics of surveyed 300 dental practitioners and dental students are shown in Table1. Out of 300 study subjects a total of 273 responded positively by

participating in this study and completed the questionnaire. In this way the response rate was 91%. Rest of the subjects either didn't participate or didn't complete the questionnaire and nor they submit the questionnaires through google form. This was usually seen in the subjects who were dental students and they had not much and in-depth knowledge regarding Oral cancer clinical presentation and diagnostic methods. Missing data were excluded from the survey.

Among the respondents, there were 111 (37%) male dentists and 162 (54%) female dentists forming a response rate of about 91% (273 participated out of 300 invited dentists). Their age ranged from 25-50 years with a mean of 35.3 years. Nearly half of the dentists (58.6%) were mature and experienced age dentists in between 36-45 years of age. High percentage of the respondents were dental students and Interns (BDS) (47.6%) and 31.3% were specialized dentists and postgraduate students (MDS). 130 dentists have an experience of 5-10 years, which contributes to almost half of the participants (43.3%). 110 dentists have an experience of 10-15 years which contributes to one third of participants (36.6%). Only 36 dentists (12%) were general dental practitioners.

Table 1: Distribution of sociodemographic characteristics of surveyed 300 dental practitioners and dental students enrolled in the study

Socio-demographic factors		Dentists (n)	n (%)
Age	25-35 yrs.	55	18.3%
	36-45 yrs.	176	58.6%
	> 45 yrs.	42	14.0%
Gender	Male	111	37%
	Female	162	54%
Qualification	BDS (Dental Students and Interns)	143	47.6%
	MDS (Specialized dentists and Post Graduate students)	94	31.3%
	Dental Practitioners	36	12%
Clinical/Teaching Experience	< 5 yrs.	9	3.0%
	5-10 yrs.	130	43.3%
	10-15 yrs.	110	36.6%
	> 15 yrs.	24	8%

Awareness and Level of Knowledge about Oral Cancer (its clinical presentation, risk factors and pre-disposing factors) among dental practitioners and dental students

Nine questions were used to assess the dentists' awareness and level of knowledge regarding the clinical presentation of oral cancer. Table 2 displays the prevalence of dentists correctly identified the clinical features, risk factors and pre-disposing factors of oral cancer. High percentage of dentists correctly identified alcohol and tobacco use (97.8%), Human Papilloma viral infection (99.3%) and prior oral cancer (93.4%) as risk factors for oral cancer. Low consumption of fruits and vegetables as a risk for oral cancer was correctly identified by 258 dentists (94.5%) and 15 dentists (5.5%) didn't know if it is a risk for oral cancer. Moreover, Majority of dental

professionals 264 (96.7%) recognized that nonhealing ulcer/ red patch that persists for longer than three weeks in oral cavity is an indication of oral cancer.

When asked about the sign and symptoms of oral cancer, 169 dental professionals and dental students (61.9%) correctly identified that Leukoplakia/white lesion is the condition is associated with oral cancer, 27.8% dentists also considered difficulty in swallowing as a sign and symptoms of oral cancer. Oral cancer is painless in early stages, almost all 271 dentists (99.3%) were familiar with this. In addition to this majority of dental professionals and dental students (93.3%) have a positive response in the form of 'Yes' regarding the sufficient knowledge concerning prevention and detection of oral cancer. (Table 2)

Table 2: Awareness and Level of Knowledge about Oral Cancer (its clinical presentation, risk factors and pre-disposing factors) among dental practitioners and dental students (N=300)

Questionnaire	Dentists	n %
Do you consider the regular consumption of tobacco and alcohol as a risk factor?	267	97.8%
Yes	6	2.2%
No		
Do you consider prior oral lesions as a risk factor?		
Yes	255	93.4%
No	18	6.6%
Do You feel that you have sufficient knowledge concerning prevention and detection of oral cancer?		
Yes		93.4%
No	255	6.6%
Do You consider ultraviolet exposure as a risk factor?	18	
Yes		92.7%
No	253	7.3%
Which signs and symptoms you will identify in the patient suffering from the oral cancer?		
fixed lesion/ Induration	27	9.9%
Painless ulcer	1	0.4%
Leukoplakia/white lesion	169	61.9%
Difficult swallowing	76	27.8%
Do you consider a patient under the risk factor for oral cancers, if he/she is infected with human papilloma virus?		99.3%

Yes	271	0.7%
No	2	
Are you aware that oral cancer may be painless in the early stages?		99.3%
Yes	271	0.7%
No	2	
Is an ulcer/red patch in the mouth that persists for longer than three weeks a possible sign of oral cancer?		96.7%
Yes	264	3%
No	9	
Do you consider low consumption of fruit and vegetable as a risk factor?	258	5.5%
Yes	15	
No		

Knowledge about Oral Cancer diagnostic procedures among dental practitioners and dental students

Table 3 shows the knowledge of dental professionals regarding diagnostic procedures of oral cancer. Diagnosis of oral cancer at an early stage is believed to be the most effective means to reduce death, morbidity and disfigurement from this disease. Considering the most common site of oral cancer, 257 dentists (94.1%) correctly identified the lateral surface of tongue as the first most common site of oral cancer and only 6 dentists (2.2%) correctly identified the floor of the mouth as the second most common site of oral cancer. Moreover, 246 dentists (90.1%) correctly identified that majority of oral cancers are diagnosed in people 40-60 years or older. Based

on the clinical features of oral cancer lesion, more than half 239 (87.5%) of dentists reported that oral cancer most probably will be painless and appear as small white lesion. Erythroplakia and leukoplakia are the two common conditions associated with oral cancer. 196 dentists (73.1%) reported that speckled type of leukoplakia is more serious pre-malignant condition associated with oral cancer. In addition to this, 75 dentists (27.5%) also considered that homogenous type of leukoplakia is also pre-malignant condition which may cause serious complications.

Based on above shown results (%age), dental professional and dental students had an adequate knowledge regarding the diagnostic procedures, their clinical appearance and malignant conditions associated with oral cancer.

Table 3: Knowledge about Oral Cancer diagnostic procedures among dental practitioners and dental students (N=300)

Questionnaire	Dentists	n %
What are the common sites for oral cancer lesion?	6	2.2%
Floor of mouth	7	2.6%
Tongue	3	1.1%
Dorsal of tongue	257	94.1%
Lateral of tongue		
	0	0%
Age group more likely to be diagnosed with oral cancer?	24	8.8%
10-20 Years	246	90.1%
20-40 Years	3	1.1%
40-60 Years		
60-80 Years	27	9.9%
	239	87.5%

What are the clinical properties of a prior oral cancer lesion?	7	2.6%
Small, painful, white area	0	0%
Small, painless, white area		
Small, painful, red area	75	27.5%
Small, painless, red area	2	0.7%
	196	73.1%
Which type of leukoplakia is more likely to be malignant?		
Homogenous		
Non-homogenous		
Speckled		

Attitude towards Oral Cancer among dental practitioners and dental students

Table 4 shows an attitude of dental professionals towards oral cancer, the participants were asked to rate their opinion about their training, confidence and knowledge to examine patients for oral cancer. Among the respondents, 268 dentists (98.2%) agree that they advise their patients about the risk factor for oral cancer based on their current knowledge and awareness of oral cancer. In addition to this, 144 dentists (52.7%) always agreed to give advice to their patients about the suspicious pre- malignant or malignant conditions. Palpating the lymph nodes in the patients' neck during the extra-oral examination,

264 dentists (96.7%) were agreed and adequately trained in examination and palpating the cervical group of lymph nodes for oral cancer. In evaluating the dentists' confidence in their ability to perform complete oral cavity examination, 267 dentists (97.8%) are agreed and only 0.7% dentists strongly agreed about the complete oral cavity examination for oral cancer besides than palpating the lymph nodes on routine basis. Moreover 99.6% dental professionals and dental students are ready to take more information and knowledge on precancerous and cancerous lesions which is the positive and an effective way of improving the clinical outcome for patients.

Table 4: Attitude towards Oral Cancer among dental practitioners and dental students (N=300).

Questionnaire	Dentists	n %
Do you advice patients about risk factors for oral cancer?		
A. Yes	268	98.2%
B. No	5	1.8%
Do you give advice to your patient with suspicious oral lesions?		
A. Always	144	52.7%
B. Often	50	18.3%
C. Sometimes	72	26.4%
D. Never	7	2.6%
Do you adequately trained to perform and examine cervical group of lymph's nodes?		
Yes	264	96.7%
No	9	3.3%
Would you like more information on precancerous and cancerous lesions?		
Yes	272	99.6%
No	1	0.4%

My patients sufficiently know sign and symptoms of oral cancer?		
Strongly agree	33	12.1%
Agree	31	11.4%
Uncertain	11	4%
Strongly disagree	198	72.5%
Do you examine complete oral cavity besides than palpating lymph node on routine basis?		
Agree	267	97.8%
Disagree	4	1.5%
Strongly agree	2	0.7%

Practice and Screening of dental professionals regarding Oral Cancer Examination (N=300)

Table 5 shows the response to questions on oral cancer screening practice. To evaluate the dentists' current practice, they were asked about the factors they assess and probe when taking the patients' medical history. It revealed that the percentage of dentists (97.8%) was very high in the form of response 'YES' when taking the patient's medical history based on the current and previous tobacco and alcohol use. Dental professionals may play a primary role in counselling and educating the self-quieting practice and recommended the tobacco cessation advice to the patients. Tobacco history is one of the major risk factors taken into consideration when performing an oral screening examination and 75.1% dental professionals agreed this and

dentist should be trained enough to provide a tobacco cessation education. Early detection of oral cancer malignancy results in better prognosis for the patient as it greatly improves the quality of life by minimizing extensive, debilitating treatments.

269 (98.5%) dentists were able to identify the patients with suspicious lesions and take biopsies. Moreover, 89.4% of the dentists agree about being comfortable referring patients with suspicious oral lesion to specialists. When further enquired about their opinion of referring the patient to a specialist in detecting early signs and symptoms of oral cancer malignancy, 230 Oral Medicine specialists (84.2%) and 41 general practice dentists (15%) have a primary role in early detection of suspected oral malignancy.

Table 5: Practice and Screening of dental professionals regarding Oral Cancer Examination (N=300)

Questionnaire	Dentists	n %
Does the early detection of an oral cancer lesion result in a better prognosis for the patient?		
Yes	268	98.2%
No	5	1.8%
Do you examine every patient's oral mucosa on a routine basis to detect and screen oral cancer or precancerous lesions?		
Yes	266	97.4%
No	7	2.6%
What factors influence your decision to perform an oral screening examination?		
Patient complains of a problem	53	19.4%
Age of the patient	15	5.5%

Tobacco history	205	75.1%
Other	0	0%
In regard to the clinical appearance of oral cancer, do you feel		
Very well informed	204	74.7%
Adequately informed	64	23.4%
Poorly informed	5	1.8%
Patients with suspicious lesions identified and biopsy taken?		
Yes	269	98.5%
No	4	1.5%
Dentists referring patients with suspicious lesions to a specialist's clinic for further evaluation?		
Agree	244	89.4%
Disagree	18	6.6%
Strongly agree	11	4.4%
Strongly disagree	0	0%
Where would you refer a patient, if you suspected an oral malignancy?		
Plastic surgery	1	0.4%
Oral and Maxillofacial surgery	1	0.4%
Dentist	41	15%
Oral Medicine	230	84.2%
Do you record patient's medical history related to alcohol and tobacco?		
Yes	267	97.8%
No	6	2.2%
Does patients are enough educated on the adverse effect of alcohol and tobacco and assisting them in cessation?		
Yes	267	97.8%
No	6	2.2%

Information Source of Oral Cancer among dental practitioners and dental students

Table 6 shows that dentists were asked about the source of information of oral cancer available in their practice. High proportion of dentists (47.3%) reported that there is an availability of information pack about oral cancer. 16.5% and

33% dental professionals participated in organized seminars and research respectively were also the ways of data gathering about the oral cancer malignancy. Only nine dentists (3.3%) reported that they attended a verbal educational lecture about oral cancer.

Table 6: Information Source of Oral Cancer among dental practitioners and dental students (N=300)

Oral Cancer information source/sources	Dentist	n%
Information Pack	129	47.3%
Participation in organized seminars	45	16.5%
Participation in organized research	90	33%
Lectures	9	3.3%

Overall percentage of Knowledge and Awareness, Attitude and Practice and Screening of Oral Cancer among dental professionals based on educational qualification

Among 273 study participant, 179 (59.6%) were Dental professionals, Dental students and Interns and 94 (31.3%) were specialized dentists and post graduate students. Participants with both qualifications were engaged in academics as well as private practitioners. Knowledge and Awareness, Attitude and Practice and Screening of Oral Cancer was assessed among BDS and MDS professionals. Positive response to structure questionnaire gave by Dental professional were tabulated in table 5.

MDS professional answered better than BDS professional towards Knowledge and Awareness, Attitude and Practice and Screening of Oral Cancer. Out of 94 MDS professional 76.5% gave correct answered to Knowledge and Awareness questionnaire, 79.7% and 73.4% responded well to Attitude and practice and Screening of Oral cancer questionnaire respectively. It was observed that based on educational qualification and clinical practice for dental professional increase the awareness and Screening of Oral cancer. (Table 5). The percentage score was obtained for Awareness regarding risk factors, knowledge regarding symptoms and signs of oral cancer and Practice and Screening by examining the patient's oral mucosa to rule out any pre-cancerous lesion of oral cancer.

Table 7: Overall percentage of Knowledge and Awareness, Attitude and Practice and Screening of Oral Cancer among dental professionals based on educational qualification

Oral Cancer	BDS Professional	n %	MDS Professional	n %
Knowledge & Awareness	65	36.3%	72	76.5%
Attitude	60	33.5%	75	79.7%
Practice & Screening	55	30.7%	69	73.4%

Discussion

Patient's visit to the dentist is an opportunity for comprehensive oral examination and a chance for one-to-one oral health education for the patients. Healthcare providers and dentists in particular, play an important role in early detection of high-risk patients for screening and patient awareness. This requires a great knowledge about the crucial risk factors that contribute in increasing the risk of oral cancer. Moreover, dentists' need to be knowledgeable about the clinical presentation of oral cancer for preliminary diagnosis and instant referral for further investigation. The early detection of asymptomatic oral cancer in the early stages is reflected to satisfactory clinical outcome and cure for most oral cancer patients. This will have a role in improving the outcome of the health care system and delivery of care. Assessing the level of knowledge is one way to measure the dentists' performance.

In dental practice, extraoral and intraoral examination is an essential step of new patient exam.²² Extraoral examination includes the examination of the patient's cervical and submandibular lymph nodes. Therefore, dentists need to be knowledgeable about the characteristics of relatively normal lymph nodes compared to abnormal lymph nodes. In our study, high percentage (96.7%) were agreed and adequately trained in examination and palpating the cervical group of lymph nodes for oral cancer which indicates towards the metastatic cancer, this is higher than what was observed in other studies.^{16,23} Accordingly, this is reflected in their attitude as most of them (97.8%) agreed about being comfortable in palpating the patients' neck for lymph nodes examination on routine basis. Intraoral examination includes the comprehensive examination of the oral cavity and the tongue. In our study, large percent of dentists (94.1%) correctly identified the lateral surface of tongue as the first most common site of oral cancer and only

6 dentists (2.2%) correctly identified the floor of the mouth as the second most common site of oral cancer. However, low percent of dentists (2.6% and 1.1%) also identify the site for oral cancer lesion i.e., overall area of tongue and dorsal surface of tongue. Therefore, it is important to refresh their basic knowledge and improve their skills through training about the oral and tongue examination steps. This will increase their confidence and show positive attitude toward comprehensive oral examination for their patients.

The findings of our study identified that high percentage of dentists (99.3%) correctly identified that oral cancer is asymptomatic and painless in its early stage. Similar studies have been conducted in Iran were 45% and in British Columbia and Nova Scotia were 78.4% correctly identified this characteristic.^{16,23} More than half of the dentists (73.1%) were familiar with Speckled type of Leukoplakia as important signs of premalignant lesion, among them 75 dentists (27.5%) agreed that Homogenous type of Leukoplakia is also to be malignant to cause the oral cancer. Similarly observed in Iran were 50% correctly identified these signs. On the other hand, higher percentage of dentists in Turkey (64.1%) and Kuwait (93%) correctly identified Leukoplakia as premalignant signs.^{24,25} These are important signs of premalignancy that the dentists need to be familiar with. The differences in the level of knowledge in different countries might be related to different educational backgrounds, different training opportunities and different shared educational environment. As for the most common site of oral cancer, almost all dentists correctly identified the lateral surface of tongue and floor of the mouth as the most common site to develop oral cancer. These identified gaps in clinical and diagnostic knowledge about oral cancer need to be addressed in the continuing educational programmes concerned with oral cancer. Because the dentists need to have the knowledge of what to look for and where to look when doing oral cancer examination for the patients.

High percentage of dentists correctly identified tobacco and alcohol (97.8%) and prior oral cancer (93.4%) as risks for oral cancer, consistently with other studies.^{23,26,27} This is reflected in their practice when taking the patients' medical history, as majority of dentists (97.8%) reported assessing the patients' medical history related to alcohol and tobacco use. More emphasis is needed to increase their knowledge about different types of tobacco use that include smokeless tobacco such as betel quid and Gutka (smokeless tobacco in the form of powder) which is widespread among the Asian culture. Dentists were asked about their opinion if they should be trained to provide tobacco cessation education, 75.1% dentists strongly agreed this. Their knowledge about Leukoplakia to be directly linked to tobacco use, showed a positive attitude toward the willingness to be actively involved in smoking cessation intervention.

Poor diet represented by inadequate consumption of fruits and vegetables is associated with increasing the risk of oral cancer.²⁸ Majority of dentists (94.5%) in the study sample, correctly identify that low consumption of fruits and vegetables as a risk factor for oral cancer and only (5.5%) doesn't know the effect of low consumption of fruits and vegetables. Poor imbalance diet can increase the risk of chronic health problems and is associated with cancer.²⁹ Health care providers play an important role in educating and motivating their patients about healthy diet. Knowledge of the dentists about the importance of fruits and vegetables can be spread to the patients by increasing their awareness for healthy diet.

The results of this study identified based on educational qualification that General dental practitioners and Interns and dental students (36.3%) are showing low level of knowledge about the clinical feature of oral cancer. Moreover, Specialized dentists and postgraduate students (76.5%) showing high level of knowledge. The results of the present study indicate that Specialized dentists are almost twice more likely to have higher clinical knowledge than general practice dentists. This is similarly

what was observed in Clovis et al were 35%, in Patton et al were 59% and in Maryland study were 35.5% had low level of knowledge about the clinical presentation of oral cancer. This indicates that there is a need for educational intervention for our study participants. Scope of practice is another characteristic that was assessed. Specialist dentists are more likely to do invasive surgical procedures and take incisions than general dental practitioners.

Almost all dentists (99.6%) wanted more information regarding oral cancer which is similar to the results of previous study from UK.²¹ Information pack were the preferred form of gaining information followed by organized research and seminars. This is similar to the study from UK, information package was identified as the most popular form for knowledge transmission.²¹ The majority of dentists considered that patients with oral cancer should be referred to dentists rather than to physicians. Oral medicine was the most commonly selected proposed referral point for the patients with a suspected oral lesion which confirmed the results of previous studies from UK.²¹ These results were consistent with where these patients are seen and referred to by dentists in Iran.³⁰

This study is not without its limitations. As this is a cross-sectional questionnaire-based study, data were collected via self-reported information rather than observed data by the dental professionals and dental students regarding knowledge (its clinical presentation, risk factors and predisposing factors) and screening (diagnostic procedures) of oral cancer; recall bias by the participants could be a limitation of the study. However, the strength point of this study is represented by the acceptable response rate of 91%. This is explained by the determined strategy that was used to minimize refusal rate to this survey, which included prenotification emails, followed by multiple contact attempts, had improved the response rate by motivating more dentists to respond. Dentist's practitioners in the private sector were also included in this survey. Therefore, these results can be generalized to the private sector also.

Conclusion

This study was able to identify gaps in the knowledge of general dental practitioners and specialized dentists about oral cancer and to compare these gaps with other results observed in other countries. The unsatisfactory level of knowledge among general dental practitioners that was observed in this study, strongly suggest providing an educational intervention to dentists about the main clinical features of OC that can be observed in their practice and integrate this educational intervention with education about the evidence-based risk factors. Specialized dentists are more likely to have higher percentage in the level of knowledge and awareness, attitude as well as practice and screening as compared to general dental practitioners.

High percentage of dentists have positive attitude toward providing tobacco cessation intervention for their patients. This is consistent with their high knowledge about tobacco smoking as a risk for oral cancer. Dental practice is a unique setting to provide cost effective tobacco cessation intervention. However, we recommend further research to be done regarding the applicability of this type of intervention and the readiness of dentists to provide tobacco cessation intervention for their patients. The results of this study can be used as base-line data for future educational intervention courses for dentists about oral cancer to evaluate the effectiveness of courses about oral cancer in raising the dentists' knowledge and awareness.

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