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Oral squamous cell carcinoma knowledge, attitude, and practice assessment among Iraqi dentists: a questionnaire-based study

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Aim: Oral squamous cell carcinoma ranks among the top cancers in the world. It is preventable and can be successfully treated when diagnosed at an early stage. It is often detected at advanced stages, resulting in aggressive therapies and poor prognosis. The lack of knowledge among dentists about early detection has been shown to contribute to delays in diagnosis and treatment. The study aims to evaluate the knowledge, attitude, and practice towards oral cancer among Iraqi dentists.
Materials and Methods: The study was a cross-sectional, questionnaire-based study. The questionnaire comprises demographic data and 28 questions regarding knowledge (ten questions), attitude (ten questions), and practice (eight questions). The correct and wrong answers scores 1 and 0 respectively. The knowledge and attitude score are categorized as negative (≤ 5) and positive (> 5). The practice score divided into negative (≤ 4) and positive (> 4).
Results: The participants were 449 dentists. The questions regarding common oral cancer and referring the suspected malignancy to a specialist gained the highest correct response. The knowledge regarding the early symptoms of oral cancer was not corrected by the highest percentage of participants. The only significant association between the demographic data and knowledge, attitude, and practice was between good attitude and long experience.
Conclusion: This study identified deficiencies in knowledge, attitude, and practice about oral cancer. Therefore, it's important to review undergraduate curricula and improve educational programs for dentists in terms of early diagnosis and prevention of oral cancer.

Keywords: Attitudes, Practice, Oral cancer, Dentists

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Introduction

Oral squamous cell carcinoma (OSCC) is one of most common cancers globally and the most common neoplasm of the head and neck region. OSCC accounts for more than 90% of all oral malignancies. [1] The worldwide incidence of OSCC is approximately 400,000 cases per year with incidence rate reach 10 to 100,000 people. [2]

OSCC is common in males than in females. [3] Increased exposure to exogenous carcinogens like tobacco and alcohol consumption, as well as the nature of outdoor occupations, could lead to males suffering from OSCC more than females. [4] However, some studies have found that the incidence of OSCC is equal between both sexes or higher in females. [5] Age is a risk factor for OSCC because the likelihood of getting oral cancer rises with continued exposure to carcinogenic substances. Developing OSCC increases after the age of forty. [6] The mean age registered in Iraq in 2023 for OSCC cases was 59 years. [7]

Multiple factors contributing to OSCC have been identified. Tobacco in various forms and alcohol have been identified as risks to OSCC. Viral infections, including human papillomavirus (HPV), herpes simplex virus (HZV), Epstein-Barr virus (EBV), and cytomegalovirus infection, have been reported as risk factors for OSCC. [8] Poor oral hygiene and chronic irritation for oral mucosa have been implicated in the development of OSCC. [9] Chronic exposure to solar ultraviolet radiation is the most widely accepted cause of lip SCC. [10]

OSCC may appear in any site within oral mucosa. The common locations are the tongue followed by the floor of the mouth. Other areas of involvement are the buccal mucosa, retromolar area, gingiva, soft palate and, less frequently, and hard palate. [11] These early OSCC often present clinically white or red patches with slight roughness and clear demarcation. Palpation reveals a change in soft tissue elasticity, which is often induration. The lesions tend to maintain their size and do not respond to local treatments. Suspicion for oral cancer should arise, particularly when the risk factors are existed.[12] There are a considerable issue in diagnosing early OSCC due to the absence of symptoms or the presence of mild discomfort, with the lesions often averaging approximately 2 cm in size. [13] The clinical picture of advance OSCC are so typical and it is easy to establish the clinical diagnosis, however biopsy is need to confirm the diagnosis. [14] The advanced lesion presents as ulcer or exophytic mass. It may also manifest with paresthesia or numbness of the chin and delayed healing after a dental extraction. [15]

The invasive nature of OSCC leads to its spreading through the lymph nodes. Large and fixed lymph nodes are clinically suggestive of malignancy. Occasionally, cervical lymph node enlargement is detected prior to the primary tumor being observed. [16] The treatment of OSCC aims are to eradicate cancer, prevent recurrence, and restore the form and function of the affected parts as much as possible. Surgery is the preferred first-line treatment for both the initial and advanced stages of OSCC. However, in cases of advanced-stage OSCC, treatment often involves a combination of surgery, chemotherapy, and radiotherapy. [17] The 5-year survival rate has not improved despite the advances in diagnosis and treatment. [18] Early detection is the most important factor for minimizing the extent of surgery required and improving the survival rates.

Unfortunately, delay diagnosis usually occurs when OSCC is in its initial stages. [19] Delay in diagnosis of OSCC can be attributed to patients' negligence due to a lack of knowledge and awareness. [20] A professional delay in making a confirmatory diagnosis can also be another factor. [21] To overcome the late diagnosis, it is important that dentists, perform oral cancer examinations as part of

their clinical practice and be aware the pathogenesis and early clinical signs of the OSCC. [22]

Several studies have been conducted in multiple countries to assess the level of knowledge of dentists concerning the OSCC and evaluate their attitude and practice skills to diagnosis the oral malignancy in early stage. The objective of the present study is to evaluate the knowledge, attitude, and practice towards OSCC among Iraqi dentists.

Materials and Methods

Ethical Approval and study design

Ethical approval (No. 145) was obtained from the ethical committee at the dentistry department of Dijlah University College on October 1, 2023. The study was conducted from November 1, 2023, to March 6, 2024. The study is a cross-sectional questionnaire-based study. The study design and the questionnaire were depended on the previous study. [23]

Population and Sample Size

The population include the graduated and postgraduate Iraqi dentists residing and working inside Iraq. In 2023, 10,471 dentists renewed their license with the Iraqi Dental Association. The sample size established depend on the following equations. [24]

Sample size = distribution / ((marginal error / confidence interval)^2)

Distribution= 0.05, Marginal error = 0.05, confidence interval of confidence level 95% = 1.96.

True Sample = (Sample Size x Population) / (Sample Size+Population−1)

The outcome of the equations was 370, representing the sample needed.

Consent and Questionnaire Distribution

Dentists were invited to enroll in the study voluntarily, and their responses were collected after the aim of the study was clarified and consent to participate was obtained. A questionnaire was distributed electronically using the social media and communications platforms Facebook, Instagram, Telegram, WhatsApp, and Messenger.

Questionnaire and Scoring

The questionnaire is constructed using the Google Forms platform (www.google.com/forms/about/) and comprises four parts (Table 1). The first part consisted of demographic data, including variables such as gender, age, graduation year, and qualifications. The age classified into (≥ 40) and (< 40), the graduation year classified into 10 years or below (≥ 10) and above ten years (< 10), finally, the qualification distributed into graduated and postgraduate. The second part assessed the dentists' knowledge with ten questions (Q1 to Q10). The third part evaluated their attitudes with another set of ten questions (Q11 to Q20). Finally, the fourth part contained eight questions (Q21 to Q28) aimed at assessing dentists' practices. In the knowledge, attitude, and practice sections, a correct answer scored 1 point, while an incorrect one scored 0. The final knowledge score is categorized as either negative (≤ 5) or positive (> 5). The Attitude score classified as negative (≤ 5) or positive (> 5). According to the practice final score is divided into negative (≤ 4) and positive (> 4).

Statistical Analysis

The statistical analysis included both descriptive and inferential statistics. The descriptive analysis involved calculating the mean and standard deviation, as well as the frequency and percentage. The inferential statistics included the chi square test to test the association between the demographic data of the participants and knowledge, attitude, and practice. A significance level of P-value set at $P < 0.05$ and a confidence interval set at 95%. All statistics were performed using SPSS software (version 23).

Table 1: The questionnaire of study

Demographic			
Gender	O Male	O Female	
Age (year)	( )		
Graduation year (year)	( )		
Qualification	O Gradated	O Postgraduate	
Knowledge			
Q1: The OSCC is a common type of oral cancer.	O **Yes**	O No	O I do not know
Q2: what is the common site for OSCC?	O Check O Floor of the mouth	O Gingiva O Palate	O **Tongue** O Other
Q3: People at a considerable risk of OSCC.	O **Equal or above 40 years of age** O Below 40 years of age		O I do not know
Q4: The risk factor for OSCC?	O Tobacco O Sun exposure O Poor oral hygiene	O Virus infection O Genetic O Irritation	O Alcohol O **All of them**
Q5: The main symptom of early OSCC.	O Pain O Paresthesia	O **None, patient is asymptomatic.** O I do not know	
Q6: The early clinical presentation of OSCC.	O **Red or white area (patch)** O Ulcer		O Swelling O I do not know
Q7: In which stage is OSCC usually diagnosed	O Premalignant O Early		O **Advanced** O I do not know
Q8: Lymph nodes in advanced OSCC.	O **Hard, fixed, bilateral** O Soft, painful, mobile		O I do not know.
Q9: The most common precancerous oral lesion.	O **Erythroplakia/Leukoplakia** O Nicotinic stomatitis		O Candidiasis O I do not know.
Q10: OSCC is treatable.	O **Yes**	O No	O I do not Know
Attitude			
Q11: Do you think you have sufficient knowledge about the signs and symptoms of OSCC O **Agree** O Disagree O Unsure			
Q12: Do you think you are adequately trained to diagnose OSCC? O **Agree** O Disagree O Unsure			
Q13: Do you think you have adequate training to perform a patient's lymph node palpation (examination) O **Agree** O Disagree O Unsure			
Q14: Dentists should be trained about provide tobacco cessation education to the patient. O **Agree** O Disagree O Unsure			
Q15: Dentists should educate patients about the risk factors of OSCC. O **Agree** O Disagree O Unsure			
Q16: Patients with suspected OSCC lesions should be referred to a specialist. O **Agree** O Disagree O Unsure			
Q17: Do you think the early detection of OSCC improves the treatment outcomes. O **Agree** O Disagree O Unsure			
Q18: Examination of the oral mucosa for OSCC for older people should be provided annually. O **Agree** O Disagree O Unsure			
Q19: Do you think the steps of early OSCC examinations are time-consuming, difficult, and complicated. O Agree O **Disagree** O Unsure			
Q20: It is important to stay updated on the latest research about OSCC. O **Agree** O Disagree O Unsure			
Practice			
Q21: Do you routinely perform a complete oral mucosa examination on your dental patients? O **Yes** O No			
Q22: Do you routinely perform examination and palpate lymph nodes on your dental patients? O **Yes** O No			
Q23: Do you take a biopsy to a suspicious lesion. O **Yes** O No			
Q24: Do you educate patients on the adverse effects of alcohol and tobacco, and assist them in cessation? O **Yes** O No			
Q25: Do you educate your patients about the routine risk factors of OSCC? O **Yes** O No			
Q26: Do you try to educate your patients about self-examination of the oral mucosa and cancer screening? O **Yes** O No			
Q27: Do you take patients and family medical history as well as the alcohol and tobacco usage? O **Yes** O No			
Q28: Do you try or seek to stay updated on the latest research and information about OSCC? O **Yes** O No			

OSCC: oral squamous cell carcinoma

Bold font: the correct answer

Results

The total number of participants was 449 dentists (table 2), categorized as 261 males and 188 females. The mean age was 30.75 years, with 356 dentists under 40 years old and 93 dentists aged 40 years or older among the respondents. Of the participants, 306 held graduate degrees, while the remaining 143 were postgraduates. 34.3% of the respondents had experience for less than 10 years.

Table 2: The demographic data of the respondents.

The demographic data		
Gender	Male [a]	261, 58.1
	Female [a]	188, 41.9
Age	Minimum - Maximum	23 -71
	Mean age ± SD	30.75 ± 8.97
	< 40 years [a]	356, 79.3
	≥ 40 years [a]	93, 20.7
Experience	< 10 years [a]	295, 65.7
	≥ 10 years [a]	154, 34.3
Qualification	Graduated [a]	306, 68.2
	Postgraduate [a]	143, 31.8

a: frequency, percentage

The correct answers to the questions are shown in Figure 1. The questions with the highest number of positive responses were Q16 (Patients with suspected OSCC lesions should be referred to a specialist), followed by Q1 (The OSCC is a common type of oral cancer) and Q15 (Dentists should educate patients about the risk factors of OSCC). The question with the lowest number of correct answers was Q5 (The main symptom of early OSCC).

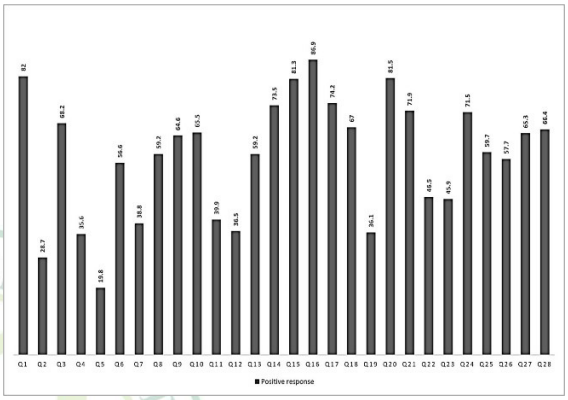

Figure 1: The percentage of the positive (gray color) response for each question. (Q1-Q10) represent the knowledge section, (Q11-Q20) represent the attitude section, and (Q21-Q28) represent the practicing section.

A positive attitude and practice toward OSCC were observed in more than half of the dentists who participated in the present study. However, less than half of the respondents 209 (46.5%) in the study demonstrated positive knowledge. Positive attitudes and practice were demonstrated by 335 (74.6%) and 251 (54.9%) of the respondents, respectively. Figure 2 shows the percentage of positive and negative knowledge, attitude, and practice regarding OSCC.

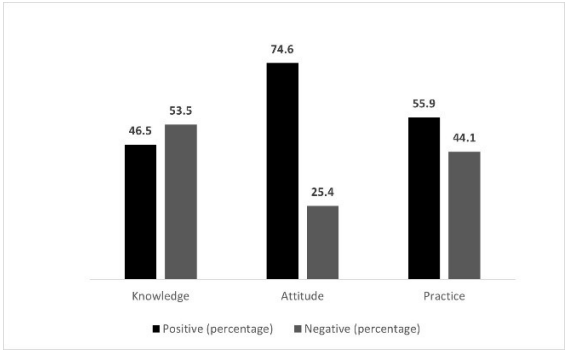

Figure 2: The percentage of both positive (black color) and negative (gray color) knowledge, attitudes, and practices concerning oral squamous cell carcinoma.

Table 3: The association between the demographic data and the final score of knowledge, attitude, and practice.

	Knowledge			**Attitude**			**Practice**		
Demographic	**Positive**	**Negative**	**P-value***	**Positive**	**Negative**	**P-value***	**Positive**	**Negative**	**P-value***
Gender	**> 5**	**≤ 5**		**> 5**	**≤ 5**		**> 4**	**≤ 4**	
Male [a]	112, 42.9	149, 57.1	0.069	189, 72.4	72, 27.6	0.228	148, 56.7	113, 43.3	0.701
Female [a]	97, 51.6	91, 48.4		146. 77.7	42, 22.3		103, 54.8	83, 45.2	
Age									
< 40 years [a]	172, 48.3	184, 51.7	0.162	261, 73.3	95, 26.7	0.217	198, 55.6	158, 44.4	0.813
≥ 40 years [a]	37, 39.8	56, 60.2		74, 79.6	19, 20.4		53, 57.0	40, 43.0	
Experience									
< 10 years [a]	139, 47.1	156, 52.9	0.737	206, 69.8	89, 30.2	**0.001**	159, 53.9	136, 46.1	0.237
≥ 10 years [a]	70, 45.5	84, 54.9		129, 83.8	25, 16.2		92, 59.7	62, 40.3	
Qualification									
Graduated [a]	146, 47.7	160, 52.3	0.469	222, 72.5	84, 27.5	0.142	166, 54.2	140, 45.8	0.302
Postgraduate [a]	63, 44.1	80, 55.9		113, 79.0	30, 21.0		85, 59.4	58, 40.6	

a: frequency, percentage
*: **Bold font** indicates significance at $p < 0.05$ by Chi-square test.

The association between demographic data with knowledge, attitude, and practice was found to be non-significant, except for the association between experience and attitude. A significant correlation (p value = 0.001) was observed for good attitude among dentists with 10 years of experience or more. Table 3 presents the association between demographic data and the final score of knowledge, attitude, and practice.

Discussion

The objective of the study was to provide a comprehensive description of OSCC knowledge, attitudes, and practices among dentists in Iraq. Deficiency in the knowledge of dentists could lead to missed or late diagnosis, which affects the aggressiveness and outcome of the treatment, as well as the prognosis.

More than two-thirds of the dentists agree that OSCC is the most common cancer in the oral cavity. This result comes in agree

with study held in United State of America. [25] According to the common sites for OSCC within the oral cavity, the correct answer, the tongue, was selected by less than one third of the participants. This outcome agrees with the findings of Nada and Sudeshni, as they found that 20% of dentists in Sudan recognized the tongue as the common site for OSCC. [26] This finding highlights the lack of knowledge regarding the preferred oral site for OSCC. Previous cohort studies have shown that the tongue is the primary site for OSCC cases in Iraq [27] and many worldwide countries. [28]

Most OSCC cases are diagnosed after the age of 40. [29] In the present study, this fact was selected by 70% of participants. Previous studies mentioned that OSCC is multifactorial, and no single cause or risk factor can be identified. However, tobacco and alcohol are considered the main risk factors; there are OSCC cases not associated with them. [30] Therefore, the correct answer to the question about the risk factor of OSCC was considered if the participant selected all choices. One third of dentists in the present study ticked the correct answer.

The most negative answer regarding the knowledge of the early symptoms of OSCC. Patients with early lesions were mostly asymptomatic, although discomfort was reported in some studies. [31] Several studies have observed that dentists fail to make sufficient early diagnoses of OSCC due to insufficient knowledge about the disease's symptoms. [32] Previous studies have reported that just less than half of dentists agree that the common diagnostic stage of OSCC is the advanced stage. [25] The present study has a similar finding to the previous works. Around sixty percent of dentists correctly selected the early clinical appearance of OSCC as a red or white patch. The percent of positive answers comes in agree with previous study held in India [33] and Italy. [34] The lymph nodes in OSCC patients have been defined as bilateral hard and fixed lymph nodes. [35] Sixty percent of the respondents in the present study demonstrated positive knowledge about the description of lymph nodes in OSCC cases. This result was almost similar to a study conducted in Indonesia [36] but lower than that observed in previous studies. [32]

Erythroplakia and leukoplakia are common precancerous lesions, [37] and sixty percent of dentists correctly identified them. This finding is consistent with a study conducted in Turkey [38] and higher than the outcomes of previous study. [39] At the same time, ninety percent of Kuwaiti dentists identified erythroplakia and leukoplakia as premalignant conditions, which does not agree with the results of the present study. [40] Squamous cell carcinoma of the oral cavity in its early stages can be treated with an excellent prognosis. The late diagnosis and advanced stage negatively affect the prognosis. [41] Around two-thirds of respondents agree with this statement.

Ninety percent of dentists showed agreement on the necessity of referring patients with suspected OSCC to specialists. The attitude of Yemeni and Saudi dentists regarding referral to specialists was like the present findings. [42]

Providing education regarding the risk factors of OSCC to the general population, could play a role in prevention measurement.[43] Two thirds of respondents agree that dentists should educate patients about the risk factors of OSCC and help them stop the habit of tobacco and alcohol intake. This result almost similar the responses of Yemeni dentists. [44] In Colombia, thirty percent of dentists showed low positively regarding the explanation the risk factor of oral cancer. [45]

In addition to the basic knowledge and training needed to detect oral cancer, keeping updated will improve the probability of early detection of OSCC. [46] The dentists in the present study showed good attitude about

keeping updated concerning signs, symptoms, diagnosis, interventions, and prognosis aspects of oral cancer.

The lymph node is part of the stage estimation for OSCC. Lymph node involvement in oral cancer has an effect on the diagnosis, type and aggressiveness of treatment, as well as the prognosis. [47] Sixty percent of the respondents agree that they have the required skill to examine the lymph node. This outcome comes close to the results of studies conducted on Turkish [48] and Kuwaiti dentists. [49]

In the current study, one-third of Iraqi dentists expressed beliefs about their ability to perform oral cancer examinations. Worldwide, dentists showed discrepancies in their capability to examine the OSCC. The percentage of dentists who showed the ability to examine the oral cavity was 49% in Kuwait [49] and 68% in India. [50]

In dental units, two-thirds of our dentists revealed that they routinely examine the mucosa of the oral cavity. These results were favorable compared to a study conducted in Egypt and Spain, where only one-third and half of dentists, respectively, reported examining the oral mucosa of dental patients.[51] Half of the study participants regularly inspect the lymph nodes of patients visiting the clinic for dental treatments. These results were lower than the findings reported by Charles and his colleagues, who indicated that 80% of dentists in the USA do routine lymph node inspections. [52] Not regularly checking the oral mucosa and lymph nodes during treatment sessions, especially when there are no obvious indicators of oral cancer, helps to prevent early detection of oral cancer. [53]

Multiple international studies have demonstrated that numerous dentists lack the proficiency to carry out biopsies. [54] This is consistent with the current study's results, which indicate that around 50% of Iraqi dentists do not do biopsies when required.

Dental professionals should educate their patients about the long-term negative impacts of alcohol and tobacco use as well as how these factors may contribute to the development of OSCC, especially in those with a history of drinking and smoking. [55] Dentists have a responsibility to further educate the public about the risk factors associated with oral cancer. Dentists, as healthcare professionals, have a crucial role in assisting patients in discontinuing harmful habits such as alcohol consumption and smoking that impact both oral and overall health. [56]

More than half of the Iraqi dentists in the study were obtaining information on alcohol and tobacco use from dental patients, assisting them in quitting these harmful behaviors, and educating them about the risk factors of OSCC. These findings are consistent with a prior study that Museedi carried out in Iraq in 2014 [57] and lower than the study held in Malaysia. [58] Thus, there is a need to enhance dentists' expertise on oral cancer-related issues. 67% of Iraqi dentists declare they seek to get update information about squamous cell carcinoma. Changing the attitude of participants who answered negatively about receiving up-to-date information and clarifying the role of dentists in preventing and detecting oral cancer early.[59]

There was no statistically significant correlation between the demographic variables and the three primary components of this study (knowledge, attitude, and practice). Attitude and years of experience were the only two variables that showed a significant correlation. Dentists who have been practicing for more than 10 years seemed to have a more positive attitude on OSCC than their younger counterparts. The recent study disagrees with study held Sudan,[60] because these studies found the recent graduated dentists had better knowledge and attitude toward oral cancer.

We thought that the practitioners were honest and gave the right answers. There are various limitations in this study. Due to its cross-sectional design, the study is susceptible to recall bias. Responses were subjective and may not accurately represent the dentist's true level of knowledge and daily professional routines. We did not include questions in the questionnaire about further established risk factors for oral cancer, such as Fanconi anemia, tertiary syphilis, and bone marrow transplantation. [61] The questionnaire is sent through social media platforms to reach dentists. The absence of responses from dentists who did not utilize social media during the study period may impact the results.

Conclusions

Oral cancer prevention strategies should be addressed in any preventative strategy to minimize the prevalence of OSCC in Iraq. Evaluating dentists' expertise is one approach to evaluate their performance. This study identified deficiencies in dentists' knowledge, attitude, and practice about certain aspects of oral cancer. As a result, the current study emphasized the importance of reviewing dental school curricula as well as improving educational methods and programs for dental students and dentists in terms of early detection and prevention of oral cancer and premalignant lesions of the oral cavity, as dental practitioners play a critical role in the prevention and early detection of oral cancer. Attendance at continuing education classes appears to influence sustaining good knowledge levels, attitudes, and practice scores for oral cancer.

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The supporting source/financial relationships had no such involvement.

Data availability statement

The data that support the findings of the present study are available from the corresponding author upon reasonable request.

Author statement

All authors have read and approved the final version of the manuscript. Muhanad L Alshami had full access to all the data in this study and takes complete responsibility for the integrity of the data and the accuracy of the data analysis.

Ethics approval and consent to participate

Ethical approval (No. 145) was obtained from the ethical committee at the dentistry department of Dijlah University College on October 1, 2023.

Conflict of interest

The authors declare no conflict of interest

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