Evaluating the Knowledge and Awareness of Oral Cancer among Dental and Medical Undergraduate Students

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Abstract

Aims: The purpose of this research was to evaluate the knowledge and awareness of undergraduate medical and dental students from various Iraqi universities regarding oral cancer. **Methods:** A cross-sectional survey was conducted, and questionnaires were distributed to 378 students. Awareness and knowledge of oral cancer were assessed through questions related to examinations, patient history, risk factors for oral cancer, and the clinical appearance of oral cancer.

Results: Dental participants reported significantly higher percentages (84.8%) for routine oral examinations compared to medical students (50.4%). Smoking was identified as a risk factor by 90.8% of medical students and 77.0% of dental students. A very small percentage of both dental (9.7%) and medical (5.0%) students felt they were very well informed about the clinical appearance of oral cancer. Regarding oral changes associated with oral cancer, 70.6% of medical students and 56.8% of dental students recognized leukoplakia. The majority of medical (91.6%) and dental (94.9%) students indicated that they needed more information about oral cancer.

Conclusions This study identified both strengths and weaknesses in oral cancer knowledge among dental and medical students. While dental students displayed greater awareness in certain areas, the overall findings emphasize the need for ongoing education and training.

Key words: cancer awareness, dental education, knowledge, medical education.

Introduction

Oral cancer is a malignant neoplasm in the mouth, which include the buccal mucosa, floor of the mouth, the tongue's anterior two-thirds, palate, vestibule, lips, alveolus, and gingivae[1, 2]. Oral cancer incidence is increasing in most nations, particularly in developing nations[3]. Squamous cell carcinomas (SCC) account for 95% of oral malignancies, which are associated with avoidable etiological risk factors[4]. Approximately 60% of cases of oral malignancies are discovered at late stages (III and IV), in spite the fact that the oral cavity is easily accessible for examination. The survival rate for this type of cancer is extremely low worldwide, having a 50% five-year survival rate on average [5,6], in spite therapy advancements.

Eating, swallowing, speaking, and physical deformities are just a few of the functional and aesthetic impairments that many patients who have successfully undergone treatment for oral cancer. As a result, their quality of life can suffer significantly as a result[7]. A substantial percentage of patients with advanced illness present late, which contributes to the substantial mortality rate from oral cancer[8]. Early detection of malignant lesions in the mouth improves quality of life, lower treatment expenses, and lowers rates of morbidity, death, and mutilation [6].

A longer interval between the onset of symptoms and the diagnostic referral increases the likelihood of receiving a diagnosis at an advanced stage, which is associated with a lower oral cancer survival rate, according to the authors of a systematic review and meta-analysis that examined the relation between intervals to diagnosis, TNM (Tumor, Node, and Metastasis) classification, and oral cancer survival [9].

Visual examination of the oral cavity for cancer screening enables painless, non-invasive, and time-efficient, detection of premalignant and malignant tumors [10, 11]. Even though the oral cavity is a readily accessible site for clinical evaluation, early diagnosis of precancerous and early cancer lesions is prevented by patients' and healthcare professionals' lack of awareness [12-14]. To date, a number of studies have documented a concerning lack of knowledge of oral cancer and its risk factors among the general public and healthcare professionals [15,16]. Similarly, research has shown that dental and medical students generally lack knowledge as well as training regarding oral cancer [17-19]. Raising patient and healthcare professional knowledge and awareness is a viable way to increase survival for oral cancer patients [20].

As future professionals, dental and medical students must develop the clinical skills necessary to identify oral cancer at early stage. Early detection allows for prompt medical attention, which can help prevent the stress associated with cancer treatment. Therefore, this research aimed to assess knowledge and awareness of undergraduate medical and dental students at different Iraqi universities about oral cancer risk factors, examination procedures, and diagnostic signs, as well as to assess if they need more information and education about oral cancer.

Materials and Methods

A cross-sectional questionnaire was conducted among dental and medical students from November 2024 and

February 2025. Only students in their clinical years were included in the study. The survey was assigned to 4th, 5th, and 6th-year medical students, as well as 4th and 5th dental students online. These students were selected because they had received lectures on oral cancer and other oral disorders.

The oral surgery and periodontics scientific committee at Mustansiriyah University's College of Dentistry approved this study. Participation was entirely voluntary, and no personal information was collected.

Questionnaires were distributed among 378 students (259 dental, 119 medical). Given that the survey questions had been used earlier in research [15,17,21], they are considered valid. The questionnaire included sections on socio-demographic characteristics such as gender, age, academic year, college, and university, and eleven items evaluating students' knowledge and awareness of oral cancer. These covered aspects such as routine oral mucosal examination, taking patient's history to identify high-risk patients, oral cancer risk factors, advising patients on risk factors, the chance to examine oral cancer patients, understanding of clinical appearance and changes within the mouth of oral cancer, preferred pathway of referral for suspected oral malignancy, perceived sufficiency of knowledge on detection and prevention of oral cancer, interest in receiving further education, and preferred methods for obtaining such information.

Data were analyzed using version 30.0 of IBM SPSS Statistics. Descriptive statistics for age and gender, including means and standard deviations, were calculated, and questionnaire responses were summarized with frequencies and percentages. The Pearson Chi-square test was used to assess the association between the responses of medical and dental students, with a p-value of ≤ 0.05 deemed considered statistically significant. The sample size was determined using G*Power software.

Results

Females were more prevalent than males in the research. Among the students surveyed, 262 (69.7%) were female, while 114(30.3%) were male. The mean age was similar for both medical and dental students, at 22.5 ± 2.4 and 22.3 ± 1.7, respectively (Table 1).

Significantly more dental participants (84.8%) reported routinely examining the oral mucosa in contrast 50.4% of medical students. Furthermore, 93% of dental students recognize the importance of history taking in identifying high-risk individuals, while only 73.1% of medical students do (Table 2).

Regarding oral cancer risk factors, recognized smoking as a risk factor, compared 90.8% of medical students in comparison to 77.0% of dental students. Almost two-thirds of medical student (64.7%) recognized alcohol as a risk factor, while a lesser percentage of dental students (52.9%) did the same (Table 2).

Significantly more dental students reported advising patients on oral cancer risk factors compared to medical students, with 66.9% of dental students and 42.9% of medical students indicating they do so. Concerning oral cancer's clinical appearance, the highest percentage of dental (45.9%) and medical (47.1%)

students believe they are adequately informed (Table 2).

When questioned about the changes in the oral cavity associated with oral cancer, 70.6% of medical students recognized leukoplakia compared to 56.8% of dental students. Erythroplakia and non-healing ulcers were reported by 38.1% and 55.6% of dental students, respectively, while these changes were recognized by 33.6% and 60.5% of medical students, respectively (Table 2).

Both medical (55.5%) and dental (68.5%) students primarily selected the oral medicine specialist as the referral point for patients with oral cancer, followed by the maxillofacial surgeon. Approximately one-third of dental students (34.2%) compared to 23.5% of medical students feel that you have sufficient knowledge about the detection and prevention of oral cancer (Table 2).

The majority of medical (91.6%) and dental (94.9%) respondents stated that they need for additional information and education regarding oral cancer. Among dental students, an information pack was the most preferred source of further information. In contrast, medical students showed a nearly equal preference for information packs, lectures, and seminars (Table 2).

Discussion

In our study, the gender distribution of respondents is similar in both the medical and dental groups, with a higher proportion of female students participating than male students. This is like other study [17,22, 23] and it aligns with the observation that more female students than male

students enrolling in medical and dentistry schools [24,25].

Despite advancements in treatment, oral cancer patients have generally poor survival rates, according to numerous research on the disease. To avoid missing the early warning signs of oral cancer, it is actually crucial that dentistry and medical students are familiar with the risk factors, clinical characteristics, as well as investigative techniques of the disease [26]. In our research, the results revealed that a significantly more dental students (84.8%) routinely examined patients oral mucosa compared to medical students (50.4%), this was in agreement with other study [17] in which the percentage were 96.7% for dental students and 60.6% for medical students. The reason for this could be due to that dental students have the chance to regularly inspect the oral cavity, but medical students are less likely to inspect oral mucosa and may only do so when a patient presents with an oral-related issue.

Chewing betel quid, alcohol, tobacco (both smokeless and smoked), and HPV (human papillomavirus) have all been found to oral cancer risk factors [27]. As for risk factors for oral cancer, our study revealed that both medical (90.8%) and dental students (77.0%) demonstrated a high level of awareness regarding smoking as a major oral cancer risk factor. This is consistent with other research showing that among healthcare students, smoking is the most recognized risk factor [21,23]. This outcome is expected given the proven association between tobacco use and oral cancer, and it demonstrates the impact of the present educational initiatives are in this area.

Regarding alcohol consumption, medical students exhibited a better understanding

compared to dental students. This discrepancy may stem from the two fields' differing emphasis on systemic risk concerns in their respective curricula. While our results showed higher overall awareness than those reported by Awan et al. (2014)[17], their findings indicated the opposite trend, with dental students demonstrating greater knowledge than medical students.

Interestingly, a significant association was found between the type of college and the recognition of radiation exposure as an oral cancer risk factor, with a higher proportion among dental students (65.8%) compared to medical students (48.7%) (p=0.002). This is may be related to radiographic exposure, and its possible hazards are given more attention in the dental curriculum. Our findings align with those of Gunjal et al. in 2019 [23], which also reported greater awareness of radiation as a risk factor among dental students compared to medical students. However, the awareness levels in the current study were lower, as their study reported significantly higher recognition rates (96.6% vs. 84%).

On the other hand, knowledge about betel quid and malnutrition as risk factors was suboptimal in both groups and it was lower than that reported in previous studies [23].

Although students demonstrated positive awareness of certain risk factors for oral cancer, such as a strong recognition of smoking and an average understanding of alcohol and radiation exposure, there was a noticeable gap in awareness of other risk factors in both groups. This underscores the need for further education and emphasis on the less commonly recognized risk factors of oral cancer.

These results are in line with research showing that less prevalent etiological causes of oral cancer are frequently not well known to healthcare students. In a multinational survey of dentistry students from four different Asian countries, Halawany et al. (2013) [28] found that the identification of different risk factors for oral cancer was notably low.

Effective patient education is crucial for oral cancer prevention. In this research, dental students demonstrated a significantly higher engagement in advising patients about the risk factors for oral cancer than medical students. This difference may be attributed to their greater exposure to oral health topics in their training. Our findings aligned with previous studies [17,21] showing that dental students demonstrated greater engagement than medical students; however, the overall results in our study were lower than those reported in these studies. This suggests that integrating structured oral cancer education into both medical and dental curricula could enhance students' awareness and involvement in preventive efforts.

Regarding self-assessed knowledge of the clinical appearance of oral cancer, the highest percentage of medical and dental students rated themselves as only "adequately informed". However, a minority in either group felt "very well informed" (5.0% among medical students vs. 9.7% dental), indicating a need for improved clinical training and emphasizing the importance of integrating more hands-on experience and case-based learning to enhance students' ability to recognize and diagnose oral cancer effectively.

The findings regarding the recognition of oral cancer manifestations varied between the two groups. Medical students demonstrated significantly greater awareness of leukoplakia as a potential sign of malignancy compared to dental students (70.6% vs. 56.8%, p=0.011). This awareness was greater than that reported by Awan et al. in 2019 [17], although in their study, dental students had greater awareness. Recognition of non-healing ulcers and fair awareness of erythroplakia was fair in both groups. A concerning proportion of students in both groups admitted to not knowing the signs of oral cancer, underscoring the need for improved education on early detection.

Among the referral options for suspected oral malignancy, oral medicine was the most commonly chosen specialty by both medical and dental students (55.5% vs. 68.5%, p=0.014), followed by maxillofacial surgery (45.4% vs. 49.8%, p=0.424). This result aligns with previous study by Carter and Ogden (2007) [21], in which Oral medicine and oral and maxillofacial surgery were chosen by the majority of medical and dentistry students as their preferred referral options for patients with suspected oral cancer. These findings suggest that students were generally recognize the importance of specialized care for oral cancer.

Our findings revealed a significant lack of self-perceived knowledge about oral cancer prevention and detection among both groups, with medical students expressing lower confidence levels. As expected, given their insufficient understanding of oral cancer detection and prevention, the vast majority of students in both groups recognized the need for more education on oral cancer. These findings

were consistent with observations from previous research [21] by Carter and Ogden (2007), which indicated that approximately 90% of both medical and dental students requested additional information on oral cancer prevention and early detection.

Conclusions

The findings of this study highlight both strengths and gaps in the knowledge of medical and dental students on oral cancer. While certain aspects of awareness, particularly among dental students, are encouraging, the overall results indicate a clear need for continuous education and training. Given the rising prevalence of oral cancer worldwide, medical professionals and dentists roles in preventing and detecting the disease are becoming increasingly crucial.

Given the crucial role of early detection in improving oral cancer outcomes, it is essential to integrate more comprehensive and up-to-date oral cancer education into medical and dental curricula. This can be accomplished through targeted lectures, clinical case discussions, and hands-on training, ensuring that students develop the confidence and competence necessary for prevention, early diagnosis, and appropriate patient management.

Updating curricula to include structured and interactive learning approaches will not only bridge existing knowledge gaps but also empower future healthcare professionals to take a more active role in the detection and prevention of oral cancer.

Conflict of interest
The authors reported that they have no conflicts of interest.

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Table1: Descriptive Statistics of the Study Sample

Variables		Medical students	Dental students	Total
Age(mean)		22.5± 2.4	22.3± 1.7	22.4± 2
Gender N (%)	Male	41(34.5%)	73(28.4%)	114(30.3%)
	Female	78(65.5%)	184(71.6%)	262(69.7%)

N (number), % (percent)

Table 2: Response Distribution of the Questioner questions

Question		Medical Freq. (%)	Dentistry Freq. (%)	P-value
1. Do you routinely examine patient's oral mucosa?	Yes	60(50.4%)	218(84.8%)	<0.001
	No	59(49.6%)	39(15.2%)	
2. Do you constantly take patient's history to identify high-risk patients?	Yes	87(73.1%)	239(93%)	<0.001
	No	32(26.9%)	18(7%)	
3. What would you consider as risk factors of oral cancer? (choose one or more)	Smoking	108(90.8%)	198(77.0%)	0.001
	Alcohol	77(64.7%)	136(52.9%)	0.032
	Betel quid	19(16.0%)	33(12.8%)	0.414
	Radiation	58(48.7%)	169(65.8%)	0.002
	Malnutrition	25 (21%)	43 (16.7%)	0.316
	Don't know	6 (5%)	8 (3.1%)	0.358
	Others	15 (12.6%)	33 (12.8%)	0.949
4. Do you advice patients on oral cancer risk factors?	Yes	51(42.9%)	172(66.9%)	<0.001
	No	68(57.1%)	85(33.1%)	
5. Have you had the chance to examine patients with oral cancer?	Yes	17(14.3%)	57(22.2%)	0.73
	No	102(85.7%)	200(77.8%)	
6. How do you feel as regards to clinical appearance of oral cancer?	Very well informed	6(5.0%)	25(9.7%)	0.009
	Well informed	14(11.8%)	55(21.4%)	
	Adequately informed	56(47.1%)	118(45.9%)	
	Poorly informed	43(36.1%)	59(23.0%)	
7. What changes in oral cavity would you associate with oral cancer? (choose one or more)	Leukoplakia	84 (70.6%)	146(56.8%)	0.011
	Erythroplakia	40(33.6%)	98(38.1%)	0.398
	Non-healing ulcer	72 (60.5%)	143(55.6%)	0.376
	Don't know	17 (14.3%)	35(13.6%)	0.862
	Others	4(3.4%)	25(9.7%)	0.031

8. Where will you refer a patient if you suspect an oral malignancy? (choose one or more)	Maxillofacial surgeon	54 (45.4%)	128(49.8%)	0.424
	Oral medicine	66 (55.5%)	176 (68.5%)	0.014
	ENT surgeon	40 (33.6%)	17 (6.6%)	<0.001
	Plastic surgery	12 (10.1%)	11 (4.3%	0.029
	Dentist	10 (8.4%)	28(10.9%)	0.456
	General practitioner	7 (5.9%)	33 (12.8%)	0.042
	Others	7(5.9%)	14(5.4%)	0.468
9. Do you feel that you have sufficient knowledge about prevention and detection of oral cancer?	Yes	28(23.5%)	88 (34.2%)	0.036
	No	91 (76.5%)	169 (65.8%)	
10. Do you think that you need more information and teaching regarding oral cancer?	Yes	109(91.6%)	244(94.9%)	0.2
	No	10 (8.4%)	13 (5.1%)	
11. If so, Which format is your favorite? (choose one or more)	Information packs	53(44.5%)	151(58.8%)	0.01
	Lectures	59 (49.6%)	91(35.4%)	0.009
	Seminars	52(43.7%)	120(46.7%)	0.588

Chi square test, freq. (Frequency), % (percent)