



Dental Students' Awareness About Prevention, Early Diagnosis and Referral of Patients With Oral Cancers in Tabriz in 2018

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Abstract

Background: Oral cancers are the 11th leading cancers worldwide, with an annual mortality rate of 500 across the world. Therefore, the aim of the present study was to evaluate the awareness of dental students about prevention, early diagnosis and referral of patients with oral cancers in Tabriz Azad University in 2018.

Methods: The present descriptive, cross-sectional study was carried out in 2018 in dental students from the third to the sixth year of their studies in Tabriz Azad University using their self-reports. To this end, 153 dental students were randomly selected based on their education levels and included in the study. Data were collected using a standard questionnaire and analyzed by chi-squared test. Statistical significance was considered to be $P < 0.05$.

Results: A total of 80.4% of the students examined the oral mucosa during routine clinical examinations and 83.7% reported that they would warn their patients about the risk factors for cancers after graduation. Only 51% of the students had ever had a chance to examine patients with oral lesions. A total of 67.1% of the subjects reported that they did not have adequate awareness of prevention of oral cancers and 91.5% were interested in gaining more knowledge about oral cancers. When the subjects were questioned about knowledge about the clinical manifestations of oral cancers, 31.4% exhibited very low level of knowledge. The majority of students (78.5%) believed that an ulcer with irregular margins that lasted for more than two weeks was due to cancer.

Conclusions: The results showed a moderate level of knowledge in dental students about the clinical manifestations of oral cancers, the related risk factors and how to refer patients with such cancers. The majority of the students reported inadequate information and knowledge about prevention of oral cancers and needed to gain more knowledge.

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Keywords: Awareness, Dental students, Oral cancers, Prevention

Received July 3, 2018

Accepted Aug. 24, 2018

ePublished Sep. 12, 2018



Citation: Noorbakhsh F, Rezaie F, Abdolmaleki M, Ghasemi N, Abdollahi B, Nojan F, et al. Dental students' awareness about prevention, early diagnosis and referral of patients with oral cancers in Tabriz in 2018. Avicenna J Dent Res. 2018;10(3):89-94. doi: 10.34172/ajdr.2018.19.

Background

There is an estimate of about 657 000 new cases of oropharyngeal cancers annually, and more than 330 000 deaths from these cancers. Oral cancers affect the main subsites of lip, oral cavity, nasopharynx, and pharynx and have a high prevalence especially in South Central Asia because of exposure to risk factor (1). Early diagnosis of these conditions might have a critical role in increasing survival rate. Patients with oral and pharyngeal cancers diagnosed early have a 5-year survival rate of 80.4%, with the rate decreasing to 31.6% in those diagnosed in advanced stages (2). In addition, early diagnosis prevents invasive surgeries and gives rise to better functional outcomes in relation to speech and swallowing (3,4).

Dentists have a prominent role in the prevention and early diagnosis of oral cancers because they might be the first clinicians to encounter a patient with oral cancer.

Highlights

- ▶ The awareness of dental students about the clinical manifestations of oral cancers, the relevant risk factors and the mechanism of referral of patients were moderate.
- ▶ The majority of the students carry out routine clinical examinations to discover oral cancers, they do not have proper knowledge about some risk factors and oral lesions that may lead to cancers.
- ▶ The majority of the students reported inadequate knowledge about prevention of oral cancers and the need for further information. It is therefore necessary to develop more comprehensive educational programs during their academic studies.

Therefore, they are able to perform screening for oral cancers, advise interventions and recommend avoiding risky habits and behaviors. Inadequate knowledge of dentists might lead to delayed diagnosis of oral cancers (5-7). It is therefore important for dental students, as future oral healthcare providers, to acquire adequate

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knowledge about oral cancer risk factors and receive appropriate training in the diagnosis of the signs and symptoms of such conditions for early management of suspected oral lesions. However, some studies have shown that dentists are not properly able to diagnose oral cancers in early stages due to lack of knowledge. Furthermore, the performance of dental students in this respect is usually unsatisfactory (4,8-12).

The total knowledge score about oral cancers was moderate and knowledge about treatment modalities and the relevant complications was low among general dental practitioners in Babol, Iran (13). Studies in the United States (14), Spain (15) and the United Kingdom (16) showed that dentists were generally knowledgeable about oral cancers; however, there had some deficiencies in their knowledge about preventive measures.

The awareness of dental students in the United Arab Emirates (17), Brazil (18), the Netherlands (2), Tehran, Iran (11) and Kuwait (19) was also low with respect to the early diagnosis of oral cancers. However, a search in databases showed that a limited number of studies have investigated the dental students' knowledge in this respect in Iran, especially in the northwest of the country. Therefore, the present study was conducted, as the first study of this type, to investigate the awareness of dental students in Tabriz Azad University about prevention, early diagnosis and referral of patients with oral cancers.

Methods

Study Design

The present descriptive, cross-sectional study was carried out in dental students in Tabriz Azad University in 2018 using their self-reports.

The general dental education curriculum in Iran consists of 6 years and dental students from the third year begin clinical training; therefore, the questionnaire was distributed among third- to sixth-year dental students (semesters 6, 8, 10, and 12, respectively) of Azad University, Tabriz Branch.

The inclusion criteria consisted of receiving education in oral cancers in oral pathology and oral medicine courses and having clinical experience.

Students who had not pass the oral pathology or oral diseases courses and those who had filled out questionnaire incompletely were excluded from the study. Cochran formula was used to determine the sample size; 153 students were randomly selected based their education level using stratified sampling and then included in the study.

Data Collection

Carter and Ogden Standard Questionnaire (10) was used to collect data. The demographic data of the students, including age, gender and education level, were recorded in the first section of the questionnaire. The second section consisted of 10 questions on the following items:

- 1) evaluation of the oral mucosa during routine dental examinations;
- 2) warning the patients about factors for oral cancers;
- 3) the opportunity to examine patients with oral cancers;
- 4) having adequate knowledge on prevention of cancers;
- 5) being interested in gaining further knowledge about oral cancers;
- 6) awareness and knowledge about oral cancers (using a Likert scale: very good, good, adequate, very low);
- 7) the patient's previous examination by a physician or a dentist);
- 8) referral of patient with oral cancer to the relevant specialist;
- 9) factors effective in inducing oral cancers; and
- 10) clinical manifestations of oral cancers.

The subjects could select more than one item for questions 9 and 10.

Before completing the questionnaires, the aim and the necessity of the study were explained to the subjects. Each subject was allowed 15 minutes to complete the questionnaire under the supervision of the researcher in a calm and comfortable location.

Validity and Reliability of the Questionnaire

The validity and reliability of the questionnaire have already been confirmed in various studies in Iran and other countries (10,11). However, its validity and reliability were evaluated in the present study again.

The questionnaire was given to five professors in the Faculty of Dentistry to assess its validity and was revised, if necessary. The questionnaire was distributed among 25 students in a pilot study to determine the reliability of the questions using Cronbach alpha coefficient. After the questionnaire was approved, it was administered to the subjects. Cronbach alpha coefficient was calculated at 0.87.

Statistical Analysis

Data were analyzed using descriptive statistics (frequency, percentage, mean and standard deviations) using chi-squared test in the SPSS version 18. Statistical significance was considered $P < 0.05$.

Results

In the present study, 94 subjects (61.4%) were female and 59 (38.6%) were male. The mean age of the subjects was 23.1 ± 0.6 years. During the routine clinical examinations, 80.4% of the students examined the oral mucosa. There was no significant difference in this respect between the students in different education levels (Table 1). In addition, 83.7% of the subjects reported that after graduation from the university, they would warn their patients about the risk factors for oral cancers, with a significantly higher rate in third-year dental students.

Only 51% of the students reported that they had already had the opportunity to examine patients with oral lesions. In this regard, the fifth- and sixth-year students and the fourth- and third-year students reported the highest and lowest rates of encountering oral cancer patients, with a statistically significant difference.

Table 1. The Frequency (Percentage) of the Students' Responses to the Questions for Each Education Level

Questions	3rd Year n=46		4th Year n=36		5th Year n=45		6th Year n=26		Total N=153		P Value
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	
Do you routinely examine the oral mucosa, too, during oral examinations?	8 (17.4)	38 (82.6)	5 (13.9)	31 (86.1)	10 (22.2)	35 (77.8)	7 (26.9)	19 (73.1)	30 (19.6)	123 (80.4)	0.5
Are you going to warn your patients about oral cancer risk factors after graduation?	2 (4.3)	44 (95.7)	8 (22.2)	28 (77.8)	12 (26.7)	33 (73.3)	3 (11.5)	23 (88.5)	25 (16.3)	128 (83.7)	0.02
Have you ever had the opportunity to examine patients with oral lesions?	37 (80.4)	9 (19.6)	14 (38.9)	22 (61.1)	15 (33.3)	30 (66.7)	9 (34.6)	17 (65.4)	75 (49)	78 (51)	0.0001
Do you believe you have adequate information on prevention of oral cancers?	31 (67.4)	15 (32.6)	27 (74.3)	9 (25.7)	29 (64.4)	16 (35.6)	16 (61.5)	10 (38.5)	103 (67.1)	50 (32.9)	0.7
Are you interested in acquiring more information about oral cancers?	2 (4.3)	42 (95.7)	0	36 (100)	9 (20)	36 (80)	2 (7.7)	24 (92.3)	13 (8.5)	140 (91.5)	0.007

Based on the self-reports of 67.1% of the subjects, they did not have adequate knowledge about the prevention of oral cancers and 91.5% of them were interested in acquiring more knowledge about oral cancers. The fourth-year students felt the greatest and lowest need for acquiring knowledge about oral cancers, followed by third-, sixth- and fifth-year students.

Regarding the knowledge about the clinical manifestations of oral cancers, 6.5% exhibited a high level of knowledge, 23.5% exhibited good knowledge, 38.6% had adequate knowledge and 31.4% had very low level of knowledge (Table 2), with no significant differences between the students in different education levels. On average, 85% of the students believed that patients with oral cancers should refer to a dentist and the rest recommended referral to a physician.

With regards to oral cancer risk factors, 81.7%, 60.1%, 63.4%, 58.2% and 56.2% of the students mentioned cigarette smoke, the immune system, genetics, alcohol and UV as the risk factors, respectively.

In response to the question "If you suspect an oral

malignancy after graduation, where are you going to refer your patient?", 77.6% of the students reported that they would refer them to an oral diseases specialist (Table 3), with no significant differences between the students in different education levels.

Regarding clinical manifestations of oral cancers, 78.5% of the students believed that ulcers with irregular margins that lasted for more than two weeks were a sign of oral cancer. In contrast, roll-border appearance of the ulcers was reported to be the least frequent clinical manifestation of oral cancers as reported by 52.3% of the students (Table 4), with a statistically significant difference between students in different education levels.

Discussion

The results of the present study showed that the majority of the students (approximately 80%) examined the oral mucosa during routine clinical examinations for the presence of various lesions. Unfortunately, not all the students reported examining patients' oral mucosa routinely even in high-risk groups.

Table 2. The Frequency (Percentage) Of the Students' Awareness About the Clinical Manifestations of Oral Cancers Based on Their Self-reports

Level	3rd Year n=46	4th Year n=36	5th Year n=45	6th Year n=26	Total N=153	P Value
Very good	4 (8.7)	2 (5.6)	2 (4.4)	2 (7.7)	10 (6.5)	0.13
Good	13 (28.3)	4 (11.1)	9 (20)	10 (38.5)	36 (23.5)	0.13
Adequate	13 (28.3)	21 (58.3)	19 (42.2)	6 (23.1)	60 (38.6)	0.13
Very low	16 (34.8)	9 (25)	30 (33.3)	8 (30.8)	47 (31.4)	0.13

Table 3. The Frequency (Percentage) of the Referral Patterns of Cancer Patients by Dental Students to Specialists

Referral to	3rd Year n=46	4th Year n=36	5th Year n=45	6th Year n=26	Total N=153	P Value
Plastic surgeon	1 (2.2)	0 (0)	1 (2.2)	0 (0)	2 (1.3)	0.56
Oral and maxillofacial surgeon	9 (19.6)	4 (11.4)	5 (11.1)	4 (19.2)	22 (15.1)	0.56
ENT specialist	1 (2.2)	0 (0)	0 (0)	0 (0)	1 (0.7)	0.56
Oral diseases specialist	33 (71.7)	31 (85.7)	34 (75.6)	21 (80.8)	120 (77.6)	0.56
Others	2 (4.3)	1 (2.9)	5 (11.1)	0 (0)	8 (5.3)	0.56

Table 4. The Frequency (Percentage) of Clinical Manifestations of Oral Cancers Reported by the Students

Clinical Manifestation	3rd Year n=46	4th Year n=36	5th Year n=45	6th Year n=26	Total n=153	P Value
Ulcer lasting for >2 weeks with irregular borders	36 (78.2)	29 (80.6)	33 (73.3)	22 (84.6)	120 (78.5)	0.34
Mal-formed lesion on the lateral border of the tongue	33 (71.7)	20 (55.6)	26 (57.8)	19 (73)	98 (64.1)	0.34
Paresthesia and involvement of lymph nodes	28 (60.8)	15 (41.7)	21 (46.6)	20 (76.9)	84 (54.9)	0.34
Prominent red and white lesions	26 (56.5)	16 (44.5)	20 (44.4)	19 (73)	81 (53)	0.34
Lesion with roll borders	26 (56.5)	15 (41.7)	21 (46.6)	18 (69.2)	80 (52.3)	0.34
Others	1 (2.2)	1 (2.8)	0	0	2 (1.3)	0.34

Consistent with the results of the present study in a study by Hosseini et al in Isfahan, approximately 80% of dental students examined the oral mucosa during routine clinical examinations (20). However, in a study by Ogden and Mahboobi in Tehran University of Medical Sciences, approximately 65% of the dental students examined the oral mucosa during routine clinical examinations (11). In a study by Razavi et al in Isfahan, approximately 85% of the last-year dental students did not examine the oral mucosa during routine oral examinations (21).

The majority of students in the present study (83.7%) reported that they were going to warn their patients about the oral cancer risk factors after graduation, which was more frequent in the third-year students than other students. It is hoped that the last-year students will become aware of the importance of this warning and will warn their patients about the risk factors for oral cancers after graduation. In the study of Hosseini et al, 80% of the students believed in the efficacy of this warning; however, the results did not show any significant difference between the students in different education levels (20).

In the present study, almost half of the students reported that they had the chance to examine patients with oral lesions. The fifth- and sixth-year students had the highest experience of encountering oral cancer patients and the fourth- and third-year students had the lowest experience, with a statistically significant difference. In a study by Hosseini et al, approximately 46% of the students reported having the chance of examining patients with oral cancers, with an increase in the chance from the third to the sixth year of studies (20). This finding is explained by the fact that the fifth- and sixth-year students have numerous opportunities to examine and treat patients and are more experienced.

The dental students' knowledge about the clinical manifestations of oral cancers were categorized as follows: very good (6.5%); good (23.5%); adequate (38.6%); and very low (31.4%), with no significant differences between the students in different education levels. In the study of Hosseini et al, 52% of the students reported low awareness in this respect (20). Therefore, the students in Tehran University of Medical Sciences have lower awareness compared to the students in the present study. However, in that study, fifth- and sixth-year students reported

less awareness compared to the third- and fourth-year students, with a statistically significant difference. This might be explained by the fact that since the fifth- and sixth-year students had encountered more patients with oral cancers, they were more aware of their deficient knowledge in this respect and therefore reported a low rate of awareness.

A total of 67.1% of the students reported inadequate knowledge about prevention of oral cancers. In the study of Hosseini et al, 71.8% of the students reported such an opinion (20).

Oral cancers are multifactorial entities, with genetic factors, smoking, alcohol, UV light (lip cancer), papillomavirus, inadequate fruit and vegetables in the diet, history of cancer in the head and neck, and age being reported as etiologic factors (18, 22). However, a literature review shows that the main risk factors for oral cancers include exposure to carcinogenic agents in tobacco and use of alcohol (23).

In the present study, the majority of students (81.7%) reported cigarette smoke as the most important risk factor for oral cancers, which shows a high awareness level in this respect. However, the second most important factor, based on the students' viewpoints, was genetics (63.4%). In a study by Soares et al in Brazil, cigarette smoke was reported to be the most important risk factor (92.4%) based on the students' viewpoints. However, in that study, alcohol was reported as the second most important risk factor, which is inconsistent with the results of the present study (18). In the study of Hosseini et al in Isfahan, 95.9% and 59.9% of the students reported cigarette smoke and alcohol as the most important risk factors, respectively (20). In a study in Spain, 100% and 96% of the dentists reported use of alcohol and cigarette smoke as the most important risk factor for oral cancers, respectively (24).

In the present study, the majority of students (85%) believed that patients with oral cancers should refer to a dentist. In case of the need for referral of the patient to a specialist, 77.6% of the students believed that the patient should be referred to an oral diseases specialist. In the study of Hosseini et al in Isfahan, 80% of the students believed that patients with oral cancers should be referred to a dentist and 79.3% of the students believed that if necessary, they should be referred to an oral diseases

specialist(20). In the study of Razavi et al, the majority of students preferred to refer a patient with suspected diagnosis of oral cancer to a specialist (21). In the study of Ogdam and Mahboobi in Tehran, the majority of the students believed that patients with oral cancer should visit a dentist. Oral medicine and oral and maxillofacial surgery specialists were reported as the most common referral points for patients with suspected oral lesions (11).

Regarding clinical manifestations of oral cancers, 78.5% of students believed that ulcers that lasted for more than 2 weeks and had irregular margins were the signs of oral cancers. In contrast, lesions with roll borders were reported to have the lowest relationship (52.3%) with oral cancers. In the study of Hosseini et al, ulcers lasting for more than two weeks were reported to be due to oral cancers with the highest frequency (20). These results have been confirmed by studies in England (25), Canada (26) and Nigeria (27).

In addition, 91.5% of the students in the present study were interested in acquiring more knowledge about oral cancers. The fourth-year students reported the highest need for increasing their knowledge about oral cancers, followed by third-, sixth-, and fifth-year students, with a statistically significant difference. It is rational that the third- and fourth-year students would feel they have inadequate knowledge and thus need to promote the knowledge on this subject. In the study of Hosseini et al, 95.2% of the students reported the need for promoting their knowledge on this subject(20). In studies by Saghafi et al (28), Motalebnejad and Hedayati (29) and Zarei and Asadpour (30), 64%, 88% and 94% of dentists, respectively, were interested in taking part in continuous education programs to gain more knowledge about oral cancers. These findings indicate that dental students and dentists do not have proper and adequate knowledge about oral cancers and cannot diagnose and treat such cases with great self-confidence.

Limitations and Recommendations

Some of the limitations of this study include use of a self-report questionnaire, use of students' own perceptions and the limited number of questions. In this study, the subjects were dental students in Azad University, Tabriz Branch; this limits the external validity and generalization of the results to other dental students and dentists. Furthermore, some potential confounding factors were not considered in this study, including the students' exposure to other sources of oral cancer education in or out of the university. The cross-sectional nature of the study was another limitation of the study, limiting the judgment about the awareness of other dental students, which can be investigated by longitudinal studies. Further studies with larger sample size are recommended to compare the knowledge of dentistry and medical students and that of students in different universities in Iran. In

order to eliminate potential sources of bias, including personal perceptions, the study aims were precisely explained to the students.

Conclusions

In the present study, the awareness of dental students about the clinical manifestations of oral cancers, the relevant risk factors and the mechanism of referral of patients was moderate. Although the majority of the students carry out routine clinical examinations to discover oral cancers, they do not have proper knowledge about some risk factors and oral lesions that may lead to cancers. The majority of the students reported inadequate knowledge about prevention of oral cancers and the need for further information. It is therefore necessary to develop more comprehensive educational programs during their academic studies.

Authors' Contribution

PF, MG and FN were responsible for the design and concept of the study as well as revision of the prepared manuscript and preparation of the questionnaire. MA, NG and BA carried out the literature search and data collection. FN, MG and FR analyzed the data and drafted the manuscript. All the authors have read and approved the final manuscript.

Ethical Statement

This study was conducted in accordance with the Helsinki Declaration of 1975, which was revised in 2002 (32). The procedure of the study was approved by the Ethics Committee of the Tabriz University of Medical Sciences. The aim of the study was explained to all the subjects before the study was started and participants' information was kept confidential. Informed consent to participate in the study was obtained from all the participants.

Conflict of Interest Disclosures

The authors declare that they have no conflict of interests.

Acknowledgments

The authors would like to thank all the staff of the Tabriz Azad University of Medical Sciences who contributed to conducting this study.

References

1. WHO. Oral cancer. Available from: <https://www.who.int/cancer/prevention/diagnosis-screening/oral-cancer/en/>.
2. Boroumand S, Garcia AI, Selwitz RH, Goodman HS. Knowledge and opinions regarding oral cancer among Maryland dental students. *J Cancer Educ.* 2008;23(2):85-91. doi: [10.1080/08858190701821238](https://doi.org/10.1080/08858190701821238).
3. Esmaelbeigi F, Hadji M, Harirchi I, Omranipour R, vand Rajabpour M, Zendehelel K. Factors affecting professional delay in diagnosis and treatment of oral cancer in Iran. *Arch Iran Med.* 2014;17(4):253-7.
4. Groome PA, Rohland SL, Hall SF, Irish J, Mackillop WJ, O'Sullivan B. A population-based study of factors associated with early versus late stage oral cavity cancer diagnoses. *Oral Oncol.* 2011;47(7):642-7. doi: [10.1016/j.oraloncology.2011.04.018](https://doi.org/10.1016/j.oraloncology.2011.04.018).
5. Hertrampf K, Wenz HJ, Koller M, Wiltfang J. Comparing dentists' and the public's awareness about oral cancer in a community-based study in Northern Germany. *J Craniomaxillofac Surg.* 2012;40(1):28-32. doi: [10.1016/j](https://doi.org/10.1016/j)

- jcms.2010.11.011.
6. Pentenero M, Chiecchio A, Gandolfo S. Impact of academic and continuing education on oral cancer knowledge, attitude and practice among dentists in north-western Italy. *J Cancer Educ.* 2014;29(1):151-7. doi: [10.1007/s13187-013-0562-1](https://doi.org/10.1007/s13187-013-0562-1).
 7. Saleh A, Kong YH, Vengu N, Badrudeen H, Zain RB, Cheong SC. Dentists' perception of the role they play in early detection of oral cancer. *Asian Pac J Cancer Prev.* 2014;15(1):229-37.
 8. Abdullah Jaber M. Dental practitioner's knowledge, opinions and methods of management of oral premalignancy and malignancy. *Saudi Dent J.* 2011;23(1):29-36. doi: [10.1016/j.sdentj.2010.10.002](https://doi.org/10.1016/j.sdentj.2010.10.002).
 9. Oliveira J, Pinto L, Lima N, Almeida G. Oral cancer: assessment of academic dentistry and nursing knowledge as for the risk factors and diagnostic procedures. *Revista Brasileira de Cancerologia.* 2013;59:211-8.
 10. Carter LM, Ogden GR. Oral cancer awareness of undergraduate medical and dental students. *BMC Med Educ.* 2007;7:44. doi: [10.1186/1472-6920-7-44](https://doi.org/10.1186/1472-6920-7-44).
 11. Ogden GR, Mahboobi N. Oral cancer awareness among undergraduate dental students in Iran. *J Cancer Educ.* 2011;26(2):380-5. doi: [10.1007/s13187-010-0170-2](https://doi.org/10.1007/s13187-010-0170-2).
 12. Pinheiro S, Cardoso J, Prado F. Oral Cancer Knowledge and Diagnosis among Dentists from the City of Jequiè, Bahia. *Revista Brasileira de Cancerologia.* 2010;56:195-205.
 13. Haji Mirzamohammad M, Khakbaz S, Motallebnejad M, Khafri S, Hamzeh M, Farrokhi R, et al. Evaluation of knowledge toward oral cancer and treatment complications among general dentists of babol, iran (2015). *Caspian J Dent Res.* 2017;6(2):48-52. doi: [10.22088/cjdr.6.2.48](https://doi.org/10.22088/cjdr.6.2.48).
 14. Applebaum E, Ruhlen TN, Kronenberg FR, Hayes C, Peters ES. Oral cancer knowledge, attitudes and practices: a survey of dentists and primary care physicians in Massachusetts. *J Am Dent Assoc.* 2009;140(4):461-7.
 15. Lopez-Jornet P, Camacho-Alonso F, Molina-Minano F. Knowledge and attitudes about oral cancer among dentists in Spain. *J Eval Clin Pract.* 2010;16(1):129-33. doi: [10.1111/j.1365-2753.2009.01132.x](https://doi.org/10.1111/j.1365-2753.2009.01132.x).
 16. Kujan O, Duxbury AJ, Glennly AM, Thakker NS, Sloan P. Opinions and attitudes of the UK's GPs and specialists in oral surgery, oral medicine and surgical dentistry on oral cancer screening. *Oral Dis.* 2006;12(2):194-9. doi: [10.1111/j.1601-0825.2005.01188.x](https://doi.org/10.1111/j.1601-0825.2005.01188.x).
 17. Rahman B, Hawas N, Rahman MM, Rabah AF, Al Kawas S. Assessing dental students' knowledge of oral cancer in the United Arab Emirates. *Int Dent J.* 2013;63(2):80-4. doi: [10.1111/idj.12017](https://doi.org/10.1111/idj.12017).
 18. Soares TRC, de Almeida Carvalho ME, Pinto LSS, Falcao CA, Matos FTC, Santos TC. Oral cancer knowledge and awareness among dental students. *Braz J Oral Sci.* 2014;13(1):28-33. doi: [10.1590/1677-3225v13n1a06](https://doi.org/10.1590/1677-3225v13n1a06).
 19. Joseph BK, Sundaram DB, Ellepola AN. Assessing Oral Cancer Knowledge Among Undergraduate Dental Students in Kuwait University. *J Cancer Educ.* 2015;30(3):415-20. doi: [10.1007/s13187-014-0734-7](https://doi.org/10.1007/s13187-014-0734-7).
 20. Hosseini SM, Bagheri F, Farahmand F, Heydari A, Khorasani E. Dental students' knowledge of preventing, early detecting and referring patients suffering from oral cancer. *J Dent Med.* 2017;29(4):262-70. [Persian].
 21. Razavi SM, Zolfaghari B, Tahani B, Emami Doost M, Forohande M. Senior students' and Dentists' knowledge, attitude and practice regarding oral cancer examination in Isfahan, Iran in 2011. *J Dent Med.* 2014;27(1):61-70.
 22. Scully C. Oral cancer aetiopathogenesis; past, present and future aspects. *Med Oral Patol Oral Cir Bucal.* 2011;16(3):e306-11.
 23. da Silva SD, Hier M, Mlynarek A, Kowalski LP, Alaoui-Jamali MA. Recurrent oral cancer: current and emerging therapeutic approaches. *Front Pharmacol.* 2012;3:149. doi: [10.3389/fphar.2012.00149](https://doi.org/10.3389/fphar.2012.00149).
 24. Greenwood M, Lowry RJ. Primary care clinicians' knowledge of oral cancer: a study of dentists and doctors in the North East of England. *Br Dent J.* 2001;191(9):510-2. doi: [10.1038/sj.bdj.4801219a](https://doi.org/10.1038/sj.bdj.4801219a).
 25. Dai M, Clifford GM, le Calvez F, Castellsague X, Snijders PJ, Pawlita M, et al. Human papillomavirus type 16 and TP53 mutation in oral cancer: matched analysis of the IARC multicenter study. *Cancer Res.* 2004;64(2):468-71.
 26. Clovis JB, Horowitz AM, Poel DH. Oral and pharyngeal cancer: knowledge and opinions of dentists in British Columbia and Nova Scotia. *J Can Dent Assoc.* 2002;68(7):415-20.
 27. Uti OG, Fashina AA. Oral cancer education in dental schools: knowledge and experience of Nigerian undergraduate students. *J Dent Educ.* 2006;70(6):676-80.
 28. Saghafi S, Zare Mahmoodabadi R, Salehinejad J, Falaki F, Farrokhizad S. Evaluation of general dentists' knowledge about oral cancer in Mashhad-Iran in 2008. *Journal of Mashhad Dental School.* 2009;33(2):107-14. [Persian].
 29. Motallebnejad M, Hedayati M. General dentists' knowledge about oral cancers in Babol, in 2005. *Journal of Mashhad Dental School.* 2006;30(3-4):309-18. [Persian].
 30. Zarei M, Asadpour F. Assessing dentist's knowledge and awareness in the diagnosis of oral cancer in Kerman. *Journal of Dental School.* 2002;4(19):357-64. [Persian].
 31. World Medical Association. The Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects. Available from: <https://www.wma.net/wp-content/uploads/2016/11/DoH-Oct2013-JAMA.pdf>.

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