

Frequency and Characteristics of Oral Malignant Lesions in an Iranian Population: A 10-year Retrospective Study

Mahin Bakhshi^a, Nafiseh Shamloo^b, Mohammad Nasir Bayani^{b,c}, Leyla Bagheri^{b,d}, Mohammadreza Kashefi Baher^{b,e}

^aDepartment of Oral Medicine, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

^bDepartment of Oral and Maxillofacial Pathology, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

^cResearch Committee, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

^dClinical Research and Development Center, Shahid Modarres Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

^eAcademic Dentist, Health Research Center, Chamran Hospital, Tehran, Iran.

*Correspondence to Mohammadreza Kashefi Baher, Email: rezakashefi78@gmail.com

Abstract

Submitted: 28 May 2025
Revised version received: 28 October 2025
Accepted: 4 November 2025
Published online: May 2026

How to cite:

Bakhshi M, Shamloo N, Nasir Bayani M, Bagheri L, Baher MK. Frequency and Characteristics of Oral Malignant Lesions in an Iranian Population: A 10-year Retrospective Study. *J Dent Sch* 2026;44(1); e17.

Objective(s): Oral malignancies pose a significant global health challenge. Oral squamous cell carcinoma (OSCC) is the most common oral cancer, yet its prevalence and clinical pattern vary by region, lifestyle, and risk factors. Despite its high burden, especially in Asia, epidemiological data remain inconsistent. This study provided updated insights on oral malignant lesions to inform early detection and optimize treatment approaches. **Methods:** This cross-sectional retrospective study reviewed oral cancer records at Department of Oral Medicine at Shahid Beheshti University of Medical Sciences, Tehran, Iran over the past 10 years. Demographic, clinical data, and risk factors were analyzed. Obtained data were analyzed using Fisher's exact test with a statistical significance of $P < 0.05$. **Results:** Fifty-two oral cancer cases were identified, with a mean age of 59.67 years and a male-to-female ratio of 1:1.26. The average duration of involvement was 26.87 weeks, with the most common chief complaints being swelling, ulceration, and pain, respectively. Exophytic lesions were the most frequently observed clinical manifestation (69.2%), with the tongue being the most common site of involvement. The most common type of oral cancer was OSCC accounting for 71.2% of cases. Notably, only 25% of patients had identified risk factors for oral cancer. **Conclusion:** The pattern of oral cancer observed in the present study was largely consistent with previous research. Oral cancer may be more prevalent among women in the absence of significant risk factors. Further exploration of cancer risk factors is essential for guiding diagnosis, treatment, and public awareness.

Keywords: Frequency; Oral Cavity; Cancer; Malignancy; Squamous Cell Carcinoma

Introduction

The rapid rise of non-communicable diseases, including cardiovascular and chronic respiratory diseases, diabetes, and cancers, has emerged as a significant global health challenge in the modern era¹. Over six million cancer-related deaths are reported worldwide annually, with approximately 3.2% attributed to oral malignancies².

Oral cancers are classified based on their origin into distinct groups, including epithelial, salivary gland, hematologic, bone, mesenchymal, odontogenic, and metastatic tumors³. Oral squamous cell carcinoma (OSCC) is the most common malignant oral lesion, originating from epithelial tissue and representing over 90% of oral cancers^{4,5}. Moreover, lymphoma, of hematologic origin, is the second most common neoplasm in the head and neck region⁶, and mucoepidermoid carcinoma (MEC) is the most prevalent malignant salivary gland tumor in this area^{7,8}. Osteosarcoma, with its mesenchymal origin, represents 6% of all jaw tumors and less than 1% of all malignant head and neck tumors⁹.

The prevalence and manifestation of oral cancers vary widely based on factors such as age, gender, ethnicity, geographic location, lifestyle, dietary habits, and risk factors including prolonged tobacco and alcohol use, human papillomavirus (HPV) infection, genetic predisposition, and poor oral hygiene¹⁰. Oral cancer is most prevalent in South Asia, certain regions of Central Asia, and Southern Europe. According to the Global Cancer Observatory (GCO), nearly 76% of deaths attributed to oral cancer in 2022 occurred in Asia^{11,12}. Countries such as Iran, India, Pakistan, Bangladesh, Sri Lanka, and Afghanistan are classified under the South Asia region in the global map of oral cancer prevalence¹³.

Epidemiological studies have yielded varied results depending on the geographic location, genetic characteristics, available healthcare resources, and other factors. Since early detection is crucial for oral cancer prognosis, the variability in findings highlights the need for region-specific, comprehensive epidemiological studies. Such studies are essential for improving diagnostic and treatment processes and enhancing the effectiveness of healthcare systems in addressing oral malignancies^{14,15}. Given the importance of descriptive studies

for understanding oral cancer patterns, this study aimed to update epidemiological data on oral malignant lesions to aid in early detection and the development of effective treatment plans.

Methods

This cross-sectional retrospective study was conducted following approval by the Ethics Committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.DRC.REC.1402.020), and in accordance with the Declaration of Helsinki to ensure confidentiality of personal information. This study reviewed all the available records from the Department of Oral Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran over the past 10 years. Cases diagnosed with oral cancer were selected for further analysis of demographic and clinical characteristics, including age, gender, duration of involvement, chief complaint, clinical manifestations, lesion location, type of malignancy, and the presence of risk factors.

The duration of involvement was defined as the time interval between the awareness of the lesion (either due to symptom onset or unplanned discovery) and the subsequent visit that led to the diagnosis of malignancy. The chief complaint included symptoms such as ulceration, pain, swelling, numbness, burning sensation, difficulty swallowing, loose denture, or the patient could be asymptomatic, with the lesion being incidentally discovered during a routine dental examination. In terms of clinical manifestations, lesions could be classified into five categories, including exophytic, ulcerative, white, red, and pigmented lesions¹⁶. According to the Union for International Cancer Control (UICC) classification, the lesions' locations included the buccal mucosa (encompassing the cheek mucosa, labial mucosa, vestibule, and retromolar areas), the maxillary alveolar mucosa and gingiva, the mandibular alveolar mucosa and gingiva, the hard palate, the tongue, and the floor of the mouth¹⁷. The type of malignancy was classified based on its origin, according to the Dhanuthai et al.'s study³. Risk factors included tobacco use (categorized as smoking or smokeless), alcohol abuse, concurrent use of alcohol and tobacco, a personal history of cancer, and a family history of malignancies.

An information form was used for data collection, and the sample size was determined through complete enumeration of available records (N=52). The inclusion criterion for the case was having oral cancer with complete information in the records. Cases with only clinical diagnosis (without histopathological confirmation) and malignancies in the pharyngeal or tonsillar regions were excluded from the study. Ultimately, demographic data and variables requiring descriptive analysis were entered into SPSS software (version 27), and frequency, percentage, mean, and standard deviation were calculated. Fisher's exact test was used to assess the association between study variables, with statistical

significance defined by a P-value less than 0.05.

Results

Demographic characteristics

A total of 52 cases of oral cancer were identified from 2366 records over the past 10 years, 37 (71.2%) of which were OSCC. The mean age of the oral cancer patients was 59.67 ± 16.57 years, ranging from 20 to 93 years. The mean age of male patients was 61.17 ± 17.26 years, while the mean age of female patients was 58.48 ± 15.59 years. OSCC cases were most common in the 60-79 age group (51.35%), and showed a mean age of 63.73 ± 15.73 years. Among patients with malignant oral lesions, the male-to-female ratio was 1:1.26. For OSCC specifically, it was 1:1.31. The frequency distribution of age groups and gender in oral cancer patients is shown in Table 1.

Table 1- Frequency distribution of age groups and gender in oral cancer patients

Age Group	Gender		Total
	Male (n/%)	Female (n/%)	
20-39	3 (5.77%)	4 (7.69%)	7 (13.46%)
40-59	6 (11.54%)	10 (19.23%)	16 (30.77%)
60-79	10 (19.23%)	12 (23.08%)	22 (42.31%)
80-93	4 (7.69%)	3 (5.77%)	7 (13.46%)
Total	23 (44.23%)	29 (55.77%)	52 (100%)

Duration of involvement and chief complaint

The duration of involvement ranged from 0 to 254 weeks, with an average of 26.87 ± 43.83 weeks. The most common chief complaint in oral cancer patients was swelling (mass). However, the most frequent chief complaint for OSCC was ulceration, with a prevalence of 29.7%. The frequency distribution of the chief complaints reported by oral cancer patients is shown in Table 2.

Table 2- Frequency distribution of the chief complaints reported by oral cancer patients

Chief Complaint	Number	Percent
Swelling	15	28.85%
Ulceration	13	25.00%
Pain	10	19.23%
Burning Sensation	5	9.61%
Loose Denture	4	7.69%
Difficulty Swallowing	3	5.77%
Asymptomatic (incidental discovery)	2	3.85%
Total	52	100%

Clinical manifestation

Exophytic lesions were the most common clinical presentation (69.2%), followed by white lesions (15.4%), and

ulcerative lesions (11.5%). The distribution of clinical manifestations of the lesions is shown in Figure 1.

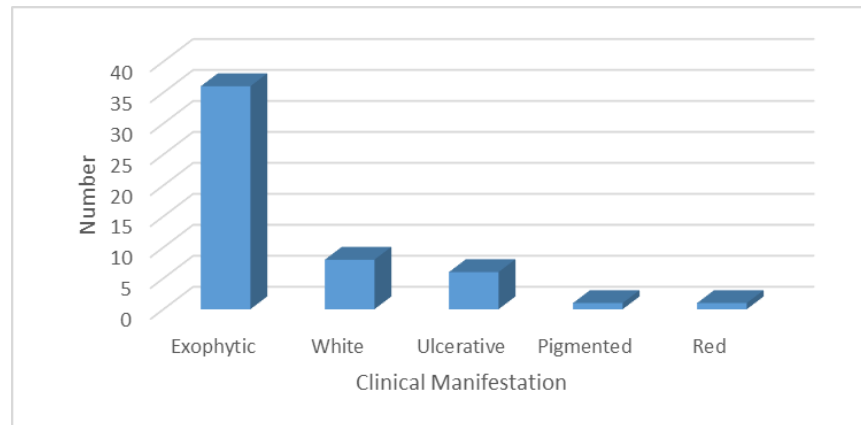


Figure 1: Frequency of clinical manifestations in oral cancer patients

• Exophytic lesions

Among the 36 exophytic lesions, 36.1% had a smooth surface, while 63.9% were rough, with the majority exhibiting a granular texture (69.56%), followed by verrucous (21.74%), and papillomatous (8.70%) surfaces. Most of these were sessile (83.3%), and 38.89% closely matched the normal tissue color. In 25% of cases, the lesions were white-red, while 13.89% were red, and 11.11% white. Additionally, 11.11% displayed other colors such as purple, black, or a combination. Ulceration was observed in 58.33% of exophytic cases, and 16.66% showed erosion. Underlying bone resorption was noted in 50% of cases, while tooth mobility was reported in 22.22%, and one patient presented with numbness. One case exhibited multiple exophytic lesions. Exophytic lesions with a rough surface included 23 cases, all of which were diagnosed as OSCC. Lesions with a smooth surface comprised four cases of MEC, four cases of osteosarcoma, three cases of non-Hodgkin lymphoma, one metastatic thyroid malignancy, and one case of malignant round cell tumor.

• White lesions

Among the eight white lesions, all diagnosed as OSCC, 62.5% had a rough surface with minimal hyperkeratinization, while 37.5% presented a verrucous surface. No papillomatous appearance was observed. Moreover, 62.5% of the white lesions showed only erosion, one case had only ulceration, and one case exhibited both ulceration and erosion. Most lesions (75%) were non-indurated.

• Ulcerative lesions

Among the six ulcerative lesions, all diagnosed as OSCC, 83.33% exhibited a crater-like appearance, while 16.67% were aphthous-like. Induration was present in 66.67% of the ulcerative lesions.

• Pigmented, red, and multiple lesions

One oral malignant lesion was identified as a pigmented lesion, diagnosed as malignant melanoma with a tumor-like appearance and a heterogeneous dark brown color diffused across the dorsal surface of the tongue. Another lesion was

diagnosed as angiosarcoma and presented as a nodular, multifocal mass with a dark red hue. Finally, two multiple lesions were identified among the oral malignancies in this study: one case of multiple exophytic SCC and one case of multifocal angiosarcoma.

Type of malignancy and risk factors

Among the 52 oral malignancy cases, epithelial tumors were the most common (71.2%), comprising 37 cases of OSCC. Salivary gland and bone malignancies each accounted for 7.7%, including four cases of MEC and four cases of osteosarcoma, respectively. Hematologic malignancies made up 5.8%, with three cases of lymphoma, while mesenchymal malignancies included one case of angiosarcoma. Metastatic, melanoma, and other lesions collectively account for 5.7% of all cases.

Only 25% of the patients had identified risk factors associated with oral cancer, with tobacco smoking being the most common. The findings related to these risk factors are presented in Table 3.

Table 3- Frequency distribution of risk factors in oral cancer patients

Risk Factor	Number	Percent
Smoking Tobacco	4	7.7%
Smokeless Tobacco	2	3.8%
Concurrent Use of Tobacco and Alcohol	2	3.8%
Non-Identified Risk Factor	39	75%
Previous Malignancy	3	5.7%
Family History of Malignancy	2	3.8%
Total	52	100%

Lesion location

The most common location for oral malignancy was the tongue, affected in 38.46% of cases (16 lesions confined to the tongue and four involving the tongue and surrounding areas). The second most frequent site was the buccal mucosa (including the cheek, lips, vestibule, and retromolar areas), involved in 30.77% of cases (five lesions confined to the

buccal mucosa and 11 lesions involving surrounding areas).

Association assessment between variables

Fisher's exact test was used to evaluate the association between different variables. Clinical manifestation showed no significant relationship with age group ($P=0.159$), gender ($P=0.87$), lesion location ($P=0.22$), or lesion type ($P=0.13$). Lesion type also demonstrated no significant relationship

with age group ($P=0.06$), or gender ($P=0.78$). However, significant association was observed between lesion type and location ($P=0.01$). As presented in Table 4, all lesions in the floor of the mouth and 95% of the tongue lesions were OSCCs. Bone malignancies mostly occurred in the upper jaw (75%), while the only metastatic lesion was seen in the lower jaw.

Table 4- Distribution of oral malignancy types by lesion location*

Lesion location	Epithelial	Salivary gland	Hematologic	Bone	Mesenchymal	Metastatic	Melanoma	Other	Total
Buccal mucosa	13 (81.25%)	1 (6.25%)	2 (12.5%)	-	-	-	-	-	16
Upper gingiva	7 (46.67%)	2 (13.33%)	2 (13.33%)	3 (20%)	1 (6.67%)	-	-	-	15
Lower gingiva	9 (75%)	-	-	1 (8.33%)	-	1 (8.33%)	-	1 (8.33%)	12
Hard palate	4 (44.44%)	2 (22.22%)	2 (22.22%)	-	1 (11.11%)	-	-	-	9
Tongue	19 (95%)	-	-	-	-	-	1 (5%)	-	20
Floor of the mouth	4 (100%)	-	-	-	-	-	-	-	4
Total	37 (71.2%)	4 (7.7%)	3 (5.8%)	4 (7.7%)	1 (1.9%)	1 (1.9%)	1 (1.9%)	1 (1.9%)	52 (100%)

* Some lesions involved more than one location.

Discussion

The present study assessed the prevalence and clinical characteristics of oral cancer, showing that it is most prevalent among individuals in their 60s and 70s, with a higher incidence in women (M/F ratio: 1:1.26). Multiple epidemiological studies in Iran have reported results consistent with the present study. Sargeran et al. and Shiva et al. found average ages of 61 and 65 years, respectively, for oral cancer patients in Tehran and Sari^{18, 19}. Furthermore, three studies specifically focused on OSCC and reported an average age of approximately 63 years²⁰⁻²². Similar findings were observed in other countries. Research by Rutkowska et al. and Khan et al. identified average ages of 61 years for patients in Poland and Malaysia, respectively, while studies by Anis et al. and Alotaibi et al. reported average ages of 55 and 58 years for OSCC patients in the UAE and Saudi Arabia. A comprehensive 20-year review by Ferreira et al. documented an average age of 62 years for OSCC cases across eight countries^{14, 23-26}. These findings, in agreement with the present study, highlight that OSCC patients tend to have a higher average age compared to the general oral cancer population^{14, 20, 27}.

Some investigations, including the current study, have reported a higher prevalence of oral cancer in women^{25, 28}, while most studies suggest that men are more commonly affected^{19-21, 29}. The observed gender distribution differences in this study may reflect the declining male-to-female ratio in oral cancers³⁰. Chen et al., in a 51-year analysis, reported a notable decrease in this ratio of OSCC, from 9.8 in the 1930s to 2.6 in the 1980s³¹.

Furthermore, some studies suggest that in cases without exposure to specific risk factors, women tend to have higher incidence rates than men, a finding consistent with the present study^{30, 32}.

The average duration of involvement in this study was 6.6 months, shorter than the 7.3 to 9 months reported in similar studies from Iran^{18, 33, 34}. This reduction may be linked to Shahid Beheshti Dental School's location in a higher socioeconomic area, as lower socioeconomic status and limited awareness often delay patient referrals³⁵. Rutkowska et al. reported a 7.4-month duration in Poland, while attributing the delay to the minimal presentation of symptoms²³. Moreover, one case in the current study had a duration of involvement of 254 weeks, likely because the patient had no issues with the lesion and delayed seeking clinical help. This underscores the importance of raising awareness about timely medical attention to improve prognosis through early diagnosis.

In this study, the most common chief complaint among oral cancer patients was swelling (mass), while for OSCC patients, the chief complaint was an ulcer. These findings are consistent with those reported in several other studies^{21, 23, 28}. This study found exophytic lesions to be the most common clinical manifestation in both oral cancers and OSCCs, followed by white lesions and ulcerative appearances. While other studies have also reported exophytic lesions as the predominant manifestation, they noted that ulcerative lesions become more frequent than white lesions in subsequent stages^{18, 22, 25, 28}.

In line with several studies from Iran^{20, 21, 29} and other countries^{3, 14, 24, 36}, this study reported that the most common sites of oral

malignancy were the tongue and buccal mucosa, respectively. Two factors that may account for this distribution are constant exposure to carcinogens in saliva and the presence of non-keratinized, thinner mucosa in these areas, which offers reduced protection against carcinogens³⁷. This study identified epithelial (OSCC) and salivary gland (MEC) cancers as the most common oral malignancies by origin, consistent with studies from both within and outside of Iran^{3, 13, 14, 20, 38}.

The present study found no significant risk factors for oral cancer, specifically 75% of the patients did not have any identified risk factors, which contrasts with findings from studies conducted outside of Iran. Furthermore, only 9.5% of the patients had a prior malignancy or a family history of cancer. Rutkowska et al. in Poland reported that 81% of patients were current or former smokers, 84% occasionally consumed alcohol, and 11% reported regular alcohol use²³. Moreover, Khan et al. in Malaysia found that over half of the patients were smokers, and more than one-third used smokeless tobacco or consumed alcohol²⁵. In addition, there are reports that suggest dental implants as a possible risk factor³⁹. These variations among studies may stem from differences in culture, national laws and policies, as well as varying levels of patient self-reporting.

The primary limitation of this study was the inability to assess the grade and stage of malignancies due to a lack of access to relevant data. Additionally, the retrospective design relying solely on existing records may have resulted in missed cases due to incomplete documentation. The study's single-center setting further limits the generalizability of the findings to the broader Iranian population, as regional variations in healthcare access and patient demographics might influence the observed patterns of oral cancer. Moreover, the relatively small number of identified cases constrains the statistical power needed to detect subtle association between variables. Future research should adopt a prospective, multicenter design to collect comprehensive data on tumor grade, stage, and follow-up outcomes.

Conclusion

Oral cancer primarily affects older individuals and is more

prevalent in women in the absence of significant risk factors. Oral cancers typically manifest as exophytic lesions, particularly on the tongue and buccal mucosa, with oral squamous cell carcinoma being the most common type. Further investigation into the risk factors and their role in the development of oral cancer is essential. The findings of this study may enhance diagnostic and therapeutic strategies, while contributing to increased public awareness.

Acknowledgement: We would like to extend our gratitude to everyone who contributed to the successful completion of this research.

Author Contributions: M.B: Conceptualization, Visualization; N.S: Methodology, Validation; M.N.B: Writing – Original Draft, Project Administration; L.B: Review; M.K.B: Data Curation, Review & Editing, Supervision.

Funding: None declared.

Ethical Approval Code: IR.SBMU.DRC.REC.1402.020.

Informed Consent Statement: Informed consent had been obtained from patients for the anonymous use of their data in the future for research or educational purposes.

Data Availability Statement: The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Using AI: The authors acknowledge the use of OpenAI's ChatGPT for language refinement and grammatical enhancement of this manuscript.

Conflict of Interest: No conflicts of interest to declare.

References

1. Ramesh S, Kosalram K. The burden of non-communicable diseases: A scoping review focus on the context of India. *J Educ Health Promot.* 2023;12:41. doi: [10.4103/jehp.jehp.1113.22](https://doi.org/10.4103/jehp.jehp.1113.22)
2. Kocarnik JM, Compton K, Dean FE, Fu W, Gaw BL, Harvey JD, et al. Cancer incidence, mortality, years of life lost, years lived with disability, and disability-adjusted life years for 29 cancer groups from 2010 to 2019: a systematic analysis for the global burden of disease study 2019. *JAMA Oncol.* 2022;8(3):420-44. doi: [10.1001/jamaoncol.2021.6987](https://doi.org/10.1001/jamaoncol.2021.6987)
3. Dhanuthai K, Rojanawatsirivej S, Thosaporn W, Kintarak S, Subarnbhesaj A, Darling M, et al. Oral cancer: A multicenter study. *Med Oral Patol Oral Cir Bucal.* 2018;23(1):e23-e9. doi: [10.4317/medoral.21999](https://doi.org/10.4317/medoral.21999)
4. Chamoli A, Gosavi AS, Shirwadkar UP, Wangdale KV, Behera SK, Kurrey NK, et al. Overview of oral cavity squamous cell

- carcinoma: Risk factors, mechanisms, and diagnostics. *Oral Oncol.* 2021;121:105451. doi: [10.1016/j.oraloncology.2021.105451](https://doi.org/10.1016/j.oraloncology.2021.105451)
5. Rivera C. Essentials of oral cancer. *Int J Clin Exp Pathol.* 2015;8(9):11884-94.
 6. DePeña CA, Van Tassel P, Lee YY. Lymphoma of the head and neck. *Radiol Clin North Am.* 1990;28(4):723-43.
 7. van Weert S, Lissenberg-Witte BI, Bloemena E, Leemans CR. Mucoepidermoid carcinoma of the head and neck: CRTC1/3 MAML 2 translocation and its prognosticators. *Eur Arch Otorhinolaryngol.* 2022;279(5):2573-81. doi: [10.1007/s00405-021-07039-2](https://doi.org/10.1007/s00405-021-07039-2)
 8. Mashhadiabbas F, Gholami S, Mohammadalizadeh Chafjiri M, Kashefi Baher MR. Central Maxillary Mucoepidermoid Carcinoma: A Case Report. *Journal of Dental School.* 2024;42(1):45-8. doi: [10.22037/jds.v42i1.44905](https://doi.org/10.22037/jds.v42i1.44905)
 9. Rodriguez-Molinero J, Pozo-Kreilinger JJ, Ruiz-Roca JA, Lopez-Sanchez AF, Cebrian-Carretero JL. Clinical and Pathological Features of Osteosarcomas of the Jaws: A Retrospective Study. *Clin Pract.* 2024;14(3):965-79. doi: [10.3390/clinpract14030077](https://doi.org/10.3390/clinpract14030077)
 10. Baher MK, Moscowchi A, Atarabashi-Moghadam S. Prevalence of oral HPV in healthy and lesion-bearing populations in Iran: a systematic review and meta-analysis. *BMC Oral Health.* 2025;25(1):699. doi: [10.1186/s12903-025-06085-0](https://doi.org/10.1186/s12903-025-06085-0)
 11. Al-Jaber A, Al-Nasser L, El-Metwally A. Epidemiology of oral cancer in Arab countries. *Saudi Med J.* 2016;37(3):249-55. doi: [10.15537/smj.2016.3.11388](https://doi.org/10.15537/smj.2016.3.11388)
 12. Rao SVK, Mejia G, Roberts-Thomson K, Logan R. Epidemiology of oral cancer in Asia in the past decade-an update (2000-2012). *Asian Pac J Cancer Prev.* 2013;14(10):5567-77. doi: [10.7314/apjcp.2013.14.10.5567](https://doi.org/10.7314/apjcp.2013.14.10.5567)
 13. Maleki D, Ghojzadeh M, Mahmoudi S-S, Mahmoudi S-M, Pournaghi-Azar F, Torab A, et al. Epidemiology of oral cancer in Iran: a systematic review. *Asian Pac J Cancer Prev.* 2015;16(13):5427-32. doi: [10.7314/apjcp.2015.16.13.5427](https://doi.org/10.7314/apjcp.2015.16.13.5427)
 14. Alotaibi ON. Oral and maxillofacial cancer: A 35-year retrospective analysis at a referral dental hospital in Saudi Arabia. *Saudi Dent J.* 2022;34(1):56-61. doi: [10.1016/j.sdentj.2021.10.001](https://doi.org/10.1016/j.sdentj.2021.10.001)
 15. Rusinovci S, Aliu X, Jukić T, Štubljar D, Haliti N. Analysis of THREE-year prevalence of oral cavity, neck and head tumors—a retrospective single-centre study. *Acta Clin Croat.* 2020;59(3):445-54. doi: [10.20471/acc.2020.59.03.08](https://doi.org/10.20471/acc.2020.59.03.08)
 16. Bagan JV, Bagan-Debon L. Clinical presentation and differential diagnosis of oral cancer. *Textbook of Oral Cancer: Prevention, Diagnosis and Management.* 2020:47-54. https://doi.org/10.1007/978-3-030-32316-3-030-32316-5_5?urlappend=%3Futm_source%3Dresearchgate.net%26utm_medium%3Darticle
 17. Ota Y, Noguchi T, Arijji E, Fushimi C, Fuwa N, Harada H, et al. General rules for clinical and pathological studies on oral cancer (2nd edition): a synopsis. *Int J Clin Oncol.* 2021;26(4):623-35. doi: [10.1007/s10147-020-01812-9](https://doi.org/10.1007/s10147-020-01812-9)
 18. Shiva A, Mousavi SJ. Epidemiologic study of oral and paraoral malignancies in sari, iran. *J Mashhad Dent Sch.* 2014;38(4):337-46 doi: [10.22038/jmds.2014.3358](https://doi.org/10.22038/jmds.2014.3358)
 19. Sargeran K, Murtooma H, Safavi SMR, Vehkalahti M, Teronen O. Malignant oral tumors in Iran: ten-year analysis on patient and tumor characteristics of 1042 patients in Tehran. *J Craniofac Surg.* 2006 Nov;17(6):1230-3. doi: [10.1097/01.scs.0000246728.23483.ce20](https://doi.org/10.1097/01.scs.0000246728.23483.ce20)
 20. Najafi S, Khayamzadeh M, Jafari Ghavamabad A, Moradi F, Bafrouei SD. A 5 year Epidemiological Study on Oral and Pharyngeal Cancers from Cancer Registration Centers in Tehran. *J Iran Med Counc,* 2018; 1(2): 63-8.
 21. Shahidi N, Lotfi A. Epidemiology and clinical findings of oral squamous cell carcinoma. *Med J Tabriz UniMed Sciences.* 2022;44(1):67-71. doi:[10.34172/mj.2022.015](https://doi.org/10.34172/mj.2022.015) [Persian]
 22. Tabatabaei SH, Maddah A, Haerian A, Akhavan Tafti M, Danesh Ardekani M, Zarmehi S. Epidemiology of Squamous Cell Carcinoma in Yazd, Iran, from 2001 to 2011. *J Dentomaxillofacial Radiology, Pathology and Surgery (3DJ).* 2016; 4(4):8-15.
 23. Rutkowska M, Hnitecka S, Nahajowski M, Dominiak M, Gerber H. Oral cancer: The first symptoms and reasons for delaying correct diagnosis and appropriate treatment. *Adv Clin Exp Med.* 2020;29(6):735-43. doi: [10.17219/acem/116753](https://doi.org/10.17219/acem/116753)
 24. Anis R, Gaballah K. Oral cancer in the UAE: a multicenter, retrospective study. *Libyan J Med.* 2013 27;8(1):21782. doi: [10.3402/ljm.v8i0.21782](https://doi.org/10.3402/ljm.v8i0.21782)
 25. Khan A, Anwar N, Manan A, Narayan K. Case Series Analysis of Oral Cancer and Their Risk Factors. *Malaysian Dental Journal.* 2008;29(1):46-50.
 26. Ferreira e Costa R, Leão MLB, Sant'Ana MSP, Mesquita RA, Gomez RS, Santos-Silva AR, et al. Oral squamous cell carcinoma frequency in young patients from referral centers around the world. *Head Neck Pathol.* 2022;16(3):755-62. doi: [10.1007/s12105-022-01441-w](https://doi.org/10.1007/s12105-022-01441-w)
 27. Ajayi O, Adeyemo W, Ladeinde A, Ogunlewe M, Effiom O, Omitola O, Arotiba G. Primary malignant neoplasms of orofacial origin: a retrospective review of 256 cases in a Nigerian tertiary hospital. *Int J Oral Maxillofac Surg.* 2007;36(5):403-8. doi: [10.1016/j.ijom.2007.01.007](https://doi.org/10.1016/j.ijom.2007.01.007)
 28. Delavarian Z, Pakfetrat A, Mahmoudi S. Five year's retrospective study of oral and maxillofacial malignancies in patients referred to oral

medicine department of Mashhad Dental School-Iran. *J Mash Dent Sch* 2009; 33(2): 129-38. Persian .

29. Andisheh-Tadbir A, Mehrabani D, Heydari ST. Epidemiology of squamous cell carcinoma of the oral cavity in Iran. *J Craniofac Surg.* 2008 ;19(6):1699-702. doi: [10.1097/SCS.0b013e31818c04cc](https://doi.org/10.1097/SCS.0b013e31818c04cc).

30. Kruse AL, Bredell M, Grätz KW. Oral cancer in men and women: are there differences? *Oral Maxillofac Surg.* 2011;15(1):51-5. doi: [10.1007/s10006-010-0253-6](https://doi.org/10.1007/s10006-010-0253-6)

31. Chen J, Katz RV, Krutchkoff DJ. Intraoral squamous cell carcinoma: epidemiologic patterns in Connecticut from 1935 to 1985. *Cancer.* 1990;66(6):1288-96. doi: [10.1002/1097-0142\(19900915\)66:6<1288::aid-cnrcr2820660632>3.0.co;2-n](https://doi.org/10.1002/1097-0142(19900915)66:6<1288::aid-cnrcr2820660632>3.0.co;2-n)

32. Wey PD, Lotz MJ, Triedman LJ. Oral cancer in women nonusers of tobacco and alcohol. *Cancer.* 1987;60(7):1644-50. doi: [10.1002/1097-0142\(19871001\)60:7<1644::aid-cnrcr2820600737>3.0.co;2-e](https://doi.org/10.1002/1097-0142(19871001)60:7<1644::aid-cnrcr2820600737>3.0.co;2-e)

33. Falaki F, Dalirsani Z, Pakfetrat A, Falaki A, Saghravanian N, Nosratzahi T, Pazouki M. Clinical and histopathological analysis of oral squamous cell carcinoma of young patients in Mashhad, Iran: a retrospective study and review of literature. *Med Oral Patol Oral Cir Bucal.* 2011;16(4):e473-7. doi: [10.4317/medoral.16.e473](https://doi.org/10.4317/medoral.16.e473)

34. Jafari A, Najafi S, Moradi F, Kharazifard M, Khami M. Delay in the diagnosis and treatment of oral cancer. *J Dent (Shiraz).* 2013;14(3):146-50.

35. Barclay M, Abel G, Greenberg DC, Rous B, Lyratzopoulos G. Socio-demographic variation in stage at diagnosis of breast, bladder, colon, endometrial, lung, melanoma, prostate, rectal, renal and ovarian cancer in England and its population impact. *Br J Cancer.* 2021 Mar;124(7):1320-1329. doi: [10.1038/s41416-021-01279-z](https://doi.org/10.1038/s41416-021-01279-z)

36. Alshami ML, Al-Maliky MA, Alsagban AA, Alshaeli AJ. Epidemiology and incidence of oral squamous cell carcinoma in the Iraqi population over 5 years (2014–2018). *Health Sci Rep.* 2023;6(4):e1205. doi: [10.1002/hsr2.1205](https://doi.org/10.1002/hsr2.1205)

37. Johnson NW. Orofacial neoplasms: global epidemiology, risk factors and recommendations for research. *Int Dent J.* 1991;41(6):365-75.

38. Razavi S, Sajadi S. Epidemiological study of oral and perioral cancers in Isfahan. 2007.

39. Bakhshi M, Dalirani S, Sadeghi HMM, Moghadam SA. Peri-Implant Oral Squamous Cell Carcinoma in a Non-Smoking, Non-Alcoholic Patient: A Case Report. *Journal of Dental School.* 2026;44(1):e5-e. doi: [10.22037/jds.v44i1.47284](https://doi.org/10.22037/jds.v44i1.47284)