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Investigation of the prevalence of potentially malignant and malignant oral lesions in the Southeastern Anatolia Region of Turkey: A 5-year retrospective study

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Abstract

Aim: The aim of this study was to determine the region, frequency, distribution, age, and sex of histopathologically diagnosed oral malignant and oral potentially malignant lesions obtained from patients admitted to the Department of Pathology, Dicle University Faculty of Medicine, Southeastern Anatolia Region of Turkey.

Methods: The pathological data of oral malignant and potentially malignant lesions histopathologically diagnosed at the Department of Pathology, Dicle University Faculty of Medicine, between 2018 and 2023, were retrospectively reviewed. Potentially malignant and malignant oral lesions were classified, and their distribution according to region, age, and sex was analyzed. The Shapiro-Wilk test was used to analyze the conformity of continuous variables to the normal distribution. The type I error level was accepted as 5% in statistical analyses.

Results: Among 161 patients with oral or potential malignancy, 76 (47.2%) were female and 85 (52.8%) were male, with a mean age of 53.9 ± 17.4 years. The most common lesions were found in the buccal mucosa (40.4%). When 104 malignant lesions were analyzed, the most common lesion was oral squamous cell carcinoma with a rate of 75%, and when 57 potentially malignant lesions were analyzed, 38 (66.7%) of the patients had lichen planus, and 19 (33.3%) had leukoplakia.

Conclusion: This retrospective study shows the distribution, frequency, and characteristics of malignant lesions in the oral cavity in a group of populations, especially in the Southeastern Anatolia Region of Turkey, and allows comparison with studies in different populations.

Keywords: Malignant oral lesion, potentially malignant oral lesion, oral squamous cell carcinoma, oral cancer, histopathology, retrospective study

Introduction

Oral cancer is defined as malignant lesions that develop in the lips, tongue, hard palate, maxilla, mandible, floor of the mouth, and gingiva. Oral cancer is a growing worldwide healthcare issue with many late-stage presentations [1-3]. The oral cavity is exposed to many harmful and carcinogenic agents. Smoking and alcohol consumption, history of human papillomavirus (which causes warts), sunlight, although a role for candida (which causes thrush), radiation, diet, areca nut, and betel nut consumption, as well as familial and genetic predisposition, are considered risk factors for oral cancer, the etiology of which is multifactorial [1, 4]. Factors such as age and gender influence the distribution of these lesions. Although advanced age is considered an important risk factor, several epidemiological reviews indicate that there is a significant increase in the number of patients diagnosed with oral cancer under the age of 45. In addition, the prevalence of oral and maxillofacial lesions varies between populations [5].

Oral precancerous lesions are characterized as "a morphologically altered tissue in which cancer is more likely to occur than in its apparently normal counterpart" (6-8). Oral potentially malignant lesions (OPML) can develop. These are malignant lesions in the oral mucosa. Cellular differences that occur in these lesions make them more prone to cancer [3]. Therefore, early diagnosis of potentially malignant oral lesions is crucial, as it can improve quality of life, influence patient prognosis, and reduce mortality [9]. The WHO 2022 classification of OPMLs includes leukoplakia, erythroplakia, erythroleukoplakia, proliferative verrucous leukoplakia, oral lichenoid lesions, lichen planus, oral submucous fibrosis, palatal lesions due to second-hand smoke, smokeless tobacco keratosis, oral graft-versus-disease, lupus erythematosus, and familial cancer syndromes (Fanconi anemia, dyskeratosis congenita, xeroderma pigmentosum, Li-Fraumeni, Bloom syndrome, ataxia telangiectasia, Cowden syndrome) [10].

Head and neck cancer is the 6th to 9th most common cancer, and its incidence has increased significantly in recent years [11]. Many types of cancer, such as oral squamous cell carcinoma (OSCC), mucoepidermoid carcinoma, adenoid cystic carcinoma, adenocarcinoma, lymphoma, sarcoma, and melanoma can be found in the oral cavity [9]. The most common of these cancers is oral squamous cell carcinoma, which accounts for more than 90% of oral cancers [12]. Although oral squamous cell carcinoma is most commonly found on the tongue, it can also be found in other parts of the oral cavity, such as the buccal mucosa, floor of the mouth, and palate [9]. Clinical examination alone is not sufficient to make a definitive diagnosis of oral lesions. In addition to a detailed clinical examination, saliva containing specific biological markers, histopathological and radiographic findings should be evaluated. Histopathological examination is the gold standard in early cancer diagnosis. However, as it is an invasive procedure, the biopsy is unsuitable for screening in the general population [13]. Despite having similar clinical characteristics, they differ in etiology and, most importantly, in their likelihood of evolving into OSCC. The risk of malignant transformation in a single lesion is difficult to quantify, and it is frequently dependent on the clinical aspect as well as the lesion's histological or biomolecular properties, in addition to the diagnostic (8).

Oral cancer incidence varies greatly across the globe. For example, oral cancer is the most frequent disease for men in India, Sri Lanka, and Pakistan, accounting for 30% of all new cancer cases in these countries, compared to only 3% of new cancer cases in the United Kingdom (2).

The aim of this study was to retrospectively evaluate the distribution, prevalence, location, and demographic characteristics of potentially malignant oral lesions and malignant lesions diagnosed histopathologically at Dicle University Faculty of Medicine in the Southeast Anatolia region between 2018 and 2023.

Materials and Methods

This study underwent review by the Local Ethics Committee of the Dicle University Faculty of Dentistry and obtained approval with protocol number 2023-27 during the meeting held on 26/06/2023.

We performed a 5-year retrospective analysis of patients treated at Dicle University Faculty of Medicine Pathology Department between 2018 and 2023. The study included 104 patients with histopathologically verified malignant lesions and 57 patients with OPML. Oral cavity lesions that were not identified as malignant or potentially malignant were excluded from the study. The patients evaluated in the study were grouped based on their diagnosis, gender, and age.

Malignant lesions were classified into eleven subgroups, including OSCC, verrucous carcinoma, adenoid cystic carcinoma, mucoepidermoid carcinoma, lymphoma, embryonal rhabdomyosarcoma, malignant mesenchymal tumor, malignant epithelial tumor, malignant tumor infiltration (NOS), Kaposi sarcoma and basal cell carcinoma (BCC). OPMLs were classified into two subgroups due to the observation of only lichen planus and leucoplakia.

Statistical analysis

The data were analyzed using IBM SPSS 21.0 software (IBM, Armonk, New York, USA).

The obtained data underwent descriptive statistical analysis. Continuous variables were tested for normal distribution using the Shapiro-Wilk test. Mean ± standard deviation or median (minimum: maximum) was used to express continuous variables, while categorical variables

were expressed as n (%). A type I error level of 5% was used.

Results

Of the 161 patients included in this study, 85 (52.8%) were male and 76 (47.2%) were female. The age range was between 2 and 101 years, with a mean age of 53.9 ± 17.4 years. The distribution of lesions was as follows: 65 (40.4%) in the buccal mucosa, 32 (19.9%) in the tongue, 34 (21.1%) in the lower lip, 10 (6.2%) in the palate, 4 (2.5%) in the upper lip, 2 (1.2%) in the salivary glands, 4 (2.5%) in the maxilla, 4 (2.5%) in the mandible, 2 (1.2%) in the gingiva, and 4 (2.5%) in the floor of the mouth. When analyzing the distribution of lesion types, 78 cases (75%) presented with oral squamous cell carcinoma (OSCC), 1 (1%) with verrucous carcinoma, 5 (4.8%) with adenoid cystic carcinoma, 3 (2.9%) with mucoepidermoid carcinoma, 5 (4.8%) with lymphoma, 1 (1%) with embryonal rhabdomyosarcoma, 2 (1. 9%) with malignant mesenchymal tumors, 1 (1%) with malignant epithelial tumors, 1 (1%) with malignant tumor infiltration (NOS), 1 (1%) with Kaposi sarcoma, while 6 (5.8%) had basal cell carcinoma (BCC). When OPMLs were analyzed, 38 (66.7%) of the lesions were lichen planus, and 19 (33.3%) were leukoplakia (Table 1).

The prevalence of OSCC in malignant lesions was determined to be 75%, which is the highest incidence rate observed. Among the 78 identified cases of OSCC, 50 were male, and 28 were female, with a mean age of 58 ± 14.9 years.

The patient with verrucous carcinoma was male, while adenoid cystic carcinoma was observed in 2 (40%) female and 3 (60%) male patients with a mean age of 54.8 ± 20.3 years. All of the cases of mucoepidermoid carcinoma were observed in female patients with a mean age of 54.8 ± 20.3 years. Two out of five lymphoma patients were female, while the remaining three were male, with an average age of 80.6 ± 7.1 years. The patient with embryonal rhabdomyosarcoma was male. Of the malignant tumors, two were mesenchymal and seen in male patients with an average age of 43.5 ± 9.2 years. There was only one female patient with a malignant epithelial tumor, while there was only one male patient with a malignant tumor infiltration. The patient diagnosed with Kaposi sarcoma was female. Five of the six patients diagnosed with basal cell carcinoma (BCC) were female, representing 83.3% of the sample; the single male patient represented the remaining 16.7%. The mean age of the patients was 60.5 ± 20.0 years. OSCCs were found to be more frequent on the lower lip when the location of malignant lesions was analyzed. Specifically, OSCC lesions were found on the tongue (26.9%), lower lip (39.7%), buccal mucosa (16.7%), palate (1.3%), upper lip (1.3%), maxilla (5.1%), mandible (2.6%), gingiva (1.3%), and floor of mouth (5.1%). Verrucous carcinoma was found solely in the palate of one case (100%).

Adenoid cystic carcinoma was noted in 20% of cases in the tongue (1), 60% of cases in the palate (3), and in one case (20%) in the salivary gland. In one case, mucoepidermoid carcinoma was observed in the buccal mucosa, palate, and salivary region (33.3%). Lymphoma was detected in 60% of cases in the tongue (3) and in 20% of cases in the palate and gingival region (1).

Table 1. Distribution of findings according to age, gender, region, and incidence.

Distribution of lesions	Incidence (n %)
Age	53.9 ± 17.4 (Age range 2 - 101)
Gender	
Female	76 (47.2%)
Male	85 (52.8%)
Region	
Buccal mucosa	65 (40.4%)
Lower lip	34 (21.1%)
Tongue	32 (19.9%)
Palate	10 (6.2%)
Upper lip	4 (2.5%)
Saliva	2 (1.2%)
Maxilla	4 (2.5%)
Mandibula	4 (2.5%)
Gums	2 (1.2%)
Mouth base	4 (2.5%)
Malignant lesions	
Oral squamous cell carcinoma	78 (75%)
Basal Cell Carcinoma	6 (5.8%)
Adenoid Cystic Carcinoma	5 (4.8%)
Lymphoma	5 (4.8%)
Mucoepidermoid Carcinoma	3 (2.9%)
Malignant Mesenchymal Tumor	2 (1.9%)
Embryonal Rhabdomyosarcoma	1 (1%)
Malignant Epithelial Tumor	1 (1%)
Malignant Tumor Infiltration	1 (1%)
Kaposi sarcoma	1 (1%)
Verrucous Carcinoma	1 (1%)
Oral Potentially Malignant Lesions	
Lichen Planus	38 (66.7%)
Leukoplakia	19 (33.3%)

Data are expressed as mean ± SD (Standart Deviation) (minimum:maximum) and n %.

Table 2. Distribution of oral malignant lesions according to age, gender and region.

Malignant lesions	Gender		Region										Total (n=104)	Age (Mean±SD)
	Female 42 (40.4%)	Male 62 (59.6%)	1	2	3	4	5	6	7	8	9	10		
Oral Squamous Cell Carcinoma	28 (35.9%)	50 (64.1%)	21 (26.9 %)	31 (39.7%)	13 (16.7%)	1 (1.3%)	1 (1.3%)	0	4 (5.1%)	2 (2.6%)	1 (1.3%)	4 (5.1%)	78 (75%)	58±14.9
Verrucous Carcinoma	0	1 (100%)	0	0	0	1 (100%)	0	0	0	0	0	0	1(1%)	-
Adenoid cystic carcinoma	2 (40%)	3 (60%)	1 (20%)	0	0	3(60%)	0	1(20%)	0	0	0	0	5 (4.8%)	54.8±20.3
Mucoepidermoid Carcinoma	3 (100%)	0	0	0	1 (33.3%)	1 (33.3%)	0	1 (33.3%)	0	0	0	0	3 (2.9%)	50.3±24.2
Lymphoma	2 (40%)	3 (60%)	3 (60%)	0	0	1 (20%)	0	0	0	0	1(20%)	0	5(4.8%)	80.6±7.1
Embryonal Rbm	0	1 (100%)	0	0	0	1 (100%)	0	0	0	0	0	0	1(1%)	-
Malignant Mesenchymal Tumor	0	2 (100%)	0	0	0	0	0	0	0	2(100%)	0	0	2 (1.9%)	43.5±9.2
Malignant Epithelial Tumor	1 (100%)	0	1 (100%)	0	0	0	0	0	0	0	0	0	1 (1%)	-
Malignant Tumor Infiltration	0	1 (100%)	0	0	0	1 (100%)	0	0	0	0	0	0	1 (1%)	-
Kaposi Sarcoma	1 (100%)	0	0	0	0	1 (100%)	0	0	0	0	0	0	1 (1%)	-
Basal Cell Carcinoma	5 (83.3%)	1 (16.7%)	0	3 (50%)	0	0	3 (50%)	0	0	0	0	0	6 (5.8%)	60.5±20.0

Data are expressed as mean ± st. deviation and n%. 1: Tongue, 2: Lower lip, 3: Buccal mucosa, 4: Palate, 5: Upper lip, 6: Salivary gland, 7: Maxilla, 8: Mandible, 9: Gingiva, 10: Base of mouth

Table 3. Distribution of oral potentially malignant lesions according to age, gender and region.

Oral Potentially Malignant Lesions	Gender		Region										Total (n=57)	Age (Mean ± SD)
	Female 34 (59,6%)	Male 23 (40,4%)	1	2	3	4	5	6	7	8	9	10		
Lichen Planus	30 (78.9%)	8 (21.1%)	1 (2.6%)	0	37 (97.4%)	0	0	0	0	0	0	0	38 (66.7%)	47.6±13.3
Leukoplakia	4 (21.1%)	15 (78.9%)	5 (26.3%)	0	14 (73.7%)	0	0	0	0	0	0	0	19 (33.3%)	42.6±19.6

Data are expressed as mean ± st. deviation and n%. 1: Tongue, 2: Lower lip, 3: Buccal mucosa, 4: Palate, 5: Upper lip, 6: Salivary gland, 7: Maxilla, 8: Mandible, 9: Gingiva, 10: Base of mouth

Embryonal rhabdomyosarcoma (1 case, 100%) was identified in the palate, malignant mesenchymal tumor (2 cases, 100%) in the mandible, malignant epithelial tumor (1 case, 100%) in the tongue, malignant tumor infiltration (NOS) (1 case, 100%) in the palate, and Kaposi sarcoma (1 case, 100%) in the palatal region. Basal cell carcinoma (BCC) was present in 3 cases (50%) in the upper lip and 3 cases (50%) in the lower lip (as shown in Table 2).

Lichen planus lesions were present in 30 female (78.9%) and 8 male (21.1%) patients with a mean age of 47.6 ± 13.3 years among the observed OPMLs. Additionally, 4 female (21.1%) and 15 male patients had leukoplakia lesions. The average age of patients with leukoplakia was 42.6 ± 19.6 years. When analyzed regionally, lichen planus was predominantly located on the buccal mucosa (97.4%) and, in one case, on the tongue (2.6%). Among patients with leukoplakia lesions, 14 (73.7%) had lesions on the buccal mucosa and 5 (26.3%) on the tongue.

Discussion

Oral cancer is the sixth most common cancer worldwide, with a particularly high incidence in South Asia, and the most common site of malignancy in the head and neck, and it refers to a set of disorders with a variety of locations and etiologies. Lifestyle, habits, demographics, and genetics all impact regional variances in the prevalence of oral cancer. [14]. Oral cancer is a major public health problem in both developed and developing countries. With an annual incidence exceeding 300,000 cases, it is among the most widespread non-communicable diseases worldwide. Early detection and prompt treatment are essential to reduce malignant transformation and mortality [15]. Biopsy is an important diagnostic tool for the identification of lesions ranging from simple periapical lesions to malignant lesions. In both dentistry and medicine, evidence-based treatment is increasingly favored for determining treatment options [16].

Numerous studies have been conducted on osteoblastic proliferation of bone marrow, commonly referred to as OPML, and malignant lesions. It is believed that these pathologies usually occur in advanced age groups due to prolonged exposure to potential cancer-causing factors. Several studies suggest that the likelihood of developing OPML is higher with increasing age [9, 17]. In this study, the mean age of individuals with oral malignant and potentially malignant lesions was 53.9 ± 17.4 years. Yalçın et al. identified the mean age of the oral squamous cell carcinoma group as 56.0±2.8 years, and Jones and Franklin reported an average of 64.2 ± 12.9 years [18, 19]. The mean age for OSCC, which emerged as the most widespread malignant lesion in this study, was 58 ± 14.9 years, sharing a parallel value with the rest of the sample.

OPML and malignant lesions were detected at a higher rate (52.8%) in males in our study when evaluated by gender. This finding is in line with previous studies conducted by Yalcin et al., Afridii et al., and Kumar et al. [18, 20, 21]. In contrast, Serindere et al.'s study found it to be more prevalent among females [17].

The most common sites for lesions were the buccal mucosa (40.4%), the tongue (19.9%), and the lower lip (21.1%). Buccal mucosa was found to be more susceptible to OPMLs. Relevant studies in the literature also support this conclusion [9, 20, 22, 23]. In contrast, Zokaee et al. reported an increased frequency of potentially malignant lesions on the tongue [9]. Although oral squamous cell carcinoma (OSCC) may develop on the cheeks, lips, or palate, the tongue is the most frequent location [24]. In this study, OSCC was most commonly observed in the lower lip and tongue. More than 90% of oral cancers are squamous cell carcinomas derived from the epithelial surface [3, 25]. According to the findings of this study, out of 161 detected lesions, 78 were malignant, and 57 were OPML. The predominant malignant lesion was OSCC, accounting for 75% of the cases. The ratio of OSCC to other malignant lesions was 28.5% and 64.4% in the Yalcin et al. and Kelloway et al. studies, respectively [17, 26]. Soylu et al. found that among 479 oral pathology histopathology cases, only 15 were malignant, and 33.3% were SCC [15]. When Zokaee et al. evaluated the prevalence of oral potentially malignant lesions (OPML), they found that lichen planus had a prevalence of 49%, while leukoplakia had a prevalence of 14.4%. In the study by Chher et al., the prevalence of leukoplakia was equal to 60% of OPML, and the prevalence of lichen planus was 30.8% [9, 22]. Afridi et al. discovered that leukoplakia constituted the most frequent type (75%) in a cohort of 120 patients. Conversely, oral submucous fibrosis emerged as the prevalent type of OPML in the studies conducted by Kumar and Gupta [20, 21, 27].

Serindere et al. reported that 50.6% of 194 patients had lichen planus lesions [17]. The most common type of OPML lesions seen in this study was lichen planus. The variance in rates across societies and genders may stem from individual consumption of tobacco and alcohol, as well as their environmental, cultural, and religious habits [20].

Conclusion

The gold standard for early cancer diagnosis is a biopsy. Early diagnosis and regular patient follow-up are crucial in preventing diagnosis and treatment delays and improving the patient's life expectancy and quality of life.

This study examines oral lesions' distribution, frequency, and characteristics in cases from the Southeastern Anatolia Region. This study will enable comparative analysis with existing research and make significant contributions to the literature by incorporating a greater number of patients, clinical parameters, and radiologic parameters.

Disclosures

Ethics Committee Approval: Ethics committee approval was received for this study from Dicle University Faculty of Dentistry Local Ethics Committee, with the approval number: 2023-27.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – B.K.; Design – B.K., M.Ç.; Supervision – B.K., U.A.; Materials – B.K., U.A.; Data collection &/or processing – U.A., C.A., H.O.; Analysis and/or interpretation – H.O.; Literature search – B.K., U.A.; Writing – B.K.; Critical review – U.A, M.Ç.

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References

1. Yazar H, Karaca İR. Oral kanserin risk faktörleri. ADO Klinik Bilimler Dergisi. 2018;9(1):1609-16.
2. Brocklehurst P, Kujan O, O'Malley L, Ogden GR, Shepherd S, Glenny A-M. Screening programmes for the early detection and prevention of oral cancer. Cochrane Database of Systematic Reviews 2013, Issue 11. Art. No.: CD004150. https://doi.org/10.1002/14651858.CD004150.pub4
3. Özer NE, Karaca B, Güneri P. Oral kanserin erken tanısında yapay zekâ uygulamaları. Ege Üniversitesi Dis Hekimligi Fakültesi Dergisi. 2022;43:19-26. https://doi.org/10.5505/eudfd.2022.24572
4. Aragón-Niño Í, Cuesta-Urquía C, González-Martín-Moro J. et al. HPV infection in oral cancer, our experience: prevalence, clinical implications, and current vaccination program in Spain. Journal of Clinical and Experimental Dentistry. 2023;15(7): e584-e589. https://doi.org/10.4317/jced.60514
5. Deveci H, Çankal DAU. Ağız kanserleri ve diş hekimlerinin rolü. Ortadoğu Tıp Dergisi. 2019;11(1):78-84. https://doi.org/10.21601/ortadogutipdergisi.456800
6. Axell T, Pindborg JJ, Smith CJ et al (1996) Oral white lesions with special reference to precancerous and tobacco-related lesions. J Oral Pathol Med 25:49–54.
7. Pindborg JJ, Reichart PA, Smith CJ et al (1997) World Health Organization: Histological typing of cancer and precancer of the oral mucosa, 2nd edn. Springer, Berlin
8. Amagasa T, Yamashiro M, Uzawa, N. Oral premalignant lesions: from a clinical perspective. Int J Clin Oncol 2011;16:5–14. https://doi.org/10.1007/s10147-010-0157-3
9. Zokaee H, Samadaei M, Zahmati Aha, Roshandel G. Prevalence of oral premalignant lesions in the area with the highest prevalence of gastrointestinal cancer. 2022. https://doi.org/10.21203/rs.3.rs-2000835/v1
10. Muller S, Tilakaratne WM. Update from the 5th edition of the World Health Organization classification of head and neck tumors: Tumours of the oral cavity and mobile tongue. Head and Neck Pathology. 2022;16(1):54-62. https://doi.org/10.1007/s12105-021-01402-9
11. Zokirovna Oa. The incidence of cancer of the oral cavity and pharynx in The Bukhara Region. International Journal of Integrative and Modern Medicine. 2023;1(1):86-9.
12. Motlokwa Pk, Tsima Bm, Martei Ym, Ralefala T, Galebole F, Stephens-Shields Aj, Et Al. Disparities in oral cancer stage at presentation in a high HIV prevalence setting in Sub-Saharan Africa. Jco Global Oncology. 2022;8:E2100439. https://doi.org/10.1200/GO.21.00439
13. Coşan G, Yilmaz S. Oral kanserlerin tanısında tükürük biyobelirteçlerinin rolü. Akdeniz Tıp Dergisi. 2022;8(2):218-24. https://doi.org/10.53394/akd.1057801
14. Shah J, Gil Z. Current concepts in management of oral cancer – surgery. Oral Oncology 2009;45(4-5):394-401. https://doi.org/10.1016/j.oraloncology.2008.05.017
15. Basha S, Mohamed Rn, Al-Thomali Y, Al Shamrani As. The prevalence of oral cancer in Saudi Arabia-A systematic review. Ann Med Health Sci Res. 2019;9(2):553-7.
16. Soylu E, Öztürk K, Osman E, Topan C, Alkan A. distribution of oral pathologies: A retrospective analysis in Kayseri Region. Sağlık Bilimleri Dergisi. 2019;28(2):70-4. https://doi.org/10.34108/eujhs.452179
17. Serindere G, Belgin Ca, Gürsoy D, Orhan K. hatay ilinde oral premalign lezyonların prevalansı: Retrospektif bir çalışma. Osmangazi Tıp Dergisi. 2020;42(5):14-7. https://doi.org/10.20515/otd.769391
18. Yalçın Ed, Bozan Ç. Oral ve maksillofasiyal patolojilerin incelenmesi: 5 yıllık retrospektif çalışma. 7tepe Klinik Dergisi.15(3):298-304.
19. Jones A, Franklin C. An Analysis of oral and maxillofacial pathology found in children over a 30-year period. International Journal of Paediatric Dentistry. 2006;16(1):19-30. https://doi.org/10.1111/j.1365-263X.2006.00683.x
20. Afridi Nm, Khan Rtu, Khan Z, Anjum Mu. A clinical study of incidence and risk factors associated with oral premalignant lesions. National Editorial Advisory Board. 2017;28(11):20173.
21. Kumar Ys, Acharya S, Pentapati Kc. Prevalence of oral potentially malignant disorders in workers of Udupi Taluk. South Asian Journal of Cancer. 2015;4(03):130-3. https://doi.org/10.4103/2278-330X.173177
22. Chher T, Hak S, Kallarakkal Tg, Durward C, Ramanathan A, Ghani Wmn, Et Al. Prevalence of oral cancer, oral potentially malignant disorders and other oral mucosal lesions in Cambodia. Ethnicity & Health. 2018;23(1):1-15. https://doi.org/10.1080/13557858.2016.1246431
23. Modi D, Laishram Rs, Sharma Ldc, Debnath K. Pattern of oral cavity lesions in A Tertiary Care Hospital In Manipur, India. Journal Of Medical Society. 2013;27(3):199-202. https://doi.org/10.4103/0972-4958.127393
24. Kara T, Sari M, Kalelioğlu B. An oral squamous cell carcinoma based on a chronic denture irritation. Turkiye Klinikleri Journal of Dental Sciences. 2022;28(3). https://doi.org/10.5336/dentalsci.2021-86502
25. Karaca İR. Oral kavitede görülen invaziv kanserler: Derleme. Ortadogu Medical Journal/Ortadogu Tip Dergisi. 2018;10(4). https://doi.org/10.21601/ortadogutipdergisi.340599
26. Kelloway E, Ha W, Dost F, Farah C. A retrospective analysis of oral and maxillofacial pathology in An Australian adult population. Australian Dental Journal. 2014;59(2):215-20. https://doi.org/10.1111/adj.12175
27. Gupta S, Singh R, Gupta O, Tripathi A. Prevalence Of oral cancer and pre-cancerous lesions and the association with numerous risk factors In North India: A hospital based study. National Journal of Maxillofacial Surgery. 2014;5(2):142. https://doi.org/10.4103/0975-5950.154816