

Original Article

Salivary Gland Tumors in Libyan Population: A 20-Years Retrospective Study

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ABSTRACT

Background and objectives. Salivary gland tumors (SGT) are relatively uncommon. It pose considerable challenging in diagnosis because their histopathological features and behavior diversity. There are several epidemiological studies describe their incidence and frequency. The current study aims to investigate the diverse histological types and distribution clinical characters. **Methods.** A retrospective study was carried out in oral diagnosis, oral medicine, oral pathology and radiology department of faculty of dentistry at Benghazi university from 2000 to 2019. Information gathered contained the year of diagnosis, age, gender, site, symptoms and histopathological diagnosis. The data collected was analyzed with SPSS. **Result.** Of the total 60 salivary gland tumors, 25 (41.7%) was benign tumors in which the pleomorphic adenoma was the most common type (n=24, 96%), and malignant tumors account (n=35, 38.3%) with mucoepidermoid carcinoma is the most frequent (n=41, 40%). Female to male ratio was 1.3:1 with average age of 40.5 (range 11-94). About 91.1% of salivary gland tumors were diagnosed in minor salivary gland where most of cases occurred in palate by 8.9%. Major salivary glands were affected by 8.9% mostly in parotid gland (7.2%). Most of cases were diagnosed as painless swelling. **Conclusion:** Malignant salivary gland tumors more common the benign type with the palate is the principle anatomical location. Pleomorphic adenoma was the most common pathological finding with predominance of female over male.

Keywords: Salivary Gland Tumors, Pleomorphic Adenoma, Mucoepidermoid Carcinoma, Benghazi.

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INTRODUCTION

Salivary gland tumors (SGT) are rare and are an important field for oral and maxillofacial pathology. The morphological diagnosis of these lesions is always challenging as they have several histological subtypes, overlapping of morphological data, and multiple classification [1].

Some improvements in the classification of salivary gland tumors, identifying 31 primary epithelial neoplasms, have recently been published by the World Health Organization (WHO) [2]. Despite this large number of subtypes, these lesions account less than 2% of all tumors and 3-5% of all head and neck tumors, with an approximate annual global incidence ranging from 0.4 to 13.5 cases per 100,000 individuals [3,4].

Although the frequency and incidence of these tumors have been evaluated by several epidemiological studies worldwide [3-9] geographical variations have been identified in this group of lesions, especially in relation to anatomical location and histological subtypes [4,5]. In addition, there is a dearth in the literature on the frequency and distribution of SGTs in Africa, and especially North Africa. Thus, the objective of the present study was to describe the clinical and demographic aspects of salivary gland tumors (SGT) diagnosed in oral pathology division of the department of oral medicine, oral pathology, oral diagnosis, and radiology of faculty of dentistry at Benghazi, Libya, and to compare the findings with epidemiological data from different geographic locations obtained through the review of the literature.

METHODS

Study Design and Sample

In this study, files in oral pathology division of the department of oral medicine, oral pathology, oral diagnosis and radiology of faculty of dentistry at Benghazi, Libya were retrospectively reviewed during a 20-year period (between January 2000 and December 2019). All cases of SGT were retrieved, and data such as gender, age, anatomical location, and histopathological diagnosis were obtained from clinical records and analyzed.

The lesions were reviewed histologically and were reclassified into benign and malignant tumors in accordance with the current WHO Classification of Head and Neck Tumors [2].

Statistical Analysis

Statistical analysis was performed with all collected data using the chi-squared test in the SPSS statistics software to analyze associations between the variables of interest (age, gender, and symptoms). The statistical significance was set at $\alpha = 0.05$.

RESULTS

In 20 years (2000-2019), there were 60 salivary gland tumors (SGT) diagnosed at oral pathology division of the department of oral medicine, oral pathology, oral diagnosis and radiology at faculty of dentistry, Benghazi University, Libya. Of these, 25 (41.7%) were benign, and 35 (58.3%) were malignant tumors (Figure 1) with a benign:malignant ratio of 1:1.6, distributed among two benign and ten malignant histologic subtypes (Table 1). The majority of patients were female 33 (56.9%), and the male were 25 (43.1%) with an overall female to male ratio of 1.3:1. The difference was significant ($p < 0.05$).

Most tumors were occurred in patients between the second and third decades of life with an average age of 40.5 (range 11-94). The difference age of patients with benign and malignant tumors was not statistically significant ($p > 0.05$). Table 2 shows the distribution of each SGT, according to the age of patients.

Regarding the anatomical site, 91.1% of the tumors were appeared in the minor salivary glands (n = 51), while only 8.9% affected the major salivary glands (n = 5). The palate was the most commonly affected site, with a frequency of 42.9% (n = 24), followed by buccal mucosa (n = 11, 19.6%), lips (n = 4, 7.2%), parotid gland (n = 3, 5.36%), floor of mouth (n=3, 5.36) and submandibular gland (n = 2, 3.57%). There were 4 cases with unspecified anatomic location (7.1%), and the sublingual gland was not reported as a site of salivary gland tumors. Both benign and malignant neoplasms predominated at the junction between soft and hard palate (Table 3).

Information on symptoms was presented for 18 cases of benign tumors. All cases were diagnosed as painless swelling. Among malignant tumors, information was available in 30 cases; 3 of which with presented pain (10%) and the remaining cases presented as a painless swelling. The chi-square test showed a non-significant association between malignant tumors and pain (p>0.05).

Among the benign salivary gland tumors, pleomorphic adenoma (PA) was the most frequent histological type (n = 24: 96%) (one case was recurrent), followed by basal cell adenoma n= 1:4% (Table 1). Most tumors were diagnosed in the second and third decades of life (Figure 2). However, the age ranged from 11 to 94 years, with an average of 41 years (SD±26.2). Most cases occurred in the palate (n = 9, 42.9%) and female patients (n =16; 72.7%), with a female: male ratio of 2.7:1 (16 female and 6 male).

Regarding the malignancies (n = 35), mucoepidermoid carcinoma was the most frequent malignant tumor (n = 14, 40%), followed by polymorphous adenocarcinoma (n = 5, 14.3%), four cases for x- pleomorphic adenoma (11.43%), and three cases for adenoid cystic carcinoma and adenocarcinoma (nonspecific ed) (8,57%) (Table 1). Most tumors were diagnosed in the third and fourth decades of life (Figure 2). However, the age ranged from 14 to 87 years, with a mean of 43 years (SD ± 20.7) (Table 2). Most cases also occurred in the minor salivary glands of the palate (n = 15, 44.1%) and male patients (n = 19, 54.3%), with a female: male ratio of 1:1.2(16 female and 19male) and 2 cases were metastasis (Tables 1 & 3).

Table (1) histologic and gender distribution of 60 salivary gland tumors

Tumors	Total 60			Gender		Mean age	Age range
		% A	% B	Male	Female		
Pleomorphic adenoma	24	96	40	5	16	41	11-94
Basal cell adenoma	1	4	1.7	1	0	67	-----
Mucoepidermoid carcinoma	14	40	23.3	8	6	36.9	22-63
Polymorphous adenocarcinoma	5	14.3	8.3	3	2	42	25-55
Adenoid cystic carcinoma	3	8.57	5	1	2	47.6	38-70
Carcinoma ex Pleomorphic adenoma	4	11.43	6.7	2	2	33.5	14-55
Squamous cell carcinoma	2	5.71	3.3	2	0	36.7	18-63
Adenocarcinoma	3	8.57	5	2	1	60.3	58-87
cystadenocarcinoma	1	2.86	1.7	0	1	32	-----
Salivary duct carcinoma	1	2.86	1.7	1	0	63	-----
Acinic cell carcinoma	1	2.86	1.7	1	0	27	-----
Undifferentiated adenocarcinoma	1	2.86	1.7	0	1	85	-----

^A Percent in the group (benign or malignant). ^B percent in relation to the total number of cases.

Table (2): Age group distribution (decade of life) of salivary gland tumor

Tumors	Total 60	Age group										Mean age	Age range
		% ^A	% ^B	11-20	21-30	31-40	41-50	51-60	61-70	>70	NS		
Pleomorphic adenoma	24	96	40	7	7	0	1	4	2	1	2	41	11-94
Basal cell adenoma	1	4	1.7	0	0	0	0	0	1	0	0	67	-----
Mucoepidermoid carcinoma	14	40	23.3	0	5	6	0	1	2	0	0	36.9	22-63
Polymorphous adenocarcinoma	5	14.3	8.3	0	1	1	2	1	0	0	0	42	25-55
Adenoid cystic carcinoma	3	8.57	5	0	0	1	1	0	1	0	0	47.6	38-70
Carcinoma ex Pleomorphic adenoma	4	11.43	6.7	1	1	1	0	1	0	0	0	33.5	14-55
Squamous cell carcinoma	2	5.71	3.3	1	0	0	0	0	1	0	0	36.7	18-63
Adenocarcinoma	3	8.57	5	0	0	0	0	1	1	1	0	60.3	58-87
cystadenocarcinoma	1	2.86	1.7	0	0	1	0	0	0	0	0	32	-----
Salivary duct carcinoma	1	2.86	1.7	0	0	0	0	0	1	0	0	63	-----
Acinic cell carcinoma	1	2.86	1.7	0	1	0	0	0	0	0	0	27	-----
Undifferentiated adenocarcinoma	1	2.86	1.7	0	0	0	0	0	0	1	0	85	-----

Table (3): Distribution of salivary gland tumors according to the location (major and minor salivary gland

NS not specified or unrecorded, IO intraosseous

Tumors	Total		Major salivary gland			Minor salivary gland						
	N 60	%	parotid	submandibular	palate	lips	Buccal mucosa	Floor of mouth	Retromolar area	IO	maxillary sinus	NS
Pleomorphic adenoma	24	40	3	1	9	1	6	1	0	0	0	3
Basal cell adenoma	1	1.7	0	0	0	0	1	0	0	0	0	0
Mucoepidermoid carcinoma	14	23.3	0	0	3	1	2	2	0	2	1	3
Polymorphous adenocarcinoma	5	8.3	0	0	4	0	1	0	0	0	0	0
Adenoid cystic carcinoma	3	5	0	1	2	0	0	0	0	0	0	0
Carcinoma ex Pleomorphic adenoma	4	6.7	0	0	1	2	0	0	0	0	0	1
Squamous cell carcinoma	2	3.3	0	0	1	0	0	0	0	0	0	1
Adenocarcinoma	3	5	0	0	2	0	0	0	0	1	0	0
cystadenocarcinoma	1	1.7	0	0	0	0	1	0	0	0	0	0
Salivary duct carcinoma	1	1.7	0	0	1	0	0	0	0	0	0	0
Acinic cell carcinoma	1	1.7	0	0	0	0	0	0	0	0	0	1
Undifferentiated adenocarcinoma	1	1.7	0	0	1	0	0	0	0	0	0	0

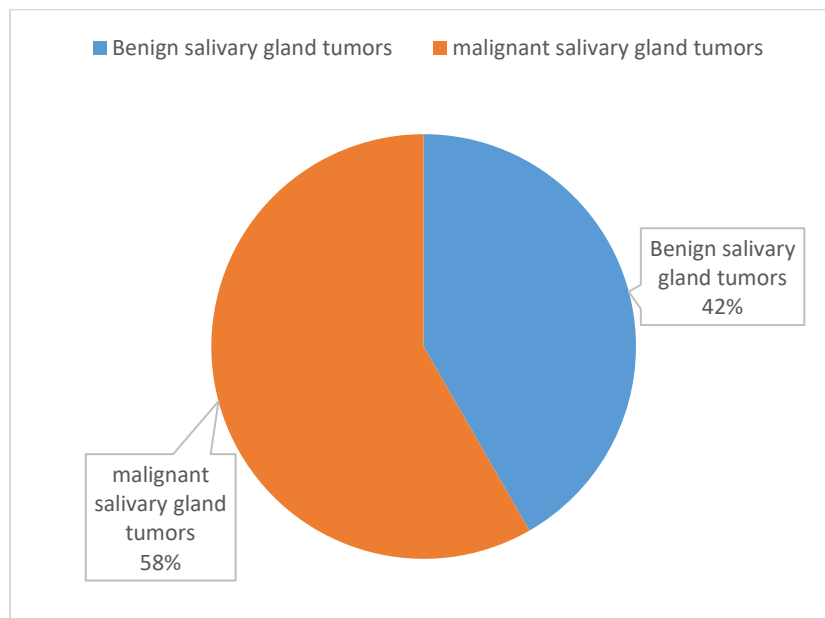


Figure 1. Incidence of benign salivary gland tumors versus malignant salivary gland tumors distributions.

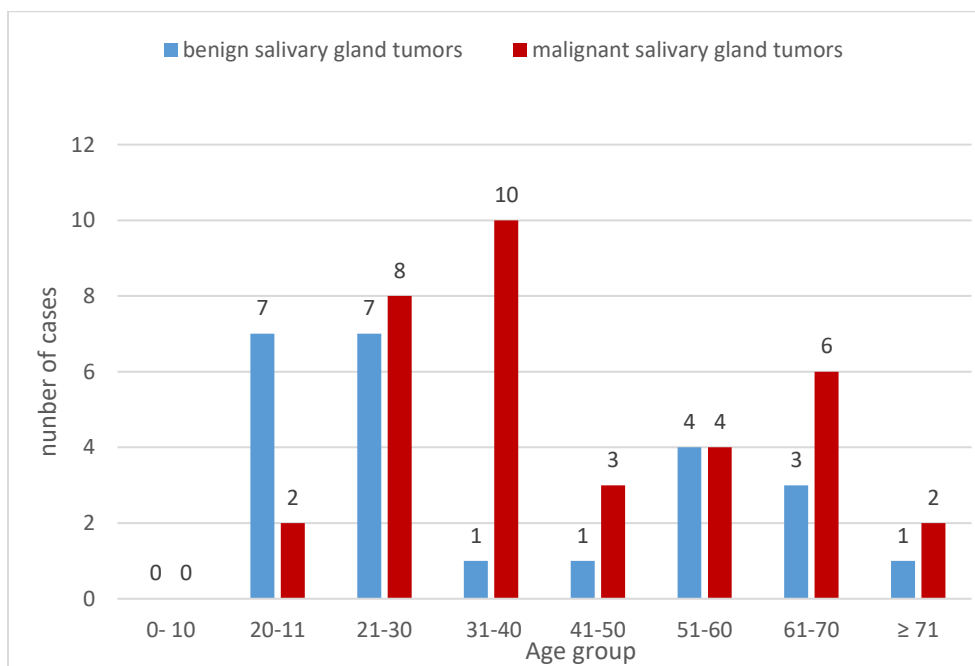


Figure 2. Distribution of 60 salivary gland tumors according to the age group (decade of life)

DISCUSSION

This retrospective study for the incidence of salivary gland tumors SGT within 20 years (2000-2019) in Benghazi city was retrieved 60 cases of salivary gland tumors. The data in this study found that the frequency of malignant was higher than benign tumors with the ratio of benign tumors to the malignant tumors 1:1.6. These findings come in consistency with variety of studies that had been done to achieve the same aims, which found the benign tumors were more common than malignant tumors [5,10-14]. However, the result of present study was attributed to geographical variability since most of the studies were done in Europe, China, India & South Africa and very less in Libya with different aims.

In our results, the age of patients with benign tumors varied from 11-94 with a mean of (40.5 years), and the age of patients with malignant SGT ranged from 14-87 years with a mean of (43 years). The age of patients with benign SGT was slightly younger than those with malignant SGT. This result was too close to other studies that found the age of patients with benign SGT is younger than patients with malignant SGT [6,15-17] despite some studies from Africa reported that the mean age is less than 40 (37.4 years) [9,18,19].

According to present data, the predominance of SGT was in females (56.9%) more than males (43.1%) with an overall female to male ratio 1.3:1. This result was in agreement with published studies [18,20]. In contrast, to two authors [10,21] who found that the predominance was in males. Furthermore, the malignant SGT were common in males than females with an overall female to male ratio 1:1.2. This finding was inconsistent with Wang et al [22], Kayembe and Kalengayi [18] who found that the predominance of malignant tumors was in males.

Although most of SGT occur in the major salivary glands, in the current study, the incidence of salivary gland tumors was greater in minor salivary glands with the palate was the most common site by 91.1%. However, the parotid salivary gland was least common site of SGT, this result was close to finding of Jaber MA, 2006 [15].

In contrast to many previous studies which reported that the parotid gland was the most common site for the tumors this [16,23-26]. M. Gao et al, 2017 Emitted a hypothesis for the reason for the highest rate of salivary gland tumors in minor salivary glands was because their location in the oral cavity and the patient seek the dental treatment first to overcome the pain & discomfort [5]. The present study was like most of other previous studies that found the pleomorphic adenoma was the most common tumor of all benign tumors and all salivary gland tumors (96%-40%) respectively. This result was similar to previous reported studies [6,9,13,27-29].

The second most common type of salivary gland tumors in this study was Mucoepidermoid carcinoma which accounted for (40%) of all salivary gland tumors and (23.3%) of all malignant tumors. Mucoepidermoid carcinoma was the most common malignant tumor of salivary gland, which was compatible with the results of most previous studies [23,30-33]. The rate of mucoepidermoid carcinoma in the present study was slightly higher than in other studies that had shown the prevalence rates ranging from 4-12% of SGT [9,18,34-39].

In contrast to this study, some literatures reported that Adenoid cystic carcinoma (ACC) was the most common malignant SGT and the mucoepidermoid carcinoma in the second place [7,9,40-42]. In this study, ACC represented 5%, 3% of malignant and all tumors respectively. According to this study, the polymorphous adenocarcinoma was the second most common malignant tumor, which represented (14.3%) of the malignant tumors and (8.3%) of all salivary gland tumors.

Carcinoma ex pleomorphic adenoma (Ex-PA) in this study represented 4% of all tumors, this frequency is slightly higher than that in the literature. In this study, among the malignant tumors, Cystadenocarcinoma, Salivary duct carcinoma, Acinic cell carcinoma and undifferentiated adenocarcinoma represented the same frequency 1% of all tumors.

Painless swelling was the most common symptom of benign SGT while pain, rapid growth and presence of ulcerative surface were almost with malignant SGT [43]. In this study all patients with benign SGT presented

with pain less swelling while, patients with malignant SGT only 10% reported pain which not significant among malignant tumors ($P>0.05$). This finding was not in agreement with other studies by Reinheimer et al [6]. and Comoglu et al [44]. that reported the pain and facial paralysis should consider as signs for malignant SGT.

CONCLUSION

The present study found that the malignant SGTs are most common especially in minor salivary gland and the palate is the most common site. Pleomorphic adenoma is the most common benign tumors. Females are the most common affected gender, the second and the third decade of life are the most affected age.

Disclaimer

The article has not been previously presented or published, and is not part of a thesis project.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

REFERENCES

1. Neville, Brad W., et al. Oral and maxillofacial pathology. Elsevier Health Sciences, 2015.
2. Seethala RR, Stenman G. Update from the 4th Edition of the World Health Organization Classification of Head and Neck Tumours: Tumors of the Salivary Gland. *Head Neck Pathol.* 2017;11(1):55–67. <https://doi.org/10.1007/s12105-017-0795-0>.
3. da Silva LP, Serpa MS, Viveiros SK, Sena DAC, de Carvalho Pinho RF, de Abreu Guimarães LD, et al. Salivary gland tumors in a Brazilian population: a 20-year retrospective and multicentric study of 2292 cases. *J Craniomaxillofac Surg.* 2018;46(12):2227–33. <https://doi.org/10.1016/j.jcms.2018.09.028>.
4. Cunha JLS, Coimbra AC, Silva JV, Nascimento IS, Oliveira CR, Andrade ME, et al. Epidemiologic analysis of salivary gland tumors over a 10-years period diagnosed in a north- east Brazilian population. *Med Oral Patol Oral Cir Bucal.* 2020;25(4):e516–e522522.
5. Gao M, Hao Y, Huang MX, Ma DQ, Chen Y, Luo HY, et al. Salivary gland tumours in a northern Chinese population: a 50-year retrospective study of 7190 cases. *Int J Oral Maxillofac Surg.* 2017;46(3):343–9. <https://doi.org/10.1016/j.ijom.2016.09.021>.
6. Reinheimer A, Vieira DS, Cordeiro MM, Rivero ER. Retrospective study of 124 cases of salivary gland tumors and literature review. *J Clin Exp Dent.* 2019;11(11):e1025–e10321032. <https://doi.org/10.4317/jced.55685>.
7. Mahomed Y, Meer S. Primary epithelial minor salivary gland tumors in South Africa: a 20-year review. *Head Neck Pathol.* 2020;14(3):715–23. <https://doi.org/10.1007/s12105-019-01111-4>.
8. CUNHA, John Lennon Silva, et al. Salivary Gland Tumors: A Retrospective Study of 164 Cases from a Single Private Practice Service in Mexico and Literature Review. *Head and Neck Pathology*, 2020, 1-9.
9. ANDO, Zacharie, et al. Epidemiological and histopathological patterns of salivary gland tumors in Cameroon. *Pan African Medical Journal*, 2016, 23.1.
10. Ferchiou M, Khayat O, Zribi S, M'barek C, Labbène N, El Khedim A, et al. Tumors of salivary glands: anatomical study and clinical epidemiology of a series of 180 cases. *La Tunisie medicale.* 2010;88(4):240-4.
11. Ouoba K, Dao M, Sakande B, Kabre M, Cisse R, Ouedraogo I, et al. Salivary gland tumors. Apropos of 48 surgical cases. *Dakar medical.* 1998;43(1):60-4.
12. Pinkston JA, Cole P. Incidence rates of salivary gland tumors: results from a population-based study. *Otolaryngology–Head and Neck Surgery.* 1999;120(6):834-40.

13. Subhashraj K. Salivary gland tumors: a single institution experience in India. *British Journal of Oral and Maxillofacial Surgery*. 2008;46(8):635-8.
14. Mejía-Velázquez CP, Durán-Padilla MA, Gómez-Apo E, Quezada-Rivera D, Gaitán-Cepeda LA. Tumors of the salivary gland in Mexicans. A retrospective study of 360 cases. *Medicina oral, patología oral y cirugía bucal*. 2012;17(2):e183.
15. Aber MA. Intraoral minor salivary gland tumors: a review of 75 cases in a Libyan population. *International journal of oral and maxillofacial surgery*. 2006 Feb 1;35(2):150-4.
16. Ito F, Ito K, Vargas P, De Almeida O, Lopes M. Salivary gland tumors in a Brazilian population: a retrospective study of 496 cases. *International journal of oral and maxillofacial surgery*. 2005;34(5):533-6.
17. de Oliveira FA, Duarte ECB, Taveira CT, Máximo AA, de Aquino EC, de Cássia Alencar R, et al. Salivary gland tumor: a review of 599 cases in a Brazilian population. *Head and neck pathology*. 2009;3(4):271.
18. Kayembe M, Kalengayi M. Salivary gland tumours in Congo (Zaire). *Odonto-stomatologie tropicale= Tropical dental journal*. 2002;25(99):19-22.
19. Pires FR, Pringle GA, de Almeida OP, Chen S-Y. Intra-oral minor salivary gland tumors: a clinicopathological study of 546 cases. *Oral oncology*. 2007;43(5):463-70.
20. Mohamed M, Abdel-Aziz A-S. Salivary gland tumours in Egypt and non-Western countries. *British journal of cancer*. 1964;18(4):649.
21. Mohamed M, Abdel-Aziz A-S. Salivary gland tumours in Egypt and non-Western countries. *British journal of cancer*. 1964;18(4):649.
22. Wang Z, Shen M-M, Liu X-J, Si Y, Yu G-Y. Characteristics of the saliva flow rates of minor salivary glands in healthy people. *Archives of oral biology*. 2015;60(3):385-92.
23. Li L-j, Li Y, Wen Y-m, Liu H, Zhao H-w. Clinical analysis of salivary gland tumor cases in West China in past 50 years. *Oral oncology*. 2008;44(2):187-92.
24. Otoh E, Johnson N, Olasoji H, Danfillo I, Adeleke O. Salivary gland neoplasms in Maiduguri, north-eastern Nigeria. *Oral diseases*. 2005;11(6):386-91.
25. Morais MdLSdA, Azevedo PR, Carvalho CH, Medeiros L, Lajus T, Costa AdLL. Clinicopathological study of salivary gland tumors: an assessment of 303 patients. *Cadernos de saude publica*. 2011;27(5):1035-40.
26. Lukšić I, Virag M, Manojlović S, Macan D. Salivary gland tumours: 25 years of experience from a single institution in Croatia. *Journal of Cranio-Maxillofacial Surgery*. 2012;40(3):e75-e81.
27. Masanja M, Kayanyama B, Simon E. Salivary gland tumours in Tanzania. *East African medical journal*. 2003;80(8):429-34.
28. Ajayi O, Adeyemo W, Ladeinde A, Ogunlewe M, Effiom O, Omitola O, et al. Primary malignant neoplasms of orofacial origin: a retrospective review of 256 cases in a Nigerian tertiary hospital. *International journal of oral and maxillofacial surgery*. 2007;36(5):403-8.
29. Toida M, Shimokawa K, Makita H, Kato K, Kobayashi A, Kusunoki Y, et al. Intraoral minor salivary gland tumors: a clinicopathological study of 82 cases. *International journal of oral and maxillofacial surgery*. 2005;34(5):528-32.
30. Jones A, Craig G, Speight P, Franklin C. The range and demographics of salivary gland tumours diagnosed in a UK population. *Oral oncology*. 2008;44(4):407-17.
31. Moghadam SA, Moghadam FA, Dadfar M. Epithelial salivary gland tumors in Ahvaz, Southwest of Iran. *Journal of dental research, dental clinics, dental prospects*. 2010;4(4):120.
32. Wang Y-L, Zhu Y-X, Chen T-Z, Wang Y, Sun G-H, Zhang L, et al. Clinicopathologic study of 1176 salivary gland tumors in a Chinese population: experience of one cancer center 1997–2007. *Acta oto-laryngologica*. 2012;132(8):879-86.
33. Al Sarraj Y, Nair SC, Al Siraj A, AlShayeb M. Characteristics of salivary gland tumours in the United Arab Emirates. *ecancermedicalscience*. 2015;9.
34. Van der Wal J, Snow G, Van Der Waal I. Histological reclassification of 101 intraoral salivary gland tumours (new WHO classification). *Journal of clinical pathology*. 1992;45(9):834-5.

35. Batsakis JG, Regezi JA, Bloch D. The pathology of head and neck tumors: salivary glands, part 3. *Head & neck surgery*. 1979;1(3):260-73.
36. Batsakis JG, Regezi JA, Bloch D. The pathology of head and neck tumors: salivary glands, part 3. *Head & neck surgery*. 1979;1(3):260-73.
37. Lambert JA. Parotid gland tumors. *Plastic and Reconstructive Surgery*. 1971;48(5):518.
38. Spitz MR, Tilley BC, Batsakis JG, Gibeau JM, Newell GR. Risk factors for major salivary gland carcinoma. A case-comparison study. *Cancer*. 1984;54(9):1854-9.
39. Gbotolorun OM, Arotiba GT, Effiom OA, Omitola OG. Minor salivary gland tumours in a Nigerian hospital: a retrospective review of 146 cases. *Tropical Dental Journal*. 2008 Sep 1;31(123):17.
40. Wang D, Li Y, He H, Liu L, Wu L, He Z. Intraoral minor salivary gland tumors in a Chinese population: a retrospective study on 737 cases. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 2007;104(1):94-100.
41. Rippin J, Potts A. Intra-oral salivary gland tumours in the West Midlands. *British dental journal*. 1992;173(1):17-9.
42. Ochicha O, Malami S, Mohammed A, Atanda A. A histopathologic study of salivary gland tumors in Kano, northern Nigeria. *Indian Journal of Pathology and Microbiology*. 2009;52(4):473.
43. Taghavi N, Sargolzaei S, Mashhadiabbas F, Akbarzadeh A, Kardouni P. Salivary gland tumors: a 15-year report from Iran. *Turkish Journal of Pathology*. 2016;32(1):35-9.
44. Comoglu S, Ozturk E, Celik M, Avci H, Sonmez S, Basaran B, et al. Comprehensive analysis of parotid mass: A retrospective study of 369 cases. *Auris Nasus Larynx*. 2018;45(2):320-7.