

ORIGINAL ARTICLE

Clinicopathological Pattern of Salivary Gland Tumors: A Decade'S Experience in Osogbo, Southwest Nigeria

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ABSTRACT

Background: Salivary gland tumors occur worldwide, with diverse histological patterns, requiring periodic analyses of local data to evaluate trends, improve diagnostic accuracy, and guide management.

Objective: To describe the clinical and histopathologic spectrum of salivary gland tumors in a sub-urban Nigerian tertiary hospital.

Methods: This descriptive, retrospective study was conducted at the UNIOSUN Teaching Hospital, Osogbo, Nigeria. Patients with salivary gland tumors who had surgical excision under anaesthesia, and histological diagnosis from 2016 – 2025 were included. Records were retrieved from patient folders, surgical notes, theatre logbooks, and histopathology reports. Structured proforma was used to collect information. Descriptive statistics were used to analyse results.

Result: Of 820 head and neck tumor surgeries, 64 (7.8%) cases occurred in the salivary glands. The mean age was 40.3 ± 18.4 years, with 35 (54.7%) males, and 29 (45.3%) females. Tumor site locations were parotid gland with 31 (48.4%) cases, submandibular- 12 (18.8%) cases, palate- 8 (12.5%) cases, and oropharynx- 7 (10.9%) cases. Benign tumors were 42 (65.6%) cases, i.e., pleomorphic adenomas 39 (60.9%), and Warthin tumor 3 (4.7%) cases respectively. Malignant tumors were 22 (34.4%) cases, mainly adenoid cystic carcinoma recording 13 (20.3%) cases. Wide local excisions were done for 41 (64.1%) cases and parotidectomies performed for 23 (35.9%). General anaesthesia was used in 60 (93.8%) cases, and local anaesthesia in 4 (6.3%) cases. Ultimately, recurrence occurred in 3 (4.7%) cases.

Conclusion: Benign salivary gland tumors predominate in Osogbo, Nigeria, especially pleomorphic adenoma, while malignant tumors were less frequent. However, the low recurrence rate highlights the role of specialist review, accurate diagnosis and appropriate care to reduce the disease burden.

Keywords: tumors, salivary gland, parotid gland, pleomorphic adenoma, adenoid cystic carcinoma, benign, malignant, Nigeria

INTRODUCTION

Salivary glands are the exocrine system of the aerodigestive tract that maintain digestion, respiration, speech, lubrication, swallowing, and homeostasis.¹ They consist of three paired major glands and about 600 – 1000 minor glands, distributed throughout the oral cavity and oropharyngeal mucosa.^{1,2}

Salivary gland tumors constitute 3 – 4% of all head and

neck tumors, out of which 10 – 15% are malignant.³ The global incidence is estimated at 2.5 – 3.0 per 100,000 annually, ranging 0.4 – 13.5 per 100,000, reflecting variations in geography, population, and case detection methods.⁴

The tumors are broadly non-neoplastic i.e., inflammatory and non-inflammatory, as well as neoplastic i.e., benign and malignant.^{2,3}

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The spectrum of salivary gland neoplasms includes benign epithelial, e.g., pleomorphic adenoma and Warthin tumor, and mesenchymal, e.g., lipoma. Malignant tumors are epithelial, e.g., basal cell adenocarcinoma, mesenchymal, e.g., rhabdomyosarcoma, and hematolymphoid, e.g., MALT lymphoma. Non-neoplastic tumors include sialolithiasis, chronic sialadenitis, and Sjögren syndrome.^{1,2,3}

Thackray et al⁵ classified salivary gland tumors, reporting that for every 100 parotid tumors, about 20 occur in minor glands, 10 in submandibular, and one in sublingual glands.

The clinical and histological subtypes of salivary gland tumors vary across regions.⁴ While, it is well described in high-income countries, data from sub-Saharan Africa is sparse regarding demographics, anatomical distribution, and histology spectrum.^{4,6,7} Late presentation, advanced disease, low awareness, cost, and limited skills and oncology infrastructure impede optimal care.⁶ Furthermore, periodic analyses of local data is required to evaluate trends, improve diagnostic accuracy, and guide management.

The objective of this study is to evaluate the clinico-demographic and histopathological profile of salivary gland tumors in a Nigerian tertiary hospital. The findings would enhance diagnostic accuracy, inform surgical and anaesthetic planning, health policy, resource allocation, and oncology management in sub-Saharan Africa.

MATERIALS AND METHODS

This study is reported in accordance with the STROBE guidelines for cohort studies.

Study design: This was a clinical, descriptive and retrospective cohort study.

Study population: All patients with clinical diagnosis of salivary gland tumors, who had surgery under anaesthesia, with histologic confirmation, between January 2016 and December 2025.

Study location: The study was conducted at the UNIOSUN Teaching Hospital, Osogbo. The hospital is a tertiary, teaching and referral center in Southwest, Nigeria, with about 420 beds. It is a sub-urban hospital which serves about ten million people in the region. The departments of otorhinolaryngology (ORL) – Head and Neck surgery, Anaesthesia and Histopathology are established, with consultants, residents, nurses and modern diagnostic and treatment facilities.

Inclusion/exclusion criteria: Patients, admitted during

the study period, with clinically and radiologically documented salivary gland tumors, who had surgical removal, and histologic diagnosis with complete records were included. Excluded were incomplete or missing records, unconfirmed histologic diagnosis, or secondary or metastatic neoplasms.

Total sampling approach was employed, including all patients with complete records during the study period.

Study protocol: All patients were evaluated at the ORL outpatient clinic, where a comprehensive history and physical examination were performed by a consultant ORL surgeon. Routine investigations included full blood count, serum electrolytes, renal function tests, 12-lead electrocardiography, and chest imaging. Additional tests e.g., echocardiography, Doppler ultrasound, computed tomography scan, and magnetic resonance imaging were done, if indicated. Patients undergoing general anaesthesia had thorough pre-anaesthetic review and optimisation, by a consultant anaesthetist, who also provided the anaesthesia.

Anaesthetic and surgical management: Patients with deep salivary gland tumors had surgical excision under general anaesthesia following intravenous induction, tracheal intubation, and controlled mechanical ventilation. Anaesthesia was maintained using volatile agents. Muscle paralysis was omitted if neural electrophysiological monitoring was required. Euvolemia, normothermia, normocapnia, and adequate analgesia was ensured.

Minor and surface tumors were excised under local anaesthesia (LA) consisting of 2% lidocaine 20 – 30 ml, with 1:200,000 epinephrine infiltration, and monitored anaesthesia care.

Surgeries were classified from clinical records. Superficial or total excision of benign or malignant parotid tumors were recorded as parotidectomy, while ulcerated parotid and other-site tumors as wide local excisions.

Pathological processing: Resected specimens were immediately fixed in formalin and sent to the laboratory. Several consultant histopathologists made histological diagnoses, based on departmental practice, using routine haematoxylin and eosin staining. Immunohistochemistry was performed selectively in unclear cases using markers appropriate to the suspected diagnosis. Histological grading was not consistently available and thus, excluded. Malignant and borderline neoplasms were not routinely subjected to second opinion or consensus review, and surgical margin status, being inconsistently documented, was similarly excluded.

All diagnoses were made by consultant histopathologists in accordance with the current World Health Organisation classification of salivary gland tumors.

Data collection: Patients information such as demographics, clinical diagnosis, tumor site location, histopathologic diagnosis, type of surgery, anaesthesia technique and recurrence rate were collected using a structured proforma. Recurrence were patients who re-presented with tumors requiring repeat surgical excision. Records were retrieved from outpatient registers, theatre logbooks, case folders, and histopathology reports. Data were anonymised prior to analysis and assigned unique study identifiers. Dataset was reviewed for completeness, internal consistency, and accuracy.

Statistical analysis: Data collected were entered into Microsoft excel and analysed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables, e.g., age was expressed in means and standard deviation. Categorical variables, e.g., sex, and anatomical location were expressed as frequencies and percentages. Descriptive statistics were used to describe results.

Study approval was obtained from the Ethics and Research Committee of Ministry of Health, Osun State, Nigeria, with protocol No OSHREC/PRS/2026/842/01/292.

RESULT

Of 820 head and neck tumor surgeries, 64 (7.8%) cases involved the salivary gland, comprising of 42 (65.6%) benign and 22 (34.4%) malignant tumors. The mean age was 40.3 ± 18.4 years. Age group 50 – 59 years was predominant, i.e., 26 (40.6%), including 14 (21.9%) benign and 12 (18.8%) malignant lesions. Males were 35 (54.7%) and females 29 (45.3%); benign and malignant lesions occurred in 22 (34.4%) and 13 (20.3%) males versus 20 (31.2%) and 9 (14.1%) females (Table 1).

The parotid, submandibular, palate, oropharynx, and sublingual glands accounted for 31 (48.4%), 12 (18.8%), 8 (12.5%), 7 (10.9%), and 6 (9.4%) cases, respectively. The corresponding numbers of benign and malignant tumors were 24 (37.5%) versus 7 (10.9%), 8 (12.5%) versus 4 (6.3%), 4 (6.3%) versus 4 (6.3%), 2 (3.1%) versus 5 (7.8%), and 4 (6.3%) versus 2 (3.1%), respectively (Table 2).

Table 1: Demographic profile of patients by histopathological classification

	Benign	Malignant	Total N – 64
Age range (years)			18 – 83 years
18 – 29	6 (9.4)	0 (0.0)	6 (9.4)
30 – 39	6 (9.4)	1 (1.6)	7 (10.9)
40 – 49	9 (14.1)	2 (3.1)	11 (17.2)
50 – 59	14 (21.9)	12 (18.8)	26 (40.6)
≥ 60	7 (10.9)	7 (10.9)	14 (21.9)
Mean age ± SD (years)	36.5 ± 15.2	47.4 ± 18.7	40.3 ± 18.4
Sex			
Male	22 (34.4)	13 (20.3)	35 (54.7)
Female	20 (31.2)	9 (14.1)	29 (45.3)
Total	42 (65.6)	22 (34.4)	64 (100.0)

Percentages may not total 100.0% due to rounding to one decimal place.

Table 2: Anatomical distribution of the tumor site location

	Benign	Malignant	Total N – 64
Parotid	24 (37.5)	7 (10.9)	31 (48.4)
Submandibular	8 (12.5)	4 (6.3)	12 (18.8)
Palate	4 (6.3)	4 (6.3)	8 (12.5)
Oropharynx	2 (3.1)	5 (7.8)	7 (10.9)
Sublingual	4 (6.2)	2 (3.1)	6 (9.4)
Total	42 (65.6)	22 (34.4)	64 (100.0)

Percentages may not total 100.0% due to rounding to one decimal place.

Table 3: Histopathological distribution of salivary gland tumor by gender

	Male	Female	Total N – 64
Benign			
Pleomorphic adenoma	21 (32.8)	18 (28.1)	39 (60.9)
Warthin tumor	1 (1.6)	2 (3.1)	3 (4.7)
Malignant			
Adenoid cystic carcinoma	8 (12.5)	5 (7.8)	13 (20.3)
Mucoepidermoid carcinoma	2 (3.1)	2 (3.1)	4 (6.3)
Acinic cell carcinoma	2 (3.1)	1 (1.6)	3 (4.7)
Basal cell carcinoma	1 (1.6)	1 (1.6)	2 (3.1)
Total	35 (54.7)	29 (45.3)	64 (100.0)

Table 4: Surgical and anaesthetic characteristics

	Benign	Malignant	Total N – 64
Surgery			
Wide local excision	35 (54.7)	6 (9.4)	41 (64.1)
Parotidectomy	7 (10.9)	16 (25.0)	23 (35.9)
Technique			
General anaesthesia	38 (59.4)	22 (34.4)	60 (93.8)
Local anaesthesia	4 (6.3)	0 (0.0)	4 (6.3)
Recurrence			
Yes	0 (0.0)	3 (4.7)	3 (4.7)
No	42 (65.6)	19 (29.7)	61 (95.3)

Histologically, benign tumors 42 (65.6%), comprised pleomorphic adenomas 39 (60.9%), occurring in 21 (32.9%) males and 18 (28.1%) females, and Warthin tumors 3 (4.7%), in 1 (1.6%) male and 2 (3.1%) females. Malignant tumors 22 (34.4%) cases, were adenoid cystic 13 (20.3%), mucoepidermoid 4 (6.3%), acinic cell 3 (4.7%), and basal cell carcinomas 2 (3.1%). Adenoid cystic carcinoma was predominant, occurring in 8 (12.5%) males and 5 (7.8%) females (Table 3).

Wide local excisions 41 (64.1%) was performed in 35 (54.7%) benign and 6 (9.4%) malignant lesions, while parotidectomies 23 (35.9%) were used in the treatment of 7 (10.9%) benign and 16 (25.0%) malignant tumors. General anaesthesia was used in 60 (93.8%) cases, including 38 (59.4%) benign and 22 (34.4%) malignant lesions, while local anaesthesia was used in 4 (6.3%) benign cases. Recurrence occurred in 3 (4.7%) patients with a malignant lesion (Table 4).

DISCUSSION

Head and neck tumors are the sixth most common neoplasm, worldwide, and salivary gland tumors are a comparatively small but clinically important subset.^{1,3} The global economic loss is estimated at 535 billion US dollars (2018 – 2030), disproportionately affecting low-income countries.⁷

This study evaluated the clinical and histopathological spectrum of salivary gland tumor surgeries in a sub-urban Nigerian hospital, demonstrating a substantial burden, and positive outcome.

We report a mean age 40.3 ± 18.4 years, (range 18 – 83 years), male and female ratio 1.2:1, mostly in 4th and 5th decade, and 7.8% incidence. Similarly, Amin et al⁸ reported mean age 43.8 years, male dominance, and 4th decade peak incidence. Sathish Babu N et al observed male 10 majority, in 3thrd – 4th decade. In Nigeria, Akpeh et al,¹⁰ and Otoh et al¹¹ stated similar age, male dominance, in 3rd to 5th decades. Although uncommon, salivary gland tumors may result in considerable morbidity, underscoring the need for accurate diagnosis and appropriate treatment.

In this study, benign tumors predominated (65.6%), as pleomorphic adenoma (60.9%) and Warthin's tumor (4.7%), broadly consistent with Amin et al⁸ (62.5%), Sathish et al⁹ (82.6%), Otoh et al¹¹ (55.7%), Al Maden et al¹² (66.2%) and Kumar et al¹³ (57.6%). Comparatively, malignant tumors (34.4%) were mostly adenoid cystic carcinoma (20.3%), with mucoepidermoid, acinic cell, and basal cell carcinomas each below 6.5%. This is similar to Otoh et al¹¹ (44.3%), Al Maden et al¹² (33.8%), and Kumar et al¹³ (42.4%), but exceeded Sathish et al⁹ (17.4%) and Amin et al⁸ (7.5%), where mucoepidermoid carcinoma predominated. This divergence may reflect referral pattern

or population-specific tumor biology. Similarly, the low Warthin's tumor (4.7%) is similar to Amin et al⁸ (12.5%), though contrasting Sathish et al⁹ (0%), possibly reflecting an age-distribution differences rather than true biological absence.

Pleomorphic adenomas account for 45 – 75% salivary gland and 80 – 90% of benign lesions.¹ Although benign disease generally has favorable outcomes, its slow, painless growth may delay presentation. Incomplete excision increases recurrence and malignant transformation risks; thus, early diagnosis and definitive surgery are essential, while balancing complete excision with facial nerve preservation.³

Adenoid cystic carcinoma (20.3%), the commonest malignant subtype in this cohort, is characterised by asymptomatic growth, aggressiveness, and metastasis. Thus, adequate preoperative evaluation, multidisciplinary care and long-term surveillance optimise outcomes.¹ The less frequent mucoepidermoid, acinic and basal cells carcinomas exhibit diverse nature, ranging from low-grade neoplasms with good prognosis to aggressive forms with poor outcomes. Their histological heterogeneity necessitates accurate diagnosis to guide optimal management.^{1,3}

The salivary gland tumor location is important. In this cohort, it involved the parotid (48.4%), submandibular (18.8%), palate (12.5%), oropharynx (10.9%), and sublingual (9.4%). This is similar to other studies,^{3,4} where parotid gland predominates. Sathish et al,⁹ Otoh et al,¹¹ and Kumar et al¹³ reported similar findings, and variable submandibular and minor gland distribution.

Almost half (48.8%) of all tumors in this cohort are in the parotid tumor, likely reflecting its large volume. Its relationship with the facial nerve necessitates meticulous dissection to achieve complete excision while preserving nerve function, underscoring the role of specialist review, and thorough imaging. Similarly, submandibular gland surgery risks injury to the mandibular, lingual, and hypoglossal nerves, affecting facial symmetry, aesthetics, speech, and swallowing. Oropharyngeal tumors may cause dysphagia, airway collapse, and reduced quality of life.^{1,3}

This study reports that 64% patients underwent wide local excisions, while 36% had parotidectomies. Similarly, Akpeh et al¹⁰ reported wide local excision in 75.5%, and maxillectomy in 22.5%. Surgery is the definitive cure in most cases. Location, size, and histology influence surgical approach, morbidity, and functional outcomes. While superficial lesions permit straightforward excision, minor

gland tumors often require deep dissection, with limited exposure increasing incomplete excision and recurrence.²

Perhaps, the most important finding are the three cases of recurrence. Similarly, Akpeh et al¹⁰ reported one recurrence. This suggests that proper planning, adequate surgery and multi-disciplinary care may produce favorable outcome even, in low-resource settings.

General anaesthesia (93.8%) is used for surgeries undergoing extensive dissections, while surface procedures are performed under LA, demonstrating the role of adequate anaesthesia planning and management. Anaesthesia considerations include difficult airway, co-morbidities e.g., sleep apnea, refeeding syndrome, anaesthesia technique, nerve monitoring, blood loss, analgesia, thromboembolism, steroids, and postoperative nausea and vomiting.¹⁴

The strength of this study includes demographic, anatomical spectrum, histopathological confirmation, and contemporary data from a low-resource setting.

However, there are several limitations. First, the retrospective single-center design may limit generalisability and introduce selection bias. Second, dependence on paper-based records may have resulted in missing data and information bias. Third, a site-specific breakdown of the 820 head and neck tumor surgeries e.g., skin, thyroid, and oral cavity was poorly documented in our records, potentially confounding our reported 7.8% prevalence, i.e., a value that is higher than previous studies.³ Structured, and site-coded registries as well as future prospective studies are recommended. Fourth, we report a 4.7% recurrence in this cohort, from patients that re-presented with symptoms to our hospital; however, this finding may be confounded by inadequate surveillance, as follow-up duration and loss-to-follow-up data were unavailable, precluding accurate assessment. Fifth, other outcomes e.g., morbidities, long-term recurrence, and mortality, were not assessed. Prospective multicenter studies, with additional outcome variables and longitudinal follow-up are needed to validate these findings and evaluate treatment outcomes.

In conclusion, benign salivary gland tumors predominate in Osogbo, Nigeria, especially pleomorphic adenoma, while malignant tumors are less frequent. However, treatment was largely successful, highlighting the role of specialist review, accurate diagnosis and appropriate surgical management, to lower disease burden.

Human Ethics and consent to participate declarations: This study was approved by the Ethics and Research

Committee of Ministry of Health, Osun State, Nigeria, with protocol No: OSHREC/PRS/2026/842/01/292. Individual consent was waived, as this was a retrospective study using de-identified patient records.

Conflict of interest: The authors declared that they have no conflict of interest.

Sponsorship: Nil

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