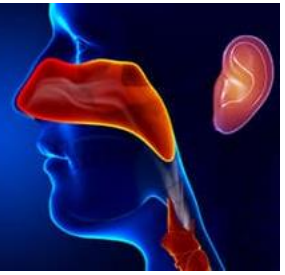


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## Clinical profile and outcome profile of salivary gland swellings: A prospective hospital-based study

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### Abstract

Salivary glands are exocrine organs responsible for the production and secretion of saliva. There are three pairs of major salivary glands: the parotid, submandibular, and sublingual glands. There are hundreds of minor salivary glands in the mucosa of the upper aerodigestive tract. Masses in the salivary gland region are difficult to diagnose in terms of their location, histological behavior, and tissue diagnosis. The purpose of the study is to know the clinical profile and outcome profile of salivary gland swellings. This is a hospital-based prospective study carried out at Department of Otolaryngology-Head & Neck Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh from February 2022 to March 2023. Out of 100 patients with features suggestive of salivary gland swelling were enrolled in the study. Most of the patients underwent pre-operative work up with FNAC and patients indicated for surgery underwent surgery and HPE. Salivary gland swelling occurred more commonly in 3rd decade of life and equal numbers of cases were seen in both genders. Most of the patients presented with salivary gland swelling (98%). 42 (42%) were non neoplastic, 58 (58%) were neoplastic swellings, 36 (36%) were benign of which pleomorphic adenoma was the most common and 22 (22%) were malignant of which adenoid cystic carcinoma was the most common. Parotid gland was the most common gland involved. Fine needle aspiration cytology was highly sensitive for benign tumours and highly specific for malignant tumours. We conclude that men and women are equally susceptible to salivary gland diseases. FNAC is the first choice in the evaluation of salivary gland diseases. Medical history and physical examination complement FNAC and aid in diagnosis. FNAC is an accurate, simple, fast, and inexpensive test that is well accepted by patients.

**Keywords:** Clinical Profile, Salivary Gland, Swellings

### Introduction

Salivary glands are exocrine organs responsible for the production and secretion of saliva. There are three pairs of major salivary glands: the parotid, submandibular, and sublingual glands. There are hundreds of minor salivary glands in the mucosa of the upper aerodigestive tract [1]. Salivary gland masses are challenging to diagnose in terms of their location, histological behavior, and tissue diagnosis [2]. Fine needle aspiration cytology (FNAC) is an accurate, rapid, cost-effective, and well-tolerated test [3]. The superficial location of the salivary glands, easy access, and high diagnostic accuracy have made FNAC a common method to evaluate these diseases. The prevalence of salivary gland lesions (SGLs) varies worldwide. The evaluation and treatment of salivary gland swellings has advanced significantly over the past decade, with an emphasis on less invasive techniques and better protection of the salivary gland and adjacent structures. Salivary gland swellings typically occur on the sides of the face, below and in front of the ear (parotid glands), or in the upper neck (caudal parotid and submandibular salivary glands). The presence of submucosal swelling in the oral cavity raises suspicion of a sublingual or minor salivary gland tumor. In some cases, the surface of intraoral lesions may ulcerate. Therefore, appropriate treatment can be planned early, which may include: B. local excision for benign neoplasms, conservative treatment for non-neoplastic lesions, radical surgery for malignant tumors, and chemotherapy or radiotherapy for metastases [4]. Therefore, this study will help us understand the clinical and pathological features of salivary gland swelling in our local population, as very little research has been done in Bangladeshi population.

**Materials and Methods**

This is a hospital-based prospective study carried out at Department of Otolaryngology-Head & Neck Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh from February 2022 to March 2023. Out of 100 patients with features suggestive of salivary gland swelling were enrolled in the study. Patients who did not wish to participate in the study were excluded. The diagnosis of salivary gland tumors should be considered in patients with salivary gland swelling. The clinical outcome and prognosis of salivary gland tumors are variable, so an accurate diagnosis is essential. Public awareness and early referral are necessary as most malignant tumors are asymptomatic and long-present benign tumors can turn into malignant tumors and early treatment leads to a better prognosis.

A database with variables was organized in Microsoft Excel 2010 program for tabulation and statistics. Data were evaluated through frequency and distribution tables, using the SPSS (Statistical Package for Social Sciences) software version 22.0 (SPSS Inc., Chicago, IL, USA).

**Results**

Total 100 patients included in our study. In our study the malignant tumors were distributed equally in all age groups. In our study, non-neoplastic swellings were seen more commonly in less than 50 years of age and pleomorphic adenoma was the most common benign tumor seen in less than 50 years. 98 patients (98%) presented with swelling, 42 patients (42%) with pain, 10 each (10%) with trismus and fever and 4 (4%) with ulceration.

It was found that most common gland to be involved was parotid (64%).10% of the salivary gland swellings were of minor salivary gland origin. The frequency of occurrence of the various pathologies related to salivary gland swellings in our study showed 42 non neoplastic and 58 cases neoplastic. Among 42 neoplastic cases 36 were benign and 22 were malignant (Tables-1, 2).

**Table 1:** Distribution of salivary gland swellings according to age (N=100)

Age (years)	Non neoplastic	Benign	Malignant
10–20	4	0	2
21–30	12	10	6
31–40	2	8	0
41–50	12	4	4
51–60	10	6	4
61–70	0	4	2
71–80	0	0	4
> 80	2	0	0
Total	42	36	22

**Table 2:** Distribution of salivary gland swellings based on pathology (N=100)

	Number (%)	Non neoplastic	Neoplastic	
			Benign	Malignant
Parotid gland	64 (64)	22	28	14
Submandibular gland	26 (26)	20	02	04
Minor salivary glands	10 (10)	00	06	04
Total	100 (100)	42	36	22

Out of 100 patients 92 underwent FNAC and 8 cases were diagnosed clinically as acute inflammatory conditions associated with severe pain. The various pathological diagnosis based on FNAC is shown in Table 3.

**Table 3:** Diagnosis of salivary gland swellings based on FNAC (N=92)

Type	FNAC	Percentage
Abscess	14	15.2
Adeno cystic carcinoma	2	2.17
Adeno carcinoma	4	4.3
Benign lympho epithelial cyst	2	2.17
Mucoepidermoid carcinoma	4	4.34
Pleomorphic adenoma	38	41.3
Parotitis	4	4.3
Sialadenitis	18	19.56
Sialolithiasis	2	2.17
Warthin’s tumor	4	4.3
Total	92	100

**Table 4:** Diagnosis of salivary gland swelling based on histopathology (N=84)

Type	Histopathology	Percentage
Abscess	10	11.9
Adeno carcinoma	4	4.7
Adenoid cystic carcinoma	8	9.5
Invasive carcinoma ex pleomorphic adenoma	2	2.4
Invasive squamous cell carcinoma	2	2.4
Mucoepidermoid carcinoma	2	2.4
Myoepithelioma	2	2.4
Pleomorphic adenoma	28	33.3
Sialadenitis	10	11.9
Sialadenitis with calculi	4	4.7
Salivary duct carcinoma	2	2.4
Sialolithiasis	2	2.4
Small cell carcinoma	2	2.4
Warthin’s tumor	6	7.1
Total	84	100

Out of 92 patients who ‘underwent FNAC, histopathology was available only in 84 patients, as rest of the cases were managed conservatively.

Table 4 Shows pathological diagnosis based on histopathology. In our study, out of 100 patients 92 underwent FNAC and only 84 patients underwent biopsy (Table 5).

**Table 5:** Incidence of various salivary glands swellings (based on final diagnosis)

Pathology	Number	Percentage
Abscess	16	16
Adeno carcinoma	4	4
Adenoid cystic carcinoma	8	8
Invasive carcinoma ex pleomorphic adenoma	2	2
Invasive squamous cell carcinoma	2	2
Muco epidermoid carcinoma	2	2
Myoepithelioma	2	2
Pleomorphic adenoma	28	28
Parotitis	6	6
Sialadenitis	10	10
Sialadenitis with calculi	4	4
Salivary duct carcinoma	2	2
Sialolithiasis	6	6
Small cell carcinoma	2	2
Warthin’s tumor	6	6

The Sensitivity, specificity, PPV, NPV and Diagnostic accuracy of FNAC for non-neoplastic lesions were 100, 93, 86.7, 100 and 95.23%, respectively, and for neoplastic lesions, they were 93, 100, 100, 86.7 and 95.23%, respectively (Table 6).

**Table 6:** Diagnostic characteristics of FNAC for determining salivary gland disease

	Non neoplastic (%)	Neoplastic (%)
Sensitivity	100	93
Specificity	93	100
Positive predictive value	86.7	100
Negative predictive value	100	86.7
Diagnostic accuracy of the test	95.23	95.23

The Sensitivity, specificity, PPV, NPV and Diagnostic accuracy of FNAC for benign lesions were 94.4, 79.16, 77.3, 95 and 85.71%, respectively, and for malignant lesions, they were 45.5, 100, 100, 83.78 and 85.71%, respectively (Table-7).

**Table 7:** Diagnostic characteristics of FNAC for determining benign and malignant neoplasm

	Benign (%)	Malignant (%)
Sensitivity	94.4	45.45
Specificity	79.16	100
Positive predictive value	77.3	100
Negative predictive value	95.0	83.78
Diagnostic accuracy of the test	85.71	85.71

## Discussion

Salivary gland swellings were classified into non-neoplastic and neoplastic swellings, including benign and malignant tumors. The results obtained from this study were compared with previous studies. A total of 100 patients were included in our study. In our study, non-neoplastic swellings were more common in individuals under 50 years of age, and pleomorphic adenoma was the most common benign tumor in individuals under 50 years of age. Warthin's tumor was the most common benign tumor in people over 50 years of age. We compared 42 non-neoplastic and 58 neoplastic salivary gland swellings. In our study, we found a 1:1 male to female ratio, similar to the study by Naz *et al* [5]. The highest incidence of salivary gland lesions was observed in the third decade of life, followed by the fifth and sixth decades of life. The results are similar to the study by Ashraf *et al* [6], the most commonly affected age group is 21-40 years. In our study, 64% of the swelling originated from the parotid gland, similar to the study of Singh Nanda *et al* [7], 26% originated from the submandibular salivary gland, similar to the study of Ashraf *et al* [6], minor salivary glands accounted for 10% of the swelling, similar to the study of Singh Nanda *et al* [7] and Omhare *et al* [8]. Our study correlates with all the above studies in that the occurrence of salivary gland lesions was most common in the parotid gland, followed by the submandibular and minor salivary glands. There were no sublingual gland swellings. In our study, unlike the results of other studies, the most common non-neoplastic swellings were abscesses, and the most common malignant tumors were adenoid cystic carcinomas. However, as in all studies, the most common benign tumors were pleomorphic adenomas [5, 9]. The diagnostic accuracy of our study was 95.23, which correlates well with other studies in which the diagnostic accuracy ranged from 73 to 95.3 [6]. The sensitivity of FNAC in detecting benign tumors was comparable to that of the study by Ashraf *et al* [6]. The sensitivity in detecting malignant tumors was comparable to that of the study by Mallon *et al* [10]. The specificity of FNAC in detecting benign tumors was comparable to that in the study by Henry *et al* [11].

The results for malignant tumors are similar to the study by Liu *et al*. [12]. Other pathological entities related to the salivary glands, such as sialadenitis, sialolithiasis, Sjögren's syndrome, ranula, and intraductal papilloma, received a lower priority during the study period. In some of these cases, the lower priority is probably due to the treatment of these entities, which often do not require surgical intervention and subsequent microscopic examination. Out of 100 patients 92 underwent FNAC and 8 cases were diagnosed clinically as acute inflammatory conditions associated with severe pain. The various pathological diagnosis based on FNAC. The diagnostic accuracy of FNAC in detecting benign and malignant tumors was similar to that of the study by Arshad *et al*. [13]. The positive predictive value of FNAC in detecting benign tumors was similar to that in the study by Mallon *et al*. [10]. The negative predictive value of FNAC in detecting benign tumors was similar to that in the study by Henry *et al*. [11]. In our study, FNAC was highly sensitive in detecting benign tumors and highly specific for malignant tumors. Histopathological examination of salivary gland tumors is complex and varied. Histopathological examination is the gold standard method of diagnosis as it predicts the prognosis of malignant neoplasms of the salivary glands through typing, staging, and classification. The diagnosis of salivary gland tumors should be considered in patients with salivary gland swelling. Accurate diagnosis is essential as salivary gland tumors have various clinical and prognostic impacts. Public education and early referral are necessary because most malignant tumors are asymptomatic and benign tumors may become malignant with long-term survival and early treatment results in good prognosis.

## Conclusion

We conclude that men and women are equally susceptible to salivary gland diseases. FNAC is the first choice in the evaluation of salivary gland diseases. History and physical examination complement FNAC and aid in diagnosis. FNAC is an accurate, simple, rapid and inexpensive test and is widely accepted by patients. Therefore, appropriate treatment can be planned early, such as conservative treatment for non-neoplastic lesions, surgery for tumors, and radiation and/or chemotherapy for metastases.

## Author's Contribution

Not available

## Conflict of Interest

Not available

## Financial Support

Not available

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