

## AGE, GENDER AND SITE DISTRIBUTION OF SALIVARY GLAND TUMOURS REPORTED AT TERTIARY CARE HOSPITALS

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### ABSTRACT

**Background and Objective:** Salivary gland tumours constitute 3-10% of all head and neck tumours. Pleomorphic adenoma (PA) is reported to be commonest benign neoplasm of salivary glands in Pakistan constituting 80–90% of all benign salivary gland tumours while mucoepidermoid carcinoma (MEC) and adenoid cystic carcinoma (AdCC) constitute 44% and 31% of all malignant salivary gland neoplasms. The objective of this study was to determine the distribution of these salivary gland tumours with respect to age, gender and site involved in the local population of Lahore.

**Method:** This descriptive study was conducted at the Department of Morbid Anatomy and Histopathology/Oral pathology, University of Health Sciences Lahore, Pakistan. A total of 182 cases, reported at King Edward Medical University/Mayo Hospital, Sheikh Zaid Hospital, Fatima Jinnah medical University/Ganga Ram Hospital Lahore, were included. The clinical data was retrieved from records of respective hospitals (from January 2012 to September 2015).

**Results:** Age, gender & site distribution, most frequently encountered in the current study, were 3<sup>rd</sup> – 5<sup>th</sup> decades of life, female predominance (1.3:1) and parotid gland (51.6%) involvement respectively. The mean age for PA, AdCC and MEC was 35.61 ± 15.69 years, 32.96 ± 14.88 years and 44.06 ± 13.87 years respectively. Regarding gender distribution, female predilection (1.5:1) in PA, male predisposition in AdCC (1:1.1) and equal gender distribution (1:1) in MEC was noted. Parotid gland was the predominant site affected by PA (57.3%) and MEC (70.8%) while minor salivary glands (87%) were affected by AdCC. Also noted in the current study was the fact that adenoid cystic carcinoma (18.7%) is slightly more common than mucoepidermoid carcinoma (13.2%) in this population.

**Conclusion:** It is concluded from the current study that salivary gland tumours in the study population affect a younger age group with slight female predilection. The main gland affected by PA and MEC is parotid while minor salivary glands (mainly mostly palate) are involved by AdCC. Also, it can be concluded that AdCC is slightly more common than MEC in local population of Lahore.

**Key words:** Pleomorphic adenoma, Mucoepidermoid carcinoma, Adenoid cystic carcinoma.

### INTRODUCTION

Salivary glands constitute an important part of the head and neck owing to their wide distribution in the oral cavity as well as in extra-oral structures in the form of minor salivary glands which are innumerable.<sup>1</sup> Worldwide epidemiological series demonstrate geographical and ethnic variation in the relative incidence of these tumours with an estimated global incidence of 0.4 – 13.5 per 100,000 persons annually.<sup>2</sup> In Pakistan, 58 – 63% of salivary gland neoplasms are benign and 37 – 41% are malignant.<sup>3,4</sup>

Pleomorphic adenomas (PA) account for 50 – 60% of benign salivary gland tumours<sup>5</sup> and are especially common in the parotid gland (80%) followed by minor salivary glands (10%) and sublingual gland (0.1%).<sup>2</sup> A mean age of about 40.4 (±16) years and a female predilection of 1.9:1<sup>6</sup> is noted for PA. Clinically, PA pre-

sents as a solitary, painless, slow growing lump or swelling in pre-auricular region or angle of the mandible.<sup>7</sup> The prognosis of pleomorphic adenoma is excellent if removed completely. Recurrence rates at 5 year – and 10 year – follow-up interval are 3.4% and 6.8%, respectively.<sup>6</sup>

The most common malignant salivary gland neoplasm seen in children and adults is mucoepidermoid carcinoma (MEC).<sup>9</sup> Parotid gland is the most common sites for MEC.<sup>2</sup> The age range for MEC is 3<sup>rd</sup> – 5<sup>th</sup> decade with mean age of 45 years<sup>10</sup> and a female predilection (3:2).<sup>2</sup> Clinically, it may be slow growing asymptomatic swelling or else, fast growing and painful depending upon grade of the tumour.<sup>11</sup> Lymph node metastasis occurs in about 10.9 – 13.8% of cases. Depending on TNM staging, involvement of nodes and positive margins, local excision alone or combined

with radical neck dissection followed by radiotherapy is the treatment of choice. The disease free survival (DFS) at 5 years is reported to be 80.47%.<sup>13</sup>

Adenoid cystic carcinoma (AdCC) is a slow growing but aggressive tumour of the salivary glands with a prolonged clinical course and late distant metastasis.<sup>14</sup> Twenty five percent AdCC arise in the parotid gland and 60% from the minor salivary glands<sup>15</sup> with palate as its most frequent site.<sup>16</sup> Adenoid cystic carcinoma shows peak incidence in 4<sup>th</sup> to 7<sup>th</sup> decades of life.<sup>20</sup> Treatment for AdCC is surgery followed by radiotherapy.<sup>19</sup> Disease free survival after 5 and 10 years is 75% and 20% respectively.<sup>18</sup>

## SUBJECTS AND METHODS

This study was conducted at the Department of Morbid Anatomy and Histopathology/Oral Pathology, University of Health Sciences, Lahore after approval from University Ethical Review Board. A total of 182 diagnosed cases of pleomorphic adenoma, mucoepidermoid carcinoma and adenoid cystic carcinoma of Salivary glands reported at Histopathology Departments of University of Health Sciences, King Edward Medical University/Mayo hospital, Sheikh Zaid hospital and Fatima Jinnah Medical University for women/Ganga Ram Hospital, Lahore from January, 2012 to September, 2015 were included in the study.

Detailed clinical data was retrieved from the respective departmental records and analysed statistically using SPSS 20.0. Chi-square and Fischer Exact tests were applied and p-value <0.05 was considered to be statistically significant.

## RESULTS

The mean age of these 182 patients was 36.84 ± 15.60 years with an age range of 2 – 80 years. There were 103/182 (56.5%) females and 79/182 (43.4%) males.

Parotid gland (n = 94, 52.2%) was the most common site for these tumours followed by minor salivary glands (n = 65, 35.7%). Cases of PA, AdCC and MEC were 124 (68.1%), 34 (18.7%) and 24 (13.2%) respectively. Site and type of tumour were significantly associated ( $p < 0.001$ ) (Figure 1).

The mean age of patients with pleomorphic adenoma (PA) was 35.61 ± 15.69 years with an age range of 2 – 75 years. Most cases were seen in 2<sup>nd</sup> to 5<sup>th</sup> decade of life. A slight female predominance was noticed with a female to male ratio of 1.5:1 (Table 1).

Parotid gland remained the most common site of occurrence (n = 70, 56.5%) followed by minor salivary glands (n = 33, 26.6%) and sub-mandibular gland (n = 20, 16.1%) cases. In minor salivary glands, palate was most frequently involved (n = 20, 60%). Other sites included lips, buccal mucosa, buccal vestibule, oropharynx and nose (Table 2).

As far as laterality was concerned, 44 (37%) cases were on the left side and 52 (44%) were on right side that was significantly associated with the gland involved and gender ( $p < 0.001$  and  $p = 0.035$  respectively).

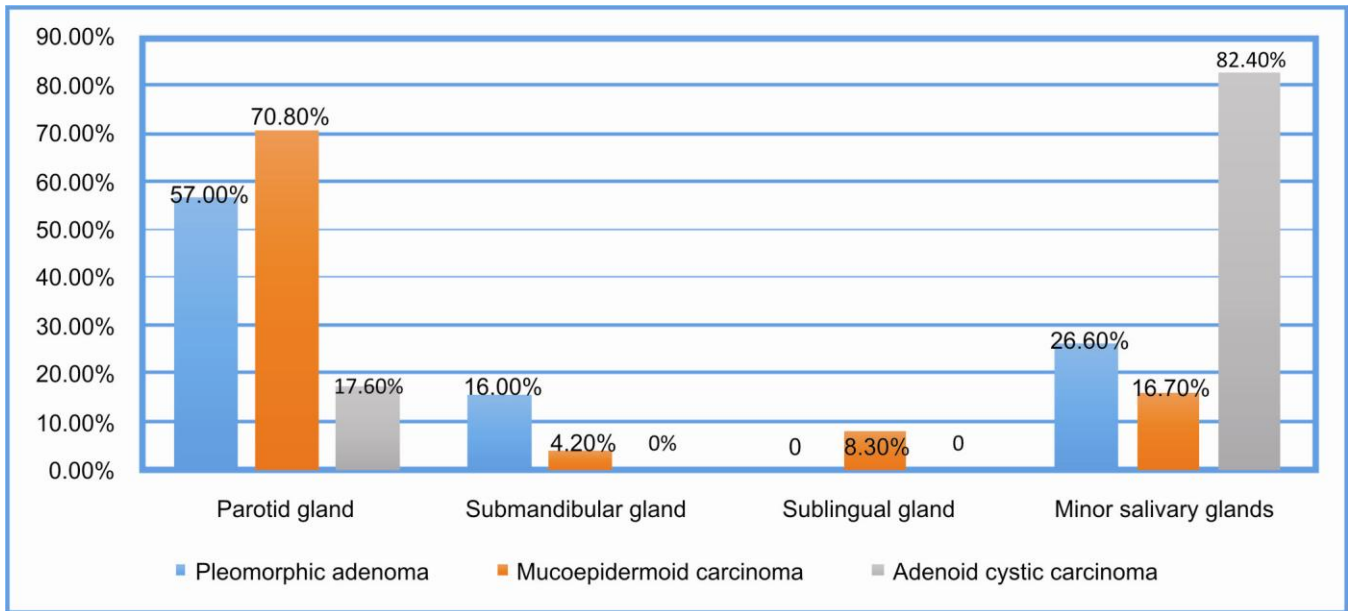
In the present study, adenoid cystic carcinoma (AdCC) was found to be more frequent than mucoepidermoid carcinoma (MEC). The mean age of occurrence of MEC was 32.96 (±14.886) years and an age range of 17 – 70 years with most of the cases in 3<sup>rd</sup> decade of life. An equal gender distribution was noted for this tumour (Table 1). Most cases of MEC occurred in major salivary glands (n = 20, 83.4%) while only few cases involved minor salivary glands (n = 4, 16.6%) (Table 1 and Table 2). Among the major salivary glands, parotid gland was the most frequently involved site (n = 17, 70.8%) (Figure 1).

As for laterality, 12 (50%) cases were on right side, 10 (41.7%) on left and 2 (8.3%) were of unknown laterality. Age and site of tumour were associated signi-

**Table 1:** Age, Gender and Gland Distribution of Pleomorphic Adenoma, Mucoepidermoid Carcinoma and Adenoid Cystic Carcinoma.

Tumour	Pleomorphic Adenoma		Mucoepidermoid Carcinoma		Adenoid Cystic carcinoma		p-value
Mean age ± S.D (years)	35.61 ± 15.69		32.96 ± 14.88		44.06 ± 13.87		0.709
Gender	F	%	F	%	F	%	0.294
Female	75	60.5	12	50	16	47.1	
Male	49	39.5	12	50	18	52.9	
F:M	1.5:1		1:1		1:1.1		
Gland	F	%	F	%	F	%	< 0.001
Major salivary glands	91	73.4	20	83.4	06	17.6	
Minor salivary glands	33	26.6	04	16.6	28	82.4	

The involvement of major and minor salivary glands by PA, MEC and AdCC was found to be significantly associated ( $p < 0.001$ ).



**Fig. 1:** Distribution of pleomorphic adenoma, mucoepidermoid carcinoma and adenoid cystic carcinoma w.r.t. salivary glands involved ( $p < 0.001$ ).

**Table 2:** Distribution of Pleomorphic Adenoma, Mucoepidermoid Carcinoma and Adeoid Cystic Carcinomain Minor Salivary Glands.

Tumour	Pleomorphic Adenoma		Mucoepidermoid Carcinoma		Adenoid Cystic carcinoma		p-value
Site	F	%	F	%	F	%	
Palate	20	16.1	01	4.2	09	26.5	< 0.001
Buccal mucosa	04	3.2	0	0	05	14.7	
Maxilla	0	0	01	4.2	06	17.6	
Lip	05	4.0	0	0	0	0	
Nostril	01	0.8	01	4.2	02	5.9	
Buccal vestibule	01	0.8	0	0	01	2.9	
Orophayrnx	02	1.6	0	0	0	0	
Mandible	0	0	0	0	02	5.9	
Maxillary sinus	0	0	0	0	01	2.9	
Retromolar area	0	0	0	0	01	2.9	
Tongue	0	0	0	0	01	2.9	
Tonsil	0	0	01	4.2	0	0	

Minor salivary gland site involved was found to significantly associated with the type of tumour (PA, MEC & AdCC) with p value <0.001.

ificantly ( $p = 0.012$ ). Laterality was found to be significantly associated with gender and site ( $p = 0.020$  and  $0.008$  respectively).

The mean age of occurrence in AdCC was 44.06 ( $\pm 13.878$ ) years with an age range of 20 – 80 years. Most of the cases occurred in 5<sup>th</sup> decade of life. It sho-

wed a slight male predilection of 1.1:1 (Table 1).

The commonest site for AdCC was found to be minor salivary glands ( $n = 28, 82.4\%$ ) with palate being the commonest site ( $n = 9, 32.14\%$ ) (Table 2). Six (17.6%) cases were seen only in the parotid gland among all major salivary glands (Figure 1).

## DISCUSSION

In the present study, the mean age of occurrence for PA, AdCC and MEC was 35.61 ( $\pm 15.691$ ) years, 44.06 ( $\pm 13.878$ ) years and 32.96 ( $\pm 14.886$ ) years, all of which are lower than studies conducted in other parts of the world<sup>20-24</sup> which may be due to regional, racial and ethnic variations.<sup>26</sup> Zaman<sup>4</sup> in Pakistan reported the mean age for PA, AdCC and MEC to be 37.78, 54.4 and 36.3 years respectively, which is in harmony with the current study. Also, a study conducted by Ghosh<sup>25</sup> in Nepal however, reported 36.2 years to be the mean age for PA, which is closer to current study.

In the current study, female to male ratio for PA, MEC and AdCC was noted to be 1.5:1, 1:1 and 1:1.1 respectively. These results differ from those reported in various studies conducted around the world.<sup>23,24</sup> For PA, a slightly higher female predominance (1.7:1) than current study (1.5:1) was reported by Wang<sup>20</sup> in China, de Oliveira<sup>23</sup> in Brazil and Zaman<sup>4</sup> in Pakistan. On the other hand a study conducted by Kızıl<sup>24</sup> in Turkey and Niazi<sup>3</sup> in Pakistan reported a lower female predilection of 1.1:1 and 1.08:1 respectively.

Regarding gender distribution in MEC, a male predominance was reported by Rapidis<sup>22</sup> in Greece (1.5:1), Kızıl<sup>24</sup> in Turkey and Zaman<sup>4</sup> in Pakistan (1:1.4) which is in contrast to current study (1:1). Others have reported a female predilection in MEC.<sup>23</sup>

In contrast to the slight male predilection noted for AdCC in the current study, Martínez-Rodríguez<sup>21</sup> in Spain and de Oliveira<sup>23</sup> in Brazil have reported female predilection. However, the current study is in harmony with Niazi<sup>3</sup> who reported male predilection for AdCC (1:1.5). On the other hand Kızıl<sup>24</sup> in Turkey reported a high male predilection (3:1) while Zaman<sup>4</sup> in Pakistan reported equal gender predisposition for AdCC.

As for site of these tumours in the current study, parotid gland was the most common site for PA and MEC and minor salivary glands were for AdCC (Figure 1). Studies conducted in Pakistan<sup>3,4</sup> and other parts of the world reported results similar to the present study.<sup>21-25</sup>

These differences in age and gender distribution of PA, AdCC and MEC with other studies may be attributed to variations in sample size or to racial, regional and ethnic differences in populations.<sup>26</sup>

In the current study, adenoid cystic carcinoma was found to be more common than mucoepidermoid carcinoma which is in contrast to the study conducted by Long – Jiang<sup>27</sup> in West China and Ettl<sup>28</sup> in Germany. However, Zaman<sup>4</sup> in Pakistan, Kızıl<sup>24</sup> in Turkey and Vuhahula<sup>29</sup> in Africa have reported AdCC to be more common than MEC. Sample size and/or geographical, ethnic and racial variations may be responsible for this increased prevalence of adenoid cystic carcinoma in our population.<sup>26</sup>

It can be **concluded** from the current study that Pleomorphic adenoma, mucoepidermoid carcinoma

and adenoid cystic carcinoma of salivary glands affect a younger age group in our local population with highest incidence in 4<sup>th</sup>, 3<sup>rd</sup> and 5<sup>th</sup> decades of life respectively. Regarding gender distribution, female predominance is noted in pleomorphic adenoma (1.5:1), male predominance in adenoid cystic carcinoma (1:1.1) and equal gender distribution in mucoepidermoid carcinoma (1:1). The main gland affected by PA and MEC is the parotid gland while AdCC mainly affects the minor salivary glands. In addition, it can also be established from this study that adenoid cystic carcinoma is slightly more common than mucoepidermoid carcinoma in local population of Lahore.

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