



HISTOPATHOLOGICAL STUDY OF NEOPLASTIC LESIONS OF ORAL CAVITY AND OROPHARYNX AT A TERTIARY HEALTH CARE CENTRE OF SOUTH GUJARAT, INDIA

Pathology

Dr Sakshi Lapsiwala*	M.D Pathology, Senior Resident, Department of Pathology, Government Medical College, VNSGU, Surat, Gujarat, India *Corresponding Author
Dr Pinal C Shah	M.D Pathology, Associate Professor, Department of Pathology, Government Medical College, VNSGU, Surat, Gujarat, India
Dr Dipti P Rupala	M.D Pathology, Senior Resident, Department of Pathology, Government Medical College, VNSGU, Surat, Gujarat, India
Dr Smita Gavit	M.D Pathology, 3rd Year Resident, Department of Pathology, Government Medical College, VNSGU, Surat, Gujarat, India

ABSTRACT

The spectrum of neoplastic lesions in oral cavity & oropharynx include inflammation, benign lesions, epithelial precursor lesions and malignant tumours. The purpose of this institutional study is to determine the distribution of oral cavity and oropharyngeal neoplasm in relation to age, sex, site, personal habits, histopathological type and differentiation (grade) & compare their trends reports from other studies. The present descriptive cross sectional study was conducted in the Department of Pathology, Tertiary care Hospital affiliated to Medical College, Surat, Gujarat from June 2017 to July 2019. The present study emphasised the trends of neoplastic lesions of oral cavity and oropharynx. This study reflects that there is an urge to raise awareness and educate people regarding detrimental effects of tobacco consumption, importance of dental hygiene, oral self-examination and the availability of preventive health care services.

KEYWORDS

Oral Cavity & Oropharynx, Dysplasia, SCC, Early Diagnosis

INTRODUCTION

Oral cavity is an entrance to the digestive system and is vulnerable to many types of epithelial, mesenchymal, salivary and hematolymphoid tumours. The spectrum include inflammation, benign lesions, epithelial precursor lesions and malignant tumours. Many of the benign tumours of oral cavity may exhibit similarities in clinical and radiographic characteristics and may resemble malignant lesions. The oral potentially malignant lesions (OPML) and oral epithelial dysplastic (OED) lesions usually present as leukoplakia, erythroplakia or mixed lesions that may undergo malignant transformation. (Masamatti & Gosavi, 2016)

Oral cancer includes cancers of lip and all subsites of the oral cavity and oropharynx. In India, Oral cancer is more common in men, in older people, and varies strongly by socio-economic condition. Incidence of lip – oral cavity cancer in 2018 was 10.4% (male – 16.1% and female – 4.8%). In males, lip – oral cavity cancers ranked 1st among all cancers frequently seen in India and in females, it ranked 4th. (*Oropharynx Globocan 2018 - Cancer Incidence and Mortality Worldwide: International Agency for Research on Cancer; World Health Organization. Available at: <https://gco.iarc.fr/today/data/factsheets/cancers/3-Oropharynx-fact-sheet>, Accessed on 9th Nov 2019, n.d.*)

Oral cancer has better prognosis and may be controlled effectively, if it is diagnosed at an early stage and they are the one of the few cancers, whose cause is known and hence it is possible to prevent it. The real challenge in oral cancer lies in its prevention and early diagnosis. (Atram, Bhalavi, & Dantkale, 2015)

The purpose of this institutional study is to determine the distribution of oral cavity and oropharyngeal neoplasm in relation to age, sex, site, personal habits, histopathological type and differentiation (grade) & compare their trends reports from other studies.

METHODS

The present descriptive cross sectional study was conducted in the Department of Pathology, Tertiary care Hospital affiliated to Medical College, Surat, Gujarat, India from June 2017 to July 2019. A total of 160 biopsies/specimens from oral cavity and oropharynx were fixed in 10% formalin, processed, embedded in paraffin, sectioned and stained with hematoxylin and eosin stain and examined under light microscope.

Inclusion criteria:

- All specimens/biopsies of neoplasm of oral cavity & oropharynx, which is adequate and representative of the lesion and received in

Department of Pathology for histopathological examination.

Exclusion criteria:

- Inadequately preserved specimens with handling artifacts.
- Non neoplastic lesions
- Neoplasm arising from nasopharynx, hypopharynx, bones of jaws and odontogenic tumours.

RESULTS

Total 160 cases with histopathologically diagnosed neoplastic lesions in oral cavity and oropharynx were included in the study. Of them, 78% cases found in oral cavity while 22% cases found in oropharyngeal.

- In the present study, lesions from oral cavity and oropharynx were classified in 4 types as shown in Table 1.

Table1: Distribution of neoplastic lesions of oral cavity and oropharynx

Type of Lesions	Oral/Oropharynx				Total	
	Oral		Oropharynx		No. of Cases	Percentage (%)
	No. of Cases	Percentage (%)	No. of Cases	Percentage (%)		
Malignant tumours	100	80%	33	94.2%	133	83.1%
Oral Potentially Malignant Lesion (OPML) and Oral Epithelial Dysplasia (OED)	03	2.4%	01	2.9%	04	2.5%
Benign tumours	15	12.0%	01	2.9%	16	10.0%
Tumour like lesions	07	5.6%	00	0	07	4.4%
Total	125	100%	35	100%	160	100%

- In the present study, maximum numbers of cases – 51 cases were in the age group of 50-59 years (31.8%), followed by 32 cases in 40-49 years (20%) while only 1 case was seen in age group 0-9 years (0.6%).

- Growth was the most common clinical presentation seen in present study i.e. 124 cases (77.5%), followed by swelling/mass in 20 cases (12.5%), ulcer in 11 cases (6.9%), leukoplakic patch in 3 cases (1.9%) and wart in 2 cases (1.2%).

I. For malignant tumours of oral cavity and oropharynx,

- In the present study, among total 133 malignant tumours of oral cavity and oropharynx, 100 cases (75.2%) were found in oral cavity and 33 cases (24.8%) were found in oropharynx.
- Maximum numbers of cases - 46 cases (34.6%) were found in the age group of 50-59 years followed by 28 cases (21%) in age group 40-49 years followed by 25 cases (18.8%) in 60-69 years while minimum number of cases - 1 case (0.8%) was seen in age group 0-9 years. 5 cases (3.8%) were in younger population of less than 30 years.
- Among 133 cases, 100 (75.2%) were male patients and 33 (24.8%) were female patients. Male to female ratio being 3:1.
- In oral cavity, Anterior 2/3 of tongue was the most common site for malignant tumours with 58 cases (58%) followed by 25 cases (25%) on buccal mucosa, 7 cases (7%) on lip followed by 4 cases (4%) on hard palate, 3 cases (9.1%) on floor of the mouth. In oropharynx, Base of tongue was the most common site for malignant tumours with 11 cases (33.3%) followed by 9 cases (27.3%) in tonsil, 5 cases (15.1%) in vallecula followed by 4 cases (12.1%) in soft palate, 3 cases (9.1%) in post pharyngeal wall followed by 1 case (3.1%) on uvula.
- According to present study, out of total 160 cases, 145 patients (90.6%) gave history of various habits such either tobacco or gutka or tapkir rubbing or alcohol consumption which were predominantly seen in males.
- ✓ The habit of tobacco chewing was noted in 66 patients (45.51%). Out of which 61 patients (92.4%) had malignant tumours. It was most common habit observed in male patients (63.63%).
- ✓ The habit of smoking was noted in 35 cases (24.1%). Out of which 31 patients (88.5%) had malignant tumours. It was also a common habit observed in male patients (82.8%).
- ✓ 6 cases (4.1%) had absolutely no history of any addiction, among them 5 cases (83.3%) had malignant tumours included 3 cases of SCC and 1 case of B cell- NHL and Acinic cell carcinoma and 1 case was of tumour like lesion.
- Histopathological typing of malignant tumours of oral cavity and oropharynx has been shown in Table 2.

Table 2: Histopathological typing of malignant tumours of oral cavity and oropharynx

Type	Oral Cavity/Oropharynx				Total	
	Oral Cavity		Oropharynx			
	No. of Cases	Percentage (%)	No. of Cases	Percentage (%)	No. of Cases	Percentage (%)
SCC	85	85%	30	90.9%	115	86.4%
Verrucous Carcinoma	14	14%	00	0	14	10.5%
B-cell NHL	00	0	03	9.1%	03	2.3%
Acinic Cell Carcinoma	01	1%	00	0	01	0.8%
Total	100	100%	33	100%	133	100%

- Histological grading of SCC of oral cavity and oropharynx has been shown in Table 3.

Table 3: Histopathological grading of SCC of oral cavity and oropharynx

Histologic grade of SCC	Oral Cavity/Oropharynx				Total	
	Oral Cavity		Oropharynx		No. of Cases	Percentage (%)
	No. of Cases	Percentage (%)	No. of Cases	Percentage (%)		
Grade 1	61	71.7%	07	23.3%	68	59.1%
Grade 2	22	25.9%	18	60.0%	40	34.8%
Grade 3	02	2.4%	05	16.7%	07	6.1%
Total	85	100%	30	100%	115	100%

II. For Oral Potentially Malignant Lesions (OPML) & Oral Epithelial Dysplastic (OED) lesions of oral cavity and oropharynx,

- Histopathological typing has been shown in Table 4. The lesions found were Leukoplakia, Carcinoma in-situ and Papillomatosis with mild to moderate dysplasia.

Table 4: Histopathological typing of Oral Potentially Malignant Lesions (OPML) & Oral Epithelial Dysplastic (OED) lesions of oral cavity and oropharynx

Type	Oral Cavity/Oropharynx				Total	
	Oral Cavity		Oropharynx			
	No. of Cases	Percentage (%)	No. of Cases	Percent age (%)	No. of Cases	Percentage (%)
Leukoplakia	01	33.33%	00	0	01	25%
Carcinoma in-situ	01	33.33%	01	100%	02	50%
Papillomatosis with dysplasia	01	33.33%	00	0	01	25%
Total	03	100%	01	100%	04	100%

- Total 4 (2.5%) cases of Oral Potentially Malignant lesions (OPML) and Oral epithelial dysplastic (OED) lesions were found among 160 total cases.
- Among 4 cases of OPML & OED, 1 (25%) case of leukoplakia was found on tongue in 24 year male patient. 2 cases (50%) of Carcinoma in-situ were found. 1st case was found in 42 year male on base of tongue and 2nd case was found in 70 year female patient on lip. 1 case (25%) of papillomatosis with mild to moderate dysplasia was found in 50 year female patient. The patient presented with wart on tongue which turned out papillomatosis with dysplasia.
- Overall frequency of leukoplakia, carcinoma in-situ and papillomatosis with dysplasia among total cases were 0.63%, 1.25% and 0.63% respectively.

III. For Benign tumours of oral cavity and oropharynx,

- Histopathological typing of benign lesions of oral cavity and oropharynx has been shown in Table 5. The lesions found were Hemangioma, Pleomorphic adenoma, Schwannoma and Verruca vulgaris. Hemangioma found to be most common benign tumour (62.5%).

Table 5: Histopathological typing of benign tumours of oral cavity and oropharynx

Type	Oral Cavity/Oropharynx				Total	
	Oral Cavity		Oropharynx			
	No. of Cases	Percent age (%)	No. of Cases	Percenta ge (%)	No. of Cases	Percentage (%)
Hemangioma	10	66.66%	00	0	10	62.5%
Pleomorphic Adenoma	02	13.33%	01	100%	03	18.7%
Schwannoma	01	6.66%	00	0	01	6.3%
Verruca Vulgaris	02	13.33%	00	0	02	12.5%
Total	15	100%	01	100%	16	100%

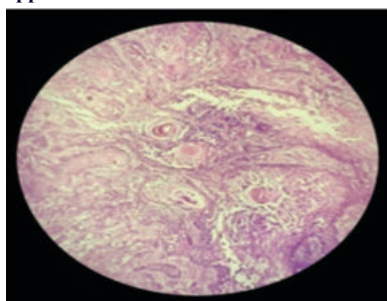
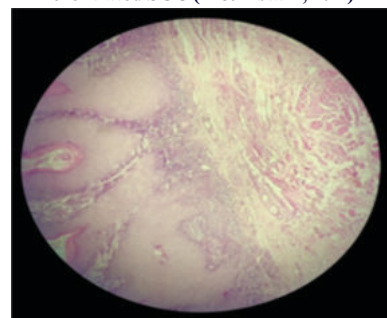
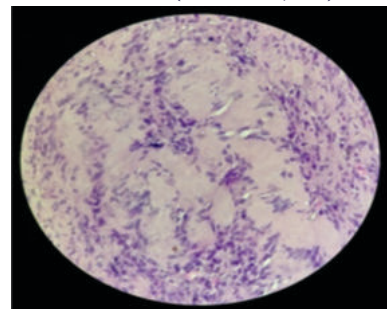
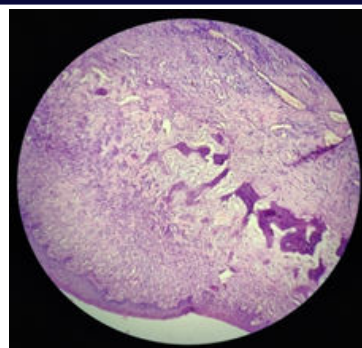
IV. For Tumour like lesions of oral cavity and oropharynx,

- Histopathological typing of Tumour like lesions of oral cavity and oropharynx has been shown in Table 6. The lesions found were Fibroma, Peripheral ossifying fibroma, Pyogenic Granuloma and Post traumatic spindle cell nodule.

Table 6: Histopathological typing of tumour like lesions of oral cavity and oropharynx

Type	Oral Cavity/Oropharynx				Total	
	Oral Cavity		Oropharynx			
	Number of Cases	Percent age (%)	Number of Cases	Percenta ge (%)	Number of Cases	Percent age (%)
Fibroma	02	28.6%	00	0	02	28.6%
Peripheral Ossifying Fibroma	02	28.6%			02	28.6%
Pyogenic Granuloma	02	28.6%	00	0	02	28.6%

Post Traumatic Spindle cell Nodule	01	14.2%	00	0	01	14.2%
Total	07	100%	00	0	07	100%

Gross Appearance:**Figure 1: Leukoplakia – white patch on lateral side of tongue****Figure 2: Growth over buccal mucosa****Microscopic Appearance:****Figure 3: Well Differentiated SCC (H & E stain, 10X)****Figure 4: Verrucous Carcinoma (H & E stain, 10X)****Figure 5: Schwannoma (H & E stain, 40X)****Figure 6: Peripheral Ossifying Fibroma (H & E stain, 10X)****DISCUSSION**

The study from June 2017 to July 2019 includes a variety of 160 oral cavity and oropharyngeal neoplastic lesions which were then analyzed for the purpose of studying the clinical aspects as well as histopathological patterns of all neoplastic lesions. The observations were recorded and compared with work of other reputed study of researchers.

The results of present study and its correlation with other studies are discussed in the following parts:

- Neoplastic lesions of oral cavity and oropharynx are known to occur at all ages ranging from early childhood to very old age.
- ✓ In the present study, age of patients ranged from 9 years to 89 years. The maximum numbers of oral cavity and oropharyngeal neoplastic lesions were seen in the age group of 50-59 years (31.8%), followed by 40-49 years (20%) while minimum number of cases were in age group 0-9 years (0.6 %). Similar study done by Gupta M et al (M. Gupta, Choudhary, Gupta, & Gupta, 2016) also reported maximum number of cases in the age group of 50-59 years with 28% followed by 40-49 years with 24% and minimum number of cases in the age group of 0-9 years and 80-89 years with 2% each.
- In present study, growth was the most common clinical presentation (77.5%), followed by swelling/mass (12.5%), ulcer (6.9%). Other clinical presentation included leukoplakic patch and wart. Similar study done by Gupta M et al (M. Gupta et al., 2016) also reported growth (73.5%) as most common clinical presentation followed by ulcer (35%) and pain (12.5%).
- ✓ However, Sharma RG et al (R. G. Sharma, Bang, Verma, & Mehta, 2012) found three most common clinical symptoms at presentation: oral ulcer (76%), pain at local site (43%) and swelling/growth (33%)
- ✓ The variability of clinical presentation could be due to ignorance of the patients to sign and symptoms although they would be meaningful and significant to the health care provider. Also, clinical features depend upon the etiopathological behaviour of the individual tumour. (Muthu, Vaishnavi, & Sivadas, 2018)

➤ **Comparative analysis of oral cavity and oropharyngeal neoplastic lesions will be discussed as follows:**

- 1) Comparative analysis of malignant tumours of oral cavity and oropharynx
- 2) Comparative analysis of Oral Potentially Malignant Lesions (OPML) and Oral Epithelial Dysplasia (OED) of oral cavity and oropharynx
- 3) Comparative analysis of Benign Tumours of oral cavity and oropharynx
- 4) Comparative analysis of Tumour like lesions of oral cavity and oropharynx

1). Comparative analysis of distribution of malignant tumours of oral cavity and oropharynx:

- In the present study, total 75.2% oral cavity malignancies and 24.8% oropharyngeal malignancies were encountered. Results are compatible to study done by Bhat SP et al (Bhat, Naik, & Swetadri, 2010) and Sharma K et al (K. Sharma et al., 2019) with 68% and 58.5% oral cavity malignancies respectively. Oral cavity being common site could be due to frequent exposure to various carcinogenic agents, specially tobacco, smoking, alcohol and human papillomavirus (HPV).

- Of the 160 cases in the present study, 34.6% cases with age group of 50-59 years were affected most and 3.8% cases with age < 30 years were affected least which are similar to findings reported by Bhattacharjee A et al (Bhattacharjee, Chakraborty, & Purkaystha, 2006) who found 5th decade to be more common (34.9%) and <30 years age to be less common (3.0%). Bhat SP et al (Bhat et al., 2010) also found most cases (30%) in the age group 50-59 years.
- In present study, majority of the cases were male (75.2%) with a male to female ratio of 3:1, the study was in accordance with various studies done by Bhat SP et al (77%) (Bhat et al., 2010), Mehrotra R et al (74.4%) (Mehrotra, Pandya, Chaudhary, Kumar, & Singh, 2008), Sachdev R et al (71.5%) (Sachdev et al., 2019) and Ajay PR et al (67.6%) (Ajay et al., 2018). High incidence was noted in males than females which may be due to easy access to tobacco products.
- ✓ The gender based preponderance of oral cancer in India is regional, tilting toward men in most parts of the country but in some parts of India male to female ratio is approximately becoming equal.
- ✓ High incidence rates are seen amongst the subpopulations of women in southern India owing to the prevailing practice of reverse smoking (chutta). In north india, habit of tobacco chewing and smoking is less in the females and this may be the reason for low incidence of malignant tumours among females. (Ajay et al., 2018)
- The most commonly encountered site in oral cavity was tongue (58%) in present study. Findings are similar to study done by Mohammad A et al (Mohammad, Bhargava, & Wadhwanja, 2018) and Durazzo MD et al (Durazzo et al., 2005) with 32.38% and 32.1% respectively. However, Atram MA et al (Atram et al., 2015) found most common site as buccal mucosa (31.94%) and Begum N et al (Begum, Naheed, Nasreen, & Khan, 2009) reported gingiva (40.7%) as most common site.
- ✓ Anatomically, the anterior portion of the oral cavity is commonly involved possibly due to the longer duration of contact with the carcinogens in tobacco and alcohol.
- ✓ In studies, having buccal mucosa and gingiva as common site, may be due to tobacco chewing to keep in the buccal pouch/gingiva for long periods. This leads to greater exposure of the subjected mucosa to carcinogens in these habit forming substances.
- In the present study, tobacco chewing was the commonest habit observed in 45.8% cases, findings of which (43.7%) are similar to study done by Ajay PR et al (Ajay et al., 2018). Sharma RG et al (R. G. Sharma et al., 2012) and Khandekar SP et al (Khandekar, Bagdey, & Tiwari, 2006) reported very high frequency of tobacco chewing - in 89% and 71.3% cases respectively.
- ✓ Sharma K et al (K. Sharma et al., 2019) reported combined habits (Tobacco Chewing and/or Smoking and/or Alcohol) as most common habit (29.6%). This higher association of tobacco and variability in habits are might be due to regional variation in tobacco use in the form of chewing and smoking.
- ✓ 4.7% cases were reported to have habit of tapkir rubbing which is a significant finding in present study. Tapkir rubbing is a smokeless tobacco used in the form of dry snuff which is kept in the oral cavity for several hours per day. So, the concentration of tobacco in snuff may exceed by two orders of magnitude levels found in other consumer products. The average consumption in regular users of snuff is about 10-15 g per day. (J. Gupta, Gupta, Samadi, & Kabiraj, 2012)
- ✓ In the present study, among retrived history of 145 patients, 6 (4.1%) cases did not have history of any bad habits. Of them, 5 cases (83.3%) had malignant tumour. The possible role of HPV orogenetic and family influences in oral carcinogenesis may be considered in these cases and needs to be evaluated further to confirm the association. (Sampoorna, SailaBala, Ramanakumari, & C. Padmavathi Devi, 2018)
- In the present study, it is observed that squamous cell carcinoma (86.4%) is the commonest type of malignant tumour found in oral cavity and oropharynx. Findings are similar to studies done by Atram MA et al (Atram et al., 2015), Sampoorna G et al (Sampoorna et al., 2018) and Gupta M et al (M. Gupta et al., 2016) who reported squamous cell carcinoma as most common malignant tumour with 83.31%, 84.82% and 81% respectively. The higher frequency of squamous cell carcinoma could be due to late presentation of patients to health care system due to less awareness to the occurrence of several different types of premalignant lesions that occur in mouth.

- Comparative analysis of SCC of oral cavity and oropharynx according to histologic grade has shown in Table 7.

Table 7: Comparative analysis of SCC of oral cavity and oropharynx according to histologic grade

Study	Grade 1	Grade2	Grade 3
Present study	59.1%	34.8%	6.1%
Ahluwalia A et al	60.1%	30.3%	9.6%
Tandon A et al	66.33%	27.55%	6.12%
Rai HC et al	50.8%	29.2%	20%
Sachdev R et al	44.03%	33.02%	22.9%

- Differentiation of tumour is dependent on etiopathological behaviour of the individual tumour.

2). Comparative analysis of Oral Potentially Malignant Lesions (OPML) & Oral Epithelial Dysplastic (OED) lesions of oral cavity and oropharynx:

- In present study, overall frequency of OPML and OED lesions was 2.5% with prevalence of leukoplakia and carcinoma in-situ being 0.63% and 1.25% respectively. Findings are in concordance with a study done by Burungale SU et al (*Burungale SU, Durge PM, Burungale DS, Zambare MB. Epidemiological study of premalignant and malignant lesions of the oral cavity. J Academia Industrial Res. 2014;2:519-23., n.d.*), Narasannavar A et al (*Narasannavar A, Wantamutte AS. Prevalence of oral precancerous lesions and conditions among tobacco consumers in rural population around Belgium. A community based cross sectional study. IOSR J Dent Med Sci. 2014;1:31-34., n.d.*) and Saraswathi et al (*Saraswathi TR, Ranganathan K, Shanmugam S. Prevalence of oral lesions in relation to habits: Cross-sectional study in South India. Ind J Dent Res. 2006;17: 121-125., n.d.*) who reported 3.25%, 5.0% and 1.29% cases of OPML and OED.
- However, other studies done by Mehrotra R et al (Mehrotra et al., 2008) and Axell et al (*Axell, T. (1987), Occurrence of leukoplakia and some other oral whitelesions among 20 333 adult Swedish people. Community Dentistry and Oral Epidemiology. 15: 46-51, n.d.*) reported very high frequency of OPML and OED lesions with 29.8% and 13.8% respectively. Other OPML and OED lesions found by other studies were Oral submucosal fibrosis (OSMF), erythroplakia, lichen planus and nicotinic stomatitis.

These variations could be explained due to (Gaphor & Abdulla Sabri, 2014):

- ✓ Age and sex distribution of the sample.
- ✓ Different methodologies used.
- ✓ Specific cultural habits like smoking and use of alcohol.
- ✓ Geographical, racial, and socioeconomic factors.
- ✓ Educational level and cultural levels of patients.
- ✓ Use of dentures.
- ✓ Systemic diseases and medication used.
- ✓ Food type

3). Comparative analysis of Benign tumours of oral cavity and oropharynx:

- In the present study, 10% cases of benign tumours were encountered. Findings are similar to study done by Masamatti S et al (Masamatti & Gosavi, 2016) who reported 10.9% cases of benign tumours. However, study done by Thakur BS et al (Thakur, P, & Sreekantha, 2014) and Mehrotra R et al (Mehrotra et al., 2008) reported slightly higher frequency of benign tumours with 17.3% and 31.7% respectively.
- In present study, hemangioma found to be most common benign tumour with frequency of 62.5%. Findings are compatible with study done by Thakur BS et al (Thakur et al., 2014) who also reported hemangioma as most common benign tumour with 52.4%. Morphologically, lobular capillary hemangioma was commonly found (90%) among all hemangioma cases finding is similar to study done by Jagadev S et al (Jagadev & Jenna, 2018).

4). Comparative analysis of Tumour like lesions of oral cavity and oropharynx:

- In present study, 4.4% tumour like lesions were found which included cases of fibroma, peripheral ossifying fibroma and pyogenic granuloma (28.6% each) followed by a case of posttraumatic spindle cell nodule (PSCN) (14.2%).
- Similar study done by Bataineh A et al (Bataineh & Al-Dwairi, 2005) reported 12.24% fibroma cases and 23.13% cases of

pyogenic granuloma. Al-Khateeb T et al (Al-Khateeb, 2009) also observed cases of pyogenic granuloma accounting for 18% which are similar to present study.

CONCLUSION

- The present study emphasised the trends of neoplastic lesions of oral cavity and oropharynx. Oral and oropharyngeal malignancies are among the most common malignancies encountered in clinical practice.
- Programs should be developed emphasizing the early diagnosis due to its impact on patient's survival rate, quality of life, and treatment costs. Dental fraternity is best to examine oral cavity and every complaint of patient should be taken in consideration and all oral lesions should be examined properly to avoid the consequences.
- The study also provides some information regarding oral potentially malignant lesions (OPML) n oral epithelial dysplasia (OED) which are important spectrum of diseases which if not taken care of, may erupt, leading to increased morbidity and mortality. A detailed clinical work up with histology can help not only in diagnosing more than 95% of the cases of oral cavity premalignant lesions but correct identification of their malignant potential may help in early diagnosis of cancer and down staging of diseases and thus reducing morbidity and mortality.
- Development of molecular markers may improve the early diagnosis and help in predicting treatment response. New treatment modalities including tumour specific antibodies and gene therapy are emerging, giving more hope for patients with oral cancer.
- Oral cancers are the one of the few cancers, whose cause is known and hence it is possible to prevent it. The real challenge in oral cancer lies in its prevention and early diagnosis.

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Conflict of Interest:

The authors declare no conflict of interest.

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