



## Histopathological Spectrum of the Lesions of Buccal Mucosa at a Tertiary Care Centre of Central India

Neha Chaturvedi<sup>1</sup>, Vandana Agrawal<sup>1</sup> and Anand Sagar<sup>2\*</sup>

<sup>1</sup>Department of Pathology, L N Medical College, India

<sup>2</sup>Department of Medicine, R D Gardi Medical College, India

\*Corresponding e-mail: [dranandsagar@hotmail.com](mailto:dranandsagar@hotmail.com)

### ABSTRACT

**Background:** The oral cavity is a common site for pathological lesions; with a wide spectrum of neoplastic and non-neoplastic lesions. They are either symptomatic or asymptomatic. Some lesions may prove to be premalignant and may be a cause of malignancy in the future. **Aims and objectives:** Our study aimed at studying the spectrum of buccal mucosa lesions and categorizing them into benign and malignant and to study the pattern of these lesions, at a tertiary care center of central India. **Materials and Methods:** It was a prospective study carried out at L N Medical College from June 2019 to June 2020. A total of 35 cases were meticulously studied in concordance with the age, sex, site and were observed for their histopathological diagnosis and were categorized into non-neoplastic and neoplastic. **Results:** Of the thirty-five cases studied, we observed eight (22.85%) non-neoplastic and twenty-seven (77.14%) neoplastic cases. In the non-neoplastic category, the predominant lesion is mucocele with four cases, common in the age group of 20-40 years of age. In the neoplastic category with twenty-seven cases, we observed benign (8.4%) premalignant (25.7%) and malignant (42.96%) cases respectively. In the malignant category, the predominant lesion observed is a well-differentiated type of SCC followed by moderately differentiated carcinoma. **Conclusion:** In our study, we observed maximum cases of neoplastic origin; therefore, accurate and timely detection of premalignant lesions in histopathology (dysplasia, hyperplasia) and early intervention can prevent the disease progression and thus can reduce the surgical burden and would improve the prognosis.

**Keywords:** SCC (Squamous Cell Carcinoma), Buccal mucosa, Neoplastic, Non-neoplastic, Spectrum

### INTRODUCTION

Oral lesions are a common entity because of mucosal exposure to tobacco, recurrent trauma, infections (especially viral infections), and genetic predisposition. Tobacco which is in various forms such as pan, khaini, smoking, etc. which was commonly seen in our study and which is carcinogenic, leading to painful deaths of young adults in their productive years, thereby causing loss of workforce of the nation and society. In 2017 about 28.6% of adults (267 million) aged 15 or above used tobacco in some form in India according to the second round of the Global Adult Tobacco Survey in 2016-2017 (GATS 2) [1]. Smokeless tobacco use causes approximately 200,000 deaths in India each year, accounting for 74% of the global burden of smokeless tobacco [2]. According to the Report of National Cancer Registry Programme, 2012-2016 the incidence rate of mouth cancer in males increased significantly by 16% annually between 2005 to 2016. The crude rate for cancer mouth in males was 13.9 in 2016 compared to 2.5 in 2005. The East Khasi Hills district of Meghalaya had the highest relative proportion of cancers associated with the use of tobacco with 70.4% and 46.5% of males and females respectively; while Bhopal had a relative proportion of cancers associated with the use of tobacco with 54.9% and 17.7% of males and females, respectively; the proportion of mouth cancer was highest among the cancers associated with the use of tobacco in central India region in males (45.0%) and females (44.8%) respectively. Mouth cancer showed a significant increase of 9.4% and 6.5% annually in males and females, respectively [3].

Tobacco smoke is made up of thousands of chemicals, of which at least 70 are known to be carcinogenic. Some of the chemicals found in tobacco smoke include hydrogen cyanide, formaldehyde, lead, arsenic, benzene, ammonia,

and radioactive elements and cancer-causing agents in smokeless tobacco, such as benzopyrene and other Polycyclic Aromatic Hydrocarbons (PAHs); smokeless tobacco also contains radioactive substances. The buccal mucosa is exposed to these carcinogens and these are absorbed through the oral mucosa which may cause oral cancer [4].

Oral Potentially Malignant Disorder (OPMD) is defined as “the risk of malignancy being present in a lesion or condition either during the time of initial diagnosis or at a future date.” Hence their early detection can reduce the transformation of pre-invasive lesions into subsequent carcinomas [5].

The oral cavity and oropharynx are the sites of numerous diseases. Tobacco chewing and alcohol intake are mostly found to be associated with oral cavity lesions. Most commonly the buccal mucosa gets involved either with non-neoplastic or neoplastic lesions. The non-neoplastic lesions commonly seen are dysplasia, mucocele, chronic nonspecific ulcer, pseudoepitheliomatous hyperplasia, epidermoid cyst, verrucous hyperplasia, viral wart, cellulitis; and the most common neoplastic lesion is squamous cell carcinoma. For immaculate diagnosis, histopathology is still the gold standard [6].

**MATERIALS AND METHODS**

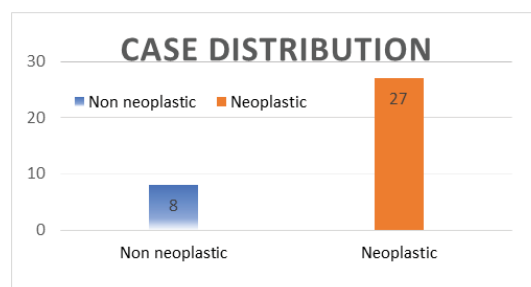
This is a prospective study carried out in the Department of Pathology at L.N. Medical College Bhopal (M.P). A total of 35 cases were taken into account and were meticulously studied, in concordance with the age, sex site/laterality. The biopsy specimens (excision and incisional) were received in 10% formalin solution and were processed as per the standard protocol and slides of 4 micron-5 micron were made for the histopathological study. After the detailed histopathological study, the diagnosis was made and categorized into major groups (non-neoplastic and neoplastic) and subgroups according to the type of lesion on the histopathological diagnosis.

**RESULTS**

Of the thirty-five cases studied, eight (22.85%) were non-neoplastic and twenty-seven (77.14%) were neoplastic. The male to female ratio is 2.9:1 (Table 1 and Graph 1). The right to left laterality ratio is 1:2.5 (Table 2 and Graph 2).

**Table 1 Distribution of the cases according to the lesion and sex**

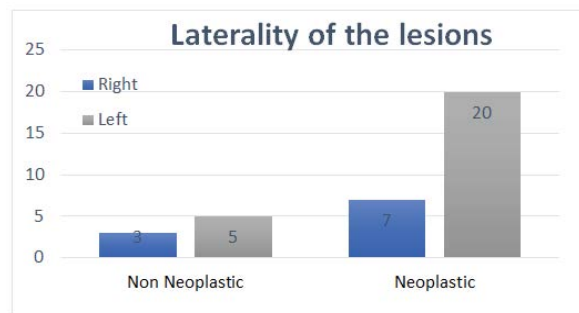
		<b>Males</b>	<b>Females</b>
Non-Neoplastic	8 (31.42%)	5	3
Neoplastic	27 (68.5%)	21	6
N=	35 (100%)	26	9



**Graph 1 Distribution of the cases according to the type of lesion**

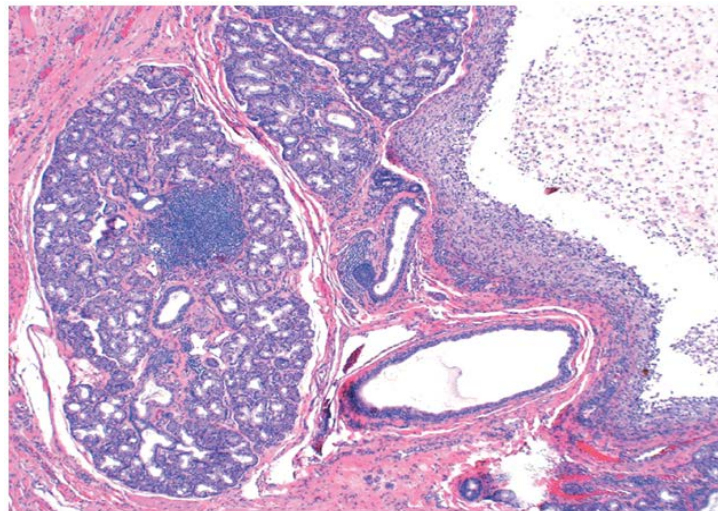
**Table 2 Site wise (Laterality) distribution of the lesions**

	<b>Right</b>	<b>Left</b>
Non-Neoplastic	3	5
Neoplastic	7	20
N=35	10	25



**Graph 2 Laterality distribution of the lesions**

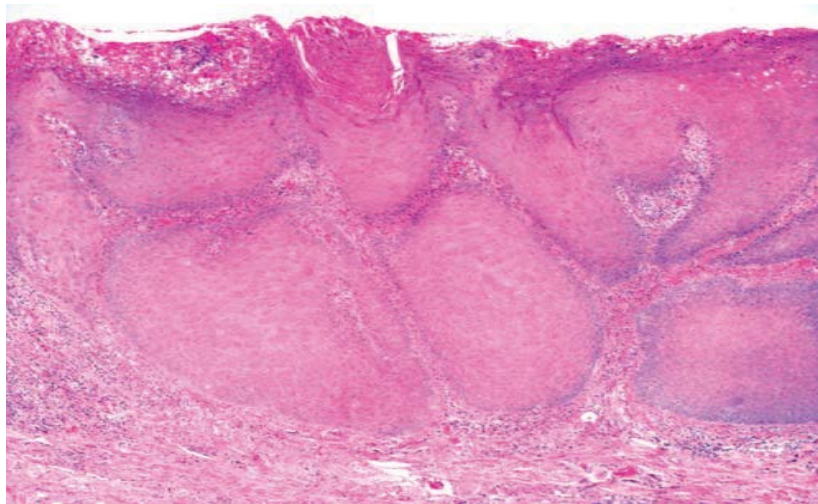
Of the eight non-neoplastic cases studied, the male to female ratio is 1:6; while the right to left laterality, the ratio is 1:1.6. Out of all the thirty-five cases studied, mucocele (Figure 1) was seen in four cases (11.42%); Chronic non-specific ulcer was seen in two cases (5.7%); epidermoid cyst and cellulitis were seen in one case each (2.8%). Mucocele had female predilection with three cases in females and only one in males. The non-neoplastic lesions were found in the age group of 20 to 50 years.



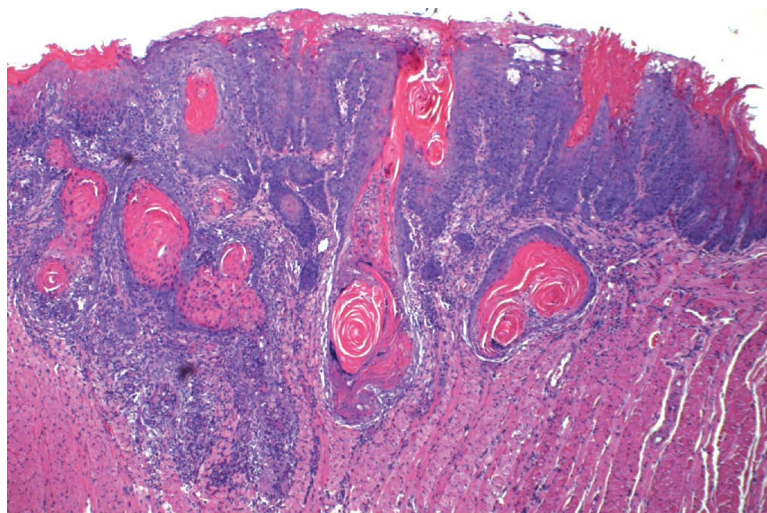
**Figure 1 At 40x magnification Mucocele**

In the twenty-seven neoplastic cases studied, the male to female ratio was 3.5:1 and the right to left laterality ratio is 1:2.8. Of the twenty-seven neoplastic cases, three were benign which included verrucous hyperplasia, viral warts, and Pseudoepitheliomatous hyperplasia; one case each (2.8%). All three benign cases were found in males in an age group of 35-47 years. Of the twenty-seven neoplastic cases studied nine cases (25.7%) were in the premalignant category which included dysplasia with a male predilection of seven cases to two cases in females; the dysplasia was seen mainly in the age group of 40-65 years. The rest of the fifteen (42.85%) cases were malignant and among them, thirteen (86.6%) were squamous cell carcinomas, and two (13.4%) were verrucous carcinoma (Figure 2), the thirteen squamous cell carcinoma cases comprised of six cases (40%) of well-differentiated squamous cell carcinoma-keratinized, followed by five cases (33.3%) of moderately differentiated squamous cell carcinoma, two cases (13.3%) of superficial micro-invasive squamous cell carcinoma.

The well-differentiated squamous cell carcinoma-keratinized (Figure 3) was seen in the age group of 35 to 60 years age and the moderately differentiated squamous cell carcinoma was seen in the age group of 45 to 65 years and superficial micro-invasive squamous cell carcinoma was seen in the age group of 30 to 55 years while verrucous carcinoma was seen in the age group of 50 to 60 years; altogether the age group of the cases of the neoplastic origin was 30 to 65 years.



**Figure 2** At 40x magnification verrucous carcinoma showing blunt and wide rete pegs pushing into the stroma with a downward growth



**Figure 3** At 10x magnification squamous cell carcinoma showing nests and islands of keratinocytes invading the stroma

## DISCUSSION

This study was carried out to study the histopathological spectrum of oral and buccal lesions received in our histopathology section of the Department of Pathology.

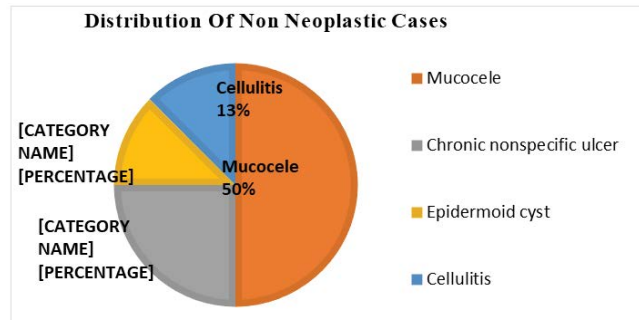
The present study included a total of 35 cases, of which eight (22.85%) cases were non-neoplastic and twenty-seven (77.14%) were neoplastic which is in concordance with the findings of Prabhakar Patro, et al. in 2020 who reported non-neoplastic (30%) and neoplastic (70%) cases respectively and Gowthami MRS, et al. reported (29%) non-neoplastic and (71%) neoplastic cases in their study and Modi D, et al. in 2013 reported neoplastic lesions in (61.4%) cases and non-neoplastic lesions in (38.6%) cases [7-9]. In the present study, the male to female ratio is 2.9:1, which is nearly similar to the study by Swati Parikh, et al. who observed a ratio of 2.74:1 while Nikunj, et al., Kosam S, et al. and Agrawal R, et al. observed a ratio of 2.44:1, 3:1, and 3.3:1 respectively [10-13]. This shows that males have a predilection for buccal lesions as compared to females.

Among the eight non-neoplastic lesions, the most common lesion observed was mucocele, comprising of four cases (50%), (Table 3, and Graph 3) with male to female ratio of 1:3, which is similar to the study by Atram MA, et al. where mucocele was the most common tumor-like lesion found in 50% cases while 60% cases of mucocele were reported by Gowthami MRS, et al. [8,14].



**Table 3 Distribution of lesions among the non-neoplastic category**

	<b>N=8</b>
Mucocele	4 (50%)
Chronic nonspecific ulcer	2 (25%)
Epidermoid cyst	1 (12.5%)
Cellulitis	1 (12.5%)



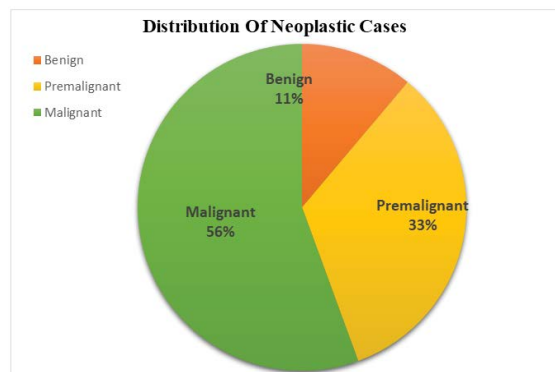
**Graph 3 Distribution of lesions among the non-neoplastic category**

In the twenty-seven neoplastic cases studied, the male to female ratio was 3.5:1 which is comparable to the study by Agrawal R, et al. who observed a ratio of 3.3:1 while Pudasani S and Brar R, et al., observed a ratio of 2:1 [13,15].

In the present study, we observed twenty-seven neoplastic cases which comprised of benign (8.4%) premalignant (25.7%) and malignant (42.96%) cases respectively; Swati Parikh, et al., (Table 4, and Graph 4) reported benign (2.30%) premalignant (12.21%) and malignant (61.83%) cases respectively; Gowthami MRS, et al. reported benign (4%) premalignant (4%) and malignant (60%) cases and Kosam, et al. reported benign (26%) cases malignant (74%) cases respectively [8,10,12].

**Table 4 Distribution of lesions among the neoplastic lesions**

	<b>Type of lesion</b>	<b>N=27 (100%)</b>
<b>Benign</b>	Verrucous hyperplasia	1 (3.7%)
	Pseudoepitheliomatous hyperplasia	1 (3.7%)
	Viral wart	1 (3.7%)
<b>Premalignant</b>	Dysplasia	9 (33.33%)
<b>Malignant</b>	SCC Well differentiated keratinized	6 (22.22%)
	SCC Moderately differentiated	5 (18.51%)
	SCC Superficial micro-invasive	2 (7.4%)
	Verrucous carcinoma	2 (7.4%)



**Graph 4 Distribution of lesions among the neoplastic category**

Amongst the fifteen malignant cases studied; squamous cell carcinoma was observed in thirteen (86.6%) cases and verrucous carcinoma in two (13.3%) cases; which is nearly similar to the observation in the study done by Swati Parikh, et al. who reported (87.6%) cases of squamous cell carcinoma and (8.6%) cases of verrucous carcinoma while Gupta M, et al., Gowthami MRS, et al., and Nayak P, et al. reported 98.18%, 95.2%, and 98% cases of squamous cell carcinoma respectively [8,10,16,17].

In the present study out of the fifteen malignant cases, we observed six cases (40%) of well-differentiated carcinoma, five (33.33%) cases of moderately differentiated squamous cell carcinoma, and two (13.33%) cases each of superficial micro-invasive squamous cell carcinoma and verrucous carcinoma; (Table 5) which is comparable to the findings reported by Khan Y, et al. Gowthami MRS, et al. and Rai HC, et al. who reported well-differentiated SCC in (47.61%), (51.67%) and (51%) of SCCs respectively [8,18,19].

**Table 5 Distribution of lesions among the malignant cases**

Type of lesion	N=15 (100%)
SCC Well differentiated keratinized	6 (40%)
SCC Moderately differentiated	5 (33.33%)
SCC Superficial micro-invasive	2 (13.33%)
Verrucous carcinoma	2 (13.33%)

The age group of the neoplastic lesions observed is 30 to 65 years with the majority in 40 to 65 years of the age group which is in concordance with the observation of Kosam S, et al. and Nayak P, et al. who observed the majority of the cases in the same age group of 40-65 years [12,17].

In our study, we observed the tongue to be the most common site for neoplastic lesions followed by the buccal mucosa for the non-neoplastic lesions which is in concordance with the findings in the studies by Agrawal R, et al., Rai HC, et al., and Mirbod and Ahing, et al., in addition, observed that the ventrolateral border of tongue was the commonest site for carcinoma tongue [13,19,20].

### CONCLUSION

With the results obtained in our study and with due consideration to the previous studies we conclude our study with the findings that lesions of buccal mucosa are a common entity with diversity in lesions and a wide age group of presentation emphasizes the role of histopathological study and diagnosis in oral lesions provides us with valuable information of the lesion being neoplastic or non-neoplastic and timely intervention could be planned. The most common culprit found to be associated with both the neoplastic and non-neoplastic lesions of the oral cavity is tobacco and probably the easy availability and access at an early age is the cause for early presentation of the cases in the 3<sup>rd</sup> decade. The oral cavity is the easily accessible site for examination and an initial awareness in the patient, to report and early diagnosis and treatment by the doctor can prevent the further progression of the inflammatory and pre-invasive lesions, thereby reducing the burden of the mutilating surgeries and helps in decreasing the morbidity and increasing the five-year survival rate.

### DECLARATIONS

#### Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### REFERENCES

- [1] National Centre for Disease Informatics and Research. "Factsheet: National cancer registry programme 2020." *Indian Council of Medical Research*, 2020. [https://ncdirindia.org/All\\_Reports/Report\\_2020/Factsheet/Fact\\_Sheet\\_2020.pdf](https://ncdirindia.org/All_Reports/Report_2020/Factsheet/Fact_Sheet_2020.pdf)

- [2] Siddiqi, Kamran, et al. "Global burden of disease due to smokeless tobacco consumption in adults: Analysis of data from 113 countries." *BMC Medicine*, Vol. 13, No. 1, 2015, pp. 1-22.
- [3] Cogliano, Vincent, et al. "Smokeless tobacco and tobacco-related nitrosamines." *The Lancet Oncology*, Vol. 5, No. 12, 2004, p. 708.
- [4] Kumar, G. Kiran, et al. "Epidemiological profile and clinical characteristics of oral potentially malignant disorders and oral squamous cell carcinoma: A pilot study in Bidar and Gulbarga Districts, Karnataka, India." *Journal of Oral and Maxillofacial Pathology: JOMFP*, Vol. 23, No. 1, 2019, pp. 90-96.
- [5] Furlong, Mary A., Julie C. Fanburg-Smith, and Esther LB Childers. "Lipoma of the oral and maxillofacial region: Site and subclassification of 125 cases." *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, Vol. 98, No. 4, 2004, pp. 441-50.
- [6] Patro, Prabhakar, et al. "A histopathological study of oral cavity lesions." *International Journal of Health Sciences and Research*, Vol. 10, No. 3, 2020, pp. 17-21.
- [7] Shruthi, R., Mahanthacha Veerabasappa, and Sharmila Surhonne. "Histopathological spectrum of tumor and tumor like lesions of oral cavity and oropharynx in tertiary care hospital." *IP Journal of Diagnostic Pathology and Oncology*, Vol. 5, No. 2, 2020, pp. 174-78.
- [8] Modi, Dilem, et al. "Pattern of oral cavity lesions in a tertiary care hospital in Manipur, India." *Journal of Medical Society*, Vol. 27, No. 3, 2013, pp. 199-202.
- [9] Parikh, Dr. Swati et al. "Histopathological study of oral cavity lesions." *International Journal of Scientific Research*, Vol. 2, No. 11, 2012, pp. 430-32.
- [10] Mehta, Nikunj V., et al. "Histopathological study of oral cavity lesions: A study on 100 cases." *International Journal of Current Research and Review*, Vol. 5, 2013, pp. 110-6.
- [11] Kosam, Shashikala, and Pratima Kujur. "Pattern of oral cavity lesion: A retrospective study of 350 cases." *International Journal of Scientific Study*, Vol. 4, No. 3, 2016, pp. 65-69.
- [12] Agrawal, Ranjan, Ashok Chauhan, and Parbodh Kumar. "Spectrum of oral lesions in a tertiary care hospital." *Journal of Clinical and Diagnostic Research: JCDR*, Vol. 9, No. 6, 2015, pp. EC11-13.
- [13] Atram, Manisha A. et al. "A clinicopathological study of tumors and tumor like lesions of oral cavity." *Indian Journal of Basic and Applied Medical Research*, Vol. 5, No. 3, 2016, pp. 146-53.
- [14] Ministry of Health & Family Welfare. "GATS-2: Global Adult Tobacco Survey. Factsheet | India 2016-17." <https://ntcp.nhp.gov.in/assets/document/surveys-reports-publications/GATS-2-FactSheet.pdf>
- [15] Pudasaini, S., and R. Baral. "Oral cavity lesions: A study of 21 cases." *Journal of Pathology of Nepal*, Vol. 1, No. 1, 2011, pp. 49-51.
- [16] Gupta, Mohit, et al. "Histopathological study of neoplastic lesions of oral cavity and oropharynx." *International Journal of Research in Medical Sciences*, Vol. 4, No. 5, 2016, pp. 1506-10.
- [17] Nayak, Pallavi, and Subrat Kumar Behera. "Clinicopathological study of premalignant and malignant lesions of oral cavity." *Journal of Dental and Medical Sciences*, Vol. 16, No. 8, 2017, pp. 20-23.
- [18] Khan, Yasmin, and Shivaji D. Birare. "Study of histopathology of the tumour like lesions and tumours of the oral cavity." *International Journal of Science and Research*, Vol. 5, No. 4, 2016, pp. 915-20.
- [19] Rai, Harish Chandra, and Junaid Ahmed. "Clinicopathological correlation study of oral squamous cell carcinoma in a local Indian population." *Asian Pacific Journal of Cancer Prevention*, Vol. 17, No. 3, 2016, pp. 1251-54.
- [20] cer Prevention, Vol. 17, No. 3, 2016, pp. 1251-54.
- [21] Mirbod, Sayed M., and Stephen I. Ahing. "Tobacco-associated lesions of the oral cavity: Part II. Malignant lesions." *Journal-Canadian Dental Association*, Vol. 66, No. 6, 2000, pp. 308-15.