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PATTERNS OF TOBACCO, BETEL NUTS AND SMOKE ABUSE IN RELATION TO MORPHOLOGICAL DIFFERENTIATION OF ORAL AND OROPHARNYGEAL SQUAMOUS CELL CARCINOMAS IN ASSAM

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Keywords:

Betel nut, Smoking, Tobacco, Oral SCC, Oropharyngeal SCC

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ABSTRACT: Background: Betel nut and different variants of tobacco and smoking is hazardous causing oral and or pharyngeal squamous cell carcinomas (SCC). In Assam, "Tamol", a raw, unprocessed betel nut is mixed with lime and betel leafis an alarming factor for oral and oropharyngeal SCC. **Aim:** To assess the patterns of tobacco, betel nuts and smoking causing variations in morphological differentiation of oral and oropharyngeal SCC. **Methods:** Morphological variations of 40 oral and oropharyngeal SCC's were studied. A self answered predesigned questionnaire was used regarding the patterns and years of abuse of tobacco, betel nuts and smoking. **Results:** 90% of cases show tobacco prevalence, 90% show betel nut prevalence in the form of raw betel nut (58.3%), dried betel nut (27.8%) and betel nut in the form of panmasala/gutkha (13.9%). 50 % show smoking prevalence in the form of beed is (80%), cigarettes (10%) and weeds (10%) respectively. Among 22 cases of well differentiated SCC, 86.3%, 90.9% and 36.3% consumed tobacco, betel nuts and smoke respectively for at least 10 years. Among 16 cases of moderately differentiated SCC, 93.7%, 87.5% and 62.5% consumed tobacco, betel nuts and smoke respectively for at least 22 years. Among 02 cases of poorly differentiated SCC, 100% cases consumed tobacco, betel nuts and smoke for at least 42 years. **Conclusion:** Different patterns of tobacco, betel nut and smoking explain various morphological differentiation of oral and oropharyngeal SCC.

INTRODUCTION: Head and neck cancer (HNC) is very common in India, constituting 30% of all the cancers because of the widespread use of tobacco and betel nuts across India. Of the 30%, Oral cavity cancer comprises approximately 58.40% and oropharynx comprises approximately 13.40% respectively.

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Squamous cell carcinoma (SCC) makes up around 95% of oral cavity cancers as well as oropharyngeal cancers [1]. Etiological factors involve different variants of tobacco and smoking with various forms of betel or areca nuts which are highly associated with oral and oropharyngeal squamous cell carcinomas (SCC) [2].

Various types of betel nut and tobacco in the form of smoking and non-smoking has been incorporated in this study. Most common forms of betel nuts include dried form, raw form, pan masala and package of betel nut in the form of gutkha [3]. Similarly, smoking variations include beedis, cigarettes and weeds [3].

The amount of time spent in intake of these abusing substances creates an dangerous impact on health of the individuals. Illiteracy and lack of health awareness provides an additional factor for intake of these carcinogens [3]. Also, children from these poor households are frequently employed in tobacco farming to provide family income [3]. Therefore, this study has been undertaken to study the pattern of these carcinogens in tumor grading as only a few studies have been done in this population.

Aims and Objectives:

- To study the patterns of usage of tobacco, betel nuts and smoking in relation to morphological differentiation of oral and oropharyngeal SCC.
- To assess the relation between years of intake of these substances and morphological differentiation of oral and oropharyngeal SCC.

MATERIALS AND METHODS:

Study Design: A hospital based cross sectional study. A self-answered question was being used to know the detailed information regarding duration and types/forms of intake of tobacco, betel nuts and smoking. After collection of the data, pattern of these substance abuse was studied in relation to well differentiated squamous cell carcinoma (WDSCC), moderately differentiated squamous cell carcinoma (MDSCC) and poorly differentiated squamous cell carcinoma (PDSCC).

Study Duration: From January 2023 to October 2023

Place of Study: The study was conducted in the Department of Pathology in collaboration with the Department of Otorhinolaryngology, JMCH.

Sample Size: A total of 40 cases were collected for the study.

Study Population: Population residing in Assam.

Inclusion Criteria: All cases of histo-pathologically diagnosed oral and oropharyngeal SCC's.

Exclusion Criteria: Those who refrained from participation in the self answered question are.

Ethical Clearance: Clearance from the Institutional Ethics Committee of Jorhat Medical College and Hospital was taken for undertaking the study.

IEC approval number –SMEJ/JMCH/MEU/841/Pt-2/2011/960

Impact of the Study: This study has shown that longer the duration of these abusive substances, higher is the grade of the tumour.

RESULTS:

Gender Wise Distribution of OSCC and OPSCC Cases: Total 40 cases were collected, of which 30 were males and 10 were females **Table 1** and **Fig. 1**.

TABLE 1: GENDER WISE DISTRIBUTION OF OSCC AND OPSCC CASES

Gender	OSCC	OPSCC	Total
Male	27	03	30
Female	09	01	10
Total	36	04	40

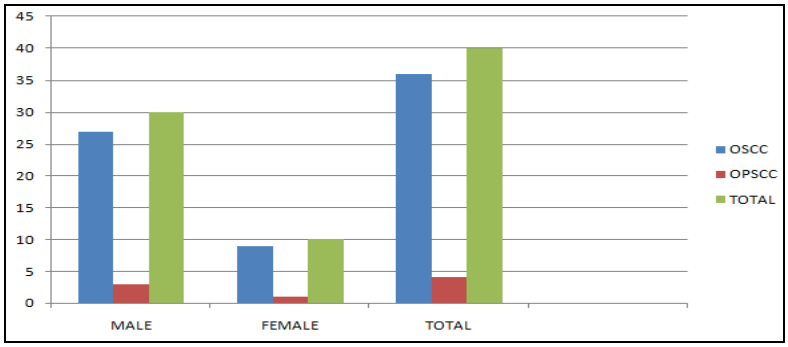

FIG. 1: GENDER WISE DISTRIBUTION OF OSCC AND OPSCC CASES

Gender Wise Distribution of Substance Abuse: Consumption of tobacco and betel nut was found to be on a higher side as compared to smoking with male predominance in all three types of abusive **Table 2** and **Fig. 2.**

TABLE 2: GENDER WISE DISTRIBUTION OF SUBSTANCE ABUSE

Substance Abuse	Male	Female	Total	Percentage
Tobacco	27	09	36	90
Betel Nut	26	10	36	90
Smoking	16	04	20	50

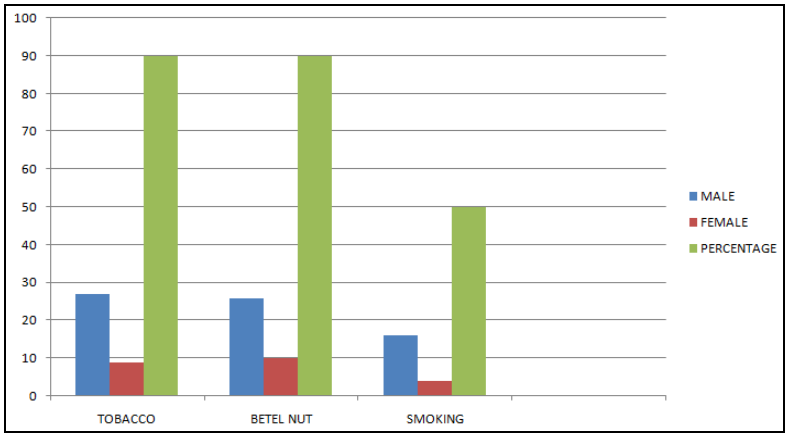

FIG. 2: GENDER WISE DISTRIBUTION OF SUBSTANCE ABUSE

Gender Wise Distribution of Variants of Betel Nuts: Different forms of betel nuts are further classified and their usage among the cases has been calculated **Table 3** and **Fig. 3.**

TABLE 3: GENDER WISE DISTRIBUTION OF VARIANTS OF BETEL NUTS

Betel Nut Variant	Male	Female	Total & Percentage
Dried Form	18	03	21 (58.3 %)
Raw Form	04	06	10 (27.8 %)
Panmasala	02	00	02 (5.5 %)
Gutkha	02	01	03 (8.3 %)
With Lime	16	07	23 (63.9 %)
Without Lime	10	03	13 (36.1%)

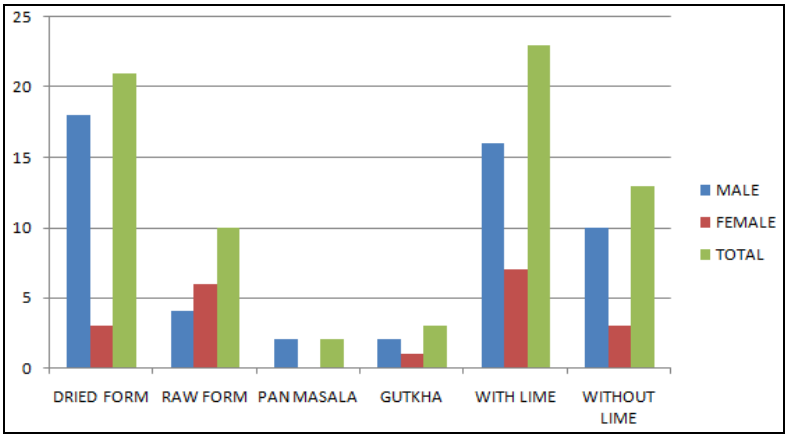

FIG. 3: GENDER WISE DISTRIBUTION OF VARIANTS OF BETEL NUTS

Gender Wise Distribution of Smoking Variants: Majority of cases were beedi smoker and only 50 % cases were smokers out of total 40 **Table 4** and **Fig. 4.**

TABLE 4: GENDER WISE DISTRIBUTION OF SMOKING VARIANTS

Smoking Variants	Male	Female	Total & Percentage
Beedis	13	03	16 (80 %)

Cigarettes	01	01	02 (10%)
Weeds	02	00	02 (10%)
Total	16	04	20

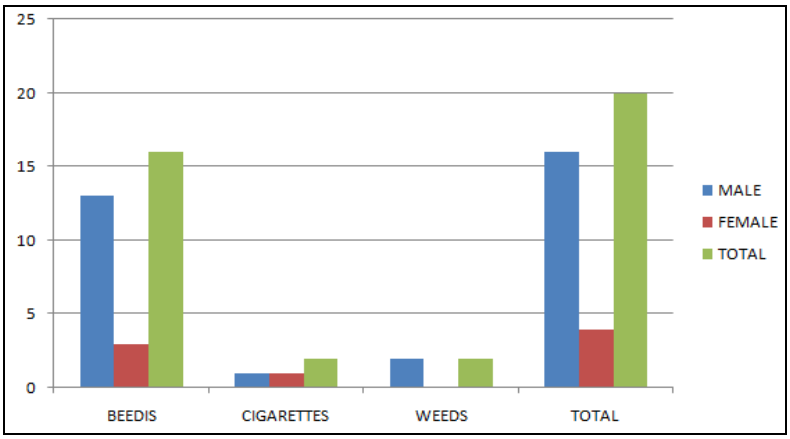

FIG. 4: GENDER WISE DISTRIBUTION OF SMOKING VARIANTS

Morphological Differentiation of SCC in Relation to Site: Study reveals that majority of SCC cases involved buccal mucosa followed by tongue. The least common site was found to be lip and alveolar ridges **Table 5** and **Fig. 5.**

TABLE 5: MORPHOLOGICAL DIFFERENTIATION OF SCC IN RELATION TO SITE

Site	WDSCC	MDSCC	PDSCC	Total
Buccal mucosa	11	07	00	18
Tongue	06	06	01	13
Alveolar Ridges	03	00	00	03
Lip	02	00	00	02
Tonsils	00	03	01	04
Total	22	16	02	40

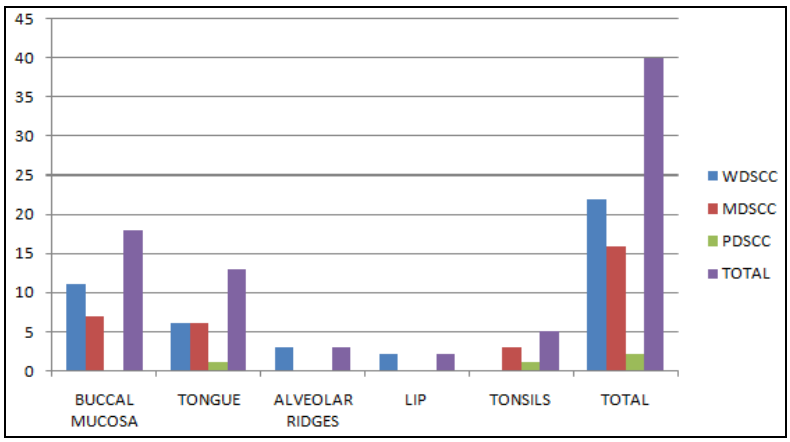

FIG. 5: MORPHOLOGICAL DIFFERENTIATION OF SCC IN RELATION TO SITE

Morphological Differentiation of SCC in Relation to Age: More than half of the cases were above 60 years of age with minimum cases below 40 years of age **Table 6** and **Fig. 6.**

TABLE 6: MORPHOLOGICAL DIFFERENTIATION OF SCC IN RELATION TO AGE

Age Group	WDSCC	MDSCC	PDSCC	Total
0-20	00	00	00	00
21-40	03	01	00	04
41-60	07	05	00	12
61-80	10	08	01	19
81 and Above	02	02	01	05
Total	22	16	02	40

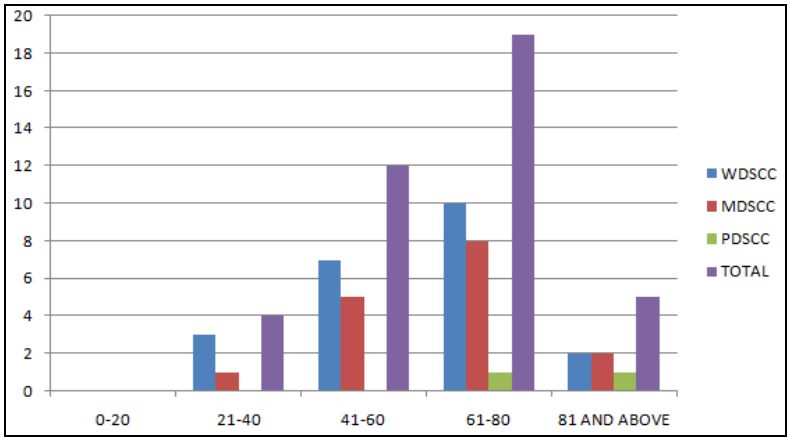

FIG. 6: MORPHOLOGICAL DIFFERENTIATION OF SCC IN RELATION TO AGE

Morphological Differentiation of SCC in Relation to Substance Abuse: Strong correlation between substance abuse and SCC differentiation has been illustrated **Table 7** and **Fig. 7.**

TABLE 7: MORPHOLOGICAL DIFFERENTIATION OF SCC IN RELATION TO SUBSTANCE ABUSE

SCC Differentiation	Tobacco	Betel Nut	Smoking
WDSCC	19 (86.3 %)	20 (90.9 %)	08 (36.3)
MDSCC	15 (93.7%)	14 (87.5%)	10 (62.5%)
PDSCC	02 (100 %)	02 (100 %)	02 (100 %)
Total	36	36	20

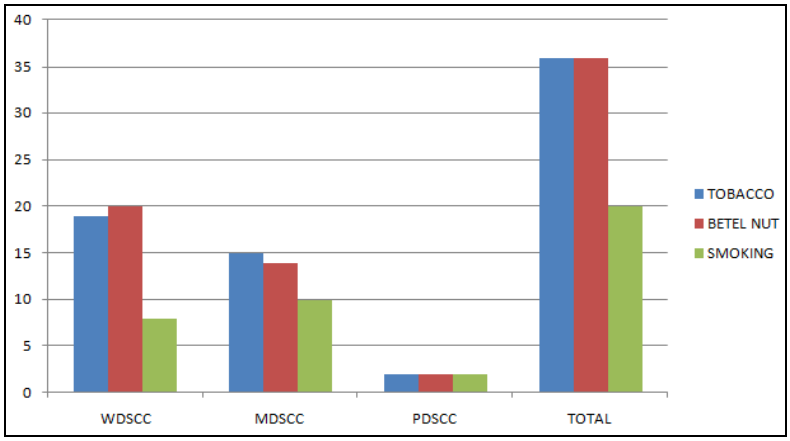

FIG. 7: MORPHOLOGICAL DIFFERENTIATION OF SCC IN RELATION TO SUBSTANCE ABUSE

Patterns of Substance Abuse in Relation to Grade of SCC: Comparison of different patterns of substance abuse in terms of per day use and years of use with SCC grade has been understood **Table 8.**

TABLE 8: PATTERNS OF SUBSTANCE ABUSE IN RELATION TO GRADE OF SCC

Number of Cases	Tobacco	Betel Nuts	Smoking	Grade of SCC
6	Yes, 2 Times/Day For 10 Years	Yes, 2 Times/Day For 10 Years	No	WDSCC
3	No	Yes, 3-4 Times/Day For 12 Years	No	WDSCC
5	Yes, 4 Times/Day For 15 Years	Yes, 4 Times/Day For 15 Years	Yes, 5 Times/Day For 15 Years	WDSCC
3	Yes, 5 Times/Day For 17 Years	No	Yes, 6 Times/Day For 17 Years	WDSCC
5	Yes, 7 Times/Day For 20 Years	Yes. 7 Times/Day For 20 Years	No	WDSCC
7	Yes, 4 Times/Day For 22 Years	Yes, 4 Times/Day For 22 Years	Yes, 5 Times/Day For 22 Years	MDSCC

1	No	Yes, 4 Times/Day For 25 Years	Yes, 5 Times/Day For 25 Years	MDSCC
1	Yes, 5 Times/Day For 26 Years	No	Yes, 6 Times/Day For 26 Years	MDSCC
1	Yes, 7 Times/Day For 28 Years	No	Yes, 7 Times/Day For 28 Years	MDSCC
4	Yes, 6 Times/Day For 30 Years	Yes, 6 Times/Day For 30 Years	No	MDSCC
2	Yes, 6 Times/Day For 34 Years	Yes, 4 Times/Day For 34 Years	No	MDSCC
1	Yes, 6 Times/Day For 42 Years	Yes, 6 Times/Day For 42 Years	Yes, 15 Times/Day For 42 Years	PDSCC
1	Yes, 8 Times/Day For 48 Years	Yes, 8 Times/Day For 48 Years	Yes, 10 Times/Day For 48 Years	PDSCC

FIG. 8: SHOWING DIFFERENT TYPES/ VARIANTS OF TOBACCO, BETEL NUT AND SMOKE ABUSE

Photomicrograph:

Well Differentiated SCC: Scanner view and high-power view of microscope showing well formed keratin pearls and tumour cells consistent with well differentiation as squamous cells **Fig. 9** and **Fig. 10** respectively.

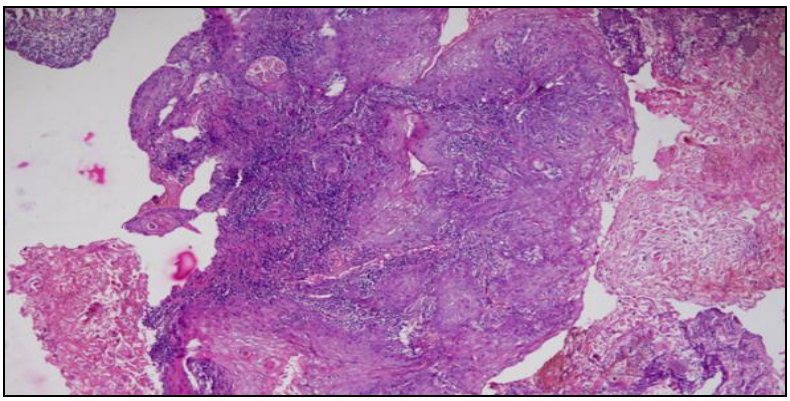

FIG. 9: HPE (4X) SHOWING FEATURES OF WELL DIFFERENTIATED SQUAMOUS CELL CARCINOMA

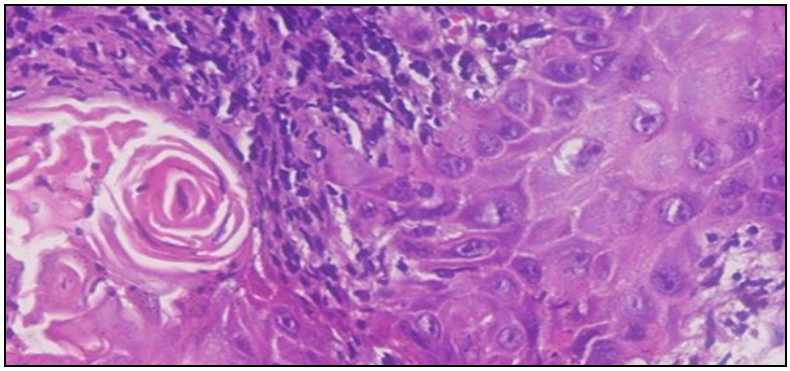

FIG. 10: HPE (40X) SHOWING FEATURES OF WELL DIFFERENTIATED SQUAMOUS CELL CARCINOMA

Moderately Differentiated SCC: Scanner view and high power view of microscope showing features consistent with SCC with moderate differentiation **Fig. 11 and Fig. 12** respectively.

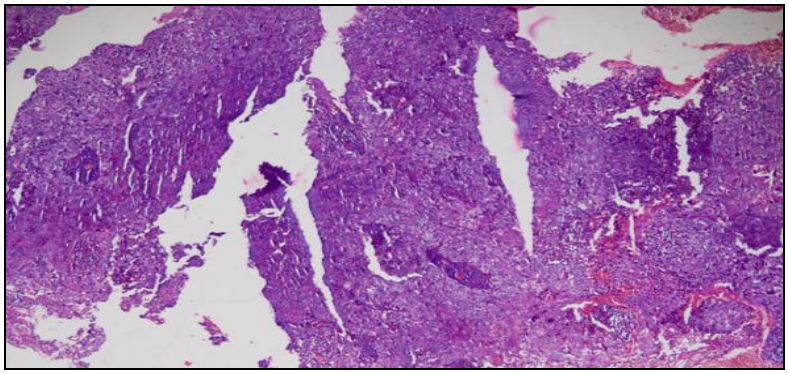

FIG. 11: HPE (4X) SHOWING FEATURES OF MODERATELY DIFFERENTIATED SQUAMOUS CELL CARCINOMA

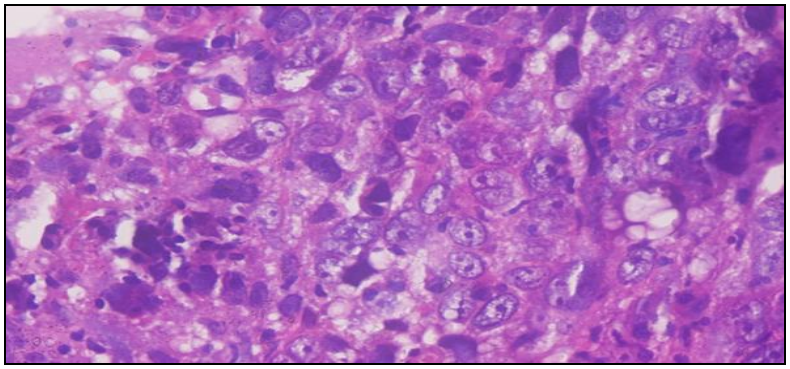

FIG. 12: HPE (40X) SHOWING FEATURES OF MODERATELY DIFFERENTIATED SQUAMOUS CELL CARCINOMA

Poorly Differentiated SCC: Scanner view and high-power view of microscope showing areas of extensive hemorrhage and necrosis along with poorly differentiated tumor cells consistent with poorly differentiated SCC **Fig. 13 and Fig. 14** respectively.

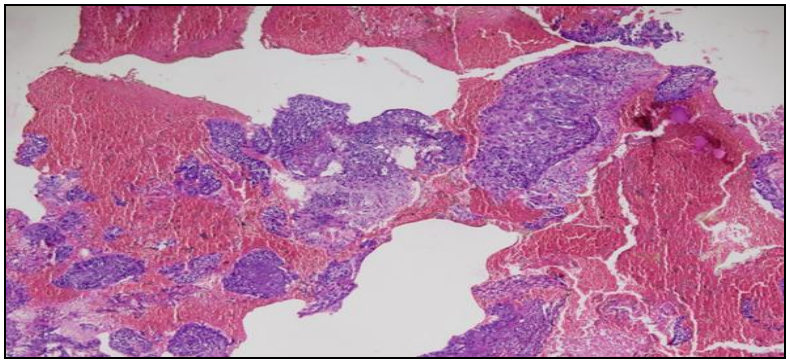

FIG. 13: HPE (4X) SHOWING FEATURES OF POORLY DIFFERENTIATED SQUAMOUS CELL CARCINOMA

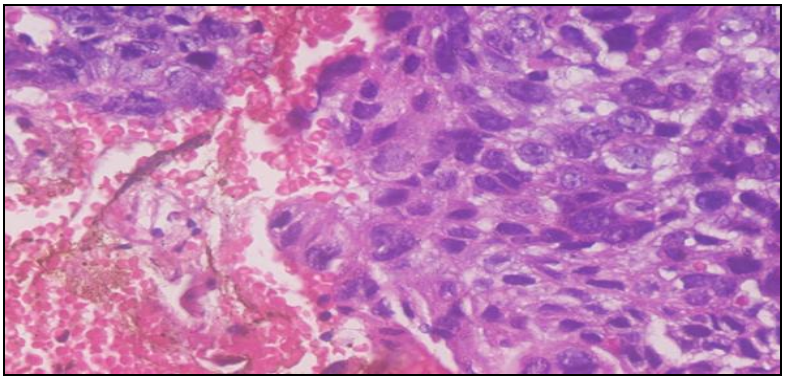

FIG. 14: HPE (40X) SHOWING FEATURES OF POORLY DIFFERENTIATED SQUAMOUS CELL CARCINOMA

DISCUSSION: 40 cases were studied of which 90% and 10% cases were OSCC and OPSCC respectively. Among 40 cases, male (75%) was the predominant population. Shashi P Tomar *et al.* in their study showed male was the predominant population too (59.04%) [3]. Present study shows Tobacco and betel nut association was present in (90%) cases as compared to smoking (50%). Shrabani Snigdha *et al.* through their study shows that tobacco and betel nut chewers were 74% whereas non-chewers were 26% [4]. In the present study, Smoking was more common (80%) in males as compared to females (40%). On the other hand, Betel nut consumption was more common (100%) in females as compared to males (86.67%). This is concurrent with the study done by Shashi P Tomar *et al.* where 5% male smoker was found as compared to 0% female smokers and 37.4% female tobacco chewers were found as compared to 34% male chewers [3].

Dried form of betel nut (58.3%) was the predominant variant overall. Addition was lime with betel nut (63.9%) was found to be highly associated with the causation of SCC's. Beauty Mahanta *et al.* in their study found that betel nut in dried form (54.9%) was more common than other forms [5]. As per site is concerned, Buccal mucosa was more commonly involved (42.5%) in both WDSCC and MDSCC as compared to tongue (32.5%) in this study. Sudhir M Naik *et al.* also presented a similar finding in their study which says 65.07% cases of buccal mucosa were found in contrast to 11.1% of tongue cases [6]. Most common age group to be involved was 61-80 years followed by 41-60 years. This is concurrent with the study done by Sudhir M Naik *et.al* which says most common mean age of oral cancer was found to be 61.67 years [6].

In the present study the average frequency of using tobacco and betel nuts was found to be 6 times per day which is concurrent with the study done by Madhusmita Panda *et al.* in 2020 which showed the average frequency of using these substances was 5 times per day [7].

CONCLUSION: The situation of substance abuse has gradually increased day by day due to the easy availability and cheapness of these products. There could be two ways to control it; one can be by restricting the sale of the products, other can be by creating health awareness about its dangerous effects on the health. In Assam, people are very much addicted to tobacco and betel nuts, so there is need to conduct effective interventions to control these carcinogens. Failure to do so can lead to continuous increase in cases of squamous cell carcinomas. With further implementation of educational institutions in tea tribes along with attention of parents, community, mass media including social media, a majority of population can be made aware of hazardous effects. Human papilloma virus testing after diagnosis of SCC would help in further management as it is another major etiological factor for SCC.

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CONFLICTS OF INTEREST: Nil

REFERENCES:

1. Chauhan R, Trivedi V, Rani R and Singh U: A Study of Head and Neck Cancer Patients with Reference to Tobacco Use, Gender and Subsite Distribution. South Asian J Cancer 2022; 11(1): 46-51. doi: 10.1055/s-0041-1740601. PMID: 35833037; PMCID: PMC9273320.
2. Kumar V, Abbas AK & Aster JC: (Eds.). (2018). Robbins basic pathology (10th ed).

3. Tomar SP, Kasar P, Tiwari R, Rajpoot S and Nayak S: Study of tobacco chewing and smoking pattern and its socio-demographic determinants in a Tribal Village in Mandla District, Madhya Pradesh. National Journal of Community Medicine 2016; 7(03): 204-7.
4. Snigdha S, Bajwa T, Anand S, Mohan L, Goyal K, Mittal M, Gupta KR, Wahlang J, Gupta RK and Diwan P: Cross-sectional study on prevalence of betel nut chewing among the youth of meghalaya, north east region of india: development of multifaceted prevention strategy. Asian Pac J Health Sci 2021; 8: 185-90.
5. Mahanta B, Phukan N, Mohapatra PK and Mahanta J: Betel nut chewing habit and its determinants among adolescent boys and girls in an industrial town of Assam, India. International Journal of Health Sciences and Research 2015.
6. Naik SM and Naik SS: A study of 63 cases of mouth neoplasms in arecanut growing belt of Sullia. Iranian Journal of Cancer Prevention 2012; 5(1): 39.
7. Panda M, Rai AK, Rahman T, Das A, Das R, Sarma A, Kataki AC and Chattopadhyay I: Alterations of salivary microbial community associated with oropharyngeal and hypopharyngeal squamous cell carcinoma patients. Archives of microbiology 2020; 202: 785-805.

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