



## Full Length Research Article

### PREVALENCE OF ORAL MUCOSAL LESIONS AND THEIR CORRELATION TO ADVERSE HABITS – A PILOT STUDY

\*Niha Naveed

Saveetha Dental College and Hospitals, Chennai, India

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#### ABSTRACT

**Background:** Oral habits refer to the overindulgence in and dependence on chemical substances mainly in the form of tobacco and alcohol leading to effects that are detrimental to the individual's physical and mental health. They have been positively associated with many oral lesions and conditions like leukoplakia, erythroplakia, tobacco pouch keratosis, oral submucous fibrosis etc., which may be potentially malignant. The reason to do this study is to help in public awareness about the ill effects of oral habits and to motivate them in overcoming their indulgence.

**Aim:** The aim of this study is to determine the prevalence of or different oral habits, habit related oral lesions and the association between them among the study population.

**Materials and Methods:** The study group comprised of 151 patients diagnosed with oral mucosal lesions and with positive history of oral habits. The study protocol included a visual oral soft tissue examination and a questionnaire-based interview. Based on the habits the study group was categorized into smokers, chewers and mixed (smoking+chewing) with alcohol as an adjunct. Data such as type of habit, quantity, duration etc., were also recorded. The data collected was tabulated and analysed for the correlation between them.

**Results:** The study comprised of 151 patients of which 71 were males (47%) and 80 were females (53%) in the age group 40-75 years. Data revealed that in the male population, the most common lesion was oral submucous fibrosis (29.6%) and in the female population it was tobacco pouch keratosis (30%). It was found that smoker's palate was the most common lesion seen in the smokers, leukoplakia was the most common lesion seen in the chewers, and oral sub mucous fibrosis was the most common lesion seen in patients reporting with a combination of all three habits.

**Conclusion:** The result of the present study provides information on the association of oral mucosal lesions in smokers, chewers and patients with mixed habits. The oral mucosal lesions encountered included a few potentially malignant conditions and oral carcinoma. Increase in the duration and frequency of habits were significant predictors of risk in the study population.

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#### INTRODUCTION

Oral malignancies collectively form the sixth most common type of cancer in the world (Parkin *et al.*, 2002). The Indian subcontinent has long been regarded as the epicentre of oral cancer around the globe and is recognised as a major health problem. It imposes a huge a burden in terms of diagnosis, survival and the use of already stretched out health care facilities in the course of treatment (Petersen, 2003) (Ferlay *et al.*, 2010). Epidemiological studies help in determining the incidence, prevalence and the severity of diseases. They also help in assessing the distribution, the risk factors and associated aetiology.

\*Corresponding author: Niha Naveed,  
Saveetha Dental College and Hospitals, Chennai, India.

This information is useful in the formulation of health care programmes at the primary level to spread awareness, help guide in early diagnosis and lead to prompt treatment (Mithra N. Hegde *et al.*, 2012). Dental professionals, in recent times, have become increasingly aware of the significance of oral mucosal lesions and the documented inclination of 'potentially malignant lesions' to lead to cancer. Tobacco and alcohol have long been recognised as risk factors in the development of oral malignancies (Jaber *et al.*, 1999; Moreno-Lopez *et al.*, 2000; Yen *et al.*, 2007). The type and location of the lesion varies with the type of tobacco used, the way it is used, and the frequency and duration of use (Daftary *et al.*, 1992). Consumption of tobacco & alcoholic beverages has become a common social habit all over world. In recent years, various commercial preparations known as **pan masala** and **gutkham**

Table 1.

Diagnosis	Gender					
	Male		Female		Total	
	N	%	N	%	N	%
Angular cheilitis	7	9.9	6	7.5	13	8.6
Erythroplakia	8	11.3	5	6.3	13	8.6
Leukoerythroplakia	7	9.9	4	5.0	11	7.3
Leukoplakia	12	16.9	23	28.7	35	23.2
Necrotising sialometaplasia	1	1.4	0	.0	1	.7
Oral Ca	3	4.2	1	1.3	4	2.6
OSMF	21	29.6	8	10.0	29	19.2
Smokers palate	11	15.5	9	11.3	20	13.2
Tobacco pouch keratosis	1	1.4	24	30.0	25	16.6
Total	71	100.0	80	100.0	151	100.0

Chi-Square Test	Value	P-Value
Fisher's Exact Test	36.991	<0.001

Table 2.

Diagnosis	Habit													
	Smoking only		Chewing only		Smoking & Chewing		Chewing & Alcohol		Smoking & Alcohol		All three		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Angular cheilitis	5	21.7	3	5.1	3	8.6	0	.0	2	9.5	0	.0	13	8.6
Erythroplakia	4	17.4	4	6.8	2	5.7	1	12.5	1	4.8	1	20.0	13	8.6
Leukoerythroplakia	2	8.7	6	10.2	1	2.9	1	12.5	1	4.8	0	.0	11	7.3
Leukoplakia	3	13.0	25	42.4	0	.0	3	37.5	4	19.0	0	.0	35	23.2
Necrotising sialometaplasia	0	.0	0	.0	1	2.9	0	.0	0	.0	0	.0	1	.7
Oral Ca	0	.0	0	.0	2	5.7	1	12.5	0	.0	1	20.0	4	2.6
OSMF	0	.0	4	6.8	15	42.9	1	12.5	6	28.6	3	60.0	29	19.2
Smokers palate	9	39.1	0	.0	4	11.4	0	.0	7	33.3	0	.0	20	13.2
Tobacco pouch keratosis	0	.0	17	28.8	7	20.0	1	12.5	0	.0	0	.0	25	16.6
Total	23	100.0	59	100.0	35	100.0	8	100.0	21	100.0	5	100.0	151	100.0

have become available in India and in many parts of Asia. Many brands of these products contain areca nut and tobacco, both of which have been implicated in occurrence of oral cancer. They have been positively associated with many oral lesions & conditions of which many are potentially malignant. The investigators have also observed that smoking and chewing of tobacco and betel quid act synergistically in oral carcinogenesis and that persons with mixed habits form a substantially high-risk population (Ko *et al.*, 1995). Tobacco is mostly used in India in the form of cigarette, cigar or pipe smoking. Other forms of tobacco use are in the form of snuff dipping & tobacco chewing (betel quid, gutkha) (Saraswathi *et al.*, 2006). Tobacco and alcohol use has been estimated to account for 50% of SCC (squamous cell carcinoma) (Massano *et al.*, 2006; Simi *et al.*, 2013). In comparison to western populations, in which oral cancer represents about 3% of malignancies, it accounts for over 30% of all cancers in India; this difference can be attributed to regional variation in the prevalence and pattern of habits (Dangi *et al.*, 2012). Thus this paper aims to evaluate the prevalence of oral mucosal lesions in Chennai, Tamil Nadu, and to correlate the findings with habits of consuming tobacco and alcohol in the population.

## MATERIALS AND METHODS

The study group comprised of 151 patients diagnosed with oral mucosal lesions and with positive history of oral habits. Diagnoses were based on history, clinical examination findings, laboratory tests results and histopathological findings, where appropriate. The clinical diagnosis was established based on the criteria as provided by the epidemiology guide for the diagnosis of oral mucosal diseases (WHO). Informed consent was obtained from all patients prior to the interview and examination. The study protocol included a visual oral soft tissue examination and a questionnaire-based

interview. Permission was obtained from the Institutional Ethical Committee before starting the study. Based on the habits the study group was categorized into smokers, chewers and mixed (smoking+chewing) with alcohol consumption as an adjunct. Smokers were categorized as those who practise reverse smoking or regular smoking. Details of the habit such as number of cigarettes smoked daily, the duration of smoking and previous successful attempts to quit were recorded. In chewers, details like the duration and frequency of the habit, and also the site of placement of quid in the oral cavity were recorded. The frequency and duration of alcohol consumers were also recorded. The responses of the patient were tabulated for analysis of the correlation between the oral mucosal lesions and associated adverse habits.

## RESULTS

Data collected were analyzed, and results showed the following observation. The study population comprised of 71 males (47%) and 80 females (53%) unlike other studies (which should a higher male proportion) and were of the age group 40 to 75 years. Table 1 shows the prevalence of habits according to gender. If  $P < 0.05$ , then it is considered to be statistically significant. The difference in the pattern of habits in the two genders were found to be highly significant ( $P < 0.001$ ). Chi-square test was subjected to the data and the Fisher's exact test showed statistical significance. Data revealed that in the male population, the most common lesion was oral submucous fibrosis (29.6%) followed by leukoplakia (16.9%) and smokers palate (15.5%) (Figure 1). In the female population, it was found that there was a high incidence of tobacco pouch keratosis (30%) closely followed by leukoplakia (28.7%) (Figure 2). Irrespective of the gender, leukoplakia was found to be the most common oral mucosal lesion (23.2%) followed by oral submucous fibrosis (19.2%). A total of four patients

(2.6%) were diagnosed with oral cancer of which three were males and one was female.

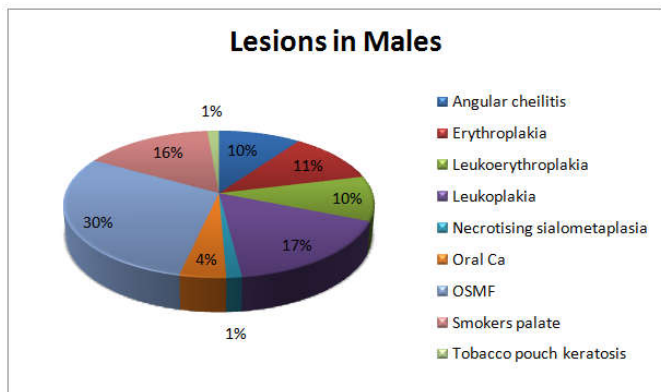


Figure 1.

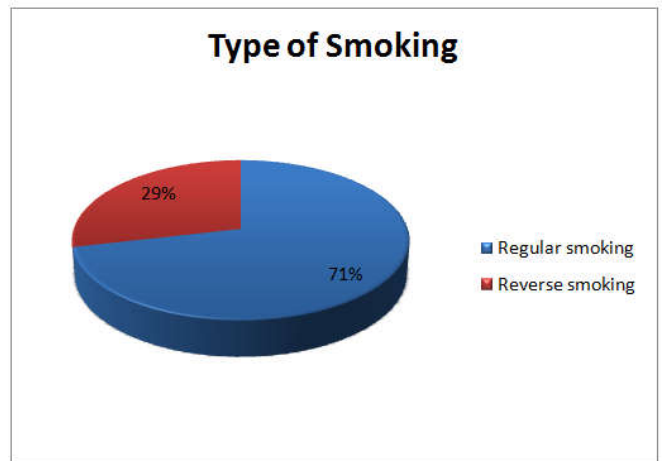


Figure 4.

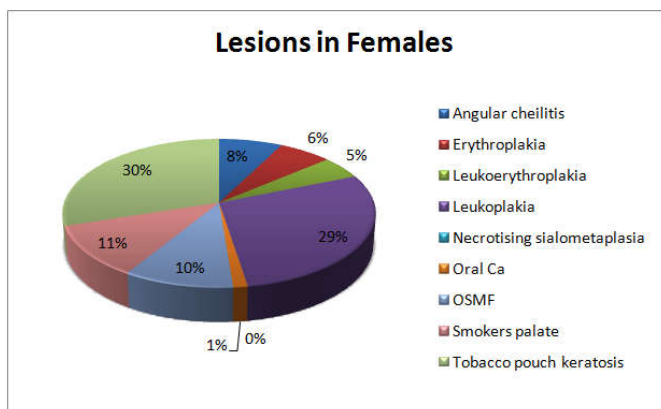


Figure 2.

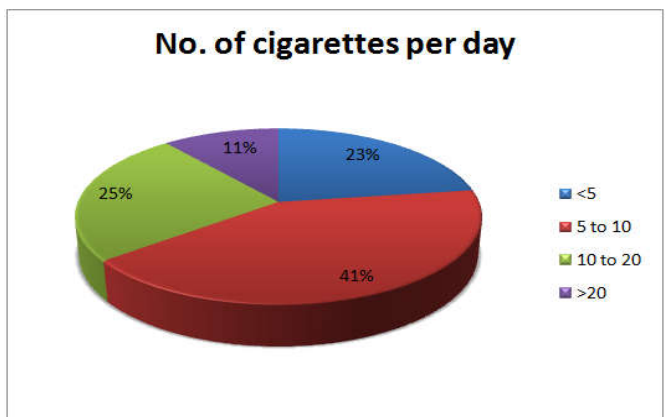


Figure 5.

**Smokers**

Out of the 151 patients included in the study, 84 patients (55.6%) reported with the habit of smoking with or without other adverse habits (Figure 3). Males were more predominant in this group (71.1%) compared to the female population. Of these, 60 patients (71.4%) practised regular smoking, while 24 (28.6%) of them practised reverse smoking (Figure 4). Regular smoking was common in males while the population of reverse smokers were predominantly females. Data about the number of cigarettes smoked per day showed that 19 of them (22.6%) smoked >5 cigarettes per day, 35 of them (41.7%) smoked 5-10 cigarettes per day, 21 of them (25%) smoked 10-20 cigarettes per day and 9 of them (10.7%) smoked >20 cigarettes per day (Figure 5).

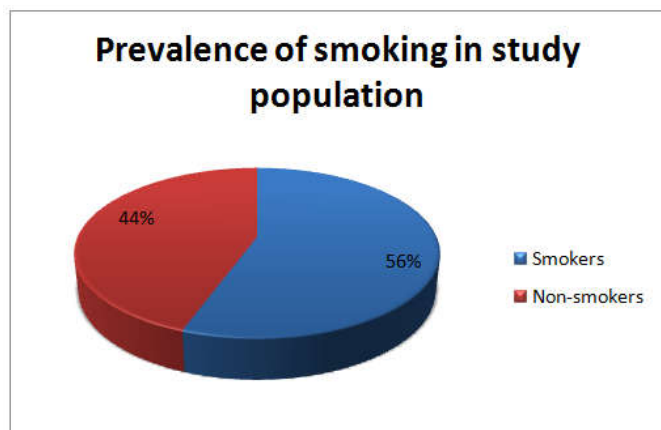


Figure 3.

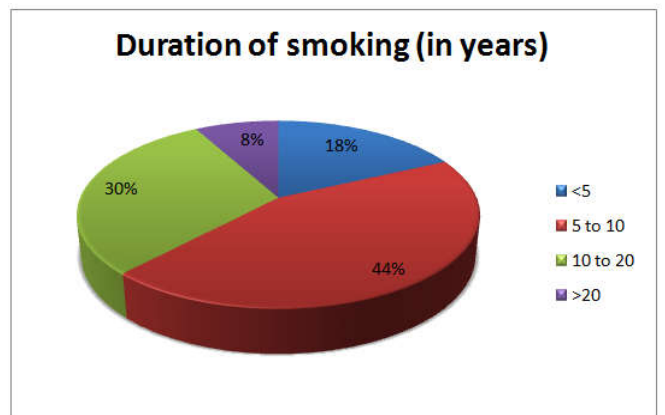


Figure 6.

Data also revealed that 15 patients (17.9%) have been smoking for <5 years, 37 patients (44%) have been smoking from 5-10 years, 25 patients (29.8%) have been smoking from 10-20 years and 7 patients (8.3%) have been smoking from >20 years (Figure 6). When enquired about previous successful attempts of quitting, only 28 patients (33.3%) reported with a positive response, while the remaining 56 patients (66.7%) showed no willingness to quit.

**Chewers**

According to our study, 107 patients (70.8%) reported with the habit of chewing smokeless tobacco products like betel quid,

gutkha etc., which was more than the incidence of smoking habit (Figure 7). This group may or may not be accompanied with other adverse habits. It was found that this group predominantly comprised of the female population (65.1%). The data revealing the quantity (no. of packets) used by the chewers per day showed that 16 of them (15%) chewed <3 packets per day, 28 of them (26.2%) chewed 3-6 packets per day, 38 of them (35.5%) chewed 6-9 packets per day and 25 of them (23.4%) chewed >9 packets per day (Figure 8). According to the duration of the habit, 10 of them (9.3%) were chewers for <5 years, 29 of them (27%) for 5-10 years, 39 of them (36.4%) for 10-20 years and 29 of them (27%) for >20 years (Figure 9). The study also showed that 69 members (64.9%) placed the quid behind the cheek (buccal site), 16 members (14.9%) behind the lip (labial site), while 22 members (20.2%) placed it under the tongue (lingual site) (Figure 10).

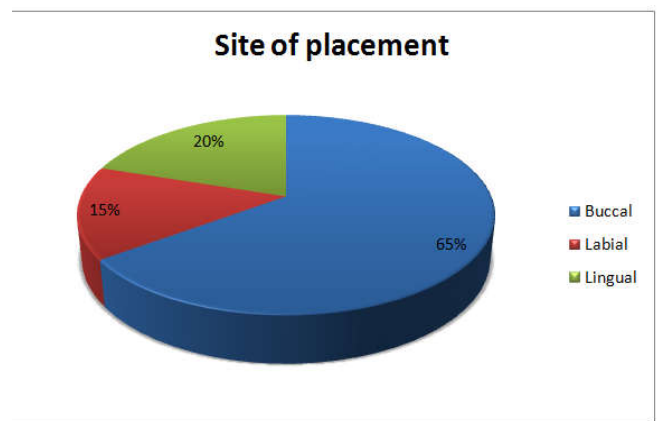


Figure 10.

**Alcohol Consumers**

The study population consisted of 34 alcohol consumers (22.5%), all of which were males (Figure 11). According to data, 7 males (20.6%) reported to drink almost daily, 10 males (29.4%) to drink almost weekly, 11 males (32.4%) to drink monthly and 6 males (17.6%) to drink occasionally (Figure 12). The group also comprised of 3 members (8.8%) who have been drinking for <5 years, 10 members (29.4%) for 5-10 years, 11 members (32.4%) for 10-20 years and 10 members (29.4%) for >20 years (Figure 13).

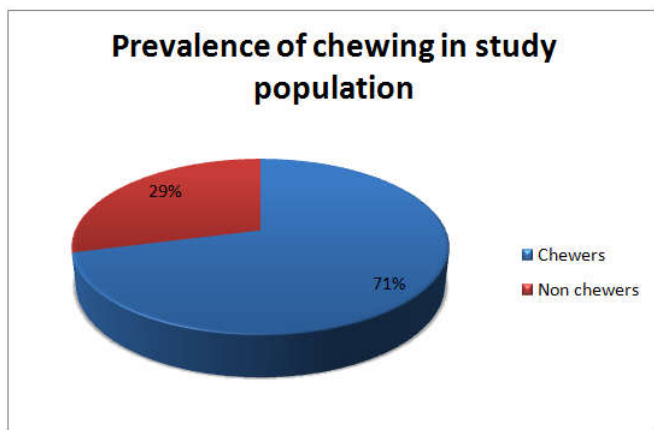


Figure 7.

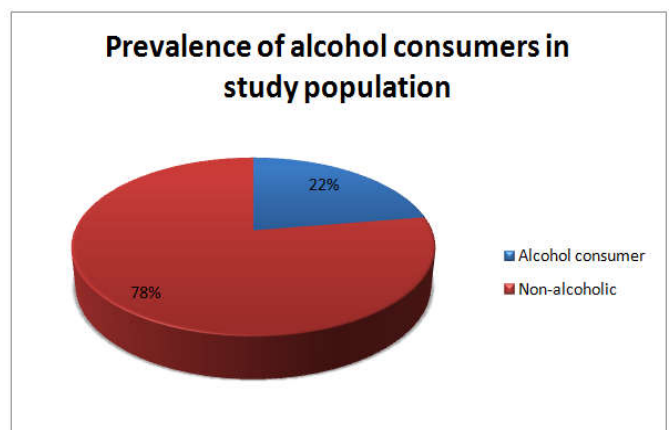


Figure 11.

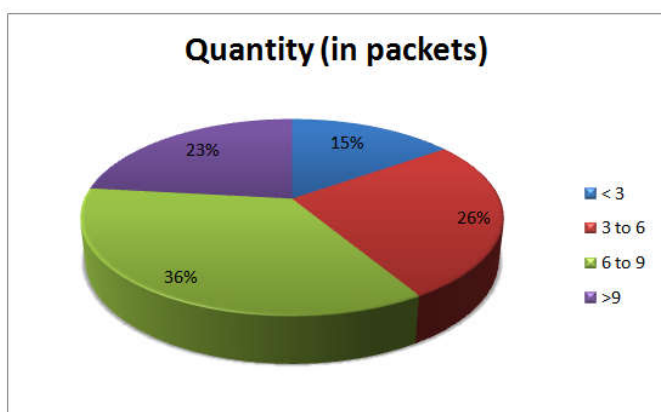


Figure 8.

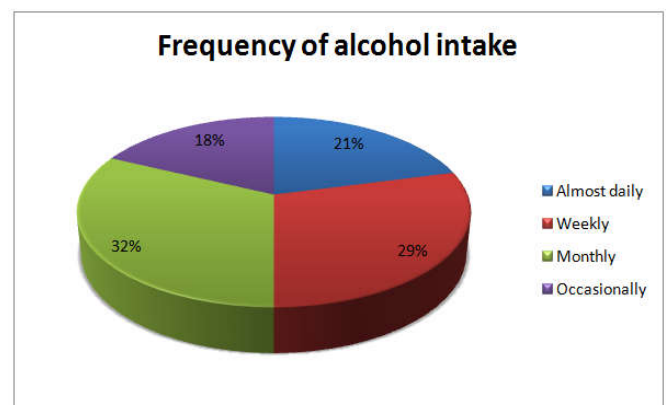


Figure 12.

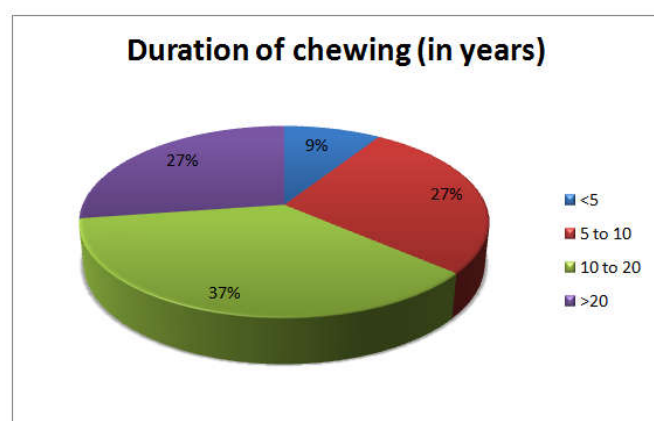


Figure 9.

The study population was further divided into patients with habit of only smoking, only chewing; smoking and chewing; smoking and alcohol; chewing and alcohol; and smoking, chewing and alcohol (Table 2).

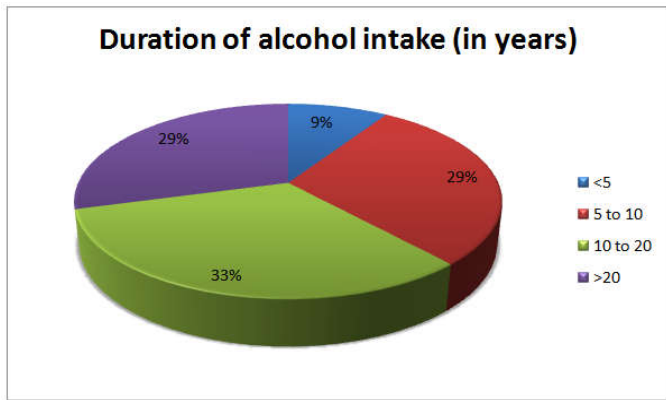


Figure 13.

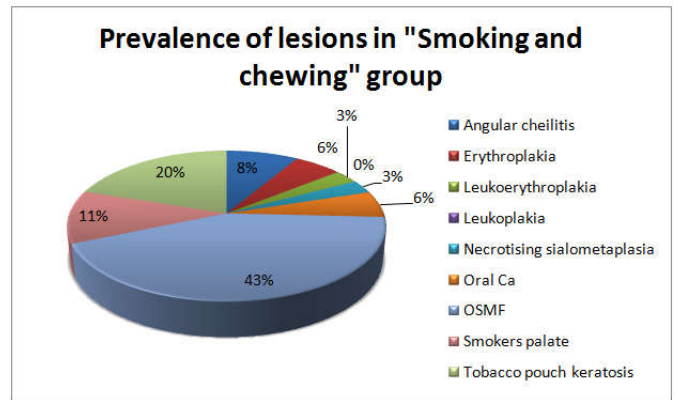


Figure 16.

Alcohol is considered to be an adjunct to smoking and chewing, and patients who presented with only the habit of alcohol consumption and no other habit were excluded from the study. Table 2 shows the correlation between the adverse habits and the prevalence of oral mucosal lesions. It was found that smoker's palate was the most common lesion seen in the smokers, leukoplakia was the most common lesion seen in the chewers, and oral sub mucous fibrosis was the most common lesion seen in patients reporting with a combination of all three habits (Figure 14) (Figure 15) (Figure16) (Figure 17) (Figure 18) (Figure 19).

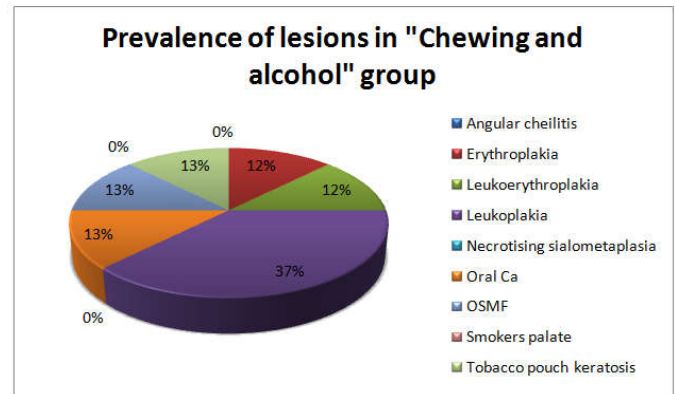


Figure 17.

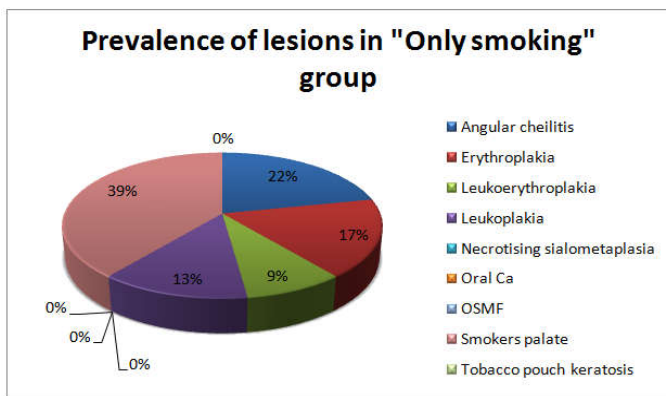


Figure 14.

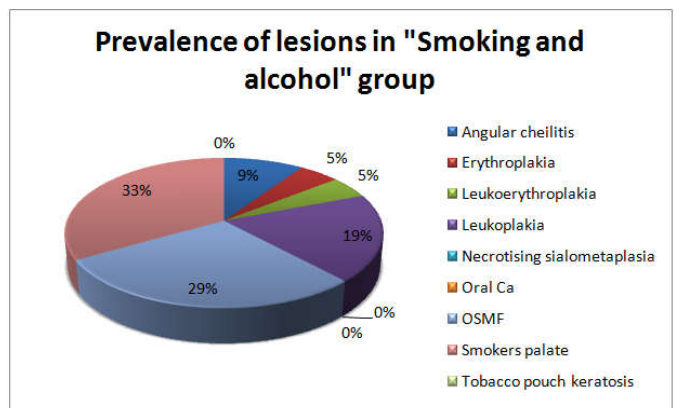


Figure 18.

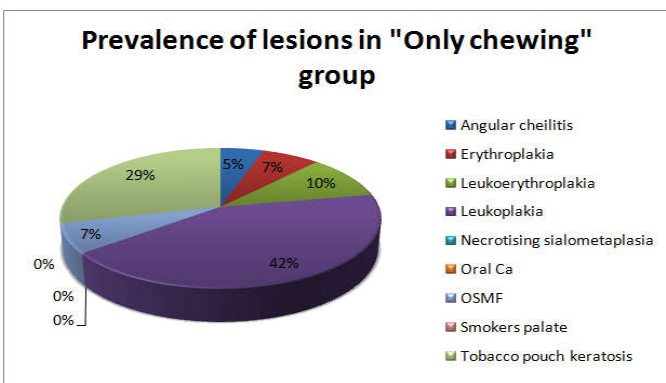


Figure 15.

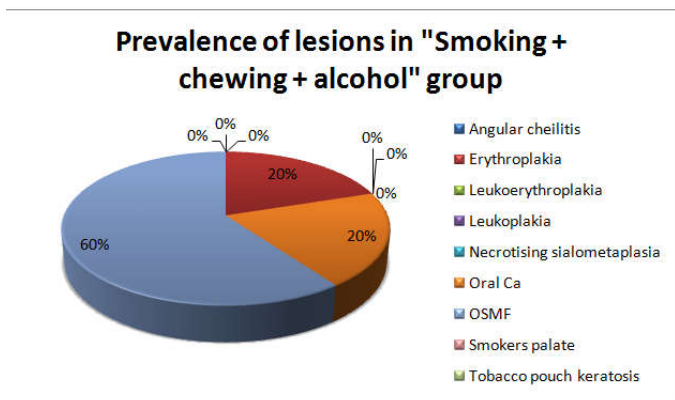


Figure 19.

**DISCUSSION**

In India, there are 240 million tobacco users (195 million men and 45 million women), accounting for one-fifth of the world's tobacco consuming population (Reddy and Gupta, 2004). Today, our universe is in a state of tobacco epidemic with a larger population of tobacco users emerging day by day.

In our country, various forms of smoking and chewing tobacco are practiced by the people. Most common form is bidi and cigarette followed by cherrut or chutta, chillum hukli and

hukkah which is rare (Mehta *et al.*, 2003). Bidi smoking is predominant in many parts of Rural India. When compared to cigarettes, bidis produce only a smaller volume of smoke. But the smoke which is generated is rich in higher concentrations of several toxic agents such as hydrogen cyanide, carbon monoxide, ammonia, and carcinogenic hydrocarbons. Bidi smoking is also considered to cause about 2-3 times greater nicotine and tar inhalation than conventional cigarettes (Hrywna *et al.*, 2004). Smokeless tobacco products contain a large array of carcinogens although the actual number found is fewer than in cigarette smoke. Benzopyrene and other polycyclic aromatic carcinogens (PAHs) are the most important carcinogenic agents in cigarette smoke but in unburnt tobacco, nitrosamines are the strongest carcinogens (KAAS Warnakulasuriya and Ralhan, 2007; Rana *et al.*, 2009). Among the subjects screened in the study, 55.6% gave the history of smoking and in them, 71.1% were males which supports study conducted by Colombo *et al.* 2002 (Colombo *et al.*, 2001). In our study, 70.8% of the study population had smokeless tobacco habit and among which 65.1% were females which is comparatively higher than smoking habit as women in many rural areas believe that tobacco has many magical and medicinal properties in keeping the mouth clean, getting rid of a foul smell, curing toothache, controlling morning sickness, during labor pains, etc., and among these many of them gave the history of eating supari (plain areca nut) followed by gutka which is almost similar with a study done by Summers *et al.* in 1994 (Summers *et al.*, 1994).

The outcome of the study shows that men have a high frequency of oral submucous fibrosis while women have high frequency of tobacco pouch keratosis. This attributes to the consumption of alcohol along with use of tobacco by men and the relative increased use of smokeless tobacco by women succumbing to the social taboo in India. The significant high incidence of leukoplakia in the population as a whole attributes to the ease of availability and accessibility of tobacco and tobacco products. Also signifying the effect of the social taboo is the increase in reverse smoking in females. The study showed that most people smoked 5-10 cigarettes per day and the highest frequency of duration was 5 to 10 years, signifying the high incidence of leukoplakia among the population. The results of this study have shown more incidence of chewing (70%) than smoking (55%), this can be attributed to the more number of females in the study population. The highest frequency of chewing was 3 to 6 packets per day and duration was 10 to 20 years. The results are suggestive of the high incidence of tobacco pouch keratosis among the study population.

Alcohol consumption being an adjunct has significantly contributed to the results and has been more common in men which may be due to occupations that require a substantial amount of physical energy as well as due to underreporting of the subjects about the habit. Our findings coincide with the study of Aruna *et al.* (2011) but contrary to the study done by Saraswathi *et al.* (2006). This corresponds to the increase incidence of OSMF among men which is in accordance with a study done by Tang *et al.* (1997) Multiple habit reported by the patient in the present study was 3.3% and these had negligible lesions when compared with single habit subjects with all being males and the possible reason being reduced time of contact or exposure to each individual habit which is supported by a study done Sujatha *et al.*, 2012. But the exact reason behind this has not yet been confirmed.

The results of our study concluded that smoker's palate was the most common lesion seen in the smokers, leukoplakia was the most common lesion seen in the chewers, and oral submucous fibrosis was the most common lesion seen in patients reporting with a combination of all three habits.

## Conclusion

The result of the present study provides information on the association of oral mucosal lesions in smokers, chewers and patients with mixed habits. This study highlighted 9 habit related mucosal lesions of the oral cavity which included a few potentially malignant conditions and oral squamous cell carcinoma. The premalignant lesions as a result of such adverse habits have high likelihood of malignant transformation. Therefore, intervention programs to discourage the use of risky habits should be a public health priority. Future case-control or cohort studies for individual lesions and with larger sample size are necessary to evaluate the risk for oral mucosal lesions including potentially malignant conditions and oral cancer resulting from smoking and chewing habits.

## REFERENCES

- Aruna, D.S., Prasad, K.V., Shavi, G.R., Ariga, J., Rajesh, G. and Krishna, M. 2011. Retrospective study on risk habits among oral cancer patients in Karnataka Cancer Therapy and Research Institute, Hubli, India. *Asian Pac J Cancer Prev.*, 12:1561-6.
- Colombo, P., Scarpino, V., Zuccaro, P., Apolone, G., Gallus, S. and La Vecchia, C. 2002. Smoking in Italian women and men, 2001. *Tumori*, 88:10-2.
- Daftary, D.K., Murti, P.R., Bhonsle, R.B., Gupta, P.C., Mehta, F.S. and Pindborg, J.J. Oxford: Oxford Medical Publications; 1992. Oral precancerous lesions and conditions of tropical interest. In: Prabhu SR, Wilson DF, Daftary DK, Johnson NW, (eds). *Oral diseases in the tropics*; pp. 402-28.
- Dangi, J., Kinnunen, T.H. and Zavras, A.I. 2012. Challenges in global improvement of oral cancer outcomes: Findings from rural Northern India. *Tob Induc Dis.* 10:5.
- Ferlay, J., Shin, H.R., Bray, F., Forman, D., Mathers, C. and Parkin, D.M. 2010. GLOBOCAN 2008 v2.0, Cancer incidence and mortality worldwide: IARC Cancer Base No. 10 (Internet). Lyon, France: International Agency for Research on Cancer; 2010.
- Hrywna, M., Delnevo, C.D., Pevzner, E.S. and Abatemarco, D.J. 2004. Correlates of bidi use among youth. *Am J Health Behav.*, 28:173-9.
- Jaber, M.A. 1999. Porter SR, Gilthorpe. Risk factors for oral epithelial dysplasia the role of smoking and alcohol. *Oral Oncology*, 35:151-6.
- KAAS Warnakulasuriya and Ralhan, R. 2007. Clinical, pathological, cellular and molecular lesions caused by oral smokeless tobacco-A Review. *J. Oral Pathol Med.* 36:63-77.
- Ko, Y.C., Huang, Y.L., Lee, C.H., Chen, M.J., Lin, L.M. and Tsai, C.C. 1995. Betel quid chewing, cigarette smoking and alcohol consumption related to oral cancer in Taiwan. *J Oral Pathol Med.*, 24:450-3.
- Massano, J., Regateiro, F.S., Januário, G. and Ferreira, A. 2006. Oral squamous cell carcinoma: Review of Prognostic and predictive factors. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* Jul 2006;102 (1): 67 – 76.

- Mehta, F.S. and Hammer, J.E. 2003. Tobacco-related Oral Mucosal Lesions and Conditions in India. India: *WHO*, p. 1-890.
- Mithra N. Hegde , Radhika Jain & Ashwitha Punja, 2012. Prevalence of Oral Mucosal Lesions and Their Co - Relation to habits in patients visiting a dental School of South Karnataka : A cross sectional survey- 2012; NUJHS Vol. 4, No.4, December 2014, ISSN 2249-7110
- Moreno-Lopez, L.A., Esparza-Gomez, G.C. and Gonzalez-Navarro, A. 2000. Risk of oral cancer associated with tobacco smoking, alcohol consumption and oral hygiene: a case- control study in Madrid, Spain. *Oral Oncol*, 36:170-4.
- Parkin, D.M., Bray, F., Ferlay, J. and Pisani, P. 2005 Global cancer statistics, 2002. CA: Cancer Journal for Clinicians 2005; 55 (2):74-108.
- Petersen, P.E. 2003. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century – the approach of theWHO Global Oral Health Programme. *Community Dent Oral Epidemiol*, 31:3–23.
- Rana, Z.A., Khoso, N.A., Bajaj, D.R. and Arshad, O. 2009. Risk factors for Precancerous lesions of Oral mucosa. *Ann Pak Inst Med Sci*. 5(4):220–23.
- Reddy, K.S. and Gupta, P.C. 2004. Report on Tobacco Control in India. India: Ministry of Health and Family Welfare, Government of India; p. 1633-7.
- Saraswathi, T.R., Ranganathan, K., Shanmugam, S., Sowmya, R., Narasimhan, P.D. and Gunaseelan, R. 2006. Prevalence of oral lesions in relation to habits: Cross-sectional study in South India. *Indian J Dent Res*, 17:121-5.
- Saraswathi, T.R., Ranganathan, K., Shanmugam, S., Sowmya, R., Prem Deepa Narasimhan, and Gunaseelan, R. 2006. Prevalence of oral lesions in relation to habits: a cross sectional study in South India. *Ind J Dent Res*, 17(3): 121 - 125.
- Simi, S.M., Nandakumar, G. and Anish, T.S. 2013. White Lesions in the Oral Cavity: A Clinico pathological Study from a Tertiary Care Dermatology Centre in Kerala, India. *Indian J Dermatol*. 2013 Jul-Aug; 58(4): 269–274.
- Sujatha, D., Hebbar, P.B. and Pai, A. 2012. Prevalence and correlation of oral lesions among tobacco smokers, tobacco chewers, areca nut and alcohol users. *Asian Pac J Cancer Prev*, 13:1633-7.
- Summers, R.M., Williams, S.A. and Curzon, M.E. 1994. The use of tobacco and betel quid ('pan') among Bangladeshi women in West Yorkshire. *Community Dent Health*, 11:12-6.
- Tang, J.G., Jian, X.F., Gao, M.L., Ling, T.Y. and Zhang, K.H. 1997. Epidemiological survey of oral submucous fibrosis in Xiangtan City, Hunan Province, China. *Community Dent Oral Epidemiol.*, 25:177-80.
- Yen, A.M., Chen, S.C. and Chen, T.H. 2007. Dose-response relationships of oral habit associated with the risk of oral pre-malignant lesions among men who chew betel quid. *Oral Oncology*, 43:634-8.

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