



## Prevalence of habit associated oral mucosal lesions among the outpatients - A prospective cross sectional study

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### Abstract:

**Introduction:** To determine the prevalence of different oral habits, habit related oral lesions and association between them among the study population. **Materials and Methods:** The study group comprised of 2,161 patients with positive history of oral habits. Associations between the lesions with various age groups, gender, education levels, number of habits, type of habits and duration of habits was estimated. **Results:** Prevalence of oral habits was 17.54%. Indulgence in habit was seen more among males between age group 26-55yrs and most of them had education above high school level. Smoking (51.9%) was most common oral habit, followed by chewing tobacco (47.52%), consuming alcohol (29.7%) and chewing pan without tobacco (16.7%). Tobacco chewing was more common single habit. Prevalence of oral mucosal lesions was 46.1%. Reactive lesions (55.41%) were the most common followed by premalignant lesions/conditions (27.67%), malignant lesions (12.40%) and other lesions (4.49%). Reactive lesions were more common among smokers (68.98%) and alcoholics (40.03%). Premalignant (31.46%), malignant (12.08%) and other lesions (3.99%) were more common among tobacco chewers. Chronicity and increase in number of habits was associated with increase in number of lesions. **Conclusion:** Oral mucosal lesions were observed in almost half of the subjects with oral habits. Pre malignant and malignant lesions were more commonly associated with tobacco chewing habit. Number of oral mucosal lesions increased with the number of oral habits and with duration of indulgence. This study helps in public awareness about the ill effects of oral habits and may motivate them in overcoming their indulgence.

**Key words:** Alcohol; Oral Premalignant Lesions; Oral Cancer; Tobacco chewing; Smoking.

### Introduction

Oral habit refers to overindulgence in and dependence on chemical substances mainly in the form of tobacco & alcohol leading to effects that are detrimental to the individual's physical and mental

health. Consumption of tobacco & alcoholic beverages has become common social habits all over world. 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). They have been positively associated with many oral lesions & conditions like leukoplakia, erythroplakia, tobacco pouch keratosis, lichen planus, lichenoid reactions, oral submucous fibrosis etc, of which many are potentially malignant [1,2]. Tobacco and alcohol use has been estimated to account for 50% of SCC (squamous cell carcinoma) and 30% of world - wide cancer burden [3,4].

To the best of our knowledge no study to find out the prevalence of oral habit associated oral mucosal lesions has been conducted in this part of the country with huge sample size. Hence this cross - sectional study was carried out for one year at Manipal College of Dental Sciences, Manipal.

## Materials and Methods

Institutional Ethical Committee approval was obtained at the start of the study. All the patients attending the diagnosis section of Oral Medicine department were enquired about past or present history of oral habits and those with positive history were included in the study. A specially designed proforma was used to record the demographic data and details about the oral habit (type, frequency, duration, location of quid placement in case of smokeless tobacco etc). Subjects were categorized based on their age and education level as shown in **Table 1**.

Oral habits were classified as 1.Smoking, 2.Pan chewing with tobacco, 3.Pan chewing without tobacco, 4.Alcohol drinking and 5.Combination of above. Patients were classified based on number of habits and duration of habits as shown in **Table 1**.

A thorough clinical examination of the oral cavity was performed by trained observers to identify the habit associated lesions and they were diagnosed based on the knowledge of appearance of the lesions. To calculate the comorbidities of lesions, they were classified as 1.Reactive lesions, 2.Premalignant lesions/conditions (Fig 1- a, b, c), 3.Malignant condition (Fig 2 – a, b, c), and 4.Other lesions. Biopsy was carried out whenever necessary after obtaining patient's consent. All the findings and histopathological diagnosis were recorded in the proforma.

## Results

Data was entered and analysed using Statistical Package for Social Services (SPSS) software, version 11.5. Descriptive statistics were presented for all variables. Pearson's Chi-Square test was performed to determine the significance of associations between the lesions with various age groups, gender, education levels, number of habits, type of habits and duration of

habits. P - value of  $\leq 0.05$  was considered to be statistically significant.

Among the 12,318 patients visiting the outpatient department 2,161 reported oral habits (17.54%). There were more men with habits (1,947) than women (214), with ratio being 9:1. Indulgence in habits was seen more among the subjects (70%) with age group between 26 - 55 yrs. About two third (67.3%) of patients with oral habits had education above high school level.

### 1. Prevalence of oral habits (Table 2, 3) –

Smoking was the most common habit (51.9%), followed by chewing tobacco (47.52%), consuming alcohol (29.7%) and chewing pan without tobacco (16.7%). Among the study subjects 63.2% had single habit, 29% had two habits and 7.8% had more than two habits. Tobacco chewing (40.73%) was the most common single habit. When combination of two habits was considered, smoking with alcohol (33.65%) & smoking with chewing tobacco (32.22%) showed greater prevalence than the rest. When combination of more than two habits was considered, alcohol with smoking & chewing tobacco showed the highest prevalence (73.96%). Prevalence of subjects based on the chronicity of habits has been shown in **Table 3**.

### 2. Prevalence of oral lesions (Chart 1) -

Among 2,161 subjects with oral habits, 996 subjects (46.1%) [910 (91.4%) males and 86 (8.6%) females], demonstrated the presence of oral lesions. Some of them had more than one oral lesion. The total number of lesions in the 996 subjects was 1,467. Number of reactive lesions (55.41%) among the subjects was higher followed by premalignant lesions/conditions (27.67%), malignant lesions (12.40%) & other lesions (4.49%). Males had more number of reactive lesions (88%), followed by premalignant lesions/ conditions (39%), malignant lesions (16.15%) and other lesions (6.15%). Among the females, premalignant lesions/ conditions (59.30%) and malignant lesions (40.70%) were more common followed by reactive lesions (13.95%) and other lesions (11.63%). Oral cancer was seen in 182 subjects who presented at different stages of cancer (TNM staging). 43.40% of the subjects with carcinoma were in stage IV, 26.29% were in stage III, 24.72% were in stage II and 4.94% in stage I.

### 3. Correlation of oral lesions with oral habits

Reactive lesions (68.98%) were more commonly seen with smoking habit. Premalignant lesions/conditions (31.46%), malignant conditions (12.08%), as well as other lesions (3.99%) were more commonly seen with tobacco chewing habit.

The number of reactive lesions and malignant lesions increased with the number of oral habits while premalignant and other lesions showed no significant

increase in number with number of habits. It was more among the single habit subjects **Table 4**.

Correlation between oral lesions and individual habits & their combinations has been demonstrated in **Table 5**.

Premalignant lesions/ conditions (19.64%) were almost equally prevalent among the middle aged and elderly subjects while reactive lesions (47.14%), malignant lesions (20.71%) and other lesions were more prevalent among elderly aged subjects. Reactive lesions (43.56%), premalignant lesions (26.31%), malignant lesions (18.53%) and other lesions (3.96%) all were more common among the subjects with lower education level.

Correlation of lesions with duration of habits showed that reactive lesions (49.32%) were more among the chronic smokers, premalignant (42.28%) and malignant lesions (32.96%) were more among the chronic tobacco chewers, while other lesions were more among both chronic smokers (22.72%) and chronic tobacco chewers (33.33%). Past smokers, chewers and alcoholics developed less number of lesions. There was no significant association of alcohol with any oral lesions ( $p = 0.058$ ) (**Table 6**).

The most common intra oral site to be involved by lesions was the buccal mucosa followed by, palate, tongue and labial mucosa. There was a statistical significant association between the site of occurrence of oral lesions with site of placement of betel quid with or without tobacco ( $p < 0.001$ ). Around 1.32% of reactive lesions, 95.67% of premalignant lesions, 98.45% of malignant lesions and 20.3% of other lesions occurred at the same site of placement of betel quid with or without tobacco.

## Discussion

Oral habits were reported by 17.54% of patients attending Oral Medicine clinics. The prevalence of smoking, tobacco chewing, alcoholism and pan chewing without tobacco among the outpatients was 9.10%, 8.12%, 5.21% and 2.9% respectively. This was lower compared to other studies [5,6]. The reason for this could be that ours is a single centre hospital based study while other studies mentioned were surveys of general population. Among the oral habits in the study subjects, smoking was the most common habit (51.9%) followed by chewing tobacco (47.52%), consuming alcohol (29.7%) and chewing pan without tobacco (16.7%). Smoking was reported to be more common in the southern states of India [7], however, in the one of the study conducted at Chennai [2], alcohol was the most common habit followed by use of tobacco and arecanut. Oral habits were practiced more among males than females (9:1). The indulgence in habits was greater

among the middle aged subjects as in other studies [1,2]. However, many studies [8,9] have shown higher prevalence of arecanut chewing among younger individuals. This may be due to the growing trend among the younger generation in usage of attractive packets of flavoured areca products which are widely marketed.

Prevalence of oral habits was more among the population with higher education in our study. However this was not true in many other previous studies [5,6,10]. With the increase in the prevalence of habits in educated population the worst is yet to come.

When there was a single habit, tobacco chewing (40.73%) was the most common. When combination of two habits was considered, smoking with alcohol (33.65%) and smoking with chewing tobacco (32.22%) showed greater prevalence than the rest. When combination of more than two habits was considered, alcohol with smoking and chewing tobacco showed the highest prevalence (73.96%). This was comparable with some of the studies [11-13], except that smoking was the most common single habit in these studies. It was observed that “occasional indulgence” in habit was reported more common when compared to “chronic usage” and “past usage” of habits as comparable with many other studies [11-14].

Among our study population of 2,161 subjects with oral habits, 996 (46.1%) subjects, i.e. 46.73% of males and 40.18% of females, had oral mucosal lesions. This shows that there is almost equal prevalence of oral mucosal lesions among males and females with oral habits and gender is not a significant risk or protective factor.

The total number of oral lesions in 996 subjects was 1,467. Reactive lesions were the most common lesions (55.41%) followed by premalignant lesions/ conditions (27.67%), malignant lesions (12.40%) and other lesions (4.49%) in accordance with other studies [1,2]. Males presented with more number of reactive lesions (88%) and premalignant lesions/ conditions (39%), while females had more number of premalignant (59.30%) and malignant conditions (40.70%). These observations were also made in the study by Saraswathi T.R.et.al [1]. Increased frequency of reactive lesions among males can be due to the higher prevalence of smoking habit amongst them.

Premalignant lesions/ conditions (19.64%) were almost equally prevalent among the middle aged and elderly aged subjects while reactive lesions (47.14%) and malignant lesions were more prevalent among elder age group (20.71%), similar to observations were made by Rooban et.al [2]. Though oral habits were more prevalent among the higher education level sector, in our study we found that, all oral lesions were more common

among subjects with lower education level. This may be due to the quality and duration of oral habits consumed by them as well as the changes in their immunity levels.

Reactive lesions were more commonly seen among subjects with smoking habit (68.98%). Among the reactive lesions prevalence of smoker's palate was the highest (47.85%) followed by smoker's melanosis (36.41%), and others, while reverse was seen in the study by Saraswathi T R.et.al [1]. However Rooban T.et.al [2], found smoker's melanosis to be the most common reactive lesion, followed by frictional keratosis. The difference could be due to the subjects in the studies varying with respect to the type of oral habits, duration of oral habits and combination of oral habits.

In our study, premalignant lesions/ conditions (31.46%) were more commonly seen with tobacco chewing habit, with leukoplakia (39.65%), and OSMF (35.46%), being the most common. This was comparable with the study by Sarawathi T R.et.al [1], but was not in agreement with the study by Rooban T.et.al [2], in which OSMF was the most common premalignant condition followed by leukoplakia and studies by Marija.et.al [15], Baric J M.et.al [16], showed greater prevalence of leukoplakia in subjects who used cigarettes and alcohol.

Oral cancer was seen among 182 (12.40%) subjects with a majority in Stage III and IV. The higher prevalence of oral cancer can be attributed to the fact that this study was conducted in a hospital where patients are referred for their dental treatment needs from a cancer hospital in the vicinity and also because of inclusion of only subjects with oral habits, known to be risk factors for oral cancer. In this study Oral cancer was more commonly associated with tobacco chewing habit. This result was in agreement with the studies by Orr [17], Wahi.et.al [18], Ko.et.al [19], but not in agreement with some studies [20,21,22], which stated that tobacco smoking and alcohol alone were major risk factors for oral cancer. When alcohol intake was the only habit, no reactive or premalignant lesions/ conditions were observed in our study and only one subject was diagnosed with an oral malignancy. This was not in agreement with the study by Saraswathi T R.et.al [1] who stated that among those who consumed alcoholic beverages alone, leukoplakia was common and the studies by Nancy Nairi.et.al [23], Mia Hashibe.et.al [24], Gupta.P.C [25], and Richard Muwonge.et.al [11], showed alcohol to be an independent risk factor for oral premalignant lesions, regardless of the beverage type or drinking pattern and that oral lesions increased with increase in the amount and duration of alcohol consumption.

Among other oral lesions, prevalence of candidiasis was the highest followed by aphthous ulcers,

angular cheilitis, post inflammatory melanosis etc. These lesions however cannot be directly linked to the oral habits and may have similar frequency even among non-habituated individuals.

This study highlights on the fact that as the number of habits increased, number of reactive, premalignant and other lesions increased, while malignant lesions showed no positive correlation and was found more among the single habit subjects.

Among the subjects with single habit, prevalence of reactive lesions was highest among the smokers (77%), and much more among the chronic smokers; while prevalence of premalignant (13.3%), and malignant conditions (11.87%) were highest among tobacco chewers which also increased with chronicity of the habit, while prevalence of other oral lesions (3.77%) were more among both chronic smokers and chronic tobacco chewers. Among the subjects with two habits, prevalence of reactive lesions was highest among the subjects having habit of smoking and alcohol intake (70.5%), prevalence of premalignant lesions/ conditions (38.98%) and malignant condition (14.4%) was highest among the subjects taking alcohol with tobacco (11.5%).

Among the subjects with more than two habits, prevalence of reactive lesions was highest among people taking alcohol, smoking and chewing without tobacco (70.45%), while prevalence of premalignant lesions/ conditions (29.6%), malignant conditions (14.4%) and other lesions (4.8%) were highest among alcohol, smoking and tobacco chewing subjects. These results are in accordance with many other studies [11,13,26-28]. Moreover, past smokers, chewers and alcoholics developed less number of lesions on the whole. This result was in agreement with many other studies [11,17,29,30]. This clearly states that as the number and chronicity of oral habits increases the number of oral lesions and severity of oral lesions also increases. Buccal mucosa was the most common site of occurrence of all oral mucosal lesions followed by palate and tongue which was comparable to the observations made by Rooban.et.al [2]. However our study showed a statistical significant association between the site of occurrence of oral lesions (95.67% of premalignant and 98.45% of malignant lesions) with site of placement of betel quid with or without tobacco ( $p < 0.001$ ).

## Conclusion

This study enlightens us on the various consequences of oral habits and its associated lesions. We hope a national level study is undertaken at future date to know the overall prevalence of habits and its associated oral lesions.

**Legends of figures**

**Figure 1: premalignant lesions and conditions**



**b) SPECKLED LEUKOPLAKIA**



**a) LEUKOPLAKIA**



**c) ORAL SUBMUCOUS FIBROSIS**

**Figure 2: Malignant Conditions**



**a) Carcinoma of Alveolar ridge**



**b) Oral Cancer With  
Extra Oral  
Proliferation**



**C) Carcinoma Of The Oral Cavity**

**Legends Of Tables**

**Table 1 -** Patients were categorized as follows

Age groups	Education level	Number of habits	Duration of habits
≤ 25yrs	Primary school education (7 <sup>th</sup> STD) and below	Those with single habit	Non-smoker/ non-chewer/ non-alcoholic
26-55yrs	High school education (8 <sup>th</sup> STD) and above	Those with two habits and	Past smoker/ past chewer/ past alcoholic (stopped smoking/ chewing/ drinking since ≥ 1yr)
≥ 56yrs		Those with more than two habits	Occasional smoker/ occasional chewer/ occasional alcoholic (< 10 cig/ beedis/ day or < 5mg of gutkha/ 5 times chewing/day or <180 ml of alcohol/ day)
			Chronic smoker/ chronic chewer/ chronic alcoholic (≥ 10 cig/ beedis/ day or ≥ 5 mg of gutkha/ 5 times chewing/ day or ≥ 180ml of alcohol/ day ≥ 1yr)

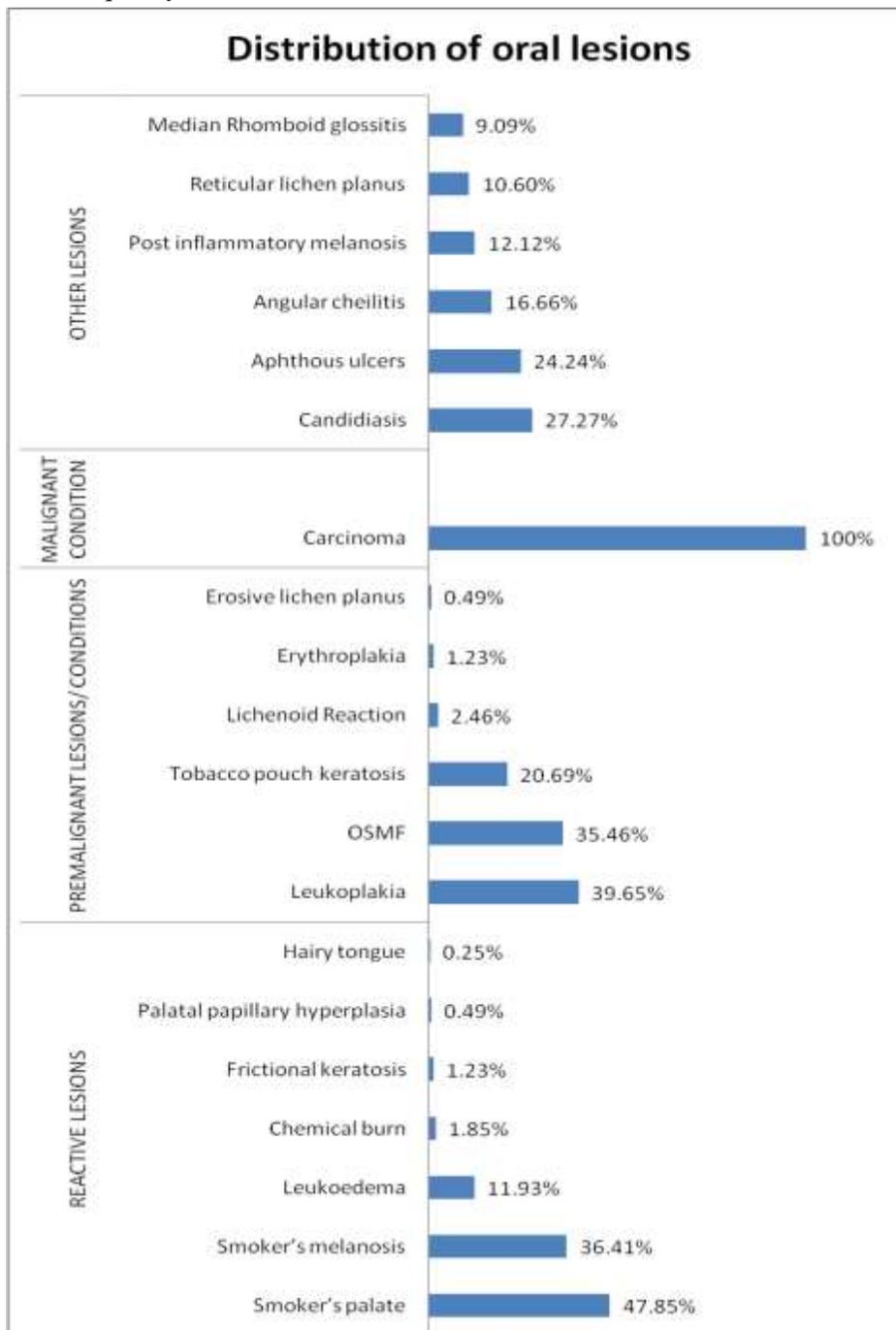
**Table 2 -** Frequency of oral habits based on the number of habits and their combinations.

	Oral Habits & Combinations	Number of subjects	Percentage
<b>Single habit</b> <b>n = 1365 (63.2%)</b>	Chewing tobacco	556 (40.73%)	25.7%
	Smoking	470 (34.43%)	21.7%
	Chewing without tobacco	221 (16.19%)	10.2%
	Alcohol	118 (8.65%)	5.5%
<b>Two habits</b> <b>n = 627 (29%)</b>	Smoking + alcohol	211 (33.65%)	9.8%
	Smoking + chewing tobacco	202 (32.22%)	9.3%
	Alcohol + chewing tobacco	118 (18.81%)	5.5%
	Smoking + chewing without tobacco	70 (11.16%)	3.2%
	Alcohol + chewing without tobacco	26 (4.14%)	1.2%
<b>Three habits</b> <b>n = 169 (7.8%)</b>	Alcohol + smoking + chewing tobacco	125 (73.96%)	5.8%
	Alcohol + smoking + chewing without tobacco	44 (26.03%)	2%
<b>Total</b>		2161	100.00%

**Table 3** - Frequency of oral habits based on the duration of habits.

Duration of habits	Smoker 1122	Tobacco Chewer 1001	Alcoholic 642	Without Tobacco Chewer 361
Past	176 (8.1%)	125 (5.8%)	63 (2.9%)	42 (1.9%)
Occasional	555 (25.7%)	463 (21.4%)	460 (21.3%)	277 (12.8%)
Chronic	391 (18.1%)	413 (19.1%)	119 (5.5%)	42 (1.9%)

**CHART 1** - Frequency of distribution of different oral lesions



**Table 4 - Correlation between number of habits and number of lesions**

LESIONS	NUMBER OF HABITS		
	One habit	Two habits	Three habits
Reactive Lesions	396 (72.66%)	314 (92.35%)	103 (92.8%)
Premalignant Lesions/Conditions	234 (42.94%)	129 (37.94%)	43 (38.74%)
Malignant Lesions	99 (18.17%)	60 (17.65%)	23 (20.72%)
Other Lesions	38 (7%)	21 (6.18%)	7 (6.31%)
Total	545	340	111

**Table 5 - Correlation between oral lesions and individual habits & their combinations**

HABITS		Reactive Lesions		Premalignant Lesions/ Conditions		Malignant Condition		Other Lesions	
SINGLE HABIT	Smoking	363	77%	32	6.8%	18	3.8%	13	2.76%
	Chewing Tobacco	26	4.7%	174	31.3%	66	11.87%	21	3.77%
	Chewing Without Tobacco	7	3.2%	28	12.7%	14	6.3%	4	1.8%
	Alcohol	0	0	0	0	1	0.8%	0	0
TWO HABITS	Smoking + Tobacco	112	55.4%	58	28.7%	20	9.9%	8	3.96%
	Smoking + Without Tobacco	48	68.6%	11	15.7%	4	5.71%	2	2.85%
	Smoking + Alcohol	148	70.5%	12	5.71%	17	8%	3	1.4%
	Alcohol + Tobacco	6	5%	46	38.98%	17	14.4%	5	4.23%
	Alcohol + Without Tobacco	0	0	2	7.69%	2	7.69%	3	11.5%
MORE THAN TWO HABITS	Alcohol + Smoking + Tobacco	72	57.6%	37	29.6%	18	14.4%	6	4.8%
	Alcohol + Smoking + Without tobacco	31	70.45%	6	13.6%	5	11.36%	1	2.27%

$\chi^2=628.068$   $p<0.001$

**Table 6** - The correlation between oral lesions and duration of oral habits

DURATION OF HABITS	Code number	Reactive Lesions n = 813		Premalignant Lesions/ Conditions n = 402		Malignant Lesion n = 182		Other Lesions n = 66	
SMOKING	Past	75	6.68%	19	1.7%	24	2.14%	4	0.36%
	Occasional	298	26.56%	81	7.22%	14	1.25%	14	1.25%
	Chronic	401	35.74%	56	5%	44	3.92%	15	1.37%
CHEWING TOBACCO	Past	28	2.8%	43	4.3%	34	3.4%	6	0.6%
	Occasional	109	10.89%	102	10.19%	27	2.8%	12	1.2%
	Chronic	79	7.89%	170	16.98%	60	6%	22	2.2%
CHEWING WITHOUT TOBACCO	Past	5	1.39%	6	1.66%	5	1.39%	3	0.83%
	Occasional	69	19.11%	28	7.76%	11	3.05%	7	1.94%
	Chronic	12	3.32%	13	3.6%	9	2.5%	0	0
ALCOHOL	Past	24	3.74%	15	2.34%	11	1.71%	3	0.47%
	Occasional	165	25.7%	62	9.66%	26	4.05%	8	1.25%
	Chronic	68	10.6%	26	4.05%	23	3.58%	7	1.1%

Smoking-	$X^2=48.48$	$p<0.001$
Chewing without tobacco-	$X^2=26.88$	$p<0.001$
Chewing tobacco-	$X^2=42.07$	$p<0.001$
Alcohol-	$X^2=12.15$	$p=0.05$

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**Conflict of Interest:** Nil

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