Original Article

Prevalence of Tongue Lesions in Tobacco and Non-tobacco users of OPD, SRM Dental College, Chennai: A Cross-Sectional Study

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ABSTRACT

Aim: The present study aimed to determine the prevalence of tongue lesions in tobacco and non-tobacco users and to evaluate the prevalence of various tobacco related habits in different age groups.

Materials and Methods: A total of 500 patients aged >18 years of both sexes were screened on the basis of consecutive sampling with a prepared proforma and were divided into 2 groups as tobacco users and non-tobacco users. All the patients were clinically screened and tongue changes were diagnosed. Few tongue lesions were confirmed histopathologically. Statistically, Chi-square test, unadjusted odds ratio and univariate logistic regression analysis were performed.

Results: Coated tongue was found to be the highest in both the groups, followed by pigmented tongue in the tobacco user group. Smoking and chewing tobacco were more prevalent in 50-60 years of age. Smoking alone was more prevalent in <30 years of age.

Conclusion: The prevalence of tongue lesions was significantly higher in tobacco users than in non-users. This enlightens the need for few community awareness health programs at a larger scale more concentrating on the areas of lacunae.

Keywords: Smoking, Tobacco, Tongue lesions

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INTRODUCTION

Mucosal lesions in the oral cavity are considered as the first sign in many systemic disorders, tongue changes being one among the most important sign. The diagnostic and prognostic importance of tongue was considered since the ancient period of Hippocrates and Galen.[1-3]

Tongue is essentially a muscular complex organ covered by specialized epithelium and performs many vital functions.[4] Lesions occurring on the tongue are vast and ranges from developmental disorders to infections, idiopathic lesions, malignancies and due to underlying systemic illness. Many pathological lesions are seen exclusively on the tongue.[1] Around the globe, several epidemiological studies have shown the prevalence of tongue lesions as nearly to 18.5%.[5]

Tobacco is the most easily accessible, an addictive substance which contributes significantly as a major risk factor for oral diseases. South Asia is a major producer and net exporter of tobacco.[6] India is also the second largest consumer of tobacco products and the third largest producer of tobacco in the world. Among adults in India, the use of smokeless tobacco was almost double (26%) than that of smoking (14%). The estimated number of tobacco users in India was 274.9 million. Of these, 163.7 million used only smokeless tobacco, 68.9 million were smokers, and 42.3 million used both forms of tobacco. The prevalence of smokeless tobacco use among adult men in India increased from 24% in 1995 to 33% in 2009, whereas the prevalence of smoking reduced from 35% to 24% during the same period.[7,8] Women mostly use smokeless forms of tobacco. Tobacco use, in whatever form, generally begins during adolescence. In prevalence

surveys in eight rural areas of India, 2-26% of men and 0-4% of women practiced both smoking and smokeless tobacco habits.[8] In addition, a higher prevalence of tobacco consumption within India accounts to one third of the global burden of oral cancer, tongue being one of the most common site of occurrence.[9,10] Tongue malignancies are one of the most commonly diagnosed oral cancer worldwide and tongue is one of the top two most common sub sites in the prevalence or oral cancer across many studies in India, tobacco being a most potent etiological factor.[5,6] As per the data from the National Cancer Control Program, the incidence of squamous cell carcinoma in tongue is showing an increasing trend in Chennai over the past 25 years.[6]

It is pertinent to mention that there is very little evidence of effects of tobacco on the tongue and hence the present study was conducted with an objective to determine the prevalence of tongue lesions in tobacco and non-tobacco users, to study the prevalence of various tobacco related habits in different age groups, and to determine the most prevalent tongue lesion in tobacco users.

MATERIALS AND METHODS

As a cross-sectional study period of 1 month from October 1 to 31st, 2014, all the patients who visited the out-patient clinic in the Department of Oral Medicine and Radiology in Sri Ramaswamy Memorial Dental College, Chennai were included through consecutive sampling method after satisfying the inclusion and exclusion criteria. Finally, a total of 500 patients were included and were screened using a separate proforma. Patients were explained regarding the study, and an informed consent was obtained. The study was approved by the Institutional Ethical Committee board.

Inclusion Criteria

Includes all patients above 18 years of age, both the sexes and all forms of tobacco usages (smoking and chewing) irrespective of alcohol consumption.

Exclusion Criteria

Exclusion of patients <18 years, developmental disorders of the tongue, uncooperative patients and patients not willing for investigations.

A proforma was prepared comprising of the demographic details of the patients with their socioeconomic status measured in terms of education, occupation, and family income per month as per Kuppuswamy's socioeconomic scale, past medical; dental; drug and personal history which included various forms of tobacco usage (smoking or chewing); frequency; duration; time; site of placement of tobacco; habits of spitting or swallowing; along with alcohol usage status and quitting periods with respect to all the habits. Other personal oral habits were also noted, and patients were divided into two groups as tobacco users and non-tobacco users. The clinical examination of the entire oral cavity and tongue was done following the World Health Organization guidelines.[11] Dental recording included dentition of the patient and their denture status. Other oral mucosal changes were also diagnosed. Tongue was clinically assessed, examined, and diagnosis was made based on consensus obtained from two oral medicine experts. Few lesions required histopathological confirmation. The tongue was examined for any surface and color changes, specific lesions, size and movements. Lymph nodes were also examined. Very few of the patients were aware of the lesions present and most of the patients were asymptomatic. Those with symptoms had complaints such as burning sensation of the tongue, painful ulcerations, difficulty in speech, altered taste sensations and difficulty in movements. None of the patients were under medications for any of the tongue lesions. Patients with other complaints were thoroughly examined and referred to appropriate departments for further management. Chi-square test, unadjusted odds ratio and univariate logistic regression analysis were used statistically and results were considered to be significant if the $P < 0.05$.

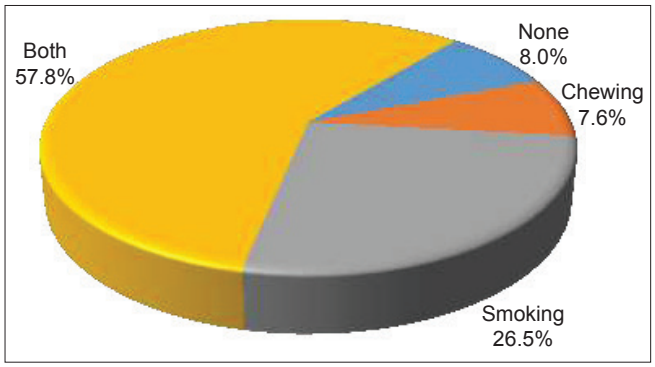
RESULTS

Of the 500 patients, 275 patients were males (55%) and 225 patients were females (45%), 281 patients (56.2%) constituted tobacco group and 219 patients (43.8%) constituted non-tobacco group. The age of the patients ranged from 18 to 88 years with a mean age of 53 years. Tobacco usage among the genders is shown in Graphs 1 and 2. Prevalence of tongue lesions in both the groups is shown in Table 1. On the whole (Table 2), 226 patients (45.2%) had coated tongue, followed by normal tongue in 108 patients (21.6%), pigmented tongue

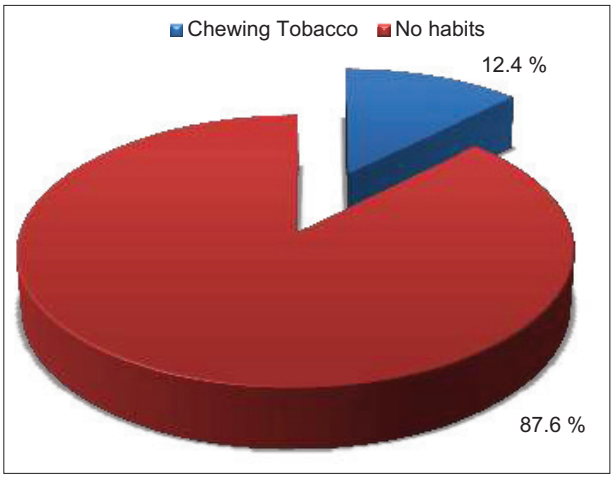
Table 1: Order of prevalence in both the groups

Diagnosis in non-tobacco users	%	Diagnosis in tobacco users	%
Coated tongue	39.3	Coated tongue	40.8
Normal	30.1	Pigmented tongue	20.6
Aphthous ulcers	5.9	Normal	14.9
Fissured tongue	5	Fissured tongue	2.5
Geographic tongue	5	Aphthous ulcers	2.5
Anemic glossitis	4.6	Traumatic ulcers	2.1
Traumatic ulcer	4.1	Macroglossia	1.1
Depappilation	3.2	Candidiasis	1.1
Pigmented tongue	0.9	Depappilation	0.7
Macroglossia	0.9	Geographic tongue	0.7
Candidiasis	0.5	Malignancy of tongue	0.7
Malignancy of tongue	0.5	Anemic glossitis	0

in 60 patients (12%), fissured tongue in 27 patients (5.4%), aphthous ulcers in 20 patients (4%), traumatic ulcers in 15 patients (3%), geographic tongue in 13 patients (2.6%), anemic glossitis in 10 patients (2%), depapillation in 9 patients (1.8%), macroglossia in 5 patients (1%), candidiasis in 4 patients (0.8%), and squamous cell carcinoma of tongue in 3 patients (0.6%). Coated tongue was found to be the highest in both the groups,



Graph 1: Distribution of tobacco usage among males

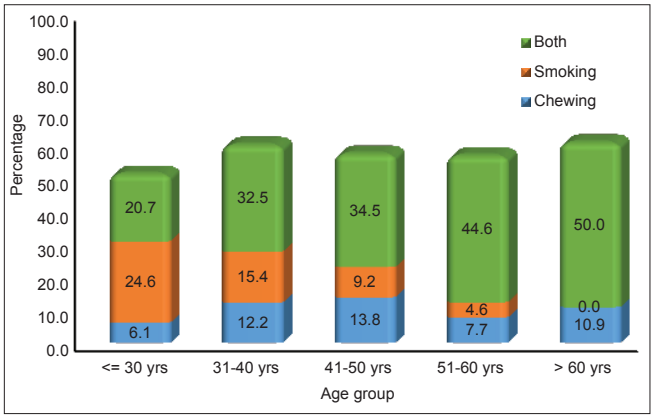


Graph 2: Distribution of tobacco usage among females

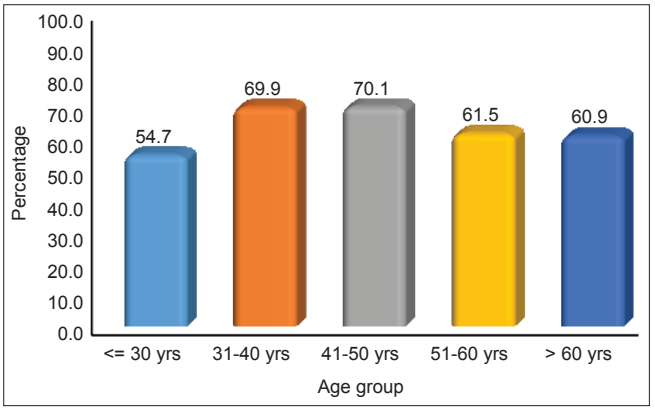
Table 2: Overall count of tongue diagnosis with respective percentages

Diagnosis	*n* (%)
Normal tongue	108 (21.6)
Coated tongue	226 (45.2)
Fissured tongue	27 (5.4)
Aphthous ulcer	20 (4.0)
Traumatic ulcer	15 (3.0)
Depapillation	9 (1.8)
Macroglossia	5 (1.0)
Pigmented tongue	60 (12.0)
Geographic tongue	13 (2.6)
Candidiasis	4 (0.8)
Anemic glossitis	10 (2.0)
Oral cancer	3 (0.6)
Total	500 (100.0)

followed by pigmented tongue in the tobacco user group (Table 1). Smoking and chewing tobacco were more prevalent in the age group 50-60 years and smoking was more prevalent in <30 years of age (Graph 3). Smoking, chewing, and alcohol consumption together was prevailing higher (111 patients, 22.2%) followed by smoking and chewing (48 patients, 9.6%), smoking alone (40 patients, 8%), chewing alone (39 patients, 7.8%), smoking and alcohol (34 patients, 6.8%), chewing and alcohol (9 patients, 1.8%) and alcohol alone (1 patient, 0.2%). Among the chewers, prevalence of chewing pan masala was higher than mawa and gutka, which was more commonly observed in lower socioeconomic people. Coated tongue, aphthous ulcers on the tongue, pigmented tongue, candidiasis on tongue, and squamous cell carcinoma of the tongue was considered as lesions to calculate to risks. On the whole, the prevalence of tongue lesions was 62.6% (313 patients), which was more commonly seen in the age group of 31-50 years (Graph 4). The Chi-square test and univariate logistic regression showing statistical significance is shown in Tables 3 and 4. Various systemic conditions were associated in the patients with tongue lesions. The most common systemic condition observed



Graph 3: Age group wise tobacco usage, Key: Green color: Both smoking and chewing, Orange color: Smoking alone, Blue color: Chewing alone



Graph 4: Prevalence of tongue lesions (%) in different age groups: Denotes a higher prevalence in the age group of 31-50 years

Table 3: Association between two proportions using Chi-square test

Factors	Chi-square test	Value	*P* value
Age group (years)	Trend Chi-square	1.374	0.241
Gender	Pearson Chi-square	21.314	<0.001*
Occupation	Pearson Chi-square	16.338	<0.001*
Dentition	Trend Chi-square	0.783	0.391
Denture	Pearson Chi-square	3.305	0.069
Smoking	Pearson Chi-square	25.290	<0.001*
Tobacco chewing	Pearson Chi-square	26.470	<0.001*
Symptom	Fisher's exact test	2.045	0.364
Risk behavior	Fisher's exact test	32.108	<0.001*

**P*<0.05 denotes statistical significance

Table 4: Uni-variate logistic regression for tongue lesions

Factors	OR	95% CI for OR		P value
		Lower	Upper	
Age group (years)				
≤30	1.000			
31-40	1.921	1.183	3.120	0.008
41-50	1.939	1.124	3.345	0.017
51-60	1.322	0.740	2.362	0.345
>60	1.286	0.664	2.491	0.456
Gender				
Female	1.000			
Male	2.373	1.639	3.437	<0.001*
Smoking				
No	1.000			
Yes	2.616	1.790	3.822	<0.001*
Tobacco chewing				
No	1.000			
Yes	2.758	1.863	4.083	<0.001*
Tobacco usage				
No	1.000			
Yes	3.331	2.283	4.861	<0.001*

**P*<0.05 denotes statistical significance, CI: Confidence interval, OR: Odds ratio

in the patients with tongue lesions was diabetes, followed by hypertension in males and anemia, followed by diabetes and thyroid abnormalities in females.

DISCUSSION

In the present study, the prevalence of coated tongue was found to be the highest in both the groups (Table 1), which is in accordance with a similar study conducted in our Indian population by Patil *et al*. and not in accordance with various other studies which showed that fissured tongue was the most common lesion.[5] Fissured tongue was reported in 27 patients with a prevalence of 5.4% (Table 2). This prevalence is not in accordance with the previous studies as reported in the literature, but it was not the most frequent lesion as mentioned in other studies.[12,13] This lesion has been suggested to be genetically determined. Various contributory factors to the development of fissured tongue include hyposalivation, diabetes mellitus, candidiasis, vitamin B deficiency and lichenoid reactions. With advancing age the prevalence of fissured tongue increases. This can be explained by the fact that increasing age is associated with hyposalivation, which is one of the prime contributing factors. The deep fissures act as reservoir for food particles and accumulate bacteria leading to the inflammation of the tongue. Aphthous ulcers were seen in 4% patients (Table 2), higher than the results of the study conducted by Kaswan *et al*.[5] Aphthous was commonly seen in females of younger age group. Pigmented tongue was reported in 12% of the cases (Table 2). The mechanism of smoking inducing the pigmentation remains unknown. Smokeless tobacco (snuff) does not appear to be associated with an increase in oral melanosis. Heat stimulated during smoking may also lead to pigmentations. Epidemiological studies suggest that oral melanosis increases prominently during the 1st year of smoking.[14] Alcohol has been associated with an increased oral pigmentation and alcoholic melanosis may be associated with a higher risk of cancers of the upper aerodigestive tract.[15] The prevalence of geographic tongue in the present study was 2.6% (Table 2), which is not in line with the findings from an Indian population, which showed a prevalence of 16.4% due to increased sample size.[5] The geographic tongue is more common during childhood though it has been reported in subjects >40 years of age and is seen predominantly in females. In the present study also females were more commonly affected. Male preponderance has been reported by Vörös-Balog *et al*.[16] Thus, the association of geographic tongue to gender is not consistent. However, its association with fissured tongue has been well reported in the literature.[3,16] The wide discrepancy in the results can be due to the transient nature of geographic tongue, differences in the ethnicity, and sample size. The prevalence of candidal infection in the present study was reported to be 0.8% (Table 2) which is not in accordance to the study conducted by Patil *et al*.[5] It is more prevalent in males and in most cases is asymptomatic. Squamous cell carcinoma was seen in 3 patients with a prevalence of 0.6% (Table 2), which is in accordance to the study conducted by Rahman *et al*. (0.3%).[5] Ulcers of the tongue should be examined carefully to rule out any malignancy. On investigating the reason for higher tobacco chewing prevalence as age advances, we found that those subjects were predominantly belonging to the lower socio economic group and were unemployed and illiterates, in whom tobacco exposure is high. This suggests a need for more tobacco cessation messages to these patients.

Data on tobacco usage relies on self-report and may suffer from recall bias as the proforma of few patients were recorded in the presence of their family members.

However, similar reports are available in the literature.[7] The evidence from the present study could either be the same or may strengthen when conducted at a multi-centric level involving a larger population.

CONCLUSION

There are various studies conducted to determine the prevalence of oral lesions in tobacco users and in non-users, but to our knowledge this is the first cross sectional study conducted to determine the prevalence of tongue lesions in tobacco and non-tobacco users in India. In this context, this study is an important addition to the existing literature. In the present study, the prevalence of tongue lesions was significantly higher in tobacco users than in non-users. This enlightens the need for few community awareness health programs at a larger scale more concentrating on the areas of lacunae. Mass screening with tobacco cessation protocols ensures early detection and prompt treatment of the oral diseases.

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