

Prevalence and Distribution of Oral Leukoplakia In Patients with Habits Attending Dental Hospital At Gwalior, Madhya Pradesh: A Clinical Study

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ABSTRACT

Background: Oral leukoplakia is the most common precancerous lesion of the oral cavity. Tobacco use is commonly associated with such lesions. Studying the association between occurrence of such lesions and the use of tobacco might help in promoting prevention and intervention based public health initiatives in this region. The following study was conducted to determine the prevalence, distribution viz. a viz. the age, sex & intraoral location of oral leukoplakia in patients attending Dental Hospital at Gwalior, Madhya Pradesh. The study population comprised of patients with habits attending Dental Hospital Gwalior, Madhya Pradesh. A detailed evaluation comprising of clinical examination and questioning regarding the habit, its type duration etc. was done and the results analyzed by using suitable statistical analysis.

Materials and Methods: The study was conducted for a period of one year i.e. from July 2014 to June 2015 and comprised of 3040 habitual tobacco users (chewers and smokers) Lime, Areca nut, & Betel leaf chewers who were interviewed and clinically examined for presence of oral leukoplakia. Patients were segregated into five age groups. The demographic data was recorded and so was a detailed history including the frequency, quantity, type of substance (chewed/smoked) and pattern/mode of consumption pertaining to the habits (chewing or smoking). The data was analyzed using SPSS (Statistical Package for Social services) 16.0 version. Chi-square Test and student-T Test were used.

Results: Among 3040 outpatients, 114(3.75%) patients were diagnosed with oral leukoplakia. It was observed that males were affected more as compared to females in a ratio of 4.35:0.61. The most commonly affected age group was age group (45-54 years) and the most common intraoral location was buccal mucosa (71.92%).

Conclusion: The results emphasize the urgent need of interventional programs to further discourage the use of tobacco products and the need for such programs to be made a public health priority. The study also provides baseline data for future studies regarding the prevalence of oral leukoplakia in Gwalior population.

Keywords: Oral leukoplakia, Prevalence, Gwalior.

INTRODUCTION

Tobacco use is highly prevalent in our society and poses a great threat in terms of health and economy. Prevalence of oral leukoplakia has been usually associated with use of tobacco. Leukoplakia is the

most prevalent precancerous lesion of the oral mucosa.^[1] Pindborg *et al*, (WHO) in 1997, described leukoplakia as a predominantly white lesion that cannot be characterized clinically or pathologically

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as any other definable lesion.^[2] It is common knowledge that, the occurrence of malignancy is greater in Leukoplakia, when compared to normal tissues.^[3]

The following study was conducted to determine the prevalence of oral leukoplakia in **Patients attending Dental Hospital at Gwalior, Madhya Pradesh, India** who had reported to the outpatient department of our institution. According to WHO, tobacco use is the largest threat to public health globally, and is anticipated to kill a staggering 1000 million people prematurely in this century alone.^[4] Therefore, such studies as ours, not only help in understanding the prevalence, incidence, and severity of oral disease in a specific population, but might also help to evolve an effective strategy for prevention and control and subsequently, in evaluating the effectiveness of such countermeasures. The results of such studies (including those on the established variety of changes that can occur in the oral mucosa) have rarely been published worldwide.^[5]

MATERIALS AND METHODS

Our study was a prospective study conducted in patients from Gwalior, Madhya Pradesh reporting to the outpatient department of our institution in the duration of One year i.e. from July 2014 to June 2015. 3040 habitual chewers and smokers were interviewed and examined for the presence of Oral Leukoplakia. Permission was obtained from the institutional ethical committee of our institution. Inclusion criteria comprised of patients who were adults i.e. over 18 years of age, were habitually using one or multiple forms of tobacco and who signed written consent to be clinically evaluated and examined intraorally. Exclusion group comprised of patients in whom, intraoral examination was not possible due to inadequate mouth opening and, those patients having any systemic diseases, malignancy etc. and, those patients who were unwilling to provide an informed consent. Patients were divided into five age groups: 18-24 years, 25-34 years, 35-44 years, 45-54 years, 55 years and above. The demographic data of each patient was recorded into a proforma. which had columns for recording patient name, age, address, occupation, date etc. along with an individual registration number that was allotted to each patient, so as to avoid ambiguity in the event of

his/her subsequent visits to the hospital, also, so that in the case of loss of documents pertaining to one patient, there was no repetitive counting of the same patient by mistake. A detailed history of chewing (tobacco, areca nut, pan masala, gutkha etc.) (Figure 1) and smoking was recorded along with duration and frequency. The patients were examined thoroughly, sitting in upright position in a dental chair, in a well-lit environment using artificial light, using mouth mirrors (Figure 2). Methods and techniques based on available literature and clinical experience of various authors, were employed to define the parameters for a clinical diagnosis of leukoplakia which chiefly involved visual inspection and manual palpation. The lesion was carefully inspected & palpated & the findings such as the site, size, shape, number, extent, borders, appearance of surrounding mucosa, tenderness, consistency, texture, induration of the lesion etc. were duly recorded. The clinical diagnosis of leukoplakia was made when patients exhibited characteristic features such as sharply defined white patch or plaque which could not be scraped and surface slightly elevated above the surrounding mucosa (Figure 3). Careful clinical examination along with pertinent questioning e.g. the method of placing the tobacco or quid at a specific site to rule out contact induced lichenoid reaction, by carefully assessing through manual palpation, any variations in pliability or flexibility of the affected site especially in middle aged group to clinically differentiate leukoedema from leukoplakia, the presence of fine greyish lines on the surface of the lesion or stretching of the lesion to notice any increase in prominence of the lesion, the association with or without a history of diabetes mellitus, presence or absence of history of tobacco chewing to rule out lichen planus. The final diagnosis could however be arrived at only after biopsy (incisional or excisional) confirmed the clinical impressions. The statistical analysis of the results was performed using SPSS (Statistical Package for Social services) 16.0 version. Chi square Test and student T Test were used to compare the data.

RESULTS

This study was conducted amongst 3040 adults, comprising of both males and females between 18-89 years of age having a history of habitual tobacco use, who were clinically examined for the presence

of Oral leukoplakia. The subjects were divided amongst five age groups i.e. 18-24, 25-34, 35-44, 45-54, 55 and above years. 114 subjects amongst the entire sample (n=3040) presented with oral leukoplakia. The overall prevalence rate of oral leukoplakia observed amongst tobacco users was therefore 3.75%. Of the 114 oral leukoplakia subjects (OL=114), majority of subjects i.e. 37 (6.32%) belonged to the 45-54 year age group. 112 out of 114 oral leukoplakia subjects, presented with homogeneous leukoplakia while the others (two subjects), were having non-homogeneous leukoplakia. 111 out of the 114 oral leukoplakia subjects (OL=114), were male and three were female. Males were therefore more commonly affected than females in a ratio of 4.35:0.61. Hence, a statistically significant ($P < 0.001$) association was noted viz. a viz. the prevalence of oral leukoplakia and gender. 2296 subjects (n=3040), were habituated to tobacco chewing, out of which 418 subjects were having a habit of chewing tobacco along with lime, In this category 26 subjects were diagnosed as oral leukoplakia clinically, which is the highest amongst tobacco chewing category. Of the 411 subjects with a habit of smoking bidi, 21 presented with oral leukoplakia while six out of the 303 subjects with a habit of smoking cigarette, were having oral leukoplakia. A statistically significant ($P < 0.001$) association was noted between oral leukoplakia & tobacco smoking in our study. Amongst the various intraoral sites, oral leukoplakia presentation was most commonly observed in buccal mucosa (71.92%) followed by lower vestibule (14.03 %), commissure/corner of lip (10.52%) and hard and soft palate (3.5%) respectively.

Table 1: Distribution of subjects with oral leukoplakia and without oral leukoplakia according to age.

S.No.	ORAL LEUKOPLAKIA	N	Min. Age (years)	Max. Age (years)	Mean Age $\pm$ SD (years)
1	Absent	2926	18	89	43.59 $\pm$ 15.63
2	Present	114	19	71	42.31 $\pm$ 15.04
	Total	3040	16	89	43.54 $\pm$ 15.65
t value=0.89, p=0.37					

Table 2: Distribution of chewing habits.

S.No.	CHEWING HABIT 1 TO 10	N	Percent
1.	Tobacco	213	9.28%
2.	Tobacco with lime	418	18.21%
3.	Tobacco, Lime, Areca nut	407	17.73%
4.	Tobacco, Lime, Areca nut, Betel leaf	284	12.37%
5.	Lime, Areca nut, Betel leaf	216	9.41%
6.	Tobacco, Areca nut, Betel leaf	217	9.45%
7.	Areca nut	183	7.97%
8.	Betel Leaf	133	5.79%
9.	Pan-masala/Gutkha	188	8.19%
10.	Tobacco, Lime, Gutkha	37	1.61%
	Total	2296	100.00%

Table 3: distribution of smoking habits.

S.No.	SMOKING HABITS	N	Percentage
1.	Bidi	411	57.17%
2.	Cigarette	303	42.14%
3.	Cigar	05	0.69%
4.	Pipes	00	0.00%
5.	Others	00	0.00%
	Total	719	100.00%

Table 4: Distribution of mixed habits.

S.No.	MIXED HABITS	No. of Respondents	Percentage
1.	Tobacco & Bidi	07	28.00
2.	Tobacco, lime & Bidi	08	32.00
3.	Tobacco, lime, bidi & Cigarette	01	04.00
4.	Tobacco, Areca nut,	01	04.00

	betel leaf & Bidi		
5.	Betel leaf & Bidi	02	08.00
6.	Pan Masala & Bidi	06	24.00
	TOTAL	25	100.00

Table 5: Gender distribution in oral leukoplakia subjects.

S.No.	Gender	LESION		Total
		Present (%)	Absent (%)	
1.	Male	111 (04.35%)	2438 (95.65%)	2549 (100%)
2.	Female	03 (0.61%)	488 (99.39%)	491 (100%)
	TOTAL	114 (03.75%)	2916 (96.25%)	3040 (100%)
$\chi^2 = 14.97$; DF = 1; P = 0.0001				
OR (95% CI) = 7.41 (2.34, 23.41)				

Table 6: Distribution of subjects according to type of oral leukoplakia.

S.No.	Type of Oral leukoplakia	No. of Patients	Percent
1.	Homogenous	112	98.24 %
2.	Non-Homogenous	02	01.76 %
3.	Total	114	100.00%

Table 7: prevalence of oral leukoplakia among different age groups.

S.No.	Age groups	N	ORAL LEUKOPLAKIA	Percentage
1	18-24	407	08	01.96
2	25-34	575	12	02.08
3	35-44	587	31	05.28
4	45-54	585	37	06.32
5	55 & Above	886	24	02.70
	Total	3040	114	03.75

$$\chi^2 = 25.63; DF = 04; P = 0.00003$$

Table 8: Gender distribution according to type of smoking habit

S.No.	SMOKING HABITS	Male (%)	Female (%)	Total
1.	1 (Bidi)	378 (91.97)	33 (09.03)	411 (100.00)
2.	2 (cigarette)	288 (95.04)	15 (04.96)	303 (100.00)
3.	3 (cigar)	05 (100.00)	00 (0.00)	05 (100.00)
4.	4 (pipes)	00 (0.00)	00 (0.00)	00 (0.00)
5.	5 (others)	00 (0.00)	00 (0.00)	00 (0.00)
	Total	671 (93.32)	48 (06.68)	719 (100.00)
$\chi^2 = 16.77$; DF = 4; P = 0.00 (HS)				

Table 9: Intraoral location and distribution of oral leukoplakia

S.No.	SITE OF ORAL LEUKOPLAKIA	N	Percentage
1.	BUCCAL MUCOSA	82	71.92
2.	HARD/SOFT PALATE	04	03.50
3.	CORNER/COMMISSURE OF LIP	12	10.52
4.	LOWER VESTIBULE	16	14.03
	TOTAL	114	100.00

DISCUSSION

Epidemiological data on the prevalence of oral leukoplakia in India varies from 0.2% to 5.2 %.¹⁷⁻¹⁰In the present study, the prevalence of oral leukoplakia was 3.75% which is comparable to the observations of Bratic MB¹¹, where it was observed to be 2.2%, to the study by Sharma R, Narang P,

Sharma AK^[11], in which the prevalence of oral leukoplakia was 2.13% and to the study by Mathew AL, Pai KM, in which the prevalence of oral leukoplakia was 1.59%.^[12]

Out of our total study sample (n= 3040), 2549 were males and 491 were females. The gender distribution seen in the present study is consistent with the observations done by Patil BP, Bathi R, Chaudhari S^[13] and those of Reichart P.A. & Kohn H.^[14] [Table-1]. It was observed that out of 3040 subjects, those who presented with oral leukoplakia {114 subjects (3.75%)} comprised of people between 19 to 71 years of age with a mean age of 42.31±15.04 years [Table-1]. Whereas, those 2926 subjects, who were not affected by oral leukoplakia were in the age range 16 to 89 years with the mean age being 43.59±15.63 years. The differences between the mean ages amongst groups with and without oral leukoplakia in our study, were not found to be statistically significant (P > 0.05) [Table 1]. These observations are in accordance with the findings of Bhatnagar P, Rai S et al.^[15] Amongst other studies, oral leukoplakia has been usually observed in the middle age and its prevalence increases with age.^[6]

Amongst our study sample (n=3040), the habit wise distribution of tobacco users was as follows [Table-2] 2296 subjects were having tobacco chewing habit. 719 subjects were having a tobacco smoking habit [Table-3] out of which 411 (57.17%) smoked bidi, 303 (42.14%) smoked cigarettes, five subjects (0.69%) smoked cigar, no subjects were using pipe. 25 subjects were having mixed habits (chewing + smoking) [Table-4].

In the present study, 2549 (83.85%) out of 3040, were males and 491 (16.15%) were females. Out of 2549 (100%) males, 111 (4.35%) were having oral leukoplakia and 2438 (95.65%) were not having oral leukoplakia. Similarly, out of 491 (100%) total female population, 488 (99.39%) females were having no oral leukoplakia and three (0.61%) presented with oral leukoplakia [Table-5]. There was a statistically significant association (P < 0.001) between gender and oral leukoplakia amongst our subjects. Percentage wise, this male predominance or, male to female ratio was 4.35:0.61. These findings are in accordance with the studies done by Sharma R, Narang P, and Sharma AK^[11] and by Mathew AL, Pai KM^[12] who also concluded that oral

leukoplakia was more common in males as compared to females.

Clinical examination of the 114 oral leukoplakia subjects revealed that two subjects were having non-homogeneous type of leukoplakia and 112 were having homogeneous leukoplakia [Table 6] which is comparable with the findings of Bratic MB^[1] where a majority, (45 subjects) were having homogeneous leukoplakia and fewer, (eight subjects) had non-homogeneous leukoplakia, and of Mathew AL, Pai KM^[12] where all the leukoplakia were found to be of homogeneous type. The majority oral leukoplakia subjects i.e. 37 (6.32%) belonged to 45-54 age group, followed by 31 subjects (5.28%) who belonged to 35-44 age group, 24 subjects (2.70%) in the age group of 55 and above, 12 subjects (2.08%) in 25-34 age group, and eight subjects (0.96%) in the 15-24 age group. [Table 7] These observations are in accordance with the findings of studies done by Sharma R, Narang P, Sharma AK^[11] and the study by Mathew AL, Pai KM.^[12] where again, leukoplakia was predominant in the middle age.

The most frequent location for oral leukoplakia was buccal mucosa (71.92%), followed by lower vestibule (14.03%), and followed by commissure of lip (10.52%) and palate (3.50%).

Out of 411 subjects who smoked bidi, 378 (91.97%) were males and 33 (9.03%) were females. Amongst the 303 subjects who smoked cigarette, 288 (95.04%) were males and 15 (4.96%) were females and five males smoked cigar. [Table 8] These observations are in accordance with findings of the studies done by Keluskar V, Kale A^[16] who observed that majority of male patients were tobacco chewers followed by bidi smokers and cigarette smokers and by Kawatra A, Lathi A^[17] et al & Saraswathi TR, Ranganathan K^[18] who also found that prevalence of tobacco chewing is more common in males as compared to females. [Table-9] Our findings are similar with the findings of Neville BW, Terry A^[19] et al & Axell T^[20] who also observed that the most common site for oral leukoplakia is buccal mucosa.

CONCLUSION

The results of the present study provide important information about oral leukoplakia in Gwalior population. Patients should be regularly monitored for any mucosal changes & the interventional programs to discourage the use of tobacco products and other risk factors should be our public health priority. In future, further studies with larger sample sizes may be needed to collate with the present.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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