

PREVALENCE OF ORAL LICHEN PLANUS AMONG 7 639 INDIAN VILLAGERS IN KERALA, SOUTH INDIA

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Abstract. In an epidemiologic house-to-house survey of oral cancer and precancerous conditions in the Ernakulam district in Kerala in South India, 7 639 individuals were also examined for oral lichen planus. A prevalence of 1.5% was found. Chewing and smoking habits were correlated with the presence of lichen planus and a much higher prevalence of lichen planus found among tobacco chewers than among those with no such habits. In the majority of cases the lichen planus was located in the buccal mucosa, more posteriorly than usual. Histologically an atrophic epithelium was seen more often than a hyperplastic epithelium. The simultaneous occurrence of lichen and submucous fibrosis is discussed in the light of the possible precancerous nature of both diseases.

Epidemiologic surveys of oral lichen planus are rare. The few reported in the literature are tabulated (Table I). These surveys, which were carried out among urban populations attending admission clinics in dental colleges in India, showed a prevalence of oral lichen planus ranging from 0.02% to 0.4%.

In 1966, an epidemiologic house-to-house survey of oral cancer and precancerous conditions was carried out among 50 915 adult villagers in four states of India (5). The results, showing an astonishingly high prevalence of lichen planus in one area, are reported here.

MATERIAL AND METHODS

Study population

The district of Ernakulam in Kerala State (Fig. 1) was one of the five districts selected. There were two main rea-

¹ "Pān" in Ernakulam district is a combination of betel leaf, lime, areca nut and very frequently tobacco. The quid is normally kept in the mandibular buccal groove.

² "Bidi" is a cheap, small smoking stick made by rolling a rectangular dried piece of Temburni (*Diospyros melanoxylon*) with 0.30 to 0.36 g of tobacco into a roughly conical shape and a securing roll with thread. The length of a bidi varies from 4 cm to 7.5 cm.

sons for choosing the Ernakulam district: 1) there are consistent reports that oral cancer is very common in that part of India, and 2) the habit of chewing pān¹ with tobacco is widespread in that area; furthermore, bidi² smoking is also a frequent habit. The villages were selected by the technique of random sampling. For details the reader is referred to the paper by Mehta et al. (5).

When the results from the survey comprising 10 187 individuals in 1967 were analysed, it was seen that there was an unexpectedly high prevalence of oral lichen planus in the study population. The examining dentists in the field found it difficult to distinguish exactly between leukoplakia and lichen planus in a number of cases. The authors therefore worked in the field for a while during the first follow-up survey (2¹/₂ to 3 years after the first survey) in order to calibrate and standardize the diagnosis of oral lichen planus. A total of 7 639 individuals above the age of 15 years were examined in the first follow-up and the results from this follow-up form the basis of the present report.

Examination technique

Oral lichen planus was diagnosed only when the lesion showed the presence of typical striae of Wickham. When the examining dentists were doubtful, a diagnosis of lichen planus was made only if the histologic changes were characteristic of lichen planus. In some cases, however, when the patients refused biopsy, the diagnosis of lichen planus was made on clinical grounds alone. Unfortunately, it was not possible to make a study of the entire skin of those suffering from oral lichen planus.

The examinations were made by two Indian dentists who were trained by and calibrated to the senior author. Before examination, the individuals were questioned about their smoking and chewing habits. The examination of the entire oral mucosa took place in natural light using two mouth mirrors. The lesions were indicated on specially designed diagrams of the oral mucosa and were photographed in colour with a Polaroid® camera.

Biopsies were taken from all lesions when the patients consented. A total of 60 biopsies (58 from the buccal mucosa, one from the maxillary left alveolar process palatally and one from the mandibular left buccal groove) were taken using local anesthesia and a 5 mm punch instrument. The biopsies were fixed in 10% neutral formalin,

Table I. Prevalence of oral lichen planus among 35 000 urban Indians in four cities

Investigator	Year	City	No. of studies	Prevalence of oral lichen planus (%)
Pindborg et al. (7)	1966	Bangalore	10 000	0.02
Pindborg et al. (8)	1965	Lucknow	10 000	0.19
Pindborg et al. (9)	1965	Bombay	10 000	0.22
Zachariah et al. (13)	1966	Trivandrum	5 000	0.40

embedded in paraffin, cut and stained with hematoxylin-eosin.

RESULTS

Prevalence of smoking and chewing habits

Of the 7 639 villagers examined during the first follow-up survey 4 723 (61.8%) had one or several habits of smoking and chewing. Table II gives the age and sex distribution of the various habits of the study sample.

It can be seen that tobacco chewing habits were practised much more by females while smoking habits were practised almost exclusively by males. Chewing habits were practised more often among higher age groups while smoking habits were practised more frequently among lower age groups.

Prevalence of lichen planus

Among 7 639 individuals examined, lichen planus was diagnosed among 118 individuals which gives a prevalence rate of 1.5%. Table III shows the prevalence distribution of lichen planus cases according to age and sex. The highest number of individuals with lichen planus fell into the three age groups between 35 and 64. The prevalence was almost the same in females (1.6%) as in males (1.5%), and was seen to be low among older (above 65) and younger age groups (below 35).

Table IV shows the locations of oral lichen planus. As a person may have more than one area affected, the total number of locations (210) is higher than number of individuals (118). The overwhelming majority (84.3%) of lesions were located in the buccal mucosa. It also includes the lesions located in the mandibular buccal groove which were considerable in number. The next highest number of lesions (5.2%) was found lo-

cated to the tongue, 7 lesions were located in the labial mucosa and 7 to the commissure. Very few lesions were found located in the other parts of the mouth. Fifty-three per cent of the patients had bilateral lesions.

Table V shows the association between tobacco smoking and chewing habits and lichen planus. The highest percentage of lesions (3.7%) was found among the mixed habit group, i.e. among individuals who practised smoking as well as chewing habits. It was closely followed by the 'pān with tobacco' habit group with 3.2%. As the number of individuals in this group was high, it accounts for more than half of the total lichen planus cases. Among the individuals having the habit of chewing tobacco with lime, 1.4% had lichen planus. Association with smoking habits was less marked; only 0.7% and 0.8% among smokers had lichen planus. Among those without



Fig. 1. Map of India showing Kerala State with the Ernakulam district where the survey was done.

Table II. Distribution of habits by age and sex among 7 639 villagers in the Ernakulam district. Comparison between males and females

Figures in parentheses denote percentages

Age group	No habits		Chewing habits		Smoking habits		Mixed habits		Total	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
15-24	333 (9.3)	758 (18.7)	7 (0.2)	29 (0.7)	495 (13.8)	3 (0.1)	15 (0.4)	—	850 (23.7)	790 (19.5)
25-34	88 (2.5)	699 (17.2)	22 (0.6)	180 (4.5)	524 (14.6)	9 (0.2)	108 (3.0)	8 (0.2)	742 (20.7)	896 (22.1)
35-44	47 (1.3)	506 (12.5)	83 (2.3)	435 (10.7)	356 (10.0)	9 (0.2)	243 (6.8)	11 (0.3)	729 (20.4)	961 (23.7)
45-54	40 (1.1)	216 (5.3)	112 (3.1)	405 (10.0)	187 (5.2)	4 (0.1)	215 (6.0)	10 (0.2)	554 (15.4)	635 (15.6)
55-64	30 (0.8)	115 (2.8)	139 (3.9)	321 (7.9)	85 (2.4)	4 (0.1)	124 (3.5)	10 (0.2)	378 (10.6)	450 (11.0)
65 and over	23 (0.7)	56 (1.4)	168 (4.7)	260 (6.4)	43 (1.2)	3 (0.1)	94 (2.6)	7 (0.2)	328 (9.2)	326 (8.1)
Total	561 (15.7)	2 350 (57.9)	531 (14.8)	1 630 (40.2)	1 690 (47.2)	32 (0.8)	799 (22.3)	46 (1.1)	3 581 (100.0)	4 058 (100.0)

habits the percentage of lichen planus was the lowest (0.3%).

Histologic findings

Of the 60 biopsies the epithelium was hyperplastic in 8.4%, in 81.6% it was atrophic and in 6.6% it had a normal thickness and in one case each the epithelium showed combinations of normal-hyperplastic and hyperplastic-atrophic. The epithelium was hyperorthokeratotic in 46.7%, hyperparakeratotic in 43.3% and presented a non-keratinized mucosa in 10.0%. Epithelial atypia (dysplasia) was present in two biopsies (3.3%). Civatte (colloid) bodies were found in 78.7%. A

band of lymphocytic infiltration was present in all biopsies.

DISCUSSION

The prevalence of oral lichen planus reported here is significantly higher than those reported pre-

Table III. Prevalence of oral lichen planus according to age and sex

Age group	Male		Female	
	Number of persons	Prevalence (%)	Number of persons	Prevalence (%)
15-24	4	0.5	—	—
25-34	9	1.2	6	0.7
35-44	16	2.2	24	2.5
45-54	16	2.9	16	2.5
55-64	4	1.1	13	2.9
65 and over	5	1.5	5	1.5
Total	54	1.5	64	1.6

Table IV. Distribution of oral lichen planus lesions according to location

Location	Number	%
Labial mucosa		
Upper	2	1.0
Lower	5	2.4
Commissure		
Right	3	1.4
Left	4	1.9
Buccal mucosa		
Right	91	43.3
Left	86	41.0
Gingiva	1	0.5
Palate	3	1.4
Tongue	11	5.2
Floor of the mouth	3	1.4
Alveolar ridge	1	0.5
Total		
Number of lesions	210	100.0
Number of persons		118

Table V. Correlation between smoking and chewing habits and prevalence of oral lichen planus

Habits	n	Lichen planus	
		n	%
Chewing habits			
Tobacco and lime	212	3	1.4
Pān without tobacco	24	—	—
Pān with tobacco	1 925	61	3.2
Smoking habits			
Bidi	1 334	10	0.7
Others	388	3	0.8
Mixed habits	845	31	3.7
No habits	2 911	10	0.3
Total	7 639	118	1.5

viously from India (Table I). Remarkably, the highest prevalence (0.4%) at these initial surveys was found in Trivandrum which is also in Kerala State and not very far from the Ernakulam district where the present survey was conducted. Unfortunately, no prevalence figures for oral lichen planus are available from other parts of the world.

With regard to prevalence studies of cutaneous lichen planus only two surveys are known to the author; one is from the Faroe Islands (4) where the prevalence in the general population was 0.13%. The other survey, comprising 39 418 individuals, is from Sweden (3) where the prevalence of lichen planus varied from 0.13% to 0.34% in five counties. These figures are well below the prevalence of oral lichen planus found in the present survey.

In the light of a female predominance in oral lichen planus reported earlier in several studies (for review see Andreasen (1)) it is astonishing that this house-to-house survey did not show the same trend.

The location distribution of lichen planus showed an overwhelming predominance of buccal mucosa which is in agreement with most earlier reports (1, 12). It was characteristic of the present study that the buccal mucosa lesions were mostly located to the posterior part. No attempts were made to classify the lesions into subgroups as is often done (1). It should, however, be mentioned that 20% of the lesions had ulcerated areas.

Though tobacco habits have never been mentioned as an etiologic factor in the causation of oral lichen planus, the present results show a significant association in this direction. Lichen planus seems to be associated much more with the habit of chewing tobacco and with the mixed habits of chewing and smoking rather than with smoking habits alone. Among individuals without tobacco habits the percentage was the lowest, only 0.3%. The association of lichen planus with chewing habits may also explain the finding of a large number of lesions in the posterior part of the buccal mucosa and mandibular groove as the tobacco quid customarily is held there.

In four of the 60 biopsies the investigators had the impression that the lichen planus changes were associated with changes characteristic of submucous fibrosis. These characteristics include (10) a marked epithelial atrophy, intercellular edema and hyalinization of the juxtaepithelial connective tissue. As oral submucous fibrosis is considered a precancerous condition (6) its association with lichen planus, which was reported for the first time in 1970 (10), gives a new dimension to the possible precancerous nature of lichen planus (2, 11). As the present survey is part of a long-term follow-up study, all the cases reported on in this paper will be checked at regular intervals for a number of years.

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