

LEUKOPLAKIA AND TOBACCO HABITS IN GIZAN, SAUDI ARABIA

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أجريت دراسة عن شيوخ الطلاوة البيضاء (تقرن الغشاء المخاطي الأبيض) وعلاقته باستعمال التبغ في عينة شملت (١٤٣٦ شخصا) يمثلون مجموعة سكانية تضم (١٦٤٠٠ فرد) في منطقة مساحتها - ٧٢٠ كم في جيزان بالمملكة العربية السعودية. وكانت نسبة انتشار الطلاوة البيضاء في هذه الدراسة ١١,٤٪، وما قبل الطلاوة البيضاء ٤,٣٪ وكان ٩٩٪ من الأفراد المصابين هم ممن يستعملون (الشمة) (خليط من مسحوق التبغ مع كربونات الصوديوم بنسبة ٣:١) وكان موضع الإصابة بالطلاوة البيضاء متطابقا دائما مع مكان وضع - الشمة داخل الفم ووجدت نسبة أقل من الإصابات بين مدخني الشيشة، بينما خلا مدخنوا السجائر وحدها من الإصابات. وتقدم هذه الدراسة دليلا على العلاقة بين استعمال الشمة وانتشار الطلاوة البيضاء.

The prevalence of leukoplakia in relation to tobacco habits was studied in 1,436 subjects in a population of 16,400 at Gizan Region, Saudi Arabia. The prevalence rate of oral leukoplakia and preleukoplakia in this study were 11.4% and 4.3%, respectively. Of the affected subjects, 99% were dippers of snuff known as *Shamma*. It is a powdered tobacco mixed with sodium carbonate hemihydrate in a ratio of 3:1 by weight.

The location of the oral lesion was almost always consistent with the site where the snuff was habitually held. A smaller proportion of lesion was found in Shisha smokers while none of those who only smoked cigarettes had leukoplakia or preleukoplakia.

The findings of this study provide evidence that a relationship exists between oral leukoplakia and *Shamma* dipping.

Introduction

Gizan province occupies the Southwestern corner of Saudi Arabia covering an area of about 20,000 km². It is one of the most densely populated parts of the Kingdom with an average population of 700,000, constituting approximately 6% of the total population of Saudi Arabia.¹ Eighty-seven percent of the population resides outside the town in more than 4,500 villages.

Oral cancer is a major health problem of the population in Gizan, comprising 33% of all cases of malignancy received in one year at King Fahad Hospital.^{2,3} Previous studies²⁻⁴ have pointed out that oral cancer in Gizan was always associated with oral leukoplakia and also confirmed the relationship between oral cancer and tobacco habits, particularly dipping the type of snuff known as *Shamma*.

Shamma is a mixture of powdered tobacco and sodium carbonate hemihydrate in a ratio of 3:1 by

weight.² The quid is placed in the lower labial or buccal vestibules, allowing absorption of the active ingredients through the oral mucosa. Although prohibited by law, *Shamma* dipping is practiced by both sexes in the rural areas of Gizan.

Oral leukoplakia had been reported as the most precancerous lesion of the mouth in the Southeast Asia subregion.⁵⁻⁸ The rate of malignant transformation in oral leukoplakia varied from 4-6% in some studies⁹ to even higher figures in others¹⁰.

The aim of this study was to report on the prevalence of oral leukoplakia and allied lesions in relation to tobacco habits among the population of Gizan.

Materials and Methods

The study material comprised 1,436 male and female subjects, aged 20-57 years, among 16,400 residents of Gizan town, an area of 720 km².

All subjects were registered and matched as to age and sex. Examination took place in day-light with the subject sitting on an ordinary chair. The criteria for inspection of the oral mucosa and for the

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diagnosis of the oral lesions were applied according to the definitions of the World Health Organization (WHO) Collaborating Center for Oral Precancerous Lesions.^{11,12} Leukoplakia was diagnosed as "an elevated white patch of the oral mucosa measuring 5 mm or more which cannot be scraped off, and which cannot be attributed to any other diagnosable disease".¹² Preleukoplakia was diagnosed as a grayish white area measuring 5 mm or more with indistinct borders on the oral mucosa.¹² The location of the lesion was designated using the recommendations of Roed-Petersen and Renstrup for the topographic classification of the oral mucosa.¹³ All examinations were done by the same examiner. Sixteen biopsies were obtained from four preleukoplakia and twelve leukoplakia patients, who were clinically diagnosed. All biopsies were taken from the buccal mucosa proper under local anesthesia. The specimens were fixed in 10% buffered formalin, embedded in paraffin, cut serially and stained with hematoxylin and eosin, periodic acid Schiff (PAS) reagent and a modified Mallory stain.

All subjects were then interviewed individually by another member of the team as to their tobacco habits. The sites where *Shamma* dippers placed the quid were identified and plotted on a diagram in the patient's record.

Results

The age and sex distributions of the population examined are shown in Table 1. Mucosal lesions compatible with leukoplakia or preleukoplakia were diagnosed in 15.7% of the population examined. Leukoplakia was evident in 11.4% while preleukoplakia was identified in 4.3%. The prevalence of leukoplakia and preleukoplakia among the population examined is shown in Table 2.

The anatomical distribution of the oral lesions is shown in Table 3. Location of the lesion was almost always consistent with the site where *Shamma* was habitually held.

Three morphological variants of leukoplakia were identified, namely homogenous [Fig. 1], verrucous [Fig. 2], and speckled or erosive forms [Fig. 3]. The distribution of the morphological variants of leukoplakia is shown in Table 4.

All individuals with mucosal lesions were *Shamma* dippers, however, others smoked cigaret-

tes or *Shisha*. The relationship between tobacco habits and mucosal lesions is shown in Table 5.

The four biopsies from preleukoplakia areas did not show a consistent histologic pattern although a parakeratotic surface layer was found in two specimens. In the twelve biopsies of leukoplakia, six were from patients diagnosed for the homogenous type. Sections showed epithelial hyperplasia, acanthosis, hyperorthokeratosis, well-developed granular layer, and mild inflammatory cell infiltration of the connective tissue [Fig. 4],

Three biopsies were obtained from verrucous leukoplakias. These showed epithelial hyperplasia, acanthosis, mild hyperorthokeratosis, with an underlying granular layer and minimal infiltration in the connective tissue. In these areas partial hyperorthokeratosis was noted [Fig. 5]. The three biopsies from erosive leukoplakias revealed hyperplastic epithelium, surface ulceration, parakeratosis and a prominent inflammatory cell infiltration of the underlying connective tissue [Fig.6]

Table 1. Age and sex distribution of the population examined.

Age group in years								
20-29		30-39		40-49		50 or more		Total
M	F	M	F	M	F	M	F	
257	188	207	89	198	115	214	168	1436

Table 2. Prevalence of preleukoplakia and leukoplakia among 1,436 Saudi Arabians in the Gizan Region.

Type of Lesion	Age group in years								
	20-29		30-39		40-49		50 or more		Total
	No.	%	No.	%	No.	%	No.	%	
Preleuko-plakia	18	4.0	17	5.7	15	4.7	13	3.4	63 4.4
Leukoplakia	27	6.0	25	8.4	44	14	66	17.3	126 11.3

Table 3. Anatomical distribution of the oral mucosal lesions (leukoplakia) and pre-leukoplakia) among the population examined.

Buccal* vestibule	Cheek		Labial vestibule		Lower lip		Floor of mouth		Tongue		
	No.	%	No.	%	No.	%	No.	%	No.	%	
	49	21.7	49	21.7	66	29.3	28	12.4	23	10.2	21 9.3

* Including alveolar mucosa and gingiva.

Table 4. Distribution of the morphologic variants of leukoplakia among different age groups in the population examined.

Variant of Lueko-plakia	Age group in years									
	20-29		30-39		40-49		50 or more		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Homogenous	18	16.8	19	17.7	24	22.4	46	42.9	107	66
Verrucous	4	11.7	8	23.5	9	26.5	13	38.2	34	21
Speckled	0	00.0	3	14.3	7	33.3	11	52.4	21	13

Table 5. Oral habits and the presence of oral mucosal lesions.

Tobacco Habit	Subjects		Preluko-plakia		Leukoplakia		Free	
	No.	%	No.	%	No.	%	No.	%
Shamma only	126	8.8	21	16.6	102	80.9	3	2.3
Shamma and others	100	7.0	38	38.0	62	62.0	0	0.0
Shisha only	18	1.2	2	11.1	0	00.0	16	88.8
Cigarettes only	474	33.0	0	00.0	0	00.0	474	99.7
None	718	50.0	2	1.2	0	00.0	716	99.7

Table 6. Epidemiological studies on oral leukoplakia

Investigator	Year	Country	Size of material	Prevalence of leuko-plakia (%)
Mehta et al ¹⁴	1961	India	4734	3.5
Burszt ¹⁵	1962	Hungary	5613	3.6
Atkinson et al ¹⁶	1964	New Guinea	3996	8.1
Pindorg et al ¹⁷	1968	Papua	1226	6.2



Figure 1. Homogenous leukoplakia of the tongue in a 62-year-old female showing a homogenous uniform surface.

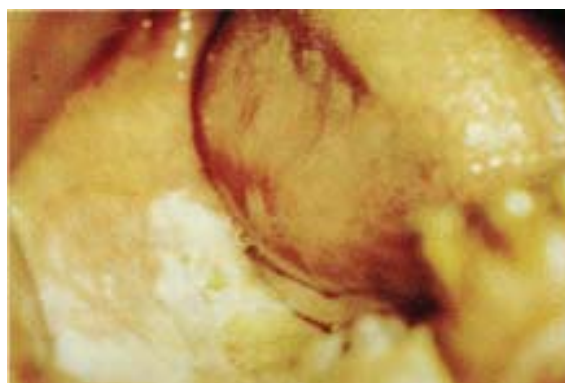


Figure 2. Verrucous leukoplakia of the alveolar mucosa in a 64-year-old female showing an exophytic papillomatous appearance.



Figure 3. Speckled leukoplakia of the lower labial vestibule showing white patches together with an erythematous component.



Figure 4. Photomicrograph of a specimen of homogenous leukoplakia showing epithelial hyperplasia, acanthosis, hyperorthokeratosis, well-developed granular layer and mild inflammatory cell infiltration in the connective tissue (H&Ex 10).

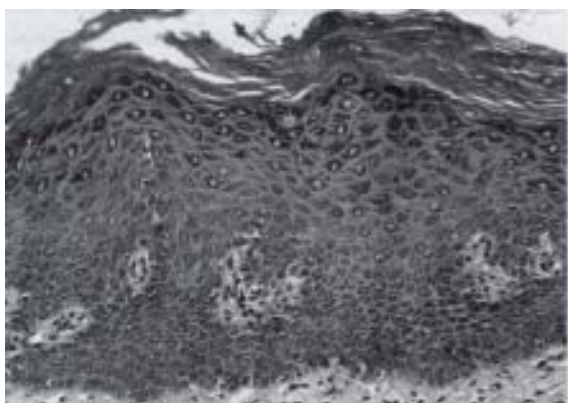


Figure 5. Photomicrograph of a specimen from verrucous leukoplakia. Note the thick keratin layer, prominent granular layer with minimal inflammatory infiltration in the connective tissue (H&E x 25).



Figure 6. Photomicrograph of biopsy from erosive leukoplakia showing epithelial hyperplasia, thick parakeratotic layer, surface ulceration and chronic inflammatory cell reaction (H&E x 25).

Discussion

In this study, oral leukoplakia was clinically diagnosed on the subjects in accordance with WHO's recommendations.^{11,12} Biopsies were taken in only sixteen cases for confirmation of mucosal lesions. The prevalence rates of leukoplakia and preleukoplakia in this study were 11.4% and 4.3%, respectively. These figures are among the highest reported so far as compared with the similar studies from different parts of the world.¹⁴⁻¹⁷ Table 6 shows comparable prevalence rates from four countries.

In this study, it was evident that there was an increase in the frequency of leukoplakia and a

relative decrease in preleukoplakia with advancing age. It is also evident that while the frequency of leukoplakia in general appeared to increase with advancing age, erosive leukoplakia predominated among the older age group. It is generally agreed that the rate of malignant transformation in erosive leukoplakia is high.⁸⁻¹⁰

Among the 226 subjects who dipped *Shamma*, 98.7% had leukoplakia or preleukoplakia (Table 5). When these findings were compared with other tobacco habits, no association was evident between smoking cigarettes or *Shisha* and the development of oral lesions. Leukoplakia was not clinically diagnosed in patients who did not have *Shamma* dipping habit.

In summary, this report points out the association between leukoplakia and/or preleukoplakia and *Shamma* dipping in this part of Saudi Arabia. Microscopic study was minimal and larger part of the study was clinical. The findings provide the evidence, in support of a preventive program designed for early detection of precancerous oral mucosal diseases in Saudi population, that at risk in the Gizan province of the Kingdom.

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