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Prevalence of Oral Mucosal Lesions and Relationship with Habits: A Cross-Sectional Prospective Clinical Study

Hamza Yıldız,[1*] MD, Özlem Karabudak Abuaf,[2] MD, Ercan Karabacak,[2] MD, Bilal Doğan,[2] MD

Address: [1]Department of Dermatology, [2]Eskisehir Military Hospital, Eskisehir, Gata Haydarpasa Teaching Hospital, İstanbul, Turkey

E-mail: hamzayildiz@gmail.com

** Corresponding Author:* Dr. Hamza Yildiz, Department of Dermatology, Eskisehir Military Hospital 26020 Eskisehir, Turkey

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Abstract

Background: Epidemiologic researches about oral mucosal lesions (OML) and possible relationships between OML and some habits or conditions have been performed in different populations.

Objective: To determine the prevalence of oral mucosal lesions and relationship between OML and black tea, tooth brushing-habits, smoking, alcohol consumption, denture use on the oral mucosal lesions.

Subjects and Methods: In this cross-sectional prospective clinical study, randomize selected 930 dermatology outpatients were examined using WHO criteria for oral mucosal lesions in our tertiary state hospital in Istanbul, Turkey, between September 2012 and December 2012.

Results: Oral mucosal lesion was recorded in 500 (53.8%) subjects (164 (%32.8) female). The mean age of the patients was 41.3±1.99 years (ranging from 18 to 88). Frictional keratosis, nicotine stomatitis, and gingivitis were significantly more prevalent among the alcohol drinkers. Frictional keratosis was seen significantly higher in patients with denture.

Heavy smoking was the risk factor for nicotine stomatitis, pigmentation, frictional keratosis, and gingivitis. Drinking black tea was found to be a significant risk factor for occurrence of nicotine stomatitis, xerostomia and gingivitis.

Conclusion: This study has provided information about the epidemiologic aspect of oral mucosal lesion in this region. Public health policies should be implemented in order to manage this problem rationally.

Introduction

Epidemiologic studies have demonstrated a wide variability in prevalence rate of oral mucosal lesion (OML) in different populations. The development OML is influenced by external factors such as geographic region, socioeconomic status, and personal habits such as smoking, tooth-brushing habits, black tea and alcohol consumption [**1, 2, 3, 4, 5, 6**]. The prevalence of OML differs between regions as a result of these factors. Information on the frequency of OML is limited. The definition of OML prevalence is important in planning therapeutic and preventive healthcare services.

This study aimed to determine the prevalence of OML among dermatology outpatients and their distribution according to age, gender, tooth-brushing habits, smoking, black tea and alcohol consumption.

Tablo 1. Prevalence of the OML According to Age and Sex

	18-25	26-35	36-45	46-55	56-65	>65	Female	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n
Gingivitis	149 (40)	47 (12)	43 (11)	40 (10)	35 (9)	63 (17)	129 (34)	377
Leukoplakia	0 (0)	1 (25)	0 (0)	1 (25)	1 (25)	1 (25)	1 (25)	4
Frictional Keratosis	22 (30)	6 (8)	9 (12)	7 (9)	10 (14)	18 (25)	23 (32)	72
Nicotine stomatitis	57 (45)	18 (15)	13 (10)	16 (13)	8 (6)	12 (10)	25 (20)	124
Lichen planus	9 (60)	0 (0)	3 (20)	3 (20)	0 (0)	0 (0)	3 (20)	15
Pigmentation	10 (26)	4 (10)	5 (13)	10 (26)	6 (15)	4 (10)	17 (44)	39
Xerostomia	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (100)	2 (100)	2
Ulcers	5 (50)	0 (0)	2 (20)	0 (0)	1 (10)	2 (20)	4 (40)	10
Total	252 (39)	76 (12)	75 (12)	77 (12)	61 (9)	102 (16)		643

Materials and Methods

In this cross-sectional prospective clinical study, randomize selected 930 dermatology outpatients, not attended for oral mucosal lesions, examined for dermatologic disease and oral mucosal lesions in our tertiary State Hospital in Istanbul, Turkey. The present study was performed in the city province of Istanbul, which is located in western region of Turkey with a population of 14,160,000. The study period was from September 2012 to December 2012. Ethical approval was obtained from the Research and Development Department of the State Hospital for this study (1491-13-12/1539 - 06.03.2012).

Patients were selected by the cluster sampling method and examined according to World Health Organization's Guide to Epidemiology and Disease of Oral Mucosal Disease and Conditions [7]. Diagnostic charts were used to record personal data and the oral lesions. All of the patients were questioned about black tea consumption, tooth brushing-habits, smoking, alcohol consumption, denture use. All examinations and diagnoses were carried out by the same authors from Department of Dermatology. All dermatologists received a standard training for detecting oral lesions before starting this study. No biopsies and laboratory tests were done in the present study.

Informed consents were obtained from the patients. Exclusion criteria were refusal and failure to return consent forms. Development defect such as sublingual varix, geographic and fissured tongue, and Fordyce granules were not included. Recurrent herpetic lesions and aphthous stomatitis were recorded only if observed at the time of the examination.

Statistical Analysis

Data analyses were performed using SPSS 11.0 statistical software (SPSS Inc., Chicago, IL). The normal distribution of the quantitative data was tested by using the Shapiro-Wilk test, and the Mann-Whitney U test was used for the abnormally distributed quantitative data. Possible statistical relationships among some of the items were analyzed by the chi-squared test with a significant level of 5%, which is determined based on the sample size. The x^2 test was used to compare qualitative data. The data are represented as the means values ± SD. A P value less than 0.05 was considered statistical significant.

Results

Of the 930 subjects included in the study, 336 (36.1%) were women and 594 (63.9%) were men. The prevalence rates of the different OML were determined according to six different age groups (**Table 1**). Age groups were as follows (age group; n (%)): 18-25; 409 (43.7%), 26-35: 124 (13.3%), 36-45: 94 (10.1%), 46-55 86 (9.2%), 56-65; 80 (%.6%), >65; 140 (15.1%). The mean age of all groups was 38±1.95 years (ranging from 18 to 88).

OML were found in 500 (53.8%) (164 (%32.8) female and 336 (%67.2) male) of 930 examined subjects. Thus the prevalence rate of OML was 53.8%. The mean age of the patients was 41.3±1.99 years (ranging from 18 to 88). Of the 500 patients, 164 were men (32.8%) and 336 were women (67.2%). Of the subjects who had one or more OML; 271 (29.1%) subjects had one OML, 198 (39.6%) had two OMLs, 25 (2.7%) had three OMLs, 6 (0.6%) had four OMLs at the same time.

Of the 930 subjects included in the study, 430 were healthy. OML were not found in 430. Of the 430 subject, 172 (40%) were women and 258 were men. The mean age of the patients was 36.4±1.86 years (ranging from 18 to 87).

Evaluation of the distribution of OML according to smoking, tooth brushing-habits, denture, black tea and alcohol consumption use are represented

Table 2. Distribution of OML According to Variables

Variables	Severity*	Female	Total	Leukoplakia	Frictional Keratosis	Nicotine stomatitis	Lichen Planus	Pigmentation	Xerostomia	Ulcers	Gingivitis	No lesion	Total
		n, %	n, %	n	n	n	n	n	n	n	n	n	n
Denture use	Yes	121, 49	247, 27	4	33	30	1	14	2	4	109	97	197
	No	215, 31	683, 73	0	39	94	14	25	0	6	268	333	446
Smoking	0	246, 45	543, 58	2	29	2	5	15	2	6	180	321	241
	1	50, 27	188, 20	1	13	49	6	15	0	1	81	65	166
	2	40, 20	199, 22	1	30	73	4	9	0	3	116	44	236
Black tea	0	26, 47	55, 6	1	5	6	0	1	1	0	20	27	34
	1	177, 39	454, 49	3	29	44	3	14	1	4	152	242	250
	2	133, 32	421, 45	0	38	74	12	24	0	6	205	161	359
Alcohol consumption	0	295, 41	714, 77	3	44	77	12	31	2	9	271	351	449
	1	31, 23	133, 14	0	13	25	1	6	0	1	65	53	111
	2	5, 11	46, 5	0	8	9	1	1	0	0	20	15	39
	3	2, 11	18, 2	0	4	7	1	0	0	0	13	3	25
	4	3, 16	19, 2	1	3	6	0	1	0	0	8	8	19
Tooth brushing	0	8, 26	31, 3	0	2	4	1	2	0	0	20	9	29
	1	25, 35	72, 8	0	6	15	1	10	0	0	39	21	71
	2	35, 27	128, 14	1	11	27	3	2	0	2	63	40	109
	3	126 35	362, 39	2	35	50	8	19	1	3	154	157	272
	4	142, 42	337, 36	1	18	28	2	6	1	5	101	203	162

*Smoking: 0 = none, 1 = 1 - 10 cigarettes per day, 2 = > 10 cigarettes per day

Black tea: 0 = none, 1 = 1 cup of tea per day, 2 = > 1 cups of tea per day

Alcohol: 0 = none, 1 = social drinker, 2 = once a week, 3 = > once a week, 4 = every day

Tooth brushing: 0 = none, 1 = once or twice a week, 2 = 3 or 4 times a week, 3 = every day, 4 = twice or more a day

in (**Table 2**). Some OML lesions such as pyogenic granuloma, Heck's disease, solitary angiokeratoma, mucocele were not statistically evaluated and given in tables.

The prevalence of nicotine stomatitis was significantly higher in male than females (p = < 0.0005); and pigmentation, xerostomia were higher in age group 5 than others; gingivitis, nicotine stomatitis, pigmentation were higher in tooth brushing in group 4 than others were observed. The comparison of OML with sex, age groups, smoking, denture use, tooth brushing, black tea and alcohol consumption were summarized in (**Table 3**).

Discussion

The comparison of the finding of this present study with other epidemiological studies is difficult, as categorizations, sampling methods, geographic settings, socio-demographic characteristics of the population (such as elderly, children, dental school patients, collages students, hospitalized patients, misusers and others population), methodology, and clinical diagnostic criteria vary from one to other studies.

The frequency of adult presenting with OML in the present study was 53.8% and the most prevalent OML were gingivitis (40.5%), nicotine stomatitis (13.3%), frictional keratosis (7.7%), pigmentation (4.2%), lichen planus (1.6%), and ulcers (1.1%) (**Table 1**). The prevalence of OML (53.8) was higher than *Avcu* et al. (52.2%), *Mumcu* et al. (41.7%, in adult), *Parlak* et al. (26.2%, prevalence of OML in 13 to 16-year-old students) *Gönül* et al. (22.6%), and *Cebeci* et al (15.5%) results in Turkish population [**2, 3, 4, 5, 6**].

The most common OML was gingivitis (40.5%) in this present study. The percentage of gingivitis was highest among subject aged 18 - 25 years old. Gingivitis was more common in male patient (66%). Smoking, heavy alcohol and drinking black tea was found to be a significant risk factor for occurrence of gingivitis. In recent studies, the general prevalence of adult gingivitis varies from approximately 50 to 100%. It is more common in second decade of life. Females generally exhibit lower gingivitis prevalence and severity than males [**8**].

The prevalence rate of nicotine stomatitis was found 1.3% [**3**]. We found the prevalence

Table 3. Analysis of Factors Associated With OML

Variables and severity		Leukoplakia	Frictional Keratosis	Nicotine stomatitis	Planus Lichen	Pigmentation	Xerostomia	Ulcers	Gingivitis
		p	*p*	*p*	*p*	*p*	*p*	*p*	*p*
Denture use	Yes	*	< 0.0005	*	*	*	*	*	*
Smoking	0,1	*	*	*	*	*	*	*	*
	2	*	< 0.0005	< 0.0005	*	0.009	*	*	< 0.0005
Black tea	0,1	*	*	*	*	*	*	*	*
	2	*	*	0.002	*	*	0.024	*	< 0.0005
Alcohol consumption	0,1,2,3	*	*	*	*	*	*	*	*
	4	*	0.003	< 0.0005	*	*	*	*	0.009
Tooth brushing	0,1,2,3	*	*	*	*	*	*	*	*
	4	*	*	0.001	*	< 0.0005	*	*	< 0.0005
Age group	1,2,3,4,6	*	*	*	*	*	*	*	*
	5	*	*	*	*	0.003	0.046	*	*
Sex	Male	*	*	< 0.0005	*	*	*	*	*

* = p > 0.05

rate of nicotine stomatitis 7.7%. The prevalence of pigmentation was found 0.3 - 6.9% in previous studies in Turkish population [**3, 6**]. We found the prevalence rate 4.2%. Pigmentation was significantly more prevalent among the heavy smoking. Tobacco smoking is known to be the main cause of oral melanin pigmentation and nicotine stomatitis [**3**].

The prevalence of oral leukoplakia (0.43%) was found similar with (0.4%) *Mumcu* and (0.4%) *Cebeci* et al. and higher than (0.7%) *Gönül* and (0.2%) *Parlak* et al. The prevalence of oral lichen planus (1.6%) was higher than (0.5%) *Mumcu* and (0.8%) *Cebeci* et al. and higher than (0.4%) *Gönül* et al. The prevalence of oral ulcer (1.1%) was lower than (1.2%) *Mumcu*, (2.3%) *Cebeci*, (4.6%) *Gönül* and (3.6%) *Parlak* et al [**2, 3, 4, 5, 6**].

247 (27%) of the patients had history of denture, 387 (42%) smoking, 875 (94%) black tea, 216 (33%) drinking alcohol, and 899 (97%) tooth brushing (**Table 2**). Black tea drinking was the most frequent habit in Turkish population, 875 (94%) black tea drinkers and 421 (45%) heavy black tea drinkers. Nicotine stomatitis, xerostomia and gingivitis were significantly more prevalent among the heavy black tea drinker. But we do not know that if there is a real relation or not, because the large majority of heavy smokers also have found that heavy black tea drinkers (black tea 2 = 72.3%, 1 = 27.5%, 0 = 4.36%).

Frictional keratosis, nicotine stomatitis, and gingivitis were significantly more prevalent among the heavy smoking. Frictional keratosis was significantly more prevalent among the denture use. Frictional keratosis, nicotine stomatitis, and gingivitis were significantly more prevalent among the alcohol drinkers. These outcomes were consistent with the literature [**9, 10, 11**]

In present study, there were not statistical significant differences between leukoplakia, lichen planus and ulcer with denture use, smoking, black tea, alcohol consumption, tooth brushing, age groups and sex (p> 0.05).

Mumcu et al. reported the prevalence of OML as 41.7% in the normal population in Istanbul, and melanin pigmentation was the most frequently lesion [**3**]. In this study, being elderly was found to be a significant risk factor for occurrence of some oral lesions. We found that the prevalence of pigmentation and xerostomia were significantly higher in elder patients. We suggest that oral mucosa should be examined carefully even if the patients do not attend with the complaint of oral lesions, especially in smokers, elderly and denture users.

The OML prevalence has an important role in planning both preventive and therapeutic healthcare services. The opinion that many regional factors, such as socioeconomic status, personal habits (such as tooth brushing,

black tea and alcohol consumption, denture use, and smoking), cultural differences, influence the prevalence of OML is supported by studies demonstrating that disease distributions can differ according to the region examined. Studies evaluating applications to hospital outpatient clinics provide valuable information about the prevalence of OML. Public health policies should be implemented in order to manage OML rationally.

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