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Prevalence of Oral Mucosal Lesions in Smokers and Nonsmokers: A Cross-Sectional Study in Jeddah, Saudi Arabia

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ABSTRACT

Introduction: *Tobacco smoking is considered as one of the most common risk factors for the development of Oral Mucosal Lesions (OML). A variety of oral mucosal lesions and conditions are associated with the habit of smoking, and many of these lesions carry a potential risk for the development of oral cancer. There has been very less literature about the prevalence of smoking and associated oral mucosal lesions in the population of Jeddah, Saudi Arabia.* ***Materials and methods:*** *A cross-sectional study was carried out with the patients who visited various Dental Colleges and dental hospitals in Jeddah, Saudi Arabia for one year. A total of 999 subjects (236 nonsmokers and 763 smokers) were interviewed and examined by trained professionals to assess any oral mucosal lesions.* ***Results:*** *There was a considerable difference in the association of oral mucosal changes in the smokers and non-smokers; 748 subjects with smoking habits had OMLs compared to 176 subjects who had no such habits. The prevalence of white lesions, pigmented lesions, and ulcerative lesions in smokers was considerably higher than non-smoker in the study group. Overall the prevalence of oral mucosal lesions differed in the subjects with the smoking habit as compared without smoking habit, which was found to be statistically significant ($p<0.05$).* ***Conclusion:*** *White, pigmented lesions were the most common types of oral mucosal lesions reported in smokers. Efforts to increase patient awareness of the oral effects of smoking and to eliminate the smoking habit are needed to improve oral and general health.*

Keywords: Oral mucosal lesion, Smoking, Tobacco, White lesions, Prevalence, Oral cancer

INTRODUCTION

Oral health is important to the quality of life of all individuals. The oral mucosa serves as a protective barrier against trauma, pathogens, and carcinogenic agents [1]. It can be affected by a wide variety of lesions and conditions, some of which are harmless, while others may have serious complications [2]. Identification and treatment of these pathologies are an important part of total oral health care. Hence, oral soft tissue examination is crucial, and it should be done systematically to include all parts of the oral cavity. Tobacco use is an inordinate health problem for developing as well

as developed countries. It is associated with high levels of morbidity and mortality all over the world [1]. Tobacco use in the form of smoking and non-smoking are common worldwide. Tobacco smoking is considered one of the most important risk factors for the development of oral mucosal lesions [3,4]. Cigarettes contain more than 4,000 ingredients of chemicals and free radicals such as nicotine, ammonia, acrolein, phenols, acetaldehyde, benzopyrene, nitric oxides, carbon monoxide, polonium, radium, and thorium that can lead to cellular damage [5,6]. Cigarette smoking is associated with Oral Mucosal Lesions (OMLs) like oral leukoplakia, smoker's melanosis, frictional hyperkeratosis, nicotinic stomatitis or smoker's palate, black hairy tongue, and squamous cell carcinoma. Also, smoking is a significant threat factor for periodontal disease. Tobacco contains an enormous number of carcinogens, but the most significant of them are the polycyclic aromatic hydrocarbons, aromatic amines, and nitrosamines [7-10]. Smoking is a recognized tobacco epidemic in Saudi Arabia as in many other countries. Common forms of tobacco used in Saudi Arabia are cigarette smoking, shisha or moasel, and gat. Despite the high usage of smoking tobacco among Saudi people and the reported risk of developing oral mucosal lesions associated with it, there is a scarcity of research which assesses the prevalence of oral mucosal lesion associated with smoking in Saudi Arabia. Therefore, the purpose of this study was to evaluate the prevalence of Oral Mucosal Lesions (OMLs) among smoker's users in Jeddah, Saudi Arabia. This information can help determine the epidemiology and severity of oral mucosal lesions in Jeddah, Saudi Arabia and help identify risk factors for OMLs. It will also serve as a baseline for future studies to find ways to improve oral health in the Kingdom of Saudi Arabia.

MATERIAL AND METHODS

A cross-sectional study was carried out in the dental colleges and dental hospitals in Jeddah over 1 year with 999 participants (233 non-smokers and 767 smokers). Respondents were divided into two groups, group-I: smokers and group-II: non-smokers. Group-II was selected from healthy non-smokers who attended the OPD or dental clinics for routine dental examinations. Participants who had any systemic disease (cardiovascular, endocrine, gastrointestinal, oral, or respiratory disease), who consumed alcohol, or who were under drug treatment were excluded from this study. Both the groups were examined by trained dental interns or experienced dentists, by using light, mouth mirrors, gauze, and a periodontal probe. The diagnosis was made based on the case history and clinical features. Using the Color Atlas of Common Oral Diseases as a guide for diagnosis and grouping, oral mucosal lesions were identified as white, red, pigmented, ulcerative, or exophytic based on their prominent clinical appearance [2]. Lesions that did not fit in any of the above groups were labeled miscellaneous. Personal data including age, gender, chief complaint, and smoking habits were recorded. The study protocol was approved by the ethics committee of Ibn Sina College of Medical Studies, Jeddah. All participants were informed and approved that the study goals had been explained to them. Data were collected during the 1-year duration and were assessed by using chi-square tests and SPSS statistical software. A p-value of 0.05 was considered statistically significant.

RESULTS

Results of the 999 study population, 528 (52.8%) were males and 472 (47.2%) were females. There was a considerable difference in the association of oral mucosal changes in the smokers and non-smokers; 748 subjects with smoking habits had OMLs compared to 176 Subjects who had no such habits. This difference was found to be statistically significant ($p<0.05$). The total number of OMLs was considerably greater in smokers than in the control group. The prevalence of OMLs was statistically significant between the two groups (Table 1). The effect of smoking on oral lesions was evaluated by using Odd Ratio (OR) estimates. The estimated OR for developing OMLs was found to be elevated in subjects with smoking habits (OR=0.059, 95% CI=0.106) as compared to those who had no such habits. The prevalence of oral mucosal lesions was found to increase with the increasing frequency and duration of the habits.

Table 1 Correlation of Oral Mucosal Lesions (OML) in smokers and non-smokers

	Smokers		**Non-smokers**		**Total**	
	Without OML	**With OML**	**Without OML**	**With OML**	**Without OML**	**With OML**
No. of cases	15	748	60	176	75	924
% of cases	2.00%	98.00%	25.40%	74.60%	7.50%	92.50%
p-value <0.05 (significant)						

There was no association of age with OMLs from the study findings. This difference was found to be statistically not significant (p=0.162). There was no association of gender with OMLs from the study findings. This difference was found to be statistically not significant (p=0.558) (Table 2).

Table 2 Correlation of OML with age and gender in smokers and non-smokers

	Age		p-value	Gender		p-value
	<40	>40		Male	Female	
Smoker	41.90%	16.30%	>0.05	58.90%	41.10%	>0.05
Non-smokers	41.30%	16.90%	>0.05	50.90%	41.90%	>0.05
p-value >0.05 (not significant)						

The prevalence of white lesions in smokers was considerably higher than in non-smoker in the study group. This difference was found to be statistically significant (p<0.05). The estimated odds ratio for developing white oral mucosal lesion was found to be elevated in subjects with smoking habits (OR=0.101, 95% CI=0.062-0.164) as compared to those who had no smoking habits. The most common white lesions reported in our study with smoking habits were leukoplakia.

The prevalence of red mucosal lesions in smokers was slightly higher than in non-smoker in the study group. This difference was found to be statistically not significant (p=0.345). The estimated odds ratio for developing red mucosal lesion was found to be elevated in subjects with smoking habits (OR=1.008, 95% CI=1.002-1.014) as compared to those who had no smoking habits. The most common red lesions reported in smokers were palatal erythema.

The prevalence of pigmented lesions in smokers was considerably higher than in non-smoker in the study group. This difference was found to be statistically significant (p<0.05). The estimated odds ratio for developing pigmented lesion was found to be elevated in subjects with smoking habits (OR=0.026, 95% CI=0.010-0.070) as compared to those who had no smoking habits. The most common pigmented lesions reported in smokers were smoker's melanosis.

The prevalence of ulcerative lesions in smokers was higher than in non-smoker in the study group. This difference was found to be statistically significant (p<0.05). The estimated odds ratio for developing ulcerative lesions was found to be elevated in subjects with smoking habits (OR=2.086, 95% CI=1.551-2.804) as compared to those who had no smoking habits. The most common ulcerative lesions reported in smokers were aphthous ulcers (Table 3).

Table 3 Correlation of different Oral Mucosal Lesions (OML) in smokers and non-smokers

		White mucosal lesion	Red Mucosal lesion	Pigmented lesion	Ulcerative lesion
Smoker	Number	355	6	305	298
	Percentage	46.50%	0.80%	40.00%	39%
Non-smokers	Number	19	0	4	135
	Percentage	8.10%	0%	1.70%	57.20%
	p-value	<0.05	>0.05	<0.05	<0.05

The above results indicate that the prevalence of oral mucosal lesions differed in the subjects with smoking and without smoking, which was found to be statistically significant (p<0.05).

DISCUSSION

There is still controversy exist in the literature about the prevalence of oral mucosal lesions in smokers. This study aimed to evaluate oral mucosal lesions in smokers compared with non-smokers in Jeddah, Saudi Arabia.

Tobacco smoking has many harmful consequences on the oral mucosa and is one of the most important risk factors for oral cancer [11]. Early detection and screening of smokers are very essential. In the present study, 1 of the 767 smokers (0.13%) had squamous cell carcinoma. Thus, the implementation of regular dental services and care and health

education is essential in high-risk patients [5].

According to the present study, the prevalence of OML is more in smokers as compared with non-smokers. We also evaluate the association of age and gender on oral mucosal lesions but did not find any correlation between age and gender. The results of another study showed that smoking and age are significant risk factors for OMLs [4].

Mathew Al, et al. in their study, found that the most prevalent normal variations and oral lesions were Fordyce granules, fissured tongue, frictional hyperkeratosis, smoker's palates [8]. In our study, we found pigmented lesions (smoker's melanosis) and white lesions (leukoplakia) were more prevalent. We did not evaluate the oral mucosal developmental anomalies.

The prevalence of oral cancer in our study was 0.13%. Another study by Lay KM, et al. concluded that the prevalence of oral cancer is 0.03% with smoking [9]. After analyzing the data, we concluded that OMLs are significantly more common in smokers in Jeddah Saudi Arabia. Fatemeh Ahmadi performed one study on the prevalence of OMLs in smokers and non-smoker in Hamadan (Iran) and found a large number of oral mucosal lesions in smokers that had a strong correlation with smoking [1]. Leukoplakia was more frequently observed in subjects with smoking habits. As in many other studies, our study also supports an association between smoking habits and leukoplakia [12]. After analyzing the data, we concluded that OMLs are significantly more common in smokers. According to the literature, these outcomes were the same as in other studies [13-16]. Dentists must be aware of the effect of smoking on the development of oral pathologic lesions and encourage smokers to quit the habit [17]. Tobacco smoking increases the number of aneuploid nuclei in the oral epithelium and causes oral malignant and premalignant lesions. Therefore, an inspection of the oral cavity to find lesions caused by tobacco is a good way to initiate tobacco cessation. Thus, the oral mucosa should be examined carefully, especially in smokers, even if the patients did not attend with the complaint of oral lesions. In this study, we selected only cigarette smokers and did not evaluate other habits such as alcohol and tobacco chewing. In another study, OMLs differed according to some habits but were most prevalent in smokers [18]. Therefore, close follow-up and systematic evaluation are more necessary in smokers. It is also necessary to educate oral hygienists, dentists, and medical specialists about how to treat smokers [18].

CONCLUSION

The results of the present study provide important information about the prevalence of oral mucosal lesions among patients who had a smoking habit in Jeddah, Saudi Arabia. The information presented in this study adds to our understanding of the common oral mucosal lesions occurring in smokers. White, pigmented lesions were the most common types of oral mucosal lesions reported in smokers. Efforts to increase patient awareness of the oral effects of smoking and to eliminate the smoking habit are needed to improve oral and general health. The results of this study should serve as the basis for a larger, nation-wide survey of oral lesions.

DECLARATIONS

Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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