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Risk Factors of Oral Leukoplakia in Iraqi Patients: A Case Control Study

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Abstract

Background: Oral leukoplakia is a precancerous condition that causes white and grey patches inside the mouth. The patches are hyperplastic lesions of oral squamous epithelium, with some cases tending to malignancy. The WHO Collaboration Centre for oral cancer identified 11 oral disorders as potentially malignant disorders, and oral leukoplakia was the most frequent finding in clinical practice. There are several risk factors for the development of oral leukoplakia. These factors will be evaluated and assessed in this study in Iraqi patients.
Aim: To determine the risk factors for oral leukoplakia in Iraqi patients.
Methods: A case-control study was conducted in Osol Al-elm University College's clinics from the 3rd of March 2021 to 17th August 2024. The study included 331 patients divided into two groups: a case group included 131 patients with oral leukoplakia (n=131) and a control group included 200 patients (n=200) who attended the outpatient clinics. Any patient with oral leukoplakia visiting dental clinics in Osol Al-elm University College is included in the study and regarded as a case group. In contrast, the control group is selected haphazardly from patients visiting dental clinics for one reason or another. Criteria for selecting the control group include: age of more than 20 years for both sexes (males and females).
Results: In this study, the age of the patient was evaluated as a risk factor for oral leukoplakia. The mean age for the case group was 55.46 with SD±8.5, while for the control group, 44.9 with SD±13.5. Regarding the age, patients aged more than 50 years are associated with increased risk for oral leukoplakia (P value = 0.01), especially the age group 50-59 years old as shown in fig. 1.
Regarding the gender: sex difference was not significantly associated with leukoplakia (P value= 0.4), as 73 patients out of 131 with oral leukoplakia are males while 58 out of 131 are females comparing with control group as male patients are 112 out of 200, while females are 88 out of 200, showing no significant difference between the two groups. Considering smoking as a risk factor, heavy smoking patients are associated with increased risk for oral leukoplakia (P value 0.04).
Conclusion: The current study identifies 2 risk factors for the development of oral leukoplakia in Iraqi patients. These risk factors were age and cigarette smoking, while excluding gender and denture use as risk factors for the development of oral leukoplakia.

Keyword*:* Oral leukoplakia, Risk factors, Iraqi patients.

1. Introduction

Oral leukoplakia is a pre-malignant disorder affecting the oral cavity. It is not a rare condition. A systematic review pooling data from studies with at least 1000 individuals estimated that the prevalence in the general population is between 0.3 and 4.1%, with high heterogeneity among continents and the highest prevalence rate recorded in Asia and Oceania [1, 2]. In a study carried by

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FW Mello in 2018 in Fedral University of Santa Catarina-Florianopolis, Santa Catarina, Brazil, the meta-analysis revealed that the prevalence of leukoplakia among oral potentially malignant disorders was 4.11%, while overall prevalence of oral potentially malignant disorders among adults worldwide was 4.47% with predominant male involvement more than females [1, 3].

In Iraq, a study caried out by Najm [4] at Basrah University, where he evaluated the prevalence of oral mucosal lesions in patients, who are attending the oral diagnosis department of the College of Dentistry, Basrah University, found that the prevalence of oral leukoplakia was 0.08% in 2318 patients visiting the oral diagnosis department of the College of Dentistry – Basrah University [5]. Oral leukoplakia is a white patch that can occur in any part of the oral cavity and can't be rubbed off like candidiasis, lichen planus, or any other white lesions in the mouth, including tongue injuries.

As a potentially premalignant condition, a long history of oral white patches, excluding the diagnosis of oral leukoplakia. So, the diagnosis of oral leukoplakia in this study is done by rule of exclusion and incisional biopsy is done if there is a suspension of malignant/dysplastic changes or differentiation from other lesions of white patches is difficult proceeding by formal consent of the patient, while definitive treatment is done by a specialized centre (faciomaxillary centre) in the medical city [6].

Risk factors include all forms of tobacco use, including cigar, cigarette, beedi and pipe. Other synergistic risk factors include alcohol consumption, chronic irritation, fungal infections such as candidiasis, oral galvanism due to restorations, and bacterial infections [7]. Also, sexually transmitted lesions like syphilis, combined micronutrient deficiency like vitamin A and vitamin B, viral infections, hormonal disturbances and ultraviolet exposure, betel nut, which is more common in the Philippines and other Southeast Asian nations, the nation of areca palms [8].

Heavy alcohol consumption is considered an important risk factor for the development of oral leukoplakia, especially if combined with tobacco smoking, but in our patients, no patient gave a history of alcohol consumption, so this factor is excluded from our study. The natural history of oral leukoplakia varies according to geographical distribution and risk profile (smoking vs tobacco chewing) [9], method of diagnosis (visual vs histopathological examination) [10], short vs long follow-up of patients, and variations in study design [3, 11].

2. Patients and methods

This is a case-control study that is conducted in Osol Al-elm University College's dental clinics from the 3rd of March to the 17th of August 2024. The study included 331 patients divided into two groups: the case group included 131 patients with oral leukoplakia (n=131) with an average age of 55.46 and (SD±8.5). while control group included 200 patients (n=200) who attended the outpatient dental clinics with an average age of 44.9 and (SD±13.5).

The sampling method used was purposive sampling based on non-random criteria (inclusive and exclusive criteria). For case-group: the inclusive criteria are any patient with oral leukoplakia visiting dental clinics in Osol El-elm University College, in whom risk factors are evaluated. There are no exclusive criteria in this group.

For the control-group inclusive criteria are the age of the patients, where any patient with age 20 years old and more is included, while children and adolescents (patients less than 20 years old) are

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excluded from this group, as leukoplakia more common in adult patients and rare in children and adolescents [4].

Diagnosis of oral leukoplakia is mainly based on the patient's history and clinical examination (irregular white or grey patches that can't be wiped away) as displayed in Fig. 1 (a, b). 47 patients out of 131 oral leukoplakia patients accepted the diagnosis with incisional biopsy, while 84 patients refused biopsy. Results of histopathology of incisional biopsy are used for diagnosis purposes, and staging of dysplasia is left for definitive treatment.

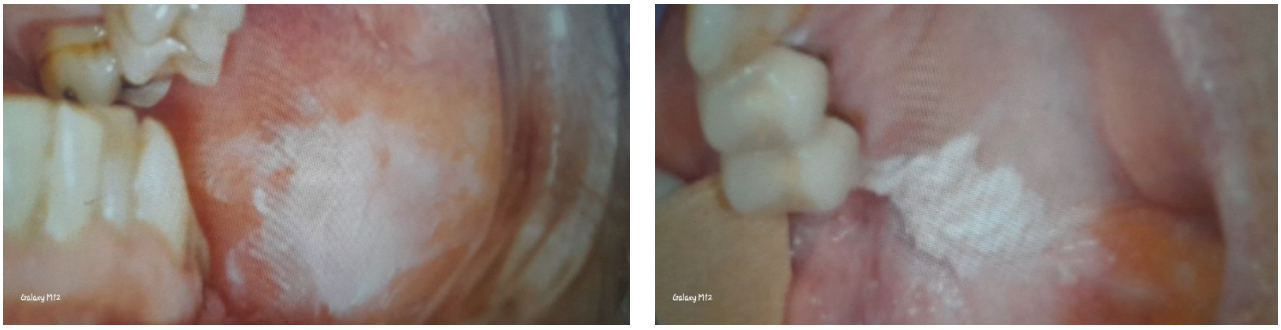

Fig. 1 Diagnosis of oral leukoplakia

Risk factors like age, gender, cigarette smoking, denture use was evaluated and analysed, while other factors especially alcohol drinking was excluded from this study because the patients didn't give history of alcohol drinking, which is considered as an important risk factor by Speight et al. [8] and Warnakulasuriya et al. [9]**.**

3. Results

The total number of study patients is 331. They are divided into two groups: case-group (with oral leukoplakia) included 131 patients, and control-group included 200 patients who attended the dental clinics for other complaints.

Regarding age, there are significant differences between study groups (P-value= 0.01), while regarding gender, there are no significant differences between study groups (P-value= 0.6), as displayed in Fig. 4. Higher incidence is among age groups 50-59, Table 1, and Figs. 2 and 3, while lowest among age groups less than 40 years old.

The same is applied for denture as a risk factor with no significant differences between study groups (P-value= 0.07), Fig. 5, while cigarette smoking is considered as a significant risk factor with differences between study groups (P-value= 0.04), table 2 and Fig. 6. Two factors are found to be statistically significant in patients with oral leukoplakia: Age of the patient (P-value= 0.01), especially patients older than 50 years old (see figure 1 and table 1) and cigarette smoking (P-value= 0.04) as shown in Table 2 and Fig. 3).

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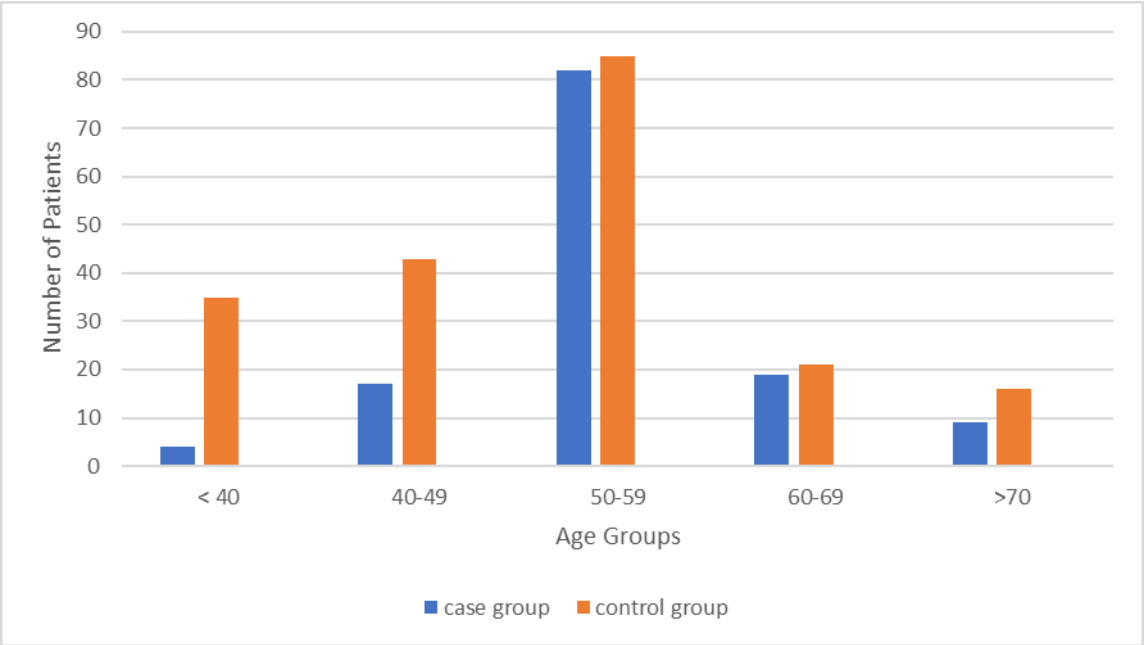

Fig. 2 Age distribution in patients with oral leukoplakia and the control group

Table 1: Age distribution in case and control groups

Age	patient with oral leukoplakia (n=131)	Percentage	Control (n=200)	Percentage
<40	4	3%	35	18%
40-49	17	12%	43	21%
50-59	82	63%	85	43%
60-69	19	15%	21	10%
>70	9	7%	16	8%

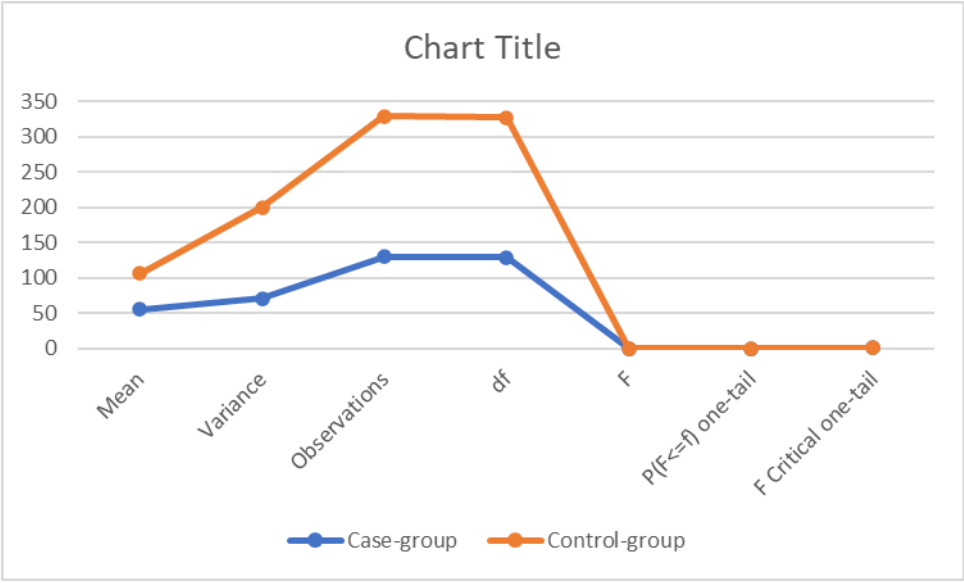

Fig. 3 age differences among case and control groups (p value=0.01)

Table 2: Comparison of Demographic and Risk Variables Between Case and Control Groups

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Variable	Study group		P-value
	Case group (n=131)	Control group (n=200)	
Age (year) Mean ± SD	55.46 ± 8.5	44.9 ± 13.5	0.01
Gender			
Male	73	112	0.06
Female	58	88	
Denture			
Yes	36	98	0.07
No	95	102	
Smoking			
Yes	73	68	0.04
No	58	132	

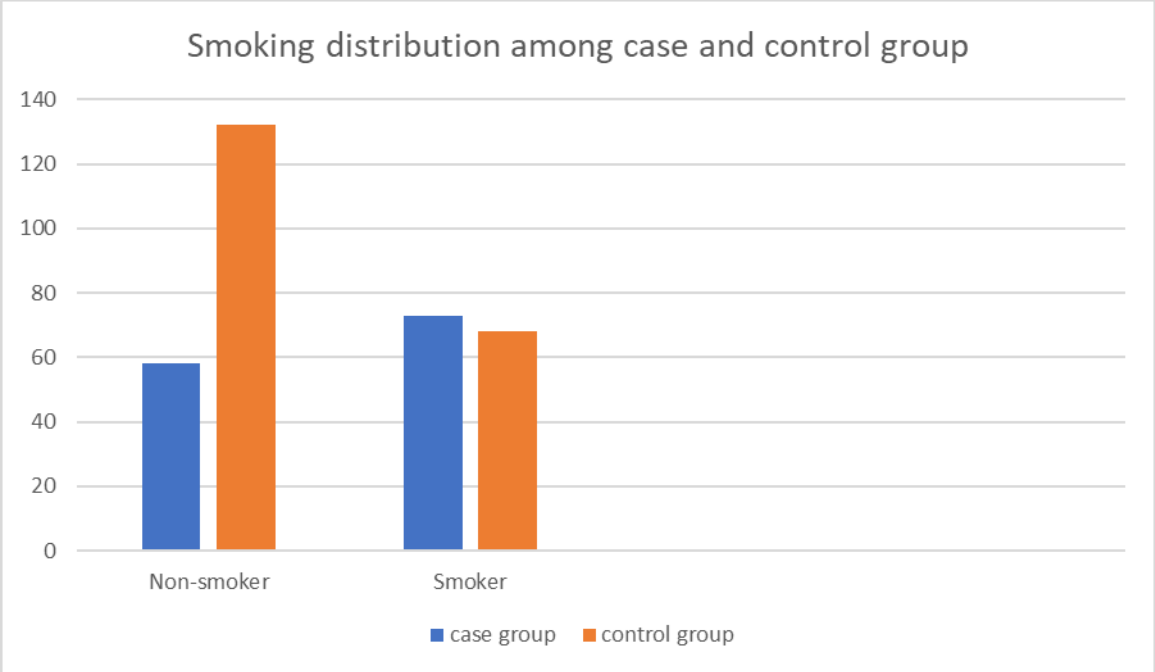

Fig. 4 Smoking distribution in case and control groups

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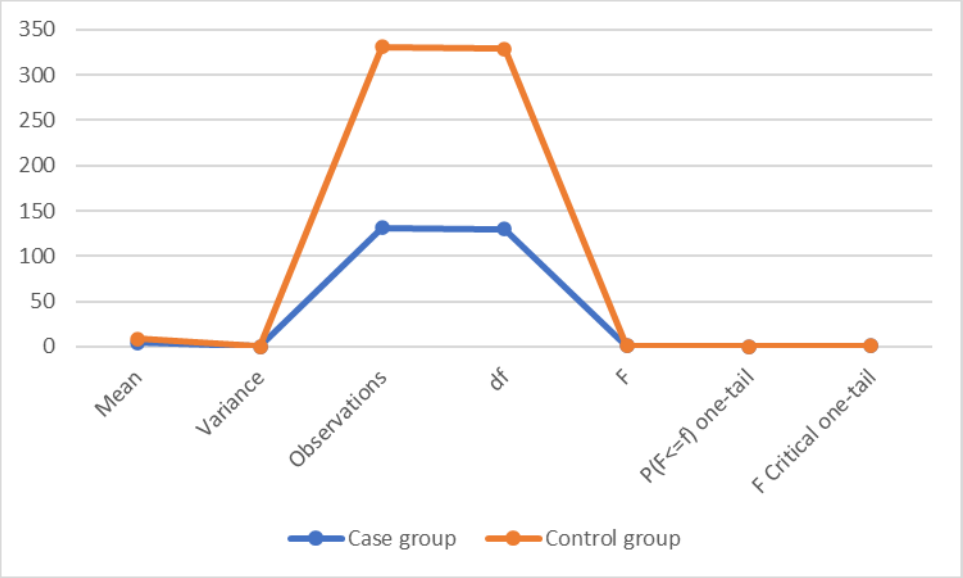

Fig. 5 Gender as a risk factor between the two groups (p value 0.6)

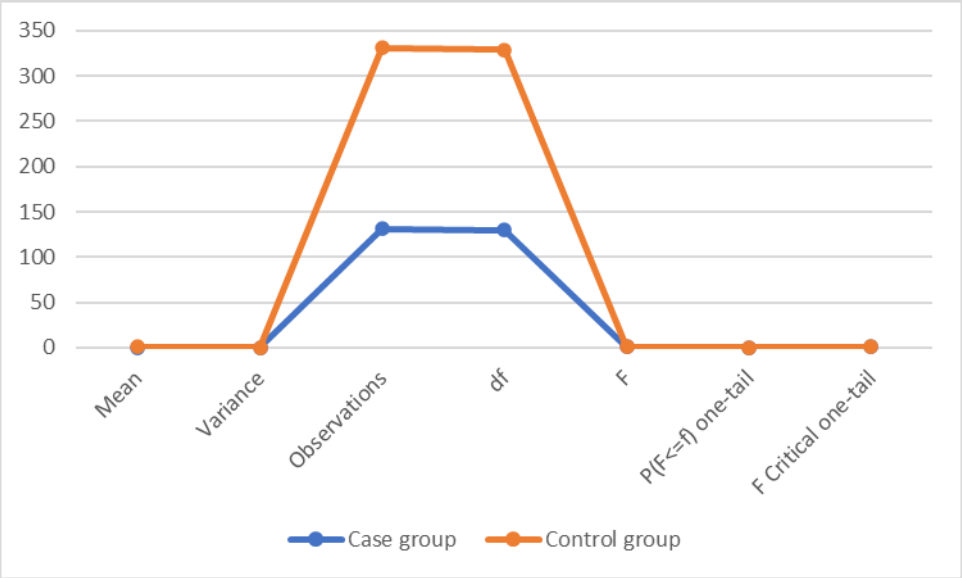

Fig. 6 The denture as a risk factor between the two groups (p value=0.07)

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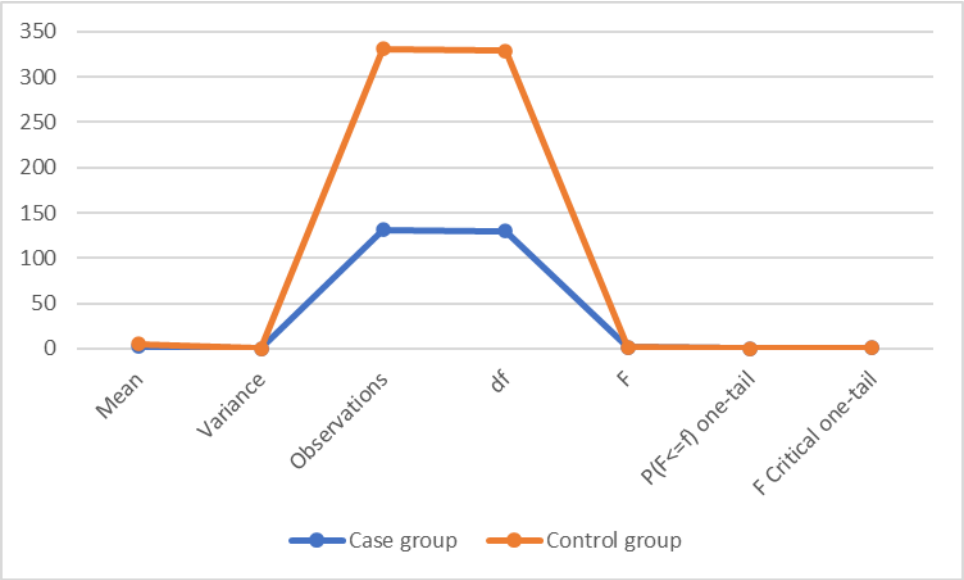

Fig. 7 cigarette smoking as a risk factor between the two groups (p value=0.04)

4. Discussion

The current study revealed that the mean age was 55.46 (SD±8.4) years, a finding similar to that reported by Shield et al. [12]. There is a significant difference in age between study groups (P-value = 0.01), which agrees with [13]. In this study the highest incidence of oral leukoplakia lies in patients with age more than 50 years old especially age group (50-59) years old, the reason is unknown, but may be relating to the genetic component, as aging is associated with decreased physiological processes which is considered as a risk factor for the development of serious diseases like malignant condition [14], as well as environmental factors like tobacco smoking which is common in this age group. Patients in this age group have many systemic diseases like diabetes mellitus, hypertension, ischemic heart diseases, or hyperlipidaemia, which modulate the immune system of the patient, and may play an important role in the development of oral leukoplakia. So, further evaluations with medical researchers may be recommended regarding this aspect.

Regarding gender, there are no significant differences in gender between study groups (P-value = 0.6) (P>0.05), which disagrees with the results of Chi et al. [15], who observed that oral leukoplakia is more common in elderly women than men. This may be due to the increased rate of cigarette smoking among Iraqi women, which approximates the chance of development of oral leukoplakia in Iraqi men patients [16], as well as systemic diseases equally affect both sexes.

The current study revealed no significant relation between denture application and oral leukoplakia (P-value = 0.07) (P>0.05), which agreed with the results observed in Aguirre et al. [11] and Neville et al. [17], in which they excluded denture use as a risk factor for oral leukoplakia. This may be explained by acute complications that may be associated with denture use that require rapid interventions.

This study found that there is a strong association between cigarette smoking and oral leukoplakia, with a P-value of 0.04. A similar finding was noticed [18], in which analysis revealed a significant association between cigarette smoking and oral leukoplakia. Nicotine in cigarettes has a major role in the development of periodontal disease, carries, as well as dysplasia of the oral cavity mucosa, which predisposes to leukoplakia development.

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5. Conclusion

The current study identifies two risk factors that have a significant association with oral leukoplakia. These include cigarette smoking and the age of the patient. Oral leukoplakia is common in patients with cigarette smoking, especially those with heavy smokers, as compared to a control group where non-smoking persons are disease-free. Regarding age, the risk of the disease is increasing with aging, being peak incidence at the 50-59 age group (43%), while excluding two other factors (gender and denture use) as risk factors, where there are no significant differences between the case and control group. Alcohol drinking is an important risk factor for oral leukoplakia development, but it is ignored in this study as our patients are non-alcohol drinkers or deny drinking alcohol for the religious background of our community.

Conflict of Interest

There is no conflict of Interest

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