

# PREVALENCE OF ORAL CANCER, POTENTIALLY MALIGNANT LESIONS AND ORAL HABITS AMONG PATIENTS VISITING DENTAL SCHOOL, SANA'A UNIVERSITY

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## ABSTRACT:

**Purpose:** Qat chewing, smoking, smokeless tobacco (locally known as shammah) and waterpipe smoking (locally known as madaah) are common habits in Yemen. The aim of this study was to investigate the prevalence of oral cancerous and precancerous lesions, and to investigate the prevalence of oral risk habits among Yemeni adults attending outpatient dental clinics, Sana'a University.

**Materials and methods:** This cross-sectional study involved 304 adults aged 14–87 years, who attended outpatient clinics at the Faculty of Dentistry, Sana'a University, Yemen. The participants were interviewed individually for socioeconomic status, oral risk habits, oral hygiene practices, systemic health, as well as history and current use of medications. Detailed oral examination of the oral cavity was performed by a single examiner based on international criteria and WHO codes.

**Results:** There were more males 206 (67.8%) than females 98 (32.2%). The mean age for the study population was 42.61 years. The prevalence of Qat-associated white lesions, Smokeless tobacco-related lesions, leukoplakia, lichen planus, and oral cancer was 8.9%, 2.3%, 0.7%, 0.7%, 0.3%, respectively. The prevalence of Qat chewing, smoking, waterpipe smoking, smokeless tobacco chewing was 58.2%, 24.3%, 7.6%, and 7.6% respectively. Oral precancerous lesions were significantly higher in males than in females ( $P < 0.05$ ). Likewise, an association was found between the occurrence of oral precancerous lesions and practice of oral habits ( $P < 0.05$ ).

**Conclusions:** This study provides information about habit trends among patients visiting this institution. It also reinforces the association between tobacco products and oral precancerous lesions.

**Keywords:** Oral cancer, precancerous lesions, oral habits, prevalence, Yemen



## INTRODUCTION:

Oral cancer is a significant disease worldwide with up to 400000 new cases every year and almost 130,000 deaths annually [1]. Notably, the incidence and mortality rates as a result of oral cancer are higher in developing countries as compared to the developed world. Oral cancer is often preceded by specific lesions and conditions that are called premalignant [2]. Different lesions have been reported to have potential to transform into cancer, of which leukoplakia, lichen planus, erythroplakia and oral submucous fibrosis are the most frequent ones.

Tobacco and alcohol have been established as risk factors for the development of such potentially malignant and malignant disorders of the oral mucosa [3-6]. Reported oral lesions associated with tobacco use include, but not limited to, leukoplakia, erythroplakia, smoking melanosis, nicotin stomatitis. In Yemen, tobacco use such as smoking, smokeless tobacco (locally known as shammah) and waterpipe smoking (locally known as madaah) is quite prevalent, especially among the youth. Beside the use of tobacco products, the chewing of qat leaves, also known as Khat, (*Catha edulis*) is common in Yemen. This habit is practiced by several millions of people in Yemen and some countries of East Africa [7].

The clinico-pathological effects of qat chewing habit on the oral mucosa are well documented [7,8]. These effects include different grades of keratotic white lesions,

keratinization of non-keratinized oral mucosa and epithelial dysplasia. One genetic study showed that qat consumption, especially when accompanied by alcohol and tobacco consumption might be a potential cause of oral malignancy [9]. This finding was supported by another study, which considers the qat habit as a probable contributing etiological factor of squamous cell carcinoma (SCC) [10]. However, most of other recent studies did not find such association [7,8,11].

Studies have shown that between less than 1 and up to 18% of oral premalignant lesions will develop into oral cancer [12,13]. Early detection of premalignant lesions can improve the prognosis and is well proved as an effective aid in disease prevention [14].

In spite of high prevalence of tobacco use and qat chewing in Yemen, and the reported risk of developing serious lesions associated with these habits, there is scarcity of studies which assessed the prevalence of these lesions among Yemenis. Therefore, the purpose of this study was to investigate the prevalence of oral cancerous and precancerous lesions as well as oral risk habits among Yemeni adults attending outpatient dental clinics, Sana'a University.

## MATERIAL AND METHODS:

This cross-sectional study involved 304 dental patients, who attended the outpatient dental clinics at the College of Dentistry, Sana'a University between October and December 2012. The study

sample included subjects who were 14 years old and over. The study was approved by the Research and Ethics Committee, Faculty of Medicine and Health Sciences, Sana'a University, Yemen. All volunteers were informed of the aims and methods of this study, and written consents were obtained.

Individual interviews were performed via standardized questionnaires and comprised the following: (1) basic data on age, gender, residence, marital status and education, (2) present medical status, (3) oral risk habits including qat chewing, smoking, smokeless tobacco (locally known as shammah) and waterpipe smoking (locally known as madaah).

Visual examination of the mouth was carried out by an oral medicine specialist, with 8 years of experience in diagnosis of oral lesions. A comprehensive extra- and intraoral examination was performed under electrical overhead lights using a mouth mirror, tweezers, gauze, and a wooden tongue depressor. The diagnostic criteria for precancerous lesions and conditions were based on those described in the WHO Guide to Epidemiology and Diagnosis of Oral Mucosa Diseases and earlier studies and reviews [15-17]. Incisional biopsy and histopathological examination were performed when necessary. After oral examination, patients who presented with lesions were referred for appropriate treatment.

SPSS (SPSS Inc., IL, Chicago, USA) version 19.00 was used for data entry and analysis. Qualitative data were presented

as frequencies and percentages, while quantitative data were presented as means and standard deviations. Chi-square test was used to determine differences between groups. A  $p < 0.05$  was considered to be statistically significant

## RESULTS:

A total of 304 subjects participated in this study, with average age of 42.61 years, and range 14-87 years. Around half of the study population (48.7%) aged between 14 and 39 years, and 35.5% were 60 years old and over. Two thirds of the subjects (67.8%) were men while 32.2% were women. The demographic characteristics are presented in Table 1.

In reference to oral habits, Qat chewing, smoking, and smokeless tobacco use were found to be significantly more prevalent among men than women ( $P=0.001$ ,  $0.001$ ,  $0.002$ , respectively). Conversely, water pipe smoking was significantly more prevalent among women ( $P=0.017$ ; table 2).

Table 3 shows oral precancerous lesions prevalence in the whole population according to gender. A total of 13/304 (4.3%) subjects had at least one precancerous lesion, which were more frequent in males than in females ( $p<0.05$ ). Four different types of cancerous/precancerous lesions were diagnosed, of which smokeless tobacco keratosis was the most common (2.3%) followed by leukoplakia (0.7%) and lichen planus (0.7%). Oral cancer was diagnosed only in one subject (0.3%).

Qat associated keratosis was also a common finding (11.2%), with a significant difference between men and women ( $P < 0.05$ ).

Distribution of cancerous/precancerous lesions in relation to the presence of risk habits is shown in table 4. A significant association was found between occurrence of oral precancerous lesions and cigarette smoking ( $p < 0.05$ ), water pipe smoking ( $P < 0.01$ ) and smokeless tobacco use ( $p < 0.05$ ) (Table 4).

## DISCUSSION:

Three routes for progression to cancer have been proposed: oral leukoplakia/erythroplakia- cancer, oral submucous fibrosis – cancer sequence and oral lichen planus – cancer<sup>[4]</sup>. Hence knowing the prevalence of these precursor lesions and treating them before they progress to malignancy should be the goal of preventive oral health care workers<sup>[14,18]</sup>.

Qat chewing and smoking (smoked and smokeless forms) were the most common risk habits reported by our study population. The prevalence of Qat chewing in the present study (58%) was very similar to the 61.12% prevalence rate found in a previous study conducted among 2500 Yemeni adults<sup>[7]</sup>.

The prevalence of Qat chewing, cigarette smoking and smokeless tobacco in the present study were found significantly higher among men than women. This finding is consistent with other studies elsewhere<sup>[3,18,19]</sup>. Qat chewing and smoking are considered men habits which, in turn explains this finding.

Interestingly, water pipe smoking was found significantly more frequent among women as compared to men. This finding is due to the fact that water-pipe smoking in Middle Eastern countries is more culturally accepted than cigarette smoking for women.

It is noteworthy here to mention that alcohol consumption was not documented in the present study as Yemen is an Islamic country where this habit is forbidden and is culturally unacceptable to ask people about it.

The prevalence of precancerous lesions in our study was 4.3%. This finding is similar to that reported in a previous studies in Sirlanka<sup>[20]</sup> and turkey<sup>[21]</sup>. However, this rate is much lower than that reported by a recent study among Saudi adults in Jeddah where the recorded prevalence was 10.5%, though the latter study included only people with tobacco habits and not all the routine patients attending the department as we did<sup>[22]</sup>. In accordance with previous studies, the present authors observed that precancerous lesions were significantly more common among men than women<sup>[3,22,23]</sup>. Furthermore, the present authors have observed that the presence of precancerous lesions were positively associated with tobacco use ( $P < 0.05$ ). This finding confirms previous findings<sup>[3,11,13,19,21-23]</sup>.

Oral precancerous lesions seen in this study were leukoplakia, lichen planus, smokeless tobacco keratosis and actinic cheilosis. Oral Leukoplakia is the most common potentially malignant disorder

reported in most oral mucosal surveys<sup>[24]</sup>  
The prevalence of leukoplakia In this study was 0.7%, a result which should be interpreted with caution because of the relatively small sample size. According to epidemiological data from different countries over the past 30 years, the prevalence of leukoplakia varies from 0.7% to 13%<sup>[25,26]</sup>.. The rate of leukoplakia in our study is within the expected range recorded, as noted above. Such great variation in the prevalence of leukoplakia among different studied populations could be attributed to geographic reasons and other variables mainly associated with different tobacco habits and different clinical criteria used<sup>[23]</sup>.

Oral lichen planus (OLP) is a chronic oral inflammatory disease of unknown etiology. According to reports, 1-2% of OLP patients develop oral squamous cell carcinoma (OSCC) in the long run<sup>[27]</sup>. The prevalence of Lichen planus in the present study was 0.7%, a finding comparable with the ones reported by other authors<sup>[23,28,29]</sup>. We observed that the frequency of OLP was comparable in both men and women, a finding contradicting most of the published reports, which found a positive correlation of lichen planus with females<sup>[30-31]</sup>.

The association of smokeless tobacco (Shammah) with oral squamous cell carcinoma (OSCC) has been extensively studied and well documented in the literature<sup>[11,13,18,22,32,33]</sup>. In the present study, the prevalence of smokeless tobacco keratosis was 2.3% among the

whole population and 30% among smokeless tobacco users. This finding is comparable with the 27% prevalence reported by Scheifele et al. (2000) among Yemeni smokeless tobacco users<sup>[32]</sup>. Furthermore, in 2002 study (n=2500), the prevalence of Shammah users was 1.6% and the prevalence of Shammah induced lesion was 72.5%<sup>[7]</sup>.. Notably, the diagnosed oral cancer case in the present study was seen in a 40 -year old smokeless tobacco user. Similarly, Scheifela et al., 2007 in his study on 199 Shammah users reported one oral cancer case at the site of Shammah use. Moreover, a recent case-control study on the risk factors of oral cancer in Yemen found that Shammah use was the only risk factor for OSCC, with an odds ratio of 12.6 and 39 for the ex-users and current users, respectively<sup>[11]</sup>. These results support previous findings of other authors which implicate smokeless tobacco in development of oral malignancy. Hence it is the responsibility of dental practitioners to educate their patients about the harm effects of smokeless tobacco and discourage them from using such deleterious habits.

Another lesion encountered in the present study was Qat induced keratosis with a prevalence rate of 8.9%. This lesion is a benign white keratotic lesion associated with the habit of Qat chewing and is strictly confined to the site of chewing<sup>[8]</sup>. Although an association between Qat chewing and oral malignancy was speculated<sup>[34]</sup>, it has not been proven. Ali et al<sup>[7]</sup> , who examined the oral cavity of habitual Qat chewers in

Yemen, and Gorsky *et al.* [8], who examined Yemeni Jewish Qat chewers in Israel, reported that no oral malignancies were detected. Moreover, recent published data have shown no association of qat chewing with oral malignant or potentially malignant lesions [11].

In conclusion, the results of the present study throw some light on the habit trends among Yemeni dental patients visiting dental college, Sana'a University. The findings showed that Qat chewing and tobacco use were the most common habits practiced by the participants. Also, smoking use in its different forms (especially smokeless tobacco) was associated with potentially malignant lesions. Due to high prevalence of these risk factors associated with oral malignancy, intervention programs to discourage the use of *tobacco* and other risky habits should be a public health priority.

The main limitation of the present study is the relatively small number of participants involved; therefore, large-scale

epidemiological studies in the general population should be designed in future studies. Another limitation is the fact that only 4 patients agreed to undergo biopsy for histopathological investigation, therefore, diagnosis of most lesions was based mainly on clinical findings rather than on histopathology. Another possible shortcoming of the present study could be detection bias as the researcher was aware of the habit history of the patient prior to oral examination. In future research the examiner can be blinded to the habit details and should examine the oral cavity first to prevent such bias. However, despite these limitations we believe that this study provides valuable baseline information about the prevalence of oral potential malignant lesions and their risk factors among Yemeni adults. The information may serve as a useful tool in educating the patients about the deleterious effects of oral tobacco and Qat exposure.

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**TABLES:**

**Table 1: Demographic and characteristics of the study subjects (n = 304)**

Charcteristics	N	(%)	Mean (SD)
<b>Sex</b>			
Male	206	67.8	
Female	98	32.2	
<b>Age (years) mean</b>			42.61
14-39	148	48.7	
40-59	48	15.8	
≥60	108	35.5	
<b>Systemic diseases</b>			
Yes	28	9.2	
No	276	90.8	
<b>Living area</b>			
Urban	244	80.3	
Rural	60	19.7	

**Table 2: Proportion of oral risk habits among the subjects by gender N (%)**

Oral habits	Male n =206	Female n =98	Total n =304	P-Value
<b>Smoking</b>				0.000
Yes	68 (33.0)	6 (6.1)	74 (24.3)	
No	112 (54.4)	87 (88.8)	199 (65.5)	
Ex	26 (12.6)	5 (5.1)	31 (10.2)	
<b>Waterpipe Smoking</b>				0.017
Yes	10 (4.9)	13 (13.3)	23 (7.6)	
No	187 (90.8)	78 (79.6)	265 (87.2)	
Ex	9 (4.4)	7 (7.1)	16 (5.3)	
<b>Smokeless tobacco</b>				0.002
Yes	22 (10.7)	1 (1.0)	23 (7.6)	
No	178 (86.4)	97 (99.0)	275 (90.5)	
Ex	6 (2.9)	0 (0.0)	6 (2.0)	
<b>Qat chewing</b>				0.000
Yes	143 (69.4)	34 (34.7)	177 (58.2)	
No	48 (23.3)	52 (53.1)	100 (32.9)	
Ex	15 (7.3)	12 (12.2)	27 (8.9)	

Chi-square test

**Table 3: distribution of lesions among subjects by gender N(%).**

lesions	Male <i>n</i> = 206	Female <i>n</i> = 98	Total <i>n</i> = 304	P-Value
<b>1. OCPL*</b>	12 (5.8)	1 (1.0)	13 (4.3)	0.045
- Shammah Keratosis	7 (3.4)	0 (0.0)	7 (2.3)	NS
- Leukoplakia	2 (1.0)	0 (0.0)	2 (0.7)	NS
- Lichen Planus	1 (0.5)	1 (1.0)	2 (0.7)	NS
- Aktinic chelosis	1 (0.5)	00 (0.0)	1 (0.3)	NS
- Oral cancer	1 (0.5)	00 (00)	1 (0.3)	NS
<b>2. Other lesion</b>				
- Qat-induced lesion	23 (11.2)	4 (4.1)	27 (8.9)	<0.05

\*Oral cancer and precancerous lesions

Fisher exact test

**Table 4: Oral cancerous/precancerous lesions according to oral risk habit.**

Oral habits	Precancerous lesions		P-Value
	N	(%)	
<b>Smoking</b>			0.016
Yes .a	<i>n</i> = 74	6	8.0
No .a	<i>n</i> = 199	4	2.0
Ex .a	<i>n</i> = 31	3	9.7
<b>Water pipe smoking</b>			0.012
Yes .b	<i>n</i> = 23	2	8.7
No .b	<i>n</i> = 265	8	3.0
Ex .b	<i>n</i> = 16	3	18.8
<b>Smokeless tobacco</b>			0.000
Yes .c	<i>n</i> = 23	8	34.8
No .c	<i>n</i> = 275	5	1.8
Ex .c	<i>n</i> = 6	0	0.0
<b>Qat chewing</b>			0.187
Yes .a	<i>n</i> = 177	11	6.2
No .a	<i>n</i> = 100	2	2.0
Ex .a	<i>n</i> = 27	0	0.0

Fisher's exact test.