

Qat Habit in Yemen Society: A Causative Factor for Oral Periodontal Diseases

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Abstract: The effect of a common habit among Yemeni population on the periodontal status was investigated. This cross-sectional study was done on 2500 Yemenis with mean age 27.01 years (1818 males and 682 females). Among these 1528 were qat chewers and 972 were non-chewers. Detailed questionnaire and pre-designed scoring system for the periodontal status were employed for each case. Study results indicated that out of 972 non-chewers 116(12%) had periodontal pocketing and 18 (1.9%) cases had gingival recession. On the other hand, out of 1528 chewers, 468 (31.8%) had periodontal pockets and 98 (6.4%) with gum bleeding, $p < 0.05$. These effects were found to increase with increased frequency and duration of chewing. It was concluded that habit of qat can cause damage to the periodontal ligament as pocketing and gum recession.

Keywords: Qat, periodontitis, gingivitis.

Introduction

Qat is known also as khat or *Catha edulis* Forsk. Qat leaves contain more than 40 alkaloids, glycosides, tannis, terpenoids and others. Cathine and cathinone are the most important alkaloid constituents of qat that have amphetamine like effect [1]. Therefore, people chew qat to get psycho-stimulation effect in the form of euphoria and excitement due to its cathin and cathinone contents [2]. Millions of men and women practice this habit in Yemen society in addition to Ethiopia, Somalia and other countries of east Africa. Qat habit is known in the Arabic countries as *takhzeen al-qat* as it is more than chewing (chewing and storing qat in the vestibule for few hours) and known socially as qat sessions [3].

Qat has psychological, medical, social and economical effects on human beings. Tachycardia, palpitation, hypertension, gastritis, constipation, bronchodilation and relaxation of bladder wall are common examples of qat effects on the human body [1, 4-6].

The clinico-pathological effects of qat habit on the oral mucosa are well documented [3, 7, 8]. These effects include different grades of keratotic white lesions, keratinization of non-keratinized oral mucosa and epithelial dysplasia. Recent 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 SCC [10], however, this is not the case in other studies [3, 7, 11].

Despite millions in Yemenis community chew qat, the proportion of the population with severe periodontal disease in Yemen was reported to be significantly lower than in countries with high level of dental care [12-15]. Another clinical study showed that qat consumption may affect the periodontal tissue especially among younger probands. However, they did not study clearly the role of different variables of qat, mainly, the duration and frequency of chewing [16].

The controversies regarding the association of periodontal diseases and the public habit of takhzeen al-qat in Yemen community motivated us to conduct this study.

Material and Methods

This cross-sectional study was done on 2500 Yemenis randomly reported to the Faculty of Dentistry, Sana'a University, mean age 27.01 years (SD=13.4), of them 1818 (72.7%) male and 682 (27.3%) female. All patients with systemic diseases have been excluded to reduce the confounding factors.

A special questionnaire was designed for this study and revised to include maximum information of the exposure under study "qat chewing habit" and its effects. The questionnaire was filled for each case with a full intra-oral clinical examination using the normal examination tools, periodontal probe and dental unit light. In addition to the evaluation of the periodontal status, the questionnaire and clinical examination included evaluation of the buccal mucosa and associated white lesions which had been published elsewhere [3].

Questionnaire

Questionnaire included the following:

1. Personal data: case number, age, sex and occupation.
2. Habit's information: a chewer (1) or a non-chewer (0), if chewer, how many years he has been a chewer (1-40), and frequency (number of qat chewing sessions per week) (1-7).
3. Any other habit that may affect the oral mucosa such as:
 - a) Smoking: a smoker (1-4) or a non-smoker (0), if he is a smoker it's frequency has been recorded as: (1) Less than 10 cigarettes daily. (2) More than 10 and less than 20 cigarettes daily. (3) More than 20 cigarettes daily. And (4) Ex-smoker (a person who left smoking for more than 1 year).

- a) Mada'a (water pipe): a smoker (1) or a non-smoker (0).
- b) Shamma (Smokeless tobacco) or what so called in some regions tombak: a user (1) or a non-user (0).
- c) Any other habits such as tumbol or betel nut chewing: a user (1) or not a user (0).

Clinical Periodontal Examination

Periodontal probing was done in chewers in the area of takhzeen al-qat only (S1, S3, S4, and S6) and compared with the same sextants in non users of qat (posterior first and second molars) using the normal periodontal probe. Two measurements were taken: the distance in millimeters from the free gingival margin to the base of the pocket (pocketing), and from the cervico-enamel junction to the free gingival margin (gum recession). The periodontal probe was gently inserted into the gingival sulcus of each tooth until light resistance is met and then it was moved around the tooth's circumference. The greatest probe depth in the mentioned area of the mouth was recorded. Probing forces should not cause pain and should be approximately 20-25 gm. The following variables of the periodontal status were scored:

1. Gum bleeding: (0) No bleeding, (1) With bleeding. (2) Excluded sextant.
2. Pocketing: (0) Less than 3 mm. (1) From 3 to 5 mm. (2) 6 mm or more. (3) Any pocketing with gum recession. (4) Excluded sextant.

All collected data has been fed into a specialized computer program (SPSS) for data analyses, and by using χ^2 test, reliable results were only documented when $P \leq 0.05$.

Results

This study was done on 2500 Yemeni, of them 1528 (61 %) were qat chewers and 972 (39 %) were non-chewers. In our sample, 1330 (73.2 %) of males were qat chewers and 198 (29 %) of females were qat chewers.

Table 1: Periodontal pockets and gum recession among Yemenis qat chewers and non-chewers

Habit of qat		Pocket			Gum recession	Excluded sextant	Total
		Less than 3mm	Pocket 3-5mm	Pocket 6 mm or more			
Non chewer	Count	843	39	59	18	13	972
	% within habit of qat	86.7	4.0	6.1	1.9	1.3	100
	% within pocket	44.7	21.5	20.6	15.5	41.9	38.9
Chewer	Count	1042	142	228	98	18	1528
	% within habit of qat	68.2	9.3	14.9	6.4	1.2	100
	% within pocket	55.3	78.5	79.4	84.5	58.1	61.1
Total	Count	1885	181	287	116	31	2500
	% within habit of qat	75.4	7.2	11.5	4.6	1.2	100
	% within pocket	100	100	100	100	100	100

Table 2: Gum bleeding among Yemenis qat chewers and non-chewers

Habit of qat		Gum bleeding			Total
		No bleeding	With bleeding	Excluded sextant	
Non chewer	Count	486	473	13	972
	% within habit of qat	50	48.7	1.3	100
	% within gum bleeding	62.1	28	41.9	38.9
Chewer	Count	296	1214	18	1528
	% within habit of qat	19.4	79.5	1.2	100
	% within gum bleeding	37.9	72	58.1	61.1
Total	Count	782	1687	31	2500
	% within habit of qat	31.3	67.5	1.2	100
	% within gum bleeding	100	100	100	100



Figure 1: Gum recession with extrinsic staining affecting the posterior teeth where this individual used to smoke during the qat sessions

Out of 972 non-chewers 116(12%) had periodontal pocketing of different depths, 473 (48.7%) cases had gingival bleeding and 18 (1.9%) had gum recession. On the other hand, out of 1528 chewers, 468 (31.8%) had periodontal pockets, 1214 (79.5%) with gum bleeding and 98 (6.4%) had gum recession. These differences were statistically significant ($p < 0.0000001$) (Tables 1 and 2).

Table 3: The relationship between periodontal status and frequency of qat chewing per week

Frequency of chewing		Pocket					Total
		Less than 3mm	Pocket 3-5mm	Pocket 6 mm or more	Gum recession	Excluded sextant	
0	Count	843	39	59	18	13	972
	% within frequency of chewing	86.7	4.0	6.1	1.9	1.3	100
	% within pocket	44.7	21.5	20.6	15.5	41.9	38.9
One per week	Count	434	43	45	12	2	536
	% within frequency of chewing	81	8	8.4	2.2	0.4	100
	% within pocket	23	23.8	15.7	10.3	6.5	21.4
Two per week	Count	121	26	26	7	-	180
	% within frequency of chewing	67.2	14.4	14.4	3.9	-	100
	% within pocket	6.4	14.4	9.1	6	-	7.2
Three per week	Count	41	3	2	-	1	47
	% within frequency of chewing	87.2	6.4	4.3	-	2.1	100
	% within pocket	2.2	1.7	0.7	-	3.2	1.9
Four per week	Count	7	-	3	-	-	10
	% within frequency of chewing	70	-	30	-	-	100
	% within pocket	0.4	-	1.0	-	-	0.4
Five per week	Count	13	9	18	5	-	45
	% within frequency of chewing	28.9	20	40	11.1	-	100
	% within pocket	0.7	5	6.3	4.3	-	1.8
Seven per week	Count	426	61	134	74	15	710
	% within frequency of chewing	60	8.6	18.9	10.4	2.1	100
	% within pocket	22.6	33.7	46.7	63.8	48.4	28.4
Total	Count	1885	181	287	116	31	2500
	% within frequency of chewing	75.4	7.2	11.5	4.6	1.2	100
	% within pocket	100	100	100	100	100	100

Regarding the periodontal status and frequency of chewing, it was found that 536 Yemenis chew qat only once per week, of them 100 (18.6%) had periodontal pockets. 719 were found to be daily qat chewers with 269 (37.9%) of them having periodontal pockets. These differences were statistically significant (Table 3). With respect to gum bleeding and frequency of chewing, there were no differences between persons who chew qat one day per week and others who chew qat daily.

With respect to the relationship between duration of chewing and periodontal status, it was found that 53 persons were qat chewers for less than 1 year; 4 of them (7.5%) had periodontal pockets. 371 were qat chewers for more than 10 years, out of which 258 (69.5%) had periodontal pocketing. These differences were statistically significant (Table 4).

Discussion

Though qat is well documented to cause many clinico-pathological changes in the oral mucosa [3, 7, 8], Yemeni population who chew qat commonly were showed to have low prevalence rate of periodontitis [15].

A clinical study reported that the proportion of the population with severe periodontal disease in Yemen is significantly lower than in countries with high level of dental care [16]. This was the major motivation for this study. As individuals chew qat only at the posterior teeth (S1, S3, S4, and S6), the first and second molars only were examined while anterior sextants (S2 and S5) were excluded from the study. Results of this study showed that qat is very harmful to the periodontal tissue as 79.5%, 31.8% and 6.4 of chewers had gum bleeding, periodontal pockets and gum recession respectively, while 48.7%, 12% and 1.9% of non-chewers had gum bleeding, periodontal pockets and gum recession respectively ($p < 0.05$). This is in contrast to another study which could not find a causal relationship between the use of qat and periodontal disease. Differences between results in the two studies might be related to the differences in the sample size and the geographical area where sample was selected [as this study was done in Sana'a only while the other study [16] was done in different cities in Yemen]. Moreover, it did not focus on the role of different variables of qat; mainly, the duration and frequency of chewing.

Table 4: The effect of duration of chewing on gum recession and periodontal pocketing

Time group		Pocket				Total	
		Less than 3mm	Pocket 3-5mm	Pocket 6 mm or more	Gum recession		Excluded sextant
Non chewer	Count	843	39	59	18	13	972
	% within time group	86.7	4.0	6.1	1.9	1.3	100
	% within pocket	44.7	21.5	20.6	15.5	41.9	38.9
1 year	Count	49	4	-	-	-	53
	% within time group	92.5	7.5	-	-	-	100
	% within pocket	2.6	2.2	-	-	-	2.1
2-5 years	Count	600	56	36	2	-	694
	% within time group	86.5	8.1	5.2	0.3	-	100
	% within pocket	31.8	30.9	12.5	1.7	-	27.8
Chewer	Count	296	34	68	10	2	410
	% within time group	72.2	8.3	16.6	2.4	0.5	100
	% within pocket	15.7	18.8	23.7	8.6	6.5	16.4
More than 10 years	Count	97	48	124	86	16	371
	% within time group	26.1	12.9	33.4	23.2	4.3	100
	% within pocket	5.1	26.5	43.2	74.1	51.6	14.8
Total	Count	1885	181	287	116	31	2500
	% within time group	75.4	7.2	11.5	4.6	1.2	100
	% within pocket	100	100	100	100	100	100

The mechanism by which qat may affect the periodontal tissues might be related to the trauma and/or the microbiological role. Trauma induced by the habit of takhzeen al-qat was suggested to cause pathological changes in the oral mucosa as white lesions [3]. These white lesions usually appear in the area of takhzeen al-qat including the oral mucosa or the gingiva. Such trauma induced by qat fibers during the habit session (3-5 hours) or by remnants of qat fibers between teeth after the qat session may play an important role in the development of periodontal diseases.

Qat constituents may affect on the normal oral flora, which might also be a possible cause for these periodontal diseases. This could be supported by the recent study which showed that takhzeen al-qat induces a microbial profile that is not incompatible with gingival health [17].

Epidemiologically, if we suggest a relationship between a causal factor and a disease, the risk of developing this disease will increase when the exposure to the risk factor increases. This was very clear in this study as the risk of developing periodontal diseases increased when the exposure to the risk factor (duration and frequency of takhzeen al-qat) increased. In consequence with this fact, results of this study showed that 37.9% of persons who chew qat daily had periodontal pockets while 18.6% of persons who chew once per week had similar changes. Similarly, it was found that 69.5% of persons who chewed qat for more than 10 years had periodontal pockets while only 7.5% of persons who chew qat for less than 1 year had similar lesions ($p < 0.05$). Gum recession appeared in 10.4% of persons who chew qat daily and in 2.2% of persons who chew qat once per week. Similarly, it appeared in 4.3% of persons who chewed qat for more than 10 years and in 1.3% of persons who chewed qat for less than a year. All these differences support the epidemiological hypothesis which states that increased exposure to qat habit will increase the risk of developing periodontal pockets and gum recession.

In conclusion, this study can propose the habit of takhzeen al qat as an etiological factor for periodontal diseases.

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