

Original Article

The Relationship between Number of Natural Teeth and Chewing Qat Habit among Adult Yemeni People in Sana'a: A Pilot Study

Sakhr A. Murshid^{1,2}, Mohammed A. Al-Labani³

¹Department of Oral and Maxillofacial Diseases, Clinicum, Helsinki University, Helsinki, Finland, ²Department of Pedodontics, Orthodontics and Preventive Dentistry, Faculty of Dentistry, Thamar University, Thamar, Yemen, ³Department of Orthodontics, Faculty of Dentistry, Sana'a University, Sana'a, Yemen

Received : 16-10-17.

Accepted : 14-12-17.

Published : 29-12-17.

INTRODUCTION

The retention of permanent teeth is crucial for good oral health status and the quality of life.^[1] Hujuel *et al.* reported that people can attach a high value to the prevention of tooth loss because of a variety of perceived tooth functions, such as incising, chewing, esthetics, and pronunciation.^[2,3] Loss of teeth impairs chewing ability, the ability to speak and influences the perception of self and perception by others; it can also impact many quality-of-life measures, including the ability and desire to socialize, to play a variety of musical instruments, to sing, to whistle, and to enjoy foods.^[3,4] Furthermore, it has been suggested that tooth loss should also be considered a disability and could potentially be linked to

ABSTRACT **Aims and Objectives:** Several studies have reported associations between the habit of chewing qat and the deterioration of periodontal health among adults in Yemen; however, qat's effect on the number of teeth has not yet been evaluated. The purpose of this observational study was to examine the relationship between the number of natural teeth and qat-chewing status among Yemeni participants.

Materials and Methods: The participants were interviewed with a structured questionnaire by a researcher on the day of the dental check-up. The surveyed items were age, sex, chewing-qat status (nonchewer; current chewer, nonsmoker; current chewer and smoker; current chewer, ex-smoker; ex-chewer, never smoked; ex-chewer and smoker). The dental examination was conducted with dental mirrors by a single examiner under sufficient artificial light. A linear regression was performed, stratified by sex, with the number of natural teeth as the dependent variable and with age and qat status as independent variables using SAS/STAT software.

Results: Results show that age was a significant factor for both males and females having few natural teeth. Females had a higher tooth loss than males. The habit of chewing qat did not affect the number of natural teeth for both males and females. In males, a small, but not significant, relationship between chewing-qat status and the number of natural teeth was found. All smokers were qat chewers.

Conclusions: This study highlights for the first time the relationship between having fewer teeth and the habit of chewing qat and provides useful findings for dental health workers to advise people about the benefits of cessation of both qat chewing and smoking.

KEYWORDS: Age, chewing qat status, gender, natural teeth, smoking

shortened longevity.^[3] In fact, tooth loss remains a major public health problem worldwide.^[1,5] It has been reported that worldwide about 30% of people aged 65–74 years are edentulous, and more sustainable improvements in tooth retention could be achieved by controlling the reasons for losing teeth.^[6,7]

Qat chewing (also known as kat or khat) is a very common habit in Yemen,^[8] and it is of particular

Address for correspondence: Dr. Sakhr Ahmed Murshid, Department of Oral and Maxillofacial Diseases, Biomedicum 1, Haartmaninkatu 8, PL 41 (Kytösuontie 9), 00014, Helsingin Yliopisto, Dentistry Institute, Faculty of Medicine, Helsinki University. E-mail: sakhr.al-kubati@helsinki.fi, sakhr1221@yahoo.com, sakhr1221@gmail.com

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Al-Labani MA. The relationship between number of natural teeth and chewing qat habit among adult Yemeni people in Sana'a: A pilot study. *J Int Soc Prevent Communit Dent* 2017;7:360-3.

Access this article online	
Quick Response Code: 	Website: www.jispcd.org
	DOI: 10.4103/jispcd.JISPCD_369_17

note that many qat users combine this with smoking. Numerous studies report that chewing qat is associated with systemic and oral health problems.^[9-11] Recently, it has been reported to be associated with a deterioration of periodontal health among adults in Yemen;^[12,13] however, qat's effect on the number of natural teeth is still unknown.

In Yemeni adults, reduced number of natural teeth correlates with marked use of chewing qat. Because of the severity of consequences that arise with loss of teeth, we decided to study whether there is a relationship between the qat-chewing status of participants and the number of their teeth. Age and smoking status are known to affect tooth number^[14] and were also included as explanatory variables in the regression model.

MATERIALS AND METHODS

The data collection and participants' examinations were completed between February and May 2016. This was an observational pilot study of volunteer participants recruited from Sana'a, Yemen.

PARTICIPANTS

The survey involved all the adults aged between 40 and 75 years, attending three dental clinics for dental care. All the participants ($n = 99$) were invited to participate in the study. All the adults who fulfilled the study inclusion criteria, (a) aged between 40 and 75 years, and (b) agreeing to participate in the study, were included. The exclusion criteria were (a) individuals who had a medical condition that made it impossible for them to brush their own teeth (such as in stroke and paralysis), and (b) individuals who had <5 remaining teeth. This study was approved by the Research Ethics Committee of the Faculty of Dentistry, University of Sana'a. All procedures were performed with adequate understanding and written consent of the participants.

MEASUREMENTS

The main outcome measure for the study was number of teeth. The main risk factor analyzed in this study was qat-chewing status. The participants were interviewed with a structured questionnaire by a researcher on the day of the dental checkup. Information regarding qat-chewing behaviors, including the status of qat chewing and qat chewing with and without smoking were recorded by asking "Have you ever chewed qat or used tobacco?" and "Do you currently chew or smoke or have you quit?" Based on the responses, we identified the following categories: Nonchewer; current chewer, nonsmoker; current chewer and smoker; current chewer, ex-smoker; ex-chewer, never smoked; ex-chewer and smoker. Dental examination was performed with dental mirrors by a

single examiner under sufficient artificial light. Gloves, masks, and disposable wooden spatulas were used. The results of the dental examination included the number of natural teeth present. The data were documented on the forms specifically designed for this study. We considered age, sex, qat-chewing status, and the number of natural teeth present.

Each tooth was required to have at least 3 mm of crown height to be recorded. Roots and replaced teeth were excluded from the analysis.

ANALYSIS

A linear regression was performed, stratified by sex, with number of teeth as the dependent variable and age and qat status as independent variables. Assumptions of the model were checked graphically and numerically. Statistical significance was set at 5% ($P < 0.05$). We analyzed all data with SAS/STAT software version 14.2.

RESULTS

The mean number of teeth present was 23.80, standard deviation (SD) = 6.17, with a minimum of 5 and a maximum of 32. The average age was 52.63 years, SD = 8.99, range = 40–75. Forty-two of the participants were male and 57 were female.

According to qat status [Table 1], 23 of the participants (23.23%) were nonchewers, 21 of the participants (21.21%) were current chewers and nonsmokers, 22 of participants (22.22%) reported that they currently chewed and smoked, 10 of the participants (10.10%) reported they currently chewed but were ex-smokers, 10 of participants (10.10%) reported they no longer chewed and had never smoked, and 13 of participants (13.13%) reported ex-chewer and smoker. Overall, 76 of the participants (76.77%) reported using qat, of these, 53 (53.77%) reported currently consuming qat, and 23 (23%) reported that they were no longer chewed qat. All the participants who smoked also chewed qat (100%).

A linear regression was performed, stratified by sex, with number of teeth as the dependent variable and age and qat status as independent variables. Assumptions of the model were checked graphically and numerically and were not violated. In particular, there were no outliers. Results are shown in [Table 2] for men and [Table 3] for women. It should be noted that this is a purely observational study and there could be other variables which, if included, might help to explain the effect of qat chewing on tooth loss.

The results of linear regression revealed, for both men and women, that the number of natural teeth present was significantly and negatively related to age. Men lost

0.27 teeth/year and women lost 0.36. Thus, over the 35-year age range in the study, women would be expected to lose $35 \times 0.36 = 12.6$ teeth, while men would be expected to lose $35 \times 0.27 = 9.45$ teeth. Qat status did not have a significant or large effect for either men or women. For men, the highest number of teeth remaining (fewest lost) was in the ex-chewer, never smoked group (13.16 more teeth than the ex-chewer and smoker). For women, all the differences between the groups were very small.

DISCUSSION

The habit of chewing qat (also known as kat or khat) has recently been reported to be associated with a deterioration of periodontal health among adults in Yemen.^[12,13] It is, therefore, important to clarify the relationship between chewing-qat status and the number

of natural teeth for the evaluation of risk factors for tooth loss in adults.

This study was planned and performed to test the hypothesis that the number of natural teeth is influenced by the habit of chewing qat to predict future health-care needs and to improve the retention of permanent teeth in adults. The work may yield significant policy implications for dental care strategies that will improve tooth retention, with no interest in generalizing our findings to the total Yemeni population. To the best of our knowledge, this study is the first to examine the relationship between the habit of chewing qat and the number of natural teeth in adult Yemeni people.

In the present study, qat consumption was high among the participating adult Yemeni people. This finding of the study is in agreement with several previous studies, which reported the prevalence of qat consumption among adults in Yemen.^[12,13]

During the 35-year age range in the study, women would be expected to lose 12.6 teeth, while men would be expected to lose 9.45 teeth. These results showed that females had a higher tooth loss than males. This might be attributed to diet, geographical location, and cultural differences commonly seen in the Yemen, where males are given priority. Furthermore, Russell *et al.* have reported that in many populations across the world, women have a higher rates of tooth loss and edentulism.^[1] They suggested this might be due to both biological and social factors associated with being female, which is an important risk factor for tooth loss.

In the present study, a significant negative relationship between age and the number of natural teeth was found. This could possibly be attributed to many factors such as with advancing age the probability of having poor oral hygiene is increased; conversely, younger patients have good oral hygiene, with good periodontal health. In addition, the interrelationship between oral health and well-being may be especially evident in older adults, who have accumulated a lifetime of exposure to multiple risk factors that contributed to the loss of some or all of their teeth.^[7]

In addition, qat status was not significantly related to fewer natural teeth in both men and women. However, the effects of qat were remarkable in men. This could be due to qat chewers being predominantly male and liking to smoke while chewing qat. Furthermore, this study revealed the relationship between qat chewing and smoking. Because all smokers were qat chewers, having few natural teeth in this groups might be the result of the combined effects of smoking and chewing. Such patterns of tooth loss may be correlated with periodontal

Table 1: Participant characteristics (n=99) according to qat status

Chewing qat status	Frequency (%)
Nonchewer	23 (23.23)
Current chewer, nonsmoker	21 (21.21)
Current chewer and smoker	22 (22.22)
Current chewer, ex-smoker	10 (10.10)
Ex-chewer, never smoked	10 (10.10)
Ex-chewer and smoker	13 (13.13)

Table 2: Relationship between qat status and number of teeth present at baseline in men

Parameter	Estimate	SE	t	P
Intercept	34.93	7.19	4.85	<0.0001
Nonchewer	7.21	3.93	1.84	0.0749
Current chewer, nonsmoker	6.69	4.07	1.64	0.1092
Current chewer and smoker	0.72	3.39	0.21	0.8321
Current chewer, ex-smoker	5.91	3.63	1.63	0.1128
Ex-chewer, never smoked	13.16	6.62	1.99	0.0546
Ex-chewer and smoker		Reference level		
Age	-0.27	0.11	-2.51	0.0170

P-value 5% ($P < 0.05$) obtained by conducting a linear regression analysis. SE=Standard error

Table 3: Relationship between qat status and number of teeth present at baseline in women

Parameter	Estimate	SE	t	P
Intercept	39.95	4.51	8.86	<0.0001
Nonchewer	2.04	2.00	1.02	0.3123
Current chewer, nonsmoker	2.84	1.97	1.44	0.1550
Current chewer and smoker	0.84	2.52	0.33	0.7391
Current chewer, ex-smoker	2.07	3.79	0.56	0.5789
Ex-chewer, never smoked	2.26	2.23	1.01	0.3158
Ex-chewer and smoker		Reference level		
Age	-0.36	0.08	-4.48	<0.0001

P-value 5% ($P < 0.05$) obtained by conducting a linear regression analysis. SE=Standard error

attachment loss or disease. It could also be that smokers consume more qat than nonsmokers. Our preliminary findings suggest that qat chewing and smoking cannot be separated in adult Yemenis, either from a behavioral perspective (virtually all smokers were chewers) or from a health perspective regarding the number of natural teeth (the combined effect of qat chewing and smoking); we found that not chewing qat and not smoking were important to prevent tooth loss. Therefore, clinicians should advise all patients, particularly those who both chew qat and smoke tobacco, to stop these habits. Sharing the importance and significance of retained teeth with both dental and nondental health-care providers may give a valuable impetus to improve oral hygiene and retain teeth.

Because of the limitations of the current study, our conclusions are still preliminary, and observational studies of a large sample size from different regions of Yemen are needed to shed further light on the potential causal relationship between the habit of chewing qat and the number of natural teeth in adulthood and aging. In addition, it should be noted that there could be other variables which if included, might help to explain the effect of chewing qat on tooth loss.

FUTURE TRENDS

The retention of teeth is crucial for the quality of life, and it is essential to control the reasons for losing teeth. This can be accomplished by sharing the importance and significance of retained teeth with both dental and nondental health-care providers may give a valuable impetus to improve oral hygiene and retain teeth. In addition, it is imperative to implement policy and health-care system strategies aimed at improving oral hygiene and retaining teeth;^[15] in this respect, qat prevention and cessation interventions could be effective and beneficial for improving oral health and retention of teeth among qat chewers. Future research should include a large sample to identify whether there is a relationship between the habit of chewing qat and the number of natural teeth.

CONCLUSIONS

The practical implications of the current results may not be obvious, and generalization of the results should be carried out with caution in view of the relatively small sample. However, to date, little attention has been given to the relationship between oral status in terms of number of teeth and chewing qat.

While age was a significant factor for tooth loss for both men and women, the habit of chewing qat was not significant for either sex. For men, chewing qat had a fairly large effect on the number of teeth remaining. Almost all smokers were qat chewers or ex-chewers, and to a large extent, the serious tooth loss consequences

suffered by qat chewers might be the result of the combined effects of smoking tobacco and chewing qat among the participating adult Yemeni people in this study. It is imperative to increase oral health awareness for our people to make them realize the importance of their teeth as well as the deleterious effect of chewing qat, which would help in reducing tooth loss. Longitudinal analysis will be needed to shed further light on the potential causal relationship between the habit of chewing qat and the number of natural teeth in adults.

ACKNOWLEDGMENT

The authors would like to thank all participants for their valuable help and cooperation.

FINANCIAL SUPPORT AND SPONSORSHIP

Nil.

CONFLICTS OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Russell SL, Gordon S, Lukacs JR, Kaste LM. Sex/Gender differences in tooth loss and edentulism: Historical perspectives, biological factors, and sociologic reasons. *Dent Clin North Am* 2013;57:317-37.
2. Hujoel PP, Powell LV, Kiyak HA. The effects of simple interventions on tooth mortality: Findings in one trial and implications for future studies. *J Dent Res* 1997;76:867-74.
3. Friedman PK, Lamster IB. Tooth loss as a predictor of shortened longevity: Exploring the hypothesis. *Periodontol* 2000 2016;72:142-52.
4. Friedman PK, Kaufman LB, Karpas SL. Oral health disparity in older adults: Dental decay and tooth loss. *Dent Clin North Am* 2014;58:757-70.
5. Polzer I, Schimmel M, Müller F, Biffar R. Edentulism as part of the general health problems of elderly adults. *Int Dent J* 2010;60:143-55.
6. Starr JM, Hall R. Predictors and correlates of edentulism in healthy older people. *Curr Opin Clin Nutr Metab Care* 2010;13:19-23.
7. Thorstensson H, Johansson B. Why do some people lose teeth across their lifespan whereas others retain a functional dentition into very old age? *Gerodontology* 2010;27:19-25.
8. Patel NB. "Natural amphetamine" khat: A Cultural tradition or a drug of abuse? *Int Rev Neurobiol* 2015;120:235-55.
9. El-Wajeh YA, Thornhill MH. Qat and its health effects. *Br Dent J* 2009;206:17-21.
10. El-Zaemey S, Schütz J, Leon ME. Qat chewing and risk of potentially malignant and malignant oral disorders: A Systematic review. *Int J Occup Environ Med* 2015;6:129-43.
11. Leon ME, Assefa M, Kassa E, Bane A, Gemechu T, Tilahun Y, *et al*. Qat use and esophageal cancer in ethiopia: A pilot case-control study. *PLoS One* 2017;12:e0178911.
12. Al-Akhali MS, Al-Moraisi EA. Khat chewing habit produces a significant adverse effect on periodontal, oral health: A systematic review and meta-analysis. *J Periodontol Res* 2017;52:937-45.
13. Al-Maweri SA, Al-Akhali M. Oral hygiene and periodontal health status among khat chewers. A case-control study. *J Clin Exp Dent* 2017;9:e629-e634.
14. Dietrich T, Walter C, Oluwagbemigun K, Bergmann M, Pischon N, *et al*. Smoking, smoking cessation, and risk of tooth loss: The EPIC-potsdam study. *J Dent Res* 2015;94:1369-75.
15. Hyde S, Dupuis V, Mariri BP, Dartevielle S. Prevention of tooth loss and dental pain for reducing the global burden of oral diseases. *Int Dent J* 2017;67 Suppl 2:19-25.