

# Self-Reported Oral Hygiene Habits and Oral Health Problems of Kuwaiti Adults

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## Key Words

Oral hygiene · Oral health · Toothbrushing ·  
Self-assessment · Dental treatment needs

## Abstract

**Objective:** The aims of this study were to examine self-reported oral hygiene habits and oral health problems of a sample of adult Kuwaitis. **Materials and Methods:** A self-administered, anonymous, structured questionnaire was distributed to 2,400 adult Kuwaiti nationals from all 6 governorates of Kuwait assessing socio-demographic variables, oral hygiene habits, and oral health problems. **Results:** Of the 2,400 questionnaires, 1,925 (80.25%) responded. Of these, 62% reported brushing their teeth at least twice daily, while daily use of dental floss was uncommon (11.8%). Adequate toothbrushing habits were significantly associated with female gender, educational level, non-smoking status, and history of recent preventive dental visits ( $p = 0.001$ ). The majority of subjects reported multiple oral health problems (64.7% with 2 or more and 41.8% with 3 or more). Factors associated with multiple oral health complaints included younger age, smoking, not having a recent preventive dental visit, and brushing the teeth less than twice daily. **Conclusions:** Less than two-thirds of the sam-

pled adult Kuwaitis followed the recommended toothbrushing frequency of twice daily or more, and the majority of subjects have not had a preventive dental visit in the previous 6 months. Furthermore, most subjects reported multiple oral health problems that are mostly preventable through adequate oral hygiene habits and regular preventive dental visits.

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## Introduction

Oral health is an important component of general health and overall quality of life [1]. The two most common oral diseases, caries and periodontal disease, continue to be highly prevalent in most regions of the world [2]. Behavioral aspects play a major role in the prevention of both diseases in that adequate oral hygiene habits and compliance with regular preventive dental visits are essential for their control [3]. Self-preventive measures for the removal of bacterial dental plaque through adequate use of the toothbrush and dental floss have been demonstrated to reduce the prevalence of both caries [4, 5] and periodontal diseases [6, 7]. Similarly, compliance with regular preventive dental examination and prophylaxis

visits have been documented as essential for the prevention and early diagnosis of oral diseases [8–12].

Self-preventive oral health behavior and oral hygiene habits are influenced by several factors, including patient motivation, attitude, and value system [13–15]. Consequently, differences in oral hygiene habits have been shown to be related to culture and geographic region [16–19]. For example, while 73–83% of schoolchildren in Norway, Germany, Sweden, Denmark, and Austria brushed their teeth twice daily [16], such toothbrushing frequency was reported by only 19–46% of patients in Lithuania, Saudi Arabia, and Japan [17–19].

Limited information is available on the oral hygiene habits of adult Kuwaitis, and the available data are either from before the Gulf war [20] or related to specific populations such as students at the health sciences center [21], or the college of health sciences [22]. Moreover, limited information is available on the dental treatment needs of adult Kuwaitis, since data from the only national health survey performed in 1985 were lost during the Gulf war [20]. Obtaining baseline information of the oral health habits and dental treatment needs is essential for the establishment of adequate preventive programs and for the proper allocation of available dental services. Therefore, the aims of this study were to examine self-reported oral hygiene habits and perceived oral health problems of Kuwaiti adults.

## Subjects and Methods

This cross-sectional study was conducted in June and July, 2003. A self-administered, anonymous, structured questionnaire was distributed to a random sample of Kuwaiti nationals 18 years of age or older recruited from all 6 governorates of Kuwait (Capital, Ahmadi, Hawalli, Jahra, Farwaniya, and Mubarak). In each district, study personnel distributed 100 questionnaires in each of 4 randomly selected locations (one male and one female high schools, and two government offices), for a total of 2,400 distributed questionnaires, and completed study forms were collected after 1 week. The study protocol was approved by the Ethics Review Committee, Faculty of Dentistry, Kuwait University, Kuwait.

The questionnaire used in this study addressed 3 aspects: socio-demographic characteristics, oral hygiene habits and practices, and self-perceived oral health problems. Socio-demographic variables included age, gender, marital status, level of education, and smoking status (current smoker or non-smoker). Oral hygiene habits were assessed through questions on the frequency of use of the toothbrush, dental floss, mouthrinses, and the traditional chewing stick (*miswak*). Subjects were also asked to report the time of their last professional tooth cleaning or dental prophylaxis visit. The last part of the questionnaire asked the subjects to report which of 13 oral health problems they were experiencing

at the time of the questionnaire or had experienced within the previous 6 months. These included continuous or transient pain in one or more teeth, pain in the gingiva, gingival bleeding when using the toothbrush or when eating, an abscess or infection in one or more teeth, missing or extracted teeth, tooth staining, bad breath, tooth sensitivity to cold, dry mouth, pain in the temporomandibular joint or jaw muscles, chewing difficulty or compromise, or other problems.

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 12.0 (Chicago, Ill., USA, 2003) statistical software. Differences in age between males and females were compared with the Student t-test, while differences in the other categorical socio-demographic variables, oral hygiene habits, and oral health problems were compared using the chi-square test. Multiple logistic regression analysis was performed to identify factors independently associated with adequate toothbrushing habits (defined as brushing the teeth two times daily or more) and with high treatment needs (defined as having 3 or more self-reported oral health problems). Odds ratios and corresponding confidence intervals were generated for the examined variables. Significance level used was  $p < 0.05$ .

## Results

A total of 1,925 completed questionnaires were returned and used in the analysis (response rate = 80.2%). The mean age of study participants was  $33.4 \pm 9.0$  years (range: 18–70), males comprised 50.8% of the sample, and the majority of subjects were married (72.3%). Current smokers accounted for 24.1% of the sample.

Differences in socio-demographic characteristics between male and female subjects are presented in table 1. Males were significantly older (35.3 vs. 31.4 years;  $p < 0.001$ ) and included more current smokers (43.9 vs. 3.6%;  $p < 0.001$ ) than females, while the proportion of married individuals was similar in males and females (73.4 vs. 71.1%, respectively), and the percentage of females with more than high school education was significantly higher than males (86.8 vs. 76.5%;  $p < 0.001$ ).

The self-reported oral hygiene habits of male and female subjects are presented in table 2. Overall, the percentage of subjects using the toothbrush at least twice daily was 62%, and those using dental floss at least once daily was 11.8%. Mouthrinses were used by 36.6% of subjects, while *miswak* was used occasionally or daily by 33% of the sample. The majority of mouthrinses used by the study subjects were over-the-counter commercial products (41.2% of mouthrinse users) or salt-water rinses (38.4%), while 20.4% used mouthrinses prescribed by their dentists. Significantly more females brushed their teeth at least twice daily (73.7 vs. 50.7%;  $p < 0.001$ ), and used mouthrinses (39.1 vs. 34.0%;  $p < 0.01$ ) than

**Table 1.** Socio-demographic variables and smoking status of study subjects

Variable	Gender		p value	Total (n = 1,925)
	male (n = 977)	female (n = 948)		
Age	35.3 ± 9.4	31.4 ± 8.0	<0.001 <sup>a</sup>	33.4 ± 9.0
Marital status				
Married	717 (73.4%)	674 (71.1%)	NS	1,391 (72.3%)
Not married	260 (26.6%)	274 (28.9%)		534 (27.7%)
Education			<0.001 <sup>b</sup>	
Primary/intermediate education	78 (8.0%)	40 (4.2%)	<0.001 <sup>b</sup>	118 (6.1%)
High school	151 (15.5%)	85 (9.0%)		236 (12.3%)
Professional college	211 (21.6%)	322 (34.0%)		533 (27.7%)
University degree	472 (48.3%)	471 (49.7%)		943 (49.0%)
Post-graduate degree	65 (6.6%)	30 (3.1%)		95 (4.9%)
Smoking status			<0.001 <sup>b</sup>	
Current smoker	429 (43.9%)	34 (3.6%)	<0.001 <sup>b</sup>	463 (24.1%)
Non-smoker	548 (56.1%)	914 (96.4%)		1,462 (75.9%)

<sup>a</sup> Student's t test; <sup>b</sup> chi-square test; SD = standard deviation; NS = not statistically significant, p > 0.05.

**Table 2.** Self-reported oral hygiene practices and preventive dental visits

Variable	Gender		p value <sup>a</sup>	Total (n = 1,925)
	male (n = 977)	female (n = 948)		
Toothbrushing/day			<0.001	
≥ Twice	495 (50.7%)	699 (73.7%)	<0.001	1,194 (62.0%)
Once	254 (26.0%)	182 (19.2%)		436 (22.6%)
Occasional <sup>b</sup>	164 (16.8%)	48 (5.1%)		212 (11.0%)
Never	64 (6.6%)	19 (2.0%)		83 (4.3%)
Flossing/day			NS	
≥ Once	117 (12.0%)	111 (11.7%)	NS	228 (11.8%)
Occasional <sup>b</sup>	264 (27.0%)	298 (31.4%)		562 (29.2%)
Never	596 (61.0%)	539 (56.9%)		1,135 (59.0%)
Mouthrinse use and type			0.010	
No	644 (66.0%)	577 (60.9%)	0.010	1,221 (63.4%)
Prescribed by dentist	55 (5.6%)	89 (9.4%)		144 (7.5%)
OTC rinse	142 (14.5%)	148 (15.6%)		290 (15.1%)
Salt water	136 (13.9%)	134 (14.1%)		270 (14.0%)
Miswak use/day			<0.001	
≥ Once	122 (12.5%)	58 (6.1%)	<0.001	180 (9.4%)
Occasional <sup>b</sup>	299 (30.6%)	156 (16.5%)		455 (23.6%)
Never	556 (56.9%)	734 (77.4%)		1,290 (67.0%)
Last preventive dental visit			NS	
≤6 months	229 (23.4%)	211 (22.3%)	NS	440 (22.9%)
6–12 months	197 (20.2%)	191 (20.1%)		388 (20.2%)
>12 months	360 (36.9%)	369 (38.9%)		729 (37.8%)
Never	191 (19.5%)	177 (18.7%)		368 (19.1%)

<sup>a</sup> Chi-square test; <sup>b</sup> occasional toothbrushing/flossing/miswak use: <once daily; NS = not statistically significant, p > 0.05; OTC rinse = over-the-counter/non-prescription rinse.

**Table 3.** Self-reported oral health problems

Oral health problems <sup>b</sup>	Gender		p value <sup>a</sup>	Total (n=1,925)
	male (n = 977)	female (n = 948)		
Constant pain in ≥ 1 tooth	78 (8.0%)	81 (8.5%)	NS	159 (8.3%)
Transient pain in ≥ 1 tooth	226 (23.1%)	283 (29.9%)	<0.001	509 (26.4%)
Pain in the gingiva	179 (18.3%)	192 (20.3%)	NS	371 (19.3%)
Gingival bleeding when brushing	264 (27.0%)	273 (28.8%)	NS	537 (27.9%)
Gingival bleeding when eating	54 (5.5%)	72 (7.6%)	NS	126 (6.5%)
Abscess/infection in ≥ 1 tooth	78 (8.0%)	34 (3.6%)	<0.001	112 (5.8%)
Oral malodor	204 (20.9%)	101 (10.7%)	<0.001	305 (15.8%)
Missing/extracted teeth	338 (34.6%)	266 (28.1%)	0.002	604 (31.4%)
TMJ/jaw muscle pain	72 (7.4%)	71 (7.5%)	NS	143 (7.4%)
Chewing difficulty/compromise	136 (13.9%)	114 (12.0%)	NS	250 (13.0%)
Tooth sensitivity to cold	300 (30.7%)	295 (31.1%)	NS	595 (30.9%)
Tooth staining	403 (41.2%)	332 (35.0%)	0.006	735 (38.2%)
Dry mouth	140 (14.3%)	85 (9.0%)	<0.001	225 (11.7%)
Other (unspecified)	47 (4.8%)	34 (3.6%)	NS	81 (4.2%)
None	93 (9.5%)	87 (9.2%)	NS	180 (9.4%)

<sup>a</sup> Chi-square test; <sup>b</sup> total numbers add up to more than the total number of subjects due to reporting of multiple oral health problems by some subjects; NS = not statistically significant,  $p > 0.05$ ; TMJ = temporomandibular joint.

males. Conversely, use of *miswak* was more common in males than females (43.1 vs. 22.6%;  $p < 0.001$ ). Regarding history of dental maintenance visits, only 22.9% of subjects have had a prophylaxis visit within the 6 months preceding the study, with no significant gender differences.

Only 9.4% of respondents reported no perceived oral health problems, while the percentages of subjects with one or two complaints were 25.9 and 22.9%, respectively. The majority of subjects, however, complained of 3 or more oral health problems (41.8%). Overall, the most common oral health problems reported by the subjects were in this order: tooth staining: 38.2%; missing/extracted teeth: 31.4%; tooth sensitivity: 30.9%; bleeding in the gingiva when brushing the teeth: 27.9%, and transient pain in one or more teeth: 26.4%. Other less commonly-reported complaints were pain in the gingiva: 19.3%; oral malodor: 15.8%; chewing difficulty or compromise in masticatory ability: 13%; xerostomia: 11.7%; constant pain in one or more teeth: 8.3%; temporomandibular joint or jaw muscle pain: 7.4%; gingival bleeding while eating: 6.5%, and an abscess/infection in one tooth or more: 5.8%. An additional 4.2% of patients complained of other, unspecified problems.

Gender differences were statistically significant for 6 of the examined oral health problems (table 3). Males more commonly reported experiencing tooth staining, missing or extracted teeth, xerostomia, oral malodor, and tooth-associated infections than females, while more females reported experiencing transient pain in the teeth than males. No significant gender differences were found in the remaining oral health complaints.

Logistic regression analysis results of factors associated with adequate toothbrushing habits (brushing the teeth at least twice daily) are presented in table 4. Female gender OR = 2.33, 95% CI: 1.87–2.91;  $p < 0.001$ ; more than high school education level OR = 1.29, 95% CI: 1.01–1.66;  $p < 0.05$ ; non-smoking status: OR = 1.58, 95% CI: 1.24–2.01;  $p < 0.001$ , and having a preventive dental visit within the previous 6 months (OR = 2.21, 95% CI: 1.72–2.83;  $p < 0.001$ ) were significantly associated with adequate toothbrushing habits.

Multiple regression analysis of the factors associated with high treatment needs (defined as 3 or more self-reported oral health problems) identified significant associations for the following factors (table 5): age of 30 years or less (OR = 1.35, 95% CI: 1.10–1.65;  $p < 0.01$ ), current smoking status (OR = 2.04, 95% CI: 1.60–2.61;  $p < 0.001$ ),

**Table 4.** Regression analysis of factors associated with tooth-brushing two or more times daily

Variable	n (%)	OR	CI	p value
Age				
≤30 years	323 (37.0)	1.00		
>30 years	408 (38.8)	1.11	0.90–1.37	NS
Gender				
Male	495 (50.7)	1.00		
Female	699 (73.7)	2.33	1.87–2.91	<0.001
Marital status				
Not married	330 (61.8)	1.00		
Married	864 (62.1)	1.01	0.79–1.27	NS
Education				
High school or less	187 (52.8)	1.00		
College	1,007 (64.1)	1.29	1.01–1.66	0.04
Smoking status				
Current smoker	208 (44.9)	1.00		
Non-smoker	986 (67.4)	1.58	1.24–2.01	<0.001
Last preventive dental visit				
>6 months	865 (58.2)	1.00		
≤6 months	329 (74.8)	2.21	1.72–2.83	<0.001

OR = Adjusted odds ratio; CI = 95% confidence interval.

not having a preventive dental visit within the previous 6 months (OR = 1.37, 95% CI: 1.09–1.72;  $p < 0.01$ ), and brushing the teeth less than twice daily (OR = 1.24, 95% CI: 1.02–1.51;  $p < 0.05$ ).

## Discussion

Assessment of the prevailing oral hygiene practices and oral health complaints of a population is essential for the adequate understanding of the oral healthcare needs of the society. Additionally, this information can be used as baseline information on which preventive programs can be established and assessed for efficacy [23]. This study was based on self-reported oral hygiene habits and dental treatment needs, hence a major limitation of the study is the reliance on subjective evaluations rather than clinical assessments. Another limitation of the study is the sampling method. Since the sample consisted mainly of educated Kuwaiti individuals recruited from schools and workplaces (93.9% of the sample completed at least high school education), exclusion of people from other more deprived background may have occurred. On the other hand, available population data indicates that the rate of secondary education enrollment amongst Ku-

**Table 5.** Regression analysis of factors associated with high treatment needs ( $\geq 3$  self-reported oral health problems)

Variable	n (%)	OR	CI	p value
Age				
>30 years	413 (39.3)	1.00		
≤30 years	392 (44.9)	1.35	1.10–1.65	0.003
Gender				
Female	384 (40.5)	1.00		
Male	421 (43.1)	1.20	0.97–1.50	NS
Marital status				
Not married	221 (41.4)	1.00		
Married	584 (42.0)	1.16	0.93–1.44	NS
Education				
College	651 (41.4)	1.00		
High school or less	154 (43.5)	1.01	0.80–1.30	NS
Smoking status				
Non-smoker	556 (38.0)	1.00		
Current smoker	249 (53.8)	2.04	1.60–2.61	<0.001
Last preventive dental visit				
≤6 months	154 (35.0)	1.00		
>6 months	651 (43.8)	1.37	1.09–1.72	0.006
Toothbrushing/day				
≥2	464 (38.9)	1.00		
<2	341 (46.6)	1.24	1.02–1.51	0.033

OR = Adjusted odds ratio; CI = 95% confidence interval.

waitis is high (89%) [24]. Therefore, interpretation of the results must be performed with caution, bearing in mind that self-assessments of oral hygiene practices may be over-estimated [25], while dental treatment needs may be under-estimated [26].

In this study, 84.6% of subjects indicated that they brushed their teeth once or more per day. This number is higher than the results of the 1985 national survey in which 73.8% of all Kuwaiti subjects brushed their teeth at least once daily [20], yet lower than the study of Kuwait health sciences center students in which 94.7% of respondents brushed their teeth once per day or more [21]. Use of the toothbrush twice or more daily was reported by 62% of the sample, compared to 67.6% of health sciences center students [21]. The difference is most likely related to the specific population examined in that study of medical, nursing, and dental students in which increased general and dental health awareness is expected. This finding is also lower than what has been reported (73–83%) in some other nations such as Norway, Denmark, and Sweden [16], yet higher than those reported in Lithuania [19] and Saudi Arabia [17].

For other oral hygiene methods, daily use of dental floss was reported by only 11.8% of subjects, which is consistent with European and Canadian reports of low frequency of use of this oral hygiene aid [16]. *Miswak* use was reported by 33% of subjects, and by significantly more males than females 43.1 vs. 22.6%, similar to studies from neighboring countries in which *miswak* use was more common in males [17, 27]. Conversely, mouthrinses were more commonly used by female subjects (39.1 vs. 34%), and the majority of mouthrinses used were not prescribed by a dentist (only 20.4% were prescribed by dentists). This high percentage of non-prescription mouthrinse users may indicate a need to inform patients that reliance on mouthrinses for plaque control without other mechanical tooth cleaning methods should be avoided. It has been demonstrated that chemical plaque control methods, including mouthrinses, alone are not sufficient for maintaining adequate oral hygiene levels and preventing the development of dental diseases, and that mechanical oral hygiene methods (toothbrushing and flossing) are necessary elements of any oral hygiene program [28].

Compliance with regular preventive dental visits (for check-ups and/or prophylaxis) was low in that only 22.9% of respondents have had such a visit within the 6 months prior to the study, and 42.1% within the last 12 months. Additionally, 19.1% of subjects have never had preventive dental visits. This percentage of 42.1% having a dental preventive visit within the last 12 months is a little higher than that reported for any dental visits (not only prophylaxis visits) in the 1985 national survey of 38.8% [20]. However, this figure is low compared to other populations [10].

Adequate toothbrushing habits in this sample were significantly associated with female gender, secondary school educational level or higher, non-smoking status, and having a preventive dental visit within the previous 6 months. This is consistent with previous investigations in which adequate oral hygiene habits were found more commonly in females [15], subjects with higher educational levels [29], non-smokers [30], and regular dental attendees [31].

Although no clinical examinations were performed and therefore no direct verification of actual treatment needs can be ascertained, self-reported oral health complaints may give indirect indications of the magnitude of certain oral health needs of the society. Self-assessment of dental treatment needs has been previously reported to have underestimated actual needs [32]. However, some validity has been reported for certain parameters such as

having missing teeth and general non-specific estimations of periodontal health, and self-assessment may therefore still be valuable in epidemiological studies of oral health [26]. Furthermore, all of the questions used in this survey were about tangible aspects that are easily perceived by the patient with no or limited dental education such as tooth staining, pain, and gingival bleeding associated with daily activities like eating or using the toothbrush, and no questions regarding conditions that can only be diagnosed by a dentist such as caries or periodontal pocketing were included.

The validity of the above argument is shown by the fact that only 9.4% of subjects reported no oral health problems, while the majority had multiple complaints (64.7% with 2 or more and 41.8% with 3 or more). Factors associated with high treatment needs (multiple oral health complaints) in this study included younger age, smoking, not having a preventive dental visit within the previous 6 months, and brushing the teeth less than twice daily. This is in agreement with previous investigations associating higher treatment needs with smoking [30], irregular dental maintenance history [33], and inadequate oral hygiene habits [9].

Given the relatively high level of education of this sample (83.6% having at least college education and 93.9% completing at least high school education), it was somewhat disappointing to find that 15.3% of subjects either never brushed their teeth or used the toothbrush infrequently, only 11.8% used dental floss on a daily basis, and 19.4% have never had a prophylaxis visit. Moreover, 34.4% reported bleeding of their gingiva while brushing or eating, a sign of severe gingival inflammation and periodontal disease since healthy gingival tissues should not bleed [7]. Such high levels of non-compliance to adequate oral hygiene and preventive practices and lack of knowledge about the basic aspects of oral health from these highly-educated individuals should not have occurred if the educational system included elements related to oral health promotion, and may therefore be indicative of discrepancies in oral health education provided to adult Kuwaitis. In Kuwait, preventive dental services for children are provided through the School Oral Health Program, but no similar programs are available for adults. Furthermore, oral healthcare services for both children and adults are mostly treatment-oriented, while limited resources and attention have been dedicated to preventive services [34]. Therefore, increased focus on oral disease prevention through improved patient educational efforts may be necessary.

## Conclusions

Our data show that less than two-thirds of the sampled adult Kuwaitis followed the recommended toothbrushing frequency of twice daily or more, and the majority of

subjects have not had a preventive dental visit in the previous 6 months. Furthermore, most subjects reported multiple oral health problems that are mostly preventable through adequate oral hygiene habits and regular preventive dental visits.

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