

Oral health status and associated lifestyle behaviors among Iranian adults: a population based household survey

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Abstract

Background: Poor oral hygiene can lead to serious diseases, like periodontitis, tooth decay, pain and discomfort in teeth or gums, infection, and loss of teeth. In Iran, particularly adults between 50 years and older experience oral health problems, and this age group will grow the next decades. Despite increasing attention into healthy aging, there is less emphasis on oral hygiene. This survey aimed to investigate oral health status among Iranian adults. This knowledge may provide vital information to those who are planning strategies of oral health care.

Method: A population-based household survey was conducted to recruit a representative sample of adults. This study was carried out among adults aged 18-65 years between May and October 2016 in Tabriz, Iran. The study population was sampled using a multi-stage cluster sampling design. The WHO's oral health questionnaire (WHO's OHQ) was used for measuring oral health status and oral health behavior.

Results: In total, 2310 respondents completed the survey. The mean age (SD) of the participants was 41.6(23.4) years. About 48.8% of participants were male and 51.2% were female. 187(8.1%) were edentulous, and 152 (20.7%) of those participants were aged 50 to 65 years. 72.3% of the sample were dentate in that they had 20 or more teeth. Half of adults aged 50-65 years said they had 20 or more teeth. In general, about one-third of the participants reported that they don't brush their teeth daily (23% for 18-35-year-old adults, 35.9% for 36-50-year-old adults, and 44.6% for 51- to 65-year-old adults). In our sample, 39.4% of 18-35-year-olds, 34.1% of 36-50-year-olds, and 26.6% of 51-65-year-olds had visited a dentist less than six months ago. One-third of participants eat sweets every day and frequently consume tea with sugar.

Conclusion: The oral health status indicates that even though the majority of Iranian people assess their dental health positively, only a minority of participants have regular dental visits. Visits to the dentist decline by increasing age, and oral health problems increase. The study findings underline the importance of dental visits and that poor oral health may increase the risk of adverse health outcomes, particularly as age increases.

Introduction

Poor oral hygiene (and the use of tobacco) has a significant impact on oral health, which creates short-term and prolonged physical discomfort. Poor oral health can lead to serious oral diseases like periodontitis, tooth decay, pain and discomfort in teeth or gums, and infection and loss of teeth [1]. Poor oral health conditions result in additional complications including trouble in swallowing, chewing, and speech, and those complications can in turn affect sleep quality and productivity at work of people [2, 3].

There is strong evidence that untreated oral diseases and disorders not only negatively impact general health, but they also increase the probability of diabetes and cardiovascular disease [4, 5]. A meta-analysis of follow-up studies have estimated that poor oral health conditions and periodontal diseases may increase the risk of cardiocascular disease (CVD) by approximately 20% [7]. Furthermore, periodontal diseases significantly increase the risk of myocardial infarction [6, 7].

Studies have demonstrated that poor oral health problems, such as natural tooth loss, dental plaque accumulation, or inflammation of gingival tissues, increase with age [8]. Iran will experience a dramatic aging population increase in the next decades [9]. WHO estimated that nearly 10% of Iranian population are older than 60 years of age, and this will have risen to 21.7% by 2050 [10- 12]. Along with the aging population, the prevalence of chronic diseases, especially the accumulation of health and oral health problems, will increase, which in turn will have an impact on the cost and the need for health care [13, 14]. Despite increasing attention on the healthy lifestyles of aging people, there is relatively less emphasis on oral health.

Some years ago, WHO recommended conducting household surveys on adult groups in order to gather epidemiological information on oral health status and dental caries patterns to make appropriate and tailored oral health care interventions among them [15]. In this study, we conducted a household survey to investigate oral health status. More specifically, we administered the WHO oral health assessment questionnaire among an adult sample in Tabriz. This knowledge may provide vital information to those who are planning strategies of oral health care for an adult population.

Methods

Study design and Population

This cross-sectional study was carried out among adults who are 18 to 65 years old between May and October 2016 in Tabriz. A population-based household survey was conducted in order to recruit a representative sample of adults from the community. Eligibility criteria are: a) living in the study area and being at home at the time of data collection and (b) not having a diagnosed of mental or cognitive disorder. Written informed consent was obtained from each participant.

Sampling and sample size

The sample size was calculated based on the level of oral health status in the adult population of Tabriz. To estimate the oral health status of 50% (edentulous) [9], with a 95% confidence and an error of 3%, the sample size was estimated to be 2310. The population of Tabriz was estimated to

be 980,000 (aged 18 to 65 years) in 2016 [16]. The study population was sampled using a multi-stage cluster sampling design [17]. In the first sampling stage, four health care centers (HCCs) were randomly selected from 16 HCCs. In the next stage, 25% of street blocks in the area of HCCs were selected. Then, every 11th household of each block was identified for the recruitments of study participants. Finally, in each household eligible individuals were asked to participate in the study. In total, 690 people refused to participate in the study. Sampling in the blocks was continued to reach the required sample size specified for that block. Four trained researchers conducted the interviews. They were bilingual in Farsi and Turkish, female, between the ages of 23 and 30 years old. In this study, a total of 2310 respondents completed the survey (77% response rate).

Data Collection and questionnaire

The WHO's oral health questionnaire (WHO's OHQ) for adults was used for measuring oral health status and oral health behavior [17]. WHO's OHQ consists of 16 variables. Four questions assessed the oral health status: (a) self-reported number of teeth present (0 = no natural teeth, 1 = 1–9 teeth, 2 = 10–19 teeth, 3 = 20 teeth or more), (b) experience of pain/discomfort from teeth and mouth (yes/no), (c) wearing of removable dentures (partial/full upper/full lower; yes/no), (d) self-assessment of status of teeth and gums (ranging from 1 = excellent to 6 = very poor). Three items assessed oral health related behaviors: (a) frequency of tooth cleaning (ranging from 1 = never to 6 = once a day), (b) use of aids/tools for oral hygiene (e.g., toothbrush, wooden toothpicks, thread; yes/no), and (c) use of toothpaste with and without fluoride (yes/no). Two questions are related to (a) dental visits (ranging from 1 = less than 6 months to 5 = 5 years or more) and (b) the reasons for the dental visit(s) (e.g. consultation/advise, treatment/follow-up treatment, pain or trouble with teeth, gums, or mouth). One question assessed the experience of reduced quality of life due to twelve oral problems (e.g., "difficulty in biting food," "difficulty in chewing food," or "felt embarrassed due to appearance of teeth") (0 = don't know, 1 = no, 2 = sometimes, 3 = fairly often, 4 = very often). One question examined the consumption of sugary foods and drinks: (a) eating fresh fruits, (b) biscuits and cream cakes, and (c) drinking tea with sugar with answer categories 1 = never/seldom, 2 = several times a month, 3 = once a week, 4 = several times a week, 5 = every day, and 6 = several times a day. One item assessed the use of tobacco with type (a) cigarettes, (b) pipe, (c) cigar, (d) chewing tobacco and (c) use of snuff tobacco, and frequency (1 = never/seldom, 2 = several times a month, 3 = once a week, 4 = several times a week, 5 = every day, and 6 = several times a day). The last question assessed the consumption of alcohol (usual number of drinks per day) during the past 30 days (ranging from 0 = less than 1 drink to 5 = 5 or more drinks). The remaining questions were socio-demographic questions about age (between 18 and 35, 36 and 50, and 51 and 65 years old) and gender (male or female).

The validity and reliability of the WHO's OHQ was assessed based on standardized cross-cultural translation guidelines [18]. The English version of the WHO's OHQ was translated into Persian. The translation was done by two independent native Persian translators. Both translators agreed on a common translation. Then, the questions were translated back from Persian to English by two professional translators. The translators and researchers checked and agreed on the final Persian version. Content validity was conducted in a pilot study of 20 individuals [19]. They were asked to give feedback on the scale for improvement. This process led to some changes in the wording of the scale. Thereafter, the Persian version of WHO's OHQ was evaluated by an expert panel (three health educationists and two dentists). The Persian version of WHO's OHQ had satisfactory validity among the pilot population.

Statistical Analysis

Statistical analyses were performed using the Statistical Package for Social Science (SPSS 18 for windows, SPSS Inc.® headquarters, Chicago, USA). Normality of data was analyzed by Kolmogorov-Smirnov tests. Discrete variables are presented with a number and a percentage. Chi-square analyses were used to test the difference between biochemical variables between two groups. Results were considered statistically significant at $p < 0.05$.

Results

Demographic characteristics and oral health status

The mean age (SD) of the 2310 participants was 41.6 (23.4) years. About 48.8% of participants were male and 51.2% were female. 187 (8.1%) were edentulous, and 152 (20.7%) of those participants were aged 50 to 65 years. 72.3% of populations were dentate in that they had 20 or more teeth. This rate was 92.7% for adults aged 18 to 35 years, 71.3% for adults aged 36 to 50 years, and 49.4% for adults aged 50 to 65 years.

The percentage of all participants having pain or discomfort in their teeth or mouths over the past 12 months was 61.2%. Table 1 presents an overview of the participants aged 18–35 years, 36–50 years and 51–65 years old. Significant differences between groups were found. Participants aged between 18 and 35 years (71.2%) reported significantly more pain or discomfort in their teeth compared to the 36- to 50-year-old group (55.8%) and the 51- to 65-year-old group (54.8%). A total of 359 participants (15.5%) have had a removal of partial denture (RPD), with 9% of the participants being between 18 and 35 years old, 16.6% of the participants between 36 and 50 years old, and 21.8% of the participants between 51 and 65 years old. With regard to self-reported states of dental health, 63.5% ($n = 1425$) reported to have good teeth. No significant differences between the three age-groups were found. No gender differences were found, with the exception of men and women between 51 and 65 years old. As shown in Table 1, significantly more women between 51 and 65 years old (60.8%) experienced pain and discomfort in their teeth and mouths during the last 12 months compared to men (48.5%).

Teeth brushing and cleaning behaviors of the three age groups are shown in Table 2. About one third of participants reported that they don't brush their teeth daily (23% for 18-to 35-year-olds, 35.9% for 36- to 50-years-olds, and 44.6% for 51- to 65-year-olds). Approximately 62% of all participants reported using a toothbrush, about 24% reported using dental floss, and about 62% reported using toothpaste for cleaning and brushing their teeth. No significant gender differences were found, with the exception that women (26.7%) between 51 and 65 years old used more dental floss than men (17.7%) between the ages of 51 and 65 years.

Table 3 shows dental care visits and the reasons for visiting among adults of the three age groups. About 39.4% of adults between 18 and 35 years old, 34.1% participants between 36 and 50 years old, and 26.6% participants between 51 and 65 years old had visited a dentist less than six months ago. No significant gender differences were found. The most frequent reason (50.9%) for visiting a dentist was having pain or trouble with teeth or gums, and mouth.

Table 4 gives an overview of the oral health problems experienced by adults during the last year. The most frequent oral health problem experienced by adults between 18 and 35 years of age was feeling tense due to problems with their teeth or mouth, while the most frequent oral health problem among adults between 36 and 50 years old and 51 and 65 years old was difficulty chewing foods with 43.5% and 54%, respectively. No significant gender differences were found, with the exception that men in the age group of 51- to 65-years-old felt significantly more tense due to tooth or mouth pain (38.6%) than women, (30.9%) and they experienced significantly more sleep interruptions than women (20.9% of men versus 14.3% of women)

Lifestyle behaviors, which include eating fresh fruits, biscuits or sweet pies, consuming other foods or drinks containing sugar, and tobacco and alcohol consumption are shown in Table 5. Only 5.7% of participants eat fresh fruits several times a day and about 60% of participants ate fresh fruits several times a week. About one-third of participants eat biscuits (30.8%) several times a month, 27.1% eat sweet pies every day, 28.8% eat jam or honey several times a week, and 30.2% drink tea with sugar every day. Approximately 88% of the participants reported never or seldom smoking and 6% consumed alcohol several times a week.

Discussion

This household survey aimed to determine [oral health status of adults living in Tabriz](#). The oral health survey revealed that about 72% of the adults had 20 or more teeth and only half of the 50- to 65-years-old participants had 20 teeth or more. A similar study conducted in Iran among 35-to 44-year-old adults reported that almost all of its participants suffered from a substantial number of dental and periodontal problems. The latter study also reported that the average rate of total missed teeth was 6.6% [20]. According to the WHO worldwide map on oral health, Iranian adults who are between 35 and 44 years old have a moderate level of dental caries [21]. The current study revealed that 8% of the participants were edentulous (no natural teeth), 15.5% of them had a removable partial denture, and about 10% of the participants had a full (lower or upper) denture. The prevalence rate of edentulism among 51- to 65-year-olds is 20.7%. A similar prevalence rate of edentulism among 71- to 92-year-old male adults was reported from UK [22]. A systematic review reported that a Chinese population who are 65 years old had an average of 20 teeth [23]. Based on Swiss Health Survey, the prevalence of edentulous people was 0.3% and 26.8% in 15- to 24-year-old and 65- to 71-year-old participants, respectively [24]. In Turkey, a higher rate (48%) was however observed [25]. Although the burden of oral disease and tooth loss seems to increase with age, a substantial number of Iranian middle-aged adults already experience oral health problems. The results of our study confirmed that about more than one-third of middle-aged adults (i.e. 31 to 50 years old) reported poor self-rated oral and gum health. In a way, these findings are similar to the results of the poor self-rated oral health among Brazilian adults aged 20 to 59 years that has been reported by Luchi et al. [26].

One-third of our participants didn't brush their teeth daily while three-quarters of them aged 18 to 35 years old had brushed their teeth once a day or more. In a study conducted among Iranian individuals aged 60 to 70 years, it was found that 20% of the participants brushed their teeth twice or more a day and about half of the participants brushed their teeth only once a day [27]. Our study also demonstrated that older participants were less likely to brush their teeth twice or more a day. It is possible that factors such as lack of knowledge and cultural values about the importance of brushing teeth impact oral health behavior among older adults [28]. It seems that younger adults are more familiar with common and effective methods of preventive oral health care than older people because of more interaction of them with community services, so they may obtain more information about oral health preventive behavior [29].

In our study, only 23% of participants reported that they use dental flossing for cleaning their teeth. It should help if they were more informed about the importance of dental flossing, which is just as important as tooth brushing, as it cleans the inter-dental embrasures and the proximal tooth surfaces. Recently, a systematic review and meta-analysis suggested that optimal tooth brushing and dental flossing should occur twice daily and involve a fluoride toothpaste for caries prevention and periodontal disease control [30].

In this study, about 30% of participants had visited a dentist once during less than six month ago, and the most common reason of visiting the dentist was pain or trouble with teeth, gums, or mouth. Similarly, Burgette and colleagues reported that 57% of their study participants visited the dentist within the past year. The authors also recommended collecting specific classifications of dental visits [31]. According to our study results, classification of dental visits show that the participants visited the dentist for problem-based care, and in fact, this dental health-seeking behavior is not related to preventive dental care. Only 12.5% of participants reported routine check-up as the reason for their last visit to the dentist.

Difficulty chewing foods was the most common problem experienced by the participants, especially among older adults (51 to 65 years old). It is assumed that tooth loss and the presence of dentures decreases chewing ability, dietary intake, and overall health. There is evidence that a chewing disability produces a significant and negative impact on oral health-related quality of life (QoL) [35]. Among 44% of young participants, tension due to tooth or mouth pain was the most common problem. In a study conducted in several European countries, it was found that 10% of the sample felt tense because of teeth, mouth, or denture problems [36]. As the number of lost or decayed teeth increases, tension and food restriction increases [37].

This study found that one-third of the participants have frequent sweets in their meals every day and frequently consume tea with sugar. Strong evidence has shown a significant association of having sugary meals and unhealthy diet with poor oral health [38, 39]. Furthermore, poor oral health probably has an indirect effect on general health through disrupting dietary intake. People with poor oral health problems, such as having edentulism, removable partial dentures that fit poorly, having pain or cavities in teeth, and oral disease, compromise general nutrition through changing food choices and meal preparation [40, 41]. The mentioned condition makes further difficulties for older people that have been particularly evident in high levels of tooth loss, dental caries, and periodontal disease [42].

Most studies have been focused on specific population such as children [14] and pregnant women [32, 33] or have been localized to specific settings and convenience samples [34]. The present study adds to the literature because it is one of the first studies that includes a large representative Iranian sample. Still, the study has some limitations. First, it can be assumed that there is some selection bias that has occurred when eligible people were not at home during the interview visits. Second, this study relies on self-reports from participants about their oral health. Self-reports represent the impressions of the participants and are subject to response distortions (e.g., extreme or central tendency responding, or socially desirable responding) [43]. A more appropriate way to measure the dependent and independent variables would be through observations or reports of independent evaluators. It might be interesting for future studies to combine self-reports with registered information from dentists. Third, in future studies, it might be interesting to include participants from different social classes to increase representation of the population.

Conclusion

This household survey found that 8.1% of participants were edentulism, 61% had pain from last 12 months, 63% had healthy teeth, 65% of participants brushed their teeth daily, and 30% had a dental visit less than six month ago. The main oral health problem was difficulty in chewing foods, and about one-third had frequent sweet meals on a daily basis, and 23% practiced dental flossing. The combination of oral health status indicates that even though the majority of Iranian assess their teeth positively, a minority of participants display routine dental visits. The study findings suggest that with increasing age as well as the dramatic aging of the Iranian population,, poor oral health may increase the risk of adverse health outcomes.

Abbreviations

WHO's OHQ: WHO's oral health questionnaire, HCCs: health care centers, CVD: cardiocascular disease, RPD: removal partial denture.

Declarations

Ethics approval and consent to participate

The study received ethical approval from the Ethics Committee of Tabriz University of Medical Sciences (NO: IR.TBZMED.REC.1395.13). We obtained written informed consent from all participants.

Consent for publication

The authors have agreed on the content of the manuscript.

Availability of data and material

The data collection tools and datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare no conflicts of interest.

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Authors' contributions

LJ and were responsible for the study design. LJ and PS did the analyses. LJ, were responsible for data interpretation. RB helped in the study design and data gathering, FD and KP helped in the drafts of the manuscript. All authors have read and approved the final manuscript.

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Tables

Table 1: teeth health status of participants

Variables	Age (years); n (%)												Total		
	18-35				36-50				51-65						
	Male	Female	Total	p-value	Male	Female	Total	p-value	Male	Female	Total	p-value			
Having natural teeth								0.508					0.508		<0.0001
No natural teeth	0	0	0 (0)		16 (4.6)	19 (5.1)	35 (4.9)		77 (21.7)	75 (19.8)	152 (20.7)		187 (8.1)		
1-9	0	0	0 (0)		10 (2.9)	11 (2.9)	21 (2.9)		77 (21.7)	78 (20.6)	155 (21.1)		176 (7.6)		
10-19	31 (7.2)	32 (7.4)	63 (7.3)		66 (19.1)	84 (22.5)	150 (20.9)		27 (7.6)	37 (9.8)	64 (8.7)		277 (12)		
20 teeth or more	397 (92.8)	398 (92.6)	795 (92.7)		253 (73.3)	260 (69.5)	513 (71.3)		174 (49)	188 (49.7)	362 (49.4)		1670 (72.3)		
Pain or discomfort on teeth or mouth during last 12 month (yes)	306 (71.5)	305 (70.9)	611 (71.2)	0.762	179 (51.9)	222 (59.4)	401 (55.8)	0.230	172 (48.5)	230 (60.8)	402 (54.8)	<0.0001	1414 (61.2)	<0.0001	
Having removable dentures															
A particular denture	44 (10.3)	36 (8.4)	80 (9.3)	0.199	61 (17.7)	58 (15.5)	119 (16.6)	0.247	69 (19.4)	91 (24.1)	160 (21.8)	0.076	359 (15.5)	<0.0001	
A full upper denture	4 (0.9)	5 (1.2)	9 (1)	0.503	27 (7.8)	30 (8)	57 (7.9)	0.517	96 (27)	91 (24.1)	187 (25.5)	0.201	253 (11)	<0.0001	
A full lower denture	2 (0.5)	2 (0.5)	4 (0.5)	0.686	19 (5.5)	25 (6.7)	44 (6.1)	0.308	82 (23.1)	75 (19.8)	157 (21.4)	0.163	205 (8.9)	<0.0001	
State of dental health				0.351				0.355				0.358		0.061	
Good	269 (62.9)	257 (59.8)	526(60.8)		238 (69.0)	237 (63.4)	475 (66.2)	0.303	215 (60.6)	209 (55.3)	424 (57.8)	0.086	1425(63.4)	0.202	
Average	129 (30.1)	136 (31.6)	265 (30.5)		62 (18)	76 (20.3)	138 (19.1)		84 (23.7)	104 (27.5)	188 (31.8)		591 (26.3)		
Poor	20 (4.7)	29 (6.7)	49 (5.7)		41 (11.9)	53 (14.2)	94 (13.1)		45 (12.7)	43 (11.4)	88 (38.1)		231 (10.3)		
State of gum health				0.107				0.303				0.086		0.050	
Good	142 (35.7)	168 (42.8)	310 (39.2)		149 (49.6)	143 (43.7)	292 (46.6)		126 (39.8)	132 (40.3)	258 (40.0)		860 (41.8)		
Average	65 (16.4)	61 (15.6)	126 (16.0)		34 (11.3)	45 (13.7)	79 (12.5)		38 (12.1)	58 (17.7)	96 (14.2)		301 (14.6)		
Poor	191 (47.9)	163 (41.6)	354 (44.7)		117 (39.3)	139 (42.6)	256 (40.9)		152 (48.1)	137 (41.6)	289 (44.8)		899 (43.0)		

Table 2: Toothbrushing and cleaning behaviors among adults

Variable	Age; n (%)												Total	
	18-35				36-50				51-65					
	Male	Female	Total		Male	Female	Total		Male	Female	Total			
Cleaning teeth				0.080				0.167				0.294		0.055
Less than once a day	110 (25.7)s	92 (21.4)	202 (23.6)		131 (38)	128 (34.2)	259 (35.9)		163 (45.9)	165 (43.7)	328 (44.6)		789 (34.6)	
Once a day and more	318 (74.3)	338 (78.6)	656 (76.4)		214 (62)	246 (65.8)	460 (64.1)		192 (54.1)	213 (56.3)	405 (55.4)		1521 (65.4)	
Using toothbrush	252 (58.9)	275 (64)	527 (61.4)	0.073	207 (60)	245 (65.5)	460 (62.7)	0.074	214 (60.3)	243 (64.3)	405 (62.3)	0.149	1436 (62.2)	0.835
Wooden toothpicks	65 (15.2)	81 (349)	146 (17)	0.091	80 (23.2)	75 (20.1)	155 (21.6)	0.176	77 (21.7)	81 (21.4)	158 (21.6)	0.501	459 (19.9)	0.03
Plastic toothpicks	4 (0.9)	2 (0.5)	6 (0.7)	0.341	3 (0.9)	4 (1.1)	7 (1)	0.544	8 (2.3)	13 (3.4)	21 (2.9)	0.230	34 (1.5)	0.01
Dental floss	99 (23.1)	114 (26.5)	213 (24.8)	0.143	81 (23.5)	94 (25.1)	175 (24.3)	0.334	63 (17.7)	101 (26.7)	164 (22.4)	0.002	552 (23.9)	0.01
Using toothpaste	250 (57.9)	275 (64)	527 (61.4)	0.165	207 (60)	245 (65.5)	460 (62.7)	0.152	214 (60.3)	243 (64.3)	405 (62.3)	0.543	1436 (62.2)	0.570
Using toothpaste that contains fluoride	150 (34.5)	165 (38.4)	315 (36.4)	0.658	107 (31.0)	134 (35.8)	241 (33.4)	0.046	114 (32.1)	131 (34.6)	245 (32.7)	0.107	801 (34.1)	0.068

Table 3: Visit with a dentist

Variable	Age; n (%)													
	18-35				36-50				51-65				Total	p-value
	Male	Female	Total	p-value	Male	Female	Total	p-value	Male	Female	Total	p-value		
Visit with a dentist				0.098				0.224				0.114		<0.001
Less than 6 month ago	146 (34.1)	128 (29.8)	274 (32.0)		119 (34.5)	118 (31.6)	237 (33.3)		82 (23.1)	103 (27.2)	185 (26.0)		696 (30.1)	
More than 6 month ago	282 (65.9)	302 (70.2)	584 (68.0)		226 (65.5)	256 (68.4)	482 (66.7)		273 (76.9)	275 (72.8)	548 (74.0)		1614 (69.9)	
The reason of last visit to the dentist				0.082				0.587				0.021		<0.001
Consultation/advice	25 (5.8)	11 (2.6)	36 (4.2)		22 (6.4)	19 (5.1)	41 (5.7)		21 (5.9)	7 (1.9)	28 (3.8)		105 (4.5)	
Pain or trouble with teeth, gums/mouth	218 (50.9)	215 (50)	433 (50.5)		141 (40.9)	150 (40.1)	291 (40.5)		222 (62.5)	229 (60.6)	451 (61.5)		1175 (50.9)	
Treatment	144 (33.6)	147 (34.2)	291 (33.9)		122 (35.4)	125 (33.4)	247 (34.4)		85 (23.9)	101 (26.7)	186 (25.4)		724 (31.3)	
Routine check-up	39 (9.1)	53 (12.3)	92 (10.7)		56 (16.2)	77 (20.6)	133 (18.5)		24 (6.8)	39 (10.3)	63 (8.6)		288 (12.5)	

Table 4: Oral health problems experienced by adults during the past 12 month

Variable	Age; n (%)												Total	
	18-35				36-50				51-65					
	Male	Female	Total	p-value	Male	Female	Total	p-value	Male	Female	Total	p-value		p-value
Experienced problems during the past 12 months														
Difficulty in biting foods	125 (30.1)	113 (27.2)	238 (28.5)	0.199	135 (41.0)	127 (36.3)	262 (38.2)	0.117	147 (45.5)	173 (49.0)	320 (47.3)	0.203	820 (38.3)	<0.0001
Difficulty chewing foods	104 (24.9)	104 (24.8)	208 (24.8)	0.508	139 (42.6)	158 (44.4)	297 (43.5)	0.351	182 (53.7)	205 (55.7)	387 (54.0)	0.322	892 (40.7)	<0.0001
Difficulty with speech/ pronouncing words	30 (7.5)	22 (5.4)	52 (6.5)	0.146	48 (14.4)	58 (16.3)	106 (15.4)	0.277	33 (9.9)	32 (8.8)	65 (8.9)	0.348	223 (10.2)	<0.0001
Dry mouth	81 (20.4)	74 (18.7)	155 (19.6)	0.308	38 (11.6)	47 (13.6)	85 (12.6)	0.244	25 (7.9)	29 (8.3)	54 (8.1)	0.483	294 (13.4)	<0.0001
Felt embarrassed due to appearance of teeth	135 (32.3)	122 (29.5)	257 (30.6)	0.210	88 (26.5)	99 (28.4)	187 (27.6)	0.307	75 (22.3)	80 (22.0)	155 (22.1)	0.509	599 (24.9)	<0.0001
Felt tense due to teeth or mouth	191 (47.6)	163 (41.2)	354 (44.4)	0.041	137 (41.3)	143 (40.6)	280 (40.9)	0.463	131 (38.6)	112 (30.9)	243 (34.8)	0.018	877 (38.6)	<0.0001
Avoiding smiling because of teeth or mouth	94 (23.7)	111 (27.4)	205 (25.5)	0.129	77 (23.3)	95 (27.5)	172 (25.4)	0.131	53 (16.5)	70 (19.5)	123 (18.1)	0.181	500 (22.8)	<0.0001
Sleep interruption	58 (15.5)	71 (18.4)	129 (16.4)	0.160	43 (12.5)	47 (13.9)	90 (13.2)	0.492	66 (20.9)	49 (14.3)	115 (17.6)	0.017	334 (15.7)	0.001
Days off work	89 (21.8)	76 (18.7)	165 (19.7)	0.140	39 (11.8)	40 (11.5)	79 (11.7)	0.501	33 (10.3)	30 (8.3)	63 (9.3)	0.249	307 (13.5)	0.001
Difficulty doing usual activity	48 (12.1)	71 (17.4)	119 (14.8)	0.022	52 (15.7)	52 (14.7)	104 (15.0)	0.402	59 (17.9)	68 (18.7)	127 (18.3)	0.410	350 (16.0)	0.001
Felt less tolerant of spouse or close people	23 (6.1)	29 (7.3)	52 (6.6)	0.300	27 (8.3)	34 (9.7)	61 (8.1)	0.304	28 (9.0)	41 (11.5)	69 (10.4)	0.500	182 (8.7)	0.048
Reduced participation in social activities	52 (13.1)	52 (12.8)	104 (13.0)	0.493	61 (18.4)	57 (16.1)	118 (17.3)	0.240	42 (12.7)	58 (15.9)	100 (14.8)	0.134	322 (15.0)	0.062

Table 5: lifestyle behaviors related to oral health

Variable						
How often do you eat or drink the following foods?	Several times a day	Every day	Several times a week	Once a week	Several times a month	Seldom never
Fresh fruits	132 (5.7)	453 (19.6)	1404 (60.8)	69 (3.0)	196 (8.5)	56 (2.4)
Biscuits	83 (3.6)	209 (9.0)	542 (23.5)	346 (15.0)	712 (30.8)	418 (18.1)
Sweet cakes, pies, buns	97 (4.2)	627 (27.1)	599 (25.9)	195 (8.4)	488 (21.1)	304 (13.2)
Jam or honey	NR	238 (10.3)	665 (28.8)	532 (23.0)	490 (21.2)	385 (16.7)
Chewing gum containing sugar/sweet /candy	14 (6)	28 (1.2)	573 (24.8)	238 (10.3)	668 (28.9)	813 (35.2)
Lemonade, Coca Cola or other soft drinks	3 (0.1)	7 (0.3)	429 (18.6)	279 (12.1)	767 (33.2)	825 (35.7)
Tea with sugar	321 (13.9)	698 (30.2)	263 (11.4)	223 (9.7)	368 (15.9)	437 (18.9)
Coffee with sugar	28 (1.2)	222 (9.6)	251 (10.9)	126 (5.5)	641 (27.7)	1040 (45.1)
Tobacco using	94 (4.1)	98 (4.2)	13 (0.6)	28 (1.2)	24 (1.0)	2053(88.9)
Drink alcohol	NR	NR	140 (6.1)	70 (3.0)	14 (0.6)	2086 (90.3)