

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

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Abstract

Background: A poor oral health can lead to serious oral diseases like periodontitis, tooth decay, pain and discomfort in teeth or gums, infection and loss of tooth. Iran will experience a dramatic aging population increase in the next decades. Despite increasing attention into healthy ageing, there is relatively less emphasis on oral health. This household survey aimed to investigate oral health status by WHO oral health assessment questionnaire among adults population in Tabriz. This knowledge may provide vital information to those who are planning strategies of oral health care for adult population. **Method:** A population-based household survey was conducted in order to recruit a representative sample of adults from the community. This cross-sectional study carried out among adults aged 18 to 65 years old between May and October 2016 in Tabriz (Iran). The study population was sampled using multi-stage cluster sampling design. The WHO's oral health questionnaire (WHO's OHQ) for adults was used for measuring oral health status and oral health behavior. **Results:** In this study, a total of 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 of which 152(20.7%) were participants aged 50-65 year. 72.3% of populations were dentate in that they had 20 or more teeth. Half of adults aged 50-65 years they had 20 or more teeth. About one third of participants reported that they don't brush their teeth daily (23% for 18-35 years old adults, 35.9 for 36-50 years, and 44.6 for 51-65 years). 39.4% of adults in 18-35 years, 34.1% in 36-50 years and 26.6 in 51-65 years had visited a dentist less than 6-month ago. One third of participants have frequent sweets meals every day and frequently consume tea with sugar. **Conclusion:** The combination of oral health status indicates that even though the majority of Iranian assess their teeth positively, a minority of participants display routinely dental visits. The study findings suggest that by increasing age and also dramatically Iranian population aging, poor oral health may increase the risk of adverse health outcomes.

Introduction

One of the most important public health issues that have a considerable impact on general health is oral health. A poor oral health can lead to serious oral diseases like periodontitis, tooth decay, pain and discomfort in teeth or gums, infection and loss of tooth [1]. Oral disorders and living with poor oral health conditions result in additional complications including trouble in swallowing, chewing, and speech and also can in turn affect sleep quality and productivity of people.

An association exists between poor oral health and cardiovascular disease, cancer, and respiratory diseases among human population [2, 3]. Strong evidences indicated that untreated oral diseases and disorders not only negatively impact on general health, but they also increase the probability of diabetes and cardiovascular disease [4, 5]. Periodontal diseases significantly increase the risk of first myocardial infarction as well [6, 7]. A meta-analysis of follow-up studies has estimated that poor oral health conditions and periodontal diseases may increase the risk of cardiocascular disease (CVD) by approximately 20% [7].

Poor oral health including natural teeth loss, dental plaque accumulation, and inflammation of gingival tissues that increase with age [8]. Iran will experience a dramatic aging population increase in the next decades [9]. According to the Iranian national and international census report, 21.7 of the population will be aged 60 and above by 2050 [10]. World healht organization (WHO) estimated that nearly 10% of Iranian population were older than 60 years and this will have risen about more than threefolds during 35 years [11, 12]. Along with population aging, the prevalence of chronic diseases and specially the cumulation of health and oral health problems increases unexpectedly, therefore, the cost and the need to health care specially to oral health care are increasing [13, 14]. Despite increasing attention into healthy ageing, there is relatively less emphasis on oral health.

WHO recomends houshold surveys on adult groups in order to gthather epideniological information on oral health status and dental caries patterns to made appropriate and tailore oral health care interventions among them [15]. This household survey aimed to investigate [oral health status by WHO oral health assessment questionnaire among adults](#) population in Tabriz. This knowledge may provide vital information to those who are planning strategies of oral health care for adult population.

Methods

Study design and Population

This cross-sectional study carried out among adults aged 18 to 65 years old between May and October 2016 in Tabriz (Iran). A population-based household survey was conducted in order to recruit a representative sample of adults from the community. Only adults who were living in the study area and who were at home at the time of data collection were included in the study. Written informed consent was obtained from each participant. Those with mental and cognitive disorders were excluded. The Ethics Committee in the Tabriz Medical University approved the present study. Participants approved to participate in this study by giving informed consent.

Sampling and sample size

The sample size was calculated using based on the level of oral health status in adult population of Tabriz. To estimate the oral health status of 46% [9], with a 95% confidence and an error of 3%, 2310 the sample size was estimated.

The population of Tabriz was estimated to be 980,000 (aged 18-65) in 2016 [16]. The study population was sampled using multi-stage cluster sampling design. The first sampling stage, four health care centers (HCCs) was randomly selected from 16 HCCs. In the next stage, 25% of blocks in the area of HCCs were selected. Then, every 11th household of each block was identified for the recruitments of the study participant. Finally, in each household eligible individual were asked to participate in the study. Sampling in the blocks was continued to reach the required sample size specified for that block.

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 is comprised of the first six items assessing oral health status that consist of "How many natural teeth do you have?", "How often during the past 12 months did you have toothache or feel discomfort due to your teeth?", "Do you have any removable dentures?", and "How would you describe the state of your teeth and gums? Is it "excellent", "very good", "good", "average", "poor", or "very poor"?". The second three items assessing oral health related behaviors including "how often do you clean your teeth", "which tools do you use to clean your teeth?", "do you use toothpaste to clean your teeth", and "do you use toothpaste that contains fluoride?"

Two next questions were about "how long is it since you last saw a dentist?" and "what was the reason of your last visit to the dentist?" The next question assessed "dental problems experienced during the past 12 months" for example "difficulty in biting food" or "difficulty in chewing food" or "felt embarrassed due to appearance of teeth", each of which had five possible answers (0= don't know, 1= no, 2= sometimes, 3=fairly often, 4=very often).

The next question examined eating or drinking behaviors that consist of nine items; for example "eating fresh fruits" or "Biscuits and cream cakes" or "drinking tea with sugar", each items had six possible answers (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 next item assess tobacco using behaviors with five items (cigarettes, pipe, cigar, chewing tobacco and use snuff), each items had six possible answers (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 alcohol drinking behavior during the past 30 days with six possible answer (0=less than 1 drink to 5= 5 or more drinks).

Finally, all participants also responded to socio-demographic questions about age, gender, education, and marital status.

Validity and reliability of the WHO's OHQ was assessed based on standardized cross-cultural translation guidelines project [18]. English version of 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 questionnaire was back translated 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 on 20 targeted populations [19].

Cronbach alpha coefficients ranged from 0.65 to 0.78. The Persian version of WHO's OHQ had satisfactory validity and reliability among pilot population.

Statistical analyses were performed with Statistical Package for Social Science (SPSS 18 for windows, SPSS Inc.® headquarter, Chicago, USA). Normality of data was analyzed by Kolmogorov-Smirnov test. Discrete variables are presented with number and 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

In this study, a total of 2310 respondents completed the survey (response rate 77%) . 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 of which 152 (20.7%) were participants aged 50-65 year. 72.3% of populations were dentate in that they had 20 or more teeth. This rate was 92.7 for adults aged (18-35), 71.3 for adults aged (36-50), and 49.4% for adults aged 50-65 years.

The percentage of participants having pain or discomfort in the tooth or mouth over the past 12 months was 61.2% (18-35 years 71.2, 36-50 years 55.8%, 51-65 years 54.8%) (Table 1), 359 (15.5%) had removal partial denture (RPD) in that about 9% in 18-35 years, 16.6% in 36-50 years, and 21.8% in 51-65 years. About 61% in 18-35 years, 66% in 36-50 years, and 58% in 50-65 years reported good teeth health status. The percent of participants reported poor state of gums' health was about 44% for 18-35 years, 40% for 36-50 years and 44% for 51-65 years (Table 1).

Teeth brushing and cleaning behaviors are shown in Table 2. About one third of participants reported that they don't brush their teeth daily (23% for 18-35 years old adults, 35.9 for 36-50 years, and 44.6 for 51-65 years) (Table 2). Approximately 62% of participants reported using toothbrush, about 24% using dental floss, and about 62% used toothpaste for cleaning and brushing their teeth.

Table 3 shows dental care visits and the reasons for visiting among adults. About 39.4% of adults in 18-35 years, 34.1% in 36-50 years and 26.6 in 51-65 years had visited a dentist less than 6-month ago. The most frequent reason (50.9) for visiting among all adults was having pain or trouble with teeth, gums/mouth.

Table 4 shows oral health problems experienced by adults during last year. The most frequent oral health problem experienced by adults 18-35 years was felting tens due to problems with teeth or mouth, by adults 36-50 years and 51-65 years were difficulty chewing foods.

Lifestyle behaviors including eating fresh fruits, Biscuits or sweet pies, or other foods or drinks containing sugar, and Tobacco and alcohol consumption are shown in Table 5. Only 5.7% of participants have eaten 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, Sweet pies (27.1%) every day, Jam or honey (28.8%) several times a week, and Tea with sugar (30.2%) every day. 88% of the population reported never or seldom smoking and 6% had alcohol consumption several times a week.

Discussion

This household survey aimed to determine [oral health status of adults living in](#) Tabriz. In this oral health survey about 72% of the adults had 20 or more teeth and participants aged 50-65 years only half of them had 20 teeth or more. A similar study from Iran among 35-44 years old adults has reported that almost all of participants suffered from a substantial number of dental and periodontal problems. They 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 (35-44 years old) have a moderate level of dental caries [21]. These findings indicate poor oral health for adults specially. The finding of our study shows that 8% of our participants were edentulous (no natural teeth), 15.5% with a removable partial denture, and about 10% with a full (lower or upper) denture. The prevalence rate of endotulism among 51-65 years old is increased to 20.7%. The similar prevalence of endotulism among 71-92 years old male adults was reported from UK [22]. A systematic review reported that Chinese population who are 65 years old had an average of 20 teeth [23]. Based on Swiss Health Survey, the prevalence of edentulous was 0.3% and 26.8% in 15-24 and 65-74 year old participants, respectively [24]. The higher rate (48%) was also observed from Turkey [25]. Although the burden of oral disease and tooth loss increases with age, a substantial number of Iranian adults experience oral health problems in middle- aged. The results of our study confirmed that about more than of one third of middle aged adults reported poor self-rated oral and gum's health. The similar results of poor self-rated oral health has been reported by Luchi et.al among 20-59 years of ages adults [26].

One third of our participants didn't brush their teeth daily while three quarter of them in 18-35 years old had brushed their teeth once a day and more. Similar study among individuals aged 6-70 years showed that 20% of the participants had twice or more tooth brushing and about half of participants had tooth brushing once a day [27]. Older participants were less likely to brush their teeth twice or more a day. It is possible that among older adults factors such as lack of knowledge and cultural values about the importance of tooth brushing impact on oral health behavior [28]. It seems 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, 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 of their teeth. They should be more informed about the importance of dental flossing that is just as important as tooth brushing to clean the inter-dental embrasures and the proximal tooth surfaces in addition to the tooth brushing. 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 been visited by a dentist once during less than six month ago, in that the most visiting (50.9%) was occurred among the participants and the most reason of last visit to the dentist was pain or trouble with teeth, gums/mouth. Similarly, Burgette and et al reported that fifty seven percent of their study participants visited the dentist within the past year. They also recommended on collecting specific classification of dental visits [31]. According with 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 last visit to the dentist.

Most of studies have been focused on specific population such as children [14] and pregnant women [32, 33] or localized to specific settings and convenience samples [34].

Difficulty chewing foods was the most common problems experienced by the participants especially among older adults (51-65 years old). It is assumed that tooth loss and the presence of denture decreases chewing ability, dietary intake and overall general health. Strong evidence indicated that the chewing disability produces a significant and negative impact over oral-health related quality of life (QoL) [35]. Felt tens due to teeth or mouth was the most problems (44%) among young participants (18-36). In a study reported from European countries determine that 10% of people in mentioned countries have felt tense because of teeth, mouth or denture problems [36]. As the number of lost or decayed teeth increases, the felt tens and food restriction increases [37].

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

This survey provide a high level of general capability in representing of large population and is one of the first attempts to measure oral health status in a population of this part of the country and the response rate was satisfactory .

Conclusions

This household survey found that % 8.1 of participants were edentulism, 61 % had pain from last 12 months, 63% total good state of teeth and 41% gum, 65% of daily tooth brushing, and 30% had dental visit less than six month ago. The main oral health problem was difficulty in chewing foods, about one third had daily frequent sweet meals, and 23% 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 routinely dental visits. The study findings suggest that by increasing age and also dramatically Iranian population aging, 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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Tabriz University of Medical Sciences provided funding resource.

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 helped in preparation of first draft 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 teeth 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 gums' 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: Teeth brushing and cleaning behaviors among adults

Variable	Age; n (%)												Total	
	18-35				36-50				51-65					
	Male	Female	Total		Male	Female	Total		Male	Female 378	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)	<0.0001
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)	<0.0001
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 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)	<0.0001

Table 3: Visit with a dentist

Variable	Age; n (%)													p-value
	18-35				36-50				51-65				Total	
	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 ^{ad}	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
Experience problems during the past 12 month														
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 tens 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)