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Original Article

Assessment of oral hygiene behaviors and periodontal status among dental patients in Turkey: A pilot study

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Abstract

Aim: Mechanical plaque control plays a substantial role in preventing periodontal diseases. The aim of this study was to determine the self-reported oral hygiene habits and periodontal status of dental patients in Turkey and to evaluate whether the data was consistent with the current periodontal status of the participants.

Methodology: The study group consisted of 104 patients in consultation with a faculty of dentistry in Turkey. Clinical measurements included probing depth (PD), clinical attachment level (CAL), plaque index and bleeding on probing. A survey was conducted in order to learn participants' oral hygiene habits and demographic data. Three groups of 0-3 mm, 4-6 mm, and ≥ 7 mm were assigned to all patients for PD and CAL values.

Results: A total of 33.6% of the participants brushed their teeth two or more times per day, and 33.7% brushed one time daily. The percentage of dental floss use was 11.5% and interproximal brushing was 7.7%. The percentage of the areas with 0-3 mm PD were 89.78%, and areas with 0-3 mm CAL were 86.61%. Areas with ≥ 7 mm PD and CAL were found to be very low (PD: 3.85%, CAL: 3.60%). The extent of dental plaque was 62.80% and bleeding on probing was 38.13% of the overall study population.

Conclusions: It is possible to say that oral care is insufficient in our study group. Also, poor oral hygiene and smoking are closely related to moderate and severe clinical attachment loss for the participants. Consequently, it is clear that more extensive researches need to be done across the country.

Keywords: Dental Public health, oral hygiene, periodontal diseases.

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Introduction

Periodontal diseases are infectious diseases characterized by inflammation and destruction of periodontal tissues, which develop due to complex relationships between pathogenic microorganisms and the host (1). Microbial dental plaque is shown to be the primary cause of periodontal diseases. Genetic and environmental factors such as age, gender, systemic diseases, drug use and smoking play an important role in the development of the disease (2, 3).

Mechanical plaque control plays a substantial role in preventing periodontal diseases (4). Adequate oral hygiene habits and regular attendance to dental visits are essential self-care behaviours to prevent gingival inflammation (5). It has been demonstrated that mechanical removal of bacterial dental plaque through adequate use of a toothbrush, interdental brush and dental floss can reduce the prevalence of periodontal diseases (6–8).

Diagnoses of periodontal diseases at early stages can be difficult due to individuals' lack of awareness, plus the painless and slow progression of the disease also factors in. Commonly, people need to visit a dentist when the disease progresses and serious symptoms are revealed, such as gingival bleeding, mobility and tooth loss. Because of these, regular dental visits and maintenance care have become important for the prevention and early diagnosis of periodontal diseases (9).

Consequently, oral hygiene habits vary according to culture and geographic region. For example, a study completed in 1993–1994 in 22 European countries showed 83–73% of 11-year-old schoolchildren brushed twice a day in Sweden, Denmark, Germany, Austria and Norway, but only 26–33% of boys brushed their teeth more than once a day in Finland, Lithuania, Russia, Estonia and Latvia. The incidence of using dental floss was very low (10). Also, according to the results of a Korean study conducted in both 2010 and 2012, 51.9% of Korean adults brushed their teeth three or more times per day, 28.2% flossed their teeth and 22.1% used an interdental brush (11).

Collecting basic information about oral hygiene habits and periodontal status is essential for evaluating public oral health, providing data on the prevalence of periodontal diseases, determining the population at-risk and planning how to maintain periodontal health. In our country, only a few comprehensive studies have evaluated oral hygiene habits and periodontal status of individuals (12—14). So we planned a prospective cross-sectional study based on the lack of data. The aim of the study was to determine self-reported oral hygiene habits and the periodontal status of dental patients in Turkey and to evaluate whether the data collected by a survey was consistent with the current periodontal status of the participants.

Materials and Methods

Participants

The study group consisted of 104 people who were obtained randomly through the patients in consultation with the Ege University Faculty of Dentistry. The study protocol was approved by the local Committee of Ethics of the Ege University, Turkey (approval number 15-9/3), and the research was conducted in full accordance with the World Medical Association Declaration of Helsinki. All steps of the procedure were explained to the individuals before they signed an informed consent form.

The inclusion criteria were: (1) age ≥ 18 years; (2) uncompromised systemic health (This entailed individuals who had no risk of bacteremia during periodontal measurements and who did not use anticoagulant drugs.); (3) no previous periodontal treatment before six months; (4) not pregnant or lactating.

Self-Reported Oral Hygiene Habits and Socio-Demographic Data of Participants

Before being examined, participants were then asked to fill out a short questionnaire giving details about oral hygiene habits, self-perceived oral health status, dental attendance patterns, smoking habits as well as demographic information (age, place of birth, educational status, medical history). An example of the questionnaire is shown in Table 1.

Clinical Periodontal Examinations

Clinical measurements were achieved by two periodontists. Prior to the study, the examiners were well trained and calibrated in the assessment of probing depths and clinical attachment levels using a probing pressure of approximately 25 gr. During clinical periodontal examination, missing teeth were detected and clinical periodontal measurements including probing depth (mm), clinical attachment level (mm), gingival recession (mm), plaque index and bleeding on probing (yes/no) were assessed at four sites (mesiobuccal, midbuccal, distobuccal and midlingual) of each tooth. A manual William's periodontal probe from Hu-Friedy was used for these assessments, and the measurements were rounded to the lowest whole millimeter. Microbial dental plaque was scored as yes/no and the Ainamo-Bay 1975 gingival index was used to assess a full mouth bleeding score.

Statistical Analysis

After the measurements were completed, three groups of 0-3 mm, 4-6 mm, ≥ 7 mm were assigned for all patients according to probing depth and clinical attachment level values. All statistical analyses were made on these groups. Statistical analysis was performed using SPSS software version 20.0. For all statistical analyses, the level of significance was accepted as $p<0.05$. The relationship between PD, CAL, dental plaque, bleeding on probing and single variables (flossing, interdental brush use, gender, smoking) was analyzed with the nonparametric Mann-Whitney U Test, and multiple variables (toothbrushing, educational status, self-assessment of periodontal health) were analyzed with the nonparametric Kruskall-Wallis Test.

Results

Before their detailed periodontal examination, the 104 participants were asked to respond to a short questionnaire about their oral hygiene habits, self-perceived oral health status, periodontal treatment backgrounds, smoking habits as well as demographic information (age, place of birth, educational status, medical history).

1. Socio-demographic data and smoking status of participants

The mean age of study participants was 43.28 years (with a range between 18-70). Females comprised 59.6% of the participants, and current smokers accounted for 25% of the sample. The percentage of the people who had attained primary or intermediate education was 30%, high school education was 39% and university or post-graduate degree was 31%.

2. Self-reported oral hygiene habits, periodontal treatment backgrounds and self-perceived oral health status of participants

Questions on habits concerning brushing, interproximal cleaning habits and mouthwash were asked. A total of 33.6% of the participants were brushing their teeth two or more times per day, and 33,7% of them were brushing one time daily. The rate of dental floss use was 11.5% and interproximal brush use was 7.7%. Also, 17.3% of the participants were using mouthwash. The percentage of those who brushed their teeth twice a day was higher in females at 32.3% compared to 19% of males, while 11.3% of females brushed their teeth three times a day and more. There were no individuals brushing their teeth three times a day or more in males. The difference in the brushing frequency between males and females was statistically significant ($p<0.05$). In addition, there was no statistically significant difference in the use of toothbrushing frequency, dental floss and interproximal brush among age groups ($P<0.05$). The relationship between oral hygiene habits and age, gender and educational levels is shown in Table 2.

The participants were also asked about their periodontal treatment backgrounds. Only 8.7% have had periodontal treatment regularly, and 26.9% had never been treated periodontally before. There was no statistically significant relationship between gender, educational status or smoking habits and periodontal treatment backgrounds. The general opinion of the participants in the study was that their oral health was poor. Only 36.5% assessed their oral health as well, but nobody assessed their oral health as perfect.

3. Periodontal status and its relation with self-reported oral hygiene habits, socio-demographic data and smoking status of participants

According to probing depth and clinical attachment level measurements, areas were separated into three groups of 0-3 mm, 4-6 mm, and ≥ 7 mm for all patients. The relationship between PD, CAL, dental plaque, bleeding on probing scores and gender, brushing habits, smoking habits, periodontal treatment backgrounds is shown in Table 3 and Table 4.

The total of the areas with 0-3 mm probing depth were 89.78%, the areas with 0-3 mm clinical attachment level were 86.61%. The percentage of the areas with 7 mm and over PD and CAL were found to be very low (PD: 3.85%, CAL: 3.60%). The extent of dental plaque was 62.80% of areas, and bleeding on probing was 38.13% of areas in the overall study population.

There was no statistically significant difference between gender and other variables ($p<0.05$). Only, dental plaque scores were significantly higher in males.

Areas with 0-3 mm probing depth were higher in the nonsmoker group; however, areas with 4 mm and over probing depth were higher in current smokers. Similarly, dental plaque scores were significantly higher in current smokers. There was a statistically significant difference at plaque scores between the individuals who brush their teeth rarely and individuals who brush their teeth once a day, twice a day and three times and more a day. Confusingly, the percentage of the areas with 7 mm and over PD were found to be higher at individuals who brushed their teeth three times a day. Dental plaque scores were lower in participants who use dental floss or interdental brush, but this difference was not statistically significant.

Along with the probing depth and clinical attachment level values being increased, the incidence of the attendance to periodontal treatment also increased. The percentage of the areas with 0–3 mm PD and CAL were found to higher in participants who assessed their oral health as good. In the group who thought of their oral health as poor, dental plaque scores were higher than the others. For bleeding on probing scores, there was no statistically significant difference in all groups ($p<0.05$).

Table 1. Questionary Form

Assessment of Oral Hygiene Behaviors and Periodontal Status Among Dental Patients					
Date:					
Age:					
Gender	Female			Male	
Educational Status	Primary School		High School	University	
Are you a smoker?	Yes			No	
How often do you brush your teeth?	Never	Rarely	1 time a day	2 times a day	3 times a day
Do you use dental floss?	Yes			No	
Do you use interdental brush?	Yes			No	
Do you use mouth wash?	Yes			No	
Have you ever need periodontal treatment before and when?	Never	1 time	Irregularly	Regularly	
How do you assess your current periodontal status?	Poor	Good		Perfect	

Table 2. Relationship between oral hygiene habits and age, gender, educational levels of the individuals

		BRUSHING HABITS %					DENTAL FLOSS %		INTERDENTAL BRUSH%	
		Never	Irregular	1 time	2 times	3 times/ more	Yes	No	Yes	No
AGE	≤ 30 years	15,0	20,0	30,0	35,0	0	5,0	95,0	5,0	95,0
	31-40 years	0	25	35,7	28,6	10,7	21,4	78,6	10,7	89,3
	41-50 years	4,8	33,3	47,6	9,5	4,8	9,5	90,5	4,8	95,2
	≥ 51 years	8,6	25,7	25,7	31,4	8,6	8,6	91,4	8,6	91,4
GENDER	Male	7,1	40,5	33,3	19,0*	0*	7,1	92,9	2,4	97,6
	Female	6,5	16,1	33,9	32,3*	11,3*	14,5	85,5	11,3	88,7
EDUCATION	Primary school	9,7	32,3	35,5	9,7	12,9	12,9	87,1	6,6	93,5
	High school	2,4	26,8	41,5	26,8	2,4	4,9	95,1	9,8	90,2
	University	9,4	18,8	21,9	43,8	6,3	18,8	81,3	6,3	93,8
TOTAL		6,7	26,0	33,7	26,9	6,7	11,5	88,5	7,7	92,3

*p <0,05 statistically significant

The significance of differences among groups was assessed using the Pearson Chi-Square test (*).

Table 3. Relationship between PD, CAL and gender, brushing habits, smoking habits, periodontal treatment backgrounds

		PROBING DEPTH (PD) %			CLINICAL ATACHMENT LEVEL (CAL) %		
		0-3 mm	4-6 mm	≥7 mm	0-3 mm	4-6 mm	≥7 mm
GENDER	Male	90,64 ± 16,008	6,93 ± 9,93	2,67 ± 7,25	85,53 ± 18,69	11,28 ± 12,80	3,44 ± 7,87
	Female	89,20 ± 18,23	6,15 ± 8,88	4,65 ± 13,82	87,34 ± 17,15	8,92 ± 10,78	3,71 ± 8,44
EDUCATION	Primary school	88,63 ± 20,15	4,92 ± 6,34	6,46 ± 18,17	84,55 ± 16,94	10,98 ± 11,43	4,45 ± 8,50
	High school	92,55 ± 12,56	6,38 ± 10,27	1,32 ± 2,85	90,01 ± 15,28	8,51 ± 12,38	1,74 ± 3,78
	University	87,37 ± 19,50	8,07 ± 10,29	4,56 ± 10,15	84,24 ± 20,96	10,54 ± 11,02	5,16 ± 11,23
BRUSHING HABITS	Never	98,50 ± 1,94	0,99 ± 1,14	0,51 ± 1,36*	94,99 ± 6,25	4,49 ± 5,26	0,44 ± 1,17
	Irregular	92,13 ± 13,64	5,28 ± 6,81	2,95 ± 7,29*	85,94 ± 20,28	9,85 ± 12,78	4,12 ± 9,44
	1 time a day	89,45 ± 15,78	7,93 ± 9,90	2,62 ± 7,10*	87,23 ± 16,16	10,27 ± 10,88	2,82 ± 7,18
	2 times a day	89,93 ± 17,55	6,35 ± 10,57	3,72 ± 9,36*	86,52 ± 17,97	9,10 ± 11,12	4,37 ± 9,52
	3 times/more a day	73,11 ± 33,06	9,57 ± 12,35	17,31 ± 34,20*	78,02 ± 21,57	6,04 ± 16,54	5,56 ± 6,15
SMOKING	Yes	91,23 ± 17,74*	5,12 ± 8,39*	3,65 ± 4,44*	88,50 ± 16,41	8,48 ± 10,15	2,98 ± 8,33*
	No	85,45 ± 15,41*	10,49 ± 10,75*	4,44 ± 6,29*	80,92 ± 20,48	14,04 ± 14,70	5,44 ± 7,56*
PERIODONTAL TREATMENT	Never	93,13 ± 17,78	4,05 ± 9,34	2,82 ± 8,70*	91,79 ± 18,33	5,23 ± 9,74	2,96 ± 8,96*
	1 time	90,18 ± 18,50	5,20 ± 5,89	4,98 ± 17,79*	86,18 ± 16,25	11,15 ± 12,02	2,61 ± 4,94*
	Irregularly	87,95 ± 16,61	8,61 ± 11,21	3,43 ± 7,25*	84,49 ± 18,71	11,78 ± 13,02	4,04 ± 8,47*
	Regularly	86,07 ± 15,82	8,59 ± 6,81	5,34 ± 12,39*	81,01 ± 14,27	12,054 ± 5,06	6,92 ± 12,20*
TOTAL		89,78 ± 17,30	6,46 ± 9,28	3,85 ± 11,62	86,61 ± 17,72	9,87 ± 11,63	3,60 ± 8,18*

* $p<0,05$ statistically significant
Values are given as mean ± standard deviation
The significance of differences between PD, CAL and single variables (gender, smoking) was assessed with Mann Whitney U Test; and multiple variables (toothbrushing, educational status, periodontal treatment) was assessed with Kruskall-Wallis Test (*).

Table 4. Relationship between dental plaque, bleeding on probing scores and gender, brushing habits, smoking habits, periodontal treatment backgrounds

		DENTAL PLAQUE %	BLEEDİNG ON PROBİNG %
GENDER	Male	73,87 ± 22,77*	40,74 ± 25,84
	Female	55,30 ± 27,66*	36,36 ± 23,59
EDUCATION	Primary school	66,24 ± 26,66	43,86 ± 24,92
	High school	65,85 ± 25,53	32,76 ± 24,14
	University	55,57 ± 29,37	39,44 ± 27,59
BRUSHING HABITS	Never	65,88 ± 34,60	40,89 ± 15,35
	Irregular	75,46 ± 24,92*	45,15 ± 27,03
	1 time a day	61,80 ± 24,87*	36,34 ± 26,32
	2 times a day	56,84 ± 41,36*	32,99 ± 27,02
	3 times/more	41,36 ± 26,66*	37,73 ± 17,71
SMOKING	Yes	59,74 ± 26,91*	36,76 ± 26,08
	No	71,99 ± 26,74*	42,23 ± 24,36
PERIODONTAL TREATMENT	Never	55,97 ± 30,75	36,11 ± 25,46
	1 time	65,19 ± 26,78	37,74 ± 23,76
	Irregularly	66,21 ± 25,95	40,71 ± 28,20
	Regularly	61,84 ± 22,74	34,38 ± 23,21
TOTAL		62,80 ± 27,26	38,13 ± 25,65

*p<0,05 statistically significant
Values are given as mean ± standard deviation
The significance of differences between Dental Plaque, Bleeding on probing and single variables (gender, smoking) was assessed with Mann Whitney U Test; and multiple variables (toothbrushing, educational status, periodontal treatment) was assessed with Kruskall-Wallis Test (*).

Discussion

Periodontal diseases are common diseases in society and can be treated easily and successfully when diagnosed at an early stage (1, 15). Determining the periodontal status and oral hygiene habits of a population is essential for the diagnosis and in explaining causes and risk factors. At the same time, this data can be used for preventing disease and to maintain periodontal health status (16).

Toothbrushing and interproximal cleaning has been considered the most effective behavioural activity for keeping good periodontal health (11, 17-19). In this study, 33.6% of the participants were brushing their teeth two or more times per day, and 33.7% of them were brushing one time daily. The rate of using dental floss was 11.5%, and the use of an interproximal brush was 7.7%. Our results were generally consistent with the other studies conducted in Turkey. In a study accomplished with non-dental university students, Kırtıloğlu et al. demonstrated that 68% of the students brushed their teeth two or more times a day, and only 3% of the subjects used dental floss daily (13). Moreover, according to the results of another study conducted in Turkey, only 19% of adolescents brushed their teeth one or more times a day, and 73% of them used any type of interproximal cleaning device (14). In addition to the study of various European countries and the Korean study mentioned in the introduction, another study conducted in Germany showed that 79.6% of participants brushed their teeth twice daily (20).

This study shows that the oral hygiene of the individuals participating in the study is inadequate. A total of 26.9% of the participants have never had any periodontal treatment before and mostly prefer to go to the dentist only when they have discomfort. Although 67% of participants argued that they brush their teeth regularly once or more daily, this data is not compatible with the amount of plaque in the mouth. The average full mouth plaque score of the participants was 62.8%. This can be explained by the current brushing methods of the individuals not being correct. Similarly, results of the study conducted in Turkey showed that only 28% of participants had adequate oral hygiene, and it was suggested that 72% of the subjects needed oral hygiene education (14).

The prevalence of periodontitis varies according to the definition criteria of the disease. For example, according to a study conducted in America, if cases in which clinic attachment loss is 2 mm or more are defined as periodontitis, the prevalence of periodontitis was evaluated at 80% in adults. In cases with the clinical attachment loss at 4 mm and over in at least one region are defined as periodontitis, the prevalence decreased to 50%. Also, if cases with clinical attachment loss of 6 mm and over were considered as periodontitis, this value decreased below 20% (22). Because of these differences in the definition of periodontal diseases, only the periodontal status of individuals was determined without any classification.

In this study, areas with 0-3 mm probing depth and clinical attachment level had the highest percentage in all measurements (PD: 89.78% ± 17.30, CAL: 86,61%). The percentage of the areas with 7 mm and over PD and CAL were found to be very low (PD: 3.85%, CAL: 3.60%). These results are consistent with the other studies from Turkey. Gökalp et al. demonstrated that the percentage of the areas with a 0-3 mm clinical attachment level was 67.9% in 35 to 44-year-old-adults (12). Similarly, 20-58% of the individuals had mild to moderate periodontal destruction and severe periodontal destruction has been shown to be only 3-8% in Europe (21, 23, 24).

Smoking is an important risk factor for periodontal diseases (25). Besides increasing the severity of periodontal disease, it has been associated with masking the signs of gingival inflammation. According to the literature, smoking increases the risk of periodontitis by 2.5-6 times (26). Bergström et al. (27) demonstrated that the prevalence of periodontitis and the amount of tooth loss is higher in smokers than in nonsmokers. Similarly, in this study, PD and CAL are found to be higher in smokers. While the percentage of areas with 0-3 mm probing depth are higher in nonsmokers, the percentage of areas with 4 mm and over probing depth are greater in smokers.

There are some limitations in the evaluation of the results of this research. Individuals included in this research may have been selected from patients who gravitated to the dental faculty especially for their needs concerning periodontal treatment. As a result, an overestimation may be made when the periodontal status of the subjects participating in the study has been assessed. Secondly, the periodontal status was assessed over the existing teeth in the mouth. The missing teeth were not included in the survey. It has been considered that the reason for the lower frequency of severe periodontal destruction may be the criterion for this exclusion.

Conclusions

Consequently, it is possible to say that oral care is insufficient in our study group. Also, poor oral hygiene and cigarette use are closely related to moderate and severe clinical attachment loss for the participants. However, there is a lack of data in Turkey in

determining the oral hygiene habits, evaluation of periodontal status and establishing the treatment requirements of individuals. It is clear that more extensive researches need to be done across the country. In this way, it is possible to inform individuals about proper oral hygiene habits and improve the oral health of the society.

Ethical Approval: Ethics committee approval was received for this study from Ege University. Approval number: 15-9/3

Informed Consent: Written informed consent was obtained from all the participiants.

Peer-review: Externally peer-reviewed.

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