

ORAL HEALTH BEHAVIOUR AND AWARENESS OF YOUNG POPULATION IN TURKEY

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ABSTRACT

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Introduction: Transition from adolescence to adulthood is an important episode in life since it determines a person's long-time health behavior and their tendency to carry chronic diseases. The present study aims to assess oral health behavior and awareness of the young population in Turkey.

Methodology: A sample of 2,740 students (1309 male, 1431 female) from 5 different universities studying 10 different degree subjects completed a questionnaire related to their oral health behavior. Age, gender and degree subjects were also recorded. The data were analyzed using SPSS 21.0.

Results: 66.6% of the students brushed their teeth twice or more times daily. The brushing frequency of students studying different degree subjects is significantly different ($p < 0.01$). Dental students have the highest brushing frequency whereas sports students have the lowest. 38% of the participants indicated that they use mouthwash; however, only 21.2% used it daily. 21.2% of the participants visit a dentist once or twice per year. 50.9% of the participants experience bleeding while brushing. Only 28.8% had regular scaling and polishing. 22.6% of the participants smoke, while 18.8% stated that they have halitosis.

Conclusion: The present study indicated that oral health behavior of young population needs to be further improved. Therefore, oral health education programs should be initiated to emphasize the importance of oral hygiene.

Keywords: Oral hygiene; health attitude; health education; health risk behaviors; toothbrushing.

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1. Introduction

As one of the world's leading authority on oral health, the World Dental Federation (FDI) identifies dental caries and periodontal diseases among the most common and crucial global oral health burdens [1]. Scientific evidence shows a significant relationship between oral health and general health. Non-communicable diseases such as cancer, diabetes, respiratory, cardiovascular and oral diseases share mutual risk factors. The possibility of having systemic diseases increase in the presence of periodontitis, or vice versa [2,3]. Van Wormer et al. stated that participants with poor oral hygiene have higher cardiovascular disease risk than those who have good oral health [4].

Prevention of oral diseases is the most efficient approach to ensure oral health. The primary etiologic factor of periodontal diseases is microbial plaque; therefore, they can mostly be prevented by plaque control. The most common way to remove plaque is tooth brushing and flossing as they avoid plaque accumulation on teeth and gums. Plaque elimination also contributes to the prevention of caries [5,6]. It is

known that people who adopted the habit of brushing their teeth at least twice a day have less dental caries compared to others. Apart from the toothbrush, oral hygiene aids such as interdental brush, tongue cleanser, chewing gum and mouthwash can be used in oral healthcare regimen [7].

Consistent health behavior is established at the early stages of human life, with the help of the parents, teachers and caretakers [8,9]. At the age of the transition from childhood to adulthood, a teenager's routines and habits are likely to be challenged since they experience independence for the first time and carry more responsibilities. During their university years students encounter new experiences, stress, social pressure and busyness. Oral and general hygiene habits can become less important with the intrusion of all these factors [8,10].

Through the review of the related literature, there are some studies which observe the oral health behavior of young population around the world. Different findings were reported depending on cultural beliefs, financial situation and education strategies [10-12]. There are

only a few studies investigated the oral health behavior of Turkish university students. This study aims to determine the oral health habits of university students from five different universities and ten different departments [13-15].

The hypothesis of the present study is that there would be slight differences on the evaluation of oral health awareness level of the current young generation considering their awareness and tendency regarding the oral health care behavior.

2. Material and Methods

This study was conducted at five university campuses in different cities of Turkey, which were Gazi University (Ankara), Istanbul University (Istanbul), Abant Izzet Baysal University (Bolu), Ege University (Izmir) and Kocaeli University (Kocaeli). Universities from different cities with a high average student count were selected in order to represent the situation in different areas of Turkey with an adequate number of subjects. The student numbers at the respective campuses were 21270 for Gazi University, 6171 for Istanbul University, 21568 for Abant Izzet Baysal University, 27439 for Ege University and 23951 for Kocaeli University. Participation was voluntary and anonymous.

On World Oral Health Day (March 20th, 2012), desks were set by volunteer dental students in a popular area of the campuses. The volunteers were prepared during a 2 hour-training by a professor from their universities before the event. On the day of the event, the students were invited to participate in the study. They were informed about the study and signed a consent form if they agreed to participate. 3150 students were asked, 2740 agreed to participate. The participation rate was 87%. After completing the survey, the participants were given an oral health education lecture. The study included 2740 undergraduate students (1309 male, 1431 female) enrolled in different faculties which were Sports, Dentistry, Pharmacy, Science, Nursing, Economics, Engineering, Teaching, Humanities and Social Sciences and Medicine.

As reviewed in similar studies, an 11-item questionnaire was designed and validated through a pilot survey before. The questions were designed to evaluate oral health habits and awareness of the students enrolled in different faculties. Age, gender, degree subject were also recorded. Participants were asked to fill out the self-administered questionnaire (Fig. 1). They received an explanation of how to fill in. The questionnaires were collected immediately after they were filled and volunteer dental students gave participants an oral care education lecture.

2.1. Statistical Analysis

The data obtained were organized into Microsoft Excel (Microsoft Inc., USA) and analyzed statistically using SPSS 21.0 software (IBM Inc., USA). The standard descriptive methods were applied to determine the characteristics of the sample. Each data set was tested for normality with the Kolmogorov-Smirnov test. Categorical variables between groups were compared by the Pearson's chi-square test. The confidence interval was set to 95% and p-values less than 0.05 were considered statistically significant.

Age: _____ Gender: _____

Name of the university and faculty: _____

1. Do you have a toothbrush?
 Yes No

2. What is the frequency of replacing your toothbrush?
 1 month 3 months 6-12 months 1-2 years

3. How many times do you brush your teeth daily?
 Never/Irregularly Once a day Twice a day Three or more times a day

4. How many times do you think is the correct frequency of toothbrushing?
 Never/Irregularly Once a day Twice a day Three or more times a day

5. Do you use any other oral hygiene products other than toothpaste?
 Yes (please select)
 Mouthrinse Dental floss Interdental brush Tongue scraper
 Dental toothpick Gum
 No

6. How often do you go to a dentist for professional dental care?
 Never/ Rarely In case of a toothache Once or twice a year

7. Do you have regular scaling and polishing?
 Yes No

8. Do you experience bleeding while brushing? If yes, did you seek help from a dentist?
 Yes/No Yes/Yes No

9. Do you smoke?
 Yes No

10. Do you have bad breath (halitosis)?
 Yes No

11. Did you receive any oral health education before?
 Yes No

Figure 1. Sample of the questionnaire used in the present study.

Table 1. Distribution of students by university, gender, age and degree subject.

Characteristics	n	%	Mean
City			
Ankara	275	10	
Istanbul	574	20.9	
Bolu	569	20.8	
Izmir	638	23.3	
Kocaeli	684	25	
Gender			
Male	1309	47.7	
Female	1431	52.3	
Age			21.08 ± 2.25
Degree Subject			
Sports	68	2.5	
Dentistry	92	3.4	
Pharmacy	33	1.2	
Science	246	9.0	
Nursing	55	2.0	
Economics	114	4.2	
Engineering	461	16.8	
Teaching	536	19.6	
Social Sciences	559	20.4	
Medicine	576	21.0	

3. Results

The answers of the students according to degree subject were given in Table 2. 52,8% of the participants changed

Table 2. Frequency of toothbrushing, use of oral hygiene aids, smoking, receiving oral health education before and belief of the correct frequency of toothbrushing.

	Frequency of Toothbrushing					Oral Hygiene Aids		Smoking		Oral Health Education		Belief of the Correct Frequency of TB		
	Never	Once a day	Twice a day	Thrice a day/more	After each meal	Yes	No	Yes	No	Yes	No	Once a day	Twice a day	Thrice a day/more
Sports	3 (4.4)	28 (41.2)	29 (42.6)	7 (10.3)	1 (1.5)	66 (97.1)	2 (2.9)	23 (33.8)	45 (66.2)	34 (50)	34 (50)	4 (5.9)	39 (57.4)	25 (36.8)
Dentistry	4 (4.3)	16 (17.4)	62 (67.4)	10 (10.9)	0 (0)	92 (100)	0 (0)	25 (27.2)	67 (72.8)	47 (51.1)	45 (48.9)	2 (2.2)	57 (64)	30 (33.7)
Pharmacy	3 (9.1)	7 (21.2)	20 (60.6)	2 (6.1)	1 (3)	33 (100)	0 (0)	9 (27.3)	24 (72.7)	17 (51.5)	16 (48.5)	3 (9.1)	18 (54.5)	12 (36.4)
Science	7 (2.8)	72 (29.3)	136 (55.3)	27 (11)	4 (1.6)	241 (98)	5 (2)	50 (20.3)	196 (79.7)	135 (54.9)	111 (45.1)	18 (7.4)	113 (46.3)	113 (46.3)
Nursing	1 (1.8)	23 (41.8)	29 (52.7)	1 (1.8)	1 (1.8)	55 (100)	0 (0)	11 (20)	44 (80)	27 (49.1)	28 (50.9)	6 (10.9)	25 (45.5)	24 (43.6)
Economics	10 (8.8)	29 (25.4)	67 (58.8)	8 (7)	0 (0)	111 (97.4)	3 (2.6)	23 (20.2)	91 (79.8)	52 (45.6)	62 (54.4)	10 (8.9)	58 (51.8)	44 (39.3)
Engineering	24 (5.2)	136 (29.5)	253 (54.9)	38 (8.2)	10 (2.2)	450 (97.6)	11 (2.4)	117 (25.4)	344 (74.6)	226 (49)	235 (51)	33 (7.3)	233 (51.2)	189 (41.5)
Teaching	35 (6.5)	137 (25.6)	322 (60.1)	35 (6.5)	7 (1.3)	508 (94.8)	28 (5.2)a	110 (20.5)	426 (79.5)	250 (46.6)	286 (53.4)	27 (5.1)	255 (47.9)	250 (47)
Social Sciences	29 (5.2)	148 (26.5)	327 (58.5)	50 (8.9)	5 (0.9)	554 (99.1)	5 (0.9)b	133 (23.8)	426 (76.2)	277 (49.6)	282 (50.4)	31 (5.6)	275 (49.5)	249 (44.9)
Medicine	31 (5.4)	172 (29.9)	327 (56.8)	36 (6.3)	10 (1.7)	555 (96.4)	21 (3.6)a	118 (20.5)	458 (79.5)	353 (61.3)	223 (38.7)	30 (5.3)	329 (57.7)	211 (37)
p			0.072			0.001		0.162		< 0.001			0.025	

their toothbrush every 3 months, while 30,1% of them changed every 6-12 months. About 28% of the students brushed their teeth once, 57.4% of them twice, 9.2% of them three times per day. 5.4% never or irregularly brushed their teeth. There is no significance between faculty and frequency of toothbrushing ($p > 0.05$). 54.4% of sports students, 79.4% of dentistry, 69.7% of pharmacy, 67.9% of science, 65.8% of economics, 65.3% of engineering, 67.9% of teaching, 68.3% of humanities and social sciences and 64.8% of medicine students brushed their teeth twice or more times daily.

97.3% of the students used one or more oral care product other than toothpaste included mouthwash (38%), gum (31.8%), floss (26.5%), tongue scraper (13.5%), dental toothpick (6.4%) and interdental brush (4.7%). 72.8% of the participants never/irregularly used mouthwash, while 15.4% used once and 5.8% twice a day. There is a statistical significance between oral hygiene aids usage by students from different faculties. Table 3 presents the summary statistics for receiving oral health education (OHE) before.

Dental care visit is in relation with receiving oral health education ($p < 0.01$). Of those whom received OHE, 43.1% never visits a dentist, 33.6% visits in case of a toothache and 23.3% visits twice annually. These percentages are statistically significant.

There is a statistical significance in the frequency of toothbrushing between OHE receivers and non-receivers. 3.7% of the OHE receivers stated they never or irregularly brush their teeth while 7.1% non-receivers did the same. 60.2% of the OHE receivers and 54.4% of non-receivers brush their teeth twice a day. There is no significance in students who brush their teeth three times or more daily.

The students who experience halitosis is higher than students who did not receive OHE than those who received.

28.8% of the students had regular scaling and polishing. In Table 4, the relationship between bleeding while tooth brushing and regular scaling/polishing were provided ($p < 0.05$). 15.8% of the subjects who had regular scaling (1-2 times/year) experienced bleeding during brushing while 35.2% of the ones who did not have regular scaling experienced the same problem. Among these students, only 16.8% sought help from a dentist.

Table 5 presents an overview of smoking habits among students. 77.4% of the students were nonsmokers and 22.6% of them were smokers. Brushing frequency among smokers and nonsmokers were statistically

Table 3. Percentages of oral-health education receivers and non-receivers of dentist visits, frequency of toothbrushing and halitosis.

Dental Care Visit	Oral Health Education		p
	Yes	No	
Never/Rarely (n = 1293)	611 (43.1%)*	682 (51.6%)	<0.001
In case of a toothache (n = 866)	476 (33.6%)*	390 (29.5%)	
Twice a year (n = 580)	330 (23.3%)*	250 (18.9%)	
Frequency of toothbrushing			
Never/Irregularly (n = 146)	52 (3.7%)*	94 (7.1%)	<0.001
Once daily (n = 769)	372 (26.2%)*	397 (30.0%)	
Twice daily (n = 1573)	854 (60.2%)*	719 (54.4%)	
Thrice or more daily (n = 252)	140 (9.9%)	112 (8.5%)	
Halitosis			
Yes (n = 516)	225 (15.9%)	291 (22.0%)	<0.001
No (n = 2224)	1193 (84.1%)	1031 (78.0%)	

*Cells which cause signification

Table 4. Frequencies of bleeding during brushing.

		Bleeding during brushing		Total
		Yes	No	
Regular Scaling & Polishing	Yes	15.8%	13.0%	28.8%
	No	35.2%	36.0%	71.2%
Total		51.0%	49.0%	100.0%

$p < 0.05$

Table 5. Brushing frequency of smokers and non-smokers.

Frequency of Toothbrushing	Smoking		Total
	Yes	No	
1 or less	7.2%	15.4%	22.6%
2 or more	52.8%	24.6%	77.4%
Total	60.0%	40.0%	100.0%

$p < 0.01$

significant ($p < 0.01$). 13.1% of the smokers never or irregularly brushed, while only 3.1% of the non-smokers did the same. In total, 82% of the non-smokers brushed twice daily, while 68.2% of the smokers did the same. Sports students evinced the highest smoking rate among students. Dental and pharmacy students followed. Nursing students evinced the lowest rate.

4. Discussion

Health behavior is defined as the activities undertaken by people in order to protect, promote or maintain health, and to prevent disease [16]. It can be determined by numbers of factors including education, beliefs, social environment (family, friends, opinion leaders), skills, financial situation and time [17]. Having an excellent oral health care routine which includes tooth brushing, use of dental floss and mouthwash, a balanced diet, frequent (ideally every six months) visits to the dentist will lead to a caries-free oral cavity [18,19]. According to previous studies poor dental behavior, diet and smoking are the risk factors of periodontal diseases [20,21]. The oral health behavior establishes the health condition of the oral cavity. Chronic oral conditions such as dental caries and periodontitis are common, yet preventable. During a person's lifetime, the progression of these conditions is induced by structural and behavioral factors [22].

Differing among different academic-based students, the hypothesis of the current study that there would be slight differences on the evaluation of oral health awareness level of the current young generation considering their awareness and tendency regarding the oral health care behavior has been clearly accepted. In the literature review, while some researches evaluated the behavioral aspects of specific groups, no study has evaluated this much of a population in Turkey. The present study reveals that 33.4% of Turkish university students brush their teeth less than twice a day, which is below the recommended behavior [23]. This data are in accordance with the previous studies which investigate Turkish university students' dental care habits. Peltzer and Pengpid (2014), Kirtiloğlu and Yavuz (2006) and who reported 32% and 32.4% of the Turkish students show inadequate brushing respectively [11,13]. In the same study of Peltzer and Pengpid, it was also stated that Indian (52.2%), Lebanese (35%) and Nigerian (79.1%) university students brush their teeth less than twice a day. Previous studies have shown that 92% of the university students brush their teeth twice or more times a day in Italy [24], and 85% of the 20-25 Swedes brush their teeth once or twice a day [25]. 80% of the university students in the USA are reported to brush their teeth twice or more daily [26]. Other studies conducted in UK and Norway [27,28] have revealed high percentages of brushing twice a day whereas lower findings were reported in Lebanon and Kuwait [12,29]. A possible explanation for this discrepancy is that the industrialized and developing countries have significant differences concerning oral health behavior. It could be the reflection of cultural beliefs, education system and financial status [11,30].

As shown in Table 3, the dental students brushing frequency is higher than the other departments, which was an expected outcome. This finding is higher than

Indian (54.4%) and Iranian (57%) dental students, but lower than Lithuanian dental students (92%) [31-33]. In the latter study, 73.3% of the technology students brushed their teeth twice, which is higher than that of engineering students (65.3%) in the present study. What is pleasing is that the habits of the students of the teaching department were relatively better than some of the other departments. Taking into consideration that these students will be the future role models for children, this is a good start that needs improvement. In a previous study, it was reported that 90.7% of the nursing students in Hong Kong brush at least twice a day [34]. Another study revealed that 61% of the nursing students in Jordan brush at least twice a day [35]. Oral health is known to be closely related to general health. As one of the primary healthcare professionals, nurses are expected to provide a good example to the patients and their community. They also have the task of informing the hospitalized patients or the public of oral health prevention in rural areas, where the number of dentists is relatively low. For this reason, oral health care courses should be given during nursing education [36]. Another critical finding was about the medical students' oral health. The frequency of tooth brushing of medical students is significantly lower than that of dental students. The medical students' frequency of tooth brushing is relatively lower than that of dental students. Medicine education is part of the undergraduate dental curriculum and supported by extensive study of human diseases. However, the involvement of dental subjects in the educational program of medical students is limited [37]. Loster and Likeman (2012) suggested that the basic dental knowledge of medical students will lead to stronger communication between dentists and medical doctors. This suggestion will further support the idea of oral health being a significant part of general health, and professionals of those fields should work together for a healthier community [38].

WHO states that 60-90% of the schoolchildren and almost 100% of the adults have dental cavities which indicate an epidemic situation worldwide [39]. Every 92 out of 100 people need treatment for dental caries in Turkey [36]. Visits to a dental professional regularly (once every six months) increase the likelihood of early diagnose of oral diseases [18]. Statistics about the oral health condition and frequency of dentist visits are relatively low in Turkey compared to the global average. 47% of the population have not visited a dentist in the last year, while 12.5% have never been to one. 51% of the patients visit a dentist only when they have a problem and only %10 visit a dentist for routine dental check-ups [37]. According to the present study results, 19.3% of the students visit the dentist regularly. The probable cause of this difference is that the oral health knowledge by the young population may be higher than by the general population in Turkey. This can be explained by the effect of college education and higher use of social media among the young population [40]. In reviewing the literature, it was found that 60% of the Korean dental hygiene students postpone visiting a dentist until they have a toothache, whereas only 1% of the US dental hygiene students agreed to this remark [36]. In another study, it was found that 41% of Japanese and only 3% of Finnish dental students have the same opinion [30]. A study including multiple

countries found that 58.2% of university students rarely or never had gone for a dentist visit [11], which is higher than the present study (47.2%). These results corroborate with the findings of Kawamura et al. (2002) who stated that the Asian way of dealing with the disease is different from the Western concepts and that they only seek professional help when home remedies are unsuccessful [36]. Also, there are other studies conducted in Arab countries like Saudi Arabia and Jordan in which the subjects tend to visit the dentist only if they have a problem or are in pain [41,42]. The thought of preventive care being unnecessary and financial status were the major obstacles preventing the subjects from visiting the dental office regularly.

Oral hygiene aids such as mouth rinse, floss and interdental brush should be used as complementary to tooth brushing in order to maintain a better plaque removal from interdental areas [18]. In the present study mouth rinse (38%) and floss (26.5%) are the most frequently used aids, while interdental brush (4.7%) is the least common oral hygiene aids that the subjects have at home. However, only 21.2% of them use mouth rinse regularly. These results reflect those of Kirtiloğlu and Yavuz (2006) who also examined the frequency of regular use of antibacterial rinse (18.8%) and interdental brush (1.6%) in Turkish students [13]. Cultural belief has a strong relationship with oral hygiene habits. In a study conducted in Saudi Arabia, the use of miswak was found to be high among school children [43]. In a previous study, it was mentioned that 52% of the students use a toothpick daily, which is a low-cost interdental cleaning device used frequently in Turkey. However, the findings of the current study (6.4%) do not support previous research. A possible explanation for this might be that the word 'dental toothpick' was used in the questionnaire which may confuse the subjects and prevent them from marking the option even if they use it.

Several reports have shown that 81% of the Turkish children did not have a regular tooth brushing habit. 72% of Turkish high school children needed oral health education [14]. The main objective of oral health education is to enhance knowledge which may lead to better oral health behavior [44]. According to the present study results 51.8% of the subjects had received oral health education. This is lower than another study made in Turkey (61%) and higher than Lithuanian technology students [13,33]. Oral health education and preventive programs are vital in decreasing caries and periodontal diseases prevalence in children and the young population [13]. Studies have shown that teachers, family and peers have a more significant role than dentists in adopting oral health behavior in adolescents [15]. Oral health education given at school considered to be efficient since the school children are approached at an age when their habits are forming. Besides, such education may not only reach the children but their family and community members [45]. It was shown in a study by Eden et al. (2018) that correct brushing techniques education is more effective if given by teachers than dentists [46]. In the present study, only less than half of the teaching students (46.6%) had received oral health education. It is important to emphasize more educating future teachers on oral health for a healthier community.

Another finding was that 22.6% of the university students are smokers and 82% of the non-smokers brush twice daily, while 68.2% of the smokers do the same. This finding indicates that poor oral health behavior (smoking) and the frequency of tooth brushing are associated, which is mostly consistent with the previous study findings [11,12,31]. Based on these findings, it is suggested that oral and general health promotion programs should be combined and encourage positive health behavior in public [11]. Healthcare professionals have an essential role in smoking cessation [47,48]. However, in a study investigating the dentists' role in tobacco control it was suggested that 60% of the dentists do not routinely recommend the smokers to quit. Therefore, the education of dental students may emphasize more tobacco control of patients [49]. According to present study, Turkish dental and medical students' smoking rates are higher than Lithuanian dental students (12%) and American medical students (6.1%) but lower than that of Italian medical students (29.5%) [33,50]. Previous studies indicated that non-smoking physicians are more successful at getting patients to quit smoking. Since healthcare professionals have a high impact on patients to establish positive health behavior, future interventions should aim to eliminate tobacco usage among the students [50].

Limitations of this study were the lack of socioeconomic status and background information of the participants. Another limitation is that dental health behavior was only assessed by self-report. This could lead to an optimistic view of the current situation since sometimes respondents tend to overestimate their actual health behaviors due to the social acceptability of their answers. Future studies may include a dental examination and socio-economic status related questions.

5. Conclusion

The findings of this study indicated that young Turkish generation sectioned from different parts of the country revealed low level of oral health awareness and behavioral routines; moreover, the overall aspect was found to be of a lesser extent when compared to high-income countries.

Regarding the data indicated there is an association between previous OHE and oral health behavior on which academic tendency plays a differentiating role in oral health behavior. Beside the primary oral health indicators, the risk factors threatening the oral health also needs to be enrolled on the awareness raising programmes. Thus, positive inclined health behavior adopted in the early adult phase of one's life would encourage the young population to adopt better health behavior.

Author Contributions

GS: planned and organized the study. wrote the manuscript. SS: collected and imported the data into the computer. MY: coordinated the volunteer students in different cities. UA: interpreted the data. HS: provided the critical revision and guidance.

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Questions

1. Which one is an important factor in developing health behaviors?

- a. Family;
 b. Friends;
 c. Education;
 d. All.

2. What is the most efficient approach to ensure oral health?

- a. Toothbrushing twice a week;
 b. Consuming sugary beverages;
 c. Removing microbial plaque regularly;
 d. Smoking once a day.

3. According to the results of this study, which students brush more frequently?

- a. Medicine;
 b. Dental;
 c. Sports;
 d. Science.

4. Which one is among the most common chronic diseases globally?

- a. Sjögren Syndrome;
 b. Dental caries;
 c. Tonge cancer;
 d. Behcet's Disease.