

EVALUATION OF EFFECTIVE FACTORS ON TOOTH BRUSHING AND ATTITUDES TOWARD TOOTHBRUSH CARE

DIŞ FIRÇALAMADA ETKİLİ FAKTÖRLERİN VE DIŞ FIRÇASI BAKIMINA İLİŞKİN TUTUMLARIN DEĞERLENDİRİLMESİ

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ÖZ

GİRİŞ ve AMAÇ: Bu çalışmanın amacı bir grup hastanın diş fırçalama alışkanlıklarının sosyodemografik faktörlerle ilişkisini belirlemek; kullanılan diş fırçasının tipi, seçimi, saklanma şekli, kullanım süresi gibi tutumlarını saptamaktır.

GEREÇ VE YÖNTEM: Hastane bazlı bu kesitsel çalışma yetişkin 450 hastaya anket yapılarak gerçekleştirildi. İstatistiksel anlamlılık düzeyi $p<0.05$ olarak kabul edildi.

BULGULAR:

Yaş, cinsiyet ve eğitim düzeyi ile fırçalama sıklığı arasındaki fark istatistiksel olarak anlamlı bulundu ($p<0.05$). Manuel diş fırçasına kıyasla elektrikli diş fırçası kullanımı oldukça düşüktü. Hastaların büyük bir kısmının diş fırçalarını altı ay içerisinde yeniledikleri ve diş fırçasının kullanım sonrasında ise genellikle tepesi yukarıda dik olarak saklandığı belirlendi. Diş fırçası seçiminde medyanın etkisinin düşük olduğu görüldü. Hastaların büyük çoğunluğu seçeceği diş fırçasını alışveriş sırasında kendisinin belirlediğini belirtti.

SONUÇ: Limitli sayıda örneklemeden elde edilen sonuçlara göre fırçalama sıklığı üzerinde demografik faktörler etkilidir. Toplumda diş fırçalama alışkanlıklarını artırmak önemlidir. Uygun diş fırçası bakımının oral sağlık için önemi dikkate alınmalıdır.

ANAHTAR KELİMELEER: Fırçalama, diş fırçası, medya

ABSTRACT

OBJECTİVE: The aim of the present study was to investigate the relationship between the tooth brushing habits and sociodemographic factors of a group of patients; To determine attitudes such as the type, choosing, pattern of storage, and replacement time of toothbrush used.

MATERIAL AND METHOD: This was a cross-sectional hospital-based study that was carried out via a questionnaire administered to 450 adult patients. Statistical level of significance was set at $p<0.05$.

RESULTS: There is a statistically significant difference regarding the frequency of brushing for age, gender, and education ($p<0.05$). It was found that the use of electric toothbrushes was rather lower than the manual toothbrush. Most of the patients have been replacing their toothbrushes within six months and toothbrushes were usually kept upright position after use. It has been determined that the effect of media on the choice of toothbrush was low. The majority of patients reported choosing toothbrush during shopping by themselves.

CONCLUSION: According to the results obtained from a limited sample, demographic factors have effects on the frequency of brushing. It is need to improve brushing habit in society. It should be taken into consideration that proper care of the toothbrush is important for oral health.

KEY WORDS: Brushing, toothbrush, media.

INTRODUCTION

The main etiological factor in caries and periodontal disease is the biofilm which forms and remains on tooth surfaces. Caries and periodontal disease can be prevented by using methods that act against this bacterial plaque¹. The measures taken for oral hygiene involve mechanical aids such as toothbrushes, floss, interdental cleaners, chewing gums, and chemotherapeutic medications found in mouth rinses, dentifrices, and chewing gums². The most common oral hygiene aids are toothbrushes and toothpaste. The choice of an oral hygiene product depends on factors such as education, income, information obtained from media such as advertisements, and personal preference in terms of taste/flavor, color, and appearance³. Brushing the teeth twice a day for two minutes with a fluoride toothpaste⁴ is generally recommended as a daily practice to remove plaque, prevent dental caries, and obtain a feeling of oral freshness⁵. Periodontal and gingival lesions are usually seen in interproximal or interdental locations that are often coated with plaque². Plaque control is primarily provided by the mechanical action of the toothbrush. The toothbrush is successful in eliminating plaque from buccal, lingual, and occlusal surfaces; however, it cannot completely clean interdental surfaces⁶. The interdental brush is the most effective interdental cleaning instrument in patients having interdental spaces. Floss, woodsticks, and oral irrigators are tools that may be effective to control gingivitis⁷. Devices that can penetrate between adjacent teeth are necessary for good interdental hygiene⁸. Current oral hygiene measures used for regular professional care can prevent caries and many periodontal diseases and help maintain oral health⁹.

The purpose of this study was to determine habits and attitudes of a group of patients with regards to oral care. Unlike many studies, their toothbrush care habits and choices were also investigated.

MATERIAL AND METHODS

Study design and population

This was a cross-sectional hospital-based study that was carried out with the use of a questionnaire. The participants included 450 patients — 238 females and 212 males — at least 18 years old (with a mean age of 36

years), dentate, who applied to the Ministry of Health Ankara 75th Year Oral and Dental Health Hospital for treatment of various dental problems. The patient who had cognitive deficiency or did not want to participate in the study was excluded from the study. All patients were informed regarding study-related procedures, and signed consent was obtained. The study was approved by the Ethics Committee of the Faculty of Dentistry at Ankara University (11/9;21.06.2017) and was conducted in accordance with the latest version of the Declaration of Helsinki. The hospital administration was informed, and permission was obtained. The study was conducted from July 2017 to February 2018.

Study questionnaire

The questionnaire was designed by the researchers on the basis of previous studies that utilized similar questionnaires^{3,10,11,12,13}. Its purpose was to collect data on the sociodemographic characteristics of patients and their attitudes and habits regarding oral care. The questions were intended to investigate the following: frequency of brushing; oral care aids used; factors considered when choosing a toothbrush; replacement time, storage of the toothbrush used; whether the patients prepare mouth rinse themselves. The questionnaire was completed by the dentists during a face-to-face interview with the patients.

Statistical analysis

The study data were summarized using descriptive statistics (i.e., frequency and percentage). Chi-square test was used to evaluate the relationship between variables. The statistical level of significance was set at $p < 0.05$. Analysis of the data was performed via IBM SPSS Statistics Version 23 package program.

RESULTS

Most of the patients were female (52.9%), older than 30 years (63.8%), and had an elementary (43.3%) education level (Table 1). In terms of frequency of brushing, 85.8% (n=386) of the patients reported their teeth regularly daily or a few times in a week (irregular) brushing, and 14.2 % of the patients went more than a week between brushings (seldom) or no brushing.

Table 1. Features of socio-demographics of patients

Parameters		Patients n (%)
Gender	Female	238 (52.9)
	Male	212 (47.1)
Age	18-30 years	163 (36.2)
	31-43 years	170 (37.8)
	44+ years	117 (26.0)
Education	Elementary	195 (43.3)
	High school	133 (29.6)
	University	122 (27.1)
Total		450 (100)

The relationship between brushing frequency, age, gender, and education variables were investigated in the Table 2. According to results, demographic factors had effective on the frequency of brushing. While younger patients (between the ages of 18-30) had a more frequent (36.2%) brushing habit of at least two times a day compared to other age groups, the patients over the age of 43 had more irregular, seldom or no brushing habit (54.7%) compared to other patients. While female patients had a more frequent brushing habit of at least two times a day (37.4%) compared to male patients (17.0%), more irregular, seldom or no brushing habit were observed in male patients (57.5%). Moreover, while it was observed that university graduates had a brushing habit of at least two times a day (45.1%), the percentage of patients with an elementary education level who had irregular, seldom or no brushing habit was higher (61.5%). There was a statistically significant difference regarding the frequency of brushing for age, gender, and education (respectively, $p=0.023$, $p=0.000$, $p=0.000$) (Table 2).

Table 2. The patterns of brushing frequency with respect to age, gender, and education level of patients

Parameters		Irregular, seldom or no brushing n (%)	Once daily n (%)	At least twice daily n (%)	Total n (%)	p* value
Age	18-30 years	63 (38.6)	41 (25.2)	59 (36.2)	163 (100)	0,023
	31-43 years	86 (50.6)	45 (26.5)	39 (22.9)	170 (100)	
	44+ years	64 (54.7)	26 (22.2)	27 (23.1)	117 (100)	
Gender	Female	91 (38.2)	58 (24.4)	89 (37.4)	238 (100)	0,000
	Male	122 (57.5)	54 (25.5)	36 (17.0)	212 (100)	
Education	Elementary	120 (61.5)	43 (22.1)	32 (16.4)	195 (100)	0,000
	High school	70 (52.6)	25 (18.8)	38 (28.6)	133 (100)	
	University	23 (18.8)	44 (36.1)	55 (45.1)	122 (100)	

*Chi-square test.

Given that the majority of patients (n: 386; 85.8%) reported daily or irregular brushing habit, it was determined that media advertisements and the other people's recommendations had low effect on the patients' toothbrush preferences (6.0% for both). Many patients (62.7%) stated that they made their choice while shopping and the majority (57.5%) said that they tended to avoid more expensive toothbrushes. Almost half of the patients (49.0%) said that they kept the head of the toothbrush closed, and most (84.7%) reported keeping the head of the toothbrush upright after use. Most of the patients (70.2%) reported replacing their toothbrushes within six months. Only 3.4% of the patients surveyed preferred powered toothbrushes to manual. A quarter of the patients (25.6%) stated that they sometimes prepared herbal rinse (with vinegar, salt, or carbonate etc.) (Table 3).

Table 3. Evaluation of attitudes regarding the choosing, care, keeping, replacement time, type of brush and preparing of herbal mouthwash in the patients who regularly brush their teeth or irregular.

Parameters		Patients (n) (%)
What mostly affects you in the choice of toothbrush?	Media advertisement	23 (6.0)
	Advice of dentist	98 (25.3)
	Advice of the other people	23 (6.0)
	During shopping by one's own	242 (62.7)
Do you take into consideration the price of the toothbrush when you buy it?	I care	222 (57.5)
	I don't care	164 (42.5)
How do you keep the head of the toothbrush after use?	Open	182 (47.1)
	Close	189 (49.0)
	I don't pay attention	15 (3.9)
How do you preserve your toothbrush after use?	Head up vertically	327 (84.7)
	Head down vertically	6 (1.6)
	Horizontally	28 (7.2)
	I don't pay attention	25 (6.5)
	Within six months	271 (70.2)
How often do you replace your toothbrush?	Longer than six months	115 (29.8)
What type of toothbrush do you use?	Manual	373 (96.6)
	Powered	13 (3.4)
Do you prepare mouth rinse (herbal, salty, with vinegar or carbonate etc.) yourself apart from the recommendation of the dentist?	Yes	99 (25.6)
	No	287 (74.4)
Total		386 (100)

In the Table 4, the relationship between replacement time of toothbrush, and age, gender, education and brushing habit variables were investigated. The percentage of women who replaced toothbrush within six months (63.6%) was higher than the percentage of women who replaced longer time than six months (36.4%). What is more, a similar relationship was observed for men. The percentage of patients with once and at least two times brushing habit replaced toothbrush within six months (respectively 71.4% and 78.4) was higher than the percentage of patient with irregular brushing habit (62.4%). There was a statistically significant difference regarding the replacement time of toothbrush for gender and frequency of brushing (respectively $p=0,010$ and $p=0.015$) (Table 4).

Table 4. Replacment time of toothbrush with respect to age, gender, education level, and brushing frequency of patients

Parameters		Replacment your toothbrush		p* value
		Within six months	Longer than six months	
		n (%)	n (%)	
Age	18-30	113 (76.9)	34 (23.1)	0.080
	31-43	95 (66.0)	49 (34.0)	
	44 +	63 (66.3)	32 (33.7)	
Gender	Female	110 (63.6)	63 (36.4)	0.010
	Male	161 (75.6)	52 (24.4)	
Education	Elementary	110 (71.4)	44 (28.6)	0.363
	High school	73 (65.2)	39 (34.8)	
	University	88 (73.3)	32 (26.7)	
Brushing Frequency	Once	80 (71.4)	32 (28.6)	0.015
	At least twice	98 (78.4)	27 (21.6)	
	Irregular	93 (62.4)	56 (37.6)	

*Chi-square test.

The patients most commonly used toothbrush and toothpaste for oral hygiene. It was found that 12.2% (n=47) of the 386 patients who reported brushing daily or irregular were cleaning interdentally with dental floss or an interdental brush and that only six of them used the interdental brush and 45 used dental floss. It was determined that 14.2% (n=55) of these patients used mouth rinses (Oral B®, Colgate®, Listerine® etc.).

DISCUSSION

People attach importance to oral hygiene. Oral cleanliness is important for oral health because

eliminating microbial plaque helps ensure that it does not accumulate on teeth and gingiva⁹. The main method of removing plaque and controlling plaque-related diseases such as periodontitis and caries is routine toothbrushing¹⁴. It has been shown that oral cleaning habits are related to the subjects' socioeconomic characteristics in adults¹⁰. In a study conducted on Finnish dentate adults, 79% of the women and 46% of the men reported brushing their teeth twice or more in a day¹⁰. In a similar study conducted by Vural et al., 38.8% of male patients and 44.6% of female patients reported brushing their teeth twice or more a day. In the same study, it was suggested that younger patients had a higher frequency of brushing and people with higher education levels had a higher rate of the habit of brushing twice a day.¹¹ Kirtiloğlu and Yavuz reported, in their study among Turkish non-dental university students, that 68% of the students brushed their teeth two or more times daily and brushing two or more times a day was more common among females than males¹². In this study, it was indicated that the rate of regular brushing among female patients was higher than male patients. The cleaning efficacy of the toothbrush is supported by the use of dentifrice. According to a recent systematic review, brushing with a dentifrice does not have any effect on the mechanical removal of dental plaque¹⁵. The traditional role of the dentifrice is mainly cosmetic, provides fresh breath, and makes the brushing more pleasurable¹⁶. Dentifrice includes abrasives, which help to eliminate stained pellicle and polish the teeth¹⁷. Fluorides are the most widely used medical active agents. Brushing with a fluoride-containing dentifrice is more effective in eliminating dental caries when compared to non-fluoride dentifrices¹⁸. In the short and long-term, powered toothbrushes more effectively reduce plaque and gingivitis when compared to manual toothbrushing¹⁹. However, the clinical significance of these findings is not clear¹⁹. Today, powered toothbrushes, particularly rotating oscillating toothbrushes, appear to be more effective than manual toothbrushes^{19,20}. However, our study indicated that few patients make use of powered toothbrushes. A proper care of toothbrush is important for oral health. Since a worn toothbrush is less effective in cleaning, the American Dental Association advises replacing the toothbrush with a new one in every three to four months when the bristles become frayed. It is necessary to replace children's toothbrushes more frequently. The toothbrush should be completely cleaned with water after use in order to eliminate toothpaste and debris and should be kept in an upright position and open.

If more than one toothbrush is to be kept together, they should be separate to prevent the transfer of germs. Moreover, the toothbrush should not be kept in a closed container as a moist environment is suitable for the growth of germs⁴. Eren and Becerik, in their studies, indicated that the gingivitis group changed their toothbrushes more often than the periodontitis group²¹. In the current study, it was found that most of the patients changed their toothbrushes before six months and stored them in an upright position. Plaque adhesion occurs mainly on the interdental surfaces of molars and premolars. It is hard to reach these surfaces as they are not visible, so caries and periodontitis develop here more frequently than on facial sites^{22,23}. Various devices for interdental cleaning can be found in the market. Ideally, the interdental cleaning instrument should be easy to use, eliminate plaque effectively and have no detrimental soft-tissue or hard-tissue effects. According to majority of the studies, flossing was generally not demonstrated to be effective in plaque removal⁷. The use of dental floss is still recommended since it is more suitable than other interdental cleaning devices that cannot pass through the interproximal area without trauma²⁴. Concavities in the approximate root sites, in particular, cannot be reached with a toothbrush, dental floss, or woodsticks. Interdental brushes can eliminate plaque up to 2-2.5 mm down the gingival margin²⁵; however, interdental cleaning instruments are not frequently used. For instance, it was found that only 5% of men and 14% of women used dental floss or an interdental brush every day¹⁰. Daily use of dental floss in Denmark was found to be 11%²⁶. In their studies of patients with periodontitis and gingivitis, Becerik and Eren reported that almost 90% of the participants did not use dental floss²¹. Along with a fluoride dentifrice, fluoride mouth rinses increase enamel fluoridation that can be effective in caries prevention. It was reported that a 220-ppm fluoride mouth rinse provides an anti-caries effect, and it has additional benefits when used along with a fluoride dentifrice even if only once a day²⁷. Individuals who reported to brush their teeth less frequently were found to have higher incidence and increment of carious lesions²⁸. Factors that affect the choice of toothbrush are ordered as texture of bristle, cost, brand, packaging, media advertisement, family influence, previous experience, size of head of toothbrush, and advice by a dentist²⁹. It was shown that the choice of oral hygiene products was affected by information from the media¹³; however, this study found that media had a low effect on an individual's choice of toothbrush.

CONCLUSIONS

Patients' oral hygiene care is insufficient. Dentists in particular should give their patients necessary oral hygiene training to prevent periodontal diseases and fight against dental caries. It is necessary to improve the self-care of patients regarding oral health. Demographic factors have effects on the frequency of brushing. Making brushing a more regular habit among all individuals in our country should be one of the important health policies. In addition, proper care of toothbrush is important for oral health and should not be overlooked. The limitation of this study is that it was applied only in one oral and dental hospital and had a relatively small sample.

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