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Evaluation of the Relationship between Oral Care Practices, Food Consumption, and Dental Caries in Young Adults

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ABSTRACT

Objective: Dental caries is an important public health problem that affects the majority of the world's population. In this study, it was aimed to evaluate the relationship between oral care practices, food consumption and DMFT (D: decayed, M:missing, F: filled, T: teeth) index in young adults. **Material and Methods:** The general characteristics of individuals, oral care practices, anthropometric measurements and food consumption frequencies were questioned with the questionnaire form. The DMFT index was calculated by questioning the number of decayed, missing and filled teeth of the individuals. **Results:** The mean DMFT index of females was 2.5±1.6, and the mean of DMFT index of males was 2.0±1.6, and a significant difference was determined between the sexes in terms of mean DMFT index ($p<0.05$). According to linear regression analysis, age, sex, frequency of tooth brushing, having a dental examination and smoking status were effective on DMFT index ($R^2=0.098$; $p<0.001$). A positive statistically significant correlation was found between the frequency of consumption of cariogenic foods such as honey, jam, molasses, pastry desserts, sugar added tea/coffee, fruit juices, acidic beverages, alcoholic beverages and packaged foods and the DMFT index ($p<0.05$). **Conclusion:** Nutritional habits are as important as oral care practices in the prevention of dental caries.

Keywords: Anticariogenic Foods, Cariogenic Foods, DMFT Index, Karyostatic Foods, Oral Care.

Genç Yetişkinlerde Ağız Bakımı Uygulamaları, Besin Tüketimi ve Diş Çürükleri Arasındaki İlişkinin Değerlendirilmesi

ÖZ

Amaç: Diş çürükleri dünya nüfusunun büyük bir bölümünü etkileyen önemli bir halk sağlığı sorunudur. Bu çalışmada genç yetişkinlerde ağız bakımı uygulamaları, gıda tüketimi ve DMFT (D: çürük, M: eksik, F: dolgulu, T: diş) indeksi arasındaki ilişkinin değerlendirilmesi amaçlanmıştır. **Gereç ve Yöntem:** Anket formu ile bireylerin genel özellikleri, ağız bakım uygulamaları, antropometrik ölçümleri ve besin tüketim sıklıkları sorgulanmıştır. Bireylerin çürük, eksik ve dolgulu diş sayıları sorgulanarak DMFT indeksi hesaplanmıştır. **Bulgular:** Kadınların ortalama DMFT indeksi 2.5±1.6, erkeklerin 2.0±1.6 olup, ortalama DMFT indeksi açısından cinsiyetler arasında anlamlı fark saptanmıştır ($p<0.05$). Lineer regresyon analizine göre yaş, cinsiyet, diş fırçalama sıklığı, diş muayenesi olma ve sigara içme durumu DMFT indeksi üzerinde etkilidir ($R^2=0.098$; $p<0.001$). Karyojenik besinlerden bal, reçel, pekmez, hamur işi tatlılar, şeker eklenmiş çay/kahve, meyve suları, asitli içecekler, alkollü içecekler ve paketli gıdalar tüketim sıklığı ile DMFT indeksi arasında pozitif yönde istatistiksel olarak anlamlı korelasyon saptanmıştır ($p<0.05$). **Sonuç:** Diş çürüğünün önlenmesinde ağız bakım uygulamaları kadar beslenme alışkanlıkları da önemlidir.

Anahtar Kelimeler: Antikaryojenik Besinler, Karyojenik Besinler, DMFT İndeksi, Karyostatik Besinler, Ağız Bakımı.

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INTRODUCTION

Dental caries, which is among the oral health problems, is an important public health problem affecting 80% of the world population. Oral health is an integral part of general health. In terms of health services, the treatment of dental caries is costly and adversely affects the quality of life of individuals when left untreated (Baniasadi et al., 2021; P. Moynihan, 2016). Today, the relationship between nutrition and many communicable and non-communicable diseases has been revealed, and the role of nutrition is also important in preventing dental caries, which is the most common oral health problem. The teeth are exposed to local chemical and mechanical effects when the foods consumed in the diet come into contact with the teeth. Dental caries occurs as a result of the fermentation of the consumed carbohydrate source foods and the demineralization of the organic acids produced by the bacteria in the dental biofilm. Initial carious lesions without cavitation on the tooth surface can be remineralized with a low cariogenic diet and good oral hygiene practices. However, once the tooth surface is fractured and cavitation occurs, restorative dental treatment is required as remineralization is no longer possible (Imfeld, 2008).

Oral care practices and nutrition are effective in the development of dental caries (AM & Nieto, 2013; Pyle & Stoller, 2003). The type of food consumed and the frequency of consumption are important in protecting oral and dental health (Cascaes et al., 2022; Sanz et al., 2013). Unhealthy eating habits cause an increase in the incidence of dental caries and the DMFT (D: decayed, M:missing, F: filled, T: teeth) index value, which is the sum of the average number of decayed, missing and filled permanent teeth and shows the severity of dental caries (Moradi et al., 2019). Foods are classified as cariogenic, anticariogenic and karyostatic according to their potential to cause dental caries. Cariogenic foods are foods that contain carbohydrates that can be fermented by microorganisms and accelerate the decay process. With the consumption of these foods, microorganisms in the mouth cause organic acid formation, causing the pH of saliva to fall below 5.5 and caries formation. Candies, confectionery, foods containing sugar (cake, pastry, cookies, etc.), honey, jam, molasses, pastry desserts, milk desserts, beverages with added sugar are among the cariogenic foods. Anticariogenic foods are foods that increase salivary pH to alkaline levels, promote enamel reminalization, and reduce the rate of tooth decay. Milk and dairy products (cheese, yogurt, etc.) are anticariogenic. Karyostatic foods are foods that do not contribute to dental caries and are not metabolized by microorganisms. Eggs, fish, meat, poultry, raw vegetables, seafood and oilseeds are karyostatic (Galhotra et al., 2014; Liliana et al., 2019).

The effect of nutrition on the dental health of individuals was investigated in various age groups. Studies on this subject, especially in children (Murshid, 2014; Ruottinen et al., 2004; Zahara et al., 2010) and elderly individuals (Kazemi et al., 2011; Tsai & Chang, 2011; Walls & Steele, 2004), are included in the literature.

The number of studies that associate nutrition with dental health in adults is limited (Ceylan et al., 2004; Koletsi-Kounari et al., 2011). Young adults can show unhealthy eating habits for various reasons. It has been determined that the consumption of sugar-added beverages and foods containing sugar is high in these individuals (Kim et al., 2017; Lula et al., 2014; Shetty, 2021). Dietary sugars are the most important risk factors for dental caries (P. Moynihan, 2016; P. Moynihan et al., 2018). In this study, it was aimed to evaluate the relationship between oral care practices, food consumption and DMFT index (dental caries) in young adults.

MATERIALS AND METHODS

Study type

This descriptive and cross-sectional study was conducted to evaluate the relationship between oral care practices, food consumption and dental caries in young adults.

Study group

The study was conducted with 525 adults aged 18-23 years in Turkey between 5 October and 10 November 2022. Research data were collected with the help of a web-based questionnaire. Researchers create data collection tools through google surveys. The sample size was not calculated as the researchers attempted to reach the maximum study size. The sample of the study was formed by the individuals who ticked the 'I consent to participate in this study voluntarily' tab at the beginning of the form and filled out the questionnaire completely.

Dependent and independent variables

The independent variables of this research are sex and age. The dependent variables are body mass index (BMI), DMFT index, smoking status, oral care practices and frequency of food consumption.

Procedures

Research data were collected with the help of a web-based questionnaire. The general characteristics of individuals, oral care practices, anthropometric measurements (body weight and height) and food consumption frequencies were questioned with the questionnaire form. The DMFT index was calculated by questioning the number of decayed, missing and filled teeth of the individuals.

DMFT Index: The DMFT index is defined as the total number of decayed, missing and filled teeth. According to the World Health Organization, this index, which is used to evaluate dental caries, is evaluated as 'very low' if <5.0, 'low' between 5.0-8.9, 'moderate' between 9.0-13.9, and 'high' if >13.9 (Petersen et al., 2005).

The number of decayed, missing and filled teeth (DMFT index) was recorded as self-report. In previous dental health studies, it was stated that self-report was similar to the results obtained by clinical and radiographic examination (Levin et al., 2013; Kazemi et al., 2016; Myers-Wright et al., 2018).

Anthropometric Measurements: Height and body weight measurements were taken based on the self-reports of individuals. Individuals were Height and body weight measurements were taken based on the self-reports of individuals. Individuals were informed about

how to take anthropometric measurements in the questionnaire form. The BMI value was calculated by dividing the body weight by the square of the height. Body mass index below 18.50 kg/m^2 was classified as underweight, between 18.50–24.99 kg/m^2 as normal, between 25.0–29.99 kg/m^2 as overweight, and above 30.0 kg/m^2 as obese (Gibson, 2005).

Frequency of Food Consumption: The frequency of anticariogenic (cheese, milk, yoğurt), cariogenic (eggs, red meat, chicken, fish, raw vegetables, oilseeds) and karyostatic food (honey, jam, molasses, milk desserts, pastry desserts, chocolate, sugar added tea/coffee, fruit juices, acidic beverages, alcoholic beverages, packaged foods) consumption of individuals was questioned with the questionnaire created by the researchers. Consumption 3 times a week or more is classified as 'very often', consumption 1-2 times a week as 'frequent', consumption once in 15 days and once a month as 'rarely' and no consumption as 'never'.

Statistical analysis

The Statistical Package for the Social Sciences (version 22.0) software was used for all analyses. Student's t test was used for the methods suitable for normal distribution in comparison of paired groups. Categorical variables were evaluated using the Chi-square test. Relationships between numerical variables are given by Pearson correlation coefficient. The factors affecting the DMFT index were estimated using a linear regression model. The results were evaluated at the 95% confidence interval, statistically at $p<0.05$ significance level.

The G* Power program (version 3.1.9 Universität Düsseldorf, Düsseldorf, Germany) was used for post-hoc power analysis. The results of the "Multiple Regression Analysis" (Table 6) conducted to test the primary hypothesis of the study were used in the post-hoc power analysis. When the statistical significance of alpha was 5%, R^2 was 0.146, the number of predictor variables was 9, and the sample size was 525, it was seen that the post-hoc power (1-β) exceeded 99.9%.

Ethical considerations

Before starting the study, ethical approval with the decision number 19/20 dated 03.10.2022 from Trakya University Faculty of Medicine Dean's Office of Ethics Committee for Non-Invasive Scientific Research. All procedures in the study were carried out in accordance with the Declaration of Helsinki. The individuals who ticked the 'I consent to participate in this study voluntarily' tab at the beginning of the form were included in the study.

RESULTS

The study was completed with 525 adult individuals. The mean age of the individuals was 20.8±1.3 years, and the mean BMI was 21.6±2.83 kg/m^2. 76.6% of the individuals were normal weight, 9.1% were overweight and 2.1% were obese. 25.1% of the individuals were smoking (Table 1).

19.4% of the individuals stated that they brush their teeth once a day, 62.9% twice a day, and 17.1% three times a day or more. 54.3% of individuals were not using dental floss. While 22.5% of the individuals had regular dental examination, 60.0% had a dental examination when there was a problem, and 17.5% did not have any dental examination. There was a statistically significant difference between the sexes in terms of tooth brushing, flossing and having a dental examination ($p<0.05$). The mean DMFT index of female individuals was 2.5±1.6, and the mean of DMFT index of male individuals was 2.0±1.6, and a significant difference was determined between the sexes in terms of mean DMFT index ($p<0.05$). There was no significant difference between the sexes according to the DMFT index classification ($p>0.05$) (Table 2).

Table 1. General characteristics of individuals.

Variables	n(%)
Sex	
Female	421(80.2%)
Male	104 (19.8%)
BMI classification	
Underweight (<18.50 kg/m^2)	64 (12.2%)
Normal (18.50-24.99 kg/m^2)	402 (76.6%)
Overweight (25.00-29.99 kg/m^2)	48 (9.1%)
Obese (≥30.0 kg/m^2)	11 (2.1%)
Smoking status	
Yes	132 (25.1%)
No	393 (74.9%)
	$\bar{X}$±SD
Age (years)	20.8±1.3
BMI (kg/m^2)	21.6±2.83

BMI= Body Mass Index, $\bar{X}$±SD= Mean±Standart Deviation.

According to linear regression analysis, age, sex, frequency of tooth brushing, having a dental examination and smoking status were effective on DMFT index ($R^2=0.098$; $p<0.001$) (Table 3).

There was a statistically significant negative correlation between the frequency of consumption of cariogenic foods such as eggs, red meat, chicken and raw vegetables and the DMFT index; a positive statistically significant correlation was found between the frequency of consumption of cariogenic foods such as honey, jam, molasses, pastry desserts, sugar added tea/coffee, fruit juices, acidic beverages, alcoholic beverages and packaged foods and the DMFT index ($p<0.05$). There was a statistically significant negative correlation between BMI and the frequency of consumption of cheese, milk, eggs, red meat and chicken; a statistically significant positive correlation was found between the frequency of consumption of cariogenic foods such as pastry desserts, sugar added tea/coffee, fruit juices, acidic beverages and packaged foods and BMI ($p<0.05$) (Table 4).

A statistically significant difference was found between the sexes in terms of consumption frequency of milk desserts, pastry desserts, chocolate, fruit juices, acidic beverages, alcoholic beverages and packaged foods ($p<0.05$) (Table 5).

According to the linear regression analysis, the frequency of cariogenic food consumption was effective on the DMFT index ($R^2=0.146$; $p<0.001$) (Table 6).

Table 2. Evaluation of oral care practices of individuals.

	Total	Female	Male	p value
	n(%)	n(%)	n(%)	
Brushing teeth				
Once a day	102(19.4)	54(12.8)	48(46.2)	$\chi2$=79.709
Twice a day	330(62.9)	280(66.5)	50(48.1)	**p<0.001***
Three times a day or more	90(17.1)	87(20.7)	3(2.9)	
Never	3(0.6)	-	3(2.9)	
Using dental floss				
Everyday	23(4.4)	18(4.3)	5(4.8)	$\chi2$=14.469
Sometimes	217(41.3)	191(45.4)	26(25.0)	**p=0.001***
Never	285(54.3)	212(50.4)	73(70.2)	
Having a dental examination				
Regular dental examination When there	118(22.5)	99(23.5)	19(18.3)	$\chi2$=26.229
was a problem	315(60.0)	266(63.2)	49(47.1)	**p<0.001***
Never	92(17.5)	56(13.3)	36(34.6)	
DMFT index	2.4±1.6	2.5±1.6	2.0±1.6	**p=0.001*[a]**
DMFT index classification				
Very low (<5.0)	423(80.6)	336(79.8)	87(83.7)	$\chi2$=0.787
Low (5.0-8.9)	102(19.4)	85(20.2)	17(16.3)	p=0.375

DMFT=Decayed, M=missing, F=filled, T= teeth, [a]Student's t test, other tests Chi-square test, *p<0.05.

Table 3. Regression model for the DMFT index according to demographic characteristics and oral care practices.

	DMFT index					
Model	**Unstandardized B**	**Coefficients Std. Error**	**Standardized Coefficients Beta**	**95.0% Confidence Interval for B**	**p value**	**VIF**
Age (years)	0.212	0.053	0.171	0.107-0.317	**<0.001***	1.064
Sex	-0.756	0.201	-0.186	-1.151--0.361	**<0.001***	1.396
BMI (kg/m^2)	0.040	0.027	0.090	0.054-0.113	0.058	1.287
Frequency of tooth brushing	-0.493	0.120	-0.189	-0.728--0.257	**<0.001***	1.210
Frequency of use of dental floss	-0.170	0.126	-0.061	-0.416-0.077	0.156	1.158
Having a dental examination	-0.172	0.118	-0.100	-0.403--0.058	**0.046***	1.193
Smoking status	0.309	0.097	0.139	0.119-0.500	**0.001***	1.084
	R^2=0.098; p<0.001					

Sex '0' female , '1' male
Status of having a dental examination '0' no, '1' yes
Smoking status '0' no, '1' yes
M=missing, F= filled, T= teeth, BMI= Body Mass Index, VIF= Variance Inflation Factor, *p<0.05.

Table 4. Evaluation of the relationship between the frequency of food consumption and the DMFT index and BMI.

	DMFT index	BMI (kg/m^2)
Anticariogenic foods		
Cheese	r=-0.021	r=-0.164
	p=0.636	**p<0.001***
Milk	r=-0.036	r=-0.131
	p=0.409	**p=0.003***
Yogurt	r=-0.021	r=-0.025
	p=0.636	p=0.567
Karyostatic foods		
Eggs	r=-0.085	r=-0.213
	p=0.043*	**p<0.001***
Red meat	r=-0.179	r=-0.093
	p<0.001*	**p=0.032***
Chicken	r=-0.335	r=-0.088
	p<0.001*	**p=0.044***
Fish	r=-0.069	r=-0.028
	p=0.112	p=0.528
Raw vegetables	r=-0.115	r=0.081
	p=0.008*	p=0.064
Oilseeds	r=-0.010	r=-0.080
	p=0.814	p=0.067

Table 4 (continued). Evaluation of the relationship between the frequency of food consumption and the DMFT index and BMI.

	r /p	r /p
Cariogenic foods		
Honey	r=0.107 **p=0.014***	r=0.060 p=0.172
Jam	r=0.112 **p=0.011***	r=0.056 p=0.201
Molasses	r=0.126 **p=0.004***	r=0.047 p=0.278
Milk desserts	r=0.049 p=0.261	r=0.058 p=0.188
Pastry desserts	r=0.172 **p<0.001***	r=0.091 **p=0.037***
Chocolate	r=0.020 p=0.644	r=0.049 p=0.263
Sugar added tea/coffee	r=0.096 **p=0.024***	r=0.102 **p=0.024***
Fruit juices	r=0.136 **p=0.002***	r=0.094 **p=0.030***
Acidic beverages (cola, soda)	r=0.144 **p=0.001***	r=0.109 **p=0.013***
Alcoholic beverages	r=0.122 **p=0.005***	r=0.068 p=0.118
Packaged foods (chips, crackers, biscuits, cakes, etc.)	r=0.110 **p=0.012***	r=0.085 **p=0.046***

Pearson correlation coefficient, *p<0.05.
M=missing, F=filled, T=teeth, BMI= Body Mass Index.

Table 5. Evaluation of the frequency of cariogenic food consumption by sex.

	Female	Male	p / test value
	n(%)	n(%)	
Honey			
Very often	111(26.4)	23(22.1)	$\chi2$=2.594 p=0.459
Frequent	103(24.5)	33(31.7)	
Rarely	145(34.4)	35(33.7)	
Never	62(14.7)	13(12.5)	
Jam			
Very often	84(20.0)	23(22.1)	$\chi2$=2.189 p=0.534
Frequent	92(21.9)	28(26.9)	
Rarely	119(28.3)	28(26.9)	
Never	126(29.9)	25(24.0)	
Molasses			
Very often	89(21.1)	21(20.2)	$\chi2$=2.011 p=0.570
Frequent	47(11.2)	15(14.4)	
Rarely	151(35.9)	41(39.4)	
Never	134(31.8)	27(26.0)	
Milk desserts			
Very often	55(13.1)	9(8.7)	$\chi2$=15.063 p=**0.002***
Frequent	143(34.0)	29(27.9)	
Rarely	202(48.0)	50(48.1)	
Never	21(5.0)	16(15.4)	
Pastry desserts			
Very often	24(5.7)	13(12.5)	$\chi2$=9.071 p=**0.028***
Frequent	106(25.2)	33(31.7)	
Rarely	239(56.8)	48(46.2)	
Never	52(12.4)	10(9.6)	
Chocolate			
Very often	219(52.0)	41(39.4)	$\chi2$=45.749 p=**<0.001***
Frequent	147(34.9)	25(24.0)	
Rarely	55(13.1)	32(30.8)	
Never	-	6(5.8)	
Sugar added tea/coffee			
Very often	115(27.3)	32(30.8)	$\chi2$=4.453 p=0.217
Frequent	103(24.5)	18(17.3)	
Rarely	118(28.0)	37(35.6)	
Never	85(20.2)	17(16.3)	

Table 5 (continued). Evaluation of the frequency of cariogenic food consumption by sex.

	n(%)	n(%)	p / test value
Fruit juices			
Very often	43(10.2)	9(8.7)	$\chi2$=8.467 p=**0.037***
Frequent	145(34.4)	24(23.1)	
Rarely	182(43.2)	34(32.7)	
Never	51(12.1)	37(35.6)	
Acidic beverages			
Very often	51(12.1)	19(18.3)	$\chi2$=8.386 p=**0.039***
Frequent	143(34.0)	12(11.5)	
Rarely	46(10.9)	21(20.2)	
Never	181(43.0)	52(50.0)	
Alcoholic beverages			
Very often	1(0.2)	4(3.8)	$\chi2$=24.191 **p<0.001***
Frequent	18(4.3)	13(12.5)	
Rarely	144(34.2)	24(23.1)	
Never	258(61.3)	63(60.6)	
Packaged foods			
Very often	72(17.1)	12(11.5)	$\chi2$=36.844 p=**<0.001***
Frequent	152(36.1)	21(20.2)	
Rarely	148(35.2)	46(44.2)	
Never	49(11.6)	25(24.0)	

Chi-square test, *p<0.05.

Table 6. Regression model for DMFT index according to frequency of cariogenic food consumption.

	DMFT index					
Model	**Unstandardized B**	**Coefficients Std. Error**	**Standardized Coefficients Beta**	**95.0% Confidence Interval for B**	**p**	**VIF**
Honey	0.202	0.051	0. 236	0.043-0.461	**<0.001***	1.541
Jam	0.125	0.073	0.096	0.018-0.268	**0.046***	1.467
Molasses	0.206	0.048	0.241	0.191-0.591	**<0.001***	1.284
Pastry desserts	0.256	0.036	0.287	0.105-0.492	**<0.001***	1.293
Sugar added tea/coffee	0.271	0.073	0.216	0.128-0.415	**<0.001***	1.453
Fruit juices	0.196	0.090	0.179	0.157-0.530	**0.001***	1.749
Acidic beverages	0.132	0.076	0.121	0.049-0.236	**0.005***	1.418
Alcoholic beverages	0.497	0.100	0.211	0.101-0.693	**<0.001***	1.079
Packaged foods	0.328	0.101	0.176	0.130-0.526	**0.002***	1.029
	R^2=0.146; p<0.001					

M=missing, F=filled, T=teeth, VIF=Variance Inflation Factor, *p<0.05.

DISCUSSION

Oral health is an integral part of general health and is closely related to health status. Today, it is known that nutrition is very important in the protection, development and improvement of oral and general health. Oral health problems are especially associated with excessive and frequent sugar consumption, unhealthy (poor) diet, tobacco and alcohol use, and poor oral hygiene, that is, improper oral care practices (Mohan, 2015; Peres et al., 2019). In this study, it was aimed to evaluate the relationship between oral care practices, food consumption and DMFT index (dental caries) in young adults with a high incidence of dental caries among oral health problems.

Oral and dental health studies carried out in Turkey are limited in number (Gökalp et al., 2006; Sağlık Bakanlığı, 2021). Individuals of various ages and age groups are included in the DMFT index recommended by the World Health Organization (Petersen et al., 2005). In this study, young adults between the ages of 18-23 were included and the number of decayed, filled and missing teeth, nutritional habits and oral care practices were questioned. According to the results of the Turkey Oral and Dental Health Profile 2004 (TADSAP-2004) and 2018 (TADSAP-2018) studies conducted throughout the country, in which adult individuals' oral care practices and their use of health services for oral health are evaluated, the rate of not going to a dentist has increased over the years (TADSAP-2004: 4.9%; TADSAP-2018: 6.1%) (Gökalp et al., 2006; Sağlık Bakanlığı, 2021). In the results of this study, it was determined that 17.5% of the individuals did not go to the dentist and did not have any dental examination. It has been stated in the Turkey Oral and Dental Health Profile studies that the habit of brushing teeth, which has an important place in oral care practices, has increased over the years (TADSAP-2004: 22.1%; TADSAP-2018: 25.1%) (Gökalp et al., 2006; Sağlık Bakanlığı, 2021). In this study, it was determined that more than half of the individuals (62.9%) brushed their teeth twice a day.

The DMFT index is the most commonly used index in dental caries epidemiology worldwide. The index is also very useful in monitoring the course of dental caries (Worthington & Craven, 1998). In this study, the DMFT index values of the individuals were calculated, the mean DMFT index of female individuals was 2.5±1.6, and the mean DMFT index of male individuals was 2.0±1.6, and a significant difference was determined between the sexes in terms of mean DMFT index ($p<0.05$). According to the World Health Organization DMFT index classification, the degree of dental caries was found to be low in both female and male. According to the results of the Turkey Oral and Dental Health Profile studies, when 2004 and 2018 were compared, it was stated that the DMFT index value was higher in female than in male in both studies, and the mean DMFT index of individuals decreased from 11.2 to 8.8. One of the most important reasons for this decrease is the increase in awareness in oral care practices and the widespread use of these practices (Gökalp et al., 2006; Sağlık Bakanlığı, 2021). As a result of this study, it was determined that sex, frequency of tooth brushing and having a dental examination were effective on the DMFT index. Studies revealing the relationship between obesity and oral health problems and dental caries have been carried out especially in the pediatric population (Costacurta et al., 2011; Kesim et al., 2016). It is thought that the relationship between DMFT and BMI is weak because the sample in this study was adult individuals and the number of obese and overweight individuals in the study was low. The reason for the increase in dental caries, which is among the oral health problems, is the increase in the consumption frequency and amount of fermentable carbohydrates (Lagerweij & van Loveren, 2020). It is stated that there is a positive correlation between the consumption of cariogenic foods with high fermentable carbohydrate content and the increase in the prevalence of dental caries. In addition, the frequency and amount of simple carbohydrates consumed in the diet plays a fundamental role in the etiology of dental caries. Consumption of foods/beverages with added sugar and foods high in simple carbohydrates increase the incidence of dental caries (Chi & Scott, 2019; P. J. Moynihan & Kelly, 2014). In the results of this study, a positive statistically significant correlation was found between the frequency of consumption of cariogenic foods such as honey, jam, molasses, pastry desserts, sugar added tea/coffee, fruit juices, acidic beverages, alcoholic beverages and packaged foods and the DMFT index ($p<0.05$). According to the linear regression analysis, the frequency of cariogenic food consumption has an effect on the DMFT index ($R^2=0.146$; $p<0.001$). In addition, the frequency of consumption of milk desserts, chocolate, ready-made fruit juices, acidic beverages and packaged foods was higher in female than male, and accordingly, the mean DMFT index of female was found to be higher than male ($p<0.05$). In order to prevent dental caries in individuals, consumption of foods with high simple carbohydrates content should be avoided. The World Health Organization has recommended that the daily consumption of simple carbohydrates be reduced, and even that the energy from simple carbohydrates should ideally not exceed 5% of the total daily energy intake for the reduction of dental caries throughout life (World Health Organization, 2017). In order to protect oral health and prevent dental caries, it is important for individuals to consume anticariogenic and karyostatic foods that increase saliva pH to alkaline level, support enamel reminalization and reduce the rate of dental caries, as well as reduce the frequency and amount of simple carbohydrates consumption. These foods have preventive properties in the formation of dental caries because they are not metabolized by microorganisms in the mouth and can increase the oral pH value by increasing the salivary flow rate (P. Moynihan et al., 2018). In this study, a statistically significant negative correlation was found between the frequency of consumption of eggs, red meat, chicken and raw vegetables, especially among the karyostatic foods, and the DMFT index ($p<0.05$).

Limitations of Study

The first limitation of this study is that only individuals who could be reached online participated in the study. The second imitation of the study was that the DMFT index was calculated by questioning the number of decayed, missing and filled teeth of the individuals. Another limitation of the study is that education level and income status, which are possible factors related to nutritional status, were not questioned in the study.

CONCLUSION

Nutritional habits are as important as oral care practices in the prevention of dental caries, which we encounter as an important public health problem throughout the society. It is necessary to improve preventive health services throughout the society, and regular oral examinations should be carried out. In addition, it is important to develop nutritional strategies for dental health within the scope of preventive health services. In line with the recommendations of the World Health Organization, the frequency and amount of consumption of foods with a high content of simple carbohydrates should be limited. Individuals should include foods with high anticariogenic and karyostatic effects in their diets more frequently.

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Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: ÖMÇ, SD; **Material, methods and data collection:** ÖMÇ, SD **Data analysis and comments:** ÖMÇ, MŞKE, SD, EMŞ **Writing and corrections:** ÖMÇ, MŞKE, SD, EMŞ.

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