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OKUL ÇOCUKLARINA AİT DİŞ SAĞLIĞI DURUMU
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BURSA İLİNDEKİ 307 ŞEHİRLİ OKUL ÇOCUĞUNA AİT DİŞ SAĞLIĞI DURUMU VE DİŞ SAĞLIĞINI ETKİLEYEN FAKTÖRLER

DENTAL HEALTH STATUS AND ITS RELATED FACTORS OF 307 URBAN SCHOOLCHILDREN IN THE CITY OF BURSA

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Özet

Yaşları 5 ve 12 arasındaki bir ilköğretim öğrencilerine ait diş çürüğü durumunu ve ilişkili faktörleri incelemek.

Bu çalışma Bursa'nın Osmangazi ilçesindeki bir ilköğretim okulunda (primer örnekleme birimi), tesadüfi olarak seçilerek Mayıs 2010 ve Haziran 2011 arasında gerçekleştirilmiştir. Tüm muayeneleri kalibre edilmiş bir dişhekimi Dünya Sağlık Örgütü (DSÖ) kriterlerine göre yapmıştır. Sosyodemografik veriler, aylık gelir, annenin eğitim düzeyi ve dişfırçalama alışkanlıkları önceden gönderilmiş anketlerle toplanmıştır. Beslenme analizler, 24 saatlik beslenme çizelgeleri kullanılarak yapılmıştır. Çalışmanın sonunda 307 öğrenciye ulaşılmıştır.

Tüm çocuklarda, ortalama dmft ve DMFT sırasıyla, 3.9 ± 0.26 ve 0.57 ± 0.08' dir. 5-6 yaşlarda, ortalama dmft significant caries indeks (SiC) sırasıyla 4.67 ± 0.57 ve 5.94 olmuştur. 7-12 yaş grubunda, ortalama dmft ve DMFT ve dmft ve DMFT için SiC değerleri sırasıyla, 3.6 ± 0.3, 0.7 ± 0.1, 5.5 ve 0.9'dur. Lojistik regresyon analizi, düşük anne eğitim düzeyinin, düzensiz diş fırçalamanın ve fazla şeker tüketiminin kötü diş sağlığı ile negative ilişkisine işaret etmiştir.

Bu çalışma grubunda okula dayalı diş çürüğü koruma programlarına ihtiyaç olduğu görülmektedir. Bursa'daki tüm okul çocuklarını temsil edecek çalışmaların tasarlanması önerilmektedir.

Anahtar Kelimeler: Significant Caries Indeks, beslenme alışkanlığı, sosyodemografik etkenler, diş sağlığı.

Abstract

To estimate the severity of dental caries and related factors in Turkish elementary schoolchildren between ages 5 and 12.

This study was conducted in one elementary school (primary sampling unit) in Osmangazi district of Bursa, selected by random sampling from the elementary schools between May 2010 and June 2011. The same calibrated examiner performed all the examinations according to World Health Organization (WHO) guidelines during school visits. Socio-demographic data, monthly family income, maternal schooling and toothbrushing habits were collected by questionnaires sent to complete. Dietary analysis was performed by using the data gathered during the 24-hour dietary recall. At the end of the study, 307 students had been reached.

Of all children, the mean dmft and DMFT were 3.9 ± 0.26 and 0.57 ± 0.08, respectively. In 5-6-year-olds, the mean dmft and their significant caries index (SiC) were 4.67 ± 0.57 and 5.94, respectively. In 7-12-year olds, the mean dmft and DMFT and their SiC values for dmft and DMFT were, 3.6 ± 0.3, 0.7 ± 0.1, 5.5 and 0.9 in respectively. Logistic regression analysis indicated the negative impact of lower levels of maternal schooling, irregular toothbrushing, and high sugar consumption as risk indicators to the poor dental health status.

Community-based dental caries prevention programs are needed to promote dental health in this group of schoolchildren. The future studies intending to represent school population in Bursa are recommended.

Key words: Significant Caries Index, dietary habits, socio-demographic factors, dental health.

Introduction

In Turkey, a recent oral health profile was expressed as dmft and DMFT for 5- and 12-year-olds in 2004 and 2005.[1] In this profile, dmft of 5-year-olds was 3.7 and DMFT of 12-year-olds was 1.9. 70 % of 5-year-olds and 61.1% of 12 year-olds were affected by dental caries. About 5 years later, a second survey was performed for 5- and 6-year-olds in the city of Istanbul[2] and the mean dmft and SiC index were found 3.7 and 7.75, respectively. Comparison of these recent data with the first situation analysis of oral health in Turkey in 1988[3] indicated that there was a reduction in DMFT index from 4.4 to 3.7 for 6-year-olds and 2.7 to 1.9 for 12-year-olds.

These partial data on the dental caries experiences of Turkish children may be ineffective to analyze the current situation of the different cities of the country and to extract the

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population who needs more preventive regimens in order not to suffer from dental caries. There is no previous or current study about the dental caries experiences of the elementary schoolchildren who live in the city of Bursa located in the western Turkey. Therefore, the aims of this survey were to estimate the severity of dental caries (expressed as dmft/DMFT and SiC index) in a group of elementary schoolchildren between ages 5 and 12 in Bursa as well as to examine the factors which may have an effect on the caries experiences.

Material and Methods

Setting and study population

This study was conducted in one elementary school (primary sampling unit) in Osmangazi district of Bursa, selected by random sampling from the elementary schools with the permission of the local education authority of Ministry of Education during the period of May 2010 to June 2011. This district was selected as its socioeconomic characteristics are very close to the average values for Bursa. During the study period, all students attending the school were included in the study. The school was revisited to recruit absent students and ensure that all the students participated in the study. No parent (s) of the students refused to participate in the study. Ethical approval for this study was obtained from the Ethics Committee of the Faculty of Medicine of Uludag University.

Dental data collection and evaluation

Oral examinations were carried out in a classroom with the help of a plain mirror and the probe under daylight or where necessary, using a portable source of light. The same calibrated examiner (CEC) performed all the examinations. Intra-examiner reliability was tested for clinical examinations. Kappa scores of 0.87 for CEC was reported.

No radiographs were taken. The number of carious teeth, fillings and missing teeth in both dentitions were recorded on examination forms in accordance with WHO criteria.

The mean dmft and DMFT values were calculated according to World Health Organization (WHO) guidelines. After the study

population was grouped into tertiles according to their mean dmft and DMFT values, the SiC index was calculated as the mean dmft and DMFT of the one-third of the population with the highest caries values.[4] Then the individuals were divided into two age groups 5-6-year-olds (primary dentition) and 7-12-year-olds (mixed dentition) and the mean dmft, DMFT and SiC index values were also evaluated for each group.

Analysis of demographics and caries-related factors

Socio-demographic data, monthly family income, maternal schooling and toothbrushing habits were collected by questionnaires sent to complete. This method was used as young children may not be able to give correct answers about tooth brushing habits.

Monthly family income in Turkish Lira (TL) was classified as low [TL ≤ 635 (≤USD 351)] or high [TL > 635 (>USD 351)] based on the data of Social Security Institution in the year 2010. Maternal schooling was classified as low [≤8 years of education (mothers who had elementary education at the highest)] or high (>8 years of education). Children were classified according to the number of times a day they brushed their teeth: regularly (twice and more), irregularly (if they brushed their teeth less than once a day or none).

Dietary analysis

The amount and frequency of at- and between-meal consumption of defined food items were abstracted from the data gathered during the 24-hour dietary recall from each individual in the survey. Parent(s) of each individual were asked to classify the food item their child reportedly had consumed into an at- or between-meal consumption to take into account the individual variations in food consumption.

A summary list of foods included in each food group was indicated in Table 1.[5] The at- and between-meal frequencies of consumption from each food group for each individual were then computed.

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Food Group	Examples of foods included
Table sugars and syrups	White sugar, honey, grape molasses
Sugary desserts and snacks	Cakes, cookies, candies
Breakfast cereals	Corn cereals, oat cereals, rice cereals
Coffee, chocolate, and tea drinks	Tea, cocoa dry powder, chocolate drinks
Fruit juices	Orange, peach, apricot
Ice cream	Ice cream cones, ice cream bar
Bread	All types of bread (Additionally, macaroni and spaghetti were also included.)
Crackers and nuts	Nuts, popcorn, crackers
Carbonated drinks	Coke, soft drinks

Table 1: A summary list of foods included in each food group.

Statistics

Descriptive statistics were calculated as mean ± SEM for continuous variables and percentage for categorical variables. Shapiro-Wilk test was performed for checking of the normality assumption. Mann-Whitney U test was used to compare differences between groups. Pearson correlation analysis was performed to investigate whether there was a significant relation between consumption frequencies related to food categories and caries values. Logistic regression analysis was performed to identify significant risk factors (sociodemographics, family income, maternal schooling, toothbrushing frequency) for dmft and DMFT. SPSS V.13 package program was used for analyses in this study. Values of $p<0.05$ were considered statistically significant.

Results

Study population

Distribution of the study population, their caries experiences and percentage of children affected by dental caries were presented in Table 2.

Sixty-seven percent of the children had low family income. Only 19.2% of the mothers

had received education for more than 8 years. According to parents' reports, 37.8% children brushed their teeth regularly.

	All children (n = 307)	5-6-year-olds (n = 149)	7-12-year-olds (n = 158)
Age (mean ± SD)	8.55±0.12	5.2 ± 0.3	9.2 ± 1.5
Gender			
Boys	159 (51.7%)	65 (43.6%)	70 (44.3%)
Girls	148 (48.3%)	84 (56.4%)	88 (55.7%)
Caries prevalence (%)	79	83	69
dmft (mean ± SD)	3.90 ± 0.26	4.67 ± 0.57	3.6 ± 0.3
dmft (SiC)	8.15	5.94	5.5
DMFT (mean ± SD)	0.57 ±0.08	-	0.7 ± 0.1
DMFT (SiC)	1.75	-	0.9

Table 2: Frequency analysis according to study population and age groups.

Logistic regression models were found to be significant for both dmft and DMFT ($p<0.001$). Risk factors for dmft index were irregular tooth brushing ($p<0.001$) and lower ages ($p<0.01$). However, being younger was the only risk factor for having increased DMFT ($p<0.001$). Low family income and lower levels of maternal schooling were not risk factors both for dmft and DMFT. More children who brushed their teeth irregularly had higher dmft values (4.79±0.34) compared to children who brushed twice or more a day (dmft = 2.49±0.34) and this difference was significant ($p<0.001$). There was no significant difference for the mean DMFT values between tooth brushing frequencies (p = 0.320). Children who were younger had significantly higher dmft (3.42±0.32) and DMFT (0.32±0.12) compared to the older ones (2.1±1.2, 1.2±0.38; respectively) ($p<0.01$, $p<0.05$). Logistic regression analysis results for significant caries index (SiC) were presented in Table 3.

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	dmft			DMFT		
	OR	95% CI for OR	p	OR	95% CI for OR	p
Age	0.762	0.635-0.914	**0.003**	2.082	1.597-2.716	**<0.001**
Gender	-	-	0.989	-	-	0.431
Maternal schooling	-	-	0.212	-	-	0.418
Toothbrushing	2.374	0.242-0.914	**0.009**	2.646	1.211-5.784	**0.015**
Model significance	*p<0.001*			*p<0.001*		

Table 3: Results of logistic regression analysis for SiC values.

Age Groups

5-6-year-olds

Distribution of the group, their caries experiences and percentage of children affected by dental caries were presented in Table 2.

Logistic regression models were found to be significant for both dmft and DMFT (p<0.001). Risk factors for dmft index were lower levels of maternal schooling (p<0.001), irregular tooth brushing (p<0.001) and lower ages (p<0.01). There is no risk factor for having increased DMFT in this age group. Mothers of children who had dmft 5+ had education up to 8 years (p=0.310). Children who brushed their teeth irregularly had higher dmft values (5.91±0.68) compared to children who brushed twice or more a day (dmft = 2.27±0.22) and this difference was significant (p<0.001).

7-12-year-olds

Distribution of the group, their caries experiences and percentage of children affected by dental caries were presented in Table 2.

Logistic regression models were found to be significant for both dmft and DMFT (p<0.001). Risk factors for dmft were irregular tooth brushing (p<0.001).

Children who brushed their teeth irregularly had higher dmft values (4.37±0.38) compared to children who brushed twice or more a day (dmft = 2.54±0.38) and this difference was significant (p<0.001). However, there was no significant difference between DMFT values and toothbrushing frequencies (p = 0.207).

Caries indexes and dietary habits

In the study population, a significant correlation was found between DT score and the consumption of coffee, chocolate, and tea drinks (r=-0.152 p=0.030).

In 5-6-year-olds, there was a significant correlation between dt and dft index values and the consumption of table sugars and syrups (r=0.393 p=0.08; r=0.342 p=0.021, respectively). A significant correlation was also found between dft index score and the consumption of coffee, chocolate, and tea drinks (r=-0.301 p=0.045).

In 7-12-year-olds, significant correlations was determined between dt and dft index values and food categories of sugary desserts and snacks and crackers and nuts (r=0.180 p= 0.026; r=0.166 p=0.041, respectively). The consumption of coffee, chocolate, and tea drinks again correlated with the higher DT values (r=0.165 p=0.042).

Discussion

Caries experiences and related factors

Caries prevalence of all children was 79% and the mean dmft and SiC for dmft were 3.90 and 8.15, respectively. The mean DMFT and SiC for DMFT were found 0.57 and 1.75. No representative data on the status of the population's oral health existed in Turkey before 1988, when the first national study was conducted.[6] In 1988, at ages 5-6, dmft and DMFT index are 15 and 4.4, respectively. DMFT of 12-year-olds is 2.7. According to a recent national survey conducted between the years 2004 and 2005, more than two-thirds of 5- and 12-year-old children have at least one carious tooth. The mean dmft is lower in girls whereas no definite difference between the genders is observed for DMFT.[1] Comparing the dmft with the previous survey conducted between 2004 and 2005, a slight increase was observed (3.90 vs. 3.70) in the present survey. There was no significant difference between the

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genders. Younger children had higher dmft index values. Ineffective and improper tooth brushing could be the reason of this result. Children who are younger than 7 years of age should be supervised by parent(s) while they are brushing their teeth. Another reason for higher dmft values could be the frequent and high sugar and syrup consumption. However, coffee, chocolate and tea consumption did cause increased DT. Coffee and tea probably consumed with sugar added into those drinks. Therefore, increase of DT was probably caused by the halo effect of table sugars.

Caries prevalence was 83% in 5-6-year-old group which was still higher when it was considered about the global goal of the WHO for the year 2020: 50 per cent of 5-6-year-olds will be caries free.[7] Not surprisingly, the mean dmft of 5-6-year-olds (4.67) is higher compared to most developed European countries. Austria and Italy reported a lower dmft of 2.7, and 1.8 among 5-6-year-old children in 2006, and 2005/06 respectively.[8,9] In 2001, Hungary reported as equal a dmft level as the level of this current study for their 6-year-olds.[10] However, the index is close to the average dmft for both Istanbul (3.74) and Turkey (3.70).[2,11] The higher dmft values in the 5-6-year-olds could be attributed to the lower levels of maternal schooling, irregular tooth brushing, and higher consumption of table sugars and syrups (alone or added into hot rinks) in this group. In a confirmative Turkish study conducted in the year 1997, 500 children preschool and school children enrolled and it is concluded that the prevalence of caries increases by frequent and high sugar consumption. There is an inverse relationship between caries prevalence and levels of maternal schooling. The percentage of children, who never or irregularly brushed their teeth, is highest in the caries active group.[12] A lower rate of SiC value (5.94) was determined for 5-6-year-olds compared to the level of 5-6-year-olds who live in Istanbul. In addition to that no skewed distribution was present in this age group (dmft vs. SiC; 4.67 vs. 5.94).

In the study, we could express caries prevalence as the mean dmft, DMFT, and SiC indexes of 7-12 year-olds. Despite the caries prevalence (69%) was high in this mixed group, their mean dmft (3.6) and SiC index for dmft (5.5) were similar compared to some European countries such as Germany and Hungry.

Additionally, SiC index for dmft in this group of children was lower compared to Germany (6.9) in 2001.[10] DMFT (0.7) and SiC (0.9) for DMFT was significantly lower compared to Greek 11-year-olds (DMFT = 1.8, SiC = 4.23).[13] However, our findings of 7-12-year-old Turkish children were similar for DMFT (0.7 vs. 0.6) whereas lower for SiC (0.9 vs.1.9) of Spanish 11-12-year-olds in 2007.[14] The present study results indicated a decline of DMFT in this group of 7-12-year-olds. The DMFT index may have reduced as a result of better oral hygiene. Conversely, it may have been underestimated in the field due to the use of natural sunlight for examination[15] and that questionable cases were recorded as negative for caries. However, children who had higher consumption of sugary desert, snacks, cracker and nut had higher dt. Coffee, chocolate and tea consumption caused increased DT.

In the present study, we could not create a separate age group of 12-year-olds since the total number of them was too small (n = 9) to perform statistical analysis. Therefore, we could not discuss the current DMFT of this group of 12-year-olds. To the best of our knowledge, no study is available about the association between the two indicators, DMFT and SiC for DMFT in 12-year-old Turkish children. Therefore this study can call up in designing future prospective studies.

There was a significant correlation between consumption of sugar and sugary foods and drinks and high numbers of carious teeth in both dentitions. Snacking between meals was a common practice among the children; that more than 70% had two or more snacks per day reflects the high accessibility and availability of these cariogenic products at school and home. Traditional dietary habits and practices have been continuing but foods and drinks typical of westernized diets are now cheap and readily available. This is usual for the country. According to the oral health profile of Turkish children between 2004 and 2005,[11] 89.3% of 5-year-old children have the habit of snacking between meals. It was also found out that 75-80% of all children passed one meal a day, and the lunch was the most often passed meal. Consuming sugary foods and drinks between meals had first place on the food list. A recent study reported a direct relationship between dental caries severity (dmft = 4.5) and cariogenic diet consumption in preschool

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children.[16] An ecological study of data from 27 European countries, Israel, Canada and USA indicated that low rates of regular tooth brushing and high rates of sweets consumption were related with higher DMFT among 11-13-year-olds.[17]

Limitations

It is appropriate to examine the weakness and the strengths of the study. A primary sampling unit design was employed; therefore it was not possible to infer a direct cause-and-effect association between diet history and concurrent dental status in this study. Conducting a longitudinal study would have provided stronger evidence on the temporal relationship between dietary factors and dental caries. In addition, the data used to investigate the influence of foods and drinks in this study collected via parent-completed questionnaires, with parents being asked to recall the amount and frequency of food and drink. This may have introduced some inaccuracies in reporting, because the data relied upon the parent recalling a child's intake retrospectively, rather than prospectively completing a dietary diary. However, the participation rate is satisfactory by modern standards.[18]

Key points

• The severity of dental caries was high in this group of elementary school children especially in the 5-6-year-olds,

• The study highlighted the negative impact of mother's lower level of education, irregular toothbrushing, and cariogenic dietary practices as risk indicators to the poor dental health status,

• This data may be of importance in the evaluation of the past and planning of future caries prevention and treatment programs targeting the high caries risk group of elementary school children.

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