Araştırma / Original Paper

Dietary Habits and Oral Health of Children in Deciduous, Early and Late Mixed Dentition

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ÖZET

Süt, erken ve geç karışık dişlenme dönemindeki çocuklarda beslenme alışkanlığı ve ağız sağlığı

Amaç: Genel sağlığın ayrılmaz bir parçası olan ağız ve diş sağlığını etkileyen en önemli iki hastalık diş çürüğü ve periodontal hastalıklardır. Bu çalışmanın amacı süt, erken ve geç karışık dişlenme dönemindeki çocuklarda beslenme, çürük oranı ve periodontal durumu değerlendirmektir.

Yöntemler: Marmara Üniversitesi Diş Hekimliği Fakültesi Pedodonti Anabilim Dalı'na başvuran 4-12 yaşları arasındaki 129 çocuğun (73 kız, 56 erkek, yaş ortalaması 7.9±2.4) dental ve periodontal durumları incelendi. Klinikte ağız içi muayeneleri tek gözlemci tarafından, reflektör ışığı altında gerçekleştirilen çocuklarda df-t, DMF-T, plak indeks ve gingival indeks ölçüldü ve beden kitle indeksi hesaplandı. Çocukların demografik bilgileri ile beslenme ve fırçalama alışkanlıklarına yönelik 23 sorudan oluşan bir anket uygulandı.

Bulgular: Çocukların %61'inin gün içinde 2-4 ara öğün aldığı, %60'ının günde 1 kez şekerli içecek tükettiği, %60'ının ara öğünlerde karyojenik gıdalarla beslendiği ve sadece %6'sının günde 3 kez dişlerini fırçaladığı saptandı. df-t, DMF-Tdeğerleri 4-6 yaş grubunda sırasıyla 8.10±2.62 ve 0.65±1.22; 7-9 yaş grubunda 7.90±2.41 ve 1.30±1.21; 10-12 yaş grubunda ise 3.80±1.60 ve 2.15±0.90 bulundu ve gruplar arasındaki fark anlamlıydı ($p<0.001$). Plak ve gingival indeks değerleri farklılık göstermedi. Tüm gruplarda beden kitle indeksinin normal sınırlar içerisinde olduğu saptandı. PI ile df-t, DMF-T seviyeleri arasında anlamlı bir pozitif ilişki bulundu ($p<0.01$).

Sonuç: Çocukların fırçalama sıklığının ve etkinliğinin yetersiz olduğu, ara öğünlerde tüketilen gıdaların hem diş hem de dişeti sağlığı için risk oluşturduğu gözlendi. Bu nedenle düzenli beslenme ve etkili ağız hijyeni uygulaması için eğitim verilmesinin gerektiği görüşüne varıldı.

Anahtar sözcükler: Beslenme, dişlenme dönemleri, DMF-T indeks, gingival indeks, plak indeksi

ABSTRACT

Dietary habits and oral health of children in deciduous, early and late mixed dentition

Objective: Dental caries and periodontal diseases have negative effects on both oral and general health. The aim of this study was to evaluate dietary habits, caries ratio and periodontal status of children in deciduous, early and late mixed dentition.

Methods: Dental and periodontal status of 129 children (73 girls, 56 boys, mean age 7.9±2.4) were examined and evaluated. Caries ratio including decayed, missing, filled teeth of the primary (df-t) and permanent dentition (DMF-T), plaque index (PI) and gingival index (GI) were determined. Demographic data, nutrition and brushing habits were collected via a questionnaire. In addition, body mass index (BMI) was calculated.

Results: The ratio of children having twice-four times a day snacks in-between-meals was found to be 61%. While 60% of children consumed sugar sweetened beverages once a day and 60% of children had a cariogenic nutrition pattern, only 6% of children brushed their teeth 3 times per day. In age groups of 4-6, 7-9 and 10-12, mean numbers of df-t were 8.10±2.62, 7.90±2.41, 3.80±1.60, and DMF-T were 0.65±1.22, 1.30±1.21, 2.15±0.90, respectively. The number of teeth with caries were significantly different among the age groups ($p<0.001$). No significant difference in PI and GI were found between the groups. BMI values were within normal limits. Significant positive correlation was found between the PI and df-t, DMF-T levels ($p<0.01$).

Conclusions: Ineffective and inadequate brushing, and consumption of cariogenic snacks may jeopardise dental and periodontal health in children at every stage of age. Health education should include the importance of proper nutrition and regular oral hygiene habits.

Key words: Dentition, DMF-T index, gingival index, nutrition, plaque index

INTRODUCTION

Diseases of the oral cavity have been viewed separately from those of the rest of the body throughout the time. However, in recent years, efforts have been made to recognize oral health as an integral part of general health. Dental caries and periodontal diseases are still the most common oral diseases affecting the population worldwide.

Dental caries is a multifactorial, chronic infectious disease characterized by demineralization of tooth tissues at lowered pH following bacterial fermentation of dietary carbohydrates. While dental caries has decreased in many industrialised countries, the contrary is still the case in many lowincome countries. When dental caries is left untreated, it may lead to pain, and impair the quality of life, nutritional status and development of young children (1-3).

Microbial dental plaque is the primary aetiologic factor in the development of periodontal disease and dental caries. Small amounts of microbial dental plaque are compatible with gingival and periodontal health. It has also been shown that oral hygiene control reduces the incidence of gingivitis and is essential to dental and periodontal health throughout life (3).

Toothbrushing and other mechanical cleaning procedures are considered as the most reliable oral hygiene methods for effective plaque removal, which is essential for prevention of periodontal diseases. A number of factors may affect an individual's oral hygiene practices such as age, gender, education, level of awareness and socio-economic status. It is known that mothers' behaviors are correlated with children's oral health, and toothbrushing habits of the mother are directly associated with those of her children's dietary habits. Further, dietary habits of children also vary according to their mothers' educational level (4).

The relationship between oral health and chronic disease supports the need for collaboration between dentistry and dietetics. Nutrition-related chronic diseases, such as diabetes, heart disease and obesity are among the top 10 leading causes of death. Furthermore, childhood obesity is a growing concern for health practitioners. Overweight and obesity is one example of a current health problem where dentists could assist with health promotion playing a valuable role in screening both the pediatric and adult population for overweight and obesity (5).

The aim of this study was to assess dietary habits and, dental and periodontal status of Turkish children in deciduous, early and late mixed dentition who were referred to our clinic for their dental treatment.

MATERIALS AND METHODS

A total of 129 children (73 girls, 56 boys, mean age 7.9±2.4) attending the clinic of Paediatric Dentistry, Faculty of Dentistry, Marmara University, were examined by one observer (BND) according to World Health Organization (WHO) guidelines (6). These children were categorized into 3 groups as primary, early mixed and late mixed dentition. Socio-economic status, demographic data, nutrition and brushing habits were collected via a questionnaire. Socio-economic and demographic data included education levels and occupations of parents as well as age, sex and type of school (private or state) attended by children. The questionnaire also involved questions about nutrition patterns, such as sugar consumption in drinks and solid nutrients. Brushing habits were described by the number of brushing sessions in a day or week. In addition, initial date of brushing was interrogated. Intra-oral examinations were carried out under dental light reflector. Caries ratio including decayed, missing, filled teeth of primary (df-t) and permanent teeth (DMF-T) (6), plaque index (PI) (7) and gingival index (GI) (8) were determined. Body mass index (BMI) (9) was also calculated.

This study was approved by the Ethical Committee of Marmara University. Written consent was obtained from parents of children. Since the data were not normally distributed, Kruskal Wallis test was used to compare continuous data among three groups and Mann-Whitney U test was used to compare continuous data between two groups. Spearman's method was used to analyze the correlations. $p<0.05$ was used as the level for statistical significance.

RESULTS

Considering the demographic data, 17% of children participating in the study were preschool aged and 83% were school aged. It was determined that 96.9% of school aged children were attending to the state schools, whereas only 3.1% to the private schools. When the education levels of the parents were questioned, it was observed that 57% of fathers were educated on primary school level, 28% were highschool graduates, 15% were university graduates (Fig. 1a) and 68% of mothers were educated on primary school level, 25% were highschool graduates and 7% were university graduates (Fig. 1b).

In order to define the dietary habits, the frequency of snack consumption, the foods consumed between meals, and also the frequency of sugar sweetened beverages were

asked in the questionnaire. The frequency of snack consumption of 13% of children was once a day, for 61% of them it was twice-four times a day and for the rest (26%) it was more than four times a day (Fig. 2). When the consumption frequency of sugar sweetened beverages was considered, it was determined that 20% of children did not consume any sugar sweetened drinks during day, 60% consumed once a day, 13% twice a day, 5% three times a day and finally 2% four times a day (Fig 3). With respect to the brushing habits, 21% of children brushed their teeth once-three times a week, 36% once a day, 37% twice a day and only 6% three times a day (Fig 4).

As shown in Table 1, the df-t, DMF-T levels were at the highest in the 7-9 aged group and at the lowest in the 10-12 aged group. The df-t, DMF-T levels showed statistically significant differences between the 4-6 and 10-12 aged groups, and between the 7-9 and 10-12 aged groups ($p<0.001$). The PI and GI values were similar in all groups ($p>0.05$). The BMI values for all groups were identified to be within normal range

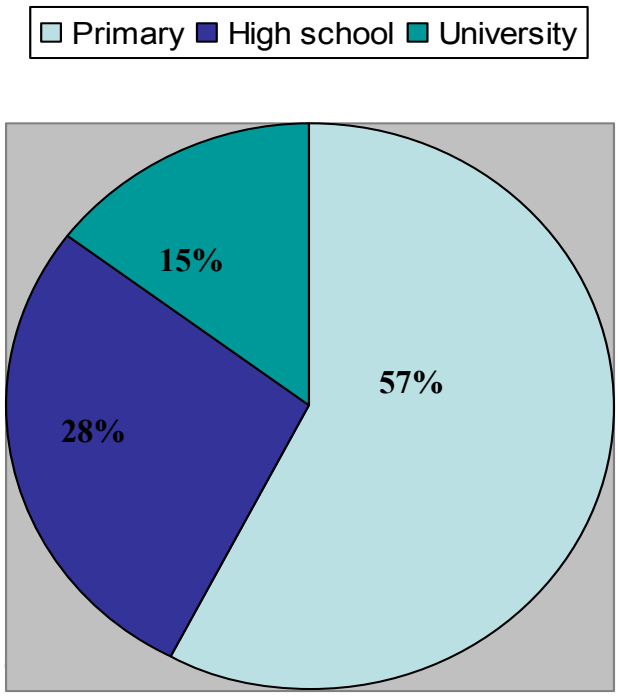

Figure 1a: Education level of fathers.

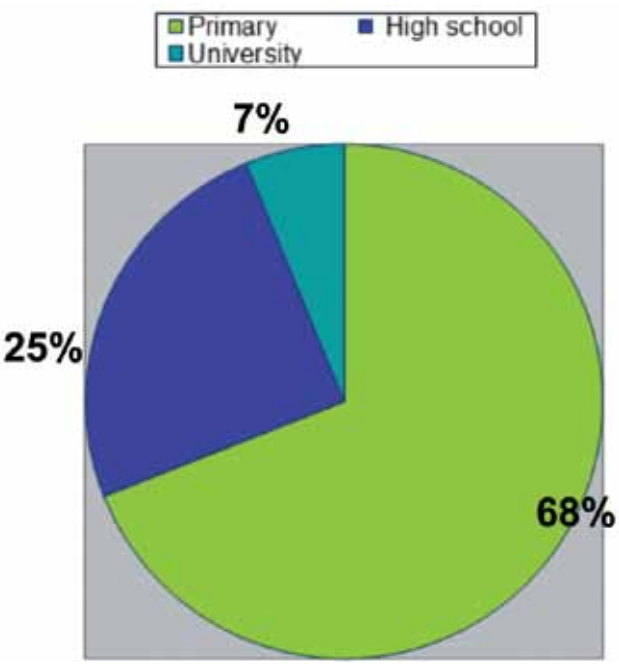

Figure 1b: Education level of mothers.

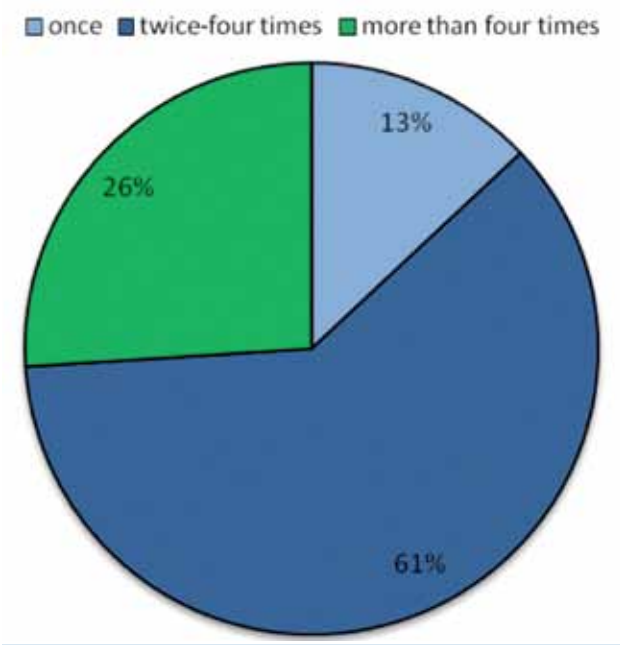

Figure 2: Frequency of snacks consumed by children.

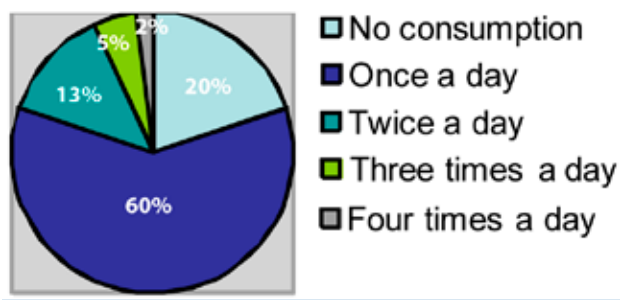

Figure 3: Consumption of sweetened beverages.

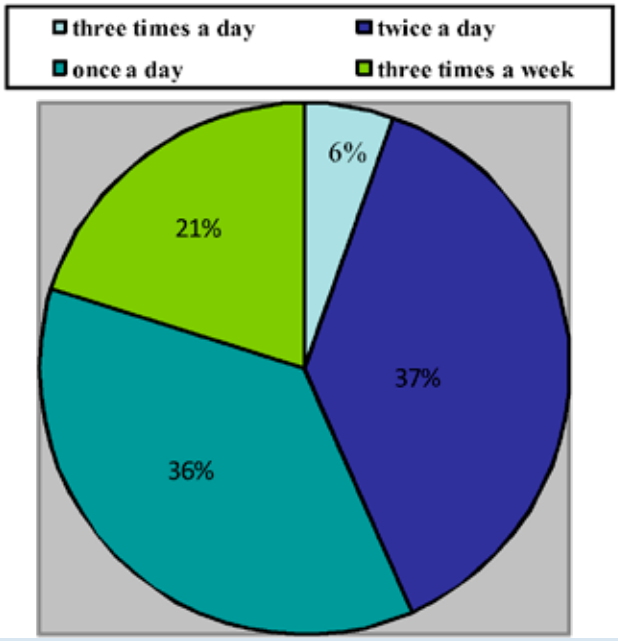

Figure 4: Brushing frequency of children.

resulting in statistically significant difference amoung groups, as expected (p<0.001) (Table1). When the data were grouped according to brushing habits, consumption of sugar sweetened beverages and education levels of parents, no significant differences were detected between the groups (p>0.05). However, significant positive correlation was found between the PI and df-t, DMF-T levels (p<0.01).

study aimed to assess dental and periodontal status of children in the period of primary, early, and late mix dentition. The association between dental caries and dietary risk factors has been examined for several decades (11). The increase of caries is caused by a variety of factors such as age, gender, education, level of awareness and socio-economic status (3).

According to the results of this study, caries was mostly seen in the period of early mix dentition, which is between ages 7-9 years. In the period of late mix dentition (between ages 10-12 years), frequency of caries decreased. Chankanka et al. (11) have stated that the highest percentage of caries has been seen in the period of mix dentition. For instance, the mean df-t of preschool children in Kosovo was found to be 5.9, and the mean DMF-T of school children aged 12 was 5.8 (12). The index values in preschool children were very high with maximum values seen in 4-6-year olds (mean df-t:8.1) in our study, but DMF-T value of 12 year-old children in Kosovo (12) was higher than those in our country at the similar age group.

Chankanka et al (11) determined strong relation between tooth decay and low socio-economic status, frequency of sugar sweetened beverages and poor brushing. Out of 129 children who participated in our study, 60% consumed sugar sweetened beverages once a day and only 20% presented no consumption. Even though

Table 1: Clinical findings and intergroup comparisons

	4-6 aged group (Primary Dentition) Mean±SD	7-9 aged group (Early Mixed Dentition) Mean±SD	10-12 aged group (Late Mixed Dentition) Mean±SD	P*	4-6/7-9 aged groups	P+ 7-9/10-12 aged groups	4-6/10-12 aged groups
dft-DMFT	8.75±2.64	9.20±3.48	5.95±2.12	**<0.001**	0.624	**<0.001**	**<0.001**
PI	1.05±0.52	1.14±0.50	1.18±0.69	0.889	-	-	-
GI	0.10±0.16	0.16±0.21	0.16±0.21	0.216	-	-	-
BMI	15.72±1.46	17.18±2.66	17.93±2.76	**<0.001**	**0.012**	0.084	**<0.001**

P*: Kruskal Wallis test, multiple comparison, P+: Mann-Whitney U test, comparison of two groups.

DISCUSSION

WHO Global Oral Health Programme has worked hardover the past five years to increase the awareness of oral health worldwide as an important component of general health and quality of life. Oral health problems are a significant segment of the child health (10).The present

toothbrushing is the most reliable method for effective plaque removal, regular toothbrushing was unfortunately rare among children (1). The toothbrushing habit of the mother has been associated directly with that of her child. Vadiakas et al. (13) have notified poor brushing in their study group aged between 12-15 years. Kolowole et al. (3) reported that toothbrushing habit once daily was the most

common practice in their research group (52%), whereas only 37% of children in our study group brushed their teeth once a day.

Children's dietary habits vary according to the mothers' educational levels (4). Mothers' education and behaviors are correlated to children's oral health more than fathers'. With respect to the education level of parents in our study, it was found that only 7% of mothers and 15% of fathers were university graduates. Huew et al. (14) reported a statistically significant negative association between dental caries and the level of father's education. Van den Branden et al. (15) have stated that more educated the mothers get, less DMF-T rates will be observed. Mothers heavily influence their children's dietary habits and food choices. The ratio of children having 2 snacks in-between-meals was found to be 61% and having 4 or more snacks per day was 25% in our study. In recent years, snacking has gained an increasing role as a risk indicator for caries development in children (2).

Johansson et al. (2) have confirmed that sugar sweetened beverages and cariogenic snacks are related to the high rate of caries. Villalobos Rodelo et al. (16) have pointed out that the children whose parents have low socio-economic status do not have adequate oral hygiene; thus there is a direct relation between these two parameters.

According to our results, the numbers of decayed, missing and filled teeth at the 4-6 and 7-9 year age groups were higher than the 10-12 year aged group. The main reason for this finding may be the change over from decidious dentition to permanent dentition. Since new erupted permanent teeth took place in the oral cavity within 10-12 years, df-t/DMF-T in this age group was found to be the lowest among the groups. In addition, untreated teeth in decidious dentition can cause early caries in new erupted teeth. Other reasons may be poor brushing, the frequency of snacks consumed and cariogenic food. Similar to the results of Van den Branden et al. (15), we point out that the priority should be to give an effective training on oral hygiene not only to children but also to parents in order to control this period. Furthermore, ideal brushing methods in ideal timing should also be practised to children under mothers' observation. Besides, providing diet training is a must and arranging the meal frequency and reducing snacks, specifically the ones enriched with carbohydrates, are compulsory. Arranging diet programs will help to improve and maintain gingival health. Moreover, it will prevent microbial dental plaque accumulation thereby decreasing the risk of caries.

The prevalence of obesity in children has increased worldwide; especially among those with a low socio-economic background. Given the causative relation between refined carbohydrates and dental caries, it is appropriate to hypothesize that overweight might also be a marker for dental caries in children and teenagers. However, the results of the study of Mojarad and Maybodi (17) did not support any association between dental caries and obesity. Children participated to our study had high df-t, DMF-T percentages, however their BMI rates have been observed to be within quite normal limits in all goups. The study of Kantowitz et al. (18) on the relation between obesity and caries risk has showed that a more controlled examination is required to clearify the relation between BMI and DMF-T. Jürgensen and Petersen (1) have reached the conclusion that there is no connection between BMI rates and oral health. Similarly, Frisbee et al. (19) could not confirm a reasonable relation between obesity and oral health, either. These referred results are in line with the conclusions reached in our study.

Periodontal disease is also the most common oral disease affecting children. The periodontal status of children was determined by using PI and GI in this present study. While PI assesses the presence and amount of visible plaque accumulating on the supragingival area (7), GI quantifies the extent and severity of gingival inflammation based on the assessment of gingival color, contour and bleeding (8). Both plaque and gingival indices did not show statistically significant differences among our groups. Kolawole et al. (3) have compared the PI and GI rates among school age children considering their sex and found a reasonable difference.

For the year 2020, the goal of WHO regarding dental caries is to increase the proportion of caries-free 6 year-olds and to reduce the DMFT particularly in D component at age 12 (20). In addition, WHO aims to reduce the number of teeth loss due to periodontal diseases at age 18. In line with the goals of WHO, the role of pedodontist becomes increasingly crucial for the diagnosis and treatment of both dental caries and periodontal diseases at early stages. Notwithstanding that, dental caries ratio in this present study was found to be higher than what has been prospected by WHO for year 2020.

It can be concluded that introducing toothbrushing at an early age and brushing frequency of at least once a day need to be encouraged among children while the consumption of sugar containing drinks and snacks between meals needs to be restricted.

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