

Evaluation of Risk Factors in Caries Formation in Children

SUMMARY

Background/Aim: The aim of this study was to evaluate the risk factors in caries formation and relationships between each other in children. **Material and Methods:** A total of 84 children aged between 5-15 years were included in the study. The children were randomly selected among the patients who came to the clinic. Oral disorders and oral hygiene were evaluated with the oral examination. Examination of the children was carried out by two calibrated pediatric dentists. Plaque index, dmft index (decay-missed-filled primary tooth) and DMF-T index (decay-missed-filled permanent tooth) scores were evaluated by clinical examination. Plaque index was evaluated using Sillness & Loe plaque index. In addition, a questionnaire was performed about children's age, tooth brushing habits, sweet consumption, dentist visit and dental treatment experience. Statistical analysis was conducted with Mann Whitney-U test, Chi-Square test, Independent t-test and Correlation test. **Results:** When the survey data is examined, there was no significant difference between boy and girl patients regarding dmft, DMFT, frequency of tooth brushing, sweet consumption and plaque index scores ($p > 0,05$). There was no relationship between frequency of sweet consumption and DMF-T, dmft and plaque index scores ($p > 0,05$). No significant relationship was found between the frequency of tooth brushing and DMF-T and dmft scores ($p > 0,05$). The examinations were revealed that there were no children with regular tooth brushing habits and the plaque index scores of children with irregular tooth brushing habit was lower than the children with no brushing habits ($p < 0,05$). In addition, a positive correlation was also observed between age and plaque index and DMFT scores. However, a negative correlation was observed between age and dmft scores. **Conclusions:** It is observed that there was a significant relationship between tooth brushing habits and plaque index values of children.

Key words: Plaque Score, Caries Indices, Children, Tooth Brushing

Berna Kuter¹, Alp Abidin Atesci², İlhan Uzel²

¹ Department of Paediatric Dentistry, Faculty of Dentistry, Izmir Democracy University, Izmir, Turkey

² Department of Pediatric Dentistry, Faculty of Dentistry, Ege University, Izmir, Turkey

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Introduction

Dental caries is one of the most common infectious disease in the world and could lead to several problems such as inflammation of the gums, pain, abscess formation, tooth loss and eventually loss of the space in the dental arch^{1, 2}. It was stated that 9 % of children worldwide have active dental caries by the World Health Organization (WHO)³. It is important to determine the

risk factors for children's dental caries, in order to develop preventive strategies to reduce this number.

There are several factors playing role in the progression of caries and dental plaque is one of them. Dental caries can not progress without a bacterial plaque. However bacterial plaque alone is not sufficient for caries progression in enamel and dentin⁴. Several etiological factors have been associated with dental caries as quantity of bacterial components, frequency of sugar

consumption, overall health status, tooth brushing habits and components of saliva⁵⁻⁹.

It is important to evaluate the etiological factors of dental caries to take preventive measures. The dmft index is one of the main and most commonly used indices in pediatric dentistry which aims to show the overall status of the dentition by calculating the total of decayed, missed and filled teeth¹⁰.

The aim of this study is to evaluate and determine the risk factors for dental caries formation and relationships between each other in children.

Material and Methods

The present study included 84 children aged between 5-15 years with no physical, psychological and systematic disorder who came to pediatric dentistry clinic. The children participated in the study was randomly selected. All procedures were approved by the local Ethics Committee on Human Research.

Examination of the children was carried out by two calibrated pediatric dentists. Children's dmft and DMFT were evaluated and recorded according to WHO criteria. Sillness & Loe plaque index was used to record the gingival inflammation on the facial, lingual, distal and mesial surfaces. Factors included in the questionnaire were: age, tooth brushing habits (none, irregular; 1 time a day, regular; 2-3 times a day), sugar consumption (1-2 times a day, 3 times a day, 3 > times a day), dentist visit and dental treatment experience, education level of parents (elementary school graduate, high school graduate, university graduate) and socioeconomic status (low income, regular income, high income).

Statistical Analysis

The collected data were calculated with SPSS for Windows using Mann Whitney-U test, chi square test, independent t test and correlation test and statistical significance was defined as $P < 0.05$.

Results

Frequency of distribution of the childrens according to gender and mean age was shown in Table 1. Demographics of the parents including socioeconomic status and education level was shown in Table 2. There were no significant differences ($P=0,57$) between the mean DMFT, dmft and plaque index scores of girls and boys patients (Table 3). A negative correlation was observed between children's tooth brushing habits and plaque index. However there were no significant relationship between sugar consumption and dmft ($P=0,17$), DMFT ($P=0,62$) and plaque index ($P=0,41$) (Table 4).

Table 1. Frequency distribution of the participants according to gender and mean age

	n (%)	Mean age	Dental visit experience (%)	Dental treatment experience (%)
Female	42 (%50)	12,33	73,8	35,7
Male	42 (%50)	10,77	59,1	27,3

Table 2. Frequency distribution of socioeconomic status and education level of parents

	Parents (%)
Socioeconomic status	Low income % 37,1
	Regular income % 53,5
	High income % 9,4
Education level of parents	Elementary school graduate % 68,5
	High school graduate % 16,3
	University graduate % 15,2

Table 3. DMFT, dmft and plaque index scores according to gender

	Male	Female	P Value
DMFT	1,64 ± 0,44	1,65 ± 0,42	0,57
dmft	2,79 ± 0,61	2,71 ± 0,65	0,71
Plaque index	1,29 ± 0,17	1,25 ± 0,11	0,49

Table 4. Frequency distribution of tooth brushing habits and sugar consumption according to gender and associations with DMFT, dmft and plaque index scores

	Male (%)	Female (%)	DMFT (P Value)	dmft (P Value)	Plaque index (P Value)
Tooth brushing	None % 18,2	% 19	0,597	0,35	0,01
	Irregular (1 time a day) % 81,8	% 81			
	Regular (2-3 times a day) % 0	% 0			
Sugar consumption	1-2 times a day %68,2	%64,3	0,62	0,17	0,41
	3 times a day %31,8	% 28,6			
	3 > times a day %0	%7,1			

Moreover, there was no significant relation between frequency of tooth brushing and dmft ($P=0,35$) and DMFT ($P=0,59$) scores. The examinations were revealed that there were no children with regular tooth brushing habits and the plaque index scores of children with irregular tooth brushing habit was lower than the children with no brushing habits. A positive correlation was observed between plaque index and DMFT scores ($P=0,022$). In addition, a positive correlation was also observed between age and plaque index and DMFT ($P=0,002$) scores. However, a negative correlation was observed between age and dmft scores.

Discussion

Dental caries remains one of the most common health problems in worldwide. It stays as the primary reason for dental pain and tooth loss¹². The present study investigated the risk factors for dental caries formation and its association with gender, age, tooth brushing habits and sugar consumption.

In the present study more than two thirds of the children had dental caries which is in accordance with the previous studies^{1,13,14}. These results revealed that none of the children had a regular tooth brushing habits and children with no brushing habits represents 18,6% of all participants. However, there were no significant relationship between tooth brushing and dmft and DMFT scores, children with regular tooth brushing habits had lower dmft and DMFT scores compared to children with irregular tooth brushing habits. Several studies in the literature reported a significant relationship between the frequency of children's tooth brushing and their dental caries status and the results of these studies are not in accordance with our results^{1,15}. This could be explained by the sample size of our study as the increased number of participants may reflect the overall situation more precisely.

Epidemiologic studies on caries reported that an increase in caries prevalence with age. Our results showed a positive correlation with age and DMFT scores. On the contrary a negative correlation was observed with age and dmft scores. Several studies reported that the newly erupted and immature teeth are more susceptible to caries^{16,17}. Results of the mentioned studies are in accordance with this study as the eruption of permanent teeth and the loss of primary teeth might explain higher DMFT and lower dmft scores.

In literature, dental caries prevalence for gender is a controversial topic. In children several studies reported that girls have higher risk for caries^{18,19}, while others have found no difference²⁰, and yet others found boys to have a higher risk²¹. It is likely that the gender-based dietary play a role in the gender related caries risk²¹. In our study

there was no significant difference between boys and girls in terms of dmft and DMFT as reported in the literature²⁰.

Diet and sugar consumption play an important role in dental caries. Previous study reported that a positive correlation between sugar consumption and DMFT. Sucrose is considered as the most cariogenic sugar which enables bacterial adhesion to teeth, blocks diffusion and buffers in the plaque. In the present study there was no significant relation found between sugar consumption and caries prevalence. This might be explained by the other factors included such as other aspects of diet, exposure to fluoride and genetic effects^{22,23}. Foods such as milk and milk products which contains calcium, have a protective effect against caries formation^{24,25}.

Dental plaque is considered as the major factor and plays a key role in caries formation⁴. Results of the present study showed that there is a positive correlation between dental plaque and DMFT scores and a negative correlation between tooth brushing habits. These observations were in accordance with the previous studies reported in the literature²⁶⁻²⁹.

Conclusions

As a conclusion, despite the limitations of this study, tooth brushing habits appears to be the most effective factor for preventing caries formation. The results presented here could help dentist and caregivers to establish strategic actions especially in oral health education and dietary guidance in order to achieve better oral health in children.

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- Correspondence:
 Berna Kuter
 Department of Paediatric Dentistry
 Faculty of Dentistry
 Izmir Democracy University, Izmir, Turkey
 e-mail: berna.kuter@idu.edu.tr