Dental Caries Experience in Croatian Schoolchildren in Primorsko-Goranska County: A Pilot Study

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DENTAL CARIES EXPERIENCE IN CROATIAN SCHOOL CHILDREN IN PRIMORSKO-GORANSKA COUNTY

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SUMMARY

Background: Dental caries as an infectious disease is still a major oral public health issue. As documented in some recent studies, it has been recognized as the most common chronic childhood disease.

Aim: The aim of this study was to evaluate caries prevalence, DMFT and dmft scores, as opposed to caries free children at the age of 6 years from a well developed western region of Primorsko-Goranska county. The purpose was also to evaluate a Significant Caries Index (SiC) and a Restoration Index (RI) in the same study sample of 6 year olds.

Methods: Data for a sample of 1,825 (868 girls and 957 boys) children was collected and analyzed by using Chi-square and Mann-Whitney U Tests.

Results: Results showed that the mean dmft was 4.68±4.19, and the mean DMFT was 0.22±0.69. D/d component constituted a major part of caries score (DMFT/dmft) in both primary and permanent dentitions in the population of 6 years old children. Caries prevalence was 74.5 in primary dentition and 11.9 in permanent dentition. Significant Caries Index value (SiC) was 0.66 for permanent and 9.6 for primary teeth, respectively. The Restoration Index (RI) was 20.1 for primary and 39.5 for permanent dentition.

Conclusion: The results obtained in this study revealed that dental caries still appears to be quite a significant problem among 6 year olds. However, collected data, particularly considering the SiC Index, can be used for further planning of preventive and restorative dental treatments as well as setting up future goals for the prevention of dental caries in Croatian school children of Primorsko-Goranska county.

Key words: dental caries, epidemiology, dmft, DMFT, Significant Caries Index, Restoration Index

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INTRODUCTION

Dental caries as an infectious disease is still a major oral public health issue (1). It results from differences between normal interactions of the teeth surface, microbial biofilm, oral hygiene and dietary habits, and still equally affects individuals of all ages (2, 3).

According to some recent studies which were conducted among American children, it has been recognized as the most common chronic childhood disease (4). However, epidemiological data representing oral health status, particularly referring to dental caries among Croatian school children are still insufficient and incomplete.

Therefore, the aim of this study was to evaluate caries prevalence, DMFT and dmft scores, as opposed to caries free children in the sample of 6 years old children from a well developed western region of Primorsko-Goranska county. The purpose was also to evaluate the Significant Caries Index (SiC) and the Restoration Index (RI) in the same study sample of 6 years old school children.

MATERIALS AND METHODS

Participants were randomly selected from a population sample of 6 years old school children and the study group was comprised of 1,825 (868 girls and 957 boys). Participants were examined over one year period from September 2008 through September 2009. Clinical examination of each participant was performed in a dental office of the University Clinic and Community Dental Clinic, and was a part of an obligatory check-up which was a prerequisite for enrolling a child in primary school. All parents/caregivers signed the informed consent when children came in the University Clinic for the first visit. The dental examinations were carried out by four dental teams, each of them consisted of a dentist and a dental nurse. Prior to commencing the study, in order to set up the unique criteria and enable examiners to conduct the study, each of the examiners was trained at the University Clinic by a principal investigator. Each participant received an oral examination sitting in a dental chair. Oral examinations were performed in the artificial light by using a plane mirror and a dental probe. Inclusion criteria for dental caries were diagnosed clinically

and detected as visually apparent cavitations, discolorations of the enamel and/or visually diagnosed recurrent caries lesions. No radiographs were taken at that stage.

Clinically acquired data was stored for each patient separately. Data included information on gender, total number of teeth as well as total number of decayed, missing and filled teeth in both primary and permanent dentitions. DMFT/dmft scores were evaluated according to the WHO criteria (5).

The following criteria also included D/d component for untreated caries, M/m for teeth which were missing due to caries, and F/f for fillings that were present at the time of examination.

Caries severity was determined by DMFT score for permanent teeth and dmft score for primary teeth.

Based on the acquired data, caries prevalence, the Significant Caries Index (SiC) and the Restoration Index (RI) were further calculated.

The Significant Caries Index (SiC Index) was used to determine individuals with the highest caries scores in the examined population. One third of the population with the highest caries scores was selected and the mean DMFT score was calculated. Finally, the obtained value constituted the SiC Index (6, 7).

The Restoration Index (RI) was used to determine the percentage of teeth with fillings calculated by DMFT/dmft score (1).

The study was approved by the Ethical Committee of the Faculty of Medicine, University of Rijeka, Croatia.

Statistical analysis was accomplished by using non-parametric Mann-Whitney U Test. Descriptive statistic was performed by calculating median and interquartile range. Chi-square test was used to compare proportions. A standard statistical package STATISTICA 8.0 (StatSoft, Tulsa OK, USA) was used for performing the data analysis.

RESULTS

With respect to gender, a statistically significant difference ($p<0.05$) was found for d component, df index, total number of primary teeth, number of healthy permanent teeth and total number of permanent teeth.

A significant difference was found between boys and girls in the number of primary teeth (median 17 and 16; $p=0.001$), d component (median 3 and 2; $p=0.029$), and df index (both median 4, interquartile range 1–8 and 0–7; $p=0.035$) (Table 1 and Fig. 1).

A significant statistical difference with respect to gender was proved in favour of girls for the total number of permanent teeth (median 6 and 5; $p<0.001$). Girls were also represented with healthier permanent teeth in comparison with boys (median 6 and 5; $p<0.001$).

A significant gender difference with respect to the total number of primary teeth was proved statistically significant, as opposed to the difference shown for d and df components ($p=0.001$).

The Significant Caries Index value (SiC) was 0.66 for permanent and 9.6 for primary teeth, respectively.

Caries prevalence in primary teeth was proved to be high: three quarters of 6 years old children having 4 primary teeth affected on average, as oposed to only 12% of 6 year olds with the same experience on permanent teeth (Table 1 and Table 2).

The Restoration Index was found low for primary dentition and slightly higher for permanent dentition (20.1 primary, and 39.5 permanent) (Table 2).

With respect to gender, Chi-square test showed no statistically significant difference regarding caries prevalence or the Restoration Index (Table 2).

D/d component constituted a major part of caries score (DMFT/dmft) in both primary and permanent dentitions in this sample of 6 years old children.

DISCUSSION

There has been no relevant research conducted recently in Croatia that would have provided thorough and detailed information on the frequency of dental caries. However, some studies have been accomplished on the local level, but resulted in obtaining rather inconsistent and diverse data.

The last study which was performed in 2000, and was a part of the national project, represented only DMFT scores for the total number of 4,346 school children in Primorsko-Goranska county. According to these results, 32.18% of children were caries free, whereas out of 57.86% children with caries, 6.81% of them were detected having secondary caries, thus accounting for 64.7% at need of restorative care (8). Finally, only 2.89% of children had filled teeth, thus carious but without the need of restoration.

Other reports giving an insight into further national achievements on this matter do not exist.

However, according to the results given by Jurić et al. in 2003, significantly high dmft (7.7) and DMFT (6.67) values were acquired in the Croatian population, as opposed to DMFT scores for children with disabilities (6.39) and healthy children (4.76) acquired by Ivančić Jokić et al. in 2007, for children aged three to seventeen (9, 10).

Most western European countries have reported the mean dmft value of approximately 2, whereas values acquired in the former eastern European countries have reported dmft values which were even up to three times higher (1, 11–14).

However, among the results obtained for most eastern European countries, the average dmft scores were found pretty similar and ranged between 3.0 and 7.7.

Data of caries free children among Polish children (18%) was found considerably lower in comparison with similarly aged children in France (41%) (11), Germany (42%) (12), and Switzerland (48%) (15).

In the light of these results, the goals that were established by the World Health Organisation seem not to have been achieved so far, although they were collected in quite a developed and economically advanced Croatian region. Nevertheless, this obtained results that represent the underscore in comparison with the WHO criteria can partially be explained by constantly changing influence of the socio-economic and demographic status. This changes in the region resulted from the major events that have occurred in the region over the past 20 years.

A possible reason is due to neglecting the preventive dental treatment during the war period in Croatia and its negative impact on dental prevention which is still not recognised by our present public health policy.

However, the collected data, particularly considering the SiC Index, can be used for further planning of preventive and restorative oral health treatments and development of future programmes, not only with respect to the population of the Primorsko-Goranska county, but for the country as such.

The ongoing preventive programme that yielded the data for this study is one of the crucial factors that can improve present situation. This programme includes educational aspect of preventive approach toward the population and involve all important segments of the population such as expectant women, preschool and school children. In order to aim at more general improvement of the oral health status in the country, this certainly represent necessary and positive implications and has a considerable impact regarding further efforts which seems to be mandatory for the entire population.

It is expected that this can affect the public health system to change legislation that will give potential encouragement to patients and result in a better care of their oral health. Furthermore, it is highly suggested that health insurance legislation should include rewards as well as penalties for patients who do not take care of their oral health.

Table 1. *Mann-Whitney U Test representing dental health in 6 years old children*

		Mean	Standard deviation	95% confidence interval		Median	Interquartile range	p*
				lower bound	upper bound			
Healthy teeth in primary dentition	M	10.47	6.07	10.08	10.85	11	6–15	0.421
	F	10.25	6.01	9.85	10.65	11	6–15	
	Total	10.36	6.04	10.09	10.64	11	6–15	
d	M	3.97	4.21	3.70	4.23	3	0–7	0.029
	F	3.50	3.98	3.23	3.76	2	0–6	
	Total	3.74	4.11	3.55	3.93	2	0–6	
f	M	0.92	1.85	0.80	1.03	0	0–1	0.154
	F	0.96	1.75	0.84	1.07	0	0–1	
	Total	0.94	1.80	0.85	1.02	0	0–1	
df	M	4.88	4.27	4.61	5.15	4	1–8	0.035
	F	4.46	4.09	4.18	4.73	4	0–7	
	Total	4.68	4.19	4.49	4.87	4	0–8	
Totally teeth in primary dentition	M	15.35	4.87	15.04	15.66	17	14–18	0.001
	F	14.71	5.09	14.37	15.04	16	13–18	
	Total	15.04	4.99	14.81	15.27	16	14–18	
Healthy teeth in permanent dentition	M	4.77	3.37	4.55	4.98	5	2–7	<0.001
	F	5.34	3.41	5.12	5.57	6	2–8	
	Total	5.04	3.40	4.88	5.20	5	2–8	
D	M	0.12	0.48	0.09	0.15	0	0	0.359
	F	0.15	0.58	0.11	0.19	0	0	
	Total	0.13	0.53	0.11	0.16	0	0	
M	M	0.00	0.00	0.00	0.00	0	0	1.000
	F	0.00	0.00	0.00	0.00	0	0	
	Total	0.00	0.00	0.00	0.00	0	0	
F	M	0.08	0.44	0.05	0.11	0	0	0.369
	F	0.09	0.44	0.06	0.12	0	0	
	Total	0.09	0.44	0.07	0.11	0	0	
DMF	M	0.20	0.64	0.16	0.24	0	0	0.420
	F	0.25	0.74	0.20	0.29	0	0	
	Total	0.22	0.69	0.19	0.25	0	0	
Totally teeth in permanent dentition	M	4.97	3.47	4.75	5.19	5	2–8	<0.001
	F	5.59	3.50	5.35	5.82	6	3–8	
	Total	5.26	3.50	5.10	5.42	6	2–8	

p* – Mann-Whitney U Test

Table 2. *Caries prevalence and Restoration Index in 6 years old children*

	M	F	Total	p**
Caries prevalence primary teeth	75.3	73.6	74.5	0.405
Caries prevalence permanent teeth	11.4	12.4	11.9	0.510
RI primary teeth	18.9	21.5	20.1	0.167
RI permanent teeth	40.8	37.2	39.5	0.116

p** – Chi-square test

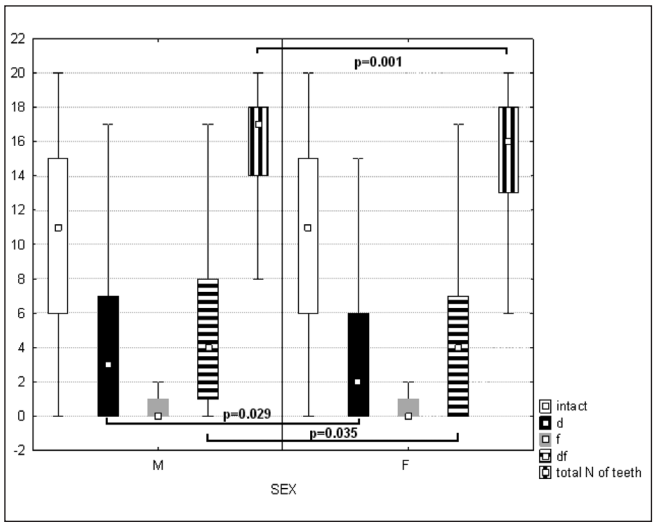

Fig.1. *Distribution of dmf values grouped by gender.*

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