PREVALENCE OF DENTAL DECAY AMONG CHILDREN SUFFERING FROM CONGENITAL HEART DISEASES

Teodora Nikolova, Radosveta Andreeva

*Department of Pediatric Dental Medicine, Faculty of Dental Medicine,
Medical University of Varna*

ABSTRACT

INTRODUCTION: In general, dental decay and periodontal diseases have low mortality, but both have high levels of distribution and are responsible for pain in the oral cavity region, loss of teeth, and represent risk factors for other systemic complications, especially among children.

AIM: The aim of this article is to assess dental decay prevalence in a group of children with congenital heart diseases (CHDs) and to compare it with the same indicator in a group of healthy, age- and gender-matched controls.

MATERIALS AND METHODS: Subject of monitoring of the prospective clinical research are 100 children from Varna region. Half of them (n=50) were diagnosed with CHDs and the other half (n=50) were healthy controls. Both groups were also divided into two age groups: from 4 to 7 years of age (n CHDs = 25; n Ctr. = 25) and from 8 to 17 years of age (n CHDs = 25; n Ctr. = 25). The dental status was examined and registered according to WHO, using the dmft/DMFT index. Possible risk factors for dental caries development were also registered.

RESULTS: Children with CHDs had statistically significant higher mean values of dmft/DMFT indices than healthy controls (age group 4-7 years: 5.5 ± 3.2 vs. 4.3 ± 1.2 ; age group 8-17 years: 5.6 ± 2.9 vs. 3.6 ± 2.3). The registered fillings among patients with CHDs were scarce. A total of 71% of patients with CHDs were subjected to regular oral medications intake due to the main chronic disease. Children with heart anomalies were mainly of low socio-economic status and had not received more intensive dental prophylaxis than healthy controls. A total of 98% of all examined patients (n=100) were affected by dental decay (dmft/DMFT>0).

CONCLUSION: The findings from this research clearly show that the group of children with CHDs are more severely affected by dental decay than the control group of healthy children. Children with CHDs are at disadvantage, because the development of oral diseases in these patients may affect their overall medical condition. Prolonged oral pharmacotherapy and low socio-economic status, which affect oral health, are possible risk factors for dental decay development in these medically compromised children.

Keywords: congenital heart disease (CHD), DMFT, pediatric dentistry, risk factors

Address for correspondence:

Teodora Nikolova
Faculty of Dental Medicine
Medical University of Varna
84 Tzar Osvoboditel Blvd
9000 Varna
e-mail: tedinikolova1@gmail.com

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INTRODUCTION

Congenital heart disease (CHD) is one of the most common congenital anomalies with an incidence of approximately 8–10 cases per 1000 live births (1-9). If left untreated, CHD is the single greatest cause of death during the neonatal period after full-time pregnancies in the industrialized part of the world (8,9). It is clear that children with CHDs frequently require regular long-term medication, but the knowledge of oral health effects, caused by long-term medication in medically compromised chil-

dren, is sparse (10, 11). Many of the medications for long-term treatment have high endogenous acidity and/or contain sucrose (12,13). There is a strong correlation between xerostomia and pharmacological treatment (12-14), and many pharmaceutical preparations are listed as xerogenic (15). There is a need to improve the oral health indices by conducting education and training for both dental and medical health care providers about oral health problems and their prevention in this new group of patients.

A number of studies have been carried out on the caries prevalence in children with CHD, but only five of them were controlled (16-20). According to one of them children with CHD had higher mean values of dmft/DMFT indices than healthy children and only a few of them had experienced fillings, indicating an unmet need for operative treatment (17, 21).

AIM

The aim of this article is to assess caries prevalence in a group of children with CHD and to compare it with the same indicator in a group of healthy controls. Information about possible risk factors for oral diseases development is also gathered.

MATERIALS AND METHODS

Subject of monitoring of the prospective clinical research are 100 children from Varna region. Half of them (n=50) were diagnosed with CHD and the other half (n=50) were healthy controls. Both groups were also divided into two age groups: from 4 to 7 years of age (n CHDs = 25; n Ctr. = 25) and from 8 to 17 years of age (n CHDs = 25; n Ctr. = 25). The dental status was registered according to WHO by the dmft/DMFT index.

The Decayed, Missing, Filled (DMF) index has been used for almost 80 years and is well established as the key measure of caries experience in dental epidemiology (22). The DMF index is applied to the permanent dentition and is expressed as the total number of teeth or surfaces that are decayed (D), missing (M), or filled (F) in an individual. When the index is applied to teeth specifically, it is called the DMFT index, and scores per individual can range from 0 to 28 or 32, depending on whether the third molars are included in the scoring (22).

When written in lowercase letters, the dmft index is a variation that is applied to the primary denti-

tion. The caries experience for a child is expressed as the total number of teeth or surfaces that are decayed (d), missing (m), or filled (f). The dmft index expresses the number of affected teeth in the primary dentition, with scores ranging from 0 to 20 for children. Because of the difficulty in distinguishing between teeth extracted due to caries and those that have naturally exfoliated, missing teeth may be ignored according to some protocols. In this case, it is called the df index (23). In our clinical research, we registered as "missing" (m) only primary teeth, which were lost due to caries and its complications.

The dental status of the children was diagnosed by visual observation and scored on teeth with an initial diagnostic threshold D1b or initial enamel lesions, visible without drying (24). Possible risk factors for dental caries development, such as prolonged medication, poor oral hygiene, improper diet and/or low socio-economic status of the family were also registered.

RESULTS AND DISCUSSION

After analyzing the data from all patients' cards, it became clear that 94% of children with CHD we examined (n=50) had been subjected to surgical treatment of their malformations. Regular intake of medications due to their chronic cardiac disease continues for 71% of the patients from the same group. Dental prophylaxis for both groups examined (CHD/Ctr) was limited to the once-a-day usage of fluoride containing toothpaste. Children with CHDs were not subjected to more intensive dental prophylaxis.

The results from the clinical examinations showed that 98% of all patients had decayed teeth (Fig. 1). The DMFT values, calculated for the age group from 8 to 17 years of age, were 5.6 ± 2.9 for CHD group vs. 3.6 ± 2.3 for their healthy peers. The dmft values, calculated for the age group from 4 to 7 years of age, were respectively 5.5 ± 3.2 for the CHD group vs. 4.3 ± 1.2 for the control group (Table 1) (Fig. 2). There was a statistically significant difference ($p < 0.05$) between both age groups within the CHD group, compared to the results of the corresponding age groups of healthy children.

It is concerning that the greatest portion of all individual dmft/DMFT values calculated came from

Fig. 1. Distribution (Ep) of dental decay among the examined children

Fig. 2. Comparison between mean values of the dmft/DMFT indices for the different groups of children examined

registered decayed (D) and very small portion from registered filled (F) teeth.

CONCLUSION

- ✦ Children with CHDs from Varna region are more severely affected by dental decay than healthy age- and gender-matched controls.
- ✦ Those children from the CHD group, exposed to prolonged medication due to the main cardiac disease, had higher values of the dmft/DMFT indices than children from the same group with no prescribed therapy.
- ✦ The intake of some medications, used for long-term therapy in pediatric cardiology, may increase the risk for dental decay development. This is due to their high values of endogenous acidity, sucrose content and/or their ability to affect salivary secretion and the buffering capacity of saliva.

Table 1. Mean values and standard deviations of dmft/DMFT indices registered

Mean		dmft / DMFT	SD
CHD	Age group from 4 to 7 years	5.5	3.2
	(1) Age group 8 to 17 years	5.6	2.9
Ctr	(2) Age group 4 to 7 years (3)	4.3	1.2
	(4) Age group 8 to 17 years	3.6	2.3
T-test		$t_{1,2} = 1.016; p = 0.5347$	
		$t_{1,3} = 0.872; p = 0.00681^*$	
		$t_{2,3} = 0.693; p = 0.00371^*$	
		$t_{1,4} = 1.007; p = 0.00622^*$	
		$t_{2,4} = 1.078; p = 0.00347^*$	
		$t_{3,4} = 0.942; p = 0.0214$	

- ✦ A great number (71%) of children from the CHD group continue the regular intake of medications, though they have surgical corrections of the cardiac malformation.
- ✦ Children with CHDs were not subjected to more active dental prophylaxis, compared to healthy peers.
- ✦ The low socio-economic and educational status of the families of children with CHDs from the region of Varna, as well as the lack of motivation for oral care, also increased the risk for dental decay development.
- ✦ Children with CHDs are at disadvantage, because the development of oral diseases in these patients may affect their overall medical condition.

CLINICAL RELEVANCE

These findings provide important baseline data for planning appropriate dental preventive strategies for children with CHDs.

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