

A Study on Oral Health of Children with Cardiac Diseases in Mashhad, Iran in 2004

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Abstract

Background and aims. Preventing oral disease is the most desirable way of ensuring good dental health for children with heart disease. Dental and gingival infections in patients with cardiac problems may lead to infective endocarditis. The aim of this study was to evaluate oral and dental health status in children with heart disease referred to a cardiac center compared with the control group.

Materials and Methods. In this descriptive cross-sectional study, case group consisting of 100 patients 2-12 years old with heart disease were examined for oral and dental status in Pediatric Cardiac Center in Mashhad, Iran, in 2004. Fifty healthy children with the same age as the case group referring to the Department of Pedodontics, Mashhad Faculty of Dentistry served as the control group. For each patient, dental and medical history, dmft, DMFT, debris index, tooth brushing status as well as parental knowledge of infective endocarditis and their economic status was registered on a questionnaire. Statistical analysis was performed using Kruskal-Wallis, chi-square and *t*-tests.

Results. There were no significant differences between case and control groups in dmft (3.92 ± 3.99 and 3.54 ± 3.33 , respectively), DMFT (3.7 ± 4 and 1.47 ± 1.72 , respectively) and their components. Tooth brushing status and debris index were significantly worse in the study group ($P = 0.001$ and $P = 0.008$, respectively). 35% of parents were aware of the importance of good oral health in cardiac children although none of them knew about infective endocarditis. Most of the parents in study group had low (30%) to medium (53%) economic status.

Conclusion. In this study, the children with cardiac disease did not have a good oral and dental health status. Developing strategies toward preventive dental care of children with cardiac problems and informing their parents is suggested.

Key words: Child, DMF index, heart diseases, oral hygiene index.

Introduction

Source of heart diseases in children can be genetic or environmental. Congenital

heart diseases are among the most common developmental anomalies in children and

affect approximately 8:1000 live births. Children with complex anomalies constitute approximately one-third of all children with congenital heart diseases.¹

The introduction of new surgical and anesthetic techniques together with the development of child especial pediatric intensive care unit have improved the treatment and care of child patients with heart disease.¹

The oral microbiological flora plays a very important role in the etiopathogenesis of bacterial endocarditis, given the condition that it is of oral or dental origin. The most common microorganism involved is streptococcus viridians (55% cases).²

Periodontal infection and poor oral hygiene at home may spread heart-threatening bacteria. To maintain a good oral and dental health, brushing twice a day, use of dental floss once a day and regular dental appointments are recommended.³

Parents lacked knowledge of bacterial endocarditis even after being informed during child's routine cardiology visit. There appears to be a deficiency of knowledge among dentists regarding the indication of antibiotic prophylaxis and its regimen, required to prevent bacterial endocarditis.⁴ There is also a lack of knowledge with regard to the fact that all cardiac surgical patients should have a dental examination and preventive dental program implemented prior to six months of age and dental screening prior to their cardiac surgery.⁴

In children with complex heart diseases, other problems often appear that may jeopardize dental health. For example, many of these children have difficulties with nutrition during their first year of life. Vomiting is a common problem, and to compensate for this, they should be fed frequent and night meals are often necessary to maintain energy intake at an acceptable level. In addition, some of the medicines for heart disease contain sucrose together with diuretics that can cause xerostomia. Infections often last for longer periods than in normal children with an increased need for drinking, sometimes at night, when salivary protection is low.¹

The main goal of this study was to evaluate oral and dental health status in children with heart diseases referred to Pediatric Cardiac Center in Mashhad, Iran.

Materials and Methods

The present investigation is a descriptive cross-sectional study. In this study, the case group consisted of 100 patients between 2-12 years old (51 girls and 49 boys) examined for oral and dental status in Pediatric Cardiac Center in Mashhad, Iran, during a two-month period in 2004. Fifty healthy children with the same age were examined as control group, in Pedodontic Department in Mashhad Faculty of Dentistry. Patients were examined using a probe, a mirror, and pen light. Dental and medical history of patients and parental knowledge of infective endocarditis were registered in a questionnaire. dmft index (for 2-5 years old), dmft and DMFT (for 6-12 years old) were recorded.⁵ dmft index of 6-12 year-olds was registered regarding to oral microbiological flora. Simplified debris index (DI-S) was recorded to evaluate oral hygiene of patients.⁵ Socioeconomic situation was evaluated with a standard chart based on father's job and education. The difference between cardiac groups (acyanotic, cyanotic and congenital heart diseases) was evaluated by Kruskal-Wallis test. In order to compare study and control groups chi-square test was used.

Results

77 patients had acyanotic congenital heart disease, 20 patients had cyanotic congenital heart diseases and 3 patients had acquired cardiac diseases. 21 children had a history of heart surgery and in 7 patients one of the parents had congenital or acquired heart diseases. 57 patients were under 6 years old and 43 were between 6-12 years old.

35% of parents were aware of the importance of good oral health in cardiac children, but no knowledge of infective endocarditis was found.

Data on dmft and DMFT indices in the study group are presented in Tables 1 and 2. There were no significant differences between patients in the study group regarding dmft and DMFT ($P = 0.3$ and $P = 0.7$, respectively).

dmft index in control group was 3.5 ± 3.3 and DMFT index was 1.47 ± 1.7 . There were no significant differences between the study and control groups ($P = 0.7$).

Table 1. dmft index in cardiac patients

Age	Disease	Number	cf	d	m	f	DI-S (mean)
< 6 years old	Acyanotic	44	13	171	-	2	3.93 ± 4.47
	Cyanotic	13	3	49	2	-	3.92 ± 3.99
	Acquired	-	-	-	-	-	-
Total (< 6 years old)		57	16	220	2	2	3.92 ± 4.33
6-12 years old	Acyanotic	33	5	80	20	12	3.39 ± 3.6
	Cyanotic	7	1	21	6	6	4.71 ± 3.5
	Acquired	3	-	10	-	-	3.33 ± 4.16
Total (< 6-12 years old)		43	6	111	26	18	3.6 ± 3.56
Total		100	22	331	28	20	3.7 ± 4.00

cf: Caries free; DI-S: Simplified debris index.

Table 2. DMFT index in 6-12 years old cardiac patients

Age	Disease	Number	D	M	F	DMFT (mean)
6-12-years-old	Acyanotic	33	51	0	6	1.72 ± 2.74
	Cyanotic	7	12	0	3	2.14 ± 1.86
	Acquired	3	3	0	2	1.66 ± 1.52
Total(<6-12years-old)		43	66	0	11	1.79 ± 2.52

Data on debris index in the study group is presented in Table 3. There were no significant differences between patients in the study group ($P = 0.12$) (Table 3).

DI-S index in the control group was 0.23 ± 0.34 . DI-S index in the study group was significantly higher than control group ($P = 0.008, 0.039$).

The number of children who did not brush were significantly more in study group than the controls (38% vs. 10%, respectively; $P = 0.001$) (Table 4).

Most of parents in study group had low (30%) to medium (53%) economic status.

Table 3. Debris index in different cardiac diseases

Age	Disease	Number	DI-S			DI-S (mean)
			0-6 Good	0.7-1.8 Fair	1.9-3 Poor	
< 6 years old	Acyanotic	44	35	9	-	0.35 ± 0.42
	Cyanotic	13	8	5	-	0.5 ± 0.38
	Acquired	-	-	-	-	-
Total (< 6 years old)		57	43	14	-	0.38 ± 0.41
6-12 years old	Acyanotic	33	26	6	1	0.43 ± 0.46
	Cyanotic	7	4	2	1	0.76 ± 0.67
	Acquired	3	3	-	-	0.16 ± 0.28
Total (< 6-12 years old)		43	33	8	2	0.46 ± 0.49
Total		100	76	22	2	0.42 ± 0.45

DI-S: Simplified debris index.

Table 4. Tooth brushing in cardiac patients and control group

Tooth brushing	Group		
	At least once daily (%)	Occasionally (%)	Never (%)
Study	38 (38%)	24 (24%)	38 (38%)
Control	22 (44%)	23 (46%)	5 (10%)

Discussion

The results of this research indicated that there were no significant differences in dmft and DMFT between study and control groups. In both groups, dental health was poor. Findings of Sarheed et al,⁶ and Balmer et al⁷ was in agreement with our results. In Sarheed et al⁶ study, children with heart transplants had significantly greater number of enamel defects and more gingival enlargement and bleeding. In another study children with congenital heart diseases had significantly more caries in primary teeth but such a difference was not seen in permanent teeth.¹ In children with cardiac problems specially complex heart diseases, other problems often appear that may jeopardize dental health. Families of children with serious heart diseases already face heavy demands due to medication, surgery, recurrent illness, and occasional nutritional problems of their children. Preventive strategies for oral and

dental disease have a critical value in these children.

Perhaps, poor condition of primary teeth in cardiac children could be related to the difficult situations that these children face during their first years of life. The overall increased vulnerability of the cardiac children to stressful treatment procedures is one of the major reasons to focus on caries prevention.¹ Close cooperation between pediatric cardiologist and dentist could help to improve dental care for these children. Of major significance is the fact that untreated caries can be a contraindication for heart surgery.⁴

In this study, dmft index in children younger than six years old who underwent heart surgery had a high score (5.08 ± 4.54), which is a considerable finding regarding the risk of bacterial endocarditis in these patients.

A significant difference in oral hygiene (DI-S) was found between the cardiac chil-

dren and healthy controls. This was in accordance with the findings of a previous study.⁸ Periodontal infections and poor oral hygiene may spread heart threatening bacteria. Therefore, it is critical to maintain a good oral and dental health by brushing twice daily with a fluoride-containing toothpaste and flossing. In fact taking good care of teeth and gums is not only for a healthy smile but also for a healthy body in cardiac patients.³ In our study, the number of children who never brushed was significantly higher in the study group. The percentage of patients who brushed regularly once a day (38%) was lower than findings of another study (44%).⁴ Parental supervision for tooth brushing in patients is very important. Teeth must be examined and cleaned professionally by pedodontist regularly. Poor dental hygiene also gives an increased risk of dental bacteriemia that may lead to infective endocarditis.¹ Findings of our study revealed that 35% of parents were aware of the importance of good oral health in cardiac children, but they had no knowledge of infective endocarditis. These figures were 41.3% and 18% in a previous study, respectively.⁸ Balmer et al⁷ found that 64% of parents were aware of the link between the oral health of their children and infective endocarditis. Parental knowl-

edge of infective endocarditis in developed countries may be due to a better public awareness, and close interaction between pediatric cardiologist and dentist. Most parents of sick children in our study were of moderate economic status, so we recommend delivering proper information to parents in health centers and cardiac clinics regarding preventive dentistry to maintain an excellent oral health.

Conclusion

In this study children with cardiac disease had a poor oral hygiene; however, DMFT and dmft indices were similar to healthy subjects. Parents lacked knowledge about bacterial endocarditis even after being informed during their child's cardiology visit. Therefore, further improvements should be made in educating parents and children on the importance of caries prevention and maintaining a good oral hygiene. It's recommended that pediatric cardiologist and dentist have more cooperation and that all cardiac patients have a dental examination and preventive dental program implemented prior to six months of age and dental screening prior to their cardiac surgery.

References

1. Stecksén-Blicks C, Rydberg A, Nyman L, Asplund S, Svanberg C. Dental caries experience in children with congenital heart disease: a case-control study. *Int J Paediatr Dent* 2004; 14: 94-100.
2. Blanco-Carrión A. Bacterial endocarditis prophylaxis. *Med Oral Patol Oral Cir Bucal* 2004; 9 Suppl: 44-51; 37-43.
3. American Dental Association. For the dental patient...Antibiotics before dental treatment. Preventing bacterial endocarditis. *J Am Dent Assoc* 2002; 133:127.
4. Hayes PA, Fasules J. Dental screening of pediatric cardiac surgical patients. *ASDC Dent Child* 2001; 68: 255-8, 228-9.
5. Chandra SA, Chandra SH. *Textbook of Community Dentistry*, 2nd ed. New Delhi: Japee Publishers; 2004:138,140.
6. al-Sarheed M, Angeletou A, Ashley PF, Lucas VS, Whitehead B, Roberts GJ. An investigation of the oral status and reported oral care of children with heart and heart-lung transplants. *Int J Paediatr Dent* 2000; 10:298-305.
7. Balmer R, Bu'Lock FA. The experiences with oral health and dental prevention of children with congenital heart disease. *Cardiol Young* 2003;13:439-43.
8. Dasilva DB, Souza IP, Cunha MC. Knowledge, attitudes and status of oral health in children at risk for infective endocarditis. *Int J Paediatr Dent* 2002; 12:124-31.