

Oral Health Status of Normal Children and those Affiliated with Cardiac Diseases

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*If a child's general health is compromised, care for his/her oral and dental health becomes an absolute necessity. Children with heart diseases require special dental care because of the risk of developing infective endocarditis. **Aims and objectives** was to evaluate the oral health status, parental oral health care knowledge of the pediatric cardiac patients and non cardiac group and infective endocarditis awareness among the parents of the cardiac group. **Materials and methods** include a total of 50 children with heart diseases and 50 non -cardiac children aged 2-12 years were examined for dental caries index and simplified debris index. A structured, administered questionnaire for parents/caregivers about knowledge of infective endocarditis and oral health were used for data collection. **Results** showed no statistically significant differences between the caries experience score for the two groups and oral health knowledge. Knowledge about Infective Endocarditis in parents of study group was very poor. Simplified Debris Index of age group 6-12 years was higher in study groups compared to the controls. **Conclusion:** Improvements should be made in educating parents and children on the importance of caries prevention and maintaining a good oral hygiene in prevention of infective endocarditis.*

Keywords: cardiac disease, DMFT index, simplified debris index, infective endocarditis.

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INTRODUCTION

Oral health is a desirable component of child's general health maintenance. If a child's general health is compromised, care for his/her oral and dental health becomes an absolute necessity. Children with congenital heart defects occur approximately 8 in 1000 live births.¹ Congenital cardiac defects are the most common forms of human malformation. With the current advances in pediatric cardiac surgery and percutaneous cardiac interventional procedures, more and more infants and children will survive and reach adulthood. It is estimated that the number of such patients will grow at a rate of 5% per year.²

Children with heart diseases require special dental care because of the risk of developing Infective Endocarditis (IE) which is a rare, but life threatening condition.³ Despite all

the advances in the health sciences, IE still has a high mortality and morbidity rate.⁴

Studies have shown significant findings regarding the susceptibility to IE and poor oral health, especially periodontal status, and certain dental procedures are risk factors in these patients.⁵ Dental extraction (50-100%), periodontal surgery (36-88%), scaling and root planning (8-80%), endodontics (0-54%), tooth brushing (0-26%), dental flossing (20-58%) and chewing (17-52%) may induce bacteremia.⁶ The micro-organisms adhere to and colonize endocardial vegetation which is initially sterile and is composed of fibrin and platelets. The initial damage to endothelium is probably initiated by blood jet streams or by eddy currents caused by various congenital and acquired endocardial lesions.⁷

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).⁸

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.⁹

Parents lacked knowledge of bacterial endocarditis even after being informed during child's routine cardiology visit. There is also a lack of knowledge with regard to the fact that all cardiac surgical patients should have a dental

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examination and preventive dental program implemented prior to six months of age and dental screening prior to their cardiac surgery. It's always better that pediatric cardiologist and dentist have more cooperation and that all cardiac patients have a dental examination and preventive dental program.¹⁰

Silva *et al* showed that the guardian's knowledge was not satisfactory in respect of the importance of the maintenance of good oral health for prevention of infective endocarditis.¹¹ Talebi *et al* showed that 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.¹²

Therefore, the purpose of the present study was to investigate the oral health status, parental oral health care knowledge of the pediatric cardiac patients and non cardiac group and IE awareness among the parents of the cardiac group.

MATERIALS AND METHOD

The sample was drawn from cardiac pediatrics patients reported to the outpatient clinics of Jayadeva Institute of Cardiology and Research Center, Bangalore, which is one of the leading Research Center in India, and non-cardiac patients who were reported to the Department of Pedodontics and Preventive Dentistry, V.S Dental College, Bangalore. A structured, administered questionnaire for parents/caregivers about knowledge of infective endocarditis and oral health and an oral examination of the children were used for data collection.¹³ In this study, the case group consisted of 100 patients between 2–12 years old examined for oral and dental status, during a two-month period. Out of which fifty healthy children with the same age were examined as control group, in Department of Pedodontic and Preventive dentistry at VS Dental College Bangalore. Patients were examined using a probe, a mirror, and penlight. 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. Simplified debris index (DI-S) was recorded to evaluate oral hygiene of patients.¹⁴

RESULTS

A total number of 100 patients, 50 with cardiac disease (study group) and 50 without cardiac disease (control group) with a mean age of 6.5 ± 3.8 were examined for the study. Of the 50, 28 (56%) subjects were male and 22 (44%) subjects were female in the cardiac groups and 26 (52%) are male and 24(48%) are female in control group.

In study group 80% (40) of patients have congenital heart diseases and 20% (10) of them have rheumatoid disease. Knowledge about IE in parents of study group was very poor. Only 10 % of them have known about the risk of IE and other 90% of people no idea about the same.

Oral health knowledge of study group and control group showed no statistically significant difference (P>0.05). The distribution of samples in both the groups with respect to the

oral health knowledge is almost the same. (Table 1, Fig.1)

Table 1. Oral health knowledge in parents of study group and control group

Oral Health Knowledge	Group		Total	χ ²	P-Value
	Study Group	Study Group			
No oral health knowledge	2	0	2	2.171	0.338
Brushes teeth once daily	30	33	63		
Brushes teeth twice daily	18	17	35		
Total	50	50	100		

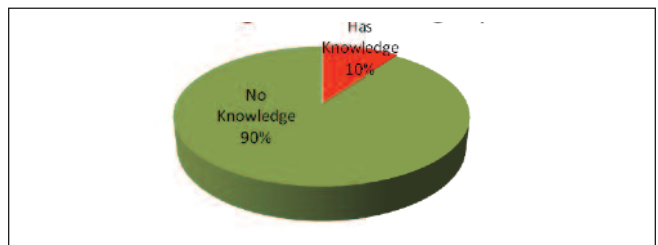


Figure 1. Knowledge of IEC in control group

The status of dental caries filled missing teeth were recorded in DMFT and dmft index. The mean number of decayed, missing and filled teeth in the primary dentition (dmft) was slightly higher in the control group compared with the cardiac group (4.1 vs. 2.8, p = 0.099), but this difference was not statistically significant. Similarly, in the permanent dentition, no significant differences were obtained in the mean DMFT between the cardiac and control groups (2.1 vs. 2.6, p = 0.354) (Table 2, Figs 3 and 4)

Simplified debris index of study group and control group of 2–6 years, (2 Vs 1.6, p = 0.129) No significant difference is observed between study group and control group with respect to the Simplified Debris Index (P > 0.05)(Table 3). But, Statistically significant difference is observed between study group and control group with respect to the Simplified Debris Index of age group 6-12 years (P < 0.01). Higher

Table 2. DMFT and dmft index of study and control groups.

Group (2-5 yrs)	n	Mean	Std. Deviation	Mean difference	Z	P-Value
Study Group	14	2.43	2.47	-1.748	-1.648	0.099
Control Group	17	4.18	2.79			
Group (6-12 yrs)	n	Mean	Std. Deviation	Mean difference	Z	P-Value
Study Group	36	2.14	2.38	-0.497	-0.926	0.354
Control Group	33	2.64	2.49			

mean debris index is found in the study group compared to the control group (1.97 vs.1.55, $p = 0.002$) (Table 4, Fig. 5)

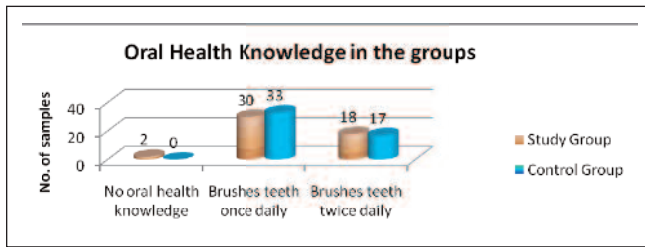


Figure 2. Oral health knowledge in parents of study group and control group.

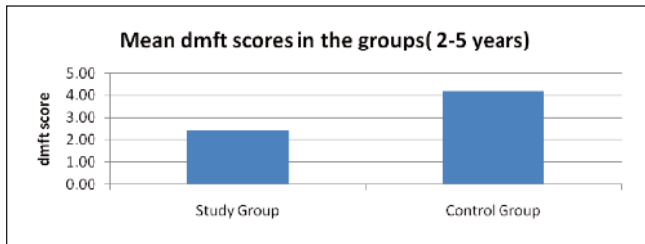


Figure 3. DMFT Index of study and control groups

Table 3. Simplified debris index of study group and control group (2-5years) (Mann-Whitney test)

Group	n	Mean	Std. Deviation	Mean difference	Z	P-Value
Study Group	14	2.00	0.68	0.353	-1.517	0.129
Control Group	17	1.65	0.49			

Table 4. Simplified debris index of study group and control group(6-12years) (Mann-Whitney test)

Group	n	Mean	Std. Deviation	Mean difference	Z	P-Value
Study Group	36	1.97	0.56	0.427	-3.038	0.002
Control Group	33	1.55	0.51			

Statistically significant difference is observed between study group and control group with respect to the Simplified Debris Index ($P < 0.01$). Higher mean debris index is found in the study group compared to the control group.

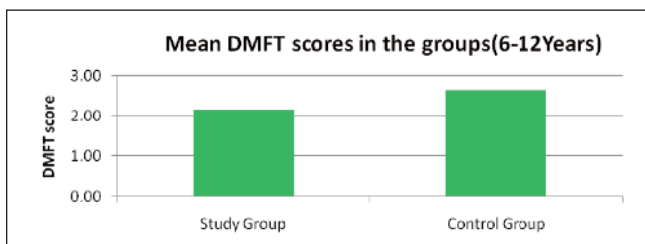


Figure 4. DMFT Index of study and control groups

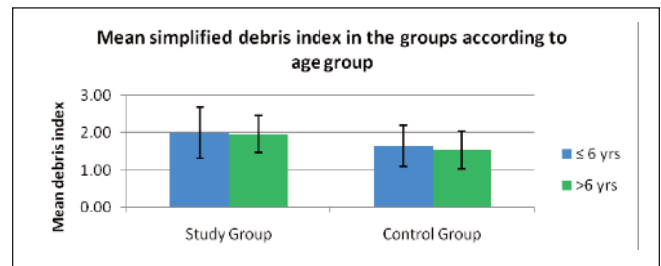


Figure 5. Simplified debris index in the study and control groups

DISCUSSION

This study included most of children with congenital heart disease(80%) than the acquired heart disease (20%) (Table 5)

Table 5. Medical diagnosis of the examined cardiac patients

Diagnosis	Number(n)	Percentage
Congenital		
ASD	10	20%
VSD	9	18%
Patent ductus arteriosus	5	10%
Tetralogy of Fallot	5	10%
Congenital heart block	4	8%
Aortic stenosis	4	8%
Mitral value prolapse	2	4%
Coarcatation of aorta	1	2%
total	40	80%
Acquired		
RHD	10	20%

No significant differences were established between the oral health status of the children with cardiac disease and the closely matched control group. The results of our study are in line with the case control study and Franco *et al*¹⁵ However, a study by Pollard and Curzon¹⁶ found a statistically significant higher dmft in 5-9 years old cardiac children as compared to controls. Another study by Hallet *et al*¹⁷ also found significantly higher dmft in the cardiac group as compared to the control group.

The result of our study also showed that the parents of the cardiac children are less aware of the infective endocarditis. However, the study by Cetta *et al*¹⁸ in United States showed good parental awareness - 62% of the parents were aware of endocarditis and 56% parents knew that their children need antibiotics before dental treatment is carried out.

Balmer *et al*¹⁹ found that 64% of parents were aware of the link between the oral health of their children and Infective Endocarditis. Parental knowledge of Infective Endocarditis in developed countries may be due to a better public awareness, and close interaction between pediatric cardiologist and dentist.

A significant difference in oral hygiene (DI-S) was found between the cardiac children and healthy controls. 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.

The results of the study showed that there was no statistically significant difference between the groups about oral health knowledge ($P > 0.05$). The distribution of samples in both the groups with respect to the oral health knowledge is almost the same. Parental supervision for tooth brushing in young cardiac patients is very important.

Saunders and Roberts²⁰ found poor oral health practices in the cardiac group when compared with the control group. The reason most often cited in the literature is a lack of recognition of their child's need for dental services. The child's cardiac disease is always given priority by the parent and the cardiologist. As a result, the equally important oral health care needs are overlooked. In the present study no statistically significant differences were found in regular brushing habits, between the cardiac and control group. This is in contrast to the findings of the Franco *et al*¹⁵ who found out that only 21% of the children in the cardiac group were regularly brushing as compared to 73% in the control group. Silva *et al*¹¹ showed that many parents/patients lacked the proper knowledge required to maintain the optimal dental health of the child. On the other hand, several parents who were aware of the implications of negligence still did not emphasize its importance to their children. The study by Grahn *et al*²¹ found that the attitude of the parents whose children receive dental services differed; parents of healthy children had a much better perception than those of children with cardiac disease. These studies indicate an inadequate parental education regarding the preventive health care needs of children with heart disease.

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. Especially in India low socioeconomic status and poor dental health awareness and increased incidence of congenital cardiac diseases necessitate the dental health education. It's recommended that pediatric cardiologist and dentist should make team efforts to promote the good oral health and suggest 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.

In children with cardiac problems especially complex heart diseases, other problems often appear 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.

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