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RESEARCH ARTICLE

PARENTS' KNOWLEDGE OF INFECTIVE ENDOCARDITIS AND ORAL HEALTH OF CHILDREN AT RISK - A COMPARATIVE STUDY

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ABSTRACT

Aim: The purpose of this study was to assess parents' knowledge and oral health status of children who were at risk of IE.
Methodology: Subjects were randomly chosen, matched and divided into two groups- Group I: 50 subjects aged 2-18 years who were at risk of IE. Group II: 50 subjects aged 2-18 years who were diagnosed without any heart disease. A structured questionnaire was given to the caretakers and an oral examination was performed on each child. To assess the significance of differences between the study and control groups, unpaired student 't' test was employed.
Results: The percentage of guardians who were aware about IE and who understood the importance of good oral health were only 2%. As regards to oral health behavior, only 24% of children were supervised by their caretakers during brushing and 96% had never visited a dentist before. There was visible plaque in 96% of children, only 2% showed inflamed gingiva and 96% of children had no enamel defects. The caries experience for primary dentition *(dmft)* was 1.82 and that for permanent dentition *(DMFT)* was 0.38.
Conclusion: Parents' knowledge about IE and its prevention was poor, however the oral health status of these children was fair.

INTRODUCTION

Infective endocarditis (IE) is an inflammatory condition affecting endocardial surfaces such as valves of heart, caused primarily by bacterial infection. [1] Worldwide, incidence of IE in children with congenital heart disease (CHD) is at an alarming 60-90%.[2] In India, 1,80,000 children are born with heart defects each year.[3] About 30-50% of these children manifest critical cardiac lesions which require early intervention. These children are highly susceptible to IE. In about 22% cases of IE, *viridians streptococcal species* is found to be the causative microorganism. [4] One member of this group, *Streptococcus mutans* is the main etiologic agent for dental caries. Lack of oral hygiene results in plaque accumulation and colonization of *viridians streptococci* over tooth surfaces. In this condition, even mild manipulation of oral tissues via brushing or chewing can result in bruising of tissues and introduction of bacteria into the bloodstream followed by their subsequent colonization over damaged heart valves resulting in IE. Few studies have reported genetic predisposition of children with CHD to enamel defects and microdontia and thus their increased susceptibility to dental caries. [5]

In the light of these factors, the aim of this study was to evaluate the awareness of caretakers and compare the oral health of children at risk of IE with that of healthy children.

METHODOLOGY

A protocol of the intended study was submitted to the Ethical Review Committee and ethical clearance was obtained. Prior necessary permission was obtained from the academic superintendent of Sri Jayadeva Institute of Cardiovascular Sciences and Research and head of the Pediatric Cardiology department of this institute to conduct the study.

Subjects were randomly chosen and matched from the institute records and were divided into two groups-

Group I (Cases): 50 subjects aged 2-18 years who were at risk of IE, diagnosed before the age of 2 years and who were on medication for at least 6 months.
Group II (Controls): 50 subjects aged 2-18 years who were referred to the outpatient cardiac clinic for investigation of a heart disease and who were subsequently diagnosed without any heart disease. Healthy children who were regularly followed up by the cardiology team due to family heart problems were also included.

Two investigators were trained and calibrated prior to the start of the study to ensure reliability.

Inclusion criteria: Children aged 2-18 years who were diagnosed with heart disease before the age of 2 years, who were on medication for a period of at least 6 months, who were diagnosed by the cardiology team to be at risk of IE and parents who consented for the study were included.

Exclusion criteria: Children with concomitant medical conditions, children with any condition or medication that affected saliva and those who did not consent for the study were excluded. Armamentarium used was mouth mirror, explorer, kidney tray, tweezer, autoclaved cotton, gloves, mouth mask and head cap.

Study was conducted by using a standardized performa, which included two parts. First part included general demographic details followed by a questionnaire to parents and second part consisted of general and clinical examination. In the second part, medical status, oral health status, developmental enamel defects, gingival condition and plaque index were recorded. The dental examination of children was conducted using the World Health Organization's (WHO) diagnostic criteria as enumerated in the guidelines of Basic Oral Health Surveys (1987).[6] The tooth status (*dmft*/*DMFT*) and developmental enamel defects were recorded. No radiographs were taken. An epidemiological index of developmental defects of dental enamel, DDE Index (1982) was used for recording enamel defects.[7] Gingivitis was recorded simply as healthy, inflamed and cyanosed, so that examination could be done visually without the need for probing the gingiva.[8]

Plaque index by Silness and Loe (1964) was used for assessment of plaque.

Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 16.0. The unpaired student 't' test was employed to assess the significance of differences between the study and control groups for *dt, mt, ft, dmft, DT, MT, FT* and *DMFT* and for plaque and gingivitis. The parents' attitudes and beliefs towards dental health were analyzed using Chi-square test and Fisher's exact probability test.

RESULTS

Table 1 compares the oral health parameters in cardiac and control groups. Both the cardiac and control groups showed similar dental caries experience, with no statistically significant difference.

Table 1 Comparison of oral health parameters in cardiac and control groups

S. No.	Oral health parameters	Cardiac group	Control group	'p' value
1.	Caries experience: *dmft/* *DMFT*	 1.82 0.38	 1.94 0.34	 0.82 0.81
2.	Developmental Enamel Defects	4%	2%	0.39
3.	Gingivitis	4%	2%	0.39
4.	Plaque	96%	92%	0.14

Dental caries was seen in 58% of children in cardiac group and 56% of children in control group. In the cardiac group, the mean missing component *mt* of the *dmft* was slightly higher than that of control group (0.16 vs. 0.04) although this was not statistically significant.

In our study, 96% of children in cardiac group and 98% in control group gave score zero for developmental enamel defects. The difference was not statistically significant (p=0.390). In the cardiac group, 96% of children presented with healthy gingiva, compared with 98% in control group. Although, there was higher plaque score in cardiac group, the difference was not statistically significant. It was observed that 96% of children in cardiac group showed presence of plaque.

Table 2 compares the parental awareness between cardiac and control groups. In response to the questions related to oral hygiene of the child, we found no significant difference between the two groups. In the cardiac group, 74% of children were brushing on their own without any adult supervision, whereas in the control group 82% brushed their teeth without any adult supervision. In the present study, only 22% of children in the cardiac group reported that they brushed twice a day as compared to 18% in the control group. In the cardiac group, 92% of children did not get any information on how to look after their child's teeth while in control group, 90% of parents were not well informed.

Table 2 – Comparison of parental awareness between cardiac and control groups

S.no.	Parental awareness parameters	Cardiac group	Control group	'p' value
1.	Parental guidance in tooth brushing	26%	18%	0.48
2.	Brushing frequency- Once Twice	 76% 22%	 78% 18%	0.36
3.	Awareness about dental plaque	20%	8%	0.02 (<0.05)
4.	Awareness about Fluoride	2%	4%	0.39
5.	Preventive treatment received	0	0	-
6.	Awareness about Infective Endocarditis	2%	0%	0.31
7.	Awareness about antibiotic prophylaxis in heart conditions	8%	2%	0.16

In cardiac group, 20% of parents defined dental plaque as white/yellow deposits compared with 8% in the control group. 4% of parents in cardiac group defined plaque as bacteria. The parental awareness regarding plaque was higher in the cardiac group as compared to the controls and the result was statistically significant (p= 0.028). The awareness about fluoride action on teeth was poor among both cardiac and control groups.

The parental compliance about the dental needs of children was poor in both the groups. Only 4% of children in cardiac group visited a dentist in past 6 months whereas none in the control group. None of the children in both groups ever received any preventive dental treatment. 98% of parents in cardiac group were unaware of any correlation between the child's oral hygiene and heart condition. They had no knowledge about IE and only 8% were aware about the need for antibiotic prophylaxis before dental treatment.

DISCUSSION

IE is still a major cause of morbidity and mortality among patients with heart diseases in India and abroad.[9] The findings in our study did not show any statistically significant difference between the prevalence of dental caries for children with heart disease and the healthy controls and thus, the study rules out heart disease as a confounding factor in dental caries. A study conducted by Talebi *et al*. was in agreement with our

results. [10] An epidemiological survey of 1140 children aged between 3 and 6 years in the city of Aracatuba presented mean *dmft* similar to the cardiac and control groups of our study. [11] According to some studies, children with cardiac diseases showed a higher index of carious lesions compared to healthy children. Authors of these studies suggested certain predisposing factors such as increased susceptibility to the development of enamel defects, chronic use of sugared medicines and high consumption of sweets as compensation for increased levels of caries in these children.[12] But such an association was not seen in our study.

An important finding of our study was that none of the children visited a dentist for any kind of preventive treatment, which is not only disheartening for pediatric and preventive dentists but more importantly, is harmful for the cardiac group of patients. This shows sheer ignorance of parents towards dental health of their children. Another serious factor is that the presence of high caries index is a contraindication for children who have to undergo a heart surgery. [13]

The results of this study showed that inspite of contact with the physicians, the parents of children with heart diseases are not provided with full range of information about IE, antibiotic prophylaxis and preventive regimen, as soon as they are diagnosed. The doctors are not vigilant about referring these patients to dentists. The parents of children aged between 1 and 5 years must be instructed to carry out oral hygiene procedures for their children, who do not have the manual dexterity and are not well motivated for good oral hygiene. [14] This negligence of oral hygiene may be due to a greater focus of parents on the child's systemic condition compared to his oral health. However, this fact cannot be considered as an excuse for child's poor oral hygiene. [15] Increased educational efforts directed at parents and their children with heart disease, regarding primary and preventive health care needs of their children may remedy the insufficient care. Closer cooperation between pediatric cardiologists and pediatric dentists could help improve dental care for these children.

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