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Dental Caries Among Children Of Age 6- 12 Years Old Visiting A Dental Institution - A Retrospective Study

RANGEELA M[1] ,DR. ARCHANA SANTHANAM[2*], DR DEEPIKA RAJENDRAN[3]

[1]Saveetha Dental College and Hospitals, Saveetha Institute Of Medical and Technical Science,Saveetha University,Chennai, India.
[2]Assistant Professor,Department of oral pathology ,Saveetha Dental College and Hospitals, Saveetha Institute Of Medical and Technical Science,Saveetha University,Chennai, India.
[3]Senior lecturer,Department of oral medicine and radiology ,Saveetha Dental College and Hospitals, Saveetha Institute Of Medical and Technical Science,Saveetha University,Chennai, India.
*Corresponding Author:
Email : 151701078.sdc@saveetha.com[1], drarch.s@gmail.com[2], : deepikar.sdc@saveetha.com[3]

Abstract: Introduction: Dental caries is the most common type of oral health problem globally. Despite scientific advance and the fact that caries is preventable, the disease continues to be a major public health problem. In developing countries like India, changing lifestyle and dietary patterns increase the incidence of caries. Dental caries are known to have multifactorial etiology with a number of variables that influence the prevalence of the condition. It refers to the demineralisation of the tooth by the bacteria which occurs when dental plaque adheres to tooth surfaces and becomes colonized by the bacteria.
Aim: The aim of this study is to determine the prevalence of dental caries among children less than 12 years.
Materials and methods: A total of 4038 patients were retrospectively reviewed from June 2019-March 2020 and included in the study. Demographic details like age, gender and dental status of all the patients were recorded. All the data were entered in the excel sheet. Data was analysed by SPSS software. Chi square test was used to find association between the study variables, where $P<0.05$ was considered statistically significant.
Results: Among the 4038 study subjects of which 2274 were boys and 1764 girls. The prevalence of dental caries is more among 10 years old children (68%) with boy predilection (69%). Mean DMFT score of the population was 4.22. The prevalence of dental caries and age groups were statistically significant ($p < 0.05$).
Conclusion: This study emphasises the need for treating dental caries at its earliest stage and parents should be aware of caries preventive measures for their children.

Keywords: Dental caries; prevalence; children; DMFT.

INTRODUCTION:

Dental caries is the most common type of oral health problem globally. Despite scientific advances and the fact that caries are preventable, the disease continues to be a major public health problem(Kalra et al., 2011). Dental caries is known to have multifactorial etiology with a number of variables that influence the prevalence of the condition.It refers to the demineralisation of the tooth by the bacteria (S et al., 2017).This occurs when dental plaque adheres to tooth surfaces and become colonized by the bacteria. In developing countries like India, changing lifestyle and dietary patterns are markedly increasing the incidence of caries (Dhar and Bhatnagar, 2009) . Low income, poor oral hygiene, schooling and fluorosis, enamel defects, low socioeconomic status, low level of parental education and cariogenic diet influence caries risk(Nelson et al., 2010).

Worldwide there is a high prevalence of dental caries involving the people of different regions. Some voluminous literature exists about dental caries prevalence in Indian population(Hegde et al., 2011),(Phipps et al., 2012). Caries prevalence varies greatly between and within countries, as well as within different strata of Indian population. The neglect of Indian population towards oral health is the prime reason for the dental caries epidemic, even though it is investigated as a preventable disease. In the past, innumerable studies and surveys have been conducted to determine the prevalence of the disease and the variables associated with its prevalence across the globe (Rao, Sequeira and Peter, 1999). Still a number of districts lack data on the prevalence of oral health problems which is very essential to formulate an action plan to combat them. The most common problem faced by the childrens nowadays is dental caries. The incidence of dental caries in children is increasing as rapid as dental caries in an adult. Simultaneously the need for its treatment is also increasingly important for proper development. Hence, dental caries remain a major health issue(Pratha and Gheena, 2019).

The prevention of dental caries has long been considered as an important task for the dental health professionals. Some scientific research studies continue to make progress in identifying the best practices for diagnosing, treating, and preventing dental caries in our communities. Conventional approaches for treating carious lesions in a surgical manner are being replaced by newer strategies that emphasize disease prevention and conservation of tooth structure.

Dental caries affect humans of all ages with the highest priority risk group being school children. According to WHO, 12 years of age is considered as the global monitoring age, as most of the oral disease can be perceived during this time span(Mandal et al., 2015).This age group of 6 to 12 years runs from childhood to adolescence(Prabakar et al., 2020). These are influential stages in people's life where lifestyle, substantial oral health related behaviour, attitude and a well being, are developed. More than 50 million hours annually are lost from school among childrens due to oral diseases. Studies have reported missed school hours, toothache, and several impairments of daily life activities associated with a high decayed component in both dentitions.Children who suffer from poor oral health are 12 times more likely to have more restricted activity.

The prevalence of dental caries in an individual is obtained by calculating DMFT, which is the most common index used and for deciduous dentitions dft index is used. Previously our team had conducted numerous clinical trials (Chakraborthy et al., 2014; Ashok Kumar and Gheena, 2015; Jangid et al., 2015; Jayaraj et al., 2015; Sivaramakrishnan and Ramani, 2015; Swathy, Gheena and L, 2015)and lab animal studies and in-vitro studies (Premkumar et al., 2014; Sherlin et al., 2015; Gheena and Ezhilarasan, 2019a; Hema Shree et al., 2019; Sridharan et al., 2019)over the past 5 years. Now we are focussing on epidemiological studies(Gupta and Ramani, 2016; Thangaraj et al., 2016; Sridharan, Ramani and Patankar, 2017; Hannah et al., 2018). The idea for this study stemmed from the current interest in our community. Hence this present study was conducted as a part of screening to assess the prevalence of dental caries among children below the age of 12 years. Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Deogade, Gupta and Ariga, 2018; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; J et al., 2018; Menon et al., 2018; Prabakar et al., 2018; Rajeshkumar et al., 2018, 2019; Vishnu Prasad et al., 2018; Wahab et al., 2018; Dua et al., 2019; Duraisamy et al., 2019; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Gheena and Ezhilarasan, 2019b; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Panchal, Jeevanandan and Subramanian, 2019; Rajendran et al., 2019; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma et al., 2019; Varghese, Ramesh and Veeraiyan, 2019; Gomathi et al., 2020; Samuel, Acharya and Rao, 2020)

MATERIALS AND METHOD:

Study setting:

This is a university hospital based retrospective , cross sectional study conducted among children aged 6 to 12 years visiting private dental institutions, Chennai with approval from the Institutional Review Board (SDC/SIHEC/2020/ DIASDATA/0619-0320). Data collected was reliable and with evidence.

Data collection: During the period from June 2019 to March 2020, we reviewed the case record of 86000 patients out of which a total of 4038 children from 6-12 years of age with dental caries were selected for this study. A customized examination form was used to collect the data and a special table for data collection was prepared. The data collected was classified according to age, gender, no of caries affected teeth, no of missing and filled teeth. DMFT index was also calculated. Dependent variables were dental caries and Independent variables are age and gender.

Data analysis:

A customised examination was used to collect the data and a special table for data collection was prepared. Data collected was recorded in the excel sheet which was later transferred for statistical analysis using SPSS software version 20 . Data were analysed using descriptive statistics and chi square test was to determine the association between the variables. P value less than or equal to 0.05 was taken as significant.

RESULTS:

A total of 4038 children of 6 to 12 year age group were examined to find out the prevalence of dental caries among them. Among 4038 study subjects, 2274 were boys(56.32%) and 1764 were girls(43.68%) as illustrated in figure 1. Figure 2 depicts the frequency distribution of the most commonly affected age group by caries belongs to 10 years of age, with an average of 0-6 teeth being affected by caries (Figure 3).The mean age group of all the participants was found to be 9.07±1.935. The prevalence of caries in children was more in boys compared to girls among all age groups with p value = 0.05 which is statistically significant (Figure 4). The overall mean DMFT values for children 6- 12 years of age was 4.22.

DISCUSSION:

The study sample consisted of 4038 subjects of which 2274 were boys (56.32%) and 1764 were girls(43.68%). Similarly Joshi N et al in their study found that the prevalence of dental caries was higher in boys (69%) than

girls(Joshi et al., 2013). This can be attributed to the fact that boys are more prevalent to snacking habits. Garkoti et al, and Karunakaran et al,in their study also found similar results (Karunakaran et al., 2014; Garkoti et al., 2015).

Among a total of 4038 children, the most commonly affected age group was 68% belonging to 10 years of age followed by 7 and 11 years of age and 12 years of age. The study results are in concordance with the study done by Dhar et al, in which children aged 6 to 10 years reported that the prevalence of dental caries was 63.2%.(Dhar and Bhatnagar, 2009). Hiremath et al (Hebbal, Ankola and Metgud, 2012), in their study among 6–11 years aged school children found that the higher prevalence of dental caries was 78.9% among 10 to 11 years old children while Bansal et al, in their study among school children of 5 to 18 years of age, prevalence of caries was found to be 30.9% among 10 years old children which is far below the prevalence in the present study (Sachdev, Bansal and Chopra, 2016).

From the present study it is inferred that the age group which had the maximum number of caries affected teeth was 10 years with an average of 0-6 teeth being affected by caries. Similarly the study on prevalence of dental caries among 5 to 13 years old children by Saravanan et al (Saravanan et al., 2008),showed the maximum number of caries affected teeth was among 10 years old children with an average of 4 to 5 teeth (70.2%). The 10-11years age group mainly contributed to this higher overall prevalence, which is a sign of continued negligence of oral health(Goel et al., 2015).

Caries prevalence in children was more in boys compared to girls among all age groups with p value = 0.05 which is statistically significant.Similarly Joshi et al in their study reported a higher prevalence among boys (80%) than in girls (73%) (Joshi et al., 2013)

The mean DMFT was found to be 4.42 in the present study, which is similar to the study by Yi hong Cheng et al with a mean DMFT of 3.2(Cheng et al., 2019). Sudha p et al and Subramanyam et al reported with a mean DMFT of 4.3 which is similar to the mean value of the present study(Mahejabeen et al., 2006),(Subramanyam et al., 2018). This finding may be due to the fact that DMFT coincides with the eruption of permanent teeth and low economic status.

Limitations of the study include short sample size, single centred study and doesn't represent all age groups of children. Risk factors for dental caries, socioeconomic status, and oral hygiene behaviors should be assessed along with the prevalence of dental caries.

Preventive measures need to be taken in future to decrease the burden caused by dental caries. OHI(oral hygiene instructions) should be given to the parents, which would be an ideal measure in the prevention of dental caries. This data might be used for evaluation and planning of future oral health prevention and treatment programs targeting young children in schools. A comprehensive community-focused oral health-care intervention that includes oral health education in elementary schools and homes are recommended to increase general oral health awareness.Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018; Ramesh et al., 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree Priyadharsini, 2019; Mathew et al., 2020)

CONCLUSION:

Based on the findings of the present study, it can be concluded that dental caries is common among 10 years old children which is more commonly seen in boys compared to girls. The study reveals that dental caries still remain as a major oral health problem among the children.

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AUTHORS CONTRIBUTIONS:

Rangeela M: Literature search, data collection, analysis, manuscript writing
Dr Archana Santhanam: Study design, data verification, manuscript drafting

CONFLICT OF INTEREST:

The authors declare that there were no conflicts of interest in the present study

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Legends for graph:

Figure 1: Bar chart depicting gender distribution of participants

Figure 2 : Bar graph depicting the frequency of age of children affected by dental caries among the study participants.

Figure 3: Bar graph depicting the association between age and number of teeth affected by dental caries using chi square test.

Figure 4: Bar graph depicting the association between gender and number of teeth affected by dental caries using chi square test.

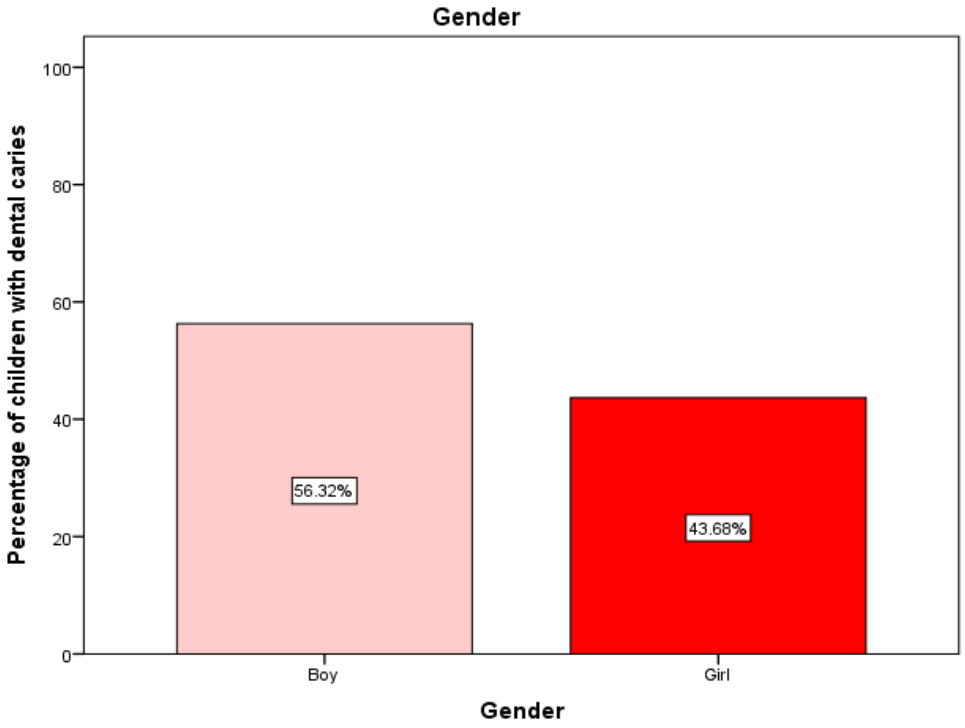

Fig.1: Bar chart represents the gender distribution of children between the age group of 6 to 12 years. X- axis represents the gender of the children(boy-pink, girl-red). Y-axis represents the percentage of children with dental caries. Dental caries was more common among the boys (56.32%) compared to girls (43.68%).

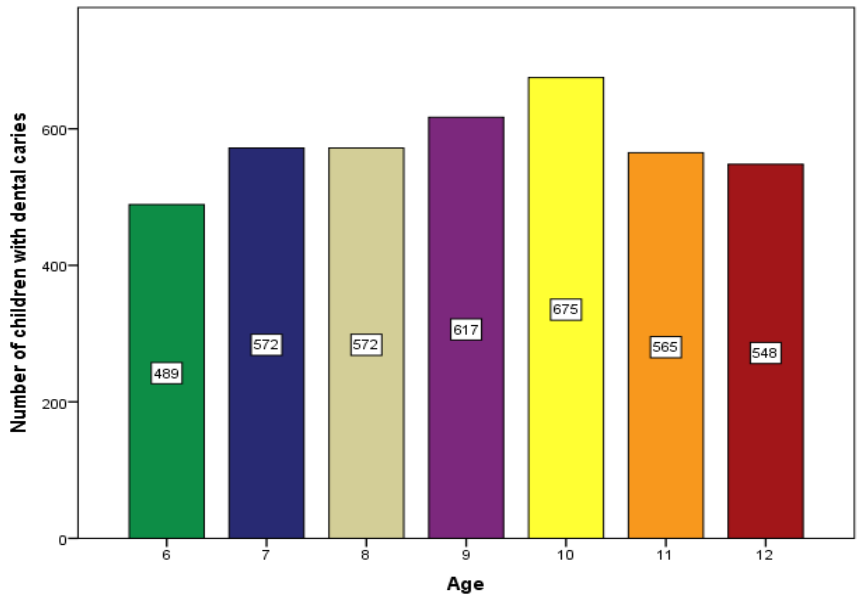

Fig.2 : Bar graph depicting the age distribution of children among the study participants. X-axis represents age (6 to 12 years). Y-axis represents the total number of children. The green colour denotes 6 years, blue colour denotes 7 years, cream colour denotes 8 years old, purple colour denotes 9 years, orange colour denotes 11 years and brown colour denotes 12 years old children. It is inferred that the most commonly affected age group by dental caries belong to 10 years of age (675- yellow).

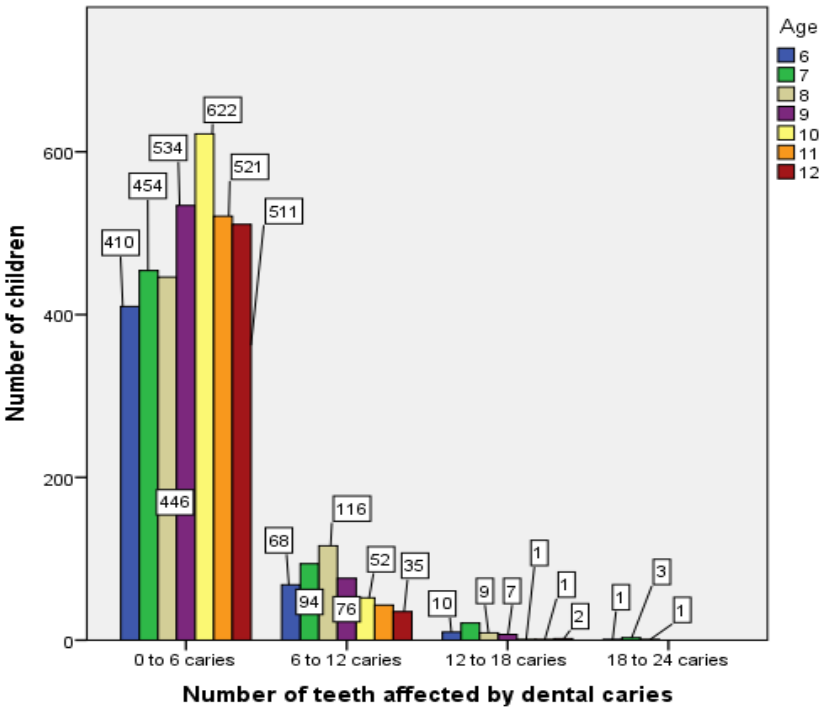

Fig.3: Bar graph depicting the association between age and number of teeth affected by dental caries among 6 to 12 years old children. X axis represents the number of teeth affected by dental caries among 6 to 12 years of age group where the green colour denotes 6 years, blue colour denotes 7 years, cream colour denotes 8 years, purple colour denotes 9 years, yellow colour denotes 10 years, orange colour denotes 11 years and brown colour denotes 12 years old children and Y-axis represents the number of children. The most commonly affected age group by caries belongs to 10 years of age (622 -yellow),0-6 teeth being affected by caries. Pearson's Chi square value = 0.000 (p<0.05) hence statistically significant.

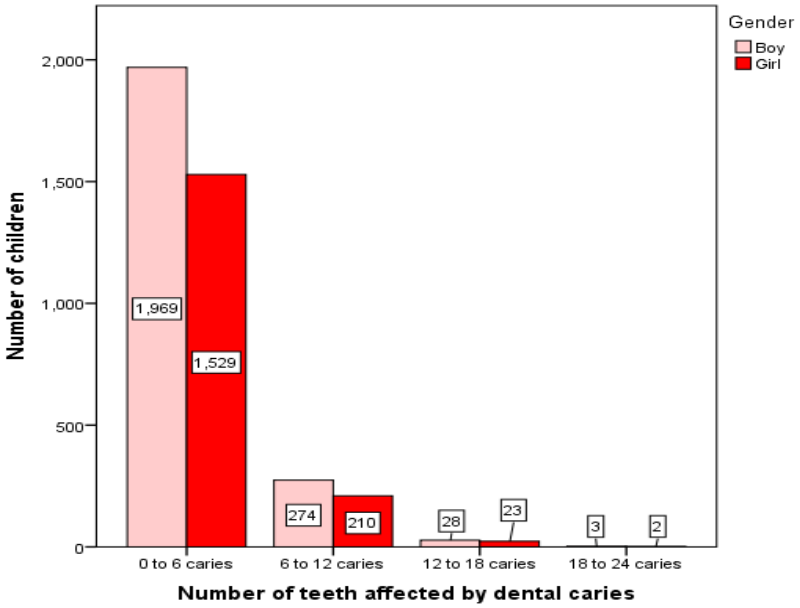

Fig.4: Bar graph depicting the association between gender and number of teeth affected by dental caries. X-axis represents the number of teeth affected by dental caries in boys and girls. Y-axis represents the number of children. The prevalence of caries in children was more in boys(1969 - pink) compared to girls(1529 - red) with 0-6 caries affected teeth. Pearson's chi square value = 0.05 (p<0.05) hence statistically significant.