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Original Research Article

A report on the occlusal dental caries experience in deciduous, mixed and permanent dentition of school children in Chennai, Tamil Nadu 2017-18

V. Anu[1*], Bellamkonda Pavani[1], D. Judyangel[1], Natasha Mayma[2], A. Jyosthna[3]

[1]Department of Public Health Dentistry, [3]Department of Orthodontics, Sathyabama Dental College and Hospital, Chennai, Tamil Nadu, India
[2]Department of Orthodontics and Dentofacial Orthopedics, SRM Dental College, Ramapuram, Chennai, Tamil Nadu, India

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***Correspondence:**
Dr. V. Anu,
E-mail: pcnanu@gmail.com

ABSTRACT

Background: Dental caries is the most common disease among the spectrum of oral diseases and is still a major public health burden in developing countries, affecting 60-90% of school children. To obtain a database about the dental caries prevalence among the school children in Chennai city, 2017-2018.
Methods: A cross-sectional study was carried out among 2300 school children aged between 3 to 17 years in Chennai, Tamil Nadu. Dental caries was recorded using World Health Organisation (WHO) criteria of decayed, missing, and filled teeth (DMFT) and DMFT indices. Chi square test was done to assess the comparison between primary and mixed and mixed and permanent. DMFT and DMFT indices had extreme values, hence '0' was set as median value and median test was applied.
Results: The present study showed a higher prevalence of dental caries in primary (40.17%), mixed ('d' 33.02% and 'D' 38.8%) and permanent dentition (51.06%). The filled component is less with 0.85% in primary, 2.20% in mixed 'f', 0.58% in mixed 'F', and 2.98% in permanent dentition. The mean 'DMFT' in primary dentition is 1.32, mixed dentition mean 'DMFT' is 0.84, mixed dentition mean 'DMFT' is 0.96 and in permanent dentition mean DMFT is 1.57. Dental caries prevalence was found to be significantly more in males when compared to females.
Conclusions: There is a higher prevalence of dental caries among school children in all three groups and this data can be used to plan preventive programmes to improve the oral health of this children.

Keywords: Dental caries, Prevalence, Primary dentition, Mixed dentition, Permanent dentition, India

INTRODUCTION

Dental caries is a multifactorial disease characterized by demineralisation of inorganic portion and destruction of the organic portion of the tooth and is the outcome of a multiple complex process involving factors such as diet, microorganisms, trace elements, saliva, genetic predisposition, and tooth morphology. Dental caries is the most common disease among the spectrum of oral diseases and is still a major public health burden in developing countries, affecting 60-90% of school children.[1] Studies have reported missing school hours, toothache, and several impairments of daily life activities associated with a high decayed component in both primary and permanent dentition.[2] In India, the National Oral Health Survey conducted in 2003 reports that the caries prevalence in 12

years old school children is 52.5%. Various studies have reported prevalence of caries in India.[3-6] Literature on the prevalence of dental caries in deciduous, mixed and permanent dentition among school children in Chennai city is scarce. Hence this study was undertaken with the aim to obtain a database about the dental caries prevalence among the school children of Chennai city.

METHODS

This study was a population based cross sectional survey conducted in Chennai, the capital of Tamil Nadu state in India, situated on the coromandel coast of the Bay of Bengal. The sample size was estimated as to be 2300 subjects which was calculated using the formula $n=(z^2pq)/d^2$ where, 'n' is the desired sample size, 'Z' the standard normal variant at a given confidence level(1.96) at 5%level of significance or 95% confidence level, 'p' the prevalence (63.2%) obtained from previous studies conducted by Parasuraman et al (2017) and 'q' the alternate proportion(1-p), 'd' the acceptable error (set as 3).[7]

Data collection

A cross-sectional study was conducted among the school children between the age group of 3 to 17 years, after obtaining ethical clearance from the institutional human ethical committee of Sathyabama dental college, Chennai. Informed consent was obtained from the school authorities and parents of the school children before the start of the study. The study was carried out between October 2017 to February 2018.

Sample selection

2377 students were randomly selected for this study from 5 private and 5 government schools in Chennai, Tamil Nadu. 814 had only primary dentition, 860 had mixed dentition and 703 had only permanent dentition. The students who were willing and present on the day of examination were included.

Type III ADA clinical examination was carried out.[8] The participants were made to sit on a chair in natural daylight and were asked to rinse mouth thoroughly with water before the examination. A clinical oral examination was carried out using a mouth mirror and community periodontal index for treatment needs (CPITN) probe. Dental caries was recorded using dmft index for primary dentition and DMFT index for permanent dentition according to World Health Organization criteria.[9,10] For mixed dentition, the caries indices for the permanent and deciduous teeth was recorded and calculated separately. DMFT and DMFT indices are never added together, the index for the permanent tooth is usually determined first and then the index for the primary tooth separately. The data were entered in Windows excel 2017 and analysis was done using statistical package SPSS 20 version. As the data are not normally distributed, non-parametric test was carried out. Frequency distribution and Chi square tests were done and the level of significance was set at 0.05. Chi square test was done to assess the comparison between primary and mixed and mixed and permanent. DMFT and DMFT indices had extreme values, hence '0' was set as median value and median test was applied.

RESULTS

Among 2377 children, 814 had primary dentition (Group A) aged 3 to 6 years, 860 had mixed dentition (Group B), aged 7 to 13 years and 703 had permanent dentition (Group C) aged 14 to 17 years.

Dental caries experience in primary dentition

Among 814 primary dentitions, 327 (40.17%) reported to have decayed teeth, 6 (0.73%) of have extracted tooth due to decay and 7 (0.85%) have filled tooth. The mean 'DMFT' in primary dentition is 1.32.

Dental caries experience in mixed dentition

In mixed dentition, the prevalence of primary teeth 'd' component is 33.02%; 'm' component is 1.27% and 'f' component is 2.20%. The mean 'dmft' for primary teeth in mixed dentition is 0.84. The prevalence of 'D' component in the permanent teeth of mixed dentition is 38.8%; 'M' component was 0.58% and 'F' component was 0.58%. The mean DMFT for permanent teeth in mixed dentition is 0.96.

Dental caries experience in permanent dentition

The prevalence of 'D' component in permanent dentition is 51.06%; 'M' component is 2.4% and 'F' component is 2.98%. Mean DMFT is 1.57.

Comparison between primary, mixed and permanent dentition

The DMFT and 'dmft' had extreme values and hence median test was carried out by setting '0'. From Table 1, it is observed that there is a significant difference between primary and mixed dentition in decay and 'DMFT' parameters. Table 2, shows all the dental parameters were statistically significant when compared between mixed and permanent dentition based on DMFT index.

Comparison based on gender

It is evident from table 3 that there is a statistical significance between gender with regards to decayed and DMFT alone in mixed dentition. Other parameters show no statistical significance in groups.

Table 1: Comparison between primary (Group A) and mixed dentition (Group B) based on the DMFT index using median test.

	Decay (d)			Extracted (e)			Filled (f)			DMFT		
Group	**A**	**B**	**Total**	**A**	**B**	**Total**	**A**	**B**	**Total**	**A**	**B**	**Total**
>Median	327	284		6	11		7	19		330	294	
≤Median	487	576	1674	808	849	1674	807	841	1674	484	566	1674
Total	814	860		814	860		814	860		814	860	
Median	0			0			0			0		
Chi-square	9.221			1.222			4.98			7.222		
P value	0.002*			0.269			0.026			0.007*		

*Significant p values.

Table 2: Comparison between mixed (Group B) and permanent dentition (Group C) based on the DMFT index using median test.

	Decay (d)			Extracted (e)			No. of filled (f)			DMFT		
Group	**B**	**C**	**Total**	**B**	**C**	**Total**	**B**	**C**	**Total**	**B**	**C**	**Total**
>Median	334	359		5	17		5	21		342	372	
≤Median	526	344	1563	855	686	1563	855	682	1563	517	331	1563
Total	860	703		860	703		860	703		860	703	
Median	0			0			0			0		
Chi-square	23.442			9.404			13.686			26.470		
P value	0.000*			0.002*			0.000*			0.000*		

*Significant p values.

Table 3: Comparison between male and female based on the dental caries experience.

			Decay			DMFT		
			No decay	**Decay**	**Total**	**Absent**	**Present**	**Total**
DMFT	Group B	Male	367	263	630	360	300	630
		Female	159	71	230	157	73	230
					860			860
		Chi square value	24.13			24.39		
		P value	0.004*			0.004*		
			Decay			**DMFT**		
			No decay	**Decay**	**Total**	**Absent**	**Present**	**Total**
	Group C	Male	282	293	575	270	305	575
		Female	62	66	128	61	67	128
					703			703
		Chi square value	5.74			12.75		
		P value	0.706			0.174		
DMFT index			**Decay**			**DMFT**		
	Group A	Male	301	327	528	302	226	528
		Female	186	97	283	182	101	283
					814			814
		Chi square value	12.1			11.8		
		P value	0.67			0.689		
	Group B	Male	425	205	630	420	210	630
		Female	151	79	230	146	84	230
					860			860
		Chi square value	12.49			11.77		
		P value	0.253			0.3		

DISCUSSION

Dental caries is the utmost common disease of childhood, which interferes with daily activities like intake of food and speech. Oral health preventive programmes on large scale considers the reduction of dental caries as prior important. World health organization in its oral health goals, 2000 AD advocates that 50% of 5 to 6 years old children should be free of dental caries.[11] This goal, though not achieved, highlights the importance of dental caries. Data pertaining to dental caries on a periodic basis is necessary. Epidemiological surveys repeated periodically under general conditions will help to estimate the trends in dental caries of the general population over time.[12] This study was undertaken with the aim to obtain a baseline data on dental caries prevalence for the period of 2017 to 2018 in primary, mixed and permanent dentition among school children aged between 3 years to 17 years in Chennai, Tamil Nadu.

The present study was conducted in Chennai city, Tamil Nadu, as there has been no relevant research conducted recently 2017-2018, to provide a thorough and detailed information on the frequency of dental caries in primary, mixed and permanent dentition of school children. However, some studies have been conducted for the differently abled children[13,14], the data of which cannot be generalised for the whole children.

The present study showed a higher prevalence of dental caries in primary (40.17%), mixed ('d' 33.02% and 'D' 38.8%) and permanent dentition (51.06%). The filled component is less with 0.85% in primary, 2.20% in mixed 'f', 0.58% in mixed 'F', and 2.98% in permanent dentition. The mean 'DMFT' in primary dentition is 1.32, mixed dentition mean 'DMFT' is 0.84, mixed dentition mean 'DMFT' is 0.96 and in permanent dentition mean DMFT is 1.57. This study highlights that although there is a higher prevalence of dental caries there is almost 20-30% reduction in dental caries among school children when compared to the study done Arangannal et al in Chennai children.[15] The difference may be because Arangannal et al (2016) followed ICDAS II to detect dental caries, which includes early enamel lesions also whereas the present study followed DMFT/DMFT indices WHO criteria which considers only cavitated dental lesions.[15] The reduction might also be because of the preventive measures planned and executed by the dental institutions nearby the school targeting the children. Increase awareness created among school children from the kindergarten classes regarding cariogenic diet, maintaining oral hygiene, etc. by the school teachers might also be a reason for the wide drop in dental caries prevalence. It is evident from this study that the filled component is less in all the three groups. This might be because of the lack of awareness to preserve primary teeth among children and their parents.

From this study it is observed that dental caries is more in males when compared to females. This is contradictory to the studies reported earlier, which supports females in India have more dental caries than males.[15-17] The reason for this contradictory result may be due to an inappropriate selection of sample. Consideration was given for selecting sample based on the type of dentition rather than gender, which can be a limitation of this study.

This study highlights the prevalence of dental caries in 2017-2018 for three groups of dentitions, i.e., primary, mixed and preventive dentitions, based on the WHO criteria for dental caries which is still being considered worldwide for epidemiological surveys. Future studies using the same criteria in the same population for different time period can be done to know the changing trends in dental caries among this population.

CONCLUSION

To conclude, there is higher prevalence of dental caries among school children in all three groups, i.e., primary, mixed and permanent dentition and this data can be used to plan preventive programmes to improve the oral health of this children.

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