IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 15, Issue 3 Ver. II (Mar. 2016), PP 76-81
www.iosrjournals.org

Dental Caries Experience and Treatment Needs among 7-17 Year Old School Children in Madurai, Tamil Nadu, South India

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Abstract
Aim: *To assess the Dental caries experience and treatment needs among 7-17 year old school children in Madurai, Tamil Nadu, South India.*
Objectives: *To determine the prevalence of dental caries among 7 to 17 year old school going children of Madurai To compare the dental caries experience among 7 to 17 year old school going children of Madurai using dft/DMFT and SiC index*
Background of methodology: *This cross sectional study was conducted on 1140 school going children in Madurai. The target population was in the age group between 7-17 year old school children. A cluster sampling methodology was used. Each school which was selected through simple random sampling was considered a cluster. New clusters were included until the desired sample size was achieved. Prior to the start of the study ethical clearance was obtained from the scientific review board of Saveetha University. Group informed consent was obtained from the respective school before examination. Examiners were trained and calibrated through a series of clinical training in the Department of Public Health Dentistry, Saveetha Dental College. Dentition status and treatment needs index from the WHO oral health assessment form was used. From the raw data obtained a SiC index score was calculated. Data was analysed using SPSS software.*
Results: *The prevalence of dental caries was 4% between 7-9 years and gradually increased to 24% between 10-12 years and further increased to 65% between 13-15 years and declined to 7% between 16-18 years. The highest caries prevalence was found among males (78.10%) than females (75.92%).*
Conclusion: *The caries experience among 7-17 year old school children was low compared to WHO-recommended values. Effective oral health promotion strategies need to be implemented to further improve the dental health of school children in Madurai city.*
Key words: *Dental caries, prevalence, school children, treatment needs.*

I. Introduction:

Dental caries is defined as a multi factorial infectious disease caused by plaque bacteria. When food enters the mouth; bacteria metabolise fermentable carbohydrates, producing acids which diffuse in to hard dental tissue and demineralise enamel.**[1]** The other factors like individual, social, environmental and cultural factors are also responsible for causing dental caries.**[2]**

School age always remains an influential stage of an individual's life. **[3]**Schools play an important role in the control and prevention of dental caries. It is the most effective mode which can help us reach children worldwide. Through children, the dental awareness can be created to their families and then to the community. This is when the oral health related behaviours, beliefs and attitudes are developed. During this period, the habits that are learnt last for periods and have a huge impact in one's life. School years cover a period that runs from childhood to adolescence. So, it is in the age group between 7-17 years of age where children are particularly receptive. According to National Health Survey conducted in 2004, in India had shown dental caries in 51.9% in 5 year –old children, 53.8% in 12 year-old children and 63.1% in 15 year –old teenagers. **[4]**This shows, though 12 years of age is known as the 'global monitoring age'; the assessment of caries prevalence is of much importance at 15 years of age. School can provide an ideal setting to reach millions of children and ensure strong foundations for healthy life at an early age.

The report concluded that a preventive dentistry program, such as water fluoridation, should be initiated to address this national crisis in dental caries. In order to assess the magnitude of the preventive task it is necessary to know the extent and severity of the disease. Schools are the best centre for effectively implementing the comprehensive health care programme, as children are easily accessible at school. **[5]**

The 'Prevalence' of Dental caries in an individual is obtained by calculating DMFT values. The high caries groups remain undiscovered in a population when only DMFT values are taken in to consideration for expressing the caries prevalence. So, another index called the 'Significant caries index' (SiC) was monitored to draw attention to individuals with the highest caries in each population. [6]
Hence, this present study was considered as a part of extensive screening, a joint initiative of Saveetha University and Times of India to assess the Prevalence and Comparison of Dental caries experience among 7-17 year old school going Children of Madurai using dft/DMFT and SiC index.

II. Materials And Methods:

Study design: A Cross sectional study.
Study area: The present study was conducted as a part of the extensive screening, a joint initiative of Saveetha University and Times of India to create awareness about oral health among school children in India. A total of 16 places and 79 schools were selected from all zones which includes 21 schools from North, 41 schools from South, 4 schools from East , 9 schools from West and 4 schools from Central. Out of 41 schools in south, one school was randomly selected from Madurai.

This cross sectional study was conducted on 1140 school children in Mahatma CBSE School, Madurai. The target population was in the age group between 7-17 year old school children. A cluster sampling methodology was used. Each school which was selected through simple random sampling was considered a cluster. New clusters were included until the desired sample size was achieved. Subject who were willing and present on the day of examination were included in the study. Subjects under long term medication who were physically or mentally challenged, which may have an impact on their oral health were not included in this study.

Prior to the start of the study ethical clearance was obtained from the scientific review board of Saveetha University. Group informed consent was obtained from the respective school before examination. Examiners were trained and calibrated through a series of clinical training in the Department of Public Health Dentistry, Saveetha Dental College. Inter examiner reliability was calculated by examining 5% of the total sample and re-examination was carried out at least 30 minutes after the initial examination. The kappa value was 0.78 which denotes substantial level of agreement.

Survey instrument and procedure:

Dentition status and treatment needs index from the WHO oral health assessment form was used. The first section of the preformed collected demographic information of the participants such as Name, Age in years, Gender, and their location.

Apart from this, the proforma had basic oral hygiene practices which included frequency of cleaning and materials used to clean the teeth by student were recorded. The data regarding dental caries experience was recorded using dft index for primary dentition and DMFT index for permanent dentition on a structured format. The tooth was considered carious (D component) if there was visible evidence of cavity, including untreated dental caries. The missing (M component) included teeth with indications for extractions or teeth extracted due to caries. The filled (F component) included filled teeth. Finally, the treatment needs were based on the data collected; it included cleaning of teeth, filling, extractions and others.
From the raw data obtained a 'Significant Caries Index' (SiC) index score was calculated, which was proposed by the WHO to draw attention to individuals with highest caries scores in each population.
Data collection was scheduled in the month of November 2014.

SiC Index:

The SiC Index was calculated by sorting the individuals according to their DMFT and dft scores and by selecting the one third of the population with the highest caries values. The mean DMFT and dft was calculated for the subgroup.

Statistical analysis:

Data was analysed using SPSS software. Descriptive statistics was done using frequency and mean and standard deviation. Inferential statistics done using x^2, 5% was set as significance level. For test, a p value of <0.05 is to be considered statistically significant.

III. Results:

This cross sectional study was conducted on 1140 school children in Mahatma CBSE School, Madurai. The target population was in the age group between 7-17 year old school children. A total of 579 males and 561 females were screened. The mean age group was 12 years. The highest caries prevalence was found among males (78.10%) than females (75.92%). Out of 1140 children, 990 (87%) brushed their teeth once daily and 150 (13%) brushed their teeth twice daily. The prevalence of caries with respect to age groups was seen as 4%

between 7-9 years and gradually increased to 24% between 10-12years and increased further to 65% between13-15 years and declined to 7% between 16-18 years. P value of 0.05 was shown statistically significant.

TABLE 1: DISTRIBUTION OF STUDY SUBJECTS

	Gender					
	Male		Female		Total	
Age	N	%	N	%	N	%
7 to 9	138	12%	91	8%	229	20%
10 to 12	174	15%	107	9%	281	25%
13 to 15	234	21%	257	23%	491	43%
16 to 18	33	3%	106	9%	139	12%
Total	**579**	**51%**	**561**	**49%**	**1140**	**100%**

FIGURE 1: PREVALENCE OF DENTAL CARIES ACCORDING TO GENDER

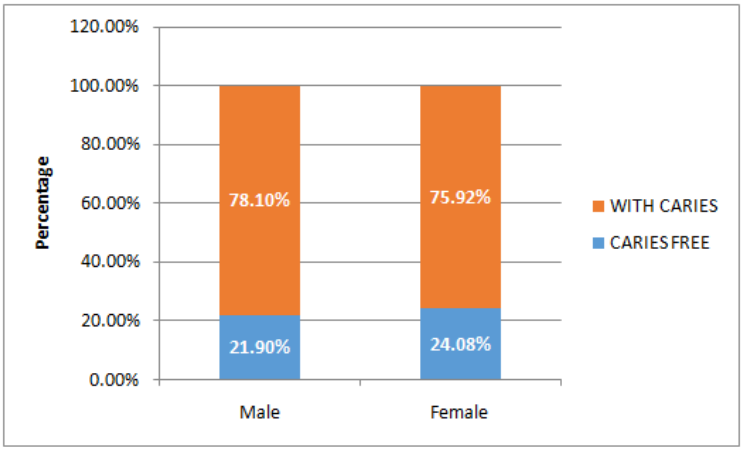

Figure 2: Depicts the prevalence of dental caries according to gender.
A Total of 60 males (21.90%) and 46 Females (24.08%) were caries free. A Total of 214 Males (78.1%) And 145 Females (75.9%) had Caries. The highest Caries Prevalence was found among males (78.10%) than females (75.92%).

FIGURE 2: DISTRIBUTION OF STUDY SUBJECTS BASED ON FREQUENCY OF CLEANING THEIR TEETH

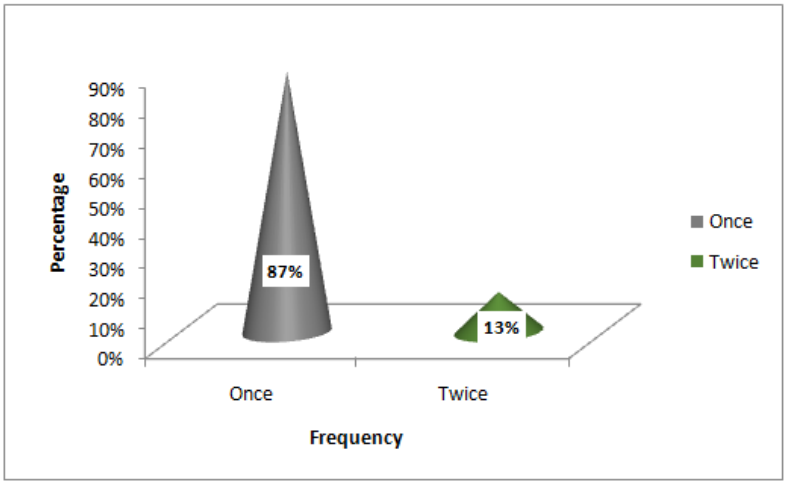

Figure 1: Depicts The Distribution of study subjects based on frequency of cleaning their teeth.
The Study Sample consisted of 1140 subjects of which 990 (87%) brushed their teeth once daily and only 150 (13%) brushed their teeth twice daily.

FIGURE 3: PREVALENCE OF DENTAL CARIES WITH RESPECT TO AGE GROUPS

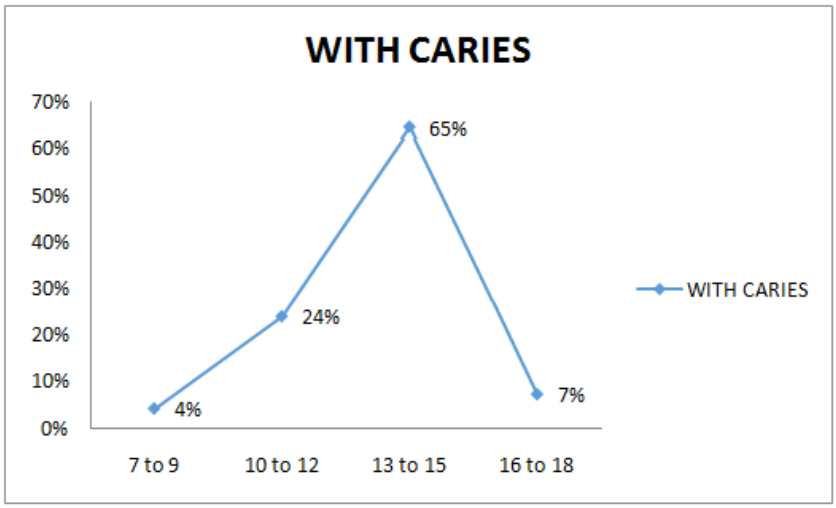

Figure 3: shows the prevalence of caries with respect to age groups.
The study subjects exhibited caries prevalence of 4% between 7-9 years and gradually increased to 24% between 10-12 years and increased further to 65% between 13-15 years and declined to 7% between 16-18 years.

TABLE 2.1: COMPARISON OF MEAN DMFT AND SiC SCORE AMONG VARIOUS AGE GROUPS

DMFT

Age group	N	Mean	SD	P-value
7 to 9	229	0.140	0.61	0.08*
10 to 12	281	0.488	0.82	
13 to 15	491	0.896	1.19	
16 to 18	139	0.281	0.63	
Total	**1140**	**0.45**	**0.81**	

SiC Score

Age group	N	Mean	SD	P-value
7 to 9	29	1.10	1.40	0.01*
10 to 12	92	1.49	0.76	
13 to 15	233	1.89	1.05	
16 to 18	26	1.50	0.51	
Total	**380**	**1.50**	**0.93**	

TABLE 2.2: COMPARISON OF MEAN dft and SiC SCORE AMONG VARIOUS AGE GROUPS

dft Score

Age group	N	Mean	SD	P-value
7 to 9	229	0.99	1.61	0.04*
10 to 12	281	0.04	0.19	
13 to 15	491	0.00	0.06	
16 to 18	139	0.00	0.00	
Total	**1140**	**0.26**	**0.47**	

SiC Score

Age group	N	Mean	SD	P-value
7 to 9	29	0.52	1.80	0.05*
10 to 12	92	0.43	0.37	
13 to 15	233	0.79	0.11	
16 to 18	26	0.00	0.00	
Total	**380**	**0.44**	**0.57**	

TABLE 3: COMPARISON OF MEAN DMFT / dft and SiC Score based on gender

Caries Index	**Male**		**Female**		**Overall**		**P Value**
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	
DMFT	0.651123	0.989151	0.48307	0.996502	0.568421	0.995893	0.03*
SIC	1.76168	0.83031	1.63253	1.217509	1.705263	1.018289	0.02*
dft	0.240069	0.897546	0.178253	0.744233	0.209649	0.825884	0.02*
SIC	2.316667	1.731969	0.3125	0.964495	0.628947	1.336203	0.01*

IV. Discussion:

In the present study it has been observed that the overall prevalence of dental caries was 77%. However, our values are more compared to 52.5% reported by National Oral Health Survey.

It is likely that high level of prevalence in the present study compared to other studies might be due to frequent consumption of cariogenic food along with poor oral hygiene practices in all the subjects and 87% of total subjects brushed their teeth once daily.

Males showed higher caries prevalence than females. Higher prevalence of dental caries among males might be attributed to early eruption of teeth among them and hence having a longer period of exposure of teeth to the oral environment compared with females.[5]Similar results were obtained by studies conducted by Sunayana G et al,[6] Varenne B et al,[7]Avinash et al.[8]

In this study, a maximum number of children, that is, 990(87%) brushed once in a day. These results are in accordance with the study conducted by Shailee et al.[9]but high as compared to findings of Harikaran et al.[10]In the present study, as the frequency of brushing increased, the prevalence of dental caries decreased. This finding is consistent with the findings of Christina SB et al, [11]Wei S et al.[12]and Sethi B et al.[13]

Decayed component constituted a major part of the DMFT scores. In the present study, the mean DMFT was 0.45, respectively; similar values were also reported by Naidu et al. [14]Peterson [15]and Bajoma and Rudolph.[16]The one third of the population with the highest caries score is selected and the mean DMFT for this

subgroup is calculated. This value constitutes the SiC Index which use to focusing attention on those individuals with the highest caries scores in each population. As expected, the SiC index score was higher in all comparison with DMFT which is agreed with other studies.[17] [18]
A comparison between DMFT and SiC indices indicated there is subgroup that presented with a higher caries rate.

With the limitation of this study, further studies are required to correlate dental caries prevalence in the target population with parent's literacy level and other socio behavioural factors. Although severity of dental caries is not assessed separately in the present study; the data regarding treatment need gives a glimpse of the severity of dental caries in the study subjects.

We found the greatest need was for one surface restoration followed by fissure sealant, preventive care, pulp care, extractions and others. This is similar to the findings of Kulkarniand Deshpande, [19]Dash JK.[20]
To improve the oral health of children, we recommend the Oral health promotion through well-structured oral health education program can create positive change in awareness for special groups like schoolchildren. Awareness among students can be generated by the school teachers because they are the role model for the students. Also Parents should be aware of the dental health of their children.

V. Conclusion:

The mean DMFT in 7-17 year-old children in Madurai city, as revealed by the study falls within the 'very low' category as per the WHO classification. But most of the decayed teeth were untreated. In the view of scarce resources that are available for dental care, establishment of school based integrated package, such as the one proposed by

WHO [21] which consist of urgent oral treatment, affordable community oral disease prevention and atraumatic restorative treatment, will probably help to improve the current situation to a large extent. A comparison between dft/DMFT and SiC indices, indicated there is a subgroup that presented with a higher caries rate. Even though the mean dft/ DMFT scores provide a good measure of population disease levels, it is always recommended to calculate the SiC index in order to look at those who might be carrying significant burden of the dental disease experience in the population. Therefore, SiC index is a useful indicator and helps in targeting the preventive programs to the at risk population in the community.

References:

[1] Sudha P, Bhasin S, Anegundi RT. Prevalence of dental caries among 5 to 13-year-old children in Mangalore city. JISPPD 2005;74-79.
[2] Tewari A, Chawla HS. Study of prevalence of dental caries in an urban area of India (Chandigarh). J Indian Dent Assoc 1977;49:231-9.
[3] Shourie KL. Dental caries in Indian children. Ind J Medical Res 1941;29:709-21.
[4] Bratthall, D. Estimation of global DMFT for 12-year olds in 2004. Int Dent J 2004;55:14-18.
[5] Saravanan S, Kalyani V, Vijayarani MP, Jayakodi P, Felix J, Arunmozhi P, et al. Caries prevalence and treatment needs of rural school children in ChidambaramTaluk, Tamil Nadu, South India. Indian J Dent Res 2008;19:186- 90.
[6] Sunayana G, John J, Sarvanan S, Arumugham IM. Prevalence of dental caries among 12 and 15 year old school children in Chennai city. J Indian Assoc Public Health Dent 2009;13:54- 9.
[7] Varenne B, Petersen PE, Ouattara S. Oral health status of children and adults in urban and rural areas of Burkina Faso, Africa. Int Dent J 2004;54:83- 9.
[8] Avinash J, Bhaskar DJ, Mathur A, Khushboo SG. Dental caries status among 12 and 15 year old school going children in urban and rural settlements of Banglore, India. J Oral Health Res 2010;1:19- 25.
[9] Shailee F, Sogi GM, Sharma KR, Nidhi P. Dental caries prevalence and treatment needs among 12- and 15- Year old schoolchildren in Shimla city, Himachal Pradesh, India. Indian J Dent Res. 2012;23:579–84. [PubMed]
[10] Harikiran AG, Pallavi SK, Hariprakash S, Ashutosh, Nage KS. Oral health-related KAP among 11- to 12-year-old schoolchildren in a government-aided missionary school of Bangalore city. J Dent Res 2008;19:236-42.
[11] Christina SB, Anna KH. Dental caries in Swedish 4 year old children. Swed Dent J 1989;13:39-44.
[12] Wei S, Holm AK. Dental caries and related factors in children in Hong Kong. Pediatr Dent 1993;15:116-19.
[13] Sethi B, Tandon S. Caries pattern in preschoolchildren . J Indian Dent Assoc 1996;67 :141-45.
[14] Naidu R, Prevatt I, Simeon D. The oral health and treatment needs of schoolchildren in Trinidad and Tobago: findings of a national survey. Int J Paediatr Dent 2006;16:412-18.
[15] Petersen PE, Kaka M. Oral health status of children and adults in the Republic of Niger, Africa. Int Dent J 1999;49:159-64.
[16] Bajoma AS, Rudolph MJ. Dental caries in 6, 12 and 15 year old venda children in South. East Afr Med J 2004;81:236-43.
[17] Kulkarni SS, Deshpande SD. Caries prevalence and treatment needs in 11-15 year old children of Belgaum city. J Indian SocPedodPrev Dent 2002;20:12-5.
[18] Namal, N., A. A. Yuceokur, and G. Can. "Significant caries index values and related factors in 5-6-year-old children in Istanbul, Turkey." (2009).
[19] Ditmyer, Marcia, et al. "Inequalities of caries experience in Nevada youth expressed by DMFT index vs. Significant Caries Index (SiC) over time." BMC Oral Health 11.1 (2011): 12.
[20] Dash JK, Sahoo PK, Bhuyan SK, Sahoo SK. Prevalence of dental caries and treatment needs among children of Cuttack (Orissa). J Indian SocPedodPrev Dent 2002;20:139-43.
[21] Pakhomov GN. Future trends in oral health and disease. Int Dent J 999;49:27- 32.