Cognitive Factor for Dental Caries among 5-9yr Elementary School Children in Chennai-Cross Sectional Study

Abstract:

Aim: The study aimed to evaluate the risk indicators for dental caries among 5-9yr old school children in Chennai.

Materials And Methods: The cross sectional study has been conducted in 5 different provinces in Chennai . 12 schools are selected on random and almost to cover all the schools in Chennai. Sample of 1020 school children are selected according to educational system.510 government school children and 510 private school children are selected based on economic status and are examined in the school premises along with the questionnaire to know the risk indicators. Questionnaires were asked based on the dietary habits, oral hygiene habits, parental modeling and regular visit to dentist. Multiple logistic regression analysis done using SPSS software.

Results: Data results show that 55% of children are affected by dental caries due to poor dental attendance and frequent consumption of dry biscuits and sugar containing drinks. The present study indicates irregular visit to dentist and frequent consumption of cariogenic foods are the risk indicators

Conclusion: The significance of oral cleanliness and nutritional patterns plays a main role in caries development.

Key Words: caries risk factors, deciduous teeth, educational system, cariogenic food

INTRODUCTION:

Dental caries is one of the most widespread persistent microbial disease. Pathological infectious diseases that causes demineralization of inorganic matter and destruction of organic matter usually by production of acids by hydrolysis of food debris leading to cavity formation. Oral cavity colonized 300 bacterial species and decay containing limited number of bacterial species. Dental caries remain a chronic childhood disease which is commonly seen in young school children which is associated with dietary habits and oral hygiene habits resulting in functional, esthetic and psychological disturbances of the child [1].Poor oral health leads to dental caries that affects the eating habits, nutrition, speaking and learning[2]

According to the study done by US, in school children of age 5-9years 50%of students have at least one cavity or restoration, no depletion was seen in the prevalence or extremity of dental caries.The study was conducted in Philippines among 1200 school students, 71.7% of School children are affected with dental caries [3]. In 2007 a cross sectional survey conducted on a representative sample of Chinese school children of sample 2014, revealed a frequency of 55% of students with dental caries and 14% of students affected with rampant caries[4]. In 2003 united kingdom dental health survey have been carried out, the survey provides information about dental health in 5-15 year old children with sample size of 12000 students in which 67% of students have dental caries experience[5].Data reported from Norway in2004 reveals increase in dental caries incidence in a sample of 50000 school children of age 12 years, 59.8% of student had dental caries[6] .India is also not spared by this global phenomena. National health survey conducted in India in 2004 in the entire country the results demonstrate 51.9% of 5year old children show dental caries and 53.8%of 12year old students show decayed tooth[7]. It is clearly understood from this studies that dental caries is a very serious public health problem hence it is important to evaluate the risk factors for decayed cavity in the deciduous teeth. The commonest form of decayed cavity depends upon the oral hygiene habits and dietary habits. It is a multi-factorial disease that involves on carbohydrates, oral microorganisms, acid, gender, age, salivary flow, utilizing fluorides, and nutritional patterns, geographical constituent and parental modeling[8]

Dental studies show that dental caries associated with variables like microorganisms, increased consumption of sugar, or frequent consumption of pediatric medicines as risk factors of dental caries, socio economic status and absence of tooth brushing are also some of the main risk factors for dental caries studies show that irregular dental attendance may lead to dental caries[9] .To summarize the main players in the etiology of dental caries are cariogenic bacteria ,fermentable carbohydrates ,host ,time.

The study aimed to evaluate the risk factors are grouped with the regularity of the carious lesion in deciduous teeth of age 5-9years. The prevalence of caries can be differ in high and low class children based on their socio-economic status. High class children caries caused due to increased consumption of sweets and in low-class children, caries is caused due to improper or irregular oral hygiene habits.

MATERIALS AND METHODS:

Chennai is the capital of Tamil Nadu and it was taken as a prototype for this study**.** In Chennai there are 1237school, in which primary schools are 271 in number. In this study 12 schools are selected random all over the Chennai using lottery method from all the students in which inclusion and exclusion criteria were included in the study until the number of 510 was obtained. The sample size was 1020 between 5-9years were studied and examined .educational system was divided into two types (Government sector and private sector schools) and from five different areas such as Thiruvanmiyur, Adayar, Ramapuram, Porur, Guindy are selected in random all over Chennai.510

Government school children and 510 private school children are selected in which 420 are boys and 600 are girls. The duration of the study was around 2 months done in the month of October and November 2011.

The children were examined in the school premises using a mouth mirror with natural light, no radiographs were used and the treatment was provided with required Clinical findings are recorded on a prefabricated Performa with questions based on frequency of brushing, oral hygiene behavior, consumption sugar added diet, fluorides exposure and pattern of dental attendance, these additional data are gained from the questionnaire given to the parents of these children. The questionnaire data contains about brushing age, frequency of brushing, parents should help the child to maintain oral health, habitual use of fluoride supplements and fluoride toothpaste. Consuming dry cookies along with candies to school were included in the questionnaire. Dissipation of Sugar added drinks along with meals was observed based on the utilize of carbonated drinks, dietary products, etc. Dental caries was evaluated based on Klein palmer Knutson criteria.

Ethical consent was obtained from the department of public health dentistry, from the school principal and from the parents of school children.DMFT index was recorded and used as a reactive variable and it was subdivided into three groups

Group: A. Children with no caries (dmft = 0),

Group: B Children with low caries experience (dmft<5)

Group: C Children with high caries experience. (dmft,>5)

RESULTS:

Statistical analysis: Descriptive statistics, multiple logistic regression analysis was used to compare oral hygiene habits with the DMFT status.SPSS software was used to complete the statistical analysis with Alpha set at 3%.We infer that 12% of children are in Risk which means they have high possibility of caries. Moreover it follows positively skewed distribution hence we conclude that 55% of children are pretentious by caries that can be observed from the below.

The Mean DMF score is 1.75 and its standard deviation is 2.132, and the median is 1 and less than two teeth affected by caries which was noted that 55% of children. The inter-quartile range is 3(Q3-Q1) and in the center, 50% of the children had a DMF in between 0 and 3.

Figure I: Brushing age

figure I; evidence at the age of brushing started ,in which

115(11%)students showed that they started brushing at 1 year of age ,330 students(32%) observed that brushing starts at the age of 2 years ,420 students (41%) that is majority of the students evidence that they started brushing at the age of 3 years ,153 students(15%) showed that the age of 4 years children started to brush their teeth and 1% of students noted that they started to brush their teeth at the age of 5 years.

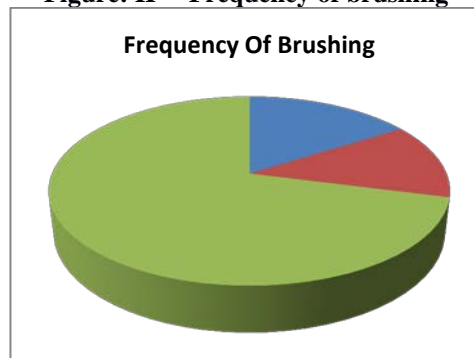### Figure: II   Frequency of brushing

Figure II: show the frequency of brushing, 162 students (16%) brushes less than once daily, 135 students (13%) brushes more than once a day and 723 students (71%) that are majority of the student's brushes once daily.
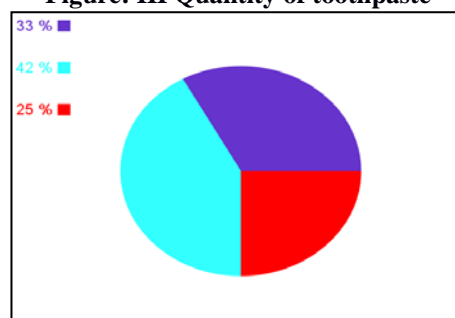
Figure: III Quantity of toothpaste

Figure: III, shows the quantity of toothpaste used by students,331students(33%)showed that they use one pea size of toothpaste,432 students (42%) use two pea size of toothpaste and 257 students (25%) use full brush of toothpaste.
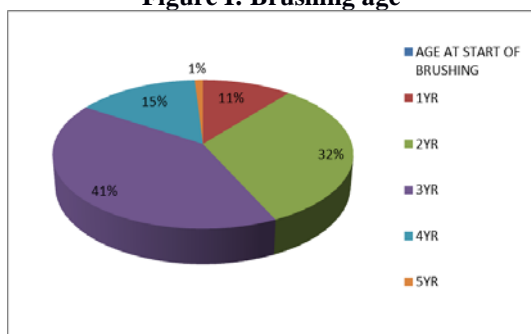
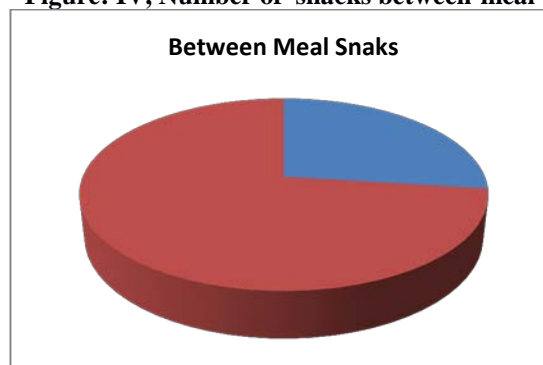### Figure: IV, Number of snacks between-meal

Figure IV, Show the number of between-meal snacks, 273 students (27%) take more than twice between-meal snacks and 747 students (73%) that is the majority of students take less than twice Between-meal snacks.

TABLE 1: Oral hygiene practice

S.no	Oral hygiene practice	Usage	
		Yes N (%)	No N (%)
1	Regular use of fluoride supplements	718 (70%)	302 (30%)
2	Brushing help	602 (59%)	418 (41%)
3	Regular use of fluoridated toothpaste	270 (26%)	750 (74%)
4	Taking dry biscuits	473 (46%)	547 (54%)
5	Taking sweets at school	765 (75%)	255 (25%)
6	Sugar containing drinks	800 (78%)	220 (22%)
7	History of visit to dentist	56 (5%)	964 (95%)

Table 1 shows oral hygiene habits and dietary habits. When the question of regular use of fluoride supplements was asked 718 students (70%) said yes and 302 of them (30%) said no.When a question on brushing help was asked 418 students (41%) said no and 602 students (59%) said yes. When questioned whether they use fluoridated toothpaste regularly, 750students (74%) said no and 270 students (26%) said yes. When asked about the consumption of dry biscuits 547 students (54%) said no and 473students (46%) said yes. When question of taking sweets at school was put forth 255 students (25%) said no and 765 students (75%) said yes. When questioned about sugar containing drinks consumption 220 students (22%) said no and 800students (78%) said yes. When asked about regular visit to dentist 56 students (5%) said yes and 964 students (95%) said no.

TABLE 2:Brushing Pattern of Parents

Serial no	Brushing Pattern of Parents	Habitual (N %)	Not to /don't know (N %)
1	Father	884 (87%)	136 (13%)
2	Mother	893 (88%)	127 (12%)

Table 2 shows brushing habits of father and mother in which 884 students (87%) father have regular brushing habits,136 students (13%) father having irregular brushing habits.893 students (88%) mother have regular brushing habits,127 students (12%) mother have irregular brushing habits.

The significance value of Regression is 0.000 that explain the beta coefficients in the regression model for all random school effect (independent variables) which enable us to proceed with further analysis. If the significance value of Regression is higher than 5% level of significance, the data is not valid to proceed to further analysis.

TABLE 3: Analysis Variance

S.No.	Model	Sum of square	Degree of freedom	Mean square	F-Value	Significance
1.	Regression	17.600	16	1.100	4.737	0.000
2.	Residual	197.143	849	0.232		
3.	Total	214.744	865			

TABLE 4: Variables

S.No.	Variables	Odds Ratio	95.0% Confidence Interval for odds ratio
1	Gender	0.991	0.694-1.416
2	Age	0.965	0.804-1.159
3	School	0.553	0.313-0.978
4	Ethnic origin	0.894	0.07-11.488
5	Age at start of brushing	0.969	0.813-1.156
6	Brushing help	1.097	0.816-1.476
7	Frequency of brushing< 1	0.873	0.509-1.497
8	Frequency of brushing= 1	1.099	0.727-1.66
9	Quantity of tooth paste- 1 pea size	0.747	0.511-1.092
10	Quantity of tooth paste -2 pea size	0.891	0.621-1.278
11	Use of fluoride supplements	1.193	0.791-1.797
12	Use of fluoridated tooth paste	0.704	0.39-1.27
13	Dry biscuit consumption	1.429	1.017-2.009
14	Taking sweets at school	0.964	0.65-1.431
15	Consumption of sugar-containing drinks	0.651	0.484-0.877
16	No of snacks between-meal	0.778	0.515-1.176
17	Brushing habits of the mother	0.514	0.253-1.043
18	Brushing habits of the father	1.327	0.662-2.66
19	History of visiting dentist	0.143	0.064-0.322
20	Constant	24.446	

TABLE 5: Statiscal Analysis

S. no	Variable	B	Standard error	Z score	Degree of freedom	Significance	Odds ratio	95.0% CI for odds ratio
1	School-+*+	-0.602	0.165	13.388	1	0.000	0.548	0,397-0.756
2	Dry biscuits	0.385	0.164	5.522	1	0.019	0.469	1.066-2.025
3	Sugar containing drink	0.383	0.142	7.257	1	0.007	0.682	0.516-0.901
4	History of visit to dentist	-1.867	o.403	21.448	1	0.000	0.155	0.07-0.341

Table 4 helps us to identify the highly significant variable for causing dental caries to the model by using stepwise regression method.

The model has been built with the above variables which have significant effect on dmft .the binary logistic regression model equation is Caries: 2.289-(0.602-school) + (0.385-dry biscuits) + (0.383-sugar containing drinks)-(1.867-dental visit).it was observed that visit to dentist was a significant contributing factor in comparison with dry biscuits consumption and consumption of sugar containing food stuffs.

TABLE 6: Classification Table on DMF:

DMF	Observed	Predicted
No Caries	197	197
Caries	137	335

The optimal cut value is .450
The 1 – 1 (Observed Caries Vs Predicted Caries) sensitivity is acceptably classified at 71% and 0 – 0 (Observed Non Caries Vs Predicted Non Caries) specificity is acceptably classified at 50%.

DISCUSSION:

The influence of different factors on caries extremity has been discussed in so many studies. The main strength of this study is an immense amount of detailed to be expected and assumed risk determinants. In the sample of 1020 Chennai school children,there are 55% of students affected by caries.The children those are consuming dry biscuits and sugar-containing drinks having higher exposure of caries because they are unaware of consulting with dentist and moreover the predominant of children who are from public school having caries.

Many studies speak about the risk indicators for dental caries, for example, a survey done in African-American people on a sample of 1021 people which concludes that low-income African-American population is prone to dental caries[11]. This study also agrees with above fact that in Turkish pre-school children about risk indicators for dental caries in a sample of 598 students show that age and father occupation play a major role in prevalence of dental caries[13,] which has its socioeconomic implication on oral health. Another study in northern Ireland in school children for risk indicators of dental caries show that less than daily tooth brushing habit and highly cariogenic diet are the main cause for dental caries[12].

The present study consisting of 1020 sample in which 420 boys and 600 girls are taken for study from two types of educational systems such as government school and private school, on comparing with the above studies.The present study shows that irregular visit to dentist is the higher risk indicator for prevalence of caries, and next is the consumption of sugar-containing drinks which score 36 %for risks of caries, followed by dry biscuits with the score of 19%.This study highlights the fact the educational system plays an important role in which government school children have higher risk of prevalence of caries due to poor oral hygiene and lack of motivation, private schools have comparatively lower risk but caries are prevalent due to dietary habits such as high cariogenic food.This factor is evident from the logistic regression analysis, the other risk factors are lack of fluoride supplements, parental modeling, less frequency of brushing that are less evident.

CONCLUSION;

The inference from this study is 55%of children are affected by caries which is relatively high for 5-9 years age group from the above analysis the children are recommended to visit dentist regularly to know the oral hygiene status. Reduction of sweets and dry biscuits should be followed and control of sugar-containing drinks. It is also recommended that fluoride should be encouraged for preventive use. The outcome of this cross-sectional study to educate the value of oral cleanliness behavior and nutritional patterns to reduce the growth of caries.

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