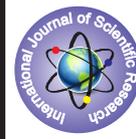


## Assessment of Dental caries risk profile among 12 years old school children of Muradnagar by Cariogram



### Dental Science

**KEYWORDS:** Cariogram, caries risk assessment, risk factors, dental Caries, children

<b>Dr. Disha Latiyan</b>	P.G STUDENT (I.T.S., C.D.S.R. Muradnagar)
<b>Dr. Ipseeta Menon</b>	Reader (department of public health dentistry, I.T.S C.D.S.R Muradnagar)
<b>Dr.Avnish Singh</b>	Reader (department of public health dentistry, I.T.S C.D.S.R Muradnagar)
<b>Dr. Ricky Pal Singh</b>	senior lecturer(department of public health dentistry, I.T.SC.D.S.R Muradnagar)
<b>Dr. Anubhav Sharma</b>	senior lecturer(department of public health dentistry, I.T.SC.D.S.R Muradnagar)
<b>Dr. Jyoti Singh</b>	senior lecturer (department of public health dentistry, Uttaranchal dental and medical research institute, Dehradun)

### ABSTRACT

**Objectives:** The present study was conducted to assess the caries risk profile of 12 years old Indian children using Cariogram.

**Study design:** A cross sectional survey was conducted and hundred children were interviewed to record any illness, oral hygiene practices and fluoride exposure. Examination was done to record plaque and dental caries status. Stimulated saliva was collected and salivary flow rate, salivary buffering capacity, Streptococcus mutans and Lactobacillus count were assessed. The information obtained was scored and Cariogram profile was created. Differences between mean decayed, missing and filled teeth and Cariogram risk groups were assessed using ANOVA.

**Results:** It was found that 1,20,40,20 and 19 children had 0-20%, 21-40%, 41-60%, 61-80% and 81-100% chance of avoiding caries respectively in future. Significant correlation was observed between cariogram score and DMFT index, diet content, diet frequency, plaque scores, Streptococcus mutans counts and fluoride measures.

**Conclusions:** Cariogram model can identify the caries-related factors that could be the reasons for the estimated future caries risk, and therefore help the dentist to plan appropriate preventive measures.

### INTRODUCTION

Despite great achievements in oral health of populations globally many people are still affected by dental caries, only the severity differs. There is interplay of three principal factors, the host, the micro flora and the substrate or diet in the occurrence of dental caries. In addition, the fourth factor time must be considered in any discussion regarding etiology of caries.[1] Conventional management of dental caries is simply done by detecting cavities or precavitated lesions followed by restoration. In recent years, a better understanding of the caries process has changed this operative treatment concept to preventive strategies involving fluoride application and re-mineralization of the damaged tissue.[2]

Exposure to fluoride is one of the most important protective factors when evaluating caries risk and is the cause of the considerable fall in caries levels in Western countries.[3] Cariogram was presented in 1996 by Bratthall for illustrating the interactions of caries related factors. The model makes it possible to single out individual risk or resistance factors. The development of the model was based on the need to explain why, in certain individuals, caries activity could be low in spite of other influencing factors like high sucrose intake, poor oral hygiene, high Streptococci load, or of fluorides [4]

Hence, we propose to perform a preliminary study on the 12 years old school children to evaluate the use of a Cariogram for the caries risk assessment.

### MATERIAL & METHODS

A Cross sectional survey on school children was conducted to assess the Dental caries risk profile among 12 years old school children. Prior scheduling was done before conducting the survey and the data was collected during the month of May 2015. To reduce the intra examiner variability, the subjects were randomly called on different days and examiner repeated the examinations on them. Later the results obtained were subjected to Kappa variability test. The mean Kappa co-efficient values for intra-examiner reliability with respect to Kappa co-efficient of the indices used was 0.88.

Before starting the study, ethical clearance was obtained from the ethical committee of Institute of Technology and Research-CDSR Muradagar, Ghaziabad. Voluntary written consent from school authority, and parents of children was taken before their participation of children in the study in order to avoid any inconvenience and to ensure full cooperation.

The risk assessment consisted of: (a) a validated questionnaire, (b) an interview (c) estimation of oral hygiene (d) saliva sampling (saliva pH and salivary flow rate) (e) clinical examination (DMFT and plaque index) (f) creating a risk profile for each child using a Cariogram. Questionnaire and interview was employed to collect data pertaining to diet, frequency of eating (snacks/meals) per day, related general diseases, the use of fluoride toothpaste, tooth brushing habits and other fluoride supplements. Schools were selected by simple random sampling out of the list available from block education office and all children 12 years of age present on the day of survey were included in the study

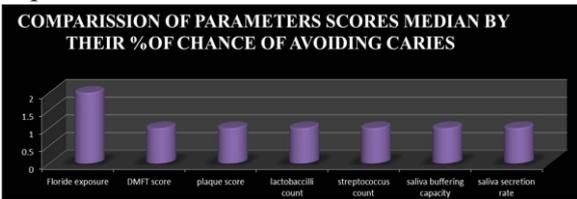
Children above 12 years of ages, whose parents consented for participating in the study and who were not on any medication therapy. The children who were mentally or physically handicapped and medically compromised were excluded.

The data obtained was compiled systematically and subjected to descriptive and inferential statistical analysis. Results on continuous measurements are presented on Mean  $\pm$  SD (Min-Max) and results on categorical measurements are presented in Numbers (%). Student's t test was performed at 95% confidence level. The statistical software namely SPSS 18.0 was used to analysis of the data and Microsoft excel have been used to generate graphs, tables, etc.

### RESULT:

A total of 100 children aged 12 years were grouped according to chance of avoiding caries. It was found that 1, 20, 40, 20 and 19 children had 0-20%, 21-40%, 41-60% and 61-80%, 81-100% chance of avoiding caries respectively in future (Graph 1).

Graph 1



Chi square test revealed that there was statistically significant association between past caries experience, plaque amount, Streptococcus mutans, Florida programme with chance of avoiding caries, whereas no statistical significance was found for lactobacilli count, any related severe disease.

By *t* test for two independent groups, the mean DMFT score of female was significantly higher than by male ( $p < 0.05$ ). Chi square test was used to find differences between caries related factors and differences between mean decayed, missing and filled Spearman Correlation coefficients were used to explore associations among Cariogram scores of avoiding actual chance new caries, salivary buffering capacity and individual variables. P-value  $< 0.05$  was considered statistically significant

## DISCUSSION

Dental caries is a dynamic process of demineralization of the dental hard tissues by the products of bacterial metabolism, alternating with periods of re-mineralization. This pathologic process occurs on a continuum, in which any lesion may range from changes at the molecular level to gross tissue destruction and cavity formation. There are practically no geographic areas in the world whose inhabitants do not exhibit some evidence of dental caries. It usually begins soon after the teeth erupt into the oral cavity.

The view that any caries risk assessment model should be based on multiple caries factors and, more importantly, should consider the cumulative and combined interactive effect on caries was emphasized.[5] The Cariogram model has been evaluated in scientific studies for both children and adult population. Thus it may be utilized as a powerful tool at community level in identifying high risk groups for dental caries and can also enable the policy makers to plan for the future, based on the caries prediction. Its clinical relevance is as under:

- Helps in developing specific preventive, promotive, curative strategies at community level, by the government, semi-government, NGO's etc.
- In a developing country like India the annual budget for health sector is as such very less. Cash trapped health sector cannot cope up with the multiple demands with respect to multiple diseases found at any given instance hence prevention would be the best option.
- Helps in identifying risk groups accurately and label them as special target groups, so that a high risk strategy can be adopted and employed to control and prevent the disease.

The age group of 12-years selected represents a crucial period of life with respect to the natural history of dentition in humans. All deciduous teeth are said to have exfoliated and the second molars would have just erupted or erupting in any child at this age, many permanent teeth but for second molars would have been exposed into oral cavity for few years. WHO considers 12-years age as the global indicator age for monitoring dental caries(3). The present study used Cariogram, which is considered one of the most reliable models as reported by many authors for predicting caries risk in an individual because it is an objective, quantitative method that uses a computer program to calculate the data, with results that can be printed out and saved.[6]

In the present study, the subjects with least chance of avoiding caries [0-20%], which means subjects with high caries susceptibility had the highest mean DMFT of 3.54 and highest mean DMFS of 3.81 at baseline and 4.1 and 4.6 very low mean DMFT and mean DMFS. This signifies the importance of the existing caries experience as a predictor of future caries. Higher the caries experience of a person lower the chance of avoiding caries, and lower the existing caries experience, higher the chance of avoiding caries. Similar relationship is seen in other studies. [7,8,9]

## REFERENCES:

- 1) Bratthall D, Hänsel Petersson G. Cariogram-a multifactorial risk assessment model for a multifactorial disease. *Community Dent Oral Epidemiol.* 2005;33:256-64.
- 2) Kemparaj U, Chavan S, Shetty NL. Caries Risk Assessment among school children in Davangere City Using Cariogram. *Int J Prev Med.* 2014 May;5(5):664-671.
- 3) Kühnisch J, Berger S, Goddon I, Senkel H, Pitts N, Heinrich-Weltzien R. Occlusal caries detection in permanent molars according to WHO basic methods, ICDAS II and laser fluorescence measurements. *Community Dent Oral Epidemiol.* 2008;36:475-84.
- 4) Hänsel Petersson G, Twetman S, Bratthall D. Evaluation of a computer program for caries risk assessment in school children. *Caries Res.* 2002;36:327-40.
- 5) Dodds MW, Wefel JS. 5<sup>th</sup> ed. Berlin: Appleton and Lange publications; 2005. The developing carious lesion: Text book of primary preventive dentistry; p.41
- 6) Ruiz-Miravet A, Montiel-Company JM, Almerich-Silla JM. Evaluation of caries risk in a young adult population. *Med Oral Patol Oral Cir Bucal.* 2007;12:412-8.
- 7) Petersson GH, Twetman S, Bratthall D. Evaluation of a computer programme for caries risk assessment in school children. *Caries Res.* 2002;36:327-40.
- 8) Zukanović A, Kobaslija S, Ganibegović M. Caries risk assessment in Bosnian children using Cariogram computer model. *Int Dent J.* 2007;57:177-83.
- 9) Sonbul H, Al-Otaibi M, Birkhed D. Risk profile of adults with several dental restorations using the Cariogram model. *Acta Odontol Scand.* 2008;66:351-7.