

## Co-Relation Between Use of Caries Risk Assessment and Individualized Caries Prevention Among Adult Patients by Practicing Dentists of Bengaluru

Prijitha Alex<sup>1\*</sup>, Shabana Achapatira Ganesh<sup>2</sup>, Fawaz Pullishery<sup>3</sup> and Rijitha Alex<sup>4</sup>

<sup>1</sup>Department of Public Health Dentistry, Educare Institute of Dental Sciences, Malappuram, Kerala

<sup>2</sup>Department of Public Health Dentistry, The Oxford Dental College & Hospital, Bengaluru

<sup>3</sup>Department of Public Health Dentistry, Educare Institute of Dental Sciences, Malappuram, Kerala

<sup>4</sup>Senior Lecturer, Department of Oral Pathology, Anoor Dental College, Muvattupuzha, Kerala

**\*Corresponding Author:** Prijitha Alex, Senior Lecturer, Department of Public Health Dentistry, Educare Institute of Dental Sciences, Malappuram, Kerala.

**Received:** September 15, 2016; **Published:** November 12, 2016

### Abstract

**Introduction:** One of the best management and outcomes for good oral health for a community through professional care can be achieved when Caries Risk Assessment is done as early as possible-preferably before the onset of disease. This study quantified and tested the hypothesis that there was no co-relation between use of Caries Risk Assessment and Individualized Caries Prevention among practicing dentists.

**Aim:** The current study is set to describe whether the practicing dentists of Bengaluru perform Caries Risk Assessment and provide Individualized Caries Prevention for their adult patients.

**Material & Methods:** A cross sectional study was conducted among practicing dentists of Bengaluru. Simple Random Sampling was used to select the study subjects. The data was collected using a structured self administered questionnaire.

**Results:** Out of 215 dentists, 80% feel that it is very important to perform Caries Risk Assessment of individuals in their day to day practice. 67% of dentists felt the need to perform Individualized Caries Prevention more often. When Individualized Caries Prevention was correlated with Caries Risk Assessment Factors, socio-economic status was found to be fair which implicated that treatments were mostly based on patient's affordability.

**Conclusion:** This study indicates that caries preventive agents are commonly used for adults by many of the dentists with higher qualification suggesting that some dentists' current treatment plan lags what is currently considered to be the best practice (Individualized Caries Prevention) based on recent scientific evidence.

**Keywords:** Caries risk; Caries prevention; Fluorides; Xylitol

## Introduction

The recent increase in the prevalence of dental caries among people has highlighted the need for a new approach to prevent caries in adults. The first step in this process is the consideration of each patient's caries risk. Caries Risk Assessment (CRA) is defined as the determination of the likelihood of a person's developing new carious lesions during a specific period and of the probability of a change in the size or activity of existing lesions across time. Caries etiology requires scientific understanding to lay a foundation for caries assessment [1].

Caries Risk Assessment is a systematic process categorizing patients into risk groups with respect to the potential to develop new carious lesions over time based on the patient's past and present caries experience and known risk factors or indicators for disease that attempt to identify caries risk by using data gleaned from a patient's medical, dental, social and preventive history, dietary screening, clinical determinants of caries status and history, salivary function tests and fluoride exposure. Patient screening questions that contribute the assessment of caries risk status should be incorporated in the initial diagnostic work-up. On the basis of the initial screening questions, supplementary testing may be indicated. Once any additional testing is completed, the information analyzed, and the patient's risk assessment status is determined, this status can be used to plan caries prevention [2].

The rationale for using a risk assessment approach is to tailor appropriate *preventive strategies* to the individual patient. Those patients who are at greater risk for disease require more aggressive intervention at more frequent intervals. In patients with on-going caries activity and progression, the desired intensity of prevention and frequency of re-evaluation recommended are to be proportional to the degree of disease risk. This risk determination for each patient is then followed by the implementation of an *Individualized Caries Prevention* (ICP) program or intervention strategy. Interventions should address the particular risk factors operating to promote the disease in individual patient. It is likely that economics are considered in dentists' treatment decisions [2].

So the current study was aimed to determine whether the practicing dentists of Bengaluru perform Caries Risk Assessment and provide Individualized Caries Prevention for their adult patients. Thus it is hypothesized that there was no co-relation between use of Caries Risk Assessment and Individualized Caries Prevention among practicing dentists on adult patients.

## Methodology

This cross sectional study was conducted among practicing dentists with the objectives to quantify dentist's subjective ratings of the importance of specific caries risk factors, to quantify the percentage of dentists who report using Individualized Caries Prevention and to find the co-relation between Individualized Caries Prevention and factors associated with Caries Risk Assessment.

This cross sectional study was conducted among practicing dentists with the objectives to quantify dentist's subjective ratings of the importance of specific caries risk factors, to quantify the percentage of dentists who report using Individualized Caries Prevention and to find the co-relation between Individualized Caries Prevention and factors associated with Caries Risk Assessment.

The study subjects were practicing dentists of Bengaluru. Bengaluru is divided in to 8 zones by Brahut Bengaluru Mahanagara Palike (BBMP). Equal numbers of practicing dentists were selected from all the eight zones (26 from each zone) by Simple Random Sampling till the sample size of 215 was achieved.

## Statistical Analysis

The data analysis was done using the SPSS 21. Regression Analysis was used to find the association between Individualized Caries Prevention and Caries Risk Assessment factors. Level of significance was fixed at  $p = 0.05$  and any value less than or equal to 0.05 was considered to be statistically significant.

## Results

### Personal Details of the Dentists

A total of 215 dentists participated out of which 127 (59.1%) were males and 88 (40.9%) were female dentists. 67 (31.2%) were general practitioners and 148 (68.8%) participants had done their specialization. Majority of dentists opted for solo practice which was 166 (77.2%) when compared to group practice which was 49 (22.8%). 135 out of 215 dentists (62.8%) opted for general practice while 80 (37.2%) followed specialty practice. Only 15 (7%) were using specific tools while majority of them were not using any kind of Caries Assessment Tools which constitutes 200 practitioners (93%).

### Importance of Assessment of Individual Caries Risk Factors

Out of 215 dentists, 172 dentists (80%) felt it is very important to perform Caries Risk Assessment. When the importance of assessment of individual caries risk factors was analyzed, 115 of them (53.5%) felt it is very important to assess the age of the patient. 99 dentists (46%) opted for the socio-economic status of the patient, 154 (71.6%) dentists gave importance for the evaluation of diet of the patient, 116 participants (54%) felt it is very essential to check the presence of active carious lesions, 84 (39.1%) gave importance to salivary examination, 80 (37.2%) dentists assessed recession with root exposure, 88 (40.9%) dentists said it is very important to assess current use of fluorides, 133 (61.9%) dentists went for the oral hygiene status of the individual and 125 (58.1%) dentists ascertained the need to assess commitment to follow up after the initial treatment (Figure 1).

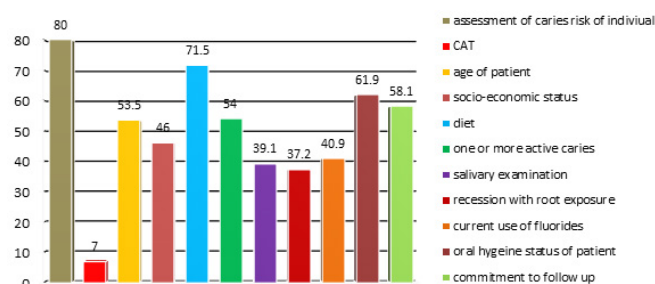


Figure 1: Cumulative Presentation of Importance of Caries Risk Factors.

### Importance of Assessment of Individual Caries Risk Factors

Out of 215 participants, 144 (67%) dentists practice ICP more often. 102 (47.4%) practice pit & fissure sealant application on their adult patients, 56 (26%) use in-office fluoride gel/varnish, 133 (61.9%) use at home fluoride paste/gel, 139 (64.7%) dentists prescribe chlorhexidine rinse and 19 (8.8%) prescribe xylitol chewing gum in their day to day practice (Figure 2).

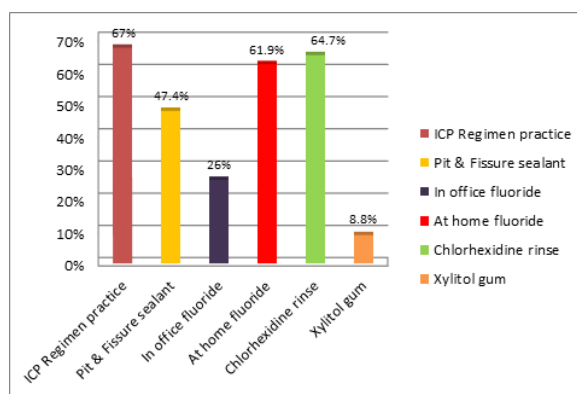


Figure 2: Cumulative Presentation of Individualized Caries Prevention.

**Association between Individualized caries Prevention and Caries Risk Assessment Factors**

Only socio-economic status was found to be fairly co-related with Individualized Caries Prevention by using Pearsons co-relation (p = 0.252). Although factors such as age (p = 0.007), gender (0.06), years of experience (p = 0.032), specialty type (p = 0.031), assessment of CRA (p = 0.012), age of the patient (p = 0.032), diet (p = 0.089), use of fluorides (p = 0.011) and oral hygiene status (p = 0.02) are positively co-related, they fail to show any clinical significance (Table 1).

VARIABLE	ICP REGIMEN (Pearson's Correlation value)	CO-RELATION
AGE	0.007	POOR
GENDER	0.06	POOR
EDUCATION	-0.019	POOR
YEARS OF EXPERIENCE	0.032	POOR
TYPE OF PRACTICE{S/G}	-0.119	POOR
HOURS OF PRACTICE	0.137	POOR
GENERAL/SPECIALITY PRACTICE	-0.005	POOR
SPECIALITY	0.031	POOR
ASSESSMENT OF CRA	0.012	POOR
AGE OF THE PATIENT	0.032	POOR
SOCIO ECONOMIC STATUS	0.252	FAIR
DIET	0.089	POOR
ONE OR MORE ACTIVE CARIES	-0.103	POOR
SALIVARY EXAMINATION	-0.145	POOR
RECESSION WITH ROOT EXPOSURE	-0.052	POOR
USE OF FLOURIDES	0.011	POOR
ORAL HYGIENE STATUS	0.02	POOR
COMMITMENT TO FOLLOW UP	-0.005	POOR

**Table 1:** Correlation of Individualized Caries Prevention and Caries Risk Assessment.

**Discussion**

Knowledge of dentists' clinical decisions related to caries preventive agents in adults is limited, but existing data on the provision of specific procedures and numbers of procedures recommended for specific patients demonstrate substantial variation. The reasons suggested include the fact that clinicians differing in their ability to detect early lesions and/or to arrest the disease and remineralize enamel. [3]

The current study showed that 59.1% of practicing dentists are males indicating a male dominating practice in dental profession in India. A study by Pallavi SK, *et al.* quoted that although the profile of the dental profession has changed, the career paths in dentistry are still gender-biased. Horizontal and vertical gender segregation can be discernible, which clearly indicates that female dentists are more in India, still we find male dominated practice. [4]

68.8% dentists have done their specializations, 77.2% dentists opted for solo practice, 62.8% were practicing general dentistry which implies that majority of dentists are at higher level of knowledge and they spent more time practicing general dentistry than getting involved only in their field of specialization.

This study found that the majority of dentists practice some form of Caries Risk Assessment. 80% of dentists followed Assessment of Caries Risk of individual. A recent postal survey of members of the Texas Academy of Pediatric Dentists provides a fair comparison. They reported that 36% of the respondents provided CRA on more than 76% of their patients. [2] Similarly, a survey of dentists practicing in the city of Indianapolis, Indiana, found that 72% of respondents used some type of risk assessment. [4]

Our statistics reveal that 53.5% of dentists felt age of the patient is important in assessment of caries risk, 46% felt socio-economic status is essential to be assessed, 71.6% opted for diet factor, 54% felt one or more active caries is important to assess, 39.1% felt salivary examination is important, 37.2% assessed recession with root exposure, 61.9% opted for current oral hygiene status of patient, 58.1% felt commitment to follow up is important which indicates that most of the dentists understand the role of diet and nutritional factors in caries incidence of various populations who subsist on dissimilar diets and identified them as the most important. The dentists felt that age and socio-economic status does not matter in making a diagnosis since these factors become just indicators (factors that are not directly associated with the causation of the disease) and not risk factors. And socio-economic factors largely depend on insurance or reimbursement plans of patients. Another factor might be because they are less emergency dominated.

In the present study, only 67% of dentists practiced ICP in their routine practice even though 80% of dentists agree that CRA is important. Empirically supported treatments include fluoride, sealants, and antibacterial rinses. Some data suggest that patients who are at high risk of developing disease are not necessarily receiving the needed preventive or management therapy. Results from Riley et al study suggest that only about 50% of patients of network participants receive ICP. [5-7] However, US and Canadian dental schools have recently increased curriculum time that focuses on teaching of caries prevention. [8-9] Because of differing methodology, it is difficult to draw meaningful conclusions about preferences in the use of preventive treatments across practices. It could be presumed that European regions and particularly the Scandinavian countries would use prevention in greater numbers as a more preventive philosophy has traditionally been acknowledged among these societies. [10-12] Several studies have directly asked dentists whether risk assessment drives decisions about caries prevention. [13]

In the current study including 215 dentists, 47.4% opted for Pit and Fissure sealants, 26% went for fluoride gel varnish application, 61.9% preferred at home fluoride use, 64.7% gave chlorhexidine prescription, 8.8% prescribed xylitol gums in their day to day practice. Nevertheless, it appears that the clinicians practice Minimally Invasive Dentistry and monitor early lesions after initial treatment to ensure that the carious activity is arrested and the enamel has been remineralized. These techniques include professional or at-home application of fluorides, dental sealants, antimicrobials such as chlorhexidine, and xylitol chewing gum with studies supporting their use. [14-17] Studies using a wide range of sampling and measurement strategies have reported considerable variability in the use of caries prevention techniques across regions or specialties. [18]

The only key characteristic with a statistically significant difference seems to be that dentists who tend to have a more-recent year of graduation from dental school than dentists at large. Dentists certainly represent a substantial diversity with regard to practice settings, patient populations, rural-urban area of residence, and geographic locations. This paper is based on the assumption that adult patients seen in their practice have approximately the same risk profiles. Dentists who use caries prevention in adult patients represent practices with a more-conservative philosophy of caries treatment for adults and subscribe to the premise that caries prevention is as important for adults as it is for pediatric patients. A potential limitation of the study was that there was no time period specified in the series of questions about risk factor importance. The measures of prevention were self-reported, and may be subjected to both social desirability and recall bias.

The caries risk assessment models that are currently used rely on a series of common elements. However, differences exist among the models because of differences in emphasis and interpretation of the science among various designers. The number that does not use Caries Risk Assessment suggests that many practitioners are not heeding the recommendations of current research reviews.

Developing a better understanding of current dental practice patterns will allow organizations to better target training and information transfer to foster movement of scientific advances into routine clinical practice.

It is incumbent on dental schools and colleges to promote Caries Risk Assessment as the current standard of care and further educate dentists on how to better use this information in treatment plan and prevention of caries there by reducing the burden on our country's economic scenario.

## Conclusion

Out of 215 dentists who participated in the study, 80% feel that it is very important to do Caries Risk Assessment of Individuals in their day to day practice. 67% of dentists felt the need to perform Individualized Caries Prevention more often. When Individualized Caries Prevention was correlated with Caries Risk Assessment Factors, the association was weaker than expected and only socio-economic status was found to be fair.

Successful use of regular CRA is based on the assumption that patients who are at increased risk will be identified and that once identified, these patients will receive the appropriate treatment to reduce the likelihood that caries will occur or progress. Empirically supported treatments include fluoride, sealants, and antibacterial rinses. This data suggest that patients who are at high risk of developing disease are not necessarily receiving the needed preventive or management therapy. Based on the results of this study, the null hypothesis is rejected.

## References

1. Ole Fejerskov and Edwina Kidd. "Dental caries- The disease and its clinical management". 2<sup>nd</sup> edition 2008.
2. Riley JL, *et al.* "Dentists' use of caries risk assessment and individualized caries prevention for their adult patients: findings from The Dental Practice-Based Research Network". *Community Dent Oral Epidemiology* 39.6 (2011): 564-573.
3. Riley JL, *et al.* "Preferences for caries prevention agents in adult patients: findings from The Dental Practice-Based Research Network". *Community Dentistry and Oral Epidemiology* 38.4 (2010): 360-370.
4. Pallavi SK and Rajkumar GC. "Professional practice among woman dentist". *Journal of International Society of Preventive and Community Dentistry* 1.1 (2011): 14-19.
5. Riley JL, *et al.* "Use of caries preventive agents on adult patients compared to pediatric patients by general practitioners: findings from The Dental Practice-Based Research Network". *The Journal of the American Dental Association* 141.6 (2010): 679-687.
6. Riley JL, *et al.* "Use of Caries Prevention Agents in Children: Findings from the Dental Practice-based Research Network". *Oral Health & Preventive Dentistry* 8.4 (2010): 351-359.
7. Riley JL, *et al.* "General practitioners' use of caries-preventive agents in adult patients versus pediatric patients: findings from the dental practice-based research network". *The Journal of the American Dental Association* 141.6 (2010): 679-687.
8. Gordan VV, *et al.* "How dentists diagnose and treat defective restorations: evidence from the dental practice-based research network". *Operative Dentistry* 34.6 (2009): 664-673.
9. Brown JP. "A new curriculum framework for clinical prevention and population health, with a review of clinical caries prevention teaching in U.S. and Canadian dental schools". *Journal of Dental Education* 71.5 (2007): 572-578.
10. Pitts NB. "Clinical diagnosis of dental caries: a European perspective". *Journal of Dental Education* 65.10 (2001): 972-978.
11. Wang NJ, *et al.* "Caries preventive services for children and adolescents in Denmark, Iceland, Norway and Sweden: strategies and resource allocation". *Community Dentistry and Oral Epidemiology* 26.4 (1998): 263-271.
12. Ekstrand KR and Christiansen ME. "Outcomes of a non-operative caries treatment programme for children and adolescents". *Caries Research* 39.6 (2005): 455-467.
13. Primosch RE and Barr ES. "Sealant use and placement techniques among pediatric dentists". *The Journal of the American Dental Association* 132.10 (2001): 1442-1451.

14. Burt BA. "The use of sorbitol- and xylitol-sweetened chewing gum in caries control". *The Journal of the American Dental Association* 137.2 (2006): 190-196.
15. Baca P, et al. "Effectiveness of chlorhexidine-thymol varnish for caries reduction in permanent first molars of 6-7-year-old children: 24-month clinical trial". *Community Dentistry and Oral Epidemiology* 30.5 (2002): 363-368.
16. Azarpazhooh A and Main PA. "Pit and fissure sealants in the prevention of dental caries in children and adolescents: a systematic review". *Journal Canadian Dental Association* 74.2 (2008): 171-177.
17. Twetman S, et al. "Caries-preventive effect of sodium fluoride mouthrinses: a systematic review of controlled clinical trials". *Acta Odontologica Scandinavica* 62.4 (2004): 223-230.
18. Trueblood R, et al. "Caries risk assessment practices among Texas pediatric dentists". *Journal of Pediatric Dentistry* 30.1 (2008): 49-53.