

## Perception of Dentists about Caries-risk Assessment tools in Jaipur, India: A Cross-sectional Study

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### Abstract:

**Background:** Caries risk assessment (CRA) is an essential element of contemporary clinical care for infants, children, and adolescents. CRA tools aid in the detection as well as documentation of caries risk predictors and let the health care professionals to be more active in identifying and referring high-risk patients for proper treatment and required prevention. The aim of the study was to assess the information-seeking behavior of dental practitioners of Jaipur regarding CRA tools.

**Materials and Methods:** A cross-sectional questionnaire-based survey was conducted among the dental practitioners of Jaipur city. A 17-itemed questionnaire was personally administered to 373 dental practitioners of Jaipur and their knowledge was assessed based on the questions about CRA tools and Cariogram. The data were analyzed using Chi-square test.

**Results:** Around 80.5% of the practitioners were aware of CRA tools among which only one-fourth were practicing CRA. Significant correlation of qualification, specialty, and years of practice was found with knowledge of CRA tools, practice of CRA and preventive treatment and attitude toward risk assessment.

**Conclusions:** A substantial percentage of dentists did not practice CRA, but were interested in receiving more education about CRA and its tools.

**Key Words:** Caries risk assessment, Cariogram, dental practitioners

### Introduction

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 remineralization of the damaged tissue. Operative treatments should be eluded unless the carious lesion has extended to cavitation. The clinical decision-making process should be based primarily on caries risk assessment (CRA).<sup>1</sup>

CRA is the determination of the likelihood of the incidence of caries (i.e. the number of new cavitated or incipient lesions) during a certain time period. It also involves the prospect that there will be a transformation in the size or activity of lesions already present to a more bigger/severe one. Dental professionals, using their ability and skill to detect caries in its earliest stage, can help prevent cavitation.<sup>2,3</sup> The American Academy of Pediatric Dentistry (AAPD) agrees that CRA is an indispensable element of contemporary clinical care for infants, children, and adolescents.<sup>4</sup>

For high-risk patients, preventive interventions should be initiated, that reduce the expected elevated incidence and severity of caries in the future. Patients at low risk do not need additional preventive interventions and should be offered extended recalls. This individualization of preventive and recall activity results in more appropriate use of dental resources and lower dental costs for some individuals.<sup>5</sup>

Imparting knowledge of CRA to future dental practitioners has two goals:

1. Bestow efficient and targeted delivery of preventive services to children who will benefit the most from caries prevention; and
2. Encourage the concept of minimally invasive dentistry in clinical practice as a new generation of dental practitioners assumes the veneer of clinical practice.<sup>6</sup>

CRA has gained a great attention in the recent literature.<sup>2,7</sup> Various CRA tools have been developed like Cariogram, AAPD's CRA Tool, Caries Management by Risk Assessment (CAMBRA), etc., as an aid for clinicians. Determination of caries risk must be considered as a professional service in itself and clinicians should re-assess the caries risk to assure the appropriateness of the preventive care.<sup>8</sup>

The practice of risk assessment in India is not common. Use of any CRA tool to assess the risk and then providing

individualized, appropriate preventive treatment has been rarely seen in India. The evidence supporting the use of CRA and even practice of CRA is very limited.

Hence, the present study was conducted with the objectives to assess the knowledge of CRA tools and Cariogram among the dental practitioners of Jaipur, their attitude toward CRA and the practices of CRA and preventive treatments among them.

## Materials and Methods

### Study design

A cross-sectional questionnaire-based survey was conducted among the dental practitioners of Jaipur city in September 2013.

### Study subjects

The study was approved by the Ethical Committee of Jaipur Dental College, Jaipur. The list of dental practitioners was obtained from Rajasthan Dental Council (till 2012). There were 597 dentists registered in Rajasthan Dental Council, of which 24 were pursuing post-graduation studies, 80 were not actively practicing in Jaipur. The remaining 493 dentists were included in the study. Seventy-six dental practitioners denied participating in the study and 44 were not available on the day of the visit, so they were excluded from the study. Thus, the sample size emanated to be 373 (241 males and 132 females). Informed consent was obtained from the study participants.

### Questionnaire

A questionnaire framed in English language comprising of four sections was used to collect the personal and demographic data, knowledge regarding CRA tools, practice of preventive treatment and CRA, and attitude toward the CRA. Prior to being finalized, the questionnaire was pilot tested on private practitioners in various departments of Jaipur Dental College. Minor changes were made in the questionnaire as per the feedback obtained from the pilot study. The queries about the personal details included age, sex, qualification (BDS/MDS), years of practice, area of practice, and attachment to any institution. The knowledge was assessed based on the questions about CRA tools and Cariogram. The dentists' practice of preventive treatment, CRA, diet counseling and use of any dental software were asked. Their attitude toward CRA and its tools was assessed asking queries about the role of risk assessment tool in motivating the patient and measures to improve the knowledge of CRA.

### Statistical analysis

All analysis was performed using computer software MedCalc version 12.2.1.0. The Chi-square test and cross-tabulations were used for correlation. For all tests, a significance level was set at  $P < 0.05$ .

## Results

Majority of the dental practitioners in Jaipur were general practitioners (74.3%) and were in the age range of 25-30 years (40.7%) (Table 1).

### Knowledge of CRA tools and Cariogram

About 80% of the dental practitioners were aware of the CRA tools, but only 10.47% of them knew that AAPD's caries risk assessment tool and CAMBRA are one of them. Furthermore, though 17.33% of dental practitioners had come across the term "Cariogram," only 3.25% of them knew that it is a software. Significant effect of specialty ( $P = 0.000$ ) and years of practice ( $P \leq 0.011$ ) was seen on various aspects of knowledge (Table 2, Graphs 1 and 2).

### CRA and preventive treatments in practice

About 40% of the practitioners reported that they practice only minimal invasive dentistry as preventive treatment and only 24.91% of the dentists assess caries risk of individual patients, of which 13% use a special form for the same. Almost none of the practitioners used any in-office tests to assess the caries risk. It was found that among the study participants nearly one-fourth of them used dental software in their clinic of which radiovisiography (RVG) was most common. The diet chart of the patients was recorded by 19.49% of the study participants and majority of them recorded diet history of 48 h. Majority of the dental practitioners themselves provided diet counseling

Table 1: Distribution of study participants based on demographic details.

Variable	N	Percentage
Age (years)		
25-30	113	74.3
31-35	68	24.5
36-40	35	12.6
41-45	28	10.1
46-50	18	6.4
>50	15	5.4
Gender		
Male	184	66.4
Female	93	33.5
Qualification		
BDS	206	74.3
MDS	71	25.6
Number of years of practice		
<5 years	111	40.0
5-10 years	96	34.6
>10 years	70	25.2
Area of practice		
Urban	259	93.5
Peri-urban	18	6.4
Institutional attachment		
Clinic only	219	79.0
Attached to dental college	58	20.9

Table 2: Knowledge of CRA tools and Cariogram.

Question	Positive response (percentage)
Aware of CRA tools	80.51
Identified Correct Caries Risk Assessment Tool (AAPD's CAT, CAMBRA)	10.47
Had come across the term Cariogram	17.33
Aware that Cariogram is a software	3.25%

CRA: Caries risk assessment, AAPD: American Academy of Pediatric Dentistry, CAMBRA: Caries Management by Risk Assessment, CAT: Caries risk assessment tool

to their patients. On comparing the qualification and specialty, statistically significant difference was found in the practices of dentists (Table 3, Graphs 3 and 4).

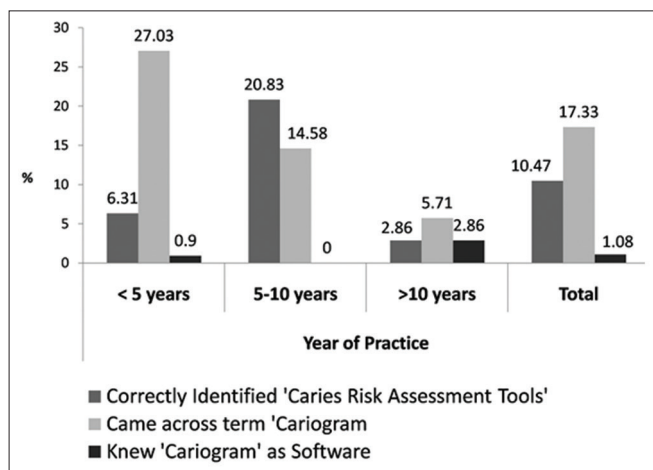
**Attitude of practitioners toward CRA tools**

About two-third (72.5%) of the practitioners had a positive attitude toward assessing the risk when the patients were

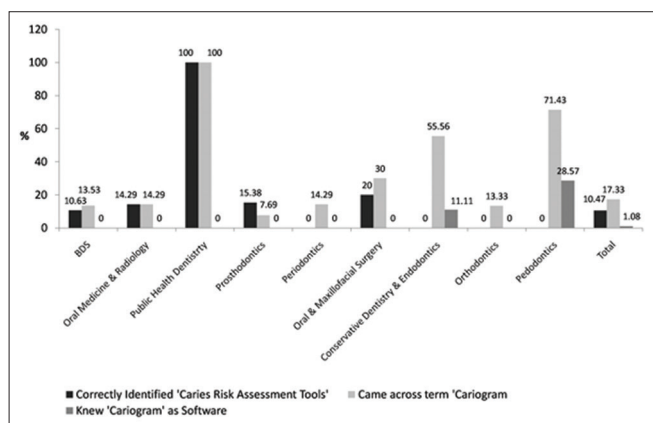
found to be at high risk. A majority of the study participants agreed with the statement that “through CRA tool, patient can be easily motivated for the preventive procedures.” Furthermore, almost all the respondents were willing to attend CDE programs on CRA and to include the use of CRA tools in UG/PG curriculum (Graph 5).

**Discussion**

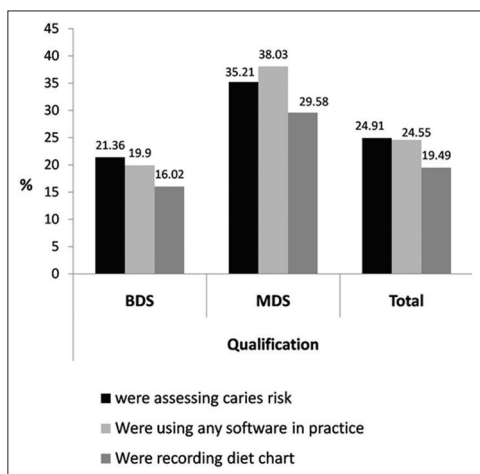
The results represent the knowledge, practice, and attitude of the dental practitioners of Jaipur regarding CRA, CRA



**Graph 1:** Significant effect of years of practice on various aspects of knowledge (P < 0.011)



**Graph 2:** Significant effect of specialty on various aspects of knowledge (P = 0.000).

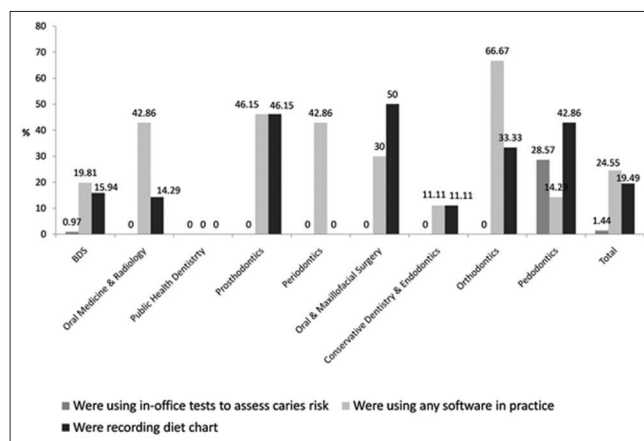


**Graph 3:** Significant effect of qualification on various aspects of practices (P ≤ 0.011).

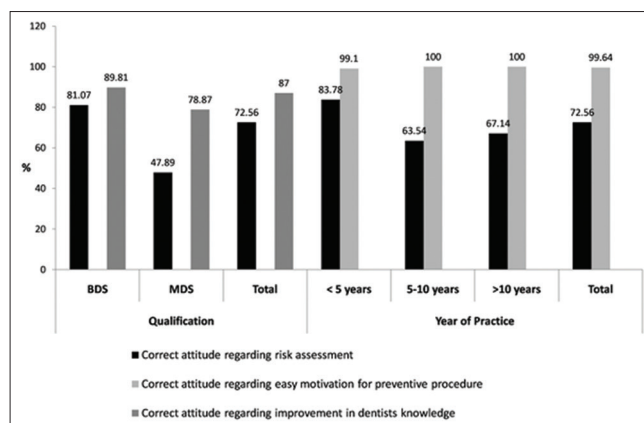
**Table 3: Practice of CRA and caries preventive treatment.**

Question	Positive response (percentage)	P value
Caries preventive treatment		
Fluoride application	0.36	NS
Pit and fissure sealants	13.36	NS
Minimal invasive dentistry	40.0	≤0.03
All of the above	47.65	≤0.04
Practice of assessing caries risk	24.91	≤0.03
Use of any in-office tests to assess risk	1.44	0.000
Use of dental software	24.5	≤0.013
Record diet chart	19.49	≤0.014
Provide diet counseling	83.39	NS

NS: Not significant, CRA: Caries-risk assessment



**Graph 4:** Significant effect of specialty on various aspects of practices (P ≤ 0.034).



**Graph 5:** Attitude of dental practitioners toward caries risk assessment and its tools (P < 0.003).

tools and the preventive treatments. There is an increasing buzz for incorporation of CRA into routine dental practice. Appropriate intervention must accompany risk assessment so as to make it beneficial for the patients. An interesting finding of the present study was, while most dentists were aware of CRA tools, only one fourth of the same dentists assessed the caries risk, but none of them used any in-office tests for the same. In a study conducted by Trueblood *et al.*,<sup>9</sup> it was found that 38% of the dentists performed CRA in their office. The results of the present study regarding practice of CRA were in contrast to a study done by Riley *et al.*,<sup>10</sup> according to which 69% of the dentists perform CRA. The results were also dissimilar from outcomes of the study conducted by McBride *et al.*,<sup>11</sup> according to which majority of the dental professionals practiced CRA. Riley *et al.*<sup>12</sup> conducted a study to quantify dental practice patterns related to caries risk and risk assessment and it was concluded that not all community dentists assess caries risk.

Cariogram is a risk assessment computer program which illustrates the interactions of various caries risk factors in a simple way (graphic model), with caries risk expressed as a chance to avoid new caries.<sup>13</sup> The dentists with more than 10 years in practice were less likely to come across the term Cariogram. The reason for this could be that it was a recent model, though developed in 1996, but actually validated after 2000.<sup>13</sup> Though more of the recently graduated practitioners had come across the term but captivatingly a very few of them exactly knew what the Cariogram was with a majority of those who were attached to any institution. And it became obvious that none of the practitioners were using this software. It was found that only a very few of them used any other dental software such as PRACTO and SARAL-Practice Management Software other than RVG.

In a separate question, bulk of the respondents reported the practice of one or the other caries preventive treatments such as pit and fissure sealants, fluoride application, and minimal invasive dentistry. In the current study, it was found that the majority of practitioners of the peri-urban area use minimal intervention dentistry. Trueblood *et al.*<sup>9</sup> found that 67% of Texas dentists placed sealants for prevention and 17% applied fluoride.

Another finding was that while about more than one-third of the study participants provided diet counseling to the patients, however, not even one fourth of the same dentists recorded the diet chart. The results were in accordance with the study done by Sajjani-Oommen *et al.*<sup>14</sup> and Trueblood *et al.*,<sup>9</sup> where it was found that the majority of the dentists provided diet counseling.

It was encouraging to note that almost all the practitioners agreed that through CRA tools, one can easily motivate the patient for preventive treatment and they were interested to

know the subject through CDE programs and seminars. The execution of a CRA and management of caries as a disease in private practice are critical to change from the traditional restorative mindset to a more preventive approach.

Since there is a little evidence to support or negate the use of CRA tools to predict future disease, practitioners should longitudinally recall their patients and monitor their clinical condition by incorporating the CRA at each visit and thus averting the disease at an early stage.

In this era, when there is enough availability of electronic health care records, billing, and provider tracking information, plans should be encouraged to develop policies related to CRA that are scientifically sound and beneficial to patients.

### Conclusion

A substantial percentage of dental practitioners of Jaipur did not practice CRA in their clinics. It is now necessary to endorse CRA for patient care and as an educational tool. Delegating CRA and use of CRA tools in the regular curriculum of UG/PG is recommended for improving future prospects and thus ending incomprehensive care for the patients.

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