### PREVALENCE OF ANTERIOR TEETH CARIES IN DAKSHINA KANNADA POPULATION

Abhishek. M. A\*, Mithra N Hegde \*\*, Mahalaxmi Yelapure \*\*\*

\* Postgraduate student, Department of Conservative Dentistry and Endodontics, A.B. Shetty Memorial Institute of Dental Sciences, Mangalore.

\*\* Vice Principal, Head of the Department, Department of Conservative Dentistry and Endodontics, A.B Shetty Memorial Institute of Dental Sciences, Mangalore.

\*\*\* Lecturer, Department of Conservative Dentistry and Endodontics, A B Shetty Memorial Institute of Dental Sciences, Mangalore.

### ABSTRACT

**Aim:** To evaluate the prevalence of anterior tooth caries in 1000 patients randomly from the population of Dakshina Kannada (South Canara) district.

**Materials and methods:** The present study was conducted on 1000 patients attending the Department of Conservative Dentistry and Endodontics, A B Shetty Memorial Institute of Dental Sciences, Mangalore, and rural satellite centers of Nitte University. Each patient was examined for anterior tooth caries on a dental chair under good illumination using sterilized mouth mirror, explorer, tweezer while the teeth were isolated using cotton roles. The patients who had anterior tooth caries were questioned using a standard questionnaire from Oral health survey WHO format 2013, to find its relation associated to age, gender, location, occupation, dietary habits and oral hygiene habits.

**Results:** According to the present study, the prevalence of anterior tooth caries in South Canara population was found to be 27.6%, of which 94.9% cases were seen in the maxillary arch with highest prevalence in the maxillary canines (51.8%) and proximal surfaces (75.7%). The study also revealed predilection to anterior tooth caries in males (55.4%), in the age group of 21 to 30 years and 41 to 60 years (27.5%), in patients from rural locations (49.6%), in those who were unemployed (24.6%) and those who were on a mixed diet (79.7%).

**Conclusion:** The prevalence of anterior tooth caries was most commonly seen in males with predilection to the age group between 21 to 30

and 41 to 60 years with an increased prevalence in maxillary canines and proximal surfaces.

**KEYWORDS:** Anterior tooth caries, Caries, Decay

#### **INTRODUCTION**

Dental caries is one of the most common diseases throughout the world <sup>[1]</sup>. Dental diseases like just any other diseases of the body are degenerative or infectious in nature <sup>[2]</sup>. Dental caries is a plaque related, multi factorial chronic infection of the oral cavity. The factors enhancing the progress of dental caries are found to be dietary carbohydrates, saliva, oral microflora, and susceptible tooth surfaces <sup>[3]</sup>. Dental caries is an infectious microbiological disease of the teeth that results in localized dissolution and destruction of the calcified tissues [4]. Caries is known to develop in the form of a white spot lesion which is reversible. Although as it progresses to cavitation it becomes an irreversible disease <sup>[5]</sup>. Anterior teeth caries has been found to affect quality of life because of aesthetic reasons and to be greater burden economically as compared to posterior teeth.<sup>[5]</sup> Thus the purpose of the study was to determine the prevalence of anterior teeth caries in Dakshina Kannada population.

#### **METHODOLOGY**

The study was conducted on 1000 patients from the outpatient department of Conservative Dentistry and Endodontics and rural centres of A.B Shetty Memorial of Dental Sciences, Deralakatte, Mangalore. Informed consent of the patient was obtained. A questionnaire was prepared to ask the patient's history related to caries. The patients were examined for anterior caries using an explorer and a mouth mirror with a proper isolation technique and good illumination. WHO criterion for caries detection was followed. Findings were recorded and entered in the questionnaire. All the data was then coded and processed utilizing the Statistical Package for Social Sciences software for statistical analysis and difference between variables were analyzed using Pearson Chi-Square Test.

### **RESULTS**

**A) PREVALENCE OF ANTERIOR TOOTH CARIES:** The sample size of this study included 1000 patients. Out of 1000 patients, 276 (27.6%) cases had anterior tooth caries.

|           | Frequency | Percent | Cumulative<br>Percent |
|-----------|-----------|---------|-----------------------|
| No caries | 724       | 72.4    | 72.4                  |
| Caries    | 276       | 27.6    | 100.0                 |
| Total     | 1000      | 100.0   |                       |

**B) PREVALENCE OF ANTERIOR TOOTH CARIES WITH RESPECT TO AGE:** Out of 276 cases with anterior tooth caries, 27.5% of cases were noticed in the age group of 21 to 31 years and 41 to 60 years of age, followed by 26.8% of cases in 30 to 40 years of age.

|            |       |                                | Anterior Tooth Caries |        |        |
|------------|-------|--------------------------------|-----------------------|--------|--------|
|            |       |                                | No caries             | Caries | Total  |
| AGE GROUP  | <20   | Count                          | 74                    | 27     | 10     |
| (IN YEARS) |       | % within age group             | 73.3%                 | 26.7%  | 100.09 |
|            |       | % within Anterior Tooth Caries | 10.2%                 | 9.8%   | 10.19  |
|            |       | % of Total                     | 7.4%                  | 2.7%   | 10.19  |
|            | 20-30 | Count                          | 211                   | 76     | 28     |
|            |       | % within age group             | 73.5%                 | 26.5%  | 100.0% |
|            |       | % within Anterior Tooth Caries | 29.1%                 | 27.5%  | 28.7%  |
|            |       | % of Total                     | 21.1%                 | 7.6%   | 28.7%  |
|            | 30-40 | Count                          | 202                   | 74     | 270    |
|            |       | % within age group             | 73.2%                 | 26.8%  | 100.0% |
|            |       | % within Anterior Tooth Caries | 27.9%                 | 26.8%  | 27.6%  |
|            |       | % of Total                     | 20.2%                 | 7.4%   | 27.6%  |
|            | 40-60 | Count                          | 177                   | 76     | 253    |
|            |       | % within age group             | 70.0%                 | 30.0%  | 100.0% |
|            |       | % within Anterior Tooth Caries | 24.4%                 | 27.5%  | 25.3%  |
|            |       | % of Total                     | 17.7%                 | 7.6%   | 25.3%  |
|            | >60   | Count                          | 60                    | 23     | 83     |
|            |       | % within age group             | 72.3%                 | 27.7%  | 100.09 |
|            |       | % within Anterior Tooth Caries | 8.3%                  | 8.3%   | 8.3%   |
|            |       | % of Total                     | 6.0%                  | 2.3%   | 8.3%   |
| Total      |       | Count                          | 724                   | 276    | 1000   |
|            |       | % within age group             | 72.4%                 | 27.6%  | 100.0% |
|            |       | % within Anterior Tooth Caries | 100.0%                | 100.0% | 100.09 |
|            |       | % of Total                     | 72.4%                 | 27.6%  | 100.09 |

## C) PREVALENCE OF ANTERIOR TOOTH CARIES WITH RESPECT TO GENDER: Out

of 276 cases with anterior tooth caries, 55.4% cases affected were males and 44.6% of cases affected were females.

|        |        |                                | Anterior Tooth Caries |        |        |
|--------|--------|--------------------------------|-----------------------|--------|--------|
|        |        |                                | No caries             | Caries | Total  |
| GENDER | Male   | Count                          | 372                   | 153    | 525    |
|        |        | % within gender                | 70.9%                 | 29.1%  | 100.0% |
|        |        | % within Anterior Tooth Carles | 51.4%                 | 55.4%  | 52.5%  |
|        |        | % of Total                     | 37.2%                 | 15.3%  | 52.5%  |
|        | Female | Count                          | 352                   | 123    | 475    |
|        |        | % within gender                | 74.1%                 | 25.9%  | 100.0% |
|        |        | % within Anterior Tooth Caries | 48.6%                 | 44.6%  | 47.5%  |
|        |        | % of Total                     | 35.2%                 | 12.3%  | 47.5%  |
| Total  |        | Count                          | 724                   | 276    | 1000   |
|        |        | % within gender                | 72.4%                 | 27.6%  | 100.0% |
|        |        | % within Anterior Tooth Caries | 100.0%                | 100.0% | 100.0% |
|        |        | % of Total                     | 72.4%                 | 27.6%  | 100.0% |

Pearson Chi-Square= 1.317 P=0.251

# D) PREVALENCE OF ANTERIOR TOOTH CARIES WITH RESPECT TO LOCATION:

Out of 276 cases with anterior tooth caries, 49.6% cases were seen in patients at rural centres and from rural areas and 33.7% cases were seen in patients from urban areas.

|          |            |                                | Anterior To |        |        |
|----------|------------|--------------------------------|-------------|--------|--------|
|          |            |                                | No caries   | Caries | Total  |
| LOCATION | Urban      | Count                          | 120         | 46     | 166    |
|          |            | % within location              | 72.3%       | 27.7%  | 100.0% |
|          |            | % within Anterior Tooth Caries | 16.6%       | 16.7%  | 16.6%  |
|          |            | % of Total                     | 12.0%       | 4.6%   | 16.6%  |
|          | Peri urban | Count                          | 245         | 93     | 338    |
|          |            | % within location              | 72.5%       | 27.5%  | 100.0% |
|          |            | % within Anterior Tooth Caries | 33.8%       | 33.7%  | 33.8%  |
| -        |            | % of Total                     | 24.5%       | 9.3%   | 33.8%  |
|          | Rural      | Count                          | 359         | 137    | 496    |
|          |            | % within location              | 72.4%       | 27.6%  | 100.0% |
|          |            | % within Anterior Tooth Caries | 49.6%       | 49.6%  | 49.6%  |
|          |            | % of Total                     | 35.9%       | 13.7%  | 49.6%  |
| Total    |            | Count                          | 724         | 276    | 1000   |
|          |            | % within location              | 72.4%       | 27.6%  | 100.0% |
|          |            | % within Anterior Tooth Caries | 100.0%      | 100.0% | 100.0% |
|          |            | % of Total                     | 72.4%       | 27.6%  | 100.0% |

Pearson Chi-Square= 0.002 P=0.999

E) PREVALENCE OF ANTERIOR TOOTH CARIES WITH RESPECT TO DIETARY HABITS: Out of 276 cases with anterior tooth caries, 79.7% cases were seen in patients on a mixed diet and 20.3% cases were seen in patients on vegetarian diet.

|                |       |                                | Anterior To | oth Caries |        |
|----------------|-------|--------------------------------|-------------|------------|--------|
|                |       |                                | No caries   | Caries     | Total  |
| DIETARY HABITS | veg   | Count                          | 117         | 56         | 173    |
|                |       | % within dietary habits        | 67.6%       | 32.4%      | 100.0% |
|                |       | % within Anterior Tooth Caries | 16.2%       | 20.3%      | 17.3%  |
|                |       | % of Total                     | 11.7%       | 5.6%       | 17.3%  |
|                | mixed | Count                          | 607         | 220        | 827    |
|                |       | % within dietary habits        | 73.4%       | 26.6%      | 100.0% |
|                |       | % within Anterior Tooth Caries | 83.8%       | 79.7%      | 82.7%  |
|                |       | % of Total                     | 60.7%       | 22.0%      | 82.7%  |
| Total          |       | Count                          | 724         | 276        | 1000   |
|                |       | % within dietary habits        | 72.4%       | 27.6%      | 100.0% |
|                |       | % within Anterior Tooth Caries | 100.0%      | 100.0%     | 100.0% |
|                |       | % of Total                     | 72.4%       | 27.6%      | 100.0% |

Pearson Chi-Square= 2.382 P=0.123

F) PREVALENCE OF ANTERIOR TOOTH CARIES WITH RESPECT TO OCCUPATION: Out of 276 patients with anterior tooth caries, 24.6% of the cases were seen among unemployed people and 18.8% of cases were seen among housemakers.

|            |             |                                | Anterior Tooth Caries |        |        |
|------------|-------------|--------------------------------|-----------------------|--------|--------|
|            |             |                                | No caries             | Caries | Total  |
| OCCUPATION | Business    | Count                          | 43                    | 28     | 71     |
|            |             | % within occupation            | 60.6%                 | 39.4%  | 100.0% |
|            |             | % within Anterior Tooth Caries | 5.9%                  | 10.1%  | 7.1%   |
|            |             | % of Total                     | 4.3%                  | 2.8%   | 7.1%   |
|            | Service     | Count                          | 86                    | 38     | 124    |
|            |             | % within occupation            | 69.4%                 | 30.6%  | 100.0% |
|            |             | % within Anterior Tooth Caries | 11.9%                 | 13.8%  | 12.4%  |
|            |             | % of Total                     | 8.6%                  | 3.8%   | 12.4%  |
|            | Skilled     | Count                          | 124                   | 41     | 165    |
|            | labour      | % within occupation            | 75.2%                 | 24.8%  | 100.0% |
|            |             | % within Anterior Tooth Caries | 17.1%                 | 14.9%  | 16.5%  |
|            |             | % of Total                     | 12.4%                 | 4.1%   | 16.5%  |
|            | Non-skilled | Count                          | 125                   | 49     | 174    |
|            | labour      | % within occupation            | 71.8%                 | 28.2%  | 100.0% |
|            |             | % within Anterior Tooth Caries | 17.3%                 | 17.8%  | 17.4%  |
|            |             | % of Total                     | 12.5%                 | 4.9%   | 17.4%  |
|            | Homemaker   | Count                          | 174                   | 52     | 226    |
|            |             | % within occupation            | 77.0%                 | 23.0%  | 100.0% |
|            |             | % within Anterior Tooth Caries | 24.0%                 | 18.8%  | 22.6%  |
|            |             | % of Total                     | 17.4%                 | 5.2%   | 22.6%  |
|            | Unemployed  | Count                          | 172                   | 68     | 240    |
|            |             | % within occupation            | 71.7%                 | 28.3%  | 100.0% |
|            |             | % within Anterior Tooth Caries | 23.8%                 | 24.6%  | 24.0%  |
|            |             | % of Total                     | 17.2%                 | 6.8%   | 24.0%  |
| Total      |             | Count                          | 724                   | 276    | 1000   |
|            |             | % within occupation            | 72.4%                 | 27.6%  | 100.0% |
|            |             | % within Anterior Tooth Carles | 100.0%                | 100.0% | 100.0% |
|            |             | % of Total                     | 72.4%                 | 27.6%  | 100.0% |

Pearson Chi-Square= 8.655 P=0.124

G) PREVALENCE OF ANTERIOR TOOTH CARIES WITH RESPECT TO ORAL HYGIENE HABITS: Patients who brushed only once and did not use any other brushing aids had higher percentages of caries in comparison to those who brushed more than once, flossed and used mouthwashes.

|         |           |                                | Anterior Tooth Caries |        |        |
|---------|-----------|--------------------------------|-----------------------|--------|--------|
|         |           |                                | No caries             | Caries | Total  |
| OTHER   | None      | Count                          | 459                   | 166    | 625    |
| ORAL    |           | % within other aids            | 73.4%                 | 26.6%  | 100.0% |
| HYGIENE |           | % within Anterior Tooth Caries | 63.4%                 | 60.1%  | 62.5%  |
| AIDS    |           | % of Total                     | 45.9%                 | 16.6%  | 62.5%  |
|         | Floss     | Count                          | 143                   | 44     | 187    |
|         |           | % within other aids            | 76.5%                 | 23.5%  | 100.0% |
|         |           | % within Anterior Tooth Caries | 19.8%                 | 15.9%  | 18.7%  |
|         |           | % of Total                     | 14.3%                 | 4.4%   | 18.7%  |
|         | Mouthwash | Count                          | 115                   | 62     | 177    |
|         |           | % within other aids            | 65.0%                 | 35.0%  | 100.0% |
|         |           | % within Anterior Tooth Caries | 15.9%                 | 22.5%  | 17.7%  |
|         |           | % of Total                     | 11.5%                 | 6.2%   | 17.7%  |
|         | Both      | Count                          | 7                     | 4      | 11     |
|         |           | % within other aids            | 63.6%                 | 36.4%  | 100.0% |
|         |           | % within Anterior Tooth Caries | 1.0%                  | 1.4%   | 1.1%   |
|         |           | % of Total                     | 0.7%                  | 0.4%   | 1.1%   |
| Total   |           | Count                          | 724                   | 276    | 1000   |
|         |           | % within other aids            | 72.4%                 | 27.6%  | 100.0% |
|         |           | % within Anterior Tooth Caries | 100.0%                | 100.0% | 100.0% |
|         |           | % of Total                     | 72.4%                 | 27.6%  | 100.0% |

Pearson Chi-Square= 7.199 P=0.066

H) PREVALENCE OF CARIES AMONG ANTERIOR TEETH AND BETWEEN ARCHES: Out of 276 cases with anterior tooth caries, 94.9% cases were seen in maxillary arch and maxillary canines were seen to be affected in 51.8% of total cases.



I) PREVALENCE OF ANTERIOR TEETH CARIES AMONG VARIOUS SURFACES: Out of 284 surfaces affected with anterior tooth caries, 57.39% cases were seen in mesial surfaces and 23.24% cases on facial surfaces.



# DISCUSSION

The study found out distribution of carious anterior teeth between the two genders. In accordance with the research conducted Mithra Hegde et al (2014) on the incidence of anterior tooth caries, the present study found that the prevalence of caries was more in males than females in the same population<sup>[5]</sup>. The assessment of anterior carious teeth among the various age groups was also determined. Out of the 1000 patients examined, maximum prevalence of carious anterior teeth was seen in the age group of 21 years and 30 years and 41 to 60 years of age

(27.5%), followed by 26.8% of cases in 30 to 40 years of age. Similar results were recorded in studies conducted by Cleaton Jones and Hugoson <sup>[6]</sup>. A strong interrelation was seen between the vegetarians, non-vegetarians (mixed diet) and caries which is dissimilar to findings of Khan et al <sup>[7]</sup>. The present study showed a higher incidence of caries in patients on a mixed diet in comparison to those on a vegetarian diet. This result can be attributed to the fact that majority of the population was that on a mixed diet. To research into the cause-effect relationship of the vegan diet on the oral cavity effectively, the sample needs to be studied for a longer period and the results re-evaluated. This study shows the prevalence of carious anterior teeth in the urban and rural populations. In the 1000 patients examined, 49.6% anterior tooth caries cases were seen in patients at rural centres and from rural areas and 33.7% cases were seen in patients from periurban areas and 16.7% in urban areas. Dental diseases in rural India are primarily due to sociocultural factors, such as inadequate or improper use of fluoride products and a lack of knowledge about oral health and hygiene, and systemic infrastructure deficiencies that prevent proper screening and dental care of oral diseases. Hegde MN et al conducted a study with comparable results in 2014<sup>[5]</sup>. It was also found that 94.9% of the anterior tooth caries were seen in the maxillary arch and maxillary canines were seen to be affected in 51.8% of total cases. There were least number of cases of carious anterior teeth reported in mandibular anteriors. These results are similar to the findings of Brekhus (1931) who also found that the prevalence of caries in anterior teeth was maximum in the maxillary arch <sup>[8]</sup>. A study done by Mustafa Demerci et al concluded that the mandibular incisors show decreased prevalence of caries most probably due to continuous bathing of the teeth by the saliva secreted by the submandibular and sublingual glands <sup>[9]</sup>. The reason for the difference between the arches may also relate to gravity and the fact that saliva with its buffering action would tend to drain from the upper teeth and collect around the lower. The present study showed an inverse relationship between the incidence of caries and the frequency of brushing and use of oral hygiene aids. The population who observed brushing once daily and did not use any oral hygiene aids had a higher caries incidence than those who brushed

twice daily and used oral hygiene aids. Therefore, it can be concluded as better oral hygiene habits lead to a decrease in the prevalence of caries which was also reported in a study conducted by Petti S Tarsitani G, Panfili P, Simonetti D (1997) <sup>[9]</sup>. Caries was found to be present mainly in the interproximal areas (75.7%) and the least in the lingual aspect. This can be attributed to the accumulation of debris and subsequent caries development in these areas.

### REFERENCES

- 1. Mustafa Demirci, Safa Tuncer and Ahmet Ayhan Yuceokier: Prevalence rate of caries on individual permanent tooth surface and its distribution by age and gender; Eur J Dent. 2010 Jul; 4(3); 270-279.
- 2. Sturdevant's Art and Science of Operative Dentistry [First South Asian Edition]
- Fejerskov Ole, Kidd Edwina, Nyvad Bente, Baelum Vibeke editor. Dental Caries: the Disease and its Clinical Management.2nd ed.. Oxford: Blackwell Munksgaard; 2008
- Fejerskov O. Changing paradigms in concepts on dental caries: consequences for oral health care. Caries Res.2004;38:182–191
- Hegde, Mithra N., Amit Malhotra, and Nidarsh D. Hegde. "Prevalence of caries in anterior teeth in adults of Dakshina Kannada Indian population–An epidemiological study." Indian Journal of Dentistry 5.1 (2014): 6-11.
- Cleaton-Jones Peter, Fatti Paul. Dental caries trends in Africa. Community Dent Oral Epidemiol. 1999;27:316–320
- Khan Abdul Arif, Jain Sudhir K, Shrivastav Archana. Prevalence of dental caries among the population of Gwalior (India) in relation of different associated factors. Eur J Dent. 2008 April;2:81–85
- A Report on Dental Caries in Ten Thousand Four Hundred Forty-Five University Students (1928–1930) ; Brekhus, P.J. Journal of the American Dental Association , Volume 18 , Issue 7 , 1350 – 1356
- 9. Petti , Panfili Pierluigi, Simonetti D'Arca Adele. Oral hygiene, sucrose

consumption and dental caries prevalence in adolescent systemic fluoride non-users. Community Dent Oral Epidemiol. 1997;25:334–336