



**PREVALENCE OF EARLY CHILDHOOD CARIES AMONG SCHOOL CHILDREN IN ARUNACHAL PRADESH, NORTH EAST AND MATHURA CITY, NORTH INDIA.**

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**ABSTRACT**

**Background:** Dental problems in early childhood have been shown to be predictive of future dental problems, growth and development by interfering with comfort, nutrition, concentration, and school participation. **Aim:** To compare the prevalence of early childhood caries in 3-5 years old school going children in North East and North India. **Materials and Methods:** School based cross sectional study in 1200 children, Group 1 consist of 600 school going children of 3-5 years from North East and Group 2 consist of 600 school going children of 3-5 years from North India. **Result:** North East study population had lower prevalence of ECC (41.7%) as compared to the North India with a prevalence of 51.3%. **Conclusion:** Overall, dental and oral health care in India is not in optimal condition. The increasing prevalence of early childhood caries needs dental health programmes, which target the specific segments of the population. Hence, an urgent need to prevent the rising dental diseases in India.

**KEYWORD:** Prevalence, early childhood caries, North East, North India.

**INTRODUCTION**

Early childhood caries (ECC) is a multiple complex process involving factors like diet, microorganisms, trace elements, saliva, genetic predisposition and tooth morphology.<sup>[1]</sup> Apart from these, many related factors like individual, social, environmental and cultural factors are also responsible.<sup>[2]</sup> The first sign of dental caries lesions in infants who develop ECC is the appearance of white demineralization areas in the cervical regions of the maxillary anterior teeth.<sup>[1]</sup>

It has been stated that ECC can be defined as the occurrence of any sign of dental caries lesions on any tooth surface during the first 3 years of life. India, with a population that exceeded 1.39 billion in 2021, is the second most populous nation in the world.<sup>[3]</sup> Eighty percent of the population lives in rural areas. The oral health care system consists of medical research institutes with departments of dentistry, more than 120 dental schools spread throughout its 27 states, medical colleges with departments of dentistry in cities and district headquarters, and private dental clinics. The majority of dental care is provided in the latter.<sup>[4]</sup>

The 'North East India' is a collective name for the easternmost part of India comprising the states of Assam, Arunachal Pradesh, Sikkim, Nagaland, Mizoram, Meghalaya, Tripura, and Manipur. Arunachal Pradesh is the largest of the Seven Sister States of Northeast India

by area.<sup>[5]</sup> There are five North Indian States and four Union Territories namely; Delhi, Chandigarh, Ladakh, Jammu and Kashmir, Himachal Pradesh, Haryana, Uttarpradesh, Punjab, and Uttarakhand. Mathura city is a sacred city in Uttar Pradesh there is large demographic difference in both the place.<sup>[6]</sup>

Currently, no data are available on the caries lesion prevalence and comparison of two regions. Therefore, this study was conducted to determine the prevalence of ECC in 3-5 years old school going children in Arunachal Pradesh, North East and Mathura city, North India.

**METHODOLOGY**

This study had the approval of head of the school, the Principal/Headmaster prior to beginning of the study. The sample consist of children age between 3 to 5 years attending both government sponsored and private schools that is running in North East and North India.

**Study population:** The study population was selected from various schools located in North East and North India.

**Inclusion criteria:** Children between 3 to 5-years old age group enrolled in various selected schools of the town, and children who were healthy.

**Exclusion criteria:** Handicapped children; children with

major debilitating illnesses.

**Sample size distribution:** A total number of 600 school going children between the age of 3 to 5 years in Arunachal, North East and 600 from Mathura, North India were examined.

**Scheduling:** The data collection was scheduled during the school working hours. An average of 50 children were examined per day.

**Data recording:** Data concerning the independent variables were collected using a self-structured questionnaire.

**Duration of study:** The study was carried out over a period of four weeks including period for data collection, statistical analysis, and writing the report.

**Data analysis:** After initial analysis, the clinical and questionnaire data were analyzed further using SPSS-20 (Statistical Programme for Social Sciences). Initially, the percentage of children with ECC and the children without ECC were compared using a cross-tabulation procedure and the relative proportions were analyzed using the Chi-squared test of association at  $p > 0.05$  insignificant and  $p < 0.05$  significant.

## RESULT

Total 600 children were sampled for the study in North East, out of which 280 (46.7%) were male and 320 (53.3%) were female. The proportion of male and female in each age group were almost equal. Results were found to be insignificant when comparing dmft with gender (Table and Graph 1).

In North India also sample for the study were 600 children, out of which 342 (57%) were male and 258 (43%) were female. Results were found same as group 1, which is insignificant when comparing dmft with gender (Table and Graph2).

Overall early childhood caries prevalence in North East was 41.7% and 51.3% in North India. There was 9.6% difference in early childhood caries prevalence between North East and North India (Graph 3).

## Table

Table 1: Prevalence of ECC based on gender in North East India. Table 2: Prevalence of ECC based on gender in North India.

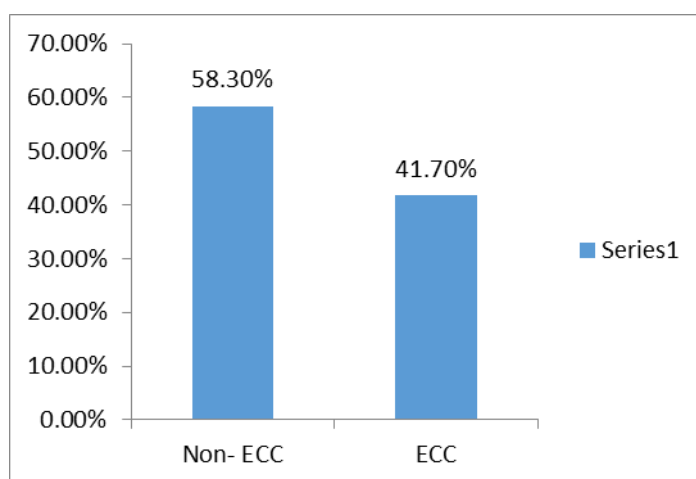
## Figures

Figure 1: Prevalence of ECC in North East India. Figure 2: Prevalence of ECC in North India.

Figure 3: Comparison of North East India and North India ECC Prevalence.

**Table 1: Prevalence of ECC based on gender in North East India.**

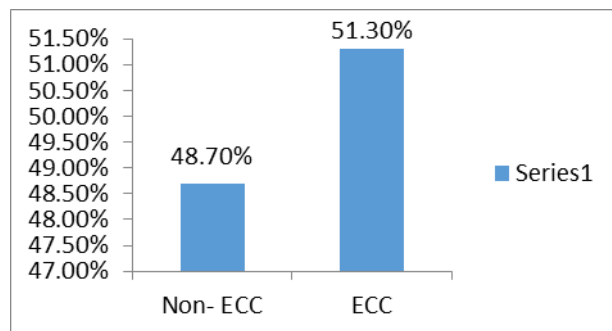
Dmft	Male	Female	Total	Chi Square Value	Pvalue
Non ECC	155 (25.8%)	195 (32.5%)	350 (58.3%)	0.193	0.167
ECC	125 (20.8%)	125 (20.8%)	250 (41.7%)		
Total	280 (46.7%)	320 (53.3%)	600 (100.0%)		



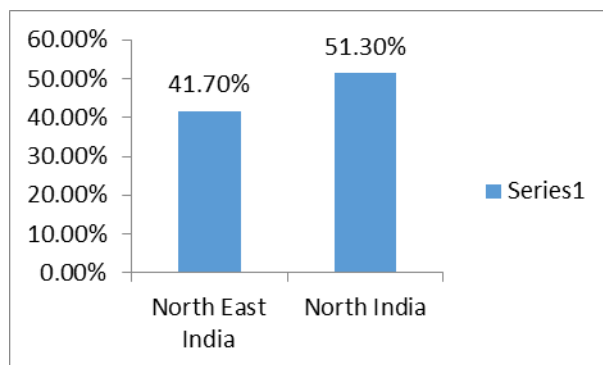
**Graph 1: Prevalence of ECC in North East India.**

**Table 2: Prevalence of ECC based on gender in North India.**

Dmft	Male	Female	Total	Chi Square Value	Pvalue
Non ECC	172 (28.7%)	120 (20%)	292 (48.7%)	0.42	0.51
ECC	170 (28.3%)	138 (23%)	308 (51.3%)		
Total	342 (57%)	258 (43%)	600 (100.0%)		



**Graph 2: Prevalence of ECC in North India.**



**Graph 3: Comparison of North East and North India ECC prevalence.**

## DISCUSSION

The schools in this study were stratified randomly and selected by a non dental administrator to enhance the representivity of the sample.<sup>[7]</sup> ECC is defined as the presence of one or more decayed, missing, or filled tooth surfaces in any primary tooth in a child at 71 months of age or younger.<sup>[3]</sup> By the time a child is 2 to 3 years of age, all primary teeth should have erupted and between the ages of 6 and 12, a mixture of both primary teeth and permanent teeth reside in the mouth.<sup>[8]</sup> The 3 to 5 years age group have been selected in this study because in this age group all sets of primary teeth are present in the oral cavity, and also their easy accessibility and to ensure uniformity in sampling.<sup>[7]</sup> So the prevalence of an early childhood caries can be identified easily. The prevalence of dental caries can be attributed to the preventive program undertaken locally, and also can highlights the importance and understanding of the local factors influencing ECC. So the aim of this study was to find out the prevalence of ECC in 3-5-years old children having dental problem in North East and North India.

Sethi and Tandon study found that Prevalence rate of caries in Udupi was 65.5% in 3-5 years age group<sup>[9]</sup> and Srikanth K et al., concluded their study showed the prevalence of 41.9% in West Godavari District.<sup>[10]</sup> Whereas in our study, the prevalence is 41.7% in North East and 51.3% in North India. This difference might be due to the demographic differences, geographic difference between two region, selection of specific population group, i.e. children belonging to schools may get education on oral health, regular health checkups and supplementary nutrition.<sup>[1]</sup> The children habit of eating chocolates, sweets and other cariogenic substances as

compared with those who do not consumed.<sup>[2]</sup> Also, they are given some tips for general and oral hygiene and may get some oral healthcare as a part of general healthcare.<sup>[8]</sup> Seeding of good habits in children such as brushing the teeth, washing hands, etc.<sup>[4]</sup>

Wendt L.K. in Sweden, Kristine Marie G. in Philippines, and Seval Olmez in Turkey found that higher age is associated with higher prevalence of ECC among the children.<sup>[11]</sup> Same conclusion was stated by Shah AF et al., their study showed a significant increase in the prevalence of ECC with increasing age ranging from 33.2% among 24–35 months old to 50.6% and 42.9% among 36–months old children, respectively.<sup>[17]</sup> Prasanth P et al., found that prevalence rate of caries in urban Bangalore, India was 27.5%, aged between 8 and 48 months.<sup>[12], [16]</sup> The overall prevalence of dental caries was found to be 47.8%, rural study population had higher caries prevalence of 53.8% as compared to the urban with a prevalence of 39.8% this was concluded by Arora B et al., in their study Prevalence and comparison of dental caries in 12 year old school going children in rural and urban areas of Ferozepur city.<sup>[13]</sup>

Prevalence of ECC was found to be more among the boys than girls by Peressini et al. in Manitoulin, Ontario.<sup>[17]</sup> However, in this study, no significant association was found between the sex of the child and ECC in both the study groups. The prevalence of ECC among the males (46.7%) and females (53.3%) was nearly equal in North East group and (57%) males and f (43%) females in North India group. The prevalence of ECC in the present study were 41.7% and 51.3%. This is comparatively high compared with that in other places in

India as per some Indian studies. Studies in Udipi and Davangere showed a prevalence of 19.4% and 19.2%, and 39.9% by Shah AF *et al.* respectively. However, a study in Kerala showed caries prevalence of 44%. The prevalence of ECC worldwide is highly variable ranging from 2.1% in Sweden to 85.5% in rural according to a systematic review of Ismail and Sohn.<sup>[11], [17]</sup> While the prevalence reported to be 11–53.1%, the prevalence in UK is 6.8–12%. This could be attributed to differences in case definitions and diagnostic criteria of ECC apart from risk factors.<sup>[2]</sup>

An important finding of this study is that around 92.5% of children with ECC were untreated caries. Moreover, there was not a single tooth which were restored and all the children required treatment. This is an indicative of a total lack of awareness about oral health among parents, lack of accessibility, and affordability for oral health care in this section of people which is quite alarming.

### CONCLUSION

- The awareness, preventive and curative oral health programs should be initiated for children from the eruption of first primary teeth.
- Anticipatory guidelines should be introduced in dental homes for infants.
- Oral healthcare providers should be aware of associating factors for ECC. Future health promotion and education programs in school should include oral health issues and the risk factors for ECC, and its consequences should be addressed. Public funded oral health programs should be started.

**Limitations:** Dental caries is a very complex disease involving a number of different variables. In this study, many variables were untouched like parent's attitude towards the child's oral health, parent's supervision of the child's oral health practices and feeding habits when the child is outdoors, which may have a marked effect on the prevalence of ECC.

**Author Contributions:** M. Gumro, contributed to conception and design, data analysis and interpretation, drafted and critically revised the manuscript; S. Gupta, contributed to data acquisition, critically revised, gave final approval; M. Panwar, contributed to conception, critically revised the manuscript; T. Dietrich, contributed to conception, critically revised the manuscript; S. Isha, contributed to data acquisition and analysis, critically revised the manuscript; S. Dutta, contributed to data analysis, critically revised the manuscript. All authors gave their final approval and agreed to be accountable for all aspects of the work.

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