

# Prevalence of Dental Caries Among 3-15 Year Old School Children in Ghaziabad City and its Adjoining Areas - A Correlated Survey

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## ABSTRACT

**Objective:** The study was conducted for the first time in Ghaziabad city and its adjoining areas to determine the prevalence and severity of dental caries in 3-15 year old children in the area and to know the effect of age, socioeconomic status, diet, oral hygiene practices and attitude towards dental awareness to caries prevalence and severity in different dentitions.

**Material & Methods:** 1500 children, 500 each from primary, mixed and permanent dentition were examined using WHO 1997 guidelines. The results were tabulated and statistically analyzed.

**Results:** The overall caries prevalence in 3-15 year old population in Ghaziabad city and adjoining areas determined was 51.46%.

**Conclusion:** It was also seen that attitude towards age, dental awareness and socioeconomic status were significantly related to caries prevalence and severity in different dentitions and the global goal of oral health by 2000 has been achieved by this population.

**Keywords:** Caries prevalence, Severity, age, Siet, socioeconomic status, Oral hygiene practices, Dental awareness

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## INTRODUCTION

Dental caries is an infectious microbial disease of multifactorial origin in which the diet, the host and the microbial flora interact over a period of time in such away so as to encourage demineralization of the tooth enamel with resultant caries formation. Caries, the product of man's progress towards civilization, has a very high morbidity potential thus is coming into focus of the mankind (1). The caries experience varies greatly among countries and even within small regions of countries. It varies with age, sex, socioeconomic conditions, ethnicity, diet, medical conditions of the patient, oral hygiene practices etc and even within oral cav-

ity all the teeth and surfaces are not equally susceptible to caries (2).

**A Brief About Ghaziabad City:** With the stringent implementation of organized community preventive measures in the developed countries, dental caries is on the decline. India still being a developing country, has few resources and a lot of economical, social and cultural barriers to overcome to achieve the target of minimal or no caries (1). Ghaziabad City is located in the Western part of Uttar Pradesh State in Northern India, sharing the borders with the National Capital Territory Delhi the capital of India. Though the city has a rural background, owing to its location close to Delhi, and with good connectivity, it is one of the important and fast developing city in the National Capital Region.

During the past few years, several studies have been conducted to assess the caries prevalence in various regions in India. However no study has been conducted on the prevalence of caries in school going children in Ghaziabad city and its adjoining areas of Western U.P., India.

This study was carried out with the following aims and objectives:

- To study the caries prevalence and severity in 3 – 15 year old children in Ghaziabad city and adjoining areas.
- To know the effect of age, socio-economic status, diet, oral hygiene practices and attitude towards dental awareness and their relation to caries prevalence in Ghaziabad city and its adjoining areas for community based oral health promotion and prevention in the area.

## MATERIALS AND METHODS

2621 children aged between 3 and 15 years in the department of Pedodontics and Preventive Dentistry, Santosh Dental College and Hospitals, Ghaziabad and various schools in Ghaziabad city were given questionnaire forms and were instructed to get them filled by their parents/caregivers. These questionnaire inquired about the childrens' personal details like age, socio-economic status, diet, oral hygiene prac-

tices and child's and parents' attitude towards dental awareness, their knowledge about pediatric and preventive dentistry as a separate branch in dentistry, awareness about fluoride application (topical and systemic), their visits to the dentist and the reasons for their last dental visit (for routine dental check-up or pain). The forms were analyzed and those forms that didn't provide proper information were excluded. A total of 1500 students, 500 each from the primary, mixed and permanent dentition were included in the study. The study was conducted between November 2009 to January 2011 caries was recorded on *WHO 1997 guidelines*(3) using a mouth mirror and explorer and proper lighting arrangement by a single examiner to avoid interexaminer variations using *DMFT*, *DMFS* and *dmft* and *dmfs indices*.

The variables used to analyze the caries prevalence were divided into different groups for statistical analysis. These groups were as follows:

### Age

- **Group I:** 3-6.9 years
- **Group II:** 7-12.9 years
- **Group III:** 13-15years

### Diet

Based on type and times of sugar intake

- **Group I:** Both solid and liquid sugar intake; 1-4 times a day
- **Group II:** Both solid and liquid sugar intake; >4 times a day
- **Group III:** Mainly liquid sugar intake; 1-4 times a day
- **Group IV:** Mainly solid and sticky sugar intake; 1-4 times a day

### Based on Vegetarian or Non-vegetarian Food

- Non-vegetarian
- Vegetarian

### Socioeconomic Status

Patients with monthly family earning:

- **Group I:** <5K
- **Group II:** 5-10K
- **Group III:** 10-15K
- **Group IV:** 15-20K
- **Group V:** - >20K

### Brushing Habits

- Never brushing
- Brushing once daily
- Brushing twice daily
- Brushing thrice daily

### Dental Awareness

- Present
- Absent

The overall caries prevalence and severity were calculated of the children aged 3-15 years. Moreover on the basis of these variables caries prevalence and severity were calculated within the individual dentitions.

### Statistical Analysis

The software used for the statistical analysis was SPSS (statistical package for social sciences) version 17.0. For the calculation of caries prevalence in different groups, chi-square test was used; while non parametric tests used were Mann-Whitney test (for comparison of caries severity between two groups- used for dental awareness) and Kruskal- Wallis test (for comparison of caries severity between more than two groups- for brushing habits).

## RESULTS

The overall sample size which was 1500. Out of this, 500 were from the primary dentition, 500 from mixed dentition and 500 from permanent dentition.

### Caries Prevalence and Severity on the Basis of Age

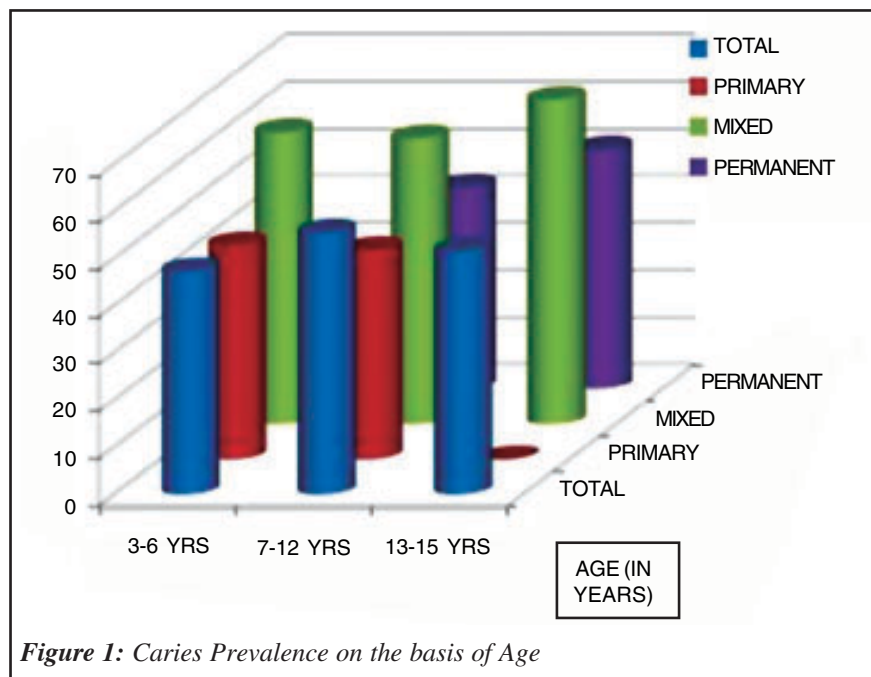
The caries prevalence and severity was maximum in the age group 7-12 years 11 months (55.53%) and minimum in 3-6years and 11 months group (47.29%). In primary and mixed dentitions, the difference between caries prevalence and severity on basis of age was not significant (p value > 0.05), while in permanent dentition, the difference in caries severity on basis of age was significant at 5% level (p value <0.05). (Table 1 and Graph 1)

### Caries Prevalence and Severity on the Basis of Dental Awareness

The caries prevalence and severity was more in children who did not have dental awareness (54.60%) compared to those who had

**Table 1: Caries severity on the basis of Age**

		Age Group			P-Value	Significance
		3-6 years	7-12 years	13-15 years		
Primary	dmfs	2.92±7.350	4.78±10.035	—	>.05	No significant
Mixed	dmfs	2.79±6.577	2.92±5.671	0.88±1.310	>.05	No significant
	DMFS	0.59±1.672	0.44±1.302	0.81±1.109		
Permenen	DMFS	—	1.06±1.674	1.61±2.283	<.05	Significant (5% level)



**Figure 1: Caries Prevalence on the basis of Age**

dental awareness (40.0%). In the primary dentition, the difference in caries prevalence and severity between those who were aware and those who weren't highly significant (p value <0.001). In mixed dentition, the difference in caries severity between children with and without dental awareness was highly significant (p value <0.001). However, no significant difference in caries prevalence and severity was seen amongst permanent dentition (p>0.05). (Table 2 and Graph 2)

**Caries Prevalence and Severity on the Basis of Socioeconomic Status**

The caries prevalence and severity was highest (64%) in children from very low income households (<5K per month) and lower in higher income households. In the primary and mixed dentitions, the difference in caries prevalence and severity on basis of socio economic status was highly significant (p value < 0.001). However, no significant difference in caries prevalence and severity was seen in permanent

dentitions on basis of socio economic status (p>0.05). (Table 3 and Graph 3)

**Caries Prevalence and Severity on the basis of Diet and Oral Hygiene Practices**

There were differences in caries prevalence and severity in different dentitions on basis of diet type/times and (veg/non-veg) and oral hygiene practices but these differences were not significant.

**Overall Caries Prevalence**

The overall caries prevalence in this population was 51.467%. The caries prevalence in primary dentition was found to be lowest (45.4%) while it was highest in the mixed dentition (60.8%). In the permanent dentition, caries prevalence was 48.2%. (Graph 4)

**Overall Caries Severity**

Overall caries severity was determined by dmft/DMFT and dmfs/DMFS ± SD. In the primary dentition, mean dmft was 1.68±3.057 while mean dmfs was 2.95±7.398; in the mixed dentition mean dmft was seen to be 1.57±2.325, mean dmfs was 2.84±5.711, while the mean DMFT was 0.36±.812 and mean DMFS was 0.47±1.348. In the permanent dentition, the mean DMFT was found to be 1.06±1.455 and the mean DMFS was 1.44±2.124. (Graph 4)

**Table 2: Caries Severity on the basis of Dental Awareness**

		Dental Awareness		P-Value	Significance
		Present	Absent		
Primary	dmfs	1.79±5.254	3.34±7.959	<0.001	Highly Significant
Mixed	dmfs	1.23±3.150	3.10±5.992	>.05	Highly significant
	DMFS	0.54±1.371	0.46±1.345		
Permenen	DMFS	1.28±2.128	1.48±2.123	<.05	Significant (5% level)

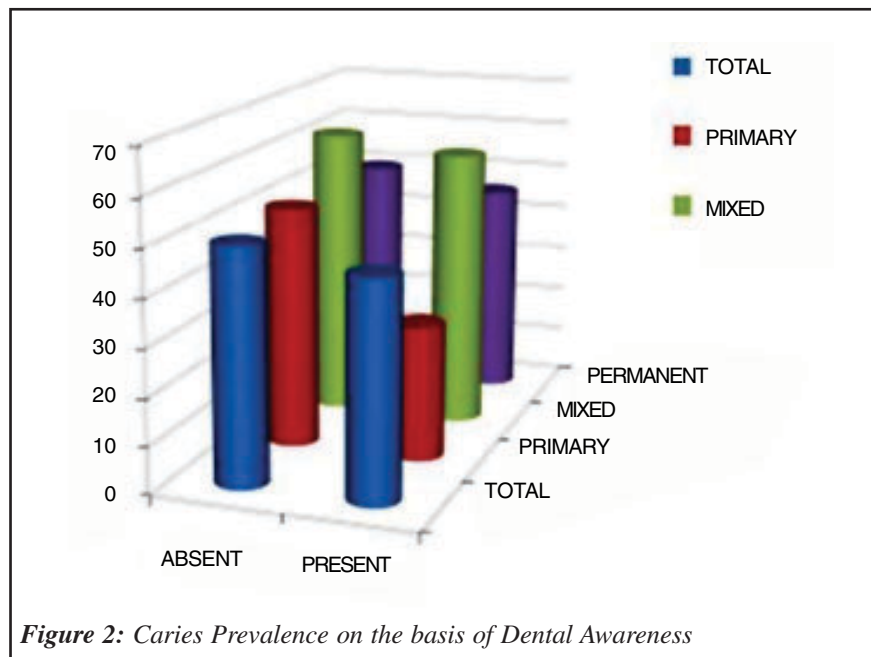


Figure 2: Caries Prevalence on the basis of Dental Awareness

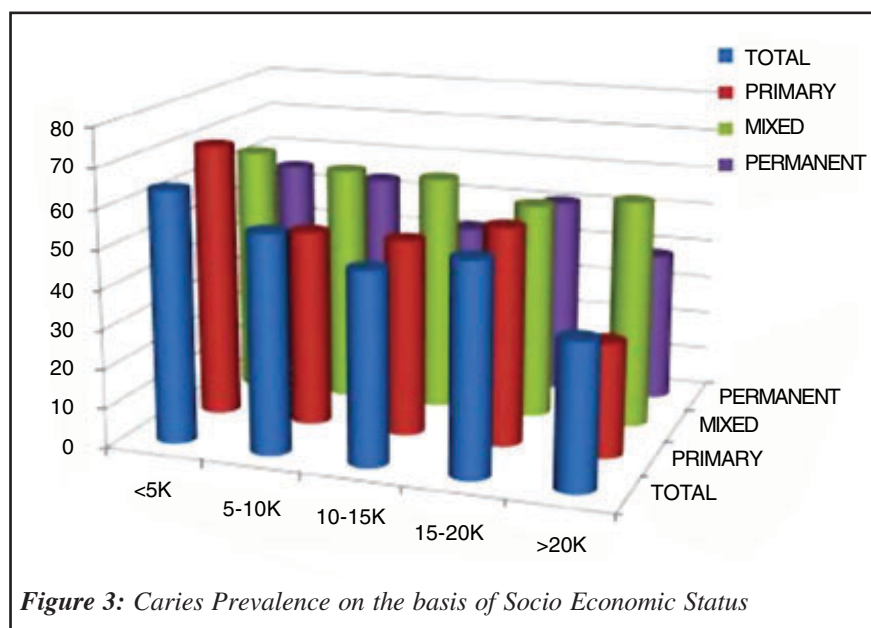


Figure 3: Caries Prevalence on the basis of Socio Economic Status

**Difference in Caries Severity between Different Dentitions**

The difference between caries severity i.e. DMFT/DMFS in mixed and permanent dentition was significant while that between dmft /dmfs in primary and mixed dentition was not significant. (Table 4)

**DISCUSSION**

There are various biological factors and social factors that affect caries process in oral cavity (4). In the recent decades, the most frequent risk factors of dental caries have been socio economic status, oral hygiene, eating habits and fluoride supplements. It is also well known that parental attitudes have an impact on the establishment of oral health habits in children (5). This is in conjunction with the findings in this study.

The prevalence of dental caries has been declining over the last three decades in most developed countries. This decline in caries has been associated mainly with widespread availability of fluoride toothpastes and changes in pattern and amount of extrinsic sugar consumption, especially sucrose increased dental awareness, increased availability of dental resources, introduction of dental health education programs, improved preventive approaches in dental practices and changed diagnostic criteria(6).

Although there are reports of declining caries prevalence in developed countries, it is still very high in many developing countries (7). In various studies conducted in India, a high caries prevalence was recorded i.e. Saravanan S.*et al* (8) found caries prevalence of 71.7% in 5-10 year old children in

Table 3: Caries Severity on the basis of Socio-Economic Status				
Socio Economic Status	Primary Dentition	Mixed Dentition		Permanent
	dmfs	Dmfs	DMFS	DMFS
<5K	5.63±11.718	3.92±7.523	0.46±1.513	1.51±2.130
5-10K	3.02±6.709	2.84±4.925	0.56±1.306	1.71±2.322
10-15K	4.28±8.384	1.75±3.834	0.56±1.662	1.21±2.003
15-20K	3.76±7.401	2.50±6.124	0.18±457	1.56±2.316
>20K	1.29±3.922	1.24±2.257	0.36±1.124	1.03±1.651
P Value	<.001	<.001	>.05	
Significance	Highly Significant	Highly Significant		Not Significant



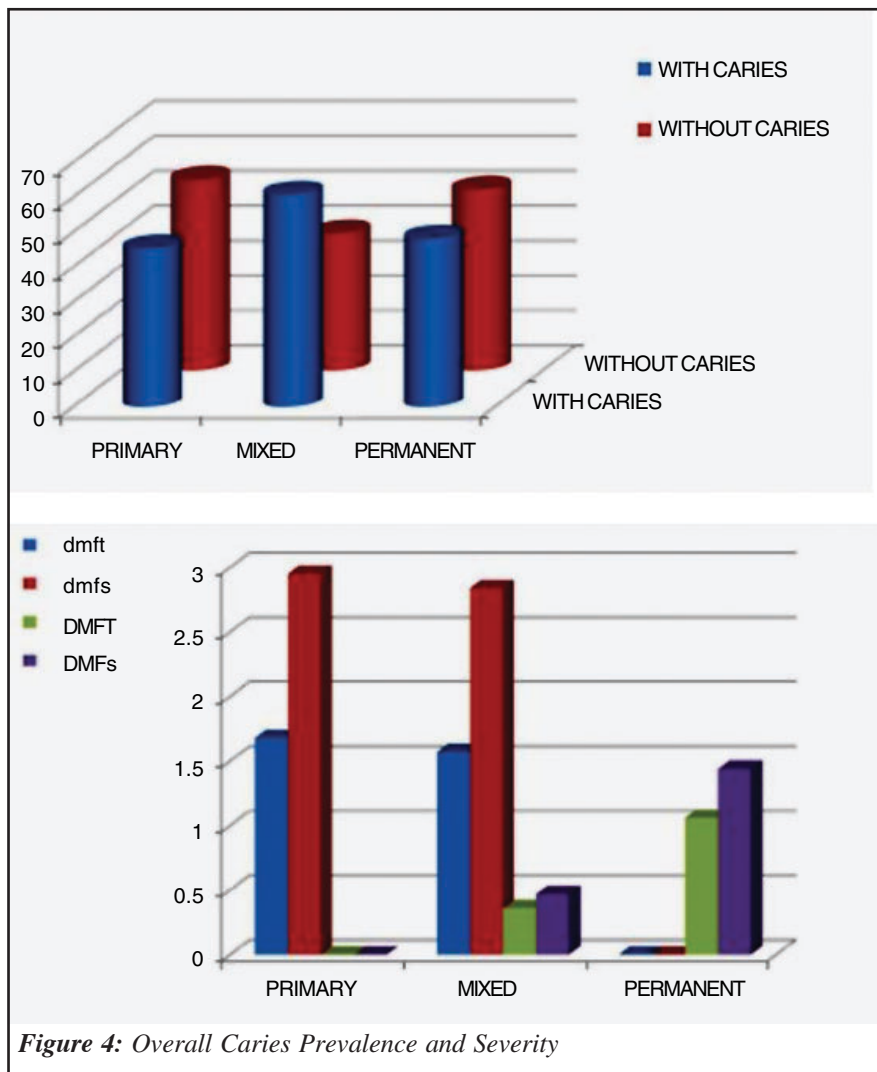


Figure 4: Overall Caries Prevalence and Severity

Chidambaram, N. Joshi *et al* (9) 2005 observed that 77% children in Kulusekharam village were affected by dental caries.

However, many studies conducted in India have also reported low caries prevalence. Dhar V.*et al* (10) 2007 reported caries prevalence of 46.75% in Udaipur district, Dash JK (11) 2002 reported caries prevalence of 64.3% in Cuttack, Prakash H. *et al* (12) 1999 reported caries prevalence of 39.19 in Delhi. In this study too, caries prevalence was found to be low i.e. 51.47%.

In 1981, WHO and the FDI World Dental Federation (13) jointly formulated goals for oral health to be achieved by the year 2000, as follows:

- 50% of 5-6 year-olds to be free of dental caries.
- The global average to be no more than 3 DMFT at 12 years of age.
- 85% of the population should have all their teeth at the age of 18 years.

In the present study, it was established that more than 50% of children under 6 years

were caries free and the DMFT was less than 3 at 12 years of age. Thus the global goals for oral health by 2000 have been achieved by the Ghaziabad children aged 3-15 years.

**LIMITATIONS OF THE STUDY**

- The dmft/DMFT index can only be used for coronal caries, it cannot record root caries. Hence, underestimation of caries is possible.
- The rate of caries progression cannot be assessed by this index which may hinder in providing proper treatment plan in the population.
- This index does not give an account of the treatment needs in a population and only records the carious and the treated lesions.

**SCOPE FOR FUTURE**

This study can be conducted in future in the same area to determine the treatment needs of these children. Moreover, now that the prevalence and severity of caries has been determined, community efforts should be made to improve the oral health status of this population.

**CONCLUSION**

- The overall caries prevalence in the 3-15 year old children in Ghaziabad city and its adjoining areas was 51.45%.
- The caries prevalence and severity in this population were significantly associated to age, socioeconomic status and attitude towards dental awareness.
- The caries prevalence on the basis of age was maximum in mixed dentition and minimum in the primary dentition. While the difference in severity on basis of age was maximum in permanent dentition.
- The caries prevalence was higher in children from lower socioeconomic strata than those from lower socio economic strata and this difference was more significant in primary and mixed dentition children.
- The caries prevalence was higher in children whose parents were aware about dental health, the difference was more significant in children from primary and mixed dentition.

**Table 4: Difference in Caries Severity between different dentitions**

Dentition	Dentition	P Value	Significance
Primary	Mixed	>.05	Not Significant
Mixed	Premanent	<.001	Highly Significant

- The caries prevalence and severity in the population were associated to, but not significantly to diet and oral hygiene.
- The caries prevalence in 3-6 year old population was less than 50% and the dmft and/or DMFT in all the three dentitions was less than 3. Thus the caries severity in this population is low and the global goal of oral health by 2000 has been achieved by this population.

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