Original Research Paper

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The Prevalence and Pattern of Early Childhood Caries in Bareilly, Uttar Pradesh: An Observational Study.

Abstract:

Background: Dental caries is a disease of teeth that results due to demineralization and destruction of organic and inorganic components of oral cavity. Early childhood caries (ECC) is a serious dental problem that affects infants and toddlers.

Aim: To evaluate the incidence of early childhood caries in children between 3-6 years in Bareilly city.

Materials & Method: This cross sectional study was conducted among 1000 preschool children, 536 male and 464 females between the age of 3-6 years in Bareilly city. They were examined for dmft and dmfs.

Results: Prevalence of ECC was 56.6% (566/1000). 57.1% males (n=306) were affected from ECC while 260 female subjects (56.0%) were found to be having ECC. Out of the total teeth evaluated, 2170 (94.84%) were decayed, 96 (4.19%) were missing and only 22 (1.0%) were filled. Mandibular posterior region was the most commonly affected teeth.

Conclusion: The prevalence of ECC in children aged 3-6 in Bareilly district is approximately 57% which is independent of the sex. The occlusal surface of the posterior teeth is the most common site for ECC. Dietary habits of the child, oral hygiene methods employed by the children and educational status of the mother play an important role in the incidence of ECC.

Keywords : Early childhood caries (ECC), Children, Nursing Bottle DMFT, DMFS, Chronic, subpopulation

Introduction:

Dental caries is a disease of teeth that results due to demineralization and destruction of organic and inorganic components of oral cavity. It is caused by prolonged accumulation of dental plaque and mediated by saliva.[1] Caries is a disease with high incidence among childen, where it is also believed to cause harm on both population and individual well-being.[2,3] When comparing it with other common diseases, dental caries is as frequent as asthma, hay fever and common cold.[4]

Early childhood caries is a disease that affects both well-developed and developing nations. Early childhood caries (ECC) is a serious dental problem that affects infants and toddlers.[5,6] Early child hood caries can also be termed as "Early childhood tooth decay", "early childhood caries (ECC)", "bottle caries", "nursing caries", "baby bottle tooth decay", or "night bottle mouth".[7,8] The expression "ECC" was proposed more than 20 years ago during a workshop supported by the Centers for Disease Control and Prevention (CDC).[9]

The American Academy of Pediatric Dentistry (AAPD) defined ECC as "the presence of one or more decayed (noncavitated or cavitated lesions), missing (because of caries), or filled tooth surfaces in any primary tooth in a child aged 71 months or younger".[10] The term "Severe Early Childhood Caries (S-ECC)" refers to "atypical" or "progressive" or "acute" or "rampant" patterns of dental

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caries, where in their definition AAPD scored ECC as the following: "in children younger than 3 years of age, any sign of smooth-surface caries is indicative of S-ECC. From ages 3 through 5, 1 or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled score of ≥4 (age 3), ≥5 (age 4), or ≥6 (age 5) surfaces constitutes S-ECC."[10]

ECC occurs due to a multifactorial etiology. ECC is caused by poor oral hygiene, bacterial invasion, bad diet habits, etc.[11,12] Moreover the incidence of enamel defects such as hypoplasia might lead to the initiation and progression of ECC.[13]

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. This serves to indicate high caries lesion activity in children.[14] Children with caries lesions in the primary dentition have a greater chance of developing caries lesions in the permanent dentition than children who are caries lesion free in the primary dentition.[15]

India is the second most populous nation in the world. Eighty percent of the population lives in rural areas. The oral health care system consists of medical research institutes, dental schools, medical colleges with departments of dentistry and private dental clinics. Bareilly is a city in Bareilly district in the state of Uttar Pradesh. It is the capital of Bareilly division and the geographical region of Rohilkhand. This study is undertaken with a view to evaluate the incidence of early childhood caries in children between 3-6 years in Bareilly city.

Material and Method:

This cross sectional study was conducted among preschool children in Bareilly city after obtaining permission from ethics committee, school authorities and parents. Study population was selected on the basis of multistage stratified cluster sampling technique. A total of 1000 preschool children between the age of 3-6 years were examined and were included in the study.

The data was collected using a basic questionnaire and clinical examination. The questionnaire included questions about each child's demographic characteristics (number of siblings, parents' educational levels and jobs etc, and monthly family income), oral hygiene measures employed etc.

The clinical examination was conducted by trained examiners. During the examination, each child was made to sit on an ordinary chair in daylight conditions, with artificial light being used as an adjunct. The examination was conducted using a different disposable dental probe and mirror for each child. Radiographs were not taken due to practical reasons. The modified WHO criteria and NIDCR criteria was used to diagnose caries lesions.

Early Childhood caries was diagnosed using NIDCR definition. Dental caries status was recorded using dmft and dmfs indices. Only those children whose general health is within normal limits were included for the study whereas the children on medication or having any systemic disease were excluded from the study.

The data was entered using the Microsoft Excel program (Microsoft Corporation, Redman, WA, USA). The collected data was statistically analyzed using IBM SPSS Software.

Results:

The present study was conducted with a view to evaluate the incidence of early childhood caries in children between 3-6 years in Bareilly city. A stratified cluster sampling technique was used to select the sample. In this study 1000 preschool children aged between 3-6 years who were not having any systemic diseases were included (Table1). Both the group of male and female were statically similar (P>0.05) according to age distribution.

Table 1: Distributions of study participants according to sex and age

Age (Years)	Male	Female	P Value
3	180	136	Chi square value=6.77 P Value = 0.08
4	134	104	
5	114	100	
6	108	124	
Total	536	464	

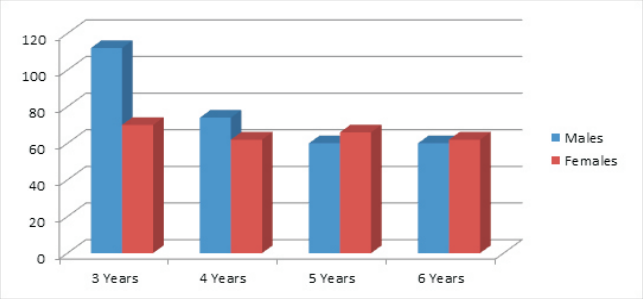
The present study was carried out on a total of 1000 children in age group of 3-6 years. Of these, 536 subjects were males (53.6%) and 464 were females (46.4%). Prevalence of ECC was 56.6% (566/1000). 57.1% males (n=306) were affected from ECC while 260 female subjects (56.0%) were found to be having ECC. There was no statistically difference in incidence of caries according to different age group among male children (P Value = 0.3743). There was no statistically significant association found in age and incidence of caries among female children (P Value = 0.0604). In female children caries were observed more in smaller age where as

males distribution across all age. This difference in distribution according to sex was found statistically significant. (P Value = 0.044)(Table 2) (Graph 1 and Graph 2).

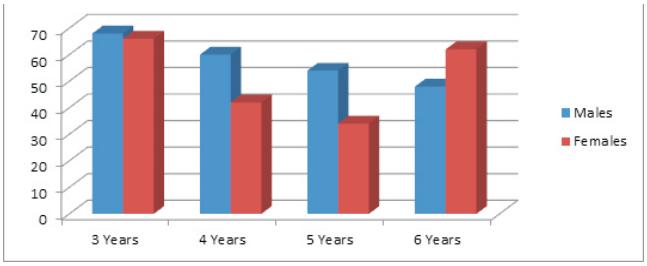
Table 2: ECC In Male And Female Subjects

Age	Male			Female		
	With caries	Without caries	Total	With caries	Without caries	Total
3	68	112	180	66	70	136
4	60	74	134	42	62	104
5	54	60	114	34	66	100
6	48	60	108	62	62	124
Total	230	306	536	204	260	464
P Value (for age distribution)	0.3743 (fisher exact test with simulated p value)			0.0604 (fisher exact test with simulated p value)		
P Value (for gender distribution)	0.044 (fisher exact test with simulated p value)					

Graph 1: Caries Affected Teeth in Males and Females



Graph 2: Caries Free Teeth in Males and Females



It was observed that out of the total 2288 teeth evaluated for decayed, missing filled scale (dmf), 2170 (94.84%) were decayed, 96 (4.19%) were missing and only 22 (1.0%) were filled (Table 3).

Table 3: DMF Analysis of the subjects

	No. Of teeth	Percentage (%)	Total
Decayed (d)	2170	94.84%	2288
Missing (m)	96	4.19%	
Filled (f)	22	1.00%	

It was observed that mandibular posterior region was the most commonly affected region followed by maxillary anterior region while mandibular anteriors were the least affected teeth. ECC invaded occlusal surfaces were the most commonly affected (46%) followed by proximal (37%) and then smooth surfaces (16%). Parent's educational status also plays an important role in the caries index of the child. A child would present with less caries incidence if his/her parents are more educated (Table 4).

Education status	Father		Mother	
	Caries (N=434)	Caries Free (N=566)	Caries (N=434)	Caries Free (N=566
No Schooling	1%	0%	1%	0%
Primary	7%	7%	5%	7%
High	30%	40%	23%	30%
Pre Degree	3%	5%	9%	14%
Degree	2%	3%	3%	6%
Post Graduate	1%	1%	1%	1%

Table 4: ECC in Children according to the Education Status of Parents

Discussion:

The present study was conducted to evaluate the prevalence of early childhood caries in 1000 children aged between 3-6 years in Bareilly in Uttar Pradesh. The results of the present study showed that male and female subjects aged 3 years were more prone to get affected from ECC at 20.8 % and 15.1%. It was also observed that the mandibular posterior teeth were most affected from ECC in the age group evaluated while the occlusal surface showed the maximum incidence of ECC.

Results from our study showed the prevalence of ECC at 56.55%. However varied prevalence of ECC has been reported throughout the world. Higher ECC prevalence were found in different areas of Saudi Arabia- 77.73% in Aseer[16] and 72.77% in Dawadmi.[17] In the United Arab Emirates, the ECC prevalence was 74.1%[18] whereas Sudan reported a prevalence of 71.4%.[19] In more developed countries like Canada and Kosovo, the ECC prevalences were less at 53% and 17.36% respectively as reported by Schroth R et al[20] and Begzati A et al.[21] Findings of our study were in agreement with the works of Dini EL et al[22] and Hattab FN et al[23] who also observed that the severity of ECC was independent of the gender. However conflicting results were observed by Sarvanan S et al[24] and Gaikwad RS[25] who observed that males were more prone to ECC in comparison to females.

Educational level of the mother plays an important role in dietary habits and oral hygiene measures of the child which decides the spread of ECC.[26] Our study showed that those

children with uneducated mothers and mothers with low educational levels had higher caries prevalence than those children with highly educated mothers which were in agreement with the results of Al-Meedani et al.[27] However Abduljalil H et al [19] observed that the mother's educational level was not significantly related to the ECC prevalence.
Conflicting results from other studies might be attributed to the differences in demography, socioeconomic conditions, educational level of the parents and dietary habits of the people.

Conclusion:

The following conclusions can be drawn from our study:

1. The prevalence of ECC in children aged 3-6 in Bareilly district is approximately 57%.
2. Incidence is independent of the sex
3. The occlusal surface of the posterior teeth is the most common site for ECC.
4. Dietary habits of the child, oral hygiene methods employed by the children and educational status of the mother play an important role in the incidence of ECC.

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