

Prevalence of Early Childhood Caries among Children Attending sub-urban primary schools in a city of Madhya Pradesh: A Cross Sectional Survey

Ajita Dwivedi^{1*} Abhishek Mani Tiwari² Abhigyan Kumar³

¹Senior Resident, Department of Oral and Maxillofacial Surgery, Shri Shankaracharya Institute of Medical Sciences, Bhilai, Durg, Chhattisgarh, India.

²Private Dental Practitioner, Mani Dental Care, Rewa, Madhya Pradesh, India.

³Assistant Professor, Department of Oral and Maxillofacial Surgery, Babu Banarasi Das College of Dental Sciences, Lucknow, India.

ABSTRACT

Background: Early childhood caries (ECC) is a well-known problem related to public health problem and children from low socioeconomic strata are particularly vulnerable to it. This study aims to assess prevalence of ECC among children attending primary schools at a sub-urban location in Rewa city of Madhya Pradesh.

Materials and Methods: A cross-sectional survey was carried out among 345 children aged 2–5 years selected via cluster random sampling, attending primary schools at a camp organized by a Non-Governmental Organization. Caries experience was assessed using decayed missing filled teeth (dmft) index (the WHO criteria) and ECC was recorded. IBM SPSS Statistics software version 19 was used for statistical analysis and significance level was set at $P < 0.05$. Descriptive data were generated in percentages. Chi-square test, Kuskall–Wallis test and Man–Whitney U-test were used for statistical analyses.

Results: A total of 345 children, with mean age 3.6 ± 1.8 years, were examined. Among them, 45.7% were boys and 54.3% girls. The prevalence of ECC was 52.6%. The prevalence of ECC increased with the increasing age. It was significantly higher among 5-year-old female children compared to males ($P = 0.023$). The mean dmft of study population was 1.26 ± 1.24 . There was only one detectable filled tooth among study population.

Conclusion: The high prevalence of ECC (52.6%), along with very low prevalence of filled teeth among the primary school children in Rewa City is a cause of concern. It suggests unmet dental treatment needs. Therefore, there is a need for caries preventive and treatment programs for this section of children.

Keywords: Primary School, Children, Dental Caries, Prevalence.

INTRODUCTION

As per the definition, Early childhood caries (ECC) is defined as the presence of one or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of 6 years.¹ This problem pertaining to major concern in public health that continues to affect infants and preschool children worldwide. The cause of this disease being multifactorial and is known to be caused as a result

of the complex interaction of three factors susceptible tooth surfaces, plaque bacteria, and carbohydrate diet over time.² The pattern of the disease is primarily linked with the feeding practices.^{3,4} Additional risk factors that are unique to the age group include early colonization with mutants streptococci, and frequent nursing and snacking, factors that create an environment which encourages the growth and dominance of mutants

Received: Feb. 3, 2021: Accepted: Mar. 29, 2021

*Correspondence Dr. Ajita Dwivedi.

Department of Oral and Maxillofacial Surgery, Shri Shankaracharya Institute of Medical Sciences, Bhilai, Durg, Chhattisgarh, India.

Email: Not Disclosed

streptococci in dental plaque. Pre-disposing factor of the disease are common presence of enamel hypoplasia in the primary dentition that predispose the newly erupted and immature enamel to dental caries.⁵ Low socioeconomic status (SES) leading to less or no affordability to oral apprentices and health services along with social determinants such as mother's educational level, cultural attitudes, are some of the other risk factors for the development of ECC.^{6,7} ECC can cause lasting harm to a child's oral and general health, and psycho-social and intellectual development. Not only does ECC affect teeth, but the consequences of this disease may also lead to more widespread health issues along with altered mental well being. ECC may be associated with severe malnutrition because of associated pain and their disinclination to eat.⁸

ECC may also be associated with iron deficiency anemia.⁹ ECC can be prevented and promptly treated during its early stages by counseling, propagating knowledge and awareness about the condition and its consequences and also by providing atraumatic restorative treatment. By knowing the prevalence of ECC among primary school children, the ward and the parents as well as the school teachers can be counseled regarding maintaining oral health measures and prevention of ECC.

MATERIALS AND METHODS

This study was a cross-sectional survey. Ethical clearance was obtained from the school and the NGO prior to the study. The sample size was estimated to be 360. A two-stage cluster sampling technique was followed. The primary schools were divided into 6 classes (play group to class Vth) and 60 children were randomly selected from one class to achieve a total sample size of 360. Children aged 2–5 years attending the school were and present on the day of examination and whose parents consented for participation of their children in the study were included. Four examiners were trained to check for decayed missing filled teeth (dmft) index by the consultant incharge during the camp. Voluntary written informed consent was obtained from the parents and assent was obtained from the children. ECC was defined as the presence of one or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of 6

years. Caries was recorded on pro forma using dmft index as per the WHO criteria.¹⁰ Statistical analysis Collected data were compiled, tabulated, and analyzed using IBM SPSS Statistics for Windows, Version 19.0. (Armonk, NY: IBM Corp.). Descriptive statistics were generated in terms of percentages. Statistical significance was set at $P \leq 0.05$. The data was not normally distributed hence Kruskal–Wallis test followed by Mann–Whitney U-test were applied for comparison of dmft scores between the age groups.

RESULTS

A total of 362 children with mean age of 3.8 ± 1.3 years, were present on the day of examination. Among them, 48.34% were boys and 51.66% girls [Graph 1]. The prevalence of ECC was 52.6% [Table 1]. The prevalence of ECC increased with the increasing age with the highest prevalence among 5 year old (65.4%) followed by 59.6%, 47.3%, and 33.7% among 4, 3, and 2 years old, respectively. The prevalence of ECC was significantly higher among 5-year-old female children compared to males ($P = 0.023$) [Table 1]. Mothers of majority of children were unemployed and under-educated. The prevalence of ECC was more among children of working mothers (55.4%) compared to children of unemployed mothers (49.6%). However, this difference was statistically no significant ($P = 0.44$). The mean dmft of study population was 1.26 ± 1.24 and the median was one [Table 2]. The mean dmft among 4- and 5-year -old subjects was significantly higher than the 2-year-old children. There was only one detectable filled tooth among study population. The mean dmft among females was 1.52 ± 1.45 , which was higher than mean dmft in males, 1.12 ± 1.66 . The difference was statistically no significant at $P = 0.451$ [Table 2].

Graph 1: Gender wise distribution of ECC in study population.

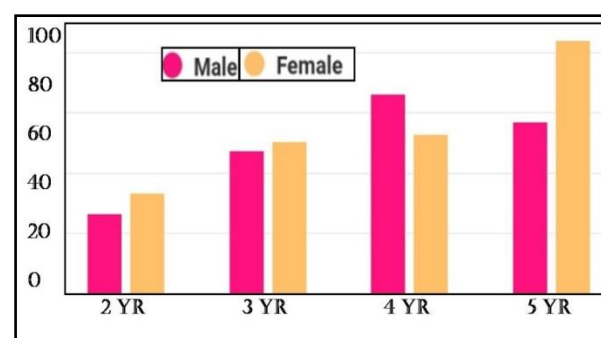


Table 1: Caries prevalence among study population.

Age groups	Gender	Caries (ECC) n (%)	Caries free n (%)	P
2 years	Male	6(26.7%)	15(73.3%)	0.004
	Female	8(33.5%)	16(66.5%)	
	Total	14(31.5%)	31(68.5%)	
3 years	Male	33(47.3%)	37(52.7%)	
	Female	41(50.6%)	40(49.4%)	
	Total	74(49.3%)	77(50.7%)	
4 years	Males	32(66.1%)	17(33.9%)	
	Females	27(53%)	26(47%)	
	Total	59(60.3%)	43(39.7%)	
5 years	Male	20(57.1%)	15(42.9%)	
	Female	24(84%)	5(16%)	
	Total	44(70.6%)	20(29.4%)	
Total	Male	91(51.1%)	84(48.9%)	
	Female	100(53.8%)	87(46.2%)	
	Total	191(52.6%)	171(47.4%)	

Table 2: Gender wise comparison of decayed missing filled teeth scores.

Gender	Mean dmft±SD	P
Females	1.52 ± 1.45	P=0.451
Males	1.12 ± 1.66	

Mann-Whitney U-test. SD – Standard deviation

DISCUSSION

In the present study, the prevalence of ECC was 52.6%. Some of the studies in India wherein children from varied population were considered, the prevalence of ECC was found to be 27.5% (Bengaluru urban, Karnataka), 32% (Rohtak, Haryana), 42.03% (Bahadurgarh, Haryana), 54.1% (Hubli-Dharwad city, Karnataka) and 47.2% in Bhubaneswar.^{11,12,13,14,15} The prevalence of ECC among children aged 3–5 years varies between continents and countries. The higher prevalence of dental caries among preschool age group might be attributed to poor oral hygiene, lack of awareness about oral hygiene maintenance and also least expenditure on dental apprentice, and negligence on the part of parents and caretakers and lack of dexterity in this age group. Many of the children in the study lacked basic facility of a tooth brush in their households. In addition, the population considered in this study was the sub-urban population, who are mostly from low socioeconomic background. The parents of this population usually spend maximum time and energy to earn a living and oral health gains less priority, which may be another reason for high prevalence of ECC in this population. Expenditure on oral health measures

and time required to visit the oral health professional is undertaken by the household needs and time to earn the daily wages. In this context, the authors would like to draw attention on the issues of SES and dental caries prevalence as studied by Boyce et al. among African-American children.¹⁶ This study had concluded that the childhood dental caries associated with low SES may involve social and psychobiological pathways through which lower SES is associated with higher numbers of cariogenic bacteria and higher levels of stress associated salivary cortisol. This convergence of psychosocial, infectious, and stress related biological processes appears to be implicated in the production of greater cariogenic bacterial growth. Unavailability and no affordability of dental services seem to be a probable reason for the high prevalence in this group. The population in the present study had a mean dmft of 1.28. This is in conformity with the studies done on similar population in Chandigarh city (2.25), and in Srinagar, Jammu, and Kashmir (1.80).¹⁷ The prevalence of dental caries was higher among girls (54.3%) as compared to boys (45.7%). The mean dmft score was higher among girls than boys. This is in accordance with studies conducted by Viridi et al wherein higher prevalence was observed in females in Bahadurgarh, Haryana.¹³ The results from different studies from different regions regarding gender differences of caries prevalence are contradictory and further exploration is required to get strong evidence and reason for the same. The present study showed significant increase in the prevalence of ECC with increasing age. A similar trend was observed in some previous studies by Prakash et al. and Stephen et al.^{11,18} The possible reasons for this could be increase in unhealthy dietary patterns with increasing age and prolonged exposure of teeth to the oral cavity suggesting a relationship of dental caries with age. An important finding of this study was that there was only one recordable filled tooth present in the study population. This is similar to a study conducted by Shah et al., where investigators did not find a single filled tooth in the children of AWCs of Srinagar city, Jammu and Kashmir.¹⁷ This is indicative of a total lack of awareness about oral health among parents. Lack of accessibility and affordability for oral health care seems to be a less probable reason as Rewa city has no dental institutions which offer treatment at low costs for the lower SES population and the

services are solely based on private practitioners. In addition to this, dental treatment is provided free of cost at the District hospital but the patient inflow is again not met by inappropriate number of staff leading to more load on the staff. In addition, Governmental and Non-Governmental institutions educate and motivate the people about oral health care by conducting community based programs from time to time. A study conducted by Kuriakose et al had found a strong positive association between the working status of mother and dental caries whereas low prevalence of ECC was seen in children of working mothers in study conducted by Stephen et al.^{18,19} A study conducted by Plutzer and Keirse though did not find a difference in the frequency of ECC in children whose mothers were working, but children of an employed single mother more frequently had caries than those of a working mother in a two parent family.²⁰ Such a data for the Indian population is not available to the best of knowledge of the authors.

CONCLUSION

The high prevalence of ECC along with very low prevalence of filled teeth among the sub-urban pre-school children of Rewa city is a cause of concern. It suggests unmet dental treatment needs. The need of oral health awareness programmes and providing affordable oral care to the sub-urban population has become the need of the moment so that the burden of poor oral health can be reduced and further complications can be minimized.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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