Early Childhood Caries Prevalence, Severity and Pattern in 3-6 Year Old Preschool Children of Mysore City, Karnataka

Prevalência, Severidade e Características da Cárie Precoce na Infância em Crianças de 3 a 6 Anos de idade de Mysore, Karnataka, India

Deepti AGARWAL[1], Sunitha S[2], C.V.K. REDDY[3], Priyanka MACHALE[4]

[1]Lecturer, Department of Community Dentistry, Dr. DY Patil Dental College Pune, Pimpri, Pune, India.

[2]Assistant Prof., Department of Community Dentistry, J.S.S. Dental College and Hospital, Mysore, Bannimantap, India.

[3]Professor and Head, Department of Community Dentistry, J.S.S. Dental College and Hospital, Mysore, Bannimantap, India.

[4] P.G.Student, Department of Community Dentistry, Dr. DY Patil Dental College Pune, Pimpri, Pune, India.

ABSTRACT

Objective: To determine Early Childhood Caries (ECC) prevalence, severity and pattern in preschool children of Mysore City, Karnataka.
Methods: A total of 10 preschools, five government and five private were selected randomly from 5 different sectors in Mysore. A total of 500 children and their parents were included in the study. Early Childhood caries was diagnosed using NIDCR definition. Dental caries status was recorded using dmft and dmfs indices.
Results: The results show that early childhood caries prevalence in 3-6 year old preschool children was 56.6% with a mean dmft and dmfs of 2.20 and 2.97 respectively. Out of the 500 children, 56% males and 57.1 % females were affected .There was no difference in caries prevalence between children of government and private preschools. 94.84% of total dmf was comprised of decayed component. Maxillary arch was affected more (29.32%) than the mandibular arch (26.14%).The most affected surfaces were the occlusal surfaces (46%) and least affected were the smooth surfaces (16%). Mandibular posteriors were affected the most (39.42%) and lower incisors were the least affected (1.84%).
Conclusion: The results support the view that oral counseling should begin within 6 months of eruption of 1st primary tooth.

RESUMO

Objetivo: Determinar a prevalência, severidade e características da cárie precoce na infância em Crianças de 3 a 6 Anos de idade de Mysore, India.
Método: Dez pré-escolas, cinco públicas e cinco privadas foram aleatoriamente selecionadas de cinco diferentes áreas da cidade de Mysore. Um total de 500 crianãs e seus pais/responsáveis foram incluídas no estudo. A ocorrência de cárie precoce na infância foi diagnosticada com o uso dos critérios NIDCR. A existência de cárie dentária foi feita com o uso dos índices ceo-d e ceo-s.
Resultados: A prevalência de cárie precoce foi de 56,6% com um ceo-d e ceo-s médios de 2,20 e 2,97, respectivamente. Do total de crianças, 56% dos meninos e 57,1 % das meninas estavam afetadas. Não se verificou diferença na prevalência de cárie entre os estudantes da rede pública e privada. Cerca de 94,84% do total do ceo-d envolvia o componente cariado. O arco superior foi mais afetado (29,32%) do que o inferior (26,14%). As superficies oclusais foram as mais afetadas (46%) e as menos afetadas foram as superfícies lisas (16%). Os molares inferiores foram os mais acometidos (39,42%) e os incisivos inferiores os menos afetados (1,84%).
Conclusão: O aconselhamento oral deve ser iniciado aos seis meses quando da erupção dos primeiros dentes decíduos.

KEY-WORDS

Prevalence; Dental caries; Tooth, Deciduous.

DESCRITORES

Prevalência; Cárie dentária; Dente decíduo.

INTRODUCTION

Information on caries prevalence and severity forms the basis for the magnitude and quality of caries preventive programmes and treatment needs in a population. Therefore a continuous need remains to find caries prevalence and severity information.[1]

Reports from developed western countries have historically shown a low caries prevalence and severity among preschool children .In contrast, caries prevalence and severity have historically been high in developing countries[2-4].

Several studies have reported ECC prevalence among preschool children in various parts of India. Some authors examined a random sample of 1500 preschool children of Hubli, Dharwad City. The prevalence of Dental caries was found to be 54%.A similar trend was found in urban Bangalore and Urban Davangere.[5]

Mysore is a city located in the southwest area in the state of Karnataka with an area of 128.42 Sq Kms and urban population of 7.8 lakhs. Children 0-6 years and women in childbearing age group of 15-45 years represent major portion of the population here which emphasizes the importance of maternal and child health care services. Preschool children attend both government sponsored and private schools. The drinking water is not fluoridated. No specific studies regarding the prevalence of early childhood caries in preschool children have been reported in Mysore city. Hence this study was undertaken to determine prevalence, severity and pattern of early childhood caries (ECC) in preschool children of Mysore city.

MATERIAL AND METHODS

This crossectional study was conducted for a period of six months, among the preschool children in Mysore city. Prior permission was obtained from ethics committee, school authorities and the parents.

A pilot survey was conducted among 50 children. Sample size was calculated using the formula $n = Z\alpha^2 * p * q / d^2$. The sample size was fixed to minimum of 383 based on the prevalence of ECC of 52% and expected precision of 5 %. In total 500 children were examined based on the sampling method used and were included in the study.

Preschool children attending both government sponsored and private primary preschools between age group of 3-6 years were selected. Study population was selected on the basis of multistage sampling. Mysore city is divided into 5 different wards. From each ward one government and one private preschool was selected by simple random sampling. The details of the preschools were obtained from the Deputy Director of Public Instruction (DDPI) office. A total of 10 preschools, five government and five private were selected in this way.

All the children from these preschools in the age of 3-6 years accompanied by their parent were included. A total of 500 children were examined and included in the study. Early Childhood caries was diagnosed using NIDCR definition. Dental caries status was recorded using dmft and dmfs indices.

The investigator was trained in the Department of Community Dentistry, J.S.S Dental College and Hospital on 10 subjects .Calibration was done on 20 subjects who were examined twice using diagnostic criteria on successive days, and then the results were compared to know the diagnostic variability. Agreement for assessment was 90 percent. Were included children whose general health is within normal limits and excluded the children on medication or having any systemic disease.

The various parameters used for the purpose of analysis were arithmetic mean, standard deviation, and chi-square test. The statistical package for social science (SPSS) version 17 was used.

RESULTS

The present study was carried out on a total of 500 children in age group of 3-6 years [232 males (43.4%) and 262 females (56.6%)].

Prevalence of ECC was 56.6%. (283/500). The mean dmft was 2.20 ± 2.92 and mean dmfs was 2.97 ± 4.90. Out of total number of males, 56% males (130/232) were affected with a mean dmft of 2.07 ± 2.88 and among females 57.1% (153/268) were affected with a mean dmft of 2.32 ± 2.95. However the difference was not statistically significant (Table 1).

Distribution of the ECC according to number of decayed missing and filled teeth (Table 2)

Distribution of the ECC according to number of decayed missing and filled teeth showed that out of 1144 dmf teeth, 94.84% (n=1085) were decayed, 4.19% (n=48) were missing and 1% (11) was filled.

Distribution of the ECC according to arch affected (Table 3)

Interarch analysis of the caries attack showed that out of 283 children affected, 30% (n=83) cases involved the maxillary arch, 26% (n=74) involved the mandibular arch and 42% (n=121) cases involved both the arches.

Mean dmft was found to be 2.81 ± 2.16 in upper arch and 2.27 ± 1.21 in lower arch. On applying the 't' test there was significant difference between mean dmft of upper and lower arch (p<0.001).

Distribution of ECC within the arches (Table 4)

Interegion analysis of ECC attack showed that mandibular posterior region was the most commonly

affected region (39.42%) followed by maxillary anterior region (26.07%).

Mandibular anteriors were the least commonly affected teeth. (1.84%)

Distribution of ECC according to surfaces involved (Graph 1)

Results of the Intersurface analysis of caries attack showed that occlusal surfaces were the most commonly affected (46%) followed by proximal (37%) and then smooth surfaces (16%).

Table 1. Prevalence of Early Childhood caries in Preschool children

Sex	Age groups In years	Prevalence					
		Caries free		Caries affected		Total	
		n	%	N	%		%
Males	3.00	31	13.4	31	13.4	62	26.7
	4.00	17	7.3	33	14.2	50	21.6
	5.00	21	9.1	31	13.4	52	22.4
	6.00	33	14.2	35	15.1	68	29.3
Total		**102**	**44.0**	**130**	**56.0**	**232**	**100**
Female	3.00	24	9.0	30	11.2	54	20.1
	4.00	27	10.1	30	11.2	57	21.3
	5.00	30	112	37	13.8	67	25.0
	6.00	34	12.7	56	20.9	90	33.6
Total		**115**	**42.9**	**153**	**57.1**	**268**	**100**
Grand Total		**217**	**43.4%**	**283**	**56.6%**	**500**	**100**

p>0.05

Table 2. Distribution of the study population according to number of decayed, missing and filled teeth

Age	no Examined		No of teeth	%	Mean± S.D
3-6 years	500	d	1085.00	94.84	2.17±2.72
		m	48.00	4.19	0.09±.59
		f	11.00	1.00	0.02±.26
		dmft	1144.00	100%	2.28±2.93

Graph 1. Distribution of ECC according to surfaces involved.

Table 3. Distribution of the ECC according to arch affected

Arch	No affected	Percentage	Mean±SD
Maxillary	83	29.32%	2.81±2.16
Mandibular	74	26.14%	2.27±1.21
Both	126	44.54%	5.42±3.19
Total	**283**	**100%**	**3.80±2.86**

p<0.05

Table 4. Distribution of ECC within the arches

Region	No	Percentage
Maxillary anterior	127	26.07%
Maxillary posterior	159	32.64%
Mandibular posterior	192	39.42%
Mandibular anterior	9	1.84%
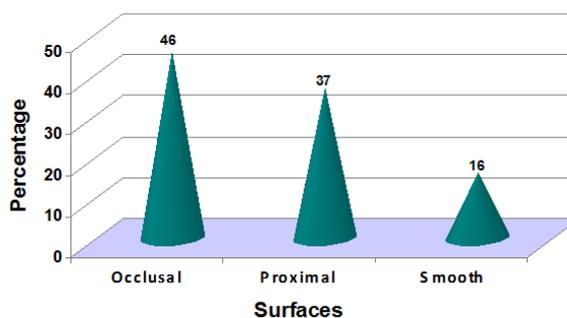
DISCUSSION

The present study was conducted with the aim of assessing the prevalence of early childhood caries in 3-6 year old preschool children of Mysore city.

Children in the age group of 3-6 years were selected because below 3 years, it was difficult to get the cluster of the sample at a common place .There are many studies on early childhood caries prevalence in primary dentition. Direct comparisons could not be drawn because of various ways in which data was reported, variety of population studies and fluoride status of communities.

Prevalence of early childhood caries in the present study of 3-6 year old preschool children was 56.6%. A similar trend of caries was reported in Dharwad

(54.1%) in 1999[5], Kerala (51.46%) in 2003[6,] Korea (56.5%) in 2003[7], Brazil (46%) in 2000[8], Ahmedabad (60.77%) in 2006[9], and Nigeria (40%) in 1985[10]and Aurangabad (47.8%) in 1992[11].

In our study in age group of 5-6 years, prevalence of caries was 57.59%. A similar trend was observed in the same age groups in eastern states of India i.e., West Bengal (52.4%), Orissa (56.01%) and Urban areas of Sikkim(61.8%) in 2001[12], Pondicherry(44.4%) in 2005[13] and Latvian (52%) in 1995[14].

Trends of higher caries in same age group were reported in Moodbidri in Udupi (75.3%) in 1999[15] and Kuwait (67%) in 1994[16].The lesser trend of caries prevalence was reported in rural areas of Sikkim (22%) in 2001[12], in England (7%) in 1989[17] and Sweden (7.7%) in 1991[17].

In our study the mean dmft and dmfs was 2.02 ± 2.29 and 2.97 ± 4.90.Closer dmft values were observed in earlier studies conducted in eastern states of India[12] and Pondicherry[13].The high prevalence of caries in our study and other developing countries like Korea, Brazil, Nigeria, Saudi Arabia and Kuwait may be due to absence of community fluoride implementation and preventive programmes in these places. The developed countries like England, Sweden had lesser caries experience. This may be because of widespread use of fluoride in different forms and preventive programmes which are practiced at various levels in these countries.

In the present study, there was no statistically significant difference in prevalence of dental caries among males (56%) and females (57.1%). The results of the present study were in agreement with the earlier studies in Recife, Brazil in 2002[8] (females 30%, males 26%) and Jordan (females 4.1% and males 6.2%)[21]. Dietary and oral hygiene practices related to dental caries are mostly controlled by parents / caretakers at this early age. As a result it may be too early to develop any gender difference. The results of our study are not in agreement with the earlier studies in Pondicherry (females 41%, males 48%) in 2005[13] and Aurangabad (females 45% males 58%) in 1992[22] where more number of males were affected than females. They attributed this difference to diet, geographical location and cultural differences seen in some societies where males are given more priority.

In the present study there was no difference in the caries prevalence between children going to government and to private preschools. The results of present study are not in agreement with earlier study conducted in Saudi Arabia in 2000[3] where caries prevalence was more among children from government schools (76%) than private preschools (69%). The reason they stated was that children from higher socioeconomic strata go to private preschools and their parents are better educated and in better position to be more conscious of or concerned about the diet and oral hygiene of their children.

Distribution of ECC according to number of decayed, missing and filled teeth revealed that 94.84% of

the total dmft of 2.20 ± 2.29 was of decayed component, 4.19% comprised the missing component while the filled component was negligible.

Decayed component making the major component of dmf score suggests the large unmet treatment needs. This may be due to lack of oral awareness in parents, oral hygiene practices, high cost of dental treatment and limited accessibility and availability of dental services. Similar trend was observed by earlier studies in Kerala in 1999, Dharwad in 2006, Udaipur, in 2007 and Latvian[4,14,23,24]. In Latvian a sizable proportion of children had received restorative treatment. The fact that virtually all individuals with restorations had untreated lesions, demonstrated the apparent futility of restorative treatment without adequate preventive coverage.

The Interarch analysis comparing teeth of upper and lower arch revealed that maxillary arch was more affected (29.32%) than the mandibular arch (26.14%). ($p<0.05$).Also mean dmft in the upper arch was higher i.e., 2.81 ± 2.16 than in the lower arch i.e. 2.27 ± 1.21.The results of the present study are in agreement with the study carried out in Kerala in 2003 and Saudi Arabia in 2008[3,6]. The lower prevalence of caries in the mandibular arch in the present study may be due to the reason that mandibular teeth are less subjected to dryness due to protective mechanism of saliva.

In our study posterior region was more commonly affected by caries than the anterior region.This is in agreement with the study in Pondicherry[13]. This may be due to the complex morphological nature of posterior teeth. In our study, occlusal surfaces were most commonly affected by caries (46%) followed by proximal surfaces (37%) and then smooth surfaces (16%).

The results of our study are not in agreement with a study carried out in Chandigarh in 2000[25] where proximal surfaces were more affected (45%) than the occlusal surfaces (25%) which was due to higher involvement of proximal surfaces of anterior teeth with nursing bottle caries.

The presence of caries in the primary dentition is the strongest predictor of caries in permanent dentition[26]. Therefore, results of the present study have a number of preventive and management implications. A high caries prevalence and dmft scores call for a concentrated effort to decrease caries prevalence and severity in preschool children. A strict preventive program has to be implemented in these children including fluoride supplements, topical fluoride and fluoride varnish applications, dietary counseling, meticulous oral hygiene maintenance, and fissure sealants. Lower molars and maxillary incisors will need special attention during preventive efforts.

Starting a preschool dental service is recommended. Such a service will not only meet the huge treatment need in these young children presently but more importantly play a pivotal role in the prevention of dental disease in these children through direct contact by dental professionals with children and

their parents.

As limitations non cavitated lesions could not recorded in our study. Therefore underestimation of the ECC prevalence might be present in our study.

CONCLUSION

The results support the view that oral counseling should begin within 6 months of eruption of 1st primary tooth.

REFERENCES

1. Wyne AH .Caries prevalence, pattern and severity in preschool children Contemp Dent Prac 2008; (9) 3:24-31.

2. Federation Dentaire International. Second International Conference on declining caries. Int Dent J 1994; 44(1):128-215.

3. Wyne AH, Al-Ghannam NA, Al-Shammery AR, Khan NB Caries prevalence , severity and pattern in preschool children. Saudi Med J 2002; 23:580-4.

4. Erickson RT, Thomas HF. A survey of the American Academy of Pediatric Dentistry membership Infant oral heath care. Pediatr Dent 1997; 19(1):17-21.

5. Mahejabeen R, Sudha P, Kulkarni S, Anegundi R. Dental caries prevalence among preschool children of Hubli: Dharwad City. J Indian Soc Pedod Prev Dent 2006; 19-22.

6. Jose B, King NM. Early childhood carious lesion in Preschool children in Kerala, India. Pediatr Dent 2003; 25(6):594-600.

7. Jin BH, Ma DS, Moon HS, Paik DI, Hahn SH, Horowitz AM. Early childhood caries: prevalence and risk factors in Seoul, Korea. J Public Health Dent 2003; 63(3):183-8.

8. Dini EL, Holt RD, Bedi R. Caries and its association with infant feeding and oral health - related behavior in 3-4 year old Brazilian children. Community Dent Oral Epidemiol 2000; 28(4):241-8.

9. WHO. Management of dental caries in selected rural areas of Gujarat through Atraumatic restorative technique (ART). WHO Collaborative Program (2006-2007).

10. Milnes AR. Description and epidemiology of nursing caries. J Public Health Dent 1996; 56(1):38-50.

11. li YA, Chandranee NJ, Khan A, Khan ZH. Prevalence of dental caries in nursery school children . J Indian Soc Pedod Prev Dent 1996; 16(1):21-5.

12. Mandal K, Tewari A, Chawla H.S Gauba K. Prevalence and severity of dental caries and treatment needs among population in the eastern states of India. J Indian Soc Pedod Prev Dent 2001; 19(3):85-91.

13. Sarvanan S, Madivanan I, Subashini B, Felix JW. Prevalence pattern of dental caries in the primary dentition among school children. Ind J Dent Res 2005; 16:140-6.

14. Bjarnason S, Care R, Berzina S, Brinkmane A, Rence I, Mackevica I, Paeglite I, Senakola E. Caries experience in Latvian nursery school children. Community Dent Oral Epidemiol 1995; 23(3):138-41.

15. Rao A, Sequeira SP, Peter S. Prevalence of dental caries among school children of Moodbidri. J Indian Soc Pedo Prev Dent 1999; 17:45-8.

16. Al-Dashti AA, Williams SA, Curzon ME. Breast feeding, bottle feeding and dental caries in Kuwait, a country with low-fluoride levels in the water supply. Community Dent Health 1995; 12(1):42-7.

17. Wyne AH. Early childhood caries. A review. Indian J Dent Res 1996; 7(1):7-15.

18. Reseine S, Douglas J.M. Psychological and behavioral issues in early childhood caries. Community Dent Oral Epidemiol 1998; 26: Supplement1:32-44.

19. Chakraborty M, Saha JB, Bhattacharyjee RN, Roy A, Ram R. Epidemiological correlates of dental caries in urban slum of West Bengal. Indian J Public Health 1997; 41(2):56-67.

20. P Sudha, S Bhasin, RT Anegundi. Prevalence of dental caries among 5-13 year old children of Mangalore city. J Indian Soc Pedod Prev Dent 2005; 23:74-9.

21. Hattab FN, Al-Omari MA, Angmar-Månsson B, Daoud N. The prevalence of nursing caries in one-to-four-year-old children in Jordan. ASDC J Dent Child 1999; 66(1):53-8.

22. Gaikwad RS. Prevalence of dental caries in school going children of Aurangabad in JIDA 1993; 64:325-6.

23. Kuriakose S, Joseph E. Caries prevalence and its relation to socioeconomic status and oral hygiene practice in 600 preschool children of Kerala, India. J Indian Soc Pedod Prev Dent 1999; 17(3):97-100.

24. Dhar V, Jain A, Van Dyke TE, Kohli A. Prevalence of dental caries and treatment needs in school going children of rural areas in Udaipur district. J Indian Soc Pedod Prev Dent. 2007 Jul-Sep;25(3):119-21.

25. Chawla HS, Gauba K and Goyal. Trends in dental caries over the last 16 years. J Indian Soc Prev Dent 2000; 18(1):41-45.

26. Skeie MS, Raadal M, Strand GV,Espelid I. The relationship between caries in the primary at 5 years of age and permanent dentition at 10 years of age- a longitudinal study. Int J Paediatr Dent 2006; 16:152-60.

Correspondence to
Dr. Deepti Agarwal
Lecturer
Dept of Community Dentistry
Dr. DY Patil Dental College
Pune 411018 India
Email: deepti20@indiatimes.com