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RESEARCH ARTICLE

PREVALENCE OF EARLY CHILDHOOD CARIES AND ASSOCIATED RISK FACTORS IN PRESCHOOL CHILDREN OF SANGAMNER, MAHARASHTRA

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ABSTRACT

Background/Introduction: Dental caries is one of the most common chronic diseases of early childhood. Dental problems in early childhood have been shown to be predictive of future dental problems, Epidemiological studies reveal considerable variationin the prevalence of caries in preschool children ranging from 3 to 85% with strong correlation to socioeconomic status and ethnicity along with local factors. This highlights the importance of prevalence studies and understanding of the local factors influencing ECC in designing a preventive program.

Aim and Objectives: To determine Early Childhood Caries (ECC) prevalence and its risk factors in preschool children of Sangamner City, Maharashtra.

Methodology: A sample of 1325 children between 24 and 71 months of age was selected from play homes and nursing homes of various parts of the city, who were clinically examined for dental caries using mouth mirror under day light. Dental caries was recorded according to World Health Organization criteria. The parents/caregivers of each child were interviewed with a structured questionnaire. The data was subjected to statistical analysis.

Results: Out of total 1325 children, 755 were affected with ECC showing an overall prevalence of 57%. The factors identified which were highly significantly correlated are age of child, mother education level, father occupational status, bottle feeding and sweetened drink consumption at night and not utilizing routine health care services.

Conclusions: Future health promotion and education programs should include oral health issues and the risk factors for ECC, its prevention & consequences should be addressed. Public funded oral health programs should be started and should be targeted at the children from lower socioeconomic status. Effective strategies should be developed to promote the use of brush and paste for cleaning teeth and discouraging inappropriate bottle-feeding, discouraging on demand consumption of chocolates and sugars. Most factors identified were preventable and needs attention to promote dental health education and routine dental visits.

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INTRODUCTION

Dental caries is one of the most common chronic diseases of early childhood. (Davies, 1998) *The American Academy of Pediatric Dentistry (AAPD)* defines early childhood caries (ECC) as presence of one or more decayed (noncavitated or cavitated), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger. (American Academy of Pediatric Dentistry, 2002) The prevalence of ECC in developing countries is reported to be as high as 70%. (de Silva-Sanigorski *et al*., 2010) Some studies reflect significant high burden of ECC among under five years old children in India. (Mc Donald and Avery, 2004) Epidemiological studies reveal considerable variation in the prevalence of caries in preschool children ranging from 3 to 85% with strong correlation to socioeconomic status and ethnicity along with local factors. (Ripa, 1988) This highlights the importance of prevalence studies and understanding of the local factors influencing ECC in designing a preventive programme. This study was undertaken with a view to find the prevalence of dental caries in children and the local factors influencing it since the factors influencing dental caries in this area differ from other parts of India and no such study had been conducted earlier in this rural region. The present study aimed to determine the prevalence of ECC and its risk factors in preschool children of Sangamner, Maharashtra.

MATERIALS AND METHODS

Study setting

The study was conducted in selected play groups and day-care homes. It was a community-based cross-sectional study. The

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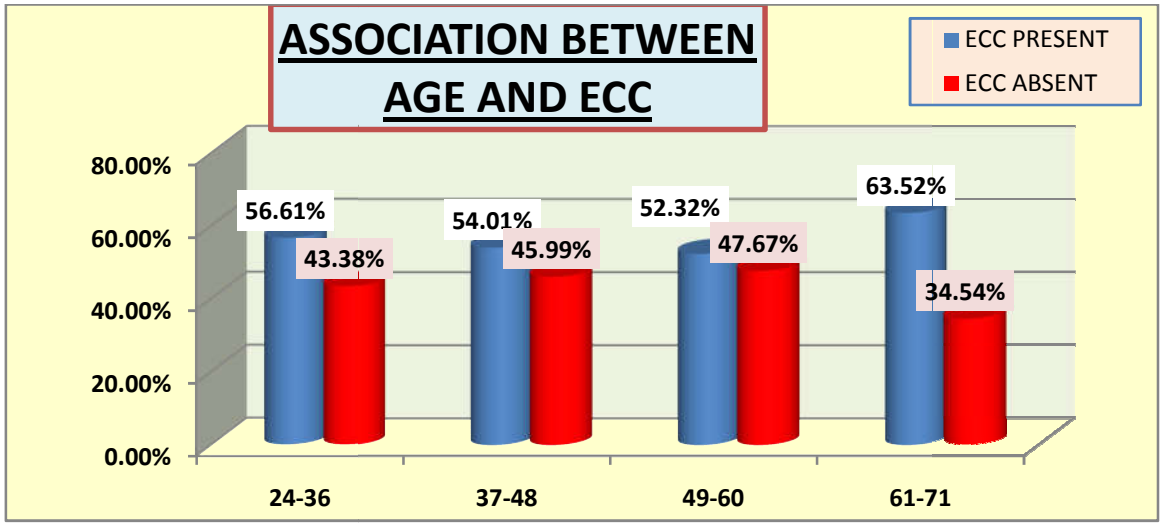
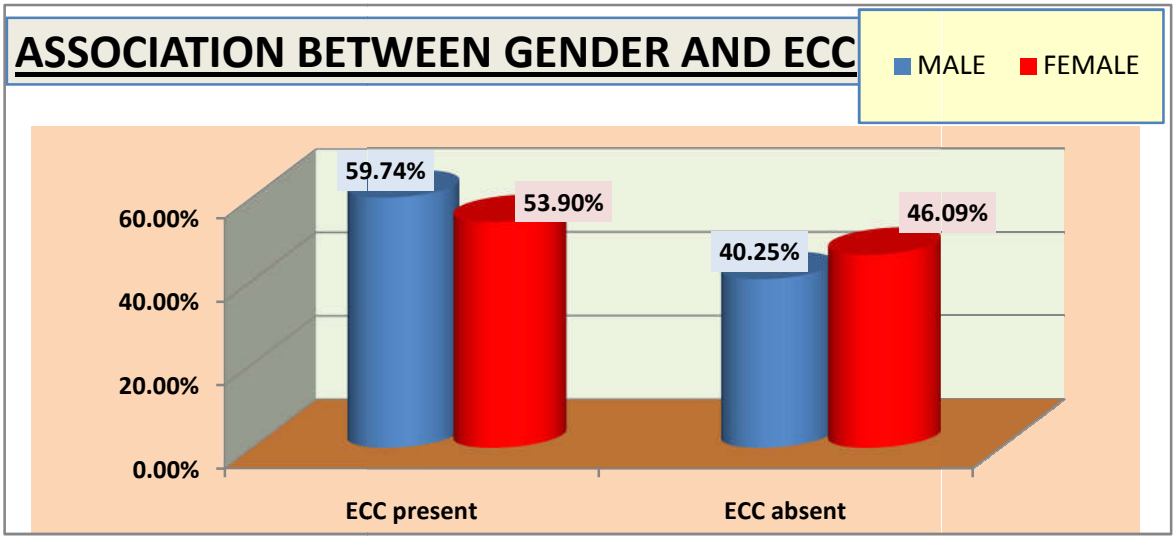
following criteria were taken to select sample of children between 24-71 months old age group enrolled in various play groups and day–care homes and those parents who are giving consent. Exclusion criteria were handicapped children, those with systemic diseases, enamel defects & extra-oral sinuses and children with special health care needs. The sample size was estimated to be 1325 children by simple random sampling method. Ethical clearance to conduct the study was obtained from the institutional review board. Permission was taken from the authorities of nurseries, schools and day-care homes in different parts of Sangamner, from where the children were selected. The parents/caregivers of children attending these play schools and day-care homes were informed of the nature of the investigation. Prior to examination of the children, written consent was obtained from them. They were given a questionnaire pertaining to information regarding; child's chronological age, birth weight, family income, educational status of parents, feeding habits and oral hygiene practices. Intraoral examinations were carried out by a sole examiner. Caries detection was done by WHO 1997 criteria. The children were seated on a chair during the examination. The knee to knee examination method was also utilized in the case of very young children. Those children who had severe dental problems were referred to Dept. of Pedodontics & Preventive Dentistry, SMBT Dental College & Hospital, Sangamner.

RESULTS

Out of total 1325 children, 755 were affected with ECC showing an overall prevalence of 57%. The factors identified which were highly significantly correlated are age of child, mother education level, father occupational status, bottle feeding and sweetened drink consumption at night and not utilizing routine health care services. Incidence of ECC increased as age increased (p value<0.05, significant) (Graph 1). High proportion of children with ECC (63.52%) were present in the age group of 61- 71.Gender did not have an impact on prevalence of ECC as there was no statistical difference between occurrence of ECC in males and females respectively (p>0.05) (Graph 2). Mothers of children who did not had any formal education/ illiterate had high occurrence of ECC (84.17%) which was found significantly significant (Table 1). Mother occupation did not had any significant association with ECC (Table 2). Highly significant association was found between type of father occupation and presence of ECC (Table 3). It was found that those who were unemployed (79.6%) had higher distribution of ECC. There was found highly significant association between bottle feeding at night and occurrence of ECC. Around 80.35% children who had habit of bottle feeding had presence of ECC in their oral cavity (Graph 3).



Graph 1. Association between AGE and ECC



Graph 2. Association between gender and ECC

Table 1. Association between mother's education AND ECC

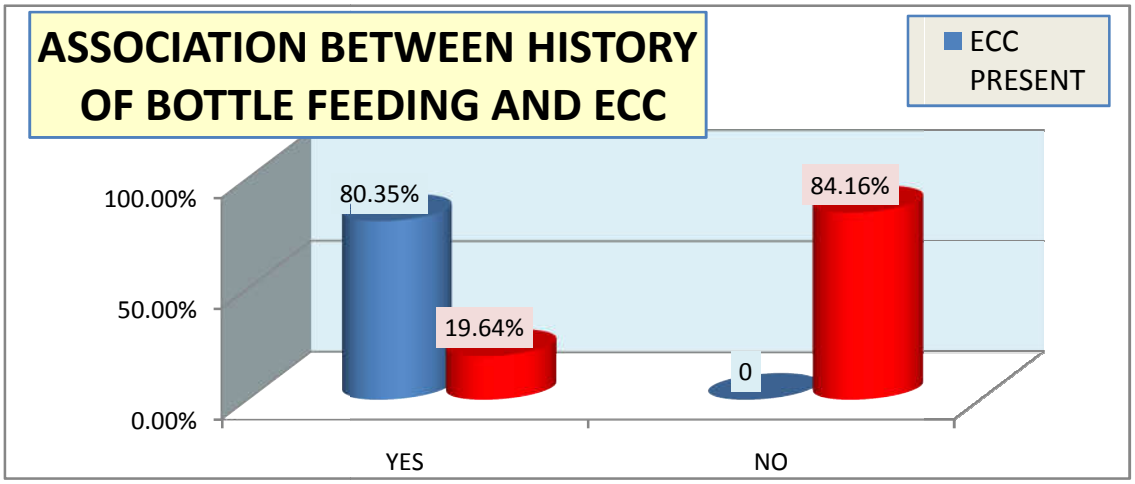
Mother's education	N	ECC present	ECC absent	Pearson Chi-square test	P value, Significance
Illiterate	278	234(84.17%)	44 (15.83%)	23.78	<0.001, Highly significant
Primary	346	218 (63%)	128 (37%)		
Middle & secondary	456	196 (42.98%)	260 (57.02%)		
High school	145	79 (54.48%)	66 (45.51%)		
Degree, post graduate	100	28 (28%)	72 (72%)		
Total	1325	755 (56.98%)	570 (43.01%)		

Table 2. Association between mother occupation and ECC

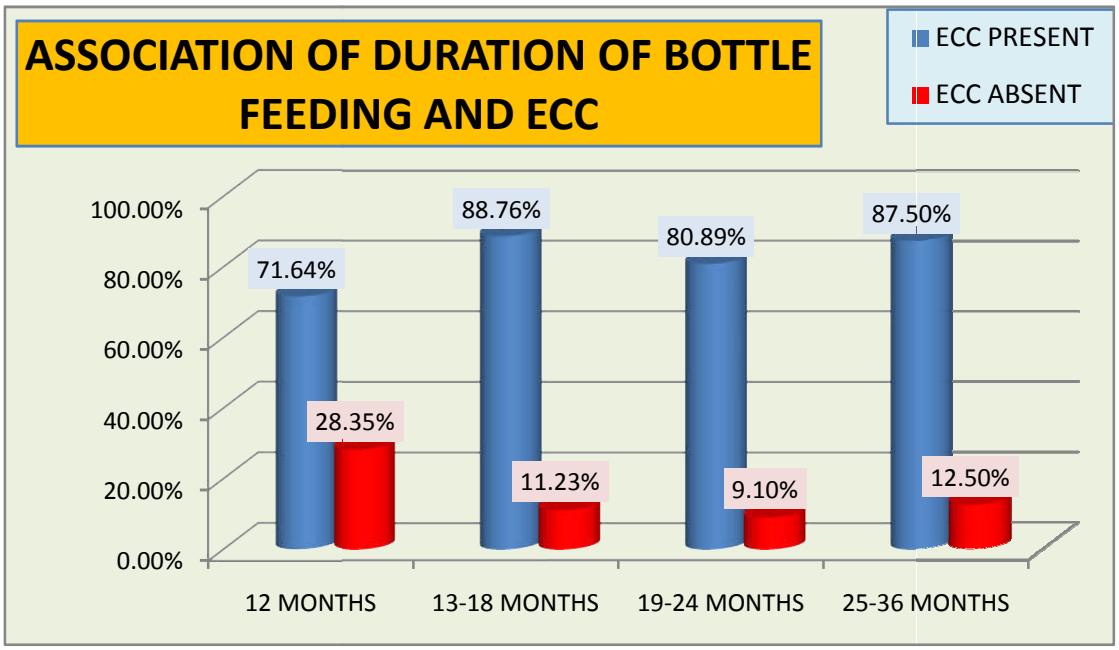
Gender	N	ECC present	ECC absent	Pearson Chi-square test	P value, Significance
Housewife	946	504(53.27%)	442 (46.72%)	5.76	0.092, not significant
Employed	379	251 (26.53%)	128 (13.53%)		
Total	1325	755 (56.98%)	570 (43.01%)		

Table 3. Association between father occupation and ECC

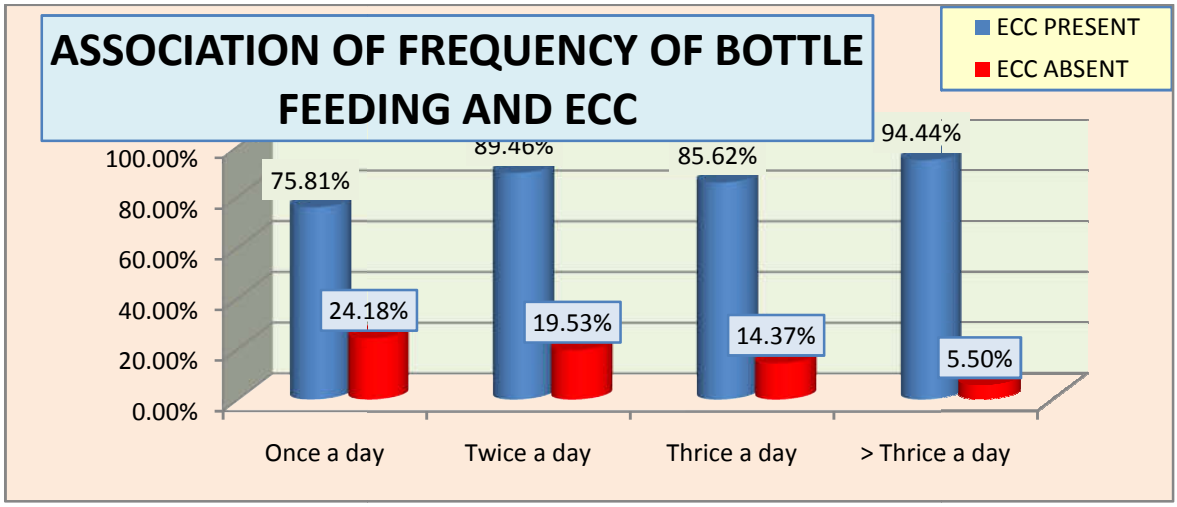
Gender	N	ECC present	ECC absent	Pearson Chi-square test	P value, Significance
Unemployed	128	102 (79.6%)	26 (20.31%)	29.54	<0.001,highly significant
Employed	1197	653 (54.55%)	544 (45.44%)		
Total	1325	755 (56.98%)	570 (43.01%)		



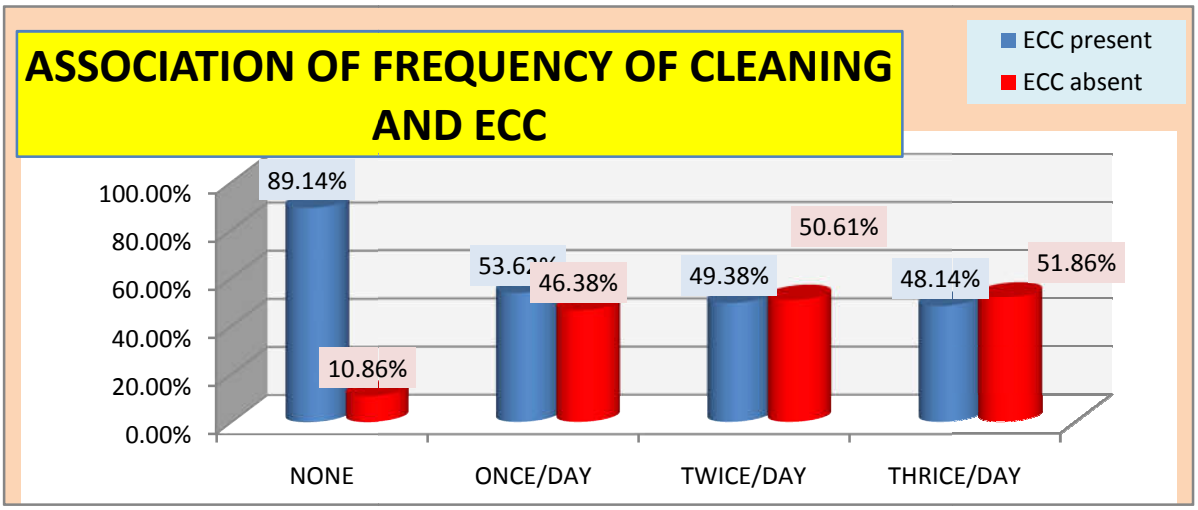
Graph 3. Association of history of bottle feeding and ECC



Graph 4. Association of duration of bottle feeding and ECC



Graph 5. Association of frequency of bottle feeding and ECC



Graph 6. Association of frequency of cleaning teeth and ECC

Table 4. Association of history of consumption of sweetened drink at night and ECC

Sweetened drink at night	N	ECC present	ECC absent	Pearson Chi-square test	P value, Significance
Yes	387	289 (74.67%)	98 (25.33%)	34.91	<0.001, highly significant
No	938	312 (33.26%)	626 (66.74%)		
Total	1325	755 (56.98%)	570 (43.01%)		

Table 5. Association of dental care utilisation and ECC

Visit to dentist	N	ECC present	ECC absent	Pearson Chi-square test	P value, Significance
Yes	389	52 (13.36%)	337 (86.63%)	27.89	<0.001, highly significant
No	936	703 (75.1%)	233(24.89%)		
Total	1325	755 (56.98%)	570 (43.01%)		

Similarly, significant association was found between duration and frequency of bottle feeding and occurrence of ECC (Graph 4,5). Factors like sweetened drink intake and dental care utilisation also were found to have highly significant association with ECC (Table 4,5). Children whose oral hygiene care was not taken had significant incidence of ECC. Children (89.14%) who did not brush their teeth had occurrence of ECC.

DISCUSSION

In the present study, children who performed aided brushing had slightly lower prevalence of ECC and similar findings have been reported in other studies as well. (Subramaniam and Prasanth, 2012) Prevalence of ECC was found to be more among boys than girls by Peressini *et al.* However, in this study, no significant association was found between the sex of the child and ECC. (Peressini *et al.*, 2004) In this study, significant association was found between the age of the child and ECC. This finding does coincide with the findings by Wendt L.K. in Sweden, (Wendt *et al.*, 1991) Khristine Marie G. in Philippines, (Khristine *et al.*, 2003) and Seval Olmez in Turkey. (Olmez *et al.*, 2003) They found that higher age is associated with higher prevalence of ECC among the children. (Wendt *et al.*, 1991; Khristine *et al.*, 2003; Olmez *et al.*, 2003) The tendency of ECC prevalence found to be increased as the

socio-economic class increased. However, another finding that lower family income is associated with higher prevalence of ECC were given by Jose B. in Kerala, (Jose and King, 2003) South India, and Ercillia Dini in Brazil (Dini *et al*., 2000) and Thangchai in Thailand (Thongchai, 2004). (Jose and King, 2003; Dini *et al*., 2000; Thongchai, 2004) A significant association was found between the history of bottle-feeding and ECC. Prevalence of ECC was more among those who were bottle-fed than those who were not bottle-fed. Similar findings were reported by Ghanim in Riyadh, (al Ghanim *et al*., 1998) Creedon in Ireland, (Creedon *et al*., 2001) Seval Olmez among Turkish children, (Olmez *et al*., 2003) and K.B. Hallet in Brisbane. (Hallett and O'Rourke, 2003) This can be attributed to the length of time the fermentable contents of bottle remain in contact with teeth (al Ghanim *et al*., 1998; Creedon and O'Mullane, 2001; Olmez *et al*., 2003; Hallett and O'Rourke, 2003). Association of duration and frequency of bottle-feeding and history of bottle-feeding to sleep at night with prevalence of ECC was significant as to the findings reported by by Ghanim in Riyadh, (al Ghanim *et al*., 1998) Creedon in Ireland, (Creedon and O'Mullane, 2001) Seval Olmez among Turkish children, (Olmez *et al*., 2003) and K.B. Hallet in Brisbane. (Hallett and O'Rourke, 2003) This may be due to very less number of subjects having the history of bottle‐feeding. (al Ghanim *et al*., 1998; Creedon and O'Mullane, 2001; Olmez *et al*., 2003; Hallett and O'Rourke, 2003) 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.

Also, many variables which were found to be significantly associated with ECC by other researchers have shown no significance in this study. This may be due to less number of subjects studied and lack of variation in the socioeconomic and behavioral aspects of the study population. This study is unable to focus light on the complex interrelationship of various factors in the present picture of ECC and point out the exact culprit for ECC. Further research is needed to uncover the hidden factors in this aspect.

Conclusion

Future health promotion and education programmes should include oral health issues and the risk factors for ECC, its prevention & consequences should be addressed. Oral healthcare providers should make aware of these factors, which influence the initiation and progression of ECC in their community. The importance of first dental visit, diet counselling and proper oral care methods should be stringently advocated to parents, preschool teachers and caregivers to inculate lasting oral health attitudes among children. The risk of developing ECC can be significantly reduced by adopting infant feeding habits such as breastfeeding for an appropriate length of time at least up to 12 months. The habit of cleaning teeth after each meal should be instilled in children from the beginning. Mother literacy rate was found to be less in this study & hence more oral health care awareness programmes need to be carried out at anganwadis and primary health care service centre.

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