EFFECT OF FREQUENCY OF FEEDING ON EARLY CHILDHOOD CARIES IN HADOTI REGION: A PILOT STUDY

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ABSTRACT

BACKGROUND: Early childhood caries (ECC) is most prevalent diseases in children, driven by a dysbiotic state of oral microorganisms. Feeding practices during early childhood play an important etiological role in early childhood caries (ECC). The role of feeding practices and its frequency in causation of ECC is still debated.

OBJECTIVE: To assess the effect of feeding practice and frequency of feeding on causation of ECC.

METHOD: A cross sectional survey was conducted on 100 preschool children of 36-71 months randomly selected from school. Information regarding feeding practice and frequency of feeding is obtained through a structured questionnaire. Clinical examination is performed on children with ECC and their dmft scores were recorded. Statistical analysis was done.

RESULTS: The prevalence of ECC was found to be 68%. ECC was found to be significantly associated with feeding pattern and its frequency.

CONCLUSION: Dental caries prevention could be accomplished by emphasizing that the breastfed or bottle-fed child be nursed at less frequent intervals once nutritionally sufficient complementary foods have been introduced. Limiting the frequency may also result in caries prevention. Overnight feeding with any type of milk beyond two years significantly increased dental caries incidence and severity.

Keywords: bottle feeding, breast feeding, early childhood caries, feeding pattern, frequency of feeding, severe-ECC.

INTRODUCTION

Although largely preventable and despite the significant improvement of oral health in the past few decades, dental caries remains the most common chronic disease among children and adolescents, both in developed and developing countries. Early childhood caries (ECC) is more of a neglected public health problem. Lack of awareness among parents on preventing and treating dental caries has resulted in very high prevalence of dental caries among preschool children.

The American Academy of Pediatric Dentistry has defined ECC as “the presence of 1 or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger.” They also defined severe ECC (S-ECC) with differences according

to age: in children younger than 3 years of age, it is defined as any sign of smooth-surface caries, whereas in children from 3 to 5, it is defined as 1 or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth, or a decayed, missing or filled score (dmft) ≥ 4 at age 3, or a dmft ≥ 5 at age 4, or a dmft ≥ 6 at age 5.¹

ECC has complex and multifactorial etiology. It is highly plausible that food-intake frequency is an important caries risk factor in children. Feeding habits, particularly during the first year of life, involve a number of simultaneous and interrelated behaviours, such as breastfeeding, bottle-feeding and the introduction of complementary foods makes the teeth more vulnerable for caries immediately after eruption. Night feeding during sleep

provides fermentable carbohydrates, along with diminished salivary flow at night, increases the risk of ECC.

In some developed countries having advanced programs for oral health protection, the prevalence of ECC is around 5%. However, developing countries have been reported with higher prevalence rates. Indian studies also reflect significantly high prevalence of ECC among children under 5 years of age.² For instance one study conducted in Anganwadis of Wardha reported a prevalence of 31.81%,³ another study in Nagpur revealed a prevalence of 63.58%.⁴

In dentistry, there is quasi-consensus that bottle feeding on demand, especially at night and if prolonged, produces caries. The American Academy of Pediatric Dentistry (AAPD) declared that breastfed and bottle-fed infants are at a potentially devastating risk for caries. This is related to prolonged and repetitive feeding. The World Health Organization (WHO) recommend to maintain breastfeeding up to the second year of life or longer. Similarly, the American Academy of Pediatrics considers that infants who are put to bed with the bottle or who breastfeed during the night are at great risk for dental caries.²

The aim of this study is to identify the effect of feeding practice and frequency of feeding on early childhood caries in Hadoti region, Rajasthan.

MATERIALS AND METHODS

STUDY DESIGN AND SAMPLE

A trail study was carried out with 100 children selected from kindergartens in the city of Kota considering a 20% expected prevalence and by taking $\pm 5\%$ error margin with 95% of confidence level. All children aged 36-71 months attending these schools were considered eligible. No exclusion criteria of children and parents were established. Parents/guardians of all eligible children were informed through a note in their school diaries about the purposes and the main issues of the study and were invited to participate. The participation consisted of compilation of a structured self-administered questionnaire by the parent/guardian and an oral examination of the child performed at school by trained professionals.

SURVEY INSTRUMENTS

The questionnaire completed by the parents/guardians included information on: child's (sex and age), current feeding practice and its frequency (breast feeding,

bottle feeding, both bottle and breast feeding) and previous feeding practice upto 12 months of age of child and its frequency (breast feeding, bottle feeding, both bottle and breast feeding).

ORAL EXAMINATION

The dental examination was conducted at school by post graduates of Department of Pediatric and Preventive Dentistry. Children were seated on a chair facing a window and the examiner used portable equipment consisting of plane mouth mirror, explorer etc. No radiographs were taken. The WHO caries diagnostic criteria for dmft and dmf surfaces (dmfs) were used to record ECC.

STATISTICAL ANALYSIS

The data was recorded and analyzed using Statistical Package for Social Sciences version 12.0.1 software (SPSS Inc., Chicago, IL, USA). Descriptive statistics included computation of percentages, means, and standard deviations. The strength of association between the variables and the severity of ECC was also analyzed using chi-square test.

RESULTS

The present study was carried out on a total of 100 children in the age group of 36-71 months old. Table 1 shows the mean of dmft score.

TABLE 1: MEAN dmft SCORE

MEAN dmft SCORE	STANDARD DEVIATION	P VALUE
6.31	3.88	<0.05

Figure 1 CURRENT FEEDING PRACTICE

Figure 1 describes the current feeding practice of child in the chosen population. In current scenario, the breast feeding was evident only in 7.1%, but the dmft score was higher who were night fed(4.7). The majority of the children were bottle fed (45%). The dmft score was higher among bottle fed children (6.9) and was statistically significant ($p < 0.05$). Among the bottle fed children, majority of them showed night time feeding(92%) and they

were put to sleep with bottle feeding(78%). The duration to complete one bottle feed was about 10-20 minutes in 61.5% of the children. Corresponding to the relationship between frequency of child falling asleep with bottle, content of the bottle (bovine milk with sugar) and

89%. The frequency of breast feeding in such children was about 8-12 times in a day for most of them. The dmft among this group who were not night fed was low as compared to other groups

Despite widespread preventive measures, dental caries continues to be a veritable scourge form an kind even today.

Analysis of caries experience in recent years, especially in developing countries, demonstrates that a significant proportion of infants and preschoolers are still affected by the disease with a strong polarization. The best way of motivating preschoolers towards good oral health is through the parents. Children's preventive practices tend to be controlled by their parents' actions and attitudes.¹

The present survey was undertaken in pre-schools of Hadoti region, Kota, Rajasthan with the aim to investigate the effect of feeding pattern and frequency of feeding in emergence of early childhood caries. The prevalence of ECC observed in our study was 68% on an average. The prevalence of ECC reported in literature ranges from 36% to 85%^{5,6,7} while in India a prevalence of 44% has been reported for caries in 8–48 month olds.⁸ The higher

Duration of the feeding, the prevalence of dental caries was higher in this group which was statistically significant ($p < 0.05$). The dmft score was slightly less in children those who were retrained from bottle and breast feeding after 1 year of age.(42.1%).

Figure 2: PREVIOUS FEEDING PRACTICE (UPTO 12 MONTHS)

Figure 2 depicts the previous feeding habit of the child upto the age of 12 months. More than half of the population were breast fed (82%) with night time feeding in

prevalence of caries in developing countries may be attributed to improper parental knowledge about feeding.

The mean dmft in this study was 6.31 which was higher compared to the national dmft of children in India (2.03 ± 2.99) and most other countries reporting ECC.⁴ Similar sample selection was noted in other studies.^{8,9} Trend of higher caries prevalence ranging from 52% to 98% was reported by Hugoson et al. (2000).¹⁰ This higher dmft may be because of the lack of oral health awareness in parents, and unhealthy feeding habits.

Children who were currently breast fed had significantly lower ECC when compared with children who were exclusively bottle-fed or fed by both breast and bottle. Contrary results were given by some previous studies. According to them, children who were exclusively breastfed had slightly higher caries prevalence.¹¹ Feeding during the night may lead to prolonged exposure to fermentable carbohydrates and create a dentally harmful environment in the oral cavity.

When bottle feeding was taken into consideration, it was observed that the association of duration of bottle feeding and ECC was statistically significant. The relation of the history of bottle feeding at

night and falling asleep with the nipple of milk bottle in the mouth with the prevalence of ECC was statistically highly significant in this study. Hallet and O'Rourke found that sleeping with milk bottle was the key determinant of S-ECC.¹² Studies that described bottle feeding in detail concluded that bottle feeding at night is the most important risk factor for the development of ECC in comparison to bottle feeding itself. These findings can be easily explained by the decreased salivary flow and swallow reflex during sleep which allows liquid carbohydrate to remain in the mouth and pool around the teeth. This decreased rate at which carbohydrates are cleared from the oral cavity is a determinant in caries initiation. Some studies did not find any significant association between duration of bottle feeding with the prevalence of ECC.¹³ There was increase in prevalence of caries in children with prolonged bottle feeding beyond two years of age, this implies that most parents did not follow or were not aware of the recommended weaning time. The most common reason of prolonged bottle feeding is the child's refusal to wean. There is a need for oral health promotion strategies that include specific messages regarding time for

weaning the bottle and practical advice for parents or caregivers of children with prolonged bottle feeding.

Since breastfeeding has positive effects on the health of the infant, the WHO recommends breastfeeding till 24 months of age.¹⁴ Infants who are breast-fed are found to have lower levels of dental caries as compared to non-breastfed infants. However, certain reports suggest increased risk for ECC with prolonged exposure of teeth to daytime or nighttime breastfeeding. High daily frequency of breastfeeding was associated with later ECC and S-ECC, including after adjustment for total carbohydrate intake and stratification for bottle-use frequency, consistent with findings from other studies in diverse settings.^{15,16}

Given the undisputed and critical role of breastfeeding in assuring maternal and infant health, dental professionals should encourage mothers to initiate exclusive breastfeeding from birth, followed by continued breastfeeding as complementary foods are added to the diet. Promotion of exclusive breastfeeding early in life does not increase caries risk. However, the results of the present study and others¹⁷ suggest that frequent

breastfeeding might have negative implications for dental health.

Although various risk factors could be outlined in the study, we may have to scrutinize the clinical scenario to effectively determine the preventive interventions that might provide maximum benefit to the individual child patient. An emphasis on the comparison of some similar research studies in future might help us in understanding more about the changing trends and their underlying changing causes.

CONCLUSION

This study has contributed about the dental caries experience and feeding habits of 36-71 months old children schooling in socioeconomically different areas of Kota (India). The findings indicate that ECC and feeding habits are significantly associated. The content of the bottle feed and feeding practice at night are the strongest factors among all feeding habits associated with ECC. Overnight feeding with any type of milk increases the prevalence and severity of dental caries among preschool children. High prevalence of ECC in certain groups shows that information and knowledge do not always translate into appropriate parenting practices.

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