Early Childhood Caries in Preschool Children of Gram Panchayat Anoo, Hamirpur, Himachal Pradesh

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Aim and Objectives: A study on prevalence and associated etiological factors of ECC. This study aimed to find the prevalence of ECC and the associated factors among preschool children in Anoo village, Hamirpur district (H.P). Materials and Methods: A sample of 65 children of age between 1 to 5 years was selected from anganwadi units of Anoo village. Dental caries was recorded and information regarding risk factors for caries was obtained through a questionnaire given to mothers or caretakers. Result: The prevalence of ECC was 55.38% and there was a strong association of ECC with some of the risk factors studied. Conclusion: The study emphasizes the need of dental health programs in preschool children. Increasing the awareness regarding maintaining good oral hygiene and encouraging the intake of healthy snacks in children can reduce ECC in concerned population.

Keywords: Anganwadis, early childhood caries, preschool children, risk factors

INTRODUCTION

Ostrom (1980) defined dental caries as a process of enamel/dental dissolution that is caused by microbial action at tooth surface and is mediated by the physiochemical flow of water dissolved ions. Dental caries is the single most common chronic childhood disease. Dental problems in early childhood have been shown to be predictive of not only future dental problems but also on growth and cognitive development by interfering with comfort nutrition, concentration, and school participation. In preschoolers, early childhood caries (ECC) which is defined as “the presence of one or more decayed, missing (due to caries) or filled tooth surface in any primary tooth in a child 71 months of age or younger (American Academy of Pediatric Dentistry)” is a major cause of dental abscesses and tooth aches.[2] The condition has also been termed nursing caries, nursing bottle caries, and baby bottle tooth decay.[3] The factors found to be positively associated with ECC include-nocturnal breast feeding,[4] putting the child to sleep with a bottle in mouth, weaning at later age,[5] enamel hypoplasia,[6] increased frequency of sugar snacks,[7] inadequate oral hygiene,[8] later age of commencement of tooth brushing, lack of parental help with tooth brushing,[9] and medically compromised children.[5] Exploration of literature has revealed that only one such published data are available for this part of Himachal Pradesh. The present study has been attempted by the same author to find out the relationship between feeding practices and ECC in preschool children in Anoo village, Hamirpur district.

MATERIALS AND METHOD

The study was conducted on total 65 children in the age group of 1–5 years, enrolled in six Anganwadi units of gram panchayat Anoo (Hamirpur). Anganwadi is the focal point for the delivery of services at community levels to children below 6 years of age, adolescent girls, pregnant women, and nursing mothers. Before the study, an approval was taken from the Child Development Project Officer, Hamirpur. Verbal consent was also taken from the Anganwadi workers and parents of the children. The children were asked to sit on a chair and...
examined with the help of mouth mirrors and explorers in natural day light. Clinical examination of an uncooperative child was done using the knee to knee position with the mother holding the child in her lap. The caries experience of the present primary teeth was recorded using the dmft index. Children having one or more decayed missed (due to decay) or filled teeth were considered as affected with ECC. Data regarding risk factors was assessed using a modified form of a questionnaire [Annexure 1] that was used by Malvania in her study on ECC in preschool children in Gujarat. The interviewer herself recorded the answers of the questionnaire to minimize misinterpretation of questions and to ensure uniformity in data.

**Results**

A total of 65 children participated in the study of which 30 were males, and 35 were females. Age- and sex-wise distribution of the study participants are shown in Figures 1 and 2. To evaluate the statistical significance of the data, MINITAB 13.2 was used.

**Caries prevalence**

It was found that 55.38% of the study participants were affected with ECC. Females showed higher prevalence (57.14) than males (53.33) ($\chi^2 = 0.6075, P > 0.05, df = 3$).

**Educational qualification of mother, feeding habits, oral hygiene habits, and caries prevalence**

It was found that there was an inverse relationship of caries prevalence with education status of the mother. Nine out of 13 children (69.23%) of uneducated mothers were affected with caries. An interesting finding was seen in children of mothers who were graduates or postgraduates and were working. These children had more decayed teeth. Five out of 8 children (62.5%) of mothers who were graduates or postgraduates were affected with caries and 4 out of these 5 mothers were working ($\chi^2 = 1.738, P > 0.05, df = 3$).

Nineteen out of 33 children (57.5%) who were breast fed and 16 out of 29 (55.17%) who were both bottle and breast fed suffered from caries. One out of three children who were the only bottle fed was affected with caries. However, the result was not statistically significant ($\chi^2 = 0.655, P > 0.05, df = 2$). The patients who were weaned after 2 years of age had more caries (63.33%) than those who were weaned before 2 years of age (48.51%). However, the result was not statistically significant [Table 1] ($\chi^2 = 1.425, P > 0.05, df = 1$).

Caries was higher among the children who had never cleaned their teeth (79.17%). Caries was more in children who brushed their teeth themselves (60.87%) than children who were assisted by the mother while brushing (13.33%). The most commonly used measure for cleaning teeth was found to be tooth brush and tooth paste. The result was statistically highly significant [Table 2] ($\chi^2 = 17.098, P < 0.01, df = 3$).

**Relationship between age at which brushing was started and caries prevalence**

Caries was found to be higher among children who started brushing later. Children who started brushing at 4 years of age showed higher caries prevalence than those who started brushing at 4 years or later ($\chi^2 = 10.456, P < 0.01, df = 1$).

| Weaning age (years) | Unaffected | Affected | Total |
|---------------------|------------|----------|-------|
| <2                  | 18         | 17       | 35    |
| >2                  | 11         | 19       | 30    |
| Total               | 29         | 36       | 65    |

$P>0.05$, statistically not significant

| Who cleans the teeth of the child | Unaffected | Affected | Total |
|----------------------------------|------------|----------|-------|
| Others                           | 2          | 1        | 3     |
| Mother                           | 13         | 2        | 15    |
| Child himself                    | 9          | 14       | 23    |
| Does not brush                   | 5          | 19       | 24    |
| Total                            | 29         | 36       | 65    |

$P<0.01$, statistically highly significant association between the oral hygiene habits and early childhood caries

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Figure 1: Age-wise distribution of the study group

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| 20%| 23%| 25%| 4%| 28%|

Figure 2: Sex-wise distribution of study age group

1 2 3 4 5

Female Male
age and above suffered more from caries (100%) than children who started brushing at 1.5 years (20%), 2 years (35.71%) and 3 years (71.42%). The result was statistically highly significant [Table 3] (χ² = 15.968, P < 0.01, df = 4).

**Frequency of snacks and caries prevalence**

Caries was higher among children who consumed snacks on demand (91.67%) than those who consumed snacks once (28.57%), twice (50%), or thrice (77.78%). The result was statistically highly significant [Table 4] (χ² = 12.378, P < 0.01, df = 3).

**DISCUSSION**

From this study, it was found that 55.38% of study subjects were found to be affected with ECC which is similar to the study conducted by Malvania and Krishnan.\[^{10}\]

The highest prevalence was noted among 5-year-old children. With age, the prevalence was found to be increasing. The lowest prevalence at 1 year of age could be due to less duration of exposure to cariogenic factors and due to protective nature of mother’s milk.

Children who were breast fed had more caries than children who were the only bottle fed or fed with both. It could be due to nocturnal breast feeding. Children who were breast fed on demand or were made to sleep with the bottle were affected with more caries than children who were fed at fixed intervals only.\[^{11}\]

Children who were weaned after 2 years of age had significantly more caries. Such results might be due to progressively diminished protection from breast milk after 12 months of age with depletion of its protective elements.\[^{11,12}\]

It was found that caries were higher among children who had never cleaned their teeth. Similar observations have been reported by Febres *et al.* and Malvania and Krishnan.\[^{4,10}\]

High prevalence of caries was seen in children who cleaned their teeth themselves. Children who started brushing later (at 4 years) had highest carious lesions. It might be due to the lack of oral hygiene and also lack exposure of fluoride from toothpastes.

Caries was found to be more in children of uneducated mothers.\[^{13}\] It might be due to lack of awareness and knowledge regarding oral hygiene. High caries in children of mothers who were working could be due to less time devoted for their children in daily practices like brushing.

Snacks, when consumed thrice or on demand, resulted in high rate of caries among children. The interesting observation that was made during this study was that none of the children had healthy snacks like fruits routinely in their diets. Food stuffs rich in extrinsic sugars such as biscuits, chocolates candies, and chips were found to be the preferred snacks by the children. Studies have shown that a high frequency of sugar consumption in infancy was related to the occurrence of caries in 3 years of age. The high frequency of sucrose eating increases the acidogenicity of plaque and enhances the establishment and growth of aciduric mutants streptococci.\[^{14}\] In this study, an interesting finding was that none of the children had ever visited any dentist before. This observation shows the lack of awareness regarding oral health among the study population.

This survey gives an insight of the oral health of preschoolers in the study population. However, a more elaborate study involving a larger sample size requires to be carried out to give more information regarding caries in preschool children of Himachal Pradesh.

**CONCLUSION**

Poor dietary habits and lack of adequate oral hygiene are the key factors for caries development in early childhood. The factors are also highly influenced and reflected by the awareness and attitudes of the parents or caregivers. It is recommended to have dental health education programs at regular intervals to preschool children, parents, and Anganwadi workers. Increasing the awareness of parents regarding oral hygiene and encouraging the intake of healthy snacks in children can prevent ECC in the concerned population.

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Conflicts of interest
There are no conflicts of interest.

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### ANNEXURE 1

| QUESTIONNAIRE |
|----------------|
| **Who is the main caretaker for the child?** |
| a. Mother |
| b. Others (specify) |
| **What is the educational level of the child?** |
| a. Did not go to school |
| b. Not completed high school |
| c. Completed high school |
| d. Graduation |
| e. Don’t know |
| **What is/was the pattern of feeding the child?** |
| a. Breast fed only |
| b. Mixed-breast fed and bottle fed |
| c. Bottle fed only |
| d. Don’t know |
| **Does the child sleep with bottle?** |
| a. Yes |
| b. No |
| c. Don’t know |
| **What is/was the pattern of breast feeding?** |
| a. On demand |
| b. On fixed intervals |
| c. Don’t know |
| **Till what age was the child fed with mother’s milk?** |
| a. <2 years old |
| b. >2 years of age |
| c. Don’t know |
| **Does the child have a habit of having milk at night?** |
| a. Yes |
| b. No |
| c. Occasionally |
| **If yes, what form of milk is given to child?** |
| a. Plain |

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| QUESTIONNAIRE |
|----------------|
| **Contd..** |
| b. With sugar |
| c. With honey |
| c. If others, specify. |
| **Who cleans the teeth of child?** |
| a. Child himself |
| b. Mother |
| c. Others |
| d. Does not brush |
| **What are the measures used for cleaning the teeth?** |
| a. Finger |
| b. Toothbrush alone |
| c. Toothbrush with toothpaste |
| d. If other, specify. |
| **At what age was brushing started?** |
| a. <1 years of age |
| b. 1.5 years of age |
| c. 2 years of age |
| d. 3 years of age |
| e. 4 years of age and above |
| **Does the child have the habit of having snacks between meals?** |
| a. Yes |
| b. No |
| c. Occasionally |
| **If yes (in XII), what is the frequency of having snacks per day?** |
| a. Once |
| b. Twice |
| c. Thrice |
| d. On demand. |
| **What types of snacks are taken?** |
| a. Chocolates and candy |
| b. Biscuits |
| c. Chips |
| d. Fruits |
| e. Others, specify |