

A descriptive analysis of reasons for early childhood caries among a selected group of Sri Lankan preschool children

Chathurika Dissanayaka¹, *Manori Gamage²

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Abstract

Introduction: Dental caries is a microbial disease of the calcified tissues of the teeth. When a child has one or more decayed missing (due to caries) or filled tooth surfaces (DMFT) in any primary teeth by 71 months or younger it is defined as early childhood caries (ECC).

Objectives: To analyse the dietary habits and oral hygienic practices among a selected group of preschool children who were diagnosed to suffer from ECC, using their primary caregiver responses.

Method: A cross sectional study was conducted among primary caregivers of children 1-5 years old with proven dental caries who were referred to the Dental Institute Maharamaga from September to December 2018. Primary caregivers of mentally retarded children and caregivers who were not familiar with the child's routine were excluded.

Results: Total number of primary caregivers involved in the study was 213. Among them 194 (91%) were mothers. Among the children included in the study, 104 (51.2%) were girls. The children had a mean age of 42 months with the majority belonging to the 49-60 month age group. Majority (60%) of children were introduced to use a toothbrush between 1-2 years of age and only 2 (0.9%) started to use a toothbrush after 2 years of age. The majority (86.9%) of caregivers stated that their children do tooth brushing twice a day and 85.9% stated that they themselves brush their

child's teeth. The majority (98.1%) of caregivers stated that they use toothpaste to brush their child's teeth and 88% stated that the toothpaste they use contains fluoride. Ninety seven (45.5%) caregivers were still breast feeding at the time of the study and of them 41(42.3%) breast fed during sleep. Only 52 (24.4%) children were bottle fed. Of the carers of bottle-fed children, 56% stated that their children bottle-fed during bedtime. Thirty two (61.5%) caregivers of bottle-fed children used to add sugar to child's milk bottle. Furthermore, 32 (61.5%) caregivers had not practised mouth washing after bottle-feeding.

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Conclusions: In this study 213 children had proven ECC despite the majority of caregivers introducing their children to the tooth brush between 1-2 years of age, themselves brushing their children's teeth twice/day and using toothpaste containing fluoride. Almost all children consumed sugary food items, such as biscuits and sugar containing milk products more than once daily. Two other possible reasons for the high rate of ECC in this study were not washing the children's mouths after they consumed sugary food and breast feeding during sleep.

(Key words: Early childhood caries, ECC, oral hygiene, dietary habits, DMFT score, breastfeeding)

Introduction

Dental caries is a problem in children and adults¹. It is described as a microbial disease of the calcified tissues of the teeth with demineralization of the inorganic portion, and destruction of the organic substance of the tooth². When a child has one or more decayed, missing (due to caries), or filled tooth surfaces (DMFT) in any primary teeth by 71 months, it is defined as early childhood caries (ECC)³. Severity of ECC is assessed using DMFT values³. Identified risk factors for dental caries include past and current dental status, current medical status, tooth location, life style, diet and dietary habits, oral hygiene, oral bio film formation and lack of fluoride⁴. Remaining food particles and nutrients through saliva, makes the oral cavity ideal for microorganisms of which *Streptococcus mutans* is a well-recognized organism metabolising sugary food into acids leading to demineralisation of the enamel of the teeth⁵.

¹BSc Nursing Undergraduate, Department of Allied Health Sciences, University of Sri Jayewardenepura, ²Senior Lecturer, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka and Honorary Consultant Paediatrician, Colombo Teaching Hospital, Sri Lanka

*Correspondence: manorigamage@sjp.ac.lk

 orcid.org/0000-0003-3836-5945

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In most developed countries, ECC prevalence is from 1% to 12% but in developing countries it is as high as 70%⁶. A Sri Lankan study in 2003 reported that the ECC prevalence in preschool children was 23%⁷. However, according to the National Oral Health Survey Sri Lanka 2015-2016, ECC prevalence among children less than 5 years was 63%⁸. Major factors contributing to the high prevalence of ECC in developing countries include poor socioeconomic status, which is closely linked with poor parental education, poor hygienic practices and unhealthy dietary habits and limited availability of dental services⁹. Although many worldwide studies have shown that dietary habits and poor oral hygienic practices are the most important risk factors for ECC, very few Sri Lankan studies have looked into the association between dietary habits and hygienic practices in children with dental caries.

Objectives

To analyse the dietary habits and oral hygienic practices among a selected group of preschool children who were diagnosed to suffer from ECC, using their primary caregiver responses.

Method

A descriptive cross sectional study was conducted after obtaining ethical clearance from the Ethics Review Committee of the Faculty of Medical Sciences, University of Sri Jayewardenepura.

Primary caregivers of children, aged 1-5 years with proven dental caries, who presented to the Dental Institute Maharamaga from September to December 2018, were included in the study after written informed consent from the caregiver. Primary caregivers of mentally retarded children and caregivers who were not familiar with the child’s routine were excluded. Data was collected using a pre-tested self-administered questionnaire. Demographic data, data related to dietary habits and data on oral hygienic practices were collected from primary caregivers.

Results

The total number of primary caregivers involved in the study was 213 of whom 194 (91%) were mothers. Of the 213, 57.7% were educated up to GCE ordinary level. All fathers were working while 77% of mothers were housewives. Among the children included, 104 (51.2%) were girls. Majority of children belonged to the age group 49-60 months with a mean age of 42 months.

Firstly, the oral hygienic practices related to tooth brushing were assessed. All 213 children did brush their teeth routinely, 60% were introduced to use a toothbrush between 1-2 years of age, 98% used tooth paste to brush their child’s teeth and 87% stated that their children did tooth brushing twice a day (Table 1).

Table 1: Oral hygienic practices related to tooth brushing (n=213)

| Characteristic | Frequency (%) |
|--|---------------|
| <i>Age at which the child started to use a tooth brush</i> | |
| Before 1 year | 84 (39.4) |
| Between 1-2 years | 127 (59.6) |
| After 2 years | 02 (0.9) |
| <i>Usage of tooth paste</i> | |
| Yes | 209 (98.1) |
| No | 04 (01.9) |
| <i>Frequency of tooth brushing</i> | |
| Once a day | 19 (08.9) |
| Twice a day | 185 (86.9) |
| More than twice a day | 09 (04.2) |

Of the primary caregivers 183 (85.9%) stated that they themselves brush their child’s teeth, whilst 8 (3.8%) stated that their child brushes teeth solely by himself or herself. Whilst 184 (88%) caregivers stated that the toothpaste they used contained fluoride, the rest did not know whether it had fluoride or not. None of the primary caregivers had ever used mouthwashes for their children.

Next, we analysed the food habits and practices of these children and found that 97 (45.5%) were still being breast fed, 42.3% of the 97 feeding from the breast during sleep (Table 2). Of the 116 not

currently breastfeeding, 36.2% had terminated breast-feeding after 2 years of age. Of the 213 children only 52 (24.4%) were bottle fed (Table 2). Of the 29, three (10.3%) caregivers mentioned that their children sleep while feeding from the bottle.

Whilst 44 (84.6%) caregivers used the feeding bottle only to give milk, the rest used it also to give juices and water. Of the 52 caregivers involved in bottle feeding, 32 (61.5%) added a teaspoonful or less of sugar to the child’s feeding bottle. Of the 52 caregivers, 32 (61.5%) did not wash their child’s mouth after bottle-feeding.

Table 2: Practices related to breast and bottle feeding (n=213)

| Practice | Frequency (%) |
|--|---------------|
| Breast fed at the time of the study | |
| Yes | 97 (45.5) |
| No | 116 (54.5) |
| Of the breast feeders, breast fed during sleep | |
| Yes | 41 (42.3) |
| No | 56 (57.7) |
| Bottle fed at the time of the study | |
| Yes | 52 (24.4) |
| No | 161 (75.6) |
| Bottle fed at night | |
| Yes | 29 (56.0) |
| No | 23 (44.0) |

In our study, almost all children consumed sugary food items more than once daily and of them the commonest was biscuits (54.5%), which was only second to sugar containing milk products (38%). It was noted that 68.1% of the caregivers did not wash their child's mouth after consuming sugary food and the rest mentioned that they practised it occasionally. When asked about usage of routine dental care facilities for their children, none had routine planned visits before their children developed dental caries and 89% of them responded that they did not know that routine visits were recommended when children were not suffering from any dental issues.

Discussion

Dental caries among children is a well-known factor for school absenteeism¹⁰. In one study it was shown that dental caries may affect the weight gain in children by causing pain and discomfort, sleeping disturbance affecting psychological wellbeing and interference with feeding¹¹. Studies have found that increased consumption of sugary food, the prolonged period of time sugary foods remain on teeth, unhealthy dietary habits, poor oral hygienic practices, and poor usage of dental care facilities, are major factors responsible for ECC¹². A study in Abu Dhabi concluded that consumption of high sugar containing food and infrequent tooth brushing have a strong association with ECC¹³. A study by Elidrissi *et al* found that children who initiated tooth brushing at an earlier age and who brushed teeth three times a day have very significantly low DMFT scores¹⁴. An Indian study in 2015 found that consumption of snacks three or more times, sticky foods and syrup medications increased the prevalence of ECC¹⁵. On the other hand, a study by Ngatia *et al* concluded that dental caries risk at 30 months of age was more with exclusively or partially breast fed babies than exclusively formula fed babies¹⁶. In this study prevalence of dental caries was higher among males than females¹⁶. In our study population 51% were female. Most children in our study belonged to the 4-5 year age category. This was supported by

a study in Sudan which concluded that dental caries increased with age, the highest prevalence being in the 3-5 year age group¹⁴. Most likely, children in this age category have more access to sugary and sticky food than younger children.

Regular and frequent tooth brushing is known to reduce ECC¹⁴. Early introduction of tooth brush to children, twice a day or more tooth brushing, and usage of a fluoride containing tooth paste are also known to reduce the prevalence ECC¹⁷. In our study population, all children did tooth brushing as an oral hygienic practice, and in 86%, brushing was done by an adult. Around 60% children were introduced to the tooth brush between 1-2 years of age. Furthermore, 98% of caregivers used toothpaste to clean their child's teeth, 88% knew that they used a fluoride containing tooth paste and 87% brushed their children's teeth twice a day. Despite all the above measures which should have reduced the incidence of ECC, all 213 study participants had proven ECC needing referral to this tertiary dental care institution. This clearly indicates that factors other than poor tooth brushing contributed to the development ECC in this selected group of preschool children. This is supported by a Sri Lankan study by Kumarihamy *et al* in 2011 in a group of preschool children from selected MOH areas of Colombo, which showed a significant relationship between intake of milk with sugar, sweet consumption and ECC¹⁸. Let us consider some of these other factors which may have contributed to the ECC in our study.

On analysing the dietary habits of our study population, there were dietary habits and practices among them which are known to increase the prevalence of ECC. These include increased and frequent consumption of sugary food and not cleaning mouth after such consumption, breast and bottle feeding while sleeping and not practising mouth washing following bedtime milk feeds before sleep.

Almost all our study subjects, consumed sugary food items, such as biscuits (54.5%) and sugar containing milk products (38%) more than once daily. Further, 68% of the caregivers did not wash their children's mouths after they had consumed sugary food. Of these preschool children, 97 (45.5%) were still being breast fed while 52 (24.4%) were being bottle fed. Of the 97 currently being breast fed, 41 (42.3%) continued to be breast fed during sleep. Of the 52 being bottle fed, 29 (55.8%) continued to be bottle fed during bedtime and 3 children used to sleep while being bottle fed. Further, 32 (61.5%) of the bottle fed babies got sugar added to their feeds by their primary caregivers, who furthermore, did not brush their teeth or wash their children's mouths after the bedtime feed. Thus, it is clearly shown that these dietary practices and habits made these preschool children develop significant dental caries which even needed a tertiary care referral.

To prevent ECC, parental influence is very important from early infant feeding, including breast feeding practices up to proper usage of dental facilities and establishing good oral hygienic practices. Mothers play a major role in establishing healthy dietary habits, food selection and dental hygienic practices. Unfortunately, there is no properly implemented primary preventive programmes for dental care in Sri Lanka. Moreover, even available facilities are limited to a few centres which have prolonged waiting times to get an appointment. This may be the reason why the majority of primary caregivers did not know about or attend preventive regular checkups. ECC is a preventable problem among preschool children, which is strongly associated with dietary and oral hygienic practices. It was noted that the major reason why they got it was due to dietary habits and practices, which could be easily, corrected with health education practices. In addition, it is strongly recommended to establish a proper primary preventive dental practices which are readily available and accessible to primary care takers.

Conclusions

In this study at the Dental Institute Maharamaga, 213 children had proven ECC despite the majority of caregivers introducing their children to the tooth brush between 1-2 years of age, themselves brushing their children's teeth twice a day and using toothpaste containing fluoride. Almost all children consumed sugary food items, such as biscuits and sugar containing milk products more than once daily. Two other possible reasons for the high rate of ECC in this study were not washing the children's mouths after they consumed sugary food, and breast feeding during sleep.

References

1. Peterson PE. The World Oral Health Report 2003: continuous improvement of oral health, in the 21st century – the approach of the WHO Global Oral Health Programme. *Community Dentistry and Oral Epidemiology* 2003; 31 Suppl1:3-23.
2. Rajendran A, Sivapathasundharam B, editors. Shafer's Textbook of Oral Pathology. 6thed. Elsevier India 2009.
3. De Drauwe A, Aps JK, Martens LC. Early childhood caries (ECC): What's in a name? *European Journal of Paediatric Dentistry* 2004; 5(2) 62-70.
4. Islam B, Khan SN, Khan AU. Dental carries: from infection to prevention. *Medical Science Monitor* 2007; 13(11): RA 196-203.
5. Vadiakas G. Case definition, aetiology and risk assessment of early childhood caries (ECC): a revisited review. *European Archives of Paediatric Dentistry* 2008; 9(3):114-25.
6. Congiu G, Campus G, Luglie PF. Early childhood caries (ECC) prevalence and background factors: A review. *Oral Health and Preventive Dentistry* 2014; 12(1): 71-6.
7. Shahim FN. Factors of risk of early childhood caries in a selected district in Sri Lanka, Post Graduate Institute of Medicine, Colombo PGIM; NSF. 2003.
8. National Oral Health Survey Sri Lanka. 2015-2016. Ministry of Health, Nutrition and Indigenous Medicine December 2018.
9. Amin TT, Al-Abad BM. Oral hygiene practices, dental knowledge, dietary habits and their relation to caries among male primary school children in Al Hassa, Saudi Arabia. *International Journal of Dental Hygiene* 2008; 6(4):361-70.
10. Jackson SL, Vann WF Jr, Kotch JB, Pahel BT, Lee JY. Impact of poor oral health on children's school attendance and performance. *American Journal of Public Health* 2011; 101(10):1900-6.

11. Sheiham A. Dental caries affects body weight, growth and quality of life in preschool children. *British Dent Journal* 2006; **201**(10):625-6.
12. Kowash MB. Severity of early childhood caries in preschool children attending Al-Ain Dental Centre, United Arab Emirates. *European Archives of Paediatric Dentistry* 2015; **16**(4):319-24.
13. Elamin A, Garemo M, Gardner A. Dental caries and their association with socioeconomic characteristics, oral hygiene practices and eating habits among preschool children in Abu Dhabi, United Arab Emirates - the NOPLAS project. *BMC Oral Health* 2018; **18**:104.
14. Elidrissi SM, Naidoo S. Prevalence of dental caries and tooth brushing habits among preschool children in Khartoum State, Sudan. *International Dental Journal* 2016; **66**(4):215-20.
15. Kuriakose S, Prasannan M, Remya KC, Kurian J, Sreejith KR. Prevalence of early childhood caries among preschool children in Trivandrum and its association with various risk factors *Contemporary Clinical Dentistry* 2015; **6**(1):69-73.
16. Ngatia EM, Imungi JK, Muita JW, Nganga PM. Dietary patterns and dental caries in nursery school children in Nairobi, Kenya. *East African Medical Journal* 2001; **78**(12):673-7.
17. Moimaz SAS, Martins RJ, Forte FDS, Saliba NA. () Oral hygiene practices, parents' education level and dental caries pattern in 0 to 5 years-old children. *Brazilian Journal of Oral Sciences* 2015; **4**(14): 778-82.
18. Kumarihamy SL, Subasinghe LD, Jayasekara P, Kularatna SM, Palipana PD. The prevalence of early childhood caries in 1-2 yrs olds in a semi-urban area of Sri Lanka. *BMC Research Notes* 2011; **4**:336.