Original Article

Dental Caries and Associated Factors in Children Aged 2-4 Years Old in Mbeya City, Tanzania

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ABSTRACT

Statement of the Problem: Dental caries in infants and young children is prevalent worldwide; its magnitude and associated factors vary between communities because of cultural and social economic differences. No such information was available for pre-school children in Mbeya city.

Purpose: To determine dental caries status and associated factors in 2 to 4-year-old children in Mbeya city.

Materials and Method: A cross sectional study was conducted among 525 children aged 2-4 years and their parents/caregivers. Caries was assessed using caries assessment spectrum and treatment index, oral hygiene by visual inspection for visible plaque on index teeth, and dietary and oral hygiene habits by a questionnaire. Kappa statistics was used to test reliability of study instruments, χ^2-test and logistic regression was employed for studying associations.

Results: Caries free children for dmft1, dmft2 and dmft3 were 79.8%, 83.8% and 94.7% and caries experience was 0.49 (1.23), 0.4 (1.14) and 0.10 (0.53) respectively. Older age [(OR =2.722 (1.617-4.582) p=< 0.001)]; and frequent consumption of factory made sugary foods/snacks at age 1-2 years [(OR=3.061 (1.188-7.887) p=0.021] were associated with caries. Prolonged breastfeeding for more than 1 year and breastfeeding at night had no association with dental caries.

Conclusion: The prevalence of dental caries was very low. Older age and frequent consumption of factory made sugary foods at age 1-2 years were associated with higher odds of developing dental caries. Prolonged breasfeeding and breastfeeding at night had no association with dental caries. Prevention of dental caries should be instituted as soon as primary teeth start erupting, especially through discouraging consumption of factory made sugary foods/snacks.

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Introduction

Dental caries in infants and young children is prevalent worldwide, with prevalence ranging from 3.3%- 61.1%. [1-7] The factors that are currently associated with dental caries in children are the life time of dentition; [1, 3, 8] infant feeding practices related to sugared beverages; [8-9] and breast feeding practices. [5, 8, 10-11] However, reviews and meta-analysis do not show adequate evidence to support breast feeding as a causative factor for early childhood caries (ECC). [12-14] Other factors include poor oral hygiene and presence of high counts of *Streptococcus mutans* in dental plaque, [15-16] social

economic status especially low maternal education [6, 17] and geographic location. [8]

Studying the prevalence of dental caries and its associated factors in a community assists in determining its public health importance and means of controlling it. Dental caries is behavioural related; therefore, its occurrence and severity is likely to vary between communities with different risk behaviours. During literature search, only three studies from Tanzania that report on factors associated with ECC were retrieved. [1, 18-19] None of these studies was conducted in Mbeya. Therefore, there was a need to conduct a similar study among children in Mbeya city to ascertain its magnitude and factors influencing its occurrence. The aim of this study was to describe the occurrence of dental caries in children aged 2-4 years old and associated factors in Mbeya city.

Materials and Method

Study design, study area and sampling procedures

A cross sectional study was conducted in Mbeya city, Tanzania. The sample size of 322 was calculated for urban and rural areas separately based on the standard power calculation formula with $\pi = 0.31$ (prevalence of caries in children). This gave a total sample size of 644. Quota sampling technique based on the rural-urban strata and age distribution of 2-4 years old children as per 2012 census was used to get study subjects. [20] To facilitate the examination and interview, the local government leader requested mothers and children to assemble at suitable places in each street. Children were examined for dental caries and oral hygiene, and their mothers/caregivers were interviewed on demographic characteristics, breastfeeding, and weaning practices.

Clinical examination for oral hygiene and dental caries

The mother/guardian held the child in supine position that enabled the researcher (HM) to examine the child. The clinical examination was conducted using natural light. The mouth mirror was used to reflect the lips and cheeks and saliva was wiped with gauze to enhance visibility during diagnosis of dental caries. Oral hygiene was assessed by visual inspection of index teeth for visible dental plaque, and recorded as 0 when dental plaque was not visible and 1 when dental plaque was visible. Dental caries was assessed using caries assessment spectrum and treatment (CAST) instrument. [21]

The CAST is a hierarchical instrument with 9 scores ranging from 0=sound tooth surface to 8= missing due to dental caries. In between are 1=surfaces with fissure sealants, 2=restored cavity, 3-enamel lesion, 4=dentinal caries, 5=dentinal caries with cavitation, 6=dentinal caries with pulp involvement, and 7= caries with abscess/ fistula discharging pus. The examiner dictated the findings to a trained assistant who recorded the dictated findings onto clinical record forms.

Questionnaire on breast feeding practices and snacking

A structured questionnaire was used to interview mothers/guardians on demographic characteristics, breastfeeding practices and foods/snacks consumed by a child when he/she was aged 1-2 and 3-4 years.

Data entry, management and analysis

Data were entered and analysed using SPSS version 16. The independent demographic variables were geographic location coded as 0= urban, 1 = rural; education coded as: (1) did not complete primary school, (2) completed primary school, (3) completed secondary school, (4) collage education and above. Education was later dichotomized into primary education or lower and secondary education or high and dummy coded as 0= secondary education or high; 1= primary education or lower. Occupation coded as (1) employed, (2) self-employed, (3) neither employed nor self-employed. Occupation was later dichotomized into employed (employed and self-employed) and unemployed, and dummy coded as 0=employed; 1= unemployed. Age of a child was recorded from 2–4 years. This was later dichotomized into young age (2 years) and older age (3-4 years) and dummy coded as 0= young age; 1=old age. Gender of child was coded 0=male and 1=female.

Other independent variables

Oral hygiene status was recorded as 0=no plaque and 1=visible plaque. Count of visible plaque was done for upper posterior teeth (sextants 1 and 3), lower posterior teeth (sextants 4 and 6) and upper anterior teeth (sextant 2). Children with counts of 2 in posterior sextants were grouped as having poor oral hygiene, and those with counts of 1 or zero as having good oral hygiene. In anterior sextants, children with count of 1 were grouped as having poor oral hygiene, and those with score 0 as having good oral hygiene. These were dummy coded as 0= good oral hygiene; 1= poor oral hygiene.

Duration of breast feeding was recorded as 1 year,

>1 year up to two years and >2 years, it was dichotomized into 1 years and >1 years and dummy coded as 0=1 years; 1= >1 years.

Breast feeding at night was recorded using 3 categories namely (1) once up to twice per night, (2) three times up to four times per night, (3) more than four times per night. It was dichotomized into once up to two times per night= 0; and three times or more per night=1.

Consumption frequency of factory made sugary foods (biscuit, sweet, juice, ice-cream, soda, cake and chewing gum) and home-made sugary foods (porridge, tea and ubuyu) was recorded either as: (1) never used, (2) not daily but at least once a week, (3) once in day, (4) twice a day and three times or more. Factory and home-made sugary foods intake were summed separately. The frequency of factory made sugary foods was dichotomized and coded as 0= no factory made sugary foods consumption reported and 1= factory made sugary foods reported to be consumed once or more times a day. Home sugary foods were dichotomized into 0= 0-3 times per day and 1= 4-6 times per day. The categories with score 0 were taken as referent categories in the logistic regression analysis.

Dependent variables

Dental caries experience (dmft) based on three different caries thresholds (CAST codes 3 to 7= dmft1; 4 to 8= dmft2; and 5 to 8= dmft3) were calculated. CAST codes 0-2 were taken as functional dentition. To determine the prevalence of dental caries, the frequency distributions of children by dmft1, dmft2 and dmft3 were generated. To allow bivariate and multivariate analyses dmft1, dmft2 and dmft3 were dichotomized into dmft=0 (caries free) and dmft≥1 (one or more decayed, missing and restored tooth). Category coded 1 was taken as outcome of interest**.** The significant level was set at $p \leq 0.05$.

Reliability of instruments for data collection

The questionnaire was administered twice to a group of 14 mothers at an interval of two weeks. Every 10th child was re-examined for dentition status. Due to continued accumulation of dental plaque, its reliability was not determined. Kappa statistic coefficients were computed to estimate reliability of the data collected.

Ethical consideration

Ethical clearance was granted by Muhimbili University of Health and Allied Sciences Ethical Committee. Written informed consents were obtained from the parents/caregivers of the child after they had read and understood the purpose of the study. Feedback on oral health status of the child was given on the sport to parents. Children found with problem were referred to Mbeya referral hospital or nearby dental clinic for further investigation and treatment.

Results

The kappa coefficients for reliability of questionnaire ranged from 0.363 to 1.0. Questions on frequency of drinking juice and tea with sugar at age of 1-2 years had the lowest coefficients of 0.363 and 0.446 respectively. Reliability for data on dentition status was good (κ= 0.845-1.0).

The questions on frequency of drinking juice at age of 1-2 years and frequency of drinking tea with sugar at age of 1-2 years had lowest kappa coefficient of 0.363 and 0.446 respectively, indicating poor reliability for frequency of drinking juice at age 1-2 years. A total of 525 children aged 2-4 years and their parents/ caregivers participated in the current study. Caries free children for dmft1, dmft2 and dmft3 were 79.8%, 83.8% and 94.7% respectively. Mean dmft1, dmft2 and dmft3 were 0.49 (1.23), 0.4 (1.14) and 0.10 (0.53) respectively (Table 1).

Bivariate analyses revealed that older children (Table 2); those who were reported to have consumed factory sugary foods at age of 1-2yrs (Table 3); and those who were diagnosed to have good oral hygiene for lower posterior teeth (Table 4) were statistically significantly associated with having dmft >0.

In multivariate analyses, older children had statistically significantly higher odds of having dmft>0 compared to younger children at all three levels of dental caries diagnosis [at dmft1: OR =2.72 (1.62-4.582); p=< 0.001; at dmft2: OR = 2.73 (1.52-4.87); p= 0.001; and at dmft3: OR = 3.40 (1.15-10.03); p= 0.027]. Children who were reported to have consumed factory sugary foods at age 1-2 years of age had statistically significantly higher odds of having dmft2>0 [OR = 3.06 (1.19-7.89); p= 0.021]. Children who had good oral hygiene had higher odds of having dmft3>0 [OR=0.29 (0.10-0.82); p= 0.02] (Table 5).

Discussion

The current study investigated the prevalence and sever-

Table 1: Distribution of children by caries experience scores, maximum, and mean dmft computed at 3 cut point levels of caries diagnosis

Caries experience scores, maximum, mean dmft	Diagnosis level of dental caries		
	Dmft 1* n (%)	Dmft 2** n (%)	Dmft 3*** n (%)
0 dmft	419 (79.8)	440 (83.8)	497 (94.7)
1-2 dmft	75 (14.3)	57 (10.8)	21 (4.0)
3-4 dmft	20 (3.8)	18 (3.4)	6 (1.2)
5-6 dmft	6 (1.2)	6 (1.2)	0 (0.0)
7-8 dmft	5 (1.0)	4 (0.8)	1 (0.2)
Maximum dmft	8	8	7
Mean dmft (SD)	0.49 (1.23)	0.40 (1.14)	0.10 (0.53)

Key: * dmft1= (enamel lesions + dentinal lesion without open cavity + dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)
** dmft2 = (dentinal lesion without open cavity + dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)
*** dmft3 = (dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)

ity of dental caries at three levels of caries diagnosis: enamel lesions, pre-cavity dentinal caries and cavity dentinal caries, and its associated factors in children aged 2-4 years old in Mbeya city. The accuracy of detecting enamel and pre-cavity dentinal caries lesions is dependent on the cleanliness of tooth surface being examined. In the field condition under which the current study was undertaken, it was not always possible to have all tooth surfaces clean. This may have led to under reporting of initial caries lesions. Therefore the prevalence and caries experience for enamel and pre-cavity dentinal caries lesions in the current study are likely to be under reported.

The oral hygiene was recorded either as present or absent. This led to grouping subjects with heavy dental plaque score with those with low or moderate plaque accumulation. This is likely to distort the association between oral hygiene and dental caries. Therefore, the reported association between oral hygiene and dental caries in the current study need to be interpreted with caution.

The current study indicate a higher proportion of caries free children when caries prevalence is computed using frank cavities (dmft3) compared to when caries

Table 2: Distribution of children by demographic factors and caries experience determined at three levels of caries diagnosis

Demographic variables	Caries prevalence determined at three levels of dental caries diagnosis					
	Dmft1*		dmft2**		dmft3***	
	Caries free n (%)	1+ dmft N (%)	Caries free n (%)	1+ dmft n (%)	Caries free N (%)	1+ dmft N (%)
Geographic location						
Urban	200 (79.7)	51 (20.3)	211(84.1)	40 (15.9)	242 (96.4)	9 (3.6)
Peri-urban	219 (79.9)	55 (20.1)	229 (83.6)	45 (16.6)	255 (93.1)	19 (6.9)
	$\chi^2 = 0.005$; $p = 0.994$		$X^2 = 0.023$; $p = 0.880$		$\chi^2 = 2.909$; $p = 0.088$	
Gender						
Male	212 (79.7)	54 (20.3)	223 (83.8)	43 (16.2)	250 (94.0)	16 (6.0)
Female	207 (79.9)	52 (20.1)	217 (83.8)	42 (16.2)	247 (95.4)	12 (4.6)
	$\chi^2 = 0.004$; $p = 0.946$		$\chi^2 < 0.01$; $p = 0.987$		$\chi^2 = 0.496$; $p = 0.481$	
Age of child						
2 years	169 (88.9)	21 (11.1)	174 (91.6)	16 (8.4)	186 (97.9)	4(2.1)
3 years	115 (78.8)	31 (21.2)	125 (85.6)	21 (14.4)	141 (96.6)	5 (3.4)
4 years	135 (71.4)	54 (28.6)	141 (74.6)	48 (25.4)	170 (89.9)	19 (10.1)
	$X^2 = 18.182$; $p < 0.001$		$\chi^2 = 20.609$; $p < 0.001$		$\chi^2 = 13.313$; $p = 0.001$	
Parents/caregiver education						
Primary education or lower	330 (78.2)	92 (21.8)	350 (82.9)	72 (17.1)	401 (95.0)	21 (5.0)
Secondary education or high	89 (86.4)	14 (13.6)	90 (87.4)	13 (12.6)	96 (93.2)	7 (6.8)
	$\chi^2 = 3.462$; $p = 0.063$		$\chi^2 = 1.203$; $p = 0.273$		$\chi^2 = 0.543$; $p = 0.146$	
Occupation of parents						
Employed	354 (79.6)	91 (20.4)	371 (83.4)	74 (16.6)	419 (94.2)	26 (5.8)
Unemployed	65 (81.2)	15 (18.8)	69 (86.2)	11 (13.8)	78 (97.5)	2 (2.5.)
	$\chi^2 = 0.122$; $p = 0.727$		$\chi^2 = 0.414$; $p = 0.520$		$\chi^2 = 1.501$; $p = 0.221$	

Key: * dmft1= (enamel lesions + dentinal lesion without open cavity + dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)
** dmft2 = (dentinal lesion without open cavity + dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)
*** dmft3 = (dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)

Table 3: Distribution of children by frequency at which snacking/ breastfeeding/ wining foods are consumed and caries experience determined at three levels of caries diagnosis

Dietary behaviour	Caries experience determined at three levels of dental caries diagnosis					
	dmft1 * n (%)		dmft2 ** n (%)		Dmft3 *** n (%)	
	caries free	dmft>1	caries free	dmft>1	caries free	dmft>1
Consumption of factory made sugary foods at age of 1-2yrs						
No	407 (80.6)	98 (19.4)	428 (84.8)	77 (15.2)	479 (94.9)	26 (5.1)
Yes (≥1/daily)	12 (60.0)	8 (40.0)	12 (60.0)	8 (40.0)	18 (90.0)	2 (10.0)
	$X^2 = 5.063$; $p = 0.024$		$\chi^2 = 8.687$; $p = 0.003$		$\chi^2 = 0.897$; $p = 0.344$	
Consumption of factory made sugary foods at age 3-4yrs						
No	239(74.5)	82 (25.5)	255 (79.4)	66 (20.6)	299 (93.1)	22 6.9)
Yes (≥1/daily)	10 (83.3)	2 (16.7)	10 (83.3)	2 (16.7)	11 (91.7)	1(8.3)
	Fisher's Exact Test $p = 0.487$		Fisher's Exact Test $p = 0.5$		Fisher's Exact Test $p = 0.583$	
Consumption of home-made sugary foods at age of 1-2 yrs						
0-3 times daily	384(80.0)	96(20.0)	401 (83.5)	79 (16.5)	45795.2%	23 (4.8)
3-6 times daily	35 (77.8)	10(22.2)	39 (86.7)	6 (13.3)	40 (88.9)	5 (11.1)
	$X^2 = 0.126$; $p = 0.723$		$\chi^2 = 0.296$; $p = 0.586$		$X^2 = 3.254$; $p = 0.071$	
Consumption of home-made sugary foods at age of 3-4 yrs						
0-3 times daily	243 (74.5)	83 (25.5)	259 (79.4)	67 (20.6)	304 (93.3)	22 (6.7)
3-6 times daily	6 (85.7)	1 (14.3)	6 (85.7)	1 (14.3)	(85.7)6	1 (14.3)
	Fisher's Exact Test $p = 0.487$		Fisher's Exact Test $p = 0.564$		Fisher's Exact Test $p7 = 0.3$	
Duration of breastfeeding						
1 year	75 (81.5)	17 (18.5)	79 (85.9)	13 (14.1)	86 (93.5)	6 (6.5)
>1 year	323 (80.0)	81 (20.0)	338 (83.7)	66 (16.3)	385(95.3)	19 (4.7)
	$X^2 = 0.117$; $p = 0.733$		$\chi^2 = 0.272$; $p = 0.602$		$\chi^2 = 0.518$; $p = 0.472$	
Breastfeeding at night						
1-2 times/night	174(79.1)	46(20.9)	182(82.7)	38(17.3)	207(94.1)	13(5.9)
≥3 times /night	224(81.2)	52 (18.8)	235(85.1)	41(14.9)	264(95.7)	12(4.3)
	$\chi^2 = 0.33$; $p = 0.565$		$\chi^2 = 0.534$; $p = 0.465$		$\chi^2 = 0.623$; $p = 0.430$	

prevalence computation involve initial caries lesions (dmft1 or dmft2). This may indicate that at any particular time of the dentition, different teeth may be at different stages of developing dental caries, therefore if preventive measures are not taken early enough, more teeth would turn out to have open cavities. But it may also mean that not all initial lesions progress to frank cavities.

The proportion of caries free children (94.7%) recorded in the current study for frank cavitation (dmft3) is similar to that reported elsewhere by different researchers in Tanzania, [1] Nigeria, [3] and Japan [5] where caries free children were reported to be 96.3%, 93.4% and 96.7% respectively. However it is higher than that reported in Iran, [7] China, [22] India, [23] Brazil, [24] and where caries free children were 38.9%

Table 4: Distribution of children by oral hygiene status in the posterior and anterior segments of the dentition and caries experience determined at three levels of caries diagnosis

Dentition segment oral hygiene status	Caries experience determined at three levels of dental caries diagnosis					
	dmft1 * n (%)		dmft2 ** n (%)		Dmft3 *** n (%)	
	caries free	dmft>1	caries free	dmft>1	caries free	dmft>1
Upper posterior teeth						
good oral hygiene	32 (82.1)	7 (17.9)	33 (84.6)	6 (15.4)	36 (92.3)	3 (7.7)
poor oral hygiene	387 (79.6)	99(20.4)	407 (83.7)	79 (16.3)	461 (94.9)	25 (5.1)
	$X^2 = 0.131$; $p = 0.717$		$\chi^2 = 0.020$; $p = 0.887$		Fisher's Exact Test $p = 0.454$	
Upper anterior teeth						
good oral hygiene	165 (80.5)	40 (19.5)	169 (82.4)	36 (17.6)	190 (92.7)	15 (7.3)
poor oral hygiene	254 (79.4)	66 (20.6)	271 (84.7)	49 (15.3)	307 (95.9)	13 (4.1)
	$X^2 = 0.096$; $p = 0.757$		$\chi^2 = 0.466$; $p = 0.495$		$\chi^2 = 2.621$; $p = 0.105$	
Lower anterior teeth						
good oral hygiene	153 (80.1)	38 (19.9)	156 (81.7)	35 (18.3)	176 (92.1)	15 (7.9)
poor oral hygiene	266 (79.6)	68 (20.4)	284 (85.0)	50 (15.0)	321 (96.1)	13 (3.9)
	$X^2 = 0.016$; $p = 0.899$		$\chi^2 = 1.008$; $p = 0.315$		$\chi^2 = 3.776$; $p = 0.052$	
Lower posterior teeth						
good oral hygiene	25(75.8)	8(24.2)	26(78.8)	7(21.2)	28 (84.8)	5 (15.2)
poor oral hygiene	394(80.1)	98(19.9)	414(84.1)	78(15.9)	469(95.3)	23 (4.7)
	$X^2 = 0.359$; $p = 0.549$		$\chi^2 = 0.654$; $p = 0.419$		$\chi^2 = 6.723$; $p = 0.01$	

Key: * dmft1= (enamel lesions + dentinal lesion without open cavity + dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)
** dmft2 = (dentinal lesion without open cavity + dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)
*** dmft3 = (dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)

Table 5: Odds ratio (95% confidence interval) for logistic regression between ages of children, factory sugary food consumed at age 1-2 years, oral hygiene for lower posterior teeth maternal education by dmft1, dmft2 and dmft3 (reference category in italics).

	OR(95%CI)	P-value
Dmft1*		
Age (2yrs/3-4yrs)	2.722 (1.617-4.582)	< 0.001
Factory sugary food age 1-2 years (no factory sugary food consumed/factory sugary food consumed)	2.257 (0.878-5.798)	0.091
Oral hygiene for lower posterior teeth (good /poor)	0.849 (0.363-1.988)	0.706
Dmft2**		
Age (2yrs/3-4yrs)	2.725 (1.524-4.873)	0.001
Factory sugary food age 1-2 years (no factory sugary food consumed/ factory sugary food consumed)	3.061 (1.188-7.887)	0.021
Oral hygiene for lower posterior teeth (good /poor)	0.767 (0.313-1.878)	0.562
Dmft3***		
Age (2yrs/3-4yrs)	3.40 (1.153-10.027)	0.027
Factory sugary food at age 1-2 years (no factory sugary food consumed/ factory sugary food consumed)	1.617 (0.343-7.616)	0.543
Oral hygiene for lower posterior teeth (good /poor)	0.286 (0.10-0.824)	0.02

Key: * dmft1= (enamel lesions + dentinal lesion without open cavity + dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)
** dmft2 = (dentinal lesion without open cavity + dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)
*** dmft3 = (dentinal lesion with open cavity + pulp exposure + dental abscess and missing teeth due to caries)

44.0%, 54.9%, and 46.4%, respectively.

In the current study, children aged 3-4 years were more likely to have caries than children aged 2 years. These differences are likely to be due to the fact that caries experience measures the cumulative effects of dental caries in life time of a particular dentition. Therefore, older children are likely to have higher dmft than younger ones. These findings are in agreement with those reported in Tanzania, [1] Nigeria, [3] and among Chinese children aged 3 to 5 years. [22] The fact that caries was recorded among children aged 2 years indicates that caries development starts well before the age of two years. Therefore, there is a need of instituting primary prevention for dental caries as soon as primary teeth start erupting.

Gender, place of residence, education of parent/ caretaker and occupation of parent/caregiver had no significant association with caries in the current study, indicating insignificant role played by these variables in the development and progression of dental caries in the studied population. Gender is unlikely to have influence on caries development and progression in preschool children in Tanzania because there are no differences in feeding practices between infants of different genders. Similar findings have been documented in Uganda, China and USA. [22-25] Residence has been shown to be an important factor in early childhood caries among preschool children in India where rural residents had more early childhood caries compared to urban children. [7]

Low socioeconomic status of parents has been associated with high prevalence of early childhood caries in India and Switzerland. [6, 26] In Brazil; however, the association was found to be reversed. [23]

Children who were reported to have consumed factory sugary foods at age of 1-2 years had higher odd of having dmft1 and dmft2 greater than zero. This underscores the well-established causal relationship of sugar consumption and dental caries. These findings point to the need of instituting oral health education to discourage early commencement of feeding infants with factory made sugary foods for prevention of early childhood caries. This is in line with the findings of a review article by Leong and colleagues in which they concluded that dietary habits initiated early at age 6 months affected not only an infant's susceptibility to bacterial acquisition, levels and ECC experience, but also the timing and frequency of the behaviors at both 12 and 18 months, suggesting a need for establishing healthy eating patterns early to reduce risk of early childhood caries. [27-28]

The fact that taking factory made sugary snacks at age of 3-4 years revealed no association with dental caries should be interpreted with caution because the

studied children were aged 1-4 years. Therefore the effects of consuming sugary snacks at age 3-4 years would manifest in later years of life because development of dental caries takes time.

Duration of breastfeeding and frequency of breastfeeding at night had no association with dental caries in the current study. The findings indicate that breastfeeding at night and its duration do not pose a risk for dental caries in the population studied. These findings differ from those reported elsewhere, [7, 10, 27-29] but support the review articles that showed no conclusive evidence to support claims that breast feeding is associated with development and progression of dental caries in children. [12-14] This indicates that the relationship between breast feeding and development of early childhood caries is still a contentious issue and need further investigations.

In the current study, good oral hygiene for lower posterior teeth was statistically significantly associated with having dmft greater than zero at dmft3 level of dental caries diagnosis. This is an unusual finding. This may be due to small number of children who had good oral hygiene compared to those with poor oral hygiene. Folayan and colleagues reported a similar picture among preschool children in Nigeria whereby children with fair oral hygiene had more caries than those with poor oral hygiene. [3]

Conclusion

The prevalence of dental caries was very low. Older age and frequent consumption of factory made sugary foods at age 1-2 years were associated with higher odds of developing dental caries. Prolonged breasfeeding and breastfeeding at night had no association with dental caries. Prevention of dental caries should be instituted as soon as primary teeth start erupting, especially through discouraging consumption of factory made sugary foods/snacks. Further studies to examine association between breast feeding practices and development of dental caries among children are recommended.

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Conflict of Interest

The authors declare no conflict of interest related to the conduct of the research and acqusition of data that generated the current report.

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