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RESEARCH ARTICLE

ASSOCIATION BETWEEN FEEDING PRACTICES AND EARLY CHILDHOOD CARIES AMONG ANGANWADI CHILDREN IN BANGALORE DISTRICT

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ABSTRACT

Introduction: Early Childhood Caries (ECC) is a significant public health problem with consequences for the growth and development of affected children.
Objective: To determine the association of feeding practices and Early Childhood Caries among Anganwadi children in Bangalore District.
Materials and Methods: A longitudinal study was conducted among 200 mother-child pairs in Anganwadis in Bangalore District. Socio-demographic information, feeding practices were collected from the mothers through interview. The children underwent dental examination and the dmft index was recorded at the age of three years.
Results: Majority of the participants reported Breast Feeding [144(72%)]. Overall most of the participants reported duration of breast feeding from 13-14 months [94(47%)] followed by 7-12 months [90(45%)]. In this study, 30(15%) children had caries experience(dmft≥1). Mean caries experience of the children was 0.64±1.64 [dt=0.64±1.64;mt=0;ft=0]. There was no statistically significant association between dental caries and type of feeding practices [0.6477 (95% CI 0.2809-1.4937)] and duration of breast feeding [1.2687 (95% CI 0.5708-2.8198)].
Conclusions: There was no association of feeding practices and Early Childhood Caries among Anganwadi children in Bangalore District. There is need to increase awareness among the public about ECC and institute preventive strategies.

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INTRODUCTION

Early childhood caries (ECC) is a major health issue globally. ECC has been defined as the presence of one or more decayed teeth (with non-cavitated or cavitated lesions), missing teeth (due to caries) or a filled surface on any primary tooth in a child aged 71 months old or younger. ECC remains one of the most common childhood diseases despite being largely preventable with good oral health behaviours and nutritional habits (Baggio *et al*., 2015). Studies in the past have considered microbiological perspective to explain the cause, treatment and prevention of caries. In addition, there are many social, demographic and behavioural factors such as family income, family status, toothbrushing habits, parental knowledge and maternal educational level which influence oral health during childhood (Begzati *et al*., 2014). Indeed, several studies have highlighted social differences in the prevalence rates of ECC; disadvantaged children such as children from lower socioeconomic backgrounds, with parents who have lower levels of education and from single-parent families have poorer oral health (Baggio *et al*., 2015). The mother's role has been highlighted in relation to the child's oral health status within the family. Children below 5 years spend most of their time with mothers; during which earliest childhood routines and habits are developed. These include healthy behaviours and dietary habits as practiced in the home that are dependent on the knowledge and behaviour of the parents. Considering the close interaction between mother and child, the mother is an important resource for the child's perception and acceptance of attitudes, values and behaviours. Parents' knowledge and beliefs affect oral hygiene and healthy eating habits, and thus influence children's oral health maintenance and outcomes (Begzati *et al*., 2014). Breastfeeding is recommended for at least the first year of life. However, prolonged and unrestricted breastfeeding has been speculated to be a potential risk factor for dental caries, but no evidence was found regarding breastfeeding or its duration as independent risk factors for early childhood caries (ECC).

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Studies have identified significant associations of bottle-feeding the child during the night on demand, with dental caries (Carvalho *et al*., 2014). A relation between preterm birth or low birthweight and caries was suggested, but no definite evidence has been found (Congiu *et al*., 2014). Anganwadi centers provide basic health care in India for children up to 6 years of age by providing supplementary nutrition, immunization, nutrition and health education, nonformal preschool education, preschool activities, and health check-ups. Anganwadis mostly belong to rural areas and urban slum areas with marked lower level of socioeconomic strata, poor feeding practice and dietary patterns, lower levels of education of parents, poor health awareness, and oral hygiene ultimately leading to increase in the incidence of dental caries (Bhayade *et al*., 2016). Previous studies on association of feeding practices and dental caries are equivocal. The aim of the study was to determine the prevalence of ECC and its association with feeding practices among Anganwadi children in Bangalore District

MATERIALS AND METHODS

A longitudinal study was conducted in birth cohorts enrolled in Anganwadis in Bangalore District. This study is a part of a longitudinal study that was conducted in Birth Cohorts Enrolled in Anganwadis in Bangalore District over a period of 3 years from 2013 - 2016. Prior to the commencement of the study, a protocol of the intended study was submitted to the Institutional Ethical Committee and ethical clearance was obtained. Permission of the Director of Women & Child Development, Government of Karnataka was obtained. Informed Consent was obtained from the mothers.

The principal investigator was trained and calibrated in the Department of Public Health Dentistry, GDCRI, Bangalore. A pilot study was conducted on 20 mothers to check the feasibility of the study in Bangalore District during July – September 2013. Prevalence of early childhood caries in various studies is about 17-78%. .Assuming prevalence of early childhood caries to be 50%, relative precision to be 15% and tolerable error (α) to be 5% the sample size has been computed as 200. Multistage random sampling procedure was followed: Bangalore District has six divisions- Bangalore South was selected randomly. Bangalore South has thirteen Circles- Kengeri(Urban) and Kaggalipura(Rural) were randomly selected. Out of 29 centres in Kengeri, 10 Centres were chosen randomly. Kaggalipura consists of 35 Anganvadi Centres. Out of which 10 Centres were chosen randomly. From these 20 centres 200 Children aged less than 6 months enrolled in the Anganwadi and their mothers were selected.

A structured proforma was used for data collection. This proforma consists of demographic information, feeding practices and clinical assessment. Socioeconomic status was assessed using Kuppuswamy's Classification (Bairwa *et al*., 2013). Clinical examination included assessment of dental caries according to WHO Oral Health Surveys: Basic Methods (World Health Organisation, 1997). The data was collected from mother and children during working hours in their respective Anganwadis. Demographic information and other details were obtained by personal interview. Oral examination of the children was performed with the child seated on the mothers lap under natural light by a single investigator using mouth mirror and CPI probe, Infection control and sterilization measures were observed throughout the study.

Statistical Analysis

Data collected was entered in a MS Excel sheet. The descriptive and analytical statistics were computed with the Statistical Package of Social Sciences (SPSS) version 16 software. Analytical statistics was done to find out the association between the study variables. A p value of <0.05 was considered as significant.

RESULTS

The response rate was 81 % (162/200). Overall Females [103(51.5%)] were slightly higher proportion than males [97(48.5%)].Most of the participants belonged to Lower Middle class [77(48.5%)] followed by Upper Lower class [74(37%)] and Upper Middle class [47(23.5%)] (Table 1). Majority of the participants reported Breast Feeding [144(72%)] and never used bottle for feeding [145(72.5%)]. Overall, most of the participants reported breast feeding for a duration from 13-14 months [(94(47%)] followed by 7-12 months [90(45%)]. Among those who practiced bottle feeding, duration ranged from7-12 months [28(14%)] followed by 13-14 months [20(10%)]. Almost all the participants reported both day time and night time breast feeding [189(94.5%)] and Bottle Feeding [36(18%)]. None of them reported the use of comforters, pacifiers or honey and all the participants performed burping. Majority of the participants did not add sugars to the milk [136(68%)]. Bottle during sleep was reported by few mothers [8(4%)] (Table 2). Majority of the participants weaned to solid food with the help of homemade food (paste of different cereals) [141(70.5%)] (Table 3). In this study, 30(15%) children had caries experience (dmft≥1)[urban: 11(11%); rural: 19(19%)]. Mean caries experience of the children was 0.64±1.64 [dt=0.64±1.64;mt=0;ft=0]. In the urban area mean caries experience of the participants was 0.49±1.34 [dt=0.49±1.34; mt=0;ft=0]. In the rural area mean caries experience of the participants was 0.79±1.6 [dt=0.79±1.6; mt=0;ft=0] (Table 4). There was no association between dental caries and type of feeding practices [0.6477 (95% CI 0.2809-1.4937)] and duration of breast feeding [1.2687 (95% CI 0.5708-2.8198)]. This was similar in urban and rural areas (Table 5).

DISCUSSION

Early childhood caries (ECC) is a widespread condition seen among children throughout the world (Congiu *et al*., 2014). The importance of the role of mothers in maintaining good oral health in their children is beyond doubt (Begzati *et al*., 2014). Recently, the interest in the identification of non-biological factors for caries development and progression has been growing (Carvalho *et al*., 2014). According to a systematic reviews, infant feeding practices (Leong *et al*., 2013; Hooley *et al*., 2012) maternal circumstances (Leong *et al*., 2013) and oral health and infant related oral health behaviours (Leong *et al*., 2013) were the key risk indicators. The identification of determinants amenable to change offers an additional approach to tackle caries in non-privileged children. This study focused on association of feeding practices with ECC among Anganwadi children in Bangalore District. Majority of the participants reported Breast Feeding and never used bottle for feeding. Overall most of the participants reported duration of breast feeding from 13-14 months.

Table 1. Distribution of study participants (children) according to sociodemographic variables

Variables	Urban N=100	Rural N=100	Total N=200
Gender			
Males	53(53)	44(44)	97(48.5)
Females	47(47)	56(56)	103(51.5)
Socioeconomic status			
Upper	1(1)	1(1)	2(1)
Upper Middle	9(9)	38(38)	47(23.5)
Lower Middle	40(40)	37(37)	77(48.5)
Upper Lower	50(50)	24(24)	74(37)
Lower	0(0)	0(0)	0(0)

Figures in the parenthesis indicate percentage

Table 2. Distribution of study participants (children) according to feeding practices

Feeding practices	Urban N=100	Rural N=100	Total N=200
Type of feeding			
Breast Feeding	71(71)	73(73)	144(72)
Bottle Feeding	0(0)	1(1)	1(0.5)
Both Breast and bottle feeding	28(28)	26(26)	54(27)
Cup	1(1)	00(0)	1(0.5)
Combination of Breast feeding, bottle feeding and cup	0(0)	0(0)	0(0)
Have you ever used bottle?			
Yes	28(28)	27(27)	55(27.5)
No	72(72)	73(73)	145(72.5)
Sometimes	0(0)	0(0)	0(0)
Duration of breast feeding(months)			
0-3	5(5)	1(1)	6(3)
4-6	2(2)	5(5)	7(3.5)
7-12	52(52)	38(38)	90(45)
13-24	40(40)	54(54)	94(47)
25-36	0(0)	1(1)	1(0.5)
NA	1(1)	1(1)	2(1)
Duration of bottle feeding(months)			
0-3	0(0)	02(2)	2(1)
4-6	4(4)	00(0)	4(2)
7-12	19(19)	09(9)	28(14)
13-24	5(5)	15(15)	20(10)
25-36	0(0)	01(1)	1(0.5)
NA	72(72)	73(73)	145(72.5)
Time of Breast Feeding			
Only at day time	0(0)	0(0)	0(0)
Only at night time	0(0)	09(9)	9(4.5)
Both day time and night time	99(99)	90(90)	189(94.5)
NA	01(1)	01(1)	2(1)
Time of Bottle Feeding			
Only at day time	03(3)	06(6)	9(4.5)
Only at night time	01(1)	09(9)	10(5)
Both day time and night time	24(24)	12(12)	36(18)
NA	72(72)	73(73)	145(72.5)
Do you give bottle during sleep			
Yes	04(4)	04(4)	8(4)
No	25(25)	23(23)	48(24)
Sometimes	0(0)	0(0)	0(0)
NA	71(71)	73(73)	144(72)
Do you add sugar to milk			
Yes	29(29)	35(35)	64(32)
No	71(71)	65(65)	136(68)
Sometimes	0(0)	0(0)	0(0)

Figures in the parenthesis indicate percentage

Table 3. Distribution of study participants (children) according to weaning practices

Feeding practices	Urban N=100	Rural N=100	Total N=200
Child was weaned to solid food with the help of			
Homemade food (paste of different cereals)	73(73)	68(68)	141(70.5)
Infant formulas available in market.	13(13)	20(20)	33(16.5)
Both of the above	14(14)	10(10)	24(12)
Any other specify	0(0)	02(2)	2(1)

Figures in the parenthesis indicate percentage

Table 4. Caries experience among study participants (children)

Caries experience	Urban N=80	Rural N=82	Total N=162
Proportion			
Absent(dmft=0)	69(69)	63(63)	132(66)
Present (dmft≥1)	11(11)	19(19)	30(15)
Mean			
dt	0.49±1.34	0.79±1.6	0.64±1.64
mt	0	0	0
ft	0	0	0
dmft	0.49±1.34	0.79±1.6	0.64±1.64

Figures in the parenthesis indicate percentage

Table 5. Association between feeding practices and Early Childhood Caries among study participants (children)

Feeding practices	Urban N=80		Rural N=82		Total N=162	
	dmft=0	dmft≥1	dmft=0	dmft≥1	dmft=0	dmft≥1
Type of feeding						
Breast Feeding	51(63.5)	6(7.5)	45(54.88)	13(15.85)	96(59.26)	19(11.73)
Both Breast and bottle feeding	18(22.5)	5(6.25)	18(21.95)	6(7.32)	36(22.22)	11(6.79)
Odds Ratio	0.4235 [95% CI 0.1151-1.5584]		0.8667 [95% CI 0.2853-2.6327]		0.6477 [95% CI 0.2809-1.4937]	
Duration of breast feeding(months)						
Upto 12 months	38(47.5)	10(12.5)	29(35.37)	7(8.54)	67(41.36)	17(10.5)
More than 12 months	31(38.75)	1(1.25)	34(41.46)	12(14.63)	65(40.12)	13(8.02)
Odds Ratio	8.1579 [95% CI 0.9894- 67.2672]		0.6839 [95% CI 0.238- 1.9654]		1.2687 [95% CI 0.5708-2.8198]	

p>0.05
Figures in the parenthesis indicate percentage

Among those who practiced bottle feeding duration ranged from7-12 months. This is in line with a study. In some studies most of the mothers provided bottle feeding for more than a year (Begzati *et al*., 2014; Perera *et al*., 2014). Almost all the participants reported both day time and night time feeding in respective practices (Breast/Bottle Feeding).None of them reported the use of comforters, pacifiers or honey. Homemade food (paste of different cereals) were used for weaning by most of the participants. Majority of the participants did not add sugars to the milk. Bottle during sleep was reported by few mothers whereas 74 % provided bottle during sleep in a study (Begzati *et al*., 201). The studied population showed caries experience of 15% of the children at the age of 3 years caries.

Studies have reported caries experience from 15-63% (Baggio *et al*., 2015; Carvalho *et al*., 2014; Congiu *et al*., 2014; Bhayade *et al*., 2016; Prashanth Prakash *et al*., 2012; Retnakumari, 2012; Qadri *et al*., 2012; Sankeshwari *et al*., 2012; Corrêa-Faria *et al*., 2015; Bissar, 2014; Perera, 2014; Chaffee, 2014). Mean caries experience of the participants was 0.64±1.64 [dt=0.64±1.64;mt=0;ft=0]. Studies have reported mean caries experience from 0.8 -6.3 (Begzati, 2014; Kumarihamy *et al*., 2011; Nunes, 2012; Prashanth Prakash *et al*., 2012; Qadri *et al*., 2012; Bissar *et al*., 2014; Perera *et al*., 2014). Breast milk may promote tooth decay, especially when the baby is at breast throughout the night. Breast-feeding and bottle-feeding during the night on demand were reported as determinants caries in children (Carvalho *et al*., 2014; Prashanth Prakash *et al*., 2012). Bottle feeding and giving pacifiers dipped in sweeteners will also promote ECC (Congiu *et al*., 2014; Kumarihamy, 2011). A high prevalence of ECC was observed in bottle-fed than breast fed (Qadri *et al*., 2012; Gaidhane *et al*., 2013). Prolonged breastfeeding (Retnakumari *et al*., 2012; Sankeshwari *et al*., 2012; Tanaka *et al*., 2013; Bissar *et al*., 2014; Prakasha Shrutha *et al*., 2013; Chaffee, 2014) feeding frequency (Retnakumari *et al*., 2012) absence of burping the child (Sankeshwari *et al*., 2012), bottle use for sweetened liquids (Tanaka *et al*., 2013; Prakasha Shrutha *et al*., 2013), other than milk, use of the nursing bottle in bed (Retnakumari *et al*., 2012; Bissar *et al*., 2014; Prakasha Shrutha *et al*., 2013) and the introduction of solid foods at six months old or later (Tanaka, 2013) might be risk factors for the development of dental caries Regarding feeding practices and dental caries among study participants there was no association between type of feeding practices and dental caries. Duration of breast feeding and dental caries showed no association. Similarly a study showed no association between bottle feeding or night feeding and dental caries (Kumarihamy *et al*., 2011). while another study concluded that prolonged breast-feeding was not a risk factor for ECC (Nunes *et al*., 2012). Majority of the participants did not add sugars to the milk in this study. A study showed significant association between intake of sugar with milk and dental caries. Two studies (Bissar *et al*., 2014; Chaffee *et al*., 2014) showed association when duration of breast feeding (>24months). Oral health programmes should focus on mothers, caregivers, community health workers, preschool teachers and children and create awareness on the diagnosis prevention and treatment of ECC among health care workers including paediatricians, physicians, nurses and midwives. Screening for dental caries should start as soon as the first primary tooth erupts or not later than one year of age. Further surveys in other regions of the country to support oral health programmes are needed.

Conclusion

There was no association between feeding practices and Early Childhood Caries among Anganwadi children in Bangalore District. An overall preventive programme for oral health promotion is needed, including the oral health education of mothers.Further development of policies aiming at improving children's oral health is necessary

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