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Research paper

Feeding practices and prevalence of early childhood caries among preschool children in urban and rural areas of Kannur district

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Abstract

Background: Early childhood caries (ECC) is one of the most prevalent chronic conditions among children. Lack of proper Parental knowledge regarding feeding practices will have a deleterious effect on child oral health.
Objective: The purpose of the study was to assess the prevalence of ECC and parental knowledge regarding feeding practices in young children.
Methods: 500 preschool children aged between 36-60 months, were selected from twenty schools. The children's were examined at the respective schools to determine the presence or absence of caries by using WHO criteria .A structured questionnaire was provided to 500 parents of the respective school children examined to assess their knowledge regarding feeding practices and oral hygiene measures in preschool children for prevention of ECC
Result: The results of the children examined and the parent surveyed were tabulated and statistically analyzed by using chi-square test. The result showed that the prevalence rate of ECC among 500 children surveyed were about 56.3%.The knowledge regarding the feeding practices and oral hygiene measures overall was found to be 56.5%
Conclusion: The prevalence of ECC was relatively high among the preschool children. The feeding practices and oral hygiene measures among parents was more off supporting the promotion of ECC. More emphasis should be given regarding introduction of oral hygiene practice from the first year of child's life and also to conduct public awareness programme to achieve optimum oral health care in children.

Keywords: *Early Childhood Caries; Feeding Habits; Prevalence; Parent's Knowledge.*

1. Introduction

Dental caries is defined as a progressive, irreversible microbial disease of multifactorial nature affecting the calcified tissues of the teeth, characterized by demineralization of inorganic portion and destruction of the organic portion of the tooth (Soben peter .2006.3rd edition). The first comprehensive description of dental caries in infants was published by Dr Elias Fass in 1962 and he termed it as "nursing bottle mouth" (Fass E .1962). More recently the term "nursing bottle mouth" has been replaced by the the term Early Childhood Ca ries(ECC) (Tinannoff N et al .1998) and which forms the most common chronic disease of childhood (Retnakumari N et al. 2012).
Although dental caries levels have declined & stabilized the world over, the problem of early childhood caries has remained persistent in many areas of the world affecting certain segments of society, especially the socially deprived, who remain at a high risk to this disease (Bedi R et al .2000, William NJ et al.2002, Mani SA et al.2010).
Early childhood caries is defined as the presence of 1 or more decayed, missing or filled tooth surfaces in any primary tooth in a child 71 months or younger(Drury T.F et al. 1999). The classic etiology of ECC involves cariogenic bacteria, fermentable carbohydrate diet, susceptible tooth and time. ECC is also linked to the following risk factors: demographic characteristics, oral hygiene practice, parental attitudes, educational status of mother, temperament of child, pacifiers dipped in honey, frequent medication and feeding habits (Lavigne V. 2013).
Early childhood caries is considered as a serious public health problem as it is a complex disease of primary dentition which relay serious socio-behavioural issues that afflict mainly the infants and toddlers (Postma et al.2008, Jose B et al .2003). ECC affects the quality of life of families and their affected children due to dental pain and subsequent tooth loss resulting in difficulty in eating, speaking, sleeping and socializing (de Souza PM et al.2015).
As the prevalence of ECC is estimated to a range from 1% to 12% in pre-schoolers of developed countries (Prakash P et al . 2012).In developing countries, a fluctuant prevalence rate is found over the years(Mohebbi SZ et al.2006) .It varied from 55.5% in 1940 to 68% in 1960s. Few studies conducted in Kerala showed high prevalence rate (Poureslami HR et al.2009). One of the significant studies conducted by Kuriakose and Joseph et al, showed an astonishing caries prevalence of 57% (Kuriakose S et al .2015) .
Therefore a study was conducted to assess the prevalence of ECC and feeding practices of infants.

2. Materials & methods

A cross-sectional survey was carried out among pre-school children of 36-60 months of age and their parent's attitude towards feeding practice was conducted in Kannur district of Kerala

Group I:

Consisted of 500 children from 20 play schools aged between 36-60months were selected by multistage sampling technique. Before commencement of survey, informed consent was obtained from parents and concerned school authorities. Ethical clearance to conduct the study was obtained from the institutional review board.

The children were examined at their respective schools. Oral examination was performed under natural daylight using reflecting mouth mirror and good reflecting surface and CPI probe. Early childhood caries experience was recorded using the WHO criteria

Group II:

Consisted of parents of the children who were examined, were provided with a questionnaire regarding the attitude of parents regarding feeding practices.

The data was statistically analysed. The results were tabulated and expressed as both numbers and percentage. Statistical analysis was done using chi-square test. Significant difference between rural and urban area regarding the prevalence of ECC.

3. Results

Table I shows that among the 500 children who participated the prevalence of ECC was 56.3%. About 132 (26.5%) of participants had in mild form, 88 (17.6%) of participants had in moderate form and 61 (12.2%) of participants had in severe form. About 174(69.6%) of rural candidates had ECC were as only 107 (43%) of urban candidates had ECC.

Table 1: Prevalence of ECC

Based on clinical appearance	Place		Overall prevalence of ECC	P value
	Rural	Urban		
Mild	88(35.2%)	44(17.7%)		
Moderate	47(18.8%)	41(16.5%)	56.3%	0.001
Severe	39(15.6%)	22(8.8%)		
Total	174(69.6%)	107(43%)		

Table II shows the response of the parents regarding the knowledge about infant oral health and dental diseases. This study shows that only 27% of the parents are aware of sharing of utensils of feeding can cause dental caries. Most of the parents are not aware that diet during pregnancy effects the child's oral health (44.6%). 50% of parents are aware of brushing the child's teeth as the first teeth erupts and 52% of parents are aware of using toothpaste for cleaning the child's teeth. More than 90% of the parents also know that poor oral hygiene and increased sugar consumption causes dental decay.

Table III shows practice of parents in relation to child's oral health. The present study shows that 285 (57%) parents responded as they cleaned their child's mouth before the eruption of tooth. When asked whether the child slept by drinking milk 280(56%) of parents responded as practicing. Only 79(15.8%) of parents responded as they use to feed child with water after feeding milk. In this study about 200(40 %)of parents fed their child with sweet drinks in bottle other than milk and 50% of parents responded positively to increased intake of sweets by their words.

Table 2: Questionnaire to Assess the Knowledge of Parents Regarding Dental Caries, Oral Hygiene and Feeding Practices

	N (%) n=500	Yes	No	Don't Know	P value
Does dental caries occur genetically	N (%)	99(19.8%)	169(33.8%)	232(46.4%)	0.559
Does pregnant mother's food pattern affect the child's dental health	N (%)	223(44.6%)	108(21.6%)	169(33.8%)	0.691
After the eruption of first tooth is brushing required	N (%)	250(50%)	176(35.2%)	74(14.8%)	0.001
After 1 year can toothpaste be introduced during Brushing	N (%)	264(52.8%)	138(27.6%)	98(19.6%)	0.001
Does night feeding cause dental caries	N (%)	147(29.4%)	207(41.4%)	146(29.2%)	0.057
Does intake of sweets cause dental caries	N (%)	474(94.8%)	11(2.2%)	15(3%)	0.18
Does poor oral hygiene cause dental caries	N (%)	455(91%)	14(2.8%)	31(6.2%)	0.749
Does sharing of things used by mother cause dental caries in child	N (%)	137(27.4%)	202(40.4%)	161(32.2%	0.001

Table 3: Questionnaire to Assess Practices Regarding Feeding and Oral Hygiene among Children and Parents.

Questions	N (%)	Yes	No	Sometimes	P value
Have you ever cleaned your child's mouth before	N (%)	285 (57%)	118 (23.6%)	97 (19.4%)	0.001
Does the child sleep by drinking milk	N (%)	280 (56%)	150 (30%)	70 (14%)	0.002
Did you feed the child with water after feeding with milk?	N (%)	79	377	44	0.171
Other than breast milk have you given milk	N (%)	119 (23.8%)	357 (71.4%)	24	0.885
Other than milk have you	N (%)	106	300	94	0.167
Do you add sugar in the	N (%)	199	254	47	0.073
Do your child eat lot off	N (%)	158	247	95	0.001

Table IV shows the time of introduction of semisolid by most of the parents. This table elicits that about 147 (29.4%) of parents started semisolid food at age of 6months, 199 (39.8%).

Table 4: Change of Diet in Infants

		n=500	%	P value
Introduction of semisolid food	6 months	147	29.4%	0.001
	6-9 months	199	39.8%	
	9-12 months	95	19%	
	1 year	59	11.8%	

Table V shows that about 298(59.6%) of mothers breast fed the child up to 2 years.

Table 5: Duration of Breast Feeding

		N=500	%	P- value
Duration of breast feeding	6 months	30	6	0.001
	1 year	74	14.8	
	2 year	298	59.6	
	After 2 years	98	19.6	

Table VI shows that 45.6% of parents believed that tooth brush has to be introduced after all teeth erupts. Only 15% has started brushing after the first teeth erupted

Table 6: Knowledge Regarding Tooth Brushing

	n=500	%	P value
Before eruption of first tooth	3	0.6%	0.005
After first tooth has erupted	75	15%	
When the tooth in front region has erupted	194	38.8%	
After all tooth has erupted	228	45.6%	

Table VII shows that 55.2% of children brushed twice daily (morning and night)

Table 7: Knowledge Regarding Frequency of Tooth Brushing in Children.

	n=500	%	P value
Morning	218	43.6%	0.119
Night	6	1.2%	
Morning and Night	276	55.2%	

4. Discussion

A number of factors contribute to the high prevalence of dental disease in young children. Among some of the more common risk factors for ECC in infants and children are unhealthy eating habits, with high intake of carbohydrates and extended use of bottle feedings or breastfeeding beyond 12months (Voronina L and Mckinney.2006). The prevalence of ECC in the present study was56.3%.which showed a marginal difference of 54% from a study conducted by Kuriakose et al in 2015 in Trivandrum (Kuriakose S et al. 2015). The attributed cause for high prevalence in this study could be due to lack of awareness among parents regarding the importance of care for primary tooth. Maternal and parental attitude is significantly correlated to the oral health of their children (Wigen TI et al .2011, Abiola Adeniyi Aet al.2009). Mothers being the primary promoters of oral hygiene practices and their increased knowledge of caries will influence their self-care habits and dietary practice which in turn, improves the dietary and oral hygiene habits of children which will lead to prevention of caries (PrakashaShrutha S et al.2013).

As a result in the present study a questionnaire to assess the knowledge of parents regarding dental caries, oral hygiene and feeding practices was circulated among parents. In this study only 19.8% of the parents agreed that dental caries occurred geneticall-y. The result obtained was comparatively less and there are no current questionnaire studies on this. But according to Darshana et al in 2014 (Bennadi D et al 2014) it was revealed that children acquire strains of Smutans from the mother's placenta and via colustrums found in lactation products. The present study reveals that about 44.6% of parent's agreed that pregnant mother's food pattern will affect the child's dental health.

Similarly in a study conducted by Rafi et al in 2012(Rafi A Togoo et al.2012) in Saudi about 39% of parents agreed that pregnant mother's food pattern had a correlation with the child's dental health. The early years of the child involves primary socialization during which the earliest childhood routines and habits are acquired. In the present study about 50% agreed to brushing is must after eruption of first tooth. Similarly in a study by Mani et al in 2012 (Mani SA et al. 2012) in Malaysia it was revealed that about 88% of parents agreed to it. In a study conducted by Vrushalli (Thakare VG et al.2012) and co-workers in Vadodara city in 2012 it was revealed that 29.2 % of parents agreed to it .In the present study about 29.4% of parents agreed that night feeding could cause tooth decay Whereas in a study conducted by Rafi et al (Rafi A Togoo et al.2012) it was revealed that only 18% of parents agreed that night feeding could cause tooth decay, which was comparatively lower than our study. The low responses reveal that most of the parents are unaware of the hidden sugars in the milk which becomes a predisposing factor of ECC. Similarly the questionnaire consisted of questions to assess the practices regarding feeding and oral hygiene among children and parents. In the present study about 56% of parents responded that their children sleep by drinking milk. In a study conducted by Priyantha (Perera PJ et al.2014) et al in 2014 in Sri Lanka it was revealed that about 52% of parents agreed that children were fed with milk overnight, similarly overnight feeding was about 40% in a study conducted by Prakash (Prakash P et al .2012) et al in 2012 in Bangalore. This increase in overnight feeding can be reduced by giving awareness to parents that the milk contains liquid carbohydrates in it which increases the chances of decay as well as at night the saliva's flow rate is comparatively less and which act as a determinant for development of ECC.

The present study reveals that only 15.8% of parents only feed their children with water after feeding milk. In another study conducted by Orawan et al in (Suwansingha O et al.2014) Thailand the prevalence was 46.3% which was higher than our study. Similarly in a study conducted by Mani (Mani SA et al .2010) et al in 2010 in Malaysia it was revealed that about 42% of parents gave plane water after each feeding. Most of the parents were not aware of importance of feeding with water after feeding milk as the remnants from milk present on the tooth surface can cause demineralisation of the enamel, which later leads to frank cavitation.

In this study about 23.8% of parents feed their children with milk powder. In a study conducted in Sri Lanka (Perera PJ et al.2014) in 2014 about 48% of mothers feed their child with milk powder. Most of mother's give milk powder as a substitute for breast milk; as a result the sugar that they add in the milk will act an agent for initiation of dental caries.

In this study about 39.8% of parents started semisolid food at the age of 6-9 months whereas only 11.8% of parents started semisolid food by the age of 1 yr. Where as in a study conducted by Mani (Mani SA et al .2010) et al in (2010) in Malaysia about 64.7 % of parents started the semisolid food only by the age of 1 year which is comparatively higher than this study. The early age of introduction of semisolid food increases the rate of prevalence of ECC, so the parents should be instructed to strictly follow the oral hygiene practices.

In this study majority of the mothers have breastfed their child up to the age of 2 years. Similarly in a study conducted by C.A Feldon et al in Brazil (2010) about 45.5% of the mother's breast fed their child beyond 1 year. Yet another study was also reported in Kanpur (PrakashaShrutha S et al.2013) where 46.7% of mothers breast fed their child after 1 year. The probable reason could be due to cultural beliefs that prolonged breast feeding could reduce the risk of diseases (gastrointestinal, asthma etc..) in children.

In this study about 0.6% of parents introduced brush before first tooth erupts,15% of parents introduced brush after the first tooth has erupted, about 38.8% of parents used brush when front milk tooth has erupted and 45.6% of parents introduced the usage of brush after all tooth has erupted. In a study conducted by (Pullishery F et al .2013) at Mangalore it was revealed that 1% of parents introduced toothbrush for the child before the eruption of tooth, 31% of parents introduced toothbrush after the eruption of first tooth, 47% of parent introduced toothbrush after the eruption of front tooth and 17% of parents introduced toothbrush after eruption of all teeth. The best age to start brushing the tooth is immediately after the eruption of first tooth using a baby sized tooth brush, so that the chances of early colonization of microorganisms can be prevented.

In this study about 43.6 % of the children brushed in morning, 1.2 % of children brushed in night and around 55.2 % brushed both morning and night. While in a study conducted by Kushalappa M et al in 2015 (Kaikure MK et al .2015) the results 95% brushed in morning, 90.9% brushed in night and 82.7% brushed both the times. Which was drastically higher than this study.

The treatment of ECC is often problematic, expensive and takes up time of the child and caretaker (Poureslami HR et al.2009) . Treatment necessitates extensive rehabilitation under general anesthesia, with all its potential complications because the level of cooperative behaviour of babies and preschool children is less than ideal (Berkowitz RJ .2003). The clinical outcomes for treatment of ECC are poor and the relapse rates of approximately 40% have

been reported within the first year after dental surgery, because recurrence of caries around restored teeth and occurrence of new decays are common (Poureslami HR et al.2009) . After surgical procedure the parents should be provided with information regarding feeding practices in order to prevent the recurrence of ECC (Berkowitz RJ .2003). There are 3 general approaches that have been used to prevent ECC which include training of mothers or caregivers to follow healthy dietary and feeding habits in order to prevent the development of ECC, early screening for signs of caries development, starting from about 7 to 8 month of age which could identify infants who are at risk of developing ECC and assist in providing information for parents about promoting oral health and preventing the development of tooth decay (Poureslami HR et al.2009).

The research evidence clearly indicates a need for early anticipatory advice to parents before their children's teeth begin to erupt. This advice may be best delivered by non-dental health-care providers who are more likely to see infants and toddlers before ECC manifests clinically (Gussy MG et al. 2006).Thus improving oral hygiene practices in early childhood requires the improvement of mother's own tooth brushing habits, which will reflect on the oral cleaning skills of the infant.

Anticipatory guidance is the process of providing practical, developmentally-appropriate information about children's health to prepare parents for the significant physical, emotional, and psychological milestones (Sigurdsson A. 2013, AAPD 2012; 132-136, AAPD 2012; 24-25).

Individualized discussion and counselling should be an integral part of each visit (AAPD 2012; 24-25).

Oral hygiene counselling involves the parent and patient. Initially, oral hygiene is the responsibility of the parent. As the child develops, home care is performed jointly by parent and child. When a child demonstrates the understanding and ability to perform personal hygiene techniques, the health care professional should counsel the child. The effectiveness of home care should be monitored at every visit and includes a discussion on the consistency of daily preventive activities (AAPD 2000; 22, AAPD; 2013; 148-156). Caries-conducive dietary practices appear to be established early, probably by 12 months of age, and are maintained throughout early childhood (Kranz S et al. 2006). Dietary practices, including prolonged and/or frequent bottle or training cup with sugar containing drinks and frequent between-meal consumption of sugar-containing snacks or drinks (eg, juice, formula, soda), increase the risk of caries (Tinanoff N et al.2000 ,Reisine S et al. 1998)

The role of carbohydrates in caries initiation is unequivocal. Dietary analysis and the role of dietary choices on oral health, malnutrition, and obesity should be addressed through nutritional and preventive oral health counselling at periodic visits (AAPD 2013; 148-156).

Guidelines on ECC prevention recommends Oral health assessments with counselling at regularly scheduled visits during the first year of life, Children's teeth should be brushed daily with a smear of fluoride toothpaste as soon as they erupt, Parents of infants and toddlers should be encouraged to reduce behaviours that promote the early transmission of mutans streptococci such as tasting food before feeding and sharing tooth brushes., Infants should not be put to sleep with a bottle and nocturnal breastfeeding should be avoided after the first primary tooth begins to erupt Frequent intake of sweet drinks and on demand feeding with sweetened baby bottles should be discouraged, especially at night time.

Elimination of active dental caries lesions, gingival disease and using agents such as fluoride and chlorhexidine and Professional applications of fluoride varnish are recommended at least twice yearly in groups or individuals at risk (EAPD; 2008; 1-4).

5. Conclusion

Preventive and educational programme should be given to parents as feeding and oral hygiene practices has an inevitable role in the caries formation. The importance of providing treatment for primary tooth should be emphasized to the parents. The present study provides a base line data to facilitate future investigations of different variables of ECC and also necessary information to develop and implement effective preventive strategies for reducing the prevalence.

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