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RESEARCH ARTICLE

EVALUATION OF RISK FACTOR OF EARLY CHILDHOOD CARIES IN PRESCHOOL CHILDREN

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ABSTRACT

Early childhood caries (ECC) has gained popularity due to increased prevalence rate (54%) worldwide. The main cause is believed to be improper feeding habits even though it is multi-factorial.
Aim: To evaluate if frequent carbohydrate snacking in between meals and poor oral hygiene is equally contributing to aetiology of ECC in 3-6 year old children attending preschools in Sullia, Karnataka.
Methods: In this questionnaire study, two sets of questionnaire were distributed, one to rule out children with history of consumption of milk based food and other to collect data on consumption of carbohydrate food frequency & timing of feeding and their oral hygiene. Children without history of consumption of milk based food was taken as sample population (266). Clinical examination was carried out to categorize children into two groups; case (133 children with ECC) and control (133 children without ECC). Data were collected and statistically analyzed.
Result: It showed that, children who snacks in between meals showed risk of having ECC 8 times more than that of children who snacks with meals; The children who brushes once daily showed risk of having ECC 3.4 times more than that of children who brushes twice daily. The correlation between the consumption of carbohydrate food without the use of milk based food and their oral hygiene habit with ECC were found to be extremely statistically significant at P value < 0.0001 level.
Conclusion: Increased frequency of highly fermentable carbohydrate was equally contributing to ECC in pre-schoolers of 3-6 years in a group of India population.

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INTRODUCTION

Early childhood caries (ECC) is a fast spread, virulent form of dental caries that can destroy the primary dentition of children (De Grauwe *et al.,* 2004). It is the most prevalent (54%) disease of childhood in India, a serious socio-behavioral and dental problem that afflicts infants and toddlers (Masumo *et al.,* 2012). The appearance of a single caries lesion on any tooth surface in an infant or toddler must be considered a serious health problem (Jose and , 2003). Dental problems impact considerably on self esteem and quality of life and expensive to treat (Moynihan and Petersen, 2004). ECC is a multi factorial disease, mainly a child put to bed with a nursing bottle filled with cariogenic substrate was considered the main culprit. Moreover, demographic factors (e.g. age, oral hygiene, and socio-economic and cultural characteristics) also affect the development of ECC (Fung *et al.,* 2013). The data on frequent carbohydrate snacking excluding the fact of prolonged bottle or breast feeding and poor oral hygiene causing ECC is not available.

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Therefore, the aim of this study was to evaluate if frequent carbohydrate snacking in between meals and poor oral hygiene is equally contributing to the aetiology of Early childhood caries in 3-6 years old children.

The objectives were:

- To find the correlation of carbohydrate snacking in aetiology of Early childhood Caries in children without the history of consumption of milk based food.
- To find the correlation between oral hygiene and Early childhood caries.

MATERIALS AND METHODS

Children aged 3-6 years who attended preschools in Sullia were included in this cross-sectional study. Two sets of questionnaire was structured. First set of Questionnaire was distributed to rule out the children with history of consumption of milk based food. The children without the history of consumption of milk based food is taken as the main sample population. Clinical examination was carried out to categorize children into case group with early childhood caries and control groups without early childhood caries.

Inclusion criteria for the case group were:

- Presence of one or more decayed tooth (ECC) in children of 3 – 6 years age,
- Children without the history of milk based food,
- Children with the history of carbohydrate snacking,
- Preschool Children of age 3- 6 years.

Exclusion criteria for the case group were:

- Those children with positive history of consumption of milk based food like, prolonged breast feeding or bottle feeding,
- Children with age greater than 6 or lesser than 3,
- Children without the presence of any decay,
- Children with xerostomia,
- Medically compromised children or children with any medical conditions.

Inclusion criteria for the control group were:

- Children without the presence of any decay (without ECC),
- Children without the history of milk based food,
- Children with the history of carbohydrate snacking,
- Preschool Children of age 3- 6 years.

Exclusion criteria for the control group were:

- Children with prolonged consumption of milk based food like prolonged breast feeding or bottle feeding,
- Children with age greater than 6 or lesser than 3,
- Children with presence of one or more decay (ECC),
- Children with xerostomia,
- Medically compromised children or children with any medical conditions.

Second set of questionnaire was given to collect data on their consumption of carbohydrate food, frequency & timing of feeding and their oral hygiene. The data was collected from the samples.

ANALYSIS

The data were collected and Binary logistic regression analysis was performed to assess the multivariable assessment of factors contributing to early childhood caries, with a threshold for the selection of $p < 0.001$ level. The corresponding Odds ratio (OR) and their confidence intervals were determined.

Binary logistic regression analysis was performed and Odds ratio was calculated using the formula; Odds ratio = ad/ bc.

RESULTS

The data were collected and analysed using SPSS software, to assess the multivariable assessment of factors contributing to early childhood caries, with a threshold for the selection of $p < 0.001$ level. Out of 266 children considered for the study, 133 were with Early childhood caries and 133 were without Early childhood caries. The data on contributing factors other than prolonged breast or bottle feeding were collected, such as carbohydrate snacking; with meals and in-between meals, frequency of snacking; one to two times and more than two times, oral hygiene; number of brushing, whether once or twice, and whether they clean their oral cavity after consuming carbohydrate snacks or not (Prakash *et al.,* 2012). The children who snacks in-between meals and who snacked more times a day had an increased frequency of getting ECC & Children with better oral hygiene habits with 2 times brushing had less frequency of getting ECC.

Binary logistic regression analysis was performed and Odds ratio was calculated using the formula;

Odds ratio = ad/ bc.

Table 1. Association of snacking time and ECC

Sr.No	Snacks	ECC	No ECC	Total
1	In between meals	88	26	114
2	With meals	45	107	152
3	Total	133	133	266

Odds ratio = 8.047

The children who snacks in between meals showed risk of having ECC 8 times more than that of children who snacks with meals.

Table 2. Association of frequency of snacking and ECC

Sr.No	Snacks frequency	ECC	No ECC	Total
1	>2 times	54	23	77
2	1-2 times	79	110	189
3	Total	133	133	266

Odds ratio = 3.26

The children who snacks >2 times a day showed risk of having ECC 3.26 times than that of children who snacks 1 or 2 times a day.

Table 3. Association of number of times of brushing and ECC

Sr.No	No. of brushing	ECC	No ECC	Total
1	One time	86	46	132
2	Two times	47	87	134
3	Total	133	133	266

Odds ratio = 3.460

The children who brushes once a day showed risk of having ECC 3.4 times more than that of children who brushes twice daily.

Table 4. Association of oral hygiene and ECC

Sr.No	Oral hygiene	ECC	No ECC	TOTAL
1	Cleans the mouth after consumption of sticky food	33	104	137
2	Does not clean	100	29	129
3	Total	133	133	266

Odds ratio = 0.092

The children who cleans after consumption of sticky food showed risk of having ECC 0.092 times that of children who does not clean.

The correlation between the consumption of carbohydrate food without the use of milk based food and their oral hygiene habit with Early childhood caries were found to be extremely statistically significant at P value < 0.0001 level (2-tailed).

DISCUSSION

Dental caries is a highly prevalent chronic disease and its consequences cause a lot of pain and suffering (Sheiham, 2001). Millions of people throughout the world have lost their teeth due to caries. Dental problems impact considerably on self esteem and quality of life and expensive to treat (Celik and Uysal, 2012). Sugars are the most important dietary etiological cause of dental caries. Dental caries has a multifactorial etiology in which there is interplay of three principal factors: the host (teethandsaliva), the microflora (plaque), and the substrate (diet), and a fourth factor: time. The role of sugar (and other fermentable carbohydrates such as highly refined flour) as a risk factor in the initiation and progression of dental caries is overwhelming (Gupta *et al.,* 2013). Dental caries is a transmissible infectious disease and understanding the acquisition of cariogenic microbes improves preventive strategies. Microbial risk markers for ECC include Mutan Streptococci and Lactobacillus species. Children with ECC generally have a high frequency of sugar consumption, not only from fluids given in the nursing bottle, but also from sweetened solid foods. This dietary characteristic cannot be ignored as being one of the most significant caries lesion risk factors in ECC. Sugars are most important cause of dental caries. Frequent consumption of carbohydrate containing snacks between meals is known to increase the amount of dental caries. Snacking several times and allowing snacks to stay on teeth cannot be neglected as an important cause of dental caries. The possibility that there is some relation between the physical nature of food and the degree of dental-caries experience was noted (Wulaerhan *et al.,* 2014). If left untreated, ECC can progress rapidly to devastate the primary dentition. An aggressive subtype, known as Severe Early Childhood Caries (S-ECC), negatively affects children's physical and mental health and increases the risk of subsequent caries in the permanent dentition (Prakash *et al.,* 2012). The early identification of poor oral hygiene and improper feeding habits should be considered in preventive health promotion strategies.Risk-based caries prevention and management are important concepts in the prevention of ECC (Ng and Chase, 2013). The management aspect for treating a child with ECC includes these primary stage of treatments:

- Reducing the parent's/sibling's MS levels to decrease transmission of cariogenic bacteria.
- Minimizing saliva-sharing activities (eg, sharing utensils) to decrease the transmission of cariogenic bacteria.
- Implementing oral hygiene measures no later than the time of eruption of the rest primary tooth. Toothbrushing should be performed for children by a parent twice daily, using a soft toothbrush of age-appropriate size. In all children under the age of three, a 'smear' or 'rice-size' amount of fluoridated toothpaste should be used. In all children ages three to six, a 'pea-size' amount of fluoridated toothpaste should be used.
- Providing professionally-applied fluoride varnish treatments for children at risk for ECC.
- Establishing a dental home within six months of eruption of the rest tooth and no later than 12 months of age to conduct a caries risk assessment and provide parental education including anticipatory guidance for prevention of oral diseases.
- Avoiding high frequency consumption of liquids and/or solid foods containing sugar. In particular:

1. Sugar-containing beverages (eg, juices, soft drinks, sweetened tea, milk with sugar added) in a baby bottle or no-spill training cup should be avoided.
2. Infants should not be put to sleep with a bottle filled with milk or liquids containing sugars.
3. Ad libitum breast-feeding should be avoided after the first primary tooth begins to erupt and other dietary carbohydrates are introduced.
4. Parents should be encouraged to have infants drink from a cup as they approach their first birthday. Infants should be weaned from the bottle between 12 to 18 months of age (American Academy of Pediatric Dentistry, American Academy of Pediatrics, 2005).

Parents play an essential role in developing a child's dietary behaviors and infancy is an important time to start healthy dietary habits. Hence, by thorough knowledge and motivation of the parents can improve and prevent the occurrence or intercept at an early stage of ECC, to provide complete rehabilitation to children as every child has the fundamental right to his total oral health and every pedodontist has an obligation to fulfill this faith.

Conclusion

This study identified that rather than milk based foods, the increased frequency of highly fermentable carbohydrate is equally contributing to ECC in pre-schoolers of 3-6 years in a group of India population. Hence, equal awareness should be given to the parents as well as teachers about the risk factors to prevent further incidence & progression of ECC in children mainly by choosing highly rich fibrous diet.

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REFERENCES

American Academy of Pediatric Dentistry, American Academy of Pediatrics, American Academy of Pediatric Dentistry Council on Clinical Affairs. Policy on early childhood caries (ECC): classifications, consequences, and preventive strategies. *Pediatric dentistry,* 2005;27(7 Suppl):31.

Celik, F. and Uysal, I. 2012. Nutrition and the Prevention of Dental Diseases. *International Journal of Basic and Clinical Studies,* 1(1):43-53.

De Grauwe, A., Aps, J.K., Martens, L.C. 2004. Early Childhood Caries (ECC): what's in a name?. *European Journal of Paediatric Dentistry,* Jun;5:62-70.

Fung HT, Wong MC, Lo EC, Chu CH. Early childhood caries: a literature review. Oral Hygiene & Health. 2013.

Gupta, P., Gupta, N., Pawar, A.P., Birajdar, S.S., Natt, A.S., Singh, H.P. 2013. Role of sugar and sugar substitutes in dental caries: A review. ISRN dentistry, Dec 29;2013.

Jose, B., King, N.M. 2003. Early childhood caries lesions in preschool children in Kerala, India. Pediatric dentistry. Nov 1; 25(6).

Masumo, R., Bardsen, A., Mashoto, K., Astrom, A.N. 2012. Prevalence and socio-behavioral influence of early childhood caries, ECC, and feeding habits among 6–36

months old children in Uganda and Tanzania. *BMC Oral Health,* Jul 26;12(1):24.

Moynihan, P., Petersen, P.E. 2004. Diet, nutrition and the prevention of dental diseases. Public health nutrition, Feb;7(1a):201-26.

Ng, M.W., Chase, I. 2013. Early childhood caries: risk-based disease prevention and management. *Dental Clinics of North America,* Jan 31;57(1):1-6.

Park, S, Lin, M, Onufrak, S, Li, R. 2015. Association of sugar-sweetened beverage intake during infancy with dental caries in 6-year-olds. *Clinical nutrition research,* Jan 1;4(1):9-17.

Prakash, P., Subramaniam, P., Durgesh, B.H., Konde, S. 2012. Prevalence of early childhood caries and associated risk factors in preschool children of urban Bangalore, India: A cross-sectional study. *European Journal of dentistry,* Apr;6(2):141.

Sheiham, A. 2001. Dietary effects on dental diseases. Public health nutrition, Apr;4(2b):569-91.

Wulaerhan, J., Abudureyimu, A., Bao, X.L., Zhao, J. 2004. Risk determinants associated with early childhood caries in Uygur children: a preschool-based cross-sectional study. BMC oral health, Nov 18;14(1):136.

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