

## FREQUENCY OF ETIOLOGIC FACTORS IN EARLY CHILDHOOD CARIES

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### ABSTRACT

**Objective:** The aim of this study was to determine the frequency of etiologic factors in early childhood caries in patients reporting to Paediatric Dentistry Department of Khyber College of Dentistry, Peshawar.

**Material and Methods:** One hundred and ninety children having primary and mixed dentition, both genders, Pakistani nationals were included in the study. Mentally and physically handicapped children, and whose parents were uncooperative were excluded from the study. Child's age, gender, feeding habits, libitum feeding, Sugar consumption, mother's education, mother's caries rate, mother's occupation, caries rate in child's siblings, saliva sharing practices and brushing habits were recorded. The data were analyzed by SPSS version 20.0.

**Results:** The mean age was  $3.84 \pm 1.08$  years. Most of the children's father were Govt. servant (23.2 %) followed by businessman (22.1%), labourer (22.1%) and shopkeepers (13.2%). It was found that ninety five (50%) patients with early childhood caries were breast feeders, 32% were bottle feeders and 17.4 % were fed by both breast and bottle. One hundred and sixty six (87.4%) children used added sugar during bottle feeding. Nocturnal feeding and Libitum feeding was found in 87.4% and 62.1% respectively. One hundred and sixty four (86.3%) children consumed sugar as a frequent snaking while 13.7% as a infrequent snaking. About 40% mothers were uneducated and most of the children were not brushing their teeth.

**Conclusions:** The bottle feeding, added sugar consumption, low income of parents, uneducated mothers, high caries rate in siblings and mothers, lacking of brushing were the associated factors in children with early childhood caries.

**Key words:** Early Childhood caries, Dental decay, Bottle feeding, Nocturnal feeding.

### INTRODUCTION

American academy of Pediatric dentistry (AAPD) defines early childhood caries (ECC) as the presence of one or more decayed (noncavitated or cavitated), missing (as a results of caries), or filled tooth surfaces in any primary tooth in a child 71 month of age or younger<sup>1</sup>. Dental caries in toddlers and infants has a distinctive pattern. Different names and terminology have been used to refer to the presence of dental caries among very young children. The definitions first used to describe ECC were related to etiology, with the focus on inappropriate nursing practices. The following terms are used interchangeably; early childhood tooth decay, early childhood caries, baby bottle-fed tooth decay, early childhood dental decay, comforter caries,

nursing caries, maxillary anterior caries, rampant caries, and many more<sup>2</sup>. Some of these terms indicate the causes of dental caries in pre-school children. Baby bottle-fed tooth decay refers to decay in an infant's teeth, associated with what the baby drinks. However, some authors use the term "nursing caries" because it designates inappropriate bottle use and nursing practices as the causal factors<sup>3</sup>. However, the term "early childhood caries" is becoming increasingly popular with dentists and dental researchers alike<sup>4</sup>.

Dental caries is the most common disease of childhood, affecting 41% of children in the United States<sup>5</sup>. In Oral Health in America: A Report of the Surgeon General (DHHS, 2001), the Surgeon General found that oral diseases are progressive and cumulative, and they become more complex over time. They can affect the ability to eat, the food to choose, how they look, and the way they communicate. If the damage is severe enough, the toddler can lose front teeth, resulting in developmental delays in speech, delays in

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physical growth, and psychological trauma<sup>6</sup>. A common consequence of untreated dental caries is pain; however, in the long run, oral health is believed to be a reflection of general health and wellbeing, and possibly related to many chronic diseases, as well as loss of productivity at school and home<sup>7</sup>.

The prevalence of early childhood caries (ECC) is especially high in developing countries<sup>8</sup>. Among the possible causes of ECC that have been identified are poor oral hygiene (i.e. visible dental plaque), inadequate tooth brushing, dietary habits (i.e. consumption of sugary snacks and frequency of between-meal snacks), and the presence of specific pathogens<sup>9</sup>. The risk factors appear to be different in children from different backgrounds<sup>10</sup>. Among these factors, however, mutans streptococci are a common factor that is strongly associated with carious lesions<sup>11</sup>. Saliva was sampled to measure cariogenic bacteria in most studies, but there are only a few studies that sampled both saliva and plaque simultaneously<sup>12</sup>. Prakasha Shrutha<sup>13</sup> reported in study on Indian population that caries prevalence was high and statistically significant ( $P < 0.05$ ) among those who were breast fed for longer duration, during nighttime, those falling asleep with bottle, and those fed with additional sugar in milk.

It is of paramount importance to know the etiology of ECC as it is one of the important causes of early loss of teeth which in turn can create orthodontic, speech, esthetic and masticatory problems. Therefore, the objective of this study was to determine the frequency of etiologic factors in children having early childhood caries so that measures should be taken for awareness of public in this respect.

## METHODS AND MATERIALS

This cross-sectional descriptive study was conducted in the Khyber College of Dentistry, Peshawar. The purpose, procedures, risks and benefits of the study were explained to the parents. An informed consent and their willingness and participation in the study were ensured. They were assured of maintaining confidentiality of their personal and other data collected from their records.

The children having primary and mixed dentition, both genders, Pakistani nationals were included in the study. Mentally and physically handicapped children, and whose parent was uncooperative were excluded from

the study. The sample size was calculated to be 190 based on WHO calculator at 95% confidence interval, 7% margins of error and 41% prevalence of ECC.

Child's age, gender, feeding habit (breast & bottle), nocturnal feeding, libitum feeding, sugar consumption, mother's education, mother's caries rate, mother's occupation, caries rate in child's siblings, saliva sharing practices, and brushing habits were recorded in Performa. Caries rate were considered high if more than three teeth in a child were affected.

The data were analysed by SPSS version 20.0. Percentages and frequencies were calculated for categorical variables i.e. gender, feeding habits, nocturnal feeding, libitum feeding, sugar consumption, mother's education, mother's caries rate, mother's occupation, caries rate in child's siblings, saliva sharing practices, and brushing habits. Mean and standard deviation were calculated for age.

## RESULTS

This study was conducted on a total of 190 children with early childhood caries (ECC) in which 118 (62.1%) were males and 72 (37.9%) were females. The age ranged from 2 to 6 years with a mean age of  $3.84 \pm 1.08$  years.

The common age in this sample was 4 years (35.8%) followed by 5 years (29.5%). The details are given in table 1. Most of the fathers of the children were Govt. servant (23.2%), followed by businessman (22.1%), laborer (22.1%) and shopkeepers (13.2%). The details are given in Fig 1. Most of the mothers were housewives (94.74%) while remaining 5.26% were working women.

Ninety five (50%) patients with ECC were breast feeders, 32% were bottle feeders and 17.4% were fed by both breast and bottle. One hundred and sixty six (87.4%) parents reported that they added sugar during bottle feeding to their children. Nocturnal feeding was found in 87.4% children with ECC. Libitum feeding was found in 62.1% children with ECC. One hundred and sixty four (86.3%) children consumed sugar as a frequent snacking while 13.7% as an infrequent snacking. The details are given in table 2.

More than half (60%) of the mothers were educated i.e.

having more than metric education. About half of the mothers (55.8%) had medium caries rate i.e. upto three carious teeth per patient and 36.3% have high caries rate i.e. more 3 carious teeth per patients. Most of the siblings of children had high caries rate (61.6%). In whole sample 84.7% children share saliva through spoon or bottle etc. Most of the children (93.7%) were not brushing their teeth. The details are given in the table 3.

Table-1: Age distribution of the children

Age (years)	n	%	Cumulative %
2.00	30	15.8	15.8
2.50	4	2.1	17.9
3.00	28	14.7	32.6
4.00	68	35.8	68.4
5.00	56	29.5	97.9
6.00	4	2.1	100.0
<b>Total</b>	<b>190</b>	<b>100.0</b>	

Table-2: Frequency of different feeding habits and sugar consumption in children with ECC

Feeding habit			
	n	%	Cumulative %
breast feeding	95	50.0	50.0
bottle feeding	62	32.6	82.6
Both breast and bottle feeding	33	17.4	100.0
<b>Total</b>	<b>190</b>	<b>100.0</b>	
bottle feeding with added sugar			
Yes	166	87.4	87.4
No	24	12.6	100.0
<b>Total</b>	<b>190</b>	<b>100.0</b>	
Nocturnal feeding			
Yes	167	87.9	87.9
No	23	12.1	100.0
<b>Total</b>	<b>190</b>	<b>100.0</b>	
Libitum feeding			
Yes	118	62.1	62.1
No	72	37.9	100.0
<b>Total</b>	<b>190</b>	<b>100.0</b>	
Sugar Consumption			
Frequent snaking	164	86.3	86.3
Infrequent snaking	26	13.7	100.0
<b>Total</b>	<b>190</b>	<b>100.0</b>	

DISCUSSION

Early childhood caries (ECC), also known as baby bottle caries, baby bottle tooth decay, and bottle rot, is a disease characterized by severe decay in the

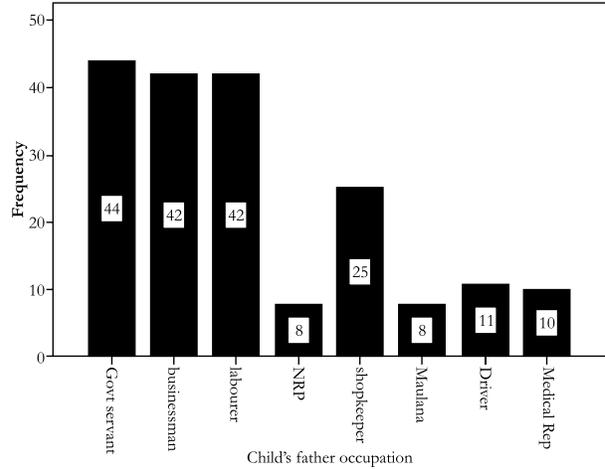


Fig-1: Frequency of child's father occupation

Table-3: Frequency of mother education, mother's caries rate, caries rate of sibling, saliva sharing practice and brushing habits of children with ECC

Mother education			
	n	%	Cumulative %
Educated	114	60.0	60.0
Uneducated	76	40.0	100.0
<b>Total</b>	<b>190</b>	<b>100.0</b>	
Mother's caries rate			
High	69	36.3	36.3
Medium	106	55.8	92.1
Low	15	7.9	100.0
<b>Total</b>	<b>190</b>	<b>100.0</b>	
Caries rate of Sibling			
High	117	61.6	61.6
Low	73	38.4	100.0
<b>Total</b>	<b>190</b>	<b>100.0</b>	
Saliva sharing practice			
Yes	161	84.7	84.7
No	29	15.3	100.0
<b>Total</b>	<b>190</b>	<b>100.0</b>	
Brushing Habits			
No brushing	178	93.7	93.7
Once a day	8	4.2	97.9
Twice a day	4	2.1	100.0
<b>Total</b>	<b>190</b>	<b>100.0</b>	

teeth of infants or young children. Early childhood caries is a very common bacterial infection. It occurs in all areas of the world. ECC occurs more often in children from the lower end of the socioeconomic scale. A large body of scientific evidence indicates that ECC is an infectious and transmissible disease, with *Streptococcus mutans* the primary microbiological agent in the disease<sup>14</sup>.

The oral health of preschoolers is an overlooked aspect of childhood health and well-being, especially in cases of ECC. These children constitute a population vulnerable to caries because of their dependence and inability to communicate with their parents<sup>15</sup>.

In this study we selected the age range from 2 to 6 years. After 2 years primary dentition is completed. However, determining the prevalence of caries in preschool children is a difficult process as the children of this age group are not easily accessible, uncooperative, a detailed examination of the oral cavity cannot be easily accomplished and no separate criteria has been developed for evaluating the extent and degree of caries in children below 3 years because of varied number of erupted teeth<sup>16</sup>.

In this study most of the parents had low income although most of them were government servant but they had fewer salaries. This indicates that government servants are more aware and bring their children for dental treatment. Social class may affect caries risk in many ways. Low income affects the degree of education, health values, life styles and access to health care information, thereby increasing susceptibility to caries. A statistically significant correlation was found between caries prevalence and low socio-economic status, measured in terms of the income in previous studies<sup>17,18</sup>.

Half of the patients were bottle feeder and use added sugar in the current study. Nocturnal feeding was found in 87.4% children in this study. The improper feeding patterns like bottle feeding beyond one year, prolonged or on-demand breast feeding and children put to bed with nursing bottle are responsible for an increase in the exposure of primary teeth to fermentable carbohydrates. This increase is likely to promote both an early colonization by oral *Mutans streptococci* and an increase in the number of these microorganisms in the dental plaque and saliva, which increases the risk of developing caries<sup>19</sup>.

In this study forty percent of the mothers were uneducated. As mothers are the primary caregivers of a child, low maternal education is related to higher caries prevalence in their children<sup>4</sup>. Previous studies show a strong association between mother's education and presence of caries in their children. This may be attributed to the lack of information and education about the oral health care for children in uneducated mothers<sup>17,20</sup>. However, one study has shown a lack of any association between ECC and education level of the mother<sup>21</sup>.

In the present study most of the mother had medium caries rate and siblings had high caries rate, this shows the lack of awareness in our population about preventive dentistry. So caries rate in mother and sibling have an association with ECC.

Most of the children did not brush their teeth in the current study. Previous studies and experience have shown that preschool children do not understand or have the manual dexterity to maintain good oral hygiene<sup>22,23</sup>. Hence, parental assistance and guidance is essential to reduce the risk of developing caries. Tooth brushing by parents or caregivers has the potential of removing dental plaque more effectively, optimally saturating the oral environment with fluoride, thereby decreasing the risk of caries among their children<sup>24</sup>.

## CONCLUSIONS

The following can be concluded from this study:-

1. Majority of patients were males in their age groups 4-5 years.
2. Most of the patients were breast feeders.
3. More than 60% of mothers were educated.
4. The bottle feeding, added sugar consumption, low income of parents, uneducated mothers, high caries rate in siblings and mothers, lacking of brushing were the associated factors in children with ECC.

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