

## Early Childhood Caries: Behavior and practices of the parents of 3-5 years old preschool children in Rohtak City, Haryana

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### Abstract:

**Background:** Early childhood caries is a significant public health problem. The best way of motivating preschoolers towards good oral health is through their parents as their preventive practices tends to be controlled by their parent's actions and attitudes. This study assesses the knowledge and practices regarding early childhood caries among parents of 3 to 5 years old preschool children and to correlate the relationship with dental caries experience among preschool children.

**Methods:** A random sample of 371 children aged 3 to 5 years were selected from 9 preschools and every even roll numbered child was selected by systematic random sampling. Modified WHO oral health assessment form and pilot tested questionnaire was used to assess the dentition status and aspects pertaining to oral hygiene, dental caries, sugar consumption, visit to dentist, importance of primary teeth from parents. Data was analyzed using SPSS 16.

**Results:** The prevalence of dental caries was 35.5% and it decreases with improved oral health practices. Nearly 44% parents knew about the causes of dental caries, only 8.8% knew that brushing of child's teeth should start immediately after eruption, 14.7% used fluoridated toothpastes, 42.1% strongly disagreed with the fact that poor oral hygiene causes dental caries and 45.1% disagreed with caring for the milk teeth. Mann-Whitney test reported that knowledge about dental caries was significantly associated with education and socioeconomic status ( $p < 0.05$ ).

**Conclusions:** Parents had poor oral health related knowledge, had negative attitude towards children's oral health and performed incorrect practices which were related to onset of early childhood caries among 3-5 years old preschool children in Rohtak city.

**Keywords:** ECC, dental caries, oral hygiene

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### I. Introduction

Childhood forms the period when children are in their influential years and growth and development is at its peak. This is a period of increased risk for an individual, as typical synergy of undernutrition and increased susceptibility to infections can lead to increased morbidity and mortality(1). While not all diseases affecting a child in crucial years can be prevented, but those amenable to prevention should be addressed. One of those disorders is early childhood caries (ECC) a burning public health problem.

ECC has been defined as "the presence of one or more decayed, missing due to caries, or filled tooth surfaces in any primary teeth in children under 6 years of age(2). Infants and toddlers are primarily depending on their parents and acquired childhood routines and habits which is essential to establish appropriate childhood norms for a healthy adult life. Parents tend to teach their children about healthy hygiene and dietary practices(3,4). Infants and toddlers are being affected by ECC worldwide. Globally, its prevalence has been reported to be ranged from 6-90%, with most developed countries in the lower end, and most developing countries, in the middle to higher end of this range(5). Prevalence of ECC among children from 3 to 6 years in India ranged from 19.2% to 57%.(2,6)

Parent's beliefs and self-efficacy helps to determine the extent to which they engage in oral health promoting behaviors. Their lower self-efficacy, poor dental knowledge and parenting stress are associated with increased rates of caries in preschool children(7).Vice versa, the presence of good knowledge and attitude towards oral health in them can promote appropriate oral hygiene skills in their children, and positively influence child's dental health(8).For the development of an effective and tailored health education or promotion strategy, there must be a robust understanding of the utmost need of the population in a defined geographical context. Therefore, this assessment can be the initial step in identifying the area of weakness and to alter their inappropriate behavior.

With this background,we are proposing to conduct this study with the aim of developing better understanding about the knowledge and practices of the parents of their children aged 3-5 yearstowards early childhood caries in Rohtak, Haryana.The objectives of this study is to assess the prevalence of Early childhood caries (ECC) among 3-5 years old preschool children in Rohtak, Haryana and tocorrelate the association of Parental knowledge, attitude, and practices with early childhood caries (ECC).

## II. Methods

**Study design:** A cross-sectional study was conducted in 9 pre-schoolsof Rohtak city (Haryana) to assess knowledge, attitude, and practices of parents of 3-5 years old preschool children regarding early childhood caries.

**Study population and Sampling technique:** Study population was parents of 3 to 5 years old children selected from randomly selected private pre-schools of the Rohtak city. The city was divided into nine administrative areas and one pre-school was randomly selected from each area using lottery method. Parents of every even roll number child was selected for the study and consent form was sent along with information sheet. Questionnaire along with instructions were sent to parents of selected children and non-responders were contacted again within the period of 30 days.

**Sample size estimation:** Anticipated prevalence of knowledge, attitude, and practices among parents of 3-5 years old preschool children regarding Early Childhood Caries is 28% (as derived from pilot study), with absolute precision of 5%, keeping z at 1.96, design effect of 1.2. The sample size thus obtained was 371 and nearly 42 parents were interviewed from each school.

**Data Collection:** Data collection was done through structured questionnaire and clinical examination. Socioeconomic status of the parents was calculated using revised Kuppuswamy's Socioeconomic status scale (2014)(9).

**Survey instrument/questionnaire:** A close ended structured questionnaire was developed by experts from Department of Pediatric Dentistry and Public Health Dentistry. The questions covered the aspects pertaining to oral hygiene, dental caries, sugar consumption, visit to dentist, importance of primary teeth. It was first developed in English language and then it was translated to Hindi which was then back translated to English. The original and translated versions were compared and then the Hindi version was finalized. The questionnaire consists of 10 questions pertaining to practices, 10 questions pertaining to knowledge, 9 questions pertaining to attitude and 2 questions related to oral health of the parents.

**Pilot testing:** Prior to being finalized, the questionnaire was pilot tested on a group of 30 parents of 3-5 years old preschool children to ensure clarity, reliability, and validity. Certain questions which were found to be irrelevant were deleted and those questions which were incomprehensible were modified/ rephrased to suit the comprehension level of survey subjects. The questionnaire's reliability was assessed by Cronbach alpha and test retest using the intra-class correlation coefficient (ICC) was done by administering the questionnaire to same subjects in a week interval. The test retest agreement and Cronbach alpha co-efficient was 0.81. The demographic details were recorded, multiple choice question having four choices were used to assess knowledge and practices whereas attitude was scored on the five-point Likert scale.

**Clinical examination:** The training and calibration of investigator was done prior to the pilot study in the Department of Public health Dentistry, Post graduate Institute of Dental Sciences Rohtak. The intra-examiner reliability was 90%. During the survey, the children were examined in the school rooms with the help of natural light. The status of each tooth was checked using plane dental mirror and an explorer. A modified WHO Oral Health Assessment Form for Children, 2013 was used to assess the dentition status and Decayed, Missing and Filled Teeth (dmft) score was calculated. After examination health education and brochures for maintaining good oral health were given to all the participants.

### Eligibility criteria

#### Inclusion criteria:

1. Parents of children in age group of 3-5 years.
2. Children who were present on the day of survey.
3. Parents who had given informed consent.

**Exclusion criteria:**

1. Child with systemic diseases and under medication.
2. Child with congenital and developmental anomalies.

**Data analysis**

Data was analyzed using SPSS version 16. The results are presented in percentages and means with standard deviation (SD). Normality of the data was checked using Shapiro-wilk test and the data was found to be nonparametric. Mann-WhitneyU test, Kruskal Wallis test and Chi square test were used to analyze continuous and categorical variables.

**Ethical considerations**

Ethical clearance was sought from the Institution Ethical committee of “Post Graduate Institute of Dental sciences, Rohtak vide letter no. PGIDS/IEC/2015/55. Permission from the concerned authorities from selected schools was taken prior to the study.

**III. Result**

Sociodemographic details of preschool children and their parents are summarized in table 1.

**Table 1:** Socio demographic status of the participants

	Male, n (%)	Female, n (%)	Total, n (%)
<b>Age (in years)</b>			
3	54 (26)	45 (26.9)	99 (26.4)
4	96 (46.2)	58 (34.7)	154 (41.1)
5	58 (27.9)	64 (38.3)	122 (32.5)
<b>Birth order</b>			
1 <sup>st</sup> child	96 (46.2)	99 (59.3)	195
2 <sup>nd</sup> child	112 (53.8)	68 (40.7)	180
<b>Occupation of parents</b>			
Professional/semi professional	24 (11.5)	14 (8.4)	38
Clerical Shop owner	82 (39.4)	63 (37.7)	145
Skilled worker/ semiskilled	94 (45.2)	87 (52.1)	181
Unskilled Worker	6 (2.9)	3 (1.8)	9
Unemployed	2 (1)	0 (0)	2
<b>Education of parents</b>			
Up to High school	22 (10.5)	12 (7.2)	34 (9)
Intermediate	28 (13.5%)	17 (10.2%)	45 (12)
Graduate or Postgraduate	143 (68.8%)	124 (74.3%)	267 (71.2)
Professionals or Honors	15 (7.2%)	14 (8.4%)	29 (7.7)
<b>Socio economic status</b>			
Upper	14 (6.7%)	11 (6.6%)	25 (6.7)
Upper Middle	153 (73.6%)	131 (78.4%)	284 (75.7)
Lower Middle	34 (16.3%)	21 (12.6%)	55 (14.7)
Upper Lower	7 (3.4%)	4 (2.4%)	11 (2.9)

**Prevalence of early childhood caries**

Overall prevalence of early childhood caries was 35.5%. High knowledge scores in the parents were inversely associated with caries prevalence in their child. However, higher caries prevalence was found in children of parents with high attitude scores. Similarly, good oral health practices in the parents were associated with higher caries prevalence in the child.

**Oral health related knowledge of the parents**

Table 2 summarizes the knowledge of parents on different domains. Almost half (44%) of the parents knew that dental caries is caused by bacteria. Majority (91.2%) of the parents were aware that sweet and sticky food increases the risk of tooth decay and there was significant difference among parents of female and male child with p value<0.05. Nearly 30% were not aware about the best time to have sweets to prevent dental caries. Only 8.8% of the parents knew that brushing should be started as soon as the eruption of first primary tooth. Nearly one third (37.3%) of the parents don't know about plaque whereas more than half (54.9%) of the parents knew that it is a layer of germs on the tooth surface. Nearly 60% of the parents knew that pea sized amount of toothpaste should be used to brush child's teeth. Only 14.7% of the parents knew that fluoridated toothpaste should be used to prevent tooth decay. Around 75% of the parents thought that child should visit the dentist only if any dental problem arises.

**Factors associated with good knowledge**

Parents in upper socioeconomic status were having high mean knowledge score as compared to parents in middle and lower socioeconomic status (p value<0.05). Absence of dental caries in parents (according to their

self-reported status) was related to significant higher knowledge (p value<0.001).There is a significant difference regarding knowledge among parents with good oral health (self-reported status) and fair or bad oral health (p value < 0.001). The parents with good oral health (self-reported) had better knowledge.

**Table 2:** Oral health related knowledge of parents

Knowledge	Male child n (%)		Female child n (%)		Total, n (%)	
	Correct	Incorrect	Correct	Incorrect	Correct	Incorrect
Cause of dental caries	90 (43.3%)	118 (56.7%)	75 (44.9%)	92 (55.1%)	165 (44%)	210 (56%)
Food which increases tooth decay	184 (88.5%)	24 (11.5%)	158 (94.6%)	9 (5.4%)	342 (91.2%)	33 (8.8%)
Time of taking sugar to prevent dental caries	85 (40.9%)	123 (59.1%)	59 (35.3%)	108 (64.7%)	144 (38.4%)	231 (61.6%)
Putting baby to bed with a bottle	83 (39.9%)	125 (60.1%)	54 (32.3%)	113 (67.7%)	137 (36.5%)	238 (63.5%)
Ideal time to start brushing child's teeth	20 (9.7%)	187 (90.3%)	13 (7.8%)	154 (92.2%)	33 (8.8%)	341 (91.2%)
Information on Plaque	120 (57.7%)	88 (42.3%)	86 (51.5%)	81 (48.5%)	206 (54.9%)	169 (45.1%)
Amount of toothpaste required for brushing child's teeth	134 (64.4%)	74 (35.6%)	90 (53.9%)	77 (46.1%)	224 (59.7%)	151 (40.3%)
Type of toothpaste to prevent dental caries	27 (13%)	181 (87%)	28 (16.8%)	139 (83.2%)	55 (14.7%)	320 (85.3%)
Effect of swallowing of toothpaste	1 (0.5%)	207 (99.5%)	0	167 (100%)	1 (0.3%)	374 (99.7%)
Suitable time to make child's first visit to dentist	9 (4.3%)	199 (95.7%)	12 (7.2%)	155 (92.8%)	21 (5.6%)	354 (94.4%)

### Oral health related attitudes of the parents

Table 3 summarized the attitudes of parents on different variables. Only 22.7% of the individuals thought that pregnant mother's diet can affect child's teeth. Merely 11.5% of the parents agreed to the fact that poor oral hygiene can cause dental caries and there was significant difference regarding this attitude among parents of female child and parents of male child with p value <0.05).

### Factors affecting attitude of the parents

Education of the parents and mean knowledge score was found to be directly related to attitude of the parents i.e. parents with higher qualification and knowledge were having high attitude score as compared to parents with low qualification and knowledge with p value < 0.05.

**Table 3:** Oral health related Attitude of Parents

Variables	Male child n (%)		Female child n (%)		Total n (%)	
	Correct	Incorrect	Correct	Incorrect	Correct	Incorrect
Effect of pregnant mother's diet on child's teeth	53 (25.5%)	155 (74.5%)	32 (19.2%)	135 (80.8%)	85 (22.7%)	290 (77.3%)
Effect of poor oral hygiene on dental caries	17 (8.2%)	191 (91.8%)	26 (15.6%)	141 (84.4%)	43 (11.5%)	332 (88.5%)
Attitude towards brushing child's teeth daily	199 (95.7%)	9 (4.3%)	157 (94%)	10 (6%)	356 (94.9%)	19 (5.1%)
Attitude towards cleaning child's teeth on their own	110 (52.9%)	98 (47.1%)	88 (52.7%)	79 (47.3%)	198 (52.8%)	177 (47.2%)
Effect of poor oral hygiene of parents on child's teeth	93 (44.7%)	115 (55.3%)	80 (47.9%)	87(52.1%)	173 (46.1%)	202 (53.9%)
Attitude towards care for primary teeth	40 (19.2%)	168 (80.8%)	26 (15.6%)	141 (84.4%)	66 (17.6%)	309 (82.4%)
Effect of primary teeth on permanent teeth	171 (82.2%)	37 (17.8%)	136 (81.4%)	31 (18.6%)	307 (81.9%)	68 (18.1%)
Effect of primary teeth on child's health	7 (3.4%)	201 (96.6%)	4 (2.4%)	163 (97.6%)	11 (2.9%)	364 (97.1%)

**Oral health related practices of the child and their parents**

Table 4 summarized the children’s and their parent’s practices. Majority (91%) of the parents reported that their child used to consume sugar anytime during the day and only 7.5% of the parents reported that their child used to take sweets along with meals. There is a significant difference in the prevalence of correct practice of sugar consumption among parents of male child as compared to parents of female child. (p-value<0.05). More than half of the parents (54.1%) reported that their child brushes his/her teeth in the morning. Nearly 87% parents reported that they have changed their child’s toothbrush within past 6 months. Almost 3/4<sup>th</sup> of the parents had never visited a dentist, 21.1% visited the dentist when there was a dental problem and very few (4.3%) used to visit dentist regularly for dental checkups.

**Factors associated with good practice**

Children in the age group of 3 years had supervised teeth brushing as compared to 4 and 5 years (p value< 0.001). Parents with higher knowledge scores and education level were found to be using fluoridated toothpaste and replace child’s toothbrush in every 3 months (p < 0.001 and 0.02 respectively).

**Table 4:** Oral health related practices of children and parents

Practices	Male n(%)		Female n(%)		Total n (%)	
	Correct	Incorrect	Correct	Incorrect	Correct	Incorrect
Time of consuming sugar	24 (11.5%)	184 (88.5%)	9(5.4%)	158 (94.6%)	33 (8.8%)	342 (91.2%)
Time of brushing teeth	68 (32.7%)	140 (67.3%)	59 (35.3%)	108 (64.7%)	127 (33.9%)	248 (66.1%)
Supervision on child’s tooth brushing	41 (19.7%)	167 (80.3%)	38 (22.8%)	129 (77.2%)	79 (21.1%)	296 (78.9%)
Time of replacing children’s tooth brush	160 (76.9%)	48 (23.1%)	131 (78.4%)	36(21.6%)	291 (77.6%)	84 (22.4%)
Visit to dentist	10 (4.8%)	198 (95.2%)	6 (3.6%)	161 (96.4%)	16 (4.3%)	359 (95.7%)
Type of toothpaste used to brush child’s teeth	28 (13.5%)	180 (86.5%)	27 (16.2%)	140 (83.8%)	55 (14.7%)	320 (85.3%)

**IV. Discussion**

The prevalence of the early childhood caries in the present study was 35.5% which is higher but comparable with the findings of Gaidhane AM et al (10), lower than the findings of Kuriakose et al and Karunakaran R et al (6,11). Low prevalence might be because of protective effect of fluorides as Rohtak lies in fluoride belt. The best way of motivating preschoolers towards good oral health is through their parents as their preventive practices tend to be controlled by their parent’s actions and attitudes. A good understanding of parental knowledge, attitudes and practices regarding oral health is essential for the effectiveness of oral health promotion efforts aimed at improving the dental health of young children.

Previous evidence reported that the frequent consumption of sugar provides continuous substrate that influences the initiation and progression of caries(12).The present survey showed that knowledge is not necessarily translated into good practices as majority of the parents knew that sweet and sticky food causes dental caries and were aware about the fact that sweet foods should be taken along with meals to prevent dental caries. However, just 7.5% of the parents used to give sweets to their child along with meals, which suggests that changing health related behaviors takes more than just improving knowledge. The results are consistent with the study done by Mani SA et al (13)where 99% of the parents knew the types of food that can cause tooth decay, yet, 45% of parents gave sweetened liquid in the bottle. The results are in contrast with the results obtained by Baginska et al(14) where 82.8% of the surveyed mothers knew that decreased consumption of sweets had a positive impact on dental health, and 85% declared that they limited their children’s diet.

The parents of the present study had week knowledge regarding the appropriate time to start brushing child’s which is supported by the study conducted by Suresh et al (4), where most of the parents felt that they should brush their child’s teeth when all the primary teeth have erupted. In this study,only one-third of parents answered that their child used to brush the teeth twice daily.Our findings are lower than the results reported by Farid H et al (15)and Baginska J et al(14), where 50.2% and 46.4% of the parents reported that their children brushed their teeth twice daily. The reason for poor practice may be because of inadequate oral health education provided to preschool children and their parents.

In the present study, there is a discrepancy in between parent’s knowledge and belief as more than 50% of the parents knew that plaque is a layer of germs on the tooth surface but only 12.4% of the parents believed that poor oral hygiene can cause dental caries. This shows that theoretical knowledge has not been fully reflected in the way they cared for their child’s teeth.The use of fluorides for prevention and control of caries is documented to be both safe and effective(16)and have made a significant contribution to the overall reduction in

carries over the past decades(17).As compared to the results obtained by Nagarajappa et al(18)and Mani SA et al(13),consistent weak knowledge and practice (14.7%) regarding the role of fluoridated toothpaste in preventing ECC among parents in the current study was observed.

Most of the parents knew about the amount of toothpaste to be used contrary to the study conducted by Mani SA et al(13).This could be possible because most toothpastes tubes have printed instructions over them. However, toothpaste for children and adults are different and should be used accordingly and adult toothpaste have higher fluoride content Moreover similar to Mani SA et al, only 0.3% of the parents in current study knew the harm of swallowing a toothpaste; this inadvertently exposes children systemically to high fluoride levels.The higher the levels of maternal salivary Mutans streptococci, the greater the risk of infant being colonized(18).In the present survey, around one fourth of the parents reported dental caries experience and half of the parents considered their oral hygiene as good. The results are better than the results obtained by Sakai et al(19) where 100% of the parents reported dental caries experience and are comparable to the study conducted by Nagarajappa et al(18) and higher than the results obtained by Suresh et al(4).

Early interventions within six months of eruption of first primary tooth are needed by dentist to educate parents on oral hygiene, prevention of dental injuries and ECC (AAPD). The present survey showed negative attitude and practice of parents in respect to visit to dentist and reported that child should visit dentist only if any dental problem arises. The reasons for not visiting the dentist can be due to shortage of time and poor perception about importance of primary teeth. These results were supported by the Nagaveni et al (20)and Farid et al (15)and in contrast with the findings of Baginska et al (14)where 60% parents used to visit dentist regularly. The findings of the present study are in line with previous studies done by Smyth et aland Al-Omiri et al(12,21)which indicated that strong knowledge of oral health exhibits better oral care practice and more positive attitude towards oral health.

#### **V. Limitation**

There were few limitations in this study. First, there is a possibility of selection bias. Not all children in this age group attend preschools and their sociodemographic behavioral characteristics may be different. Second, illiterate parents or who were unable to understand the questionnaire were potentially missed. Third, there are chances of social desirability bias in the information obtained from the parents. The findings of this study will form part of a baseline for the oral health assessment for children below 5 years of age in Haryana.

#### **VI. Conclusion**

Prevalence of Early childhood caries in Rohtak, Haryana is 35.5% and had no relation to age and gender.Dental caries among 3- 5 years old was significantly related to healthy parental practices.Children of Parents with self-reported caries had significantly lower caries.Risk factors for ECC include lower education and socioeconomic status. Knowledge and attitude of the parents plays an important role in preventing dental caries among this population.

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