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Infant oral health: Knowledge, attitude and practices of parents in Udaipur, India

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ABSTRACT

Background: The aim of this study was to assess the infant oral health (IOH) related knowledge, attitudes and practices (KAP) of parents in Udaipur, India.

Materials and Methods: A cross-sectional descriptive study was conducted among 470 parents visiting the Department of Pediatrics, Rabindranath Tagore Medical College and Hospital. A 32-item questionnaire covering socio-demographic characteristics and questions pertaining to KAP regarding IOH care was used to collect the data. Descriptive statistics, Student's *t*-test, one-way analysis of variance, and Scheffe's test were used for the statistical analysis ($P \leq 0.05$).

Results: Majority of the parents had good knowledge regarding tooth eruption, but had a poor knowledge of cleaning (58.7%) and development of caries (48.5%). Parents in the age group of 25-30 years showed significantly higher mean knowledge (25.90 ± 3.93), attitude (15.71 ± 2.23), and practice (20.09 ± 2.50) scores. Female parents showed a significantly higher mean knowledge (21.45 ± 4.27) and attitude scores (14.97 ± 2.15) than the male parents.

Conclusion: Parent's knowledge on IOH care was inadequate. Health professionals, who are the first to come into contact with expectant and new mothers, need to disseminate appropriate and accurate information about oral health-care for infants.

Key Words: Attitude, knowledge, oral health, parents, practices

INTRODUCTION

Infant oral health (IOH) is the foundation upon, which preventive education and dental care must be built to enhance the opportunity for life-time freedom from preventable oral diseases.[1] Parents are the decision makers in matters of health-care for children; thus, they play an important role in achieving the best oral health outcomes for their young children.[2] It is therefore expected that preventive oral health behavior of parents for children would influence their children's behavior in adapting preventive oral health practices as they grow along.[3]

Early childhood caries (ECC) is an infectious and preventable disease that is transmitted vertically from mothers or other intimate caregivers to infants. Modification of the mother's oral hygiene, diet, and the use of topical fluorides can have a significant impact on the child's caries rate.[1]

Since parents/guardians are responsible for almost all health issues related to their children, their role in modeling their children toward practicing preventive oral health throughout life is crucial.[4] Thus, parents/guardians should be educated about oral health-care for their children from inception through the existing setup.[3]

Studies eliciting parental knowledge, attitudes, and preventive behaviors on oral health of children are scanty.[4-6] Considering, parent's important role in the

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well-being of young children, it is essential to explore their knowledge, attitude, and practices (KAP) as it affects the dental care that children receive at home and their access to professional dental services. Furthermore, their assumptions and beliefs may be an important consideration in attempts made to improve IOH. Thus, this study was undertaken to assess the IOH-related KAP of parents having children aged 6 months to 3 years in Udaipur city, Rajasthan, India.

MATERIALS AND METHODS

Study design and study setting

A cross-sectional descriptive study was conducted in the Department of Pediatrics, Rabindranath Tagore (RNT) Medical College and Hospital, Udaipur, during the month of August 2011 after obtaining the ethical approval from the Institutional Review Board of Pacific Dental College and Hospital (Reference No. PDC/134/2011-12 Dated 23.07.2011). Official permission was taken from the Head of the Department of Pediatrics.

This is the only Government Medical College present at Udaipur city, which comes under Udaipur Metropolitan Region and is governed by Municipal Corporation. Udaipur city is located in Rajasthan state of India. As per provisional reports of Census India, population of Udaipur in 2011 is 451,735; of which male and female are 234,681 and 217,054 respectively. Average literacy rate of Udaipur city is 90.66% of which male and female literacy was 95.56 and 85.39%.[7]

Inclusion criteria

Parents having children aged 6 months to 3 years; who were willing to participate and also signed the informed consent.

Exclusion criteria

Parents who could not read and write.

Pilot study

A pilot survey was conducted among 45 eligible parents to assess the reliability of the questionnaire, feasibility of conducting the survey and for sample size calculation. Based on the 50% prevalence, 95% confidence level and 10% precision of IOH knowledge (our main outcome) among Udaipur parents and the minimum sample size was estimated as 384.

Sample size = $Z^2 \times p \times q/d^2$
Z = Standard normal deviate (1.96)
p = Prevalence (0.50)
q = 1 − p = (0.50)
d = Allowable error (10).

Sampling and sample size

All the parents of children aged 6 months to 3 years, who visited the Department of Pediatrics, of RNT Medical College and Hospital, Udaipur, during 1st to 31st August 2011 were informed about the purpose of the survey and were invited to participate. Those who fulfilled the above mentioned eligibility criteria were included in the survey. Based on convenience sampling, a total sample size of 470 was obtained.

Methodology

A self-administered structured questionnaire written in English was translated in local language (Hindi) and was validated through pre-tested survey. Face validity indicates whether the instrument appears to be assessing the desired qualities. When face validity was assessed, it was observed that 95% of the participants found the questionnaire to be easy. Assessment of content validity reflects a judgment whether the instrument samples all the relevant or important domains. Mean content validity ratio was calculated as 0.87 based on the opinions expressed by a panel of total six academicians. Test of reliability comprised two components: Question-question reliability, which was assessed by the percentage of agreement (90%) and internal reliability for the responses to questions, which was assessed using the Cronbach's alpha (0.82).

The final questionnaire consisted of 32 questions under following sections:
Section I: Incorporated five questions to gather information related to parent's demographic characteristics including gender, age, employment, educational level, and monthly income.

Section II: Integrated 10 multiple choice questions to assess the IOH care knowledge among parents.

Section III: Comprised of nine questions, which aimed to assess the attitude of parents toward IOH care. The answers were scored on a three point Likert scale as "agree," "disagree" and "don't know."

Section IV: Is made of eight questions aimed to investigate the practices of parents regarding IOH care. The responses were recorded on a four point Likert scale as "always," "frequent" "sometimes," and "never."

Data were collected by a single investigator who distributed the questionnaires to the parents, gave

sufficient time to fill it and collected on the spot after they had completed.

Statistical analysis

Data were analyzed using the SPSS software version 11.5 (SPSS Inc., Chicago, IL, USA). Descriptive statistics was used to summarize the sample and responses of the questionnaire. Student's *t*-test and one-way analysis of variance was used to assess the relationship between the KAP score and the demographic characteristics. A significant relationship was assumed to exist between the groups if the *P* value was found to be lesser than 5% ($P \leq 0.05$).

Scoring criteria

Every item pertaining to the attitude questionnaire was coded from 1 to 3 (disagree to agree). Attitude items were re-coded to ensure that, for all items, a high score indicated a positive attitude toward IOH care, and a low score indicated a negative attitude. Regarding behavior and practice items, the right answer was coded as 1 and the wrong answer as 0. The individual scores were then summed up to yield a total score.

For the purpose of analysis, age of the participants was categorized as: 20-24 years, 25-29 year, and 30-34 years and >35 years. Education was classified as primary school, secondary school, high school certificate, and intermediate/post-high school certificate and graduate/post-graduate degree. Occupation of the participants was stratified as unemployed, unskilled worker, skilled worker, clerical/shop owner/farmer, and professional. Income of the individuals was recorded on the basis of the Prasad's classification of socio-economic status scale.[8] The income categories were grouped under high (upper high and high), middle (upper middle and lower middle) and poor (lower) socio-economic status groups.

RESULTS

The analysis of the demographic data showed that the majority of the participants were in the age group of 20-24 and 25-29 years (34% each), females (63.6%) and unemployed (49.8%). Almost half of the study population had high school education (47.4%) and the bulk of income group belonged to the middle socio-economic class (63.7%) [Table 1].

Most of the parents had good knowledge of child's tooth eruption stages. However, they had poor knowledge of cleaning, brushing of baby's teeth, caries development, and teething signs and symptoms. More than half of the parents (58.7%) believed that cleaning of baby's mouth after each feeding should begin only after the teeth erupt. Nearly, half of the parents (48.5%) believed that caries occurs after 2 years of age. Many of them wrongly attributed symptoms such as fever, diarrhea, sleep disturbance, and vomiting to teething.

Table 2 shows parent's attitude toward IOH care. Almost half of the parents disagreed to the statement that tooth decay is caused by bacteria transmitted by sharing feeding utensils while 56.2% and 45.1% thought that night time and frequent breast/bottle feeding did not cause tooth decay respectively. About 42% agreed to the fact that swallowing of toothpaste can be harmful to a child's health and 33.6% of the parents disagreed of visiting a dentist before the child is 2 years old.

As regard to oral health practices, 30% of the parents agreed to have bitten the food into small pieces before giving it to the children. Almost 40% of the parents acknowledged of giving sweet food to the child.

Table 1: Demographic profile of the study population

Demographic characteristics	*N*=470	%
Age (in years)		
20-24	160	34
25-29	160	34
30-34	129	27
>35	21	4.5
Sex		
Male	177	36.4
Females	293	63.6
Education		
Postgraduate or graduate	123	26.2
Intermediate or post high school diploma	96	20.4
High school certificate	223	47.4
Middle school certificate	16	3.4
Primary school certificate	12	2.5
Occupation		
Profession/semi profession	50	10.6
Clerical, shop owner, farmer	93	19.8
Skilled/semi-skilled worker	36	7.7
Unskilled	57	12.1
Unemployed	234	49.8
Income		
I	15	3.2
II	59	12.6
III	106	22.6
IV	193	41.1
V	97	22.6

Furthermore, 29.1% of the parents used full brush length toothpaste to brush their children's teeth [Table 3].

Parents in the age group of 25-29 years showed significantly higher mean knowledge (25.90 ± 3.93) (P = 0.042), attitude (15.71 ± 2.63) (P = 0.032), and practice (20.09 ± 3.15) (0.013) scores than the other age groups [Table 4].

Furthermore, mothers showed a statistically significant higher mean knowledge (21.45 ± 4.27) and attitude scores (14.97 ± 2.15) than the fathers (20.85 ± 2.99 and 14.36 ± 2.10 respectively). The mean practices score between fathers (19.13 ± 2.97) and mothers (18.80 ± 2.69) was not statistically significant [Table 5].

Parents of higher socio-economic status showed statistically significant higher mean knowledge (21.52 ± 4.16), attitude (15.01 ± 2.34), and practices scores (19.30 ± 2.90) than those of middle socio-economic status (21.03 ± 3.37, 14.44 ± 2.29, 19.24 ± 2.84 respectively) and lower socio-economic status groups (19.38 ± 2.48, 14.17 ± 1.61, 18.68 ± 1.94 respectively) [Table 6].

DISCUSSION

Oral health of the children is associated with oral health knowledge of their parents/guardians as oral health related habits (such as those related to oral hygiene and diet) are established during infancy and maintained throughout early childhood.[6]

Parents function as role models for their children. This study provides data about the KAP about relative risk and protective factors that are likely to have influence on oral health of infants and also the influence of socio-demographic factors on parent's oral health KAP scores.

Table 2: Percentage distribution of questions regarding attitude to infant oral health-care

Questions	Agree	Disagree	Don't know
Tooth decay is caused by bacteria that are transmitted by sharing feeding utensils	30.9	48.5	20.6
A balanced diet is essential for the healthy growth of the baby's diet	69.8	25.7	4.5
Night time bottle/breast feeding can cause tooth decay	36.4	56.2	7.4
Frequent and prolonged breast/bottle feeding can cause tooth decay	43.0	45.1	11.9
A child's teeth should be brushed/cleaned	69.5	24.5	6.0
Effective cleaning of teeth brushing can be achieved by the child him/herself	30.2	62.1	7.7
Swallowing of toothpaste can be harmful to a child's teeth	42.1	27.7	30.2
It is important for a child to visit the dentist before 2 years old	44.7	33.6	21.7
Prolonged use of pacifier can affect the normal development of child's teeth	61.1	18.5	20.4

Table 3: Percentage distribution of responses regarding the practices of infant oral health-care

Questions	Always	Frequent	Sometimes	Never
Do you bite the food into small pieces before giving to the child?	28.9	6.0	18.5	46.6
How often do you give sweet food to the child (liquid/solid)?	19.6	12.1	62.1	6.2
When did you start semisolid food to child?	57.8	28.5	7.7	6.0
6 months (A)				
1 year (F)				
11/2 years (S)				
2 years (N)				
How often do you supervise your child's tooth brushing?	52.6	13.8	28.7	4.9
How much toothpaste do you use to brush a child's teeth?	34.3	24.3	29.1	12.3
Smear (A)				
Pea size (F)				
Full brush length (S)				
Not at all (N)				
Do you use pacifier dipped into sweet liquid for the child?	18.1	13.4	24.7	43.8
What do you do to relieve pain of teething problems?	13.8	21.5	36.8	27.9
Allow child to bite on a chilled object (A)				
Apply topical analgesics to rub gums (F)				
Use systemic analgesics (S)				
Allow bottle feeding at night (N)				
Do you take effort to improve your dental health knowledge?	40.9	16.5	30.5	12.1

Table 4: Assessment and comparison of mean knowledge, attitude, and practices scores according to the age of the parents

Variables	Age (in years)	*N*	Mean	Standard deviation	Standard error	*P* value
Knowledge	20-24	160	21.10[a]	3.758	0.313	0.042*
	25-29	160	25.90[b]	3.939	0.296	
	30-34	129	21.02[a]	3.001	0.264	
	>35	21	20.00[a]	2.214	0.483	
	Total	470	25.96	3.973	0.165	
Attitude	20-24	160	14.46[a]	2.101	0.166	0.032*
	25-29	160	15.71[b]	2.630	0.176	
	30-34	129	14.02[a]	1.984	0.175	
	>35	21	15.67[a]	2.389	0.587	
	Total	470	14.75	2.157	0.099	
Practices	20-24	160	18.39[a]	1.449	0.224	0.013*
	25-29	160	20.09[b]	3.153	0.198	
	30-34	129	19.19[a]	2.502	0.278	
	>35	21	19.00[a]	2.839	0.316	
	Total	470	18.92	2.800	0.129	

Tests used: One-way ANOVA, *Post-hoc* Scheffe test; One way ANOVA: *Indicates statistically significant difference; *Post-hoc* Scheffe test: Groups with same letter superscripted are not statistically significant (*P*>0.05)

Table 5: Assessment and comparison of mean knowledge, attitude, and practices scores according to the sex of the parents

Variables	Sex	*N*	Mean	Standard deviation	Standard error	*P* value
Knowledge	Male	177	20.85	2.991	0.173	0.000
	Females	293	21.45	4.275	0.327	
Attitude	Male	177	14.36	2.105	0.125	0.003
	Females	293	14.97	2.158	0.161	
Practices	Male	177	19.13	2.970	0.227	0.212
	Females	293	18.80	2.695	0.156	

Test used: Student's *t*-test

Table 6: Assessment and comparison of mean knowledge, attitude, and practices scores according to the SES of the parents

Variables	SES	*N*	Mean	Standard deviation	Standard error	*P* value
Knowledge	High	131	21.52[a]	4.168	0.364	0.001*
	Middle	281	21.03[b,c]	3.375	0.326	
	Low	58	19.38[c]	2.484	0.201	
	Total	470	20.96	3.573	0.165	
Attitude	High	131	15.01[a]	2.297	0.307	0.004*
	Middle	281	14.44[b,c]	2.341	0.141	
	Low	58	14.17[c]	1.618	0.137	
	Total	470	14.75	2.157	0.099	
Practices	High	131	19.30[a]	2.909	0.255	0.002*
	Middle	281	19.24[bc]	2.844	0.248	
	Low	58	18.68[c]	1.940	0.171	
	Total	470	18.92	2.800	0.129	

SES: Socio-economic status; Tests used: One-way ANOVA, *Post-hoc* Scheffe test; One-way ANOVA: *Indicates statistically significant difference; *Post-hoc* Scheffe test: Groups with same letter superscripted are not statistically significant (*P*>0.05)

A total of 470 parents were surveyed among, which majority of them were females 299 (62.4%). This is not surprising since in this community, mothers are the parents commonly in contact with children in this age group. American Academy of Pediatric Dentistry recommends that the child should be seen by a dentist within 6 months of eruption of the first primary tooth and no later than 12 months of age.[1] Traditionally, the

developmental age for initial dental visit was thought to be 3 years. The rationale for this was children are more manageable at this age and treatment will be more efficient. Early interventions are needed to educate parents on oral hygiene, prevention of dental injuries and ECC.[9] Hence at age one, dental visit is recommended.

The concept of dental caries as an infectious and transmittable disease was demonstrated by Keyes (1960).[10] Majority of the parents in the present study had good knowledge regarding the role of diet in oral health; they believed that sweet snacks contribute to caries.

An important aspect of oral hygiene practices is brushing. In the present study, a major proportion of the parents (58.7%) believed that their child's mouth should not be cleaned before the primary teeth erupts, which was lower in comparison to the findings obtained by Shivaprakash *et al*. (70%).[4] Similar findings were observed in the study by Suresh *et al*.,[6] where most of the parents felt that they should brush their child's teeth when all the primary teeth have erupted.

In accordance with most of the studies, the present study showed that desire to bite; gum irritation and increased salivation were correctly attributed to teething by most of the parents.[11-15] However, majority of the parents have also attributed signs and symptoms such as fever (70%), diarrhea (87%), runny nose (32%), vomiting (37.8%), and ear problems (23.8%) incorrectly. The proportion of parents (70%) who believed that fever was associated with teething was in accordance with the study conducted by Wake *et al*.,[14] (70-85%). The findings of the present study were higher when compared to study conducted by Feldens *et al*.,[16] (38.9%), but were lower when compared to study by Owais *et al*.,[12] (84.9%).

In agreement with the findings of the previous studies by Shivaprakash *et al*.,[4] and Suresh *et al*.,[6] a consistent weak knowledge regarding the role of fluoride in caries prevention was observed among the parents in our study.

Vertical transmission of *Mutans Streptococci* (MS) from mother to infant is well- documented.[17] The higher the levels of maternal salivary MS, the greater the risk of the infant being colonized.[18] Along with salivary levels of MS, mother's oral hygiene, periodontal disease, snack frequency, and socio-economic status also are associated with infant colonization.[19]

Almost 41% of the parents agreed that tooth decay is caused by bacteria transmitted by sharing feeding utensils. This percentage was lower (55%) in comparison to the findings of Shivaprakash *et al*.,[4] and higher (27.2%) to the findings by Suresh *et al*.,[6] the findings were also in accordance with a study by Sakai *et al*.,[20] where most interviewed adults reported the habit of blowing and tasting food, sharing utensils, and kissing the children on their mouth.

In accordance to the results of a previous study by Rwakatema and Ng'ang'a[5] present study results also showed that 52% of the parents disagreed on night time bottle/breast feeding as a cause of tooth decay because of the unawareness of detrimental oral habits that can cause oral diseases.

Parents in the age group of 25-29 years presented a better KAP score, which was in contrast to the results obtained by Williams *et al*.,[21] in which age group of parent was not significant for either dental knowledge or dental attitude.

A significant association was observed in this study between outcome and socio-economic status. Studies by Suresh *et al*.,[6] and Williams *et al*.,[21] have also shown that parents with lower education had poor dental knowledge and attitude level. It is possible that parents with higher education level are more likely to have positive health attitudes and render greater attention to the health of the child.

Conditions established in pre-school years provide a foundation for oral health and patterns for use of dental services later and in adulthood. Parents, especially mothers, need to realize that they are role models for their children and to be encouraged to improve the child's dental health habit.

The results of this study cannot be extrapolated as the sample size was small and the study was localized to one particular hospital. Hence, studies exploring the same issue need to be conducted on larger samples covering different populations so as to evaluate, which strategies will be effective and efficient in bringing about a behavior change in parents regarding IOH care.

CONCLUSION

Parent's knowledge on IOH care was inadequate. Health professionals, who are the first to come into contact with expectant and new mothers, need to disseminate appropriate and accurate information

about oral health-care for infants, especially the use of nursing bottle at night, the value of tooth brushing, and regular dental visits. A matter of high priority is the development and implementation of wide-scale, long-term programs of health education, and promotion for expectant new mothers.

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